DOE–LM/1554–2007

2007 Annual Inspection of the Monticello Mill Tailings (USDOE) and Monticello Radioactively Contaminated Properties Sites

December 2007

U.S. Department of Energy

Office of Legacy Management

Work Performed Under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
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for the U.S. Department of Energy, Grand Junction, Colorado

Contents

Figures

Appendix

1.0 Introduction

This report presents the findings of the annual inspection of the U.S. Department of Energy (DOE) Monticello Mill Tailings Site (MMTS) and the Monticello Vicinity Properties (MVP), Monticello, Utah, conducted September 18−20, 2007. DOE inspects these sites annually to ensure that the selected remedies remain protective of human health and the environment. Under those remedies, contamination remains in place at some locations that prevent unrestricted use and unlimited exposure. Annual inspections (1) verify that DOE long-term surveillance and maintenance (LTSM) activities implemented throughout the year are effective and appropriate, (2) confirm that the institutional controls that restrict land and water use under the MMTS and MVP remedies remain effective, and (3) identify deficiencies and recommend corrective actions as needed.

1.1 Background Information

Intermittently between the early 1940s and 1960, uranium and vanadium ore was processed by various operators at the mill and ore buying station in Monticello, Utah. The former millsite is located in the valley of Montezuma Creek immediately south of town. Low-level radioactive mill tailings, the sand-like byproduct of ore milling, were impounded at four locations at the millsite. Over time, some tailings were dispersed to nearby properties by wind and water or were used for construction in Monticello. Drainage of liquids from the impounded tailings caused contamination of groundwater in the underlying shallow alluvial aquifer. Approximately 2.5 million cubic yards of tailings and contaminated soil remained on the millsite after milling ceased.

The MVP were placed on the National Priorities List (NPL) to address the mill-related contamination on properties within the residential and commercial sections of Monticello. The MMTS was placed on the NPL in 1989 to address contamination on the former millsite and adjacent properties, and on properties downstream of the millsite along Montezuma Creek. The location of the Monticello NPL sites is shown in Figure 1. DOE, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as implemented through a Federal Facilities Agreement (FFA), completed remediation of soil contamination at the MMTS and MVP in August 1999. In some locations, radiologically contaminated material was left in place in compliance with supplemental standards as codified at Title 40 *Code of Federal Regulations* Part 192.21. These locations are commonly referred to as supplemental standards properties and occur on City and private property and beneath some street and utility corridors in Monticello. Supplemental standards properties are identified in Figure 2.

All radiologically contaminated material removed during MMTS and MVP remedial actions was placed in an engineered disposal cell located on DOE property about 1 mile south of the former mill area. The disposal cell was closed in October 1999. The disposal cell and associated support facilities indicated in Figure 3 are known collectively as the repository site. In 2000, through the National Park Service “Land-to-Parks” Program, DOE transferred approximately 380 acres of property, including the former mill area and several adjacent parcels, to the city of Monticello with specific re-use conditions and restrictions. The transferred properties and associated land and water use restrictions are identified in Figure 4. The millsite property was restored by the City as a public park as required under the transfer agreement. Features of the restored millsite and the surrounding land are shown in Figure 5.

In addition to the transferred properties, land use restrictions apply to the privately owned supplemental standards properties located primarily in the floodplain of Montezuma Creek downstream of the former mill area. These areas are identified as the "Montezuma Creek Restrictive Easement Area" in Figure 2. Deeds for the affected properties have been annotated to indicate that soil and sediment removal from the restricted area is not permitted. A further restriction imposed on the City and owners of property in the Montezuma Creek valley is that domestic use of contaminated groundwater is prohibited. This restriction is an institutional control that was implemented through the State Engineer's Office to designate the Monticello Groundwater Restricted Area (GWRA) (see Figure 2 for location). In the restricted area, domestic-use wells in the alluvial aquifer and improperly designed wells in deeper formations are disallowed through the Utah water-well permitting process.

1.2 Long-Term Maintenance and Surveillance

Long-term stewardship of the Monticello NPL sites began under the DOE Long-Term Surveillance and Maintenance Program, October 1, 2001, and continues under the DOE Office of Legacy Management (LM) as of December 2003. DOE implements routine surveillance and maintenance of the Monticello sites, with oversight by the U.S. Environmental Protection Agency (EPA) Region VIII and the Utah Department of Environmental Quality, to ensure that the selected remedies continue to be protective of human health and the environment. The primary LTSM components at the Monticello sites are:

- Routine inspection, operation, and maintenance of the on-site permanent disposal cell and leachate management system.
- Routine inspection of all properties affected by land and water use controls to ensure compliance with the controls.
- Monitoring and management of radiologically contaminated soil encountered at City and Utah Department of Transportation (UDOT) excavations in Monticello.
- Monitoring of groundwater and surface water quality and annual evaluation and reporting of the water quality restoration.
- Annual site inspections.
- CERCLA 5-year reviews (begun in 1997) to monitor and document the protectiveness of the MMTS and MVP remedies.

Routine LTSM activities are conducted in accordance with the procedures provided in *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites*, Rev. 0, June 2007 (DOE−LM/1465−2007). Two DOE-LM contractor staff stationed at the DOE-LM field office in Monticello are responsible for implementing the routine on-site LTSM activities in accordance with the LTSM Plan.

1.3 Annual Site Inspection Scope

Annual site inspections of the MMTS and MVP focus on the general topics identified under the following headings. Each topic is further itemized on inspection checklists that are provided to inspection team members. Copies of the blank inspection checklists are available as Appendix K in the *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites*, Rev. 0, June 2007.

1.3.1 DOE Repository

The repository is inspected for:

- Integrity of constructed features and support facilities (fences, drainage channels, roads).
- Groundskeeping.
- Integrity of the disposal cell cover and health of the plant community.
- Management/operation of the disposal cell leachate collection system and Pond 4.
- Management/operation of the temporary storage facility (TSF) where radiologically contaminated material transferred from supplemental standards properties is impounded until eventual off-site disposal.

1.3.2 City and Private Properties

City and private properties where supplemental standards and/or institutional controls apply are inspected for:

- Evidence of prohibited soil removal.
- Evidence of severe erosion and soil movement.
- Evidence of prohibited overnight camping on all City-owned property transferred from DOE.
- Evidence of prohibited groundwater use (also confirmed through contact with State Engineer).
- Evidence of habitable structures constructed in restricted areas.
- Compliance with the special zoning ordinances affecting City property MP–00211 and private property MS–00176.
- Ecological health of riparian habitat along Montezuma Creek and the constructed wetlands (Wetlands 1, 2, and 3) on the former millsite.
- Evidence of severe erosion on the millsite and condition of drainage controls on the millsite and adjoining properties.

1.3.3 City Streets and Utility Corridors

DOE manages radiologically contaminated material encountered in City and UDOT excavations in Monticello through ultimate off-site disposal. Annual inspections confirm that current excavations are appropriately monitored and managed by the on-site LM staff. The Highway 191 embankment at Montezuma Creek (a UDOT-owned supplemental standards property) is inspected for evidence of severe erosion and movement of radiologically contaminated soil.

1.3.4 Record Keeping and Administrative Review

Record keeping by the on-site LM staff is reviewed for proper documentation of day-to-day activities. This includes accurate and complete entries in the on-site record books (Repository Site Record Book, TSF Record Book, City-owned Properties Record Book, and Private Property Restricted Areas Record Book), and on the radiological “as-built” maps (detailed property maps maintained on site to identify the locations and results of radiological monitoring by the on-site

LM staff). The inspection also confirms that (1) deed annotations applicable to the supplemental standards properties are accurately filed at the County Courthouse, (2) the on-site information repository is complete and current, (3) the current LTSM plan and safety manual are available on site for LM staff, and (4) City maintenance workers are appropriately trained in radiological health and safety.

2.0 2007 Annual Site Inspection Participants and Schedule

The physical site inspection for fiscal year 2007 was conducted on September 19 and 20, 2007, by the following participants:

Jalena Maestas	U.S. Department of Energy, Monticello Site Manager.
Paul Mushovic	U.S. Environmental Protection Agency, Remedial Project Manager.
Christina Wilson	U.S. Environmental Protection Agency.
Chad Gilgen	Utah Department of Environmental Quality, Monticello Site Manager.
Timothy Bartlett	S.M. Stoller, Monticello Site Manager and Project Hydrogeologist.
Linda Sheader	Battelle Memorial Institute, Plant Ecologist and curator of Monticello Information Repository.
Joe Slade	S.M. Stoller on-site representative.
Todd Moon	S.M. Stoller on-site representative.

The following City officials attended a portion of the inspection at the invitation of DOE:

Trent Schafer	Manager, City of Monticello.
Doug Allen	Mayor, City of Monticello.
Craig Leavitt	Maintenance employee, City of Monticello.

Joe Desormeau (DOE) was on site Wednesday for a safety inspection of the DOE-LM field office. The safety inspection was not related to the annual site inspection.

2.1 Schedule

Wednesday Morning, September 19, 2007
Convened at the Monticello field office and discussed landowner concerns and operation of the repository leachate management system with on-site staff. Distributed inspection checklists and organized into two groups: Bartlett and Gilgen inspected the perimeter of the repository; Maestas, Wilson, Mushovic, and Sheader inspected the repository cover, TSF and Pond 4 (with on-site staff), and repository drainage controls; Sheader conducted the administrative and records inspection.

Wednesday Afternoon, September 19, 2007
DOE, EPA, and J. Slade inspected property MS−00176 (private-owned supplemental standards property affected by special zoning ordinance). Bartlett and Gilgen inspected MP−00211 (City-owned property affected by special zoning ordinance). Sheader inspected repository site trenches, transects, and settlement plates.

Bartlett, Gilgen, Allen, and Schafer then inspected the run-on control ditches and drains along the north margin of the millsite while EPA, DOE, and Leavitt inspected the drainage control along the east side of Highway 191. The two teams and City officials then met at the end of South 200 East Street for brief discussion. Schafer and Allen present for about 1 hour.

Mushovic and Leavitt then inspected the south side of the millsite and properties MP−00391, MP−01040 North Portion, and property MP−01077. Leavitt departed at about 3:30 p.m. Bartlett, Maestas, Wilson, Gilgen, and Sheader inspected the former haul road (property MP−01077 Phase I) and properties MP−01042, and MP−01041.

Teams convened at the field office for a summary meeting, and departed the site at about 5:00 p.m.

Thursday Morning, September 20, 2007
Convened at the DOE field office to review LTSM record books and radiological as-built drawings (Sheader had inspected the record books, the on-site Information Repository, and Courthouse records for deed restrictions on Tuesday and Wednesday, September 18 and 19, 2007).

Discussed planned UDOT Highways 191 and 491 reconstruction project and current resurfacing project with on-site representatives. Teams then observed external and internal conditions of Manhole 3 with T. Moon.

Bartlett, Gilgen, and Wilson inspected the GWRA and the Montezuma Creek supplemental standards area. Moon, Mushovic, and Maestas inspected City streets and utilities excavations in progress. Sheader inspected inactive wells on property MP-00179.

Both teams then returned to the field office to discuss findings and consolidate field notes and observations. The field inspection concluded at about 11:30 a.m. and all participants departed the site.

3.0 2007 Site Inspection Results

3.1 Repository Inspection

The repository is on DOE-owned property located approximately one mile south of Monticello, Utah, on U.S. Highway 191. The repository site includes the permanent disposal cell and vegetated cover, the disposal cell leachate management system (including Pond 4), the TSF, the LM field office, and fences, gates, signs, and site markers.

3.1.1 Repository Perimeter

A conventional barbed wire stock fence marks the repository site boundary and discourages human trespass and livestock entry (“perimeter fence”). Forty numbered signs at surveyed locations are fixed to the fence or to separate posts as reference points. There are several gates in the perimeter fence. The site entrance gate is locked at night.

Perimeter Fence
No section of the fence or gate requires repair.

Location Reference Signs
All location reference signs are present and legible.

Boundary Markers
All six boundary markers are present. These are physical land-survey control points along the south and east sides of the repository boundary.

Erosion/Gullies
A gully between signs E and P1 is undermining several fence posts. Relocating the affected posts or repairing the gully may be required if the posts become completely undermined. The gully is formed by storm runoff from Highway 191 that is channeled along the right-of-way to North Draw.

A small ravine at sign P27 is undermining some fence posts. This is a natural ravine that does not receive runoff from the engineered drainage controls built on the repository. The ravine likely seldom contains significant flowing water.

Action Item: On-site staff will monitor the fence sections at the noted gully and ravine during routine inspection and will repair collapsing sections of fence as needed.

Vegetation
Vegetation between the inner and perimeter fences is healthy and comprised of both native and adapted introduced species. On-site staff will remove accumulated tumbleweeds at the northeast corner of the fence (at sign P18).

3.1.2 Repository Cover

An 8-foot-high chain link fence ("inner fence") surrounds the disposal cell portion of the repository site. A double gate at the west end is for vehicle access to the disposal cell from the field office/support area. A double gate at the east end is for access to Pond 4. Vehicle gates are locked except when the repository is occupied. Five gates are installed in the fence to allow ingress and egress of wildlife and LM personnel.

Engineered drainage controls that collect and direct runoff from the vegetated cover of the disposal cell are referred to as the West Drain Ditch, South Drain Ditch, East Toe Trench, and North Toe Trench. These features are rock lined and were constructed to prevent erosion of the disposal cell. Water collected in these drains is diverted to either of three collection basins (Sediment Ponds A, B, C). Each of these basins has a perforated standpipe placed in a sand and gravel base. Beneath the base, the standpipe is connected to a buried outfall pipe that runs through the berm and daylights in a natural drainage below the basin. Storm runoff that enters the basin is temporarily impounded where it subsequently evaporates, seeps into the soil, or flows to the outfall. Each pond has a rock-lined spillway to control possible overflow.

The cover of the disposal cell includes a vegetated area and a graveled upper road that provides access to Pond 4, the disposal cell manholes, and to other monitoring installations on or adjacent to the cover. The road outlines the location of the underlying tailings.

Inner Fence
All sections of the inner fence and gates are in working condition. There is no evidence of vandalism or damage. The wildlife gates were open to provide access to wildlife.

West Drain Ditch
The West Drain Ditch was lined with high-durability rock in July 2002 after deterioration of the original rock was noted in the 2001 inspection. That inspection also noted significant erosion in the steep part of the drain immediately north of the inner fence. The erosion was repaired and rock lining of the channel was extended to North Draw in September 2002. The West Drain Ditch is not in need of repair at present.

South Drain Ditch
Erosion rills, generally 2 inches wide and 2 inches deep, but up to 12 inches wide by 6 inches deep, are present on the north side of the South Drain Ditch. The rills have stabilized due to plant growth since 2004. These features do not require action other than continued monitoring.

East Toe Trench and North Toe Trench
These features are rock-filled trenches that were constructed to capture runoff and subsequently direct water away from the cover in the subsurface. Rock at the surface of both toe trenches is degrading, windblown sediment is accumulating at the surface, and vegetation is becoming established. Erosion or bypass of these trenches is not evident. High-durability rock is stockpiled at the site to overlay the trenches should erosion or bypass occur. The toe trenches are not presently in need of repair.

Sediment Pond Interiors
No water was observed in Sediment Pond A, B, or C. There was no evidence of water reaching the spillways, and each spillway was intact. Trash lids capping the standpipes were intact, and the standpipes remain in a vertical position. Sediment accumulation is minor. Pond interiors are absent of debris and noxious weeds.

Sediment Pond Berms
Previously noted minor gully erosion on the inside of the south berm of Sediment Pond A remains stable. Previously noted minor gully erosion on the inside of the south berm of Sediment Pond B remains stable. Berm repair is not needed at this time.

Sediment Pond Outlet Works
The outlets of each pond are not obstructed.

Sediment Pond Fencing
Sediment Pond B is located outside of the repository perimeter fence. The fence around Sediment Pond B does not require repair.

Sediment Pond C Inlet
The 2004 inspection noted that the drain at the inlet to Sediment Pond C was not effective in directing runoff to Sediment Pond C. DOE reconstructed the portion of this drain between the inner fence and Sediment Pond C in September 2005. The drainage is now effective in directing flow to Sediment Pond C.

Action Item: On-site staff will remove accumulated weeds from the inflow area of Sediment Pond C.

3.1.3 Disposal Cell Vegetated Cover

The disposal cell cover is inspected for plant health, animal burrowing, and evidence of structural instability.

Vegetation
Inspection of the vegetation confirmed that desired plants are well established in density and diversity. Apart from the annual site inspection, quantitative monitoring of cover vegetation has occurred since 2002 to compare plant density and diversity against established criteria. The latest vegetation monitoring (annual) was completed in October 2007. A report of those results will be submitted in December 2007. This year's monitoring results for Area A1 (the repository cover) and B (the soil-covered rock side slopes) were similar to 2006 results (see Figure 6 for vegetation zones). Total desirable cover, perennial grasses, and species composition generally met success criteria, but the cover of forbs and shrubs remained low. The density of shrubs in these areas was approximately 25 percent lower in 2007 than in 2006, probably the result of damage from the vole outbreak in 2005 and 2006. However, young sagebrush plants were observed on the cover during monitoring, and live planting of approximately 3,000 rabbitbrush seedlings in spare areas was accomplished in October 2007 after vegetation monitoring. Vole infestation decreased significantly in 2007.

Areas A2 (the side slopes with no rock cover) and A3 (the outlying areas) have been successfully revegetated. Area A3 met all success criteria, and Area A2 was slightly below success criteria values in only two areas (total vegetative cover and relative cover of forbs), both of which can reasonably be attributed to the impact of wildlife grazing in 2007.

Burrowing
Ground squirrels and burrows were observed in the rock-lined slopes on the north side of the repository. Rabbit burrows are not uncommon on the cover. Burrowing is not excessive at this time. One large burrow was determined to be abandoned and will be filled.

Stability
No area of the cover indicated settling, slumping, fracturing, seepage, or significant erosion.

The steepest sides of the repository are lined with rock (see Figure 3 or 5 for location of rock lined slopes). These slopes show no evidence of rock movement or degradation, settling, slumping, or erosion.

3.1.4 Miscellaneous Disposal Cell Features

Roads
The road on the disposal cell is in good condition. The road was graded and water bars were installed during the summer of 2005 to control storm water runoff. The road to Pond 4 is in good condition.

Raptor Perches
Six raptor perches were erected along the outer edge of the road in August 2007 to encourage predation on rodents. On-site staff report use of the perches by one or more pair of hawks.

Action Item: DOE will obtain location coordinates of the raptor perches for inclusion on subsequent maps of the repository.

Site Markers

Two granite site markers identify ownership, historic information, and content of the disposal cell. The markers are located immediately within the access gate to the disposal cell and near the top center of the disposal cell. Both markers are legible and undamaged.

Settlement Plates

Nine settlement plates, identified by the letters A through I, are located on the disposal cell. The outer protective casings (4-inch PVC pipe) are intact and undamaged. The survey plates within the protective casings are intact and undamaged. Data from elevation surveys of the settlement plates as of 2006 indicated no evidence of settlement. Beginning in July 2006, settlement plate elevations are surveyed every 5 years.

Manholes

There are five manholes within the repository boundary. Only Manholes 1 and 3 are routinely entered. Manholes 1 and 3 enclose equipment for the disposal cell leachate collection and detection system. LM Health and Safety personnel inspected manhole hazard identification and entry requirements in August 2007. All manhole warnings and entry procedures comply with the findings of that inspection.

On-site staff demonstrated that Manholes 1 and 3 surface components are in working condition. Manhole interiors are not entered during the annual inspection. The interior of Manhole 3, observed from above ground, was in good condition and free of unnecessary tools, equipment, or obstacles.

Action Item: The covers of the video ports (inspection ports MH 1 and MH 2, Figure 3) are presently not locked. On-site staff will secure the video ports with locks.

3.1.5 Repository Telemetry System and Leachate Production

The original monitoring equipment for the leachate management system was not fully functional until 2007 when the equipment was upgraded. The new equipment, comprising the repository "telemetry system," monitors water levels in the sumps, controls sump pump operation and monitors pumping rates, and relays the monitoring data to the DOE-LM Systems Operation at Remote Site (SOARS) system for data viewing, evaluation, and management. The telemetry data is routinely monitored by on-site staff and is provided to DOE, EPA, and the Utah Department of Environmental Quality (UDEQ) in quarterly FFA reports.

Annual inspection of the telemetry system is conducted through interview with on-site staff. During the 2007 inspection, the on-site staff indicated that all pumps, flow meters, pump controls, water level sensors, software, and communications devices were in working order. Access to the SOARS system by the Monticello Site Manager confirmed that the telemetry system was functional. The on-site staff reported that, with the exception of past testing when external water was added to the sumps, no water has been collected in the disposal cell leak detection system (LDS; the lower liner system). Currently, and over the past several years, approximately 1,800 gallons of water is pumped per week to Pond 4 from the disposal cell leachate detection and recovery system (LCRS; the upper liner system). This rate represents a decrease in leachate production from initial values of about 30,000 gallons per week. Leachate production rates are reported quarterly to DOE, EPA, and UDEQ.

3.1.6 Pond 4

Pond 4 is a lined solar evaporation pond that collects water pumped from the disposal cell leachate management system. Pond 4 is constructed with an LCRS and LDS. Both of these systems do not currently collect water. The Pond 4 LDS has never collected water. The Pond 4 LCRS has collected water infrequently in the past when the pond was used to store construction water or at times of increased precipitation. At those times the water level rose to a level above an apparent leak in the upper liner.

Pond 4 is surrounded by an 8-foot chain link security fence. Locked chain link gates are present at the northeast and southwest corners. Vehicle access to the pond is through a gate in the west side of the fence. The vehicle gate is locked except when personnel are working at Pond 4. Radiological contamination signs and a rope barrier delineate the crest of the pond within the security fence.

Access Road, Gate, Fence, Entrance and Perimeter Signs
The access road and the security fence are in good working condition. Warning signs (water hazard, contaminated water, no trespass, controlled area) on the perimeter fence are easily visible and legible. There was no evidence of vandalism or trespass.

Perimeter Berm
The rope barrier was in place and warning signs (contamination area) are visible and legible. There is no visible evidence of damage (burrowing, erosion, slumping) to the berm. Vegetation on the outslopes of the berm is well established.

Lifesaving Equipment
Water rescue equipment is stored in a weatherproof metal cabinet located on the berm near the northeast corner of Pond 4. The cabinet is highly visible, adequately labeled, and in good condition. The contents of the cabinet (throw buoys, rope, rope ladder, personal floatation devices) are easily accessible and are in good condition.

Pond 4 LCRS/LDS Control Cabinet
The cabinet is in good condition. The cabinet interior did not contain debris or evidence of water damage and had no insect or rodent infestation.

Liner and Liner Anchors
No holes or evidence of holes in the pond liner were observed. The original sandbag anchor system constructed to prevent billowing has since deteriorated. Installation of a replacement system using sand-filled, 3-inch-diameter polyethylene pipe was completed in 2007.

Pond Interior
The northeast corner of the pond contains several inches of water. Several inches of windblown silt and sand covers much of the pond floor. Tamarisk plants in these deposits were last eradicated in 2005. No tamarisk was observed in Pond 4 during the 2007 inspection.

3.1.7 Temporary Storage Facility (TSF)

The TSF is a restricted-access, gravel-surfaced area enclosed by 8-foot-high chain link fence. The fence is appropriately posted with access control signs. Within the enclosure is a three-sided

concrete bin with moveable cover for temporary storage of radiologically contaminated material from City and UDOT excavations in Monticello. The movable cover, constructed in 2003, is in good working order. At the time of the inspection the TSF bin was empty. Radiologically contaminated soil was last transferred from the TSF to the Grand Junction Disposal Site in spring 2007. The TSF is well maintained.

Other contents of the TSF are empty storage drums and secondary containment vessels for temporary storage of mixed or suspected mixed waste, and a small shed containing tarps and miscellaneous tools required for work in the TSF. Steel drums have been discarded and are being replaced with polyethylene drums.

3.2 City-Owned Properties Transferred from DOE

City-owned properties transferred from DOE in 2000 are inspected annually to confirm that the institutional controls of the land transfer remain effective, to document other site conditions that may potentially affect the protectiveness of the OU I and OU II remedies, and to confirm that areas of potential concern have been appropriately monitored for radiological contamination by on-site staff. The affected City-owned properties are: MP−00391−VL, MP−01077−VL, MP−01040−VL (north), MP−01041−VL, MP−01042−VL, MS−00893−OT, and MP−00181−OT. The location of these properties and institutional control information is shown in Figures 2 and 4.

Properties MS−00893−OT and MP−00181−OT comprise the area known as the former millsite. By cooperative agreement between DOE and the city of Monticello, following remediation by DOE, these properties were restored by the City as a public park in accordance with a restoration plan approved by EPA and UDEQ, with technical support by DOE.

Properties MP−00391−VL, MP−01077−VL, MP−01040−VL (north), MP−01041−VL, MP−01042−VL remain essentially as vacant land in a natural state. These properties are traversed by prominent drainage ravines leading to Montezuma Creek and are vegetated primarily in native grasses, pinyon and juniper, oakbrush, sagebrush, and rabbitbrush.

3.2.1 Supplemental Standards Properties

Supplemental standards for soil remediation have been applied to portions of properties MP−00391−VL, MP−01077−VL, MP–01041−VL (also known as “piñon/juniper” supplemental standards properties). An institutional control prohibits the removal of soil from these properties. DOE inspects these properties to confirm that supplemental standards material is not dispersed by human activity or natural processes into remediated areas. No evidence of soil removal by human activity or natural processes was noted on any of these properties during the 2007 inspection.

3.2.1.1 Boundary Fences

The supplemental standards areas are enclosed by four-strand wire fence. These fences were constructed to physically delineate the areas where supplemental standards were applied. The fencing is inspected for physical integrity.

Undercutting of several fence posts by runoff was observed near the mouth of Deer Draw. All remaining fencing that encloses the supplemental standards areas of these properties was intact during the 2007 inspection.

3.2.2 Construction of Habitable Structures

An institutional control prohibits construction of a habitable structure on properties MP−00391−VL, MP−01077−VL, MP−01040−VL (north), MP−01041−VL, MP−01042−VL, MS−00893−OT, and MP−00181−OT. No evidence of a habitable structure or construction activity was observed at these properties during the 2007 inspection or through the year.

3.2.3 Recreational Use

As a condition of the land transfer, the following properties are open to public day-use recreation: MP−00391−VL, MP−01077−VL, MP–01040−VL (north), MP−01041−VL, MP−01042−VL, MS−00893−OT, and MP−00181−OT. An institutional control prohibits overnight camping on these properties.

Public Access

"No Hunting" signs are posted at the entrance to property MP–01040−VL (north) from Highway 191 and on fencing along the west side of the supplemental standards area of property MP−00391−VL (MP−00391 Phase III). On-site staff indicated that these properties were annexed by the City in the past year and hunting is not allowed in City limits.

The entrance to the City Park (MS−00893−OT and MP−00181−OT) is at the northeast corner of property MS−00893−OT. The public access sign (required) at the entrance was noted as poorly maintained for easy visibility.

At the park entrance is a former support area for DOE remedial actions. Since the land was transferred, the City had used the area for stockpiling construction and maintenance materials. During the 2007 inspection, the City was clearing the area of this debris, fencing, and stockpiled material. This work was also in progress during the week of October 9, 2007, when the site was visited for OU III groundwater and surface water monitoring.

Day Use and Overnight Camping

No evidence of camping was observed on any property.

The City, with assistance from a local resident, is constructing a mountain bike/hiking path that crosses several of these properties.

In the City Park, footbridges across Montezuma Creek are in workable condition. Picnic tables have yet to be installed at designated locations. Walking paths are in fair condition.

3.2.4 Groundwater Use

An institutional control prohibits domestic use of groundwater from the shallow aquifer on City-owned properties MS−00893−OT, MP−00181−OT, and MP−01077−VL. No evidence of groundwater use or water-well drilling on these properties was observed during the 2007 inspection or through the year.

3.2.5 Wetlands and Riparian Habitat

Restoration of the former millsite included rechanneling Montezuma Creek, constructing three wetlands adjacent to the creek, and establishing wetland and riparian habitat in these areas. Use of the wetland and riparian areas is not restricted by an institutional control. Instead, by cooperative agreement, the City will not disturb these areas without prior approval from the appropriate State and Federal agencies. DOE was responsible for establishing the wetland habitat to meet EPA-specific vegetation criteria. These criteria have been met since 2004 as agreed upon by DOE, EPA, and UDEQ. Also by cooperative agreement, the City is not responsible for repairing damage to these areas by natural cause.

During the 2007 inspection, the creek channel and wetlands showed no evidence of damage by human activity or excessive alteration by natural cause. The wetlands and riparian zone are ecologically healthy. Willow growth is dense along the banks of Montezuma Creek, and cattails, rushes, and sedges are dominant plant species in the wetlands although some tamarisk (or salt cedar, a Utah and San Juan County-listed noxious weed) is present. Wildlife use of the wetlands and riparian zone is very common.

Open and free-flowing water is present in Wetland 1 and 2. Open water is not present in Wetland 3 (very dense cattails). Water in the wetlands reaches a depth of about 1 foot. During June 2005, a temporary rock dam and two 6-inch culverts through the dam were removed from Montezuma Creek just below Wetland 3. In September 2005, DOE removed a silt deposit that had accumulated behind the dam and restricted outflow from Wetland 3. These activities appear to have improved water flow through Wetland 3.

3.2.6 Erosion Control

By cooperative agreement, the City was to restore the non-creek channel areas of the former millsite to be erosionally stable. This condition was achieved by October 2005. In the 2007 inspection, all erosion control structures were observed to be intact and functional. No new areas of significant erosion, sedimentation, or instability were noted. Desirable plant species are well established in density and diversity and weed density has decreased significantly from previous years. Numerous young elm trees (volunteers) colonize the hillslope in the northwest area of the millsite.

The 2007 inspection noted several minor areas of potential concern for erosion, including:

- Sediment loading from the stockyard to the ditch along the north side of the millsite could cause failure of the ditch.
- Scouring and washout is occurring just above the road crossing the drainage from Steele's Pond to Montezuma Creek.
- Sediment loading in the ditch on the north side of the millsite road. This ditch channels water from seeps on the north side of the millsite to a collection box and culvert that runs under the road and outfalls to Wetland 2.
- Piled riprap in the drainage between Dam 2 and Montezuma Creek could result in scouring or bypass of the channel (first noted in 2006 inspection).

During site restoration, erosion controls were also constructed on properties adjacent to the millsite to minimize erosion on the millsite and to contain runoff and sediment from supplemental standards properties. These erosion controls are identified as the various dams, berms, drainages, and riprap-armored channels in Figure 5. With the exceptions listed below by property, these erosion controls were observed to be intact and functional during the 2007 inspection.

MP−00391−VL Phase I and II

- Sediment loading and a deer crossing at the ditch leading to Deer Draw from the east on the north boundary of property MP−00391 III could cause failure of the ditch (first noted in 2006 inspection).
- The mountain bike path may cause excessive erosion or damage to Dam 2.
- Head-ward erosion at the basin above Dam 2 could cause bypass of that structure (first noted in 2006 inspection).

MP−01077−VL Phase I

- The 2006 noted that a portion of the ditch along the northwest edge of MP−01077 Phase I (former haul road) had filled with sediment. This ditch is down slope of supplemental standards property MP−01077 Phase II. On-site staff had determined that the sediment was not radiologically contaminated. The City responded to land-owner concerns of potential damage to property MP−00179 by removing excess sediment from the ditch and improving the ditch in August 2007.

MP−01040 (north portion)−VL

- The northern portion of this property is the former borrow area for topsoil used in millsite restoration. Revegetation of this property by desirable species is well established.
- Erosion controls constructed on this property are runoff buffers to Deer Draw and the adjacent supplemental standards areas on property MP−00391−VL Phase III. Piping erosion is developing in the dirt road across the outfall culverts of "Deer Draw Dam" (Figure 5). This could lead to wash out of the dam, road, and culverts. During the 2007 inspection, all erosion controls were otherwise in good condition and effective.

3.3 City Property MP–00211–VL

Property MP−00211−VL is City property adjoining the northwest boundary of the former millsite. This property is not a supplemental standards property; however, in one area, uranium in soil exceeds the EPA Region III standard for residential use (uranium concentration ≥230 mg/kg). Monticello Zoning Ordinance 2003–2 designates this property to be within Overlay Zone OL–1. This prevents construction of a habitable structure where uranium exceeds this standard. The ordinance requires DOE to conduct a radiological survey of any proposed footprint of a habitable structure and to notify the City of the results. If uranium concentrations do not exceed the standard, and the radium-226 standard is also achieved, a building permit may be issued. City property MP–00211–VL was inspected for excavations or evidence of planned construction activities. No such evidence was noted during the 2007 inspection and confirmed in discussions with City officials.

3.4 City Streets and Utilities

Radiologically contaminated soil remains in some places beneath streets and utility corridors in Monticello, in the Highway 191 embankment over Montezuma Creek, and UDOT rights-of way along Highways 191 and 491. Supplemental standards have been applied to these areas. Through a cooperative agreement with the City, on-site staff monitors all City and UDOT excavations in Monticello for radiologically contaminated material. If encountered, the material is transported by the City to the TSF under direction of the on-site staff. On-site staff manually update maps of the streets and utility corridors as new radiological scanning results are obtained. The manually updated maps are updated electronically each year, typically during winter, at the DOE-LM office in Grand Junction, Colorado. The on-site LM representatives are then provided a copy of the updated maps.

During the 2007 inspection the radiological maps maintained on site were found to be current and acceptable in content. Throughout the course of the inspection, City streets were inspected at random for unmonitored or unplanned excavations; none were identified. The two excavations that were in progress were under the attention of the on-site staff for radiological monitoring and control.

3.4.1 Highways 191 and 491

All excavations of Highways 191 and 491 are monitored by on-site staff for radiologically contaminated material. UDOT has the option of returning any contaminated material to the excavation as backfill or having City workers, under the direction of on-site staff, haul the material to the TSF.

During the 2007 inspection, an inspector drove along Highway 491 from its intersection with Highway 191 eastward for 1.8 miles. This section of the highway comprises the length of Highway 491 having supplemental standards. There was no evidence of current or recent excavations. The inspector also drove along Highway 191 from mile marker 71 to mile marker 73. This is the section of Highway 191 having supplemental standards. There was no evidence of current or recent excavations. There was unmonitored erosion of the highway embankment at Montezuma Creek.

Highways 191 and 491 were resurfaced with a veneer of asphalt in summer 2007. No excavation was required for this work. UDOT plans to implement a major resurfacing of the highways in several years. That work will likely be accompanied by significant excavation as the City replaces water and sewer lines. This may require additional DOE support to that currently provided by on-site staff to plan and manage radiologically contaminated soil encountered in this project.

3.5 Private Property MS–00176–VL

Monticello Zoning Ordinance 2002–4 designated this property to be within Overlay Zone OL–1. This requires a special building permit based on radiological scanning results before construction of a habitable structure. The property deed has been annotated to this effect. This property is inspected for evidence of erosion, soil removal, and construction of habitable structures. There was no evidence of these conditions during the 2007 inspection.

A portion of this property was reported by on-site staff to have been sold in 2006. The portion that was sold does not have supplemental standards areas. The land use restriction annotated to the deed was not removed by the new owner.

3.6 Montezuma Creek Restrictive Easement Properties

MMTS privately owned properties where supplemental standards have been applied are identified as MP−00951−VL, MP−00990−CS, MP−01084−VL, MG−01026−VL, MG−01027−VL, MG−01029−VL, MG−01030−VL, and MG−01033−VL. These properties are also known as the "OU II Soil and Sediment Properties." Portions of these properties, typically within the narrow floodplain of Montezuma Creek, are supplemental standards areas. Restrictive easements are in place to prohibit soil removal from or construction of habitable structures within the supplemental standards areas. The soil and sediment properties are inspected for evidence of erosion, soil removal, and construction of habitable structures.

There was no evidence of significant erosion or soil removal from the restricted areas of these properties during the 2007 inspection. Since the 2005 inspection, a new residence was constructed on property MP–00990–CS (L. Adams, landowner). The residence is not within the supplemental standards area but is within the GWRA (see below). In spring 2006, on-site staff assisted Mr. Adams in delineating the restricted area of this property. Mr. Adams desired to cultivate a portion of the property that is in the restricted area. Cultivation is permitted in the restricted area so long as the soil is not moved outside of the area. Construction of the residence and current cultivation practices by Mr. Adams are compliant with the land use restriction.

Property MP−00951−VL is currently owned by Mr. Brian Bowring. On-site staff reported that the land is for sale. On-site staff will stay informed of any ownership or land use change.

3.7 Groundwater Restricted Area

Domestic use of groundwater from the alluvial aquifer is prohibited within the designated GWRA. The GWRA is an institutional control for OU III that is administered by the State Engineer's Office. The GWRA is inspected during the annual inspection to confirm that no new water wells for domestic use have been installed into the alluvial aquifer. On-site staff inspect the GWRA in April each year and have a general awareness of land use activities on these properties. In the past year there has been no well drilling activity in or near the GWRA. This was confirmed on September 13, 2007, by Mark Stilson of the State Engineer's Office who indicated to T. Bartlett that there were no applications filed in the past year for water wells in or near the Monticello GWRA.

3.8 Operable Unit III

Water Quality Monitoring

Operable Unit III water quality is monitored at an established network of groundwater monitoring wells and surface water monitoring sites. Active wells are inspected while sampled or while water level is measured in April and October of each year. All wells that are not actively monitored were inspected during the 2007 inspection. All wells are in good condition and are adequately labeled except that several wells at the PRB have cracked concrete pads or are missing cover bolts. The cover does not fit on two wells because the PVC riser is too high. Well

TW–06 remains buried under excavation spoils. Each surface water-monitoring site is identified by a stamped metal tag fixed to a steel tee-post near the point of sample collection. All surface water site markers were located and legible during the 2007 inspection.

Permeable Reactive Barrier (PRB) and Auxiliary Treatment System

The PRB and treatment cell comprise a groundwater treatment system on private property (MP−01079−VL) east of the former millsite. These features are inspected each year to ensure that land use (ranching) is not adversely impacted. The area is inspected for evidence of saturated soil at the PRB and infiltration trench, crop damage, and damage to surface components of the treatment system (vaults, telecommunications antenna, electrical panel, fence enclosure). The condition of the area was acceptable during the 2007 inspection.

3.9 Administrative and Records Inspection

The records inspection was completed by L. Sheader on September 18, 2007. The following categories of documents/records were inspected for completeness and accuracy of information recorded by on-site staff:

- Radiological as-built drawings.
- Site record books (Repository Record Book, TSF Record Book, City-owned Properties Record Book, Private Property Restricted Areas Record Book).
- Surveillance Checklists (routine inspection checklists completed by on-site staff).

The following categories of documents/records were inspected to ensure that pertinent information for implementing LTSM activities is readily available to on-site staff and/or the general public:

- LTSM Plan.
- LM Health and Safety Manual.
- Administrative Record and Information Repository.
- LTSM Training Records.

The following records were inspected to ensure that administrative controls remain in effect with the City and County:

- Deed restrictions (verified with San Juan County recorder).
- Zoning overlay OL-1.

No deficiencies were noted by the records inspector (L. Sheader) in any of the above administrative categories. L. Sheader was not able to verify that zoning overlay OL-1 remained in effect; however, T. Bartlett was able to verify with the City Manager that the ordinance remained in effect. This occurred during the inspection of the millsite and property MP−00211−VL on September 19, 2007.

4.0 DOE Action Items

- On-site staff will secure the video ports with locks.
- On-site staff will conduct radiological scanning of eroded soil on property MP−00181−OT near the embankment of Highway 191.
- On-site staff will conduct radiological scanning on the bike path from the top of the hill on property MP−01077−VL Phase II to the old haul road on property MP−01077−VL Phase I.
- On-site staff will clear the accumulated weeds at the inlet of Sediment Pond C.
- New drums will be placed in the TSF to replace the recently discarded steel drums.
- Location coordinates will be obtained for the raptor perches and cover-study test pits installed (and backfilled) in July 2007.

These action items will be addressed in the following months. Completion of these items will be documented in the corresponding FFA quarterly report to EPA and UDEQ.

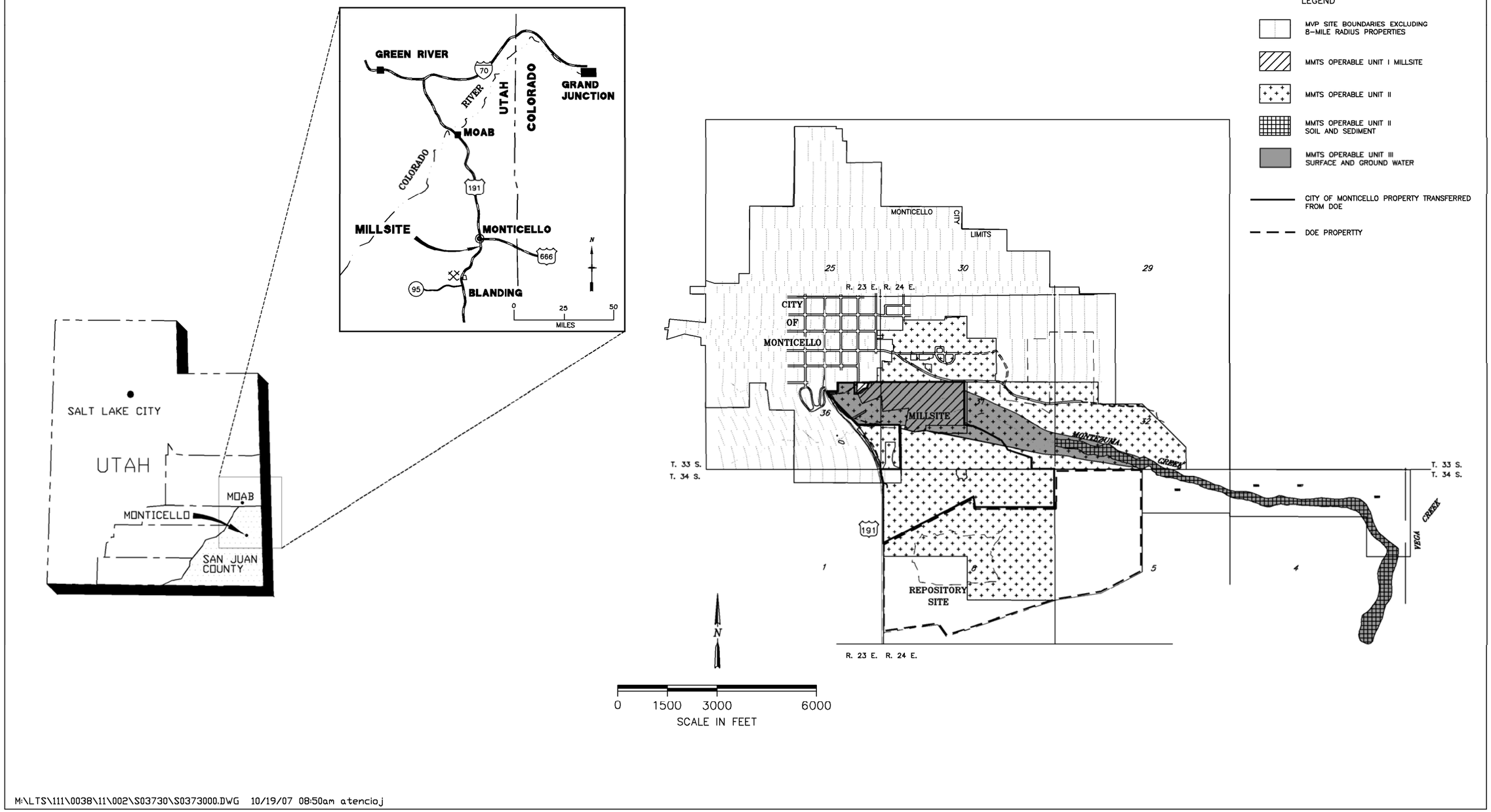

Figure 1. Location and Features of Monticello MMTS and MVP Sites

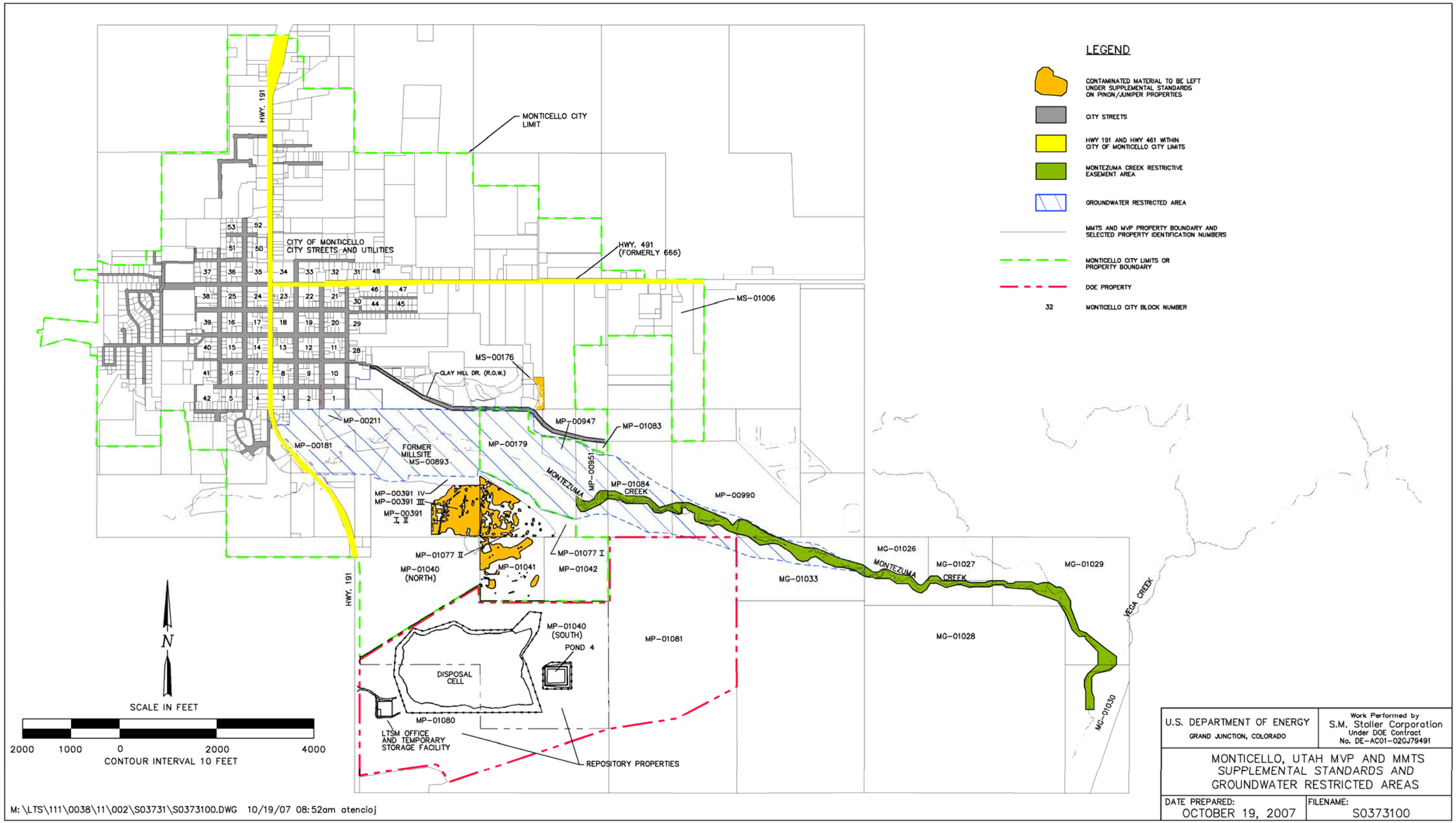

Figure 2. MMTS and MVP Supplemental Standards and Groundwater Restricted Areas

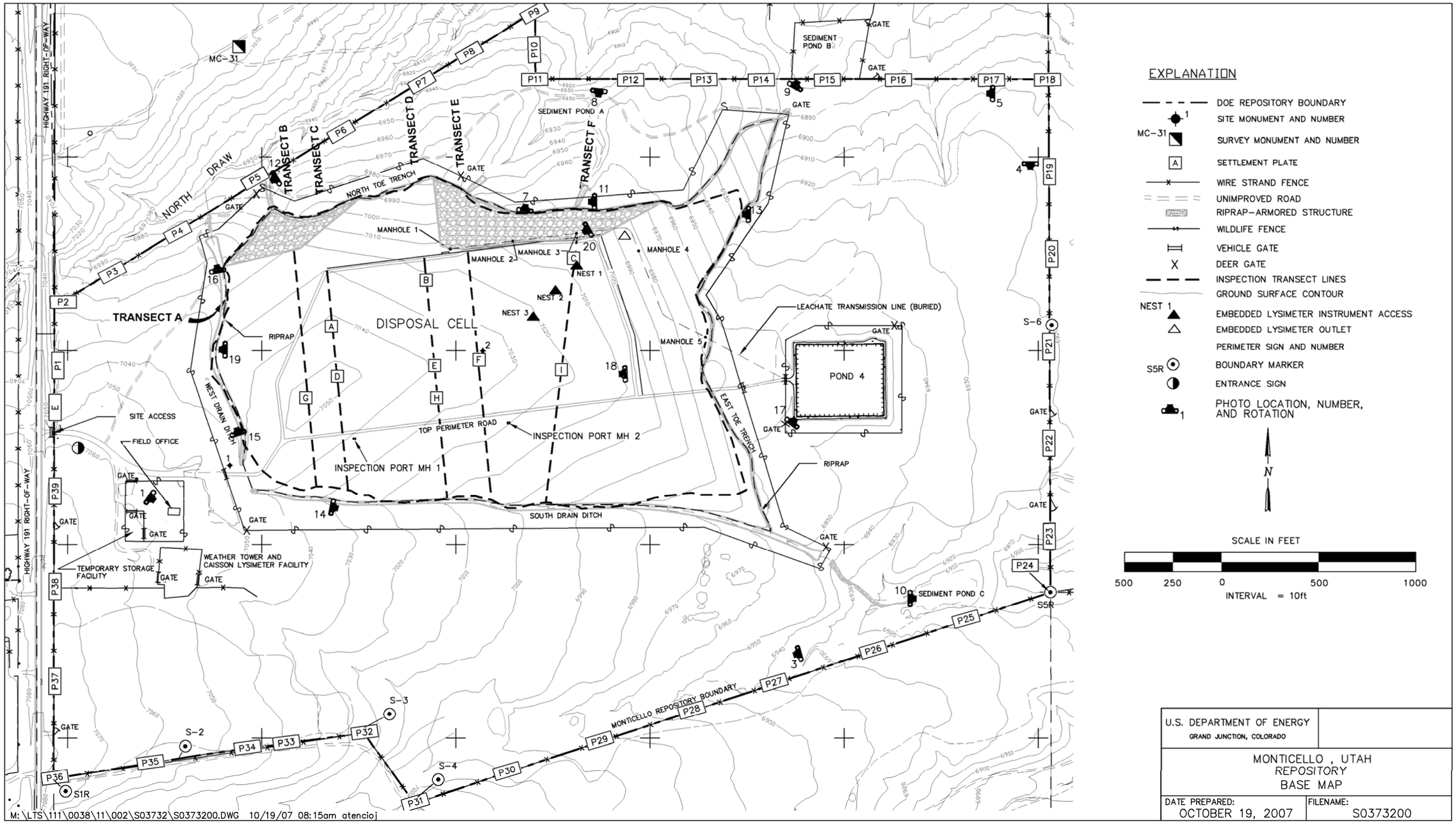

Figure 3. Monticello, Utah, Repository Base Map

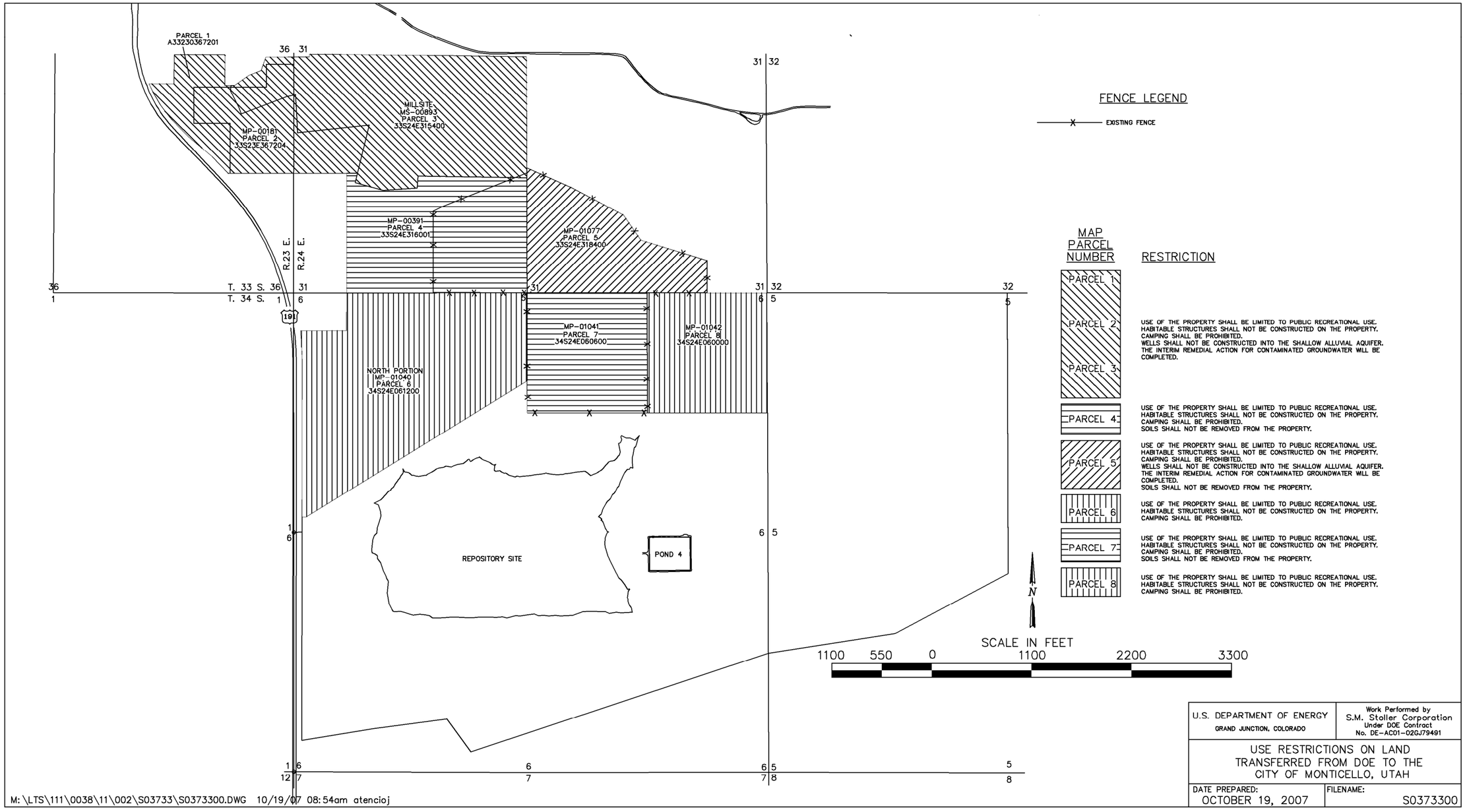

Figure 4. Use Restrictions on Land Transferred from DOE to the City of Monticello, Utah

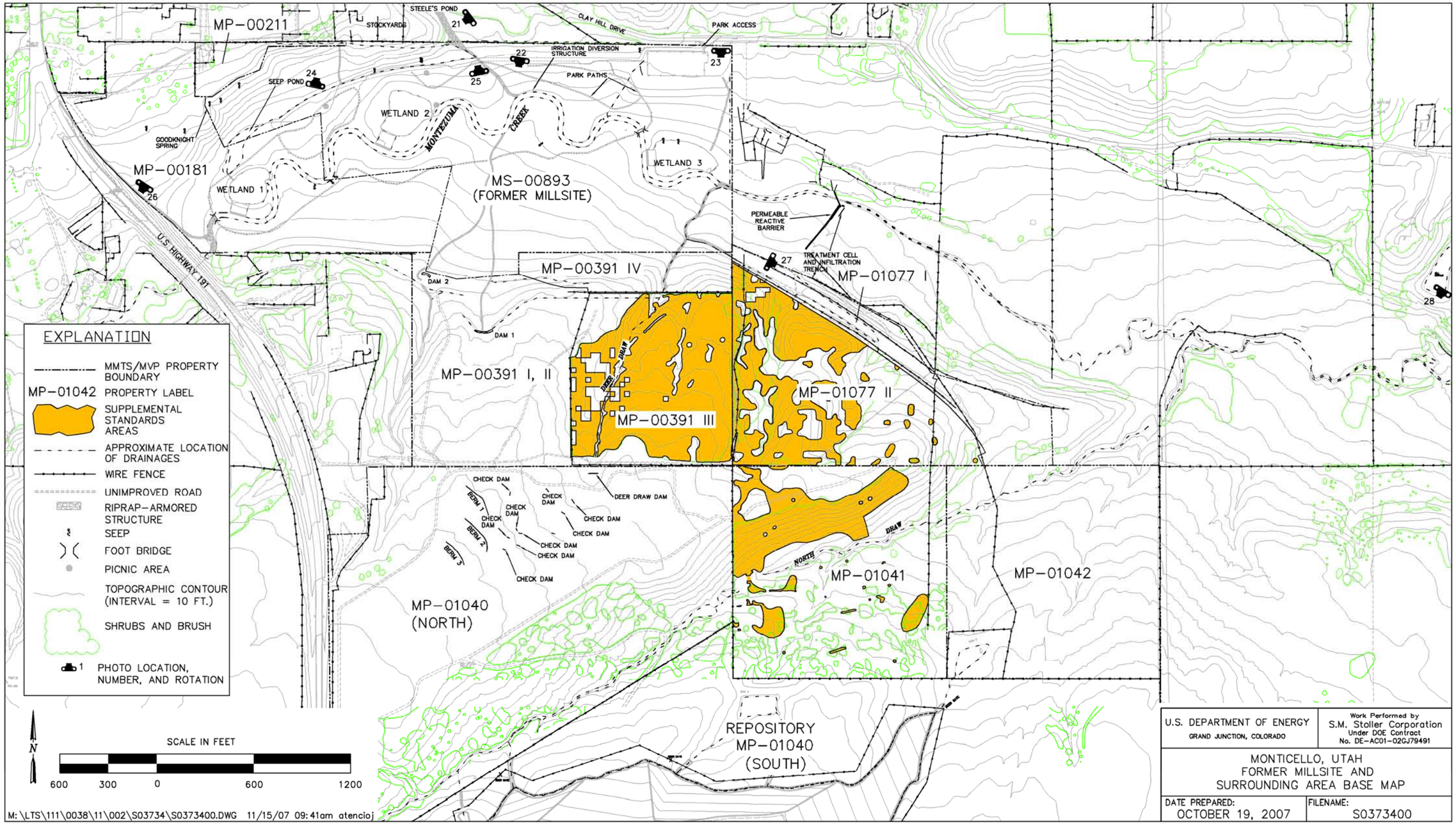

Figure 5. Monticello, Utah, Former Millsite and Surrounding Area Base Map

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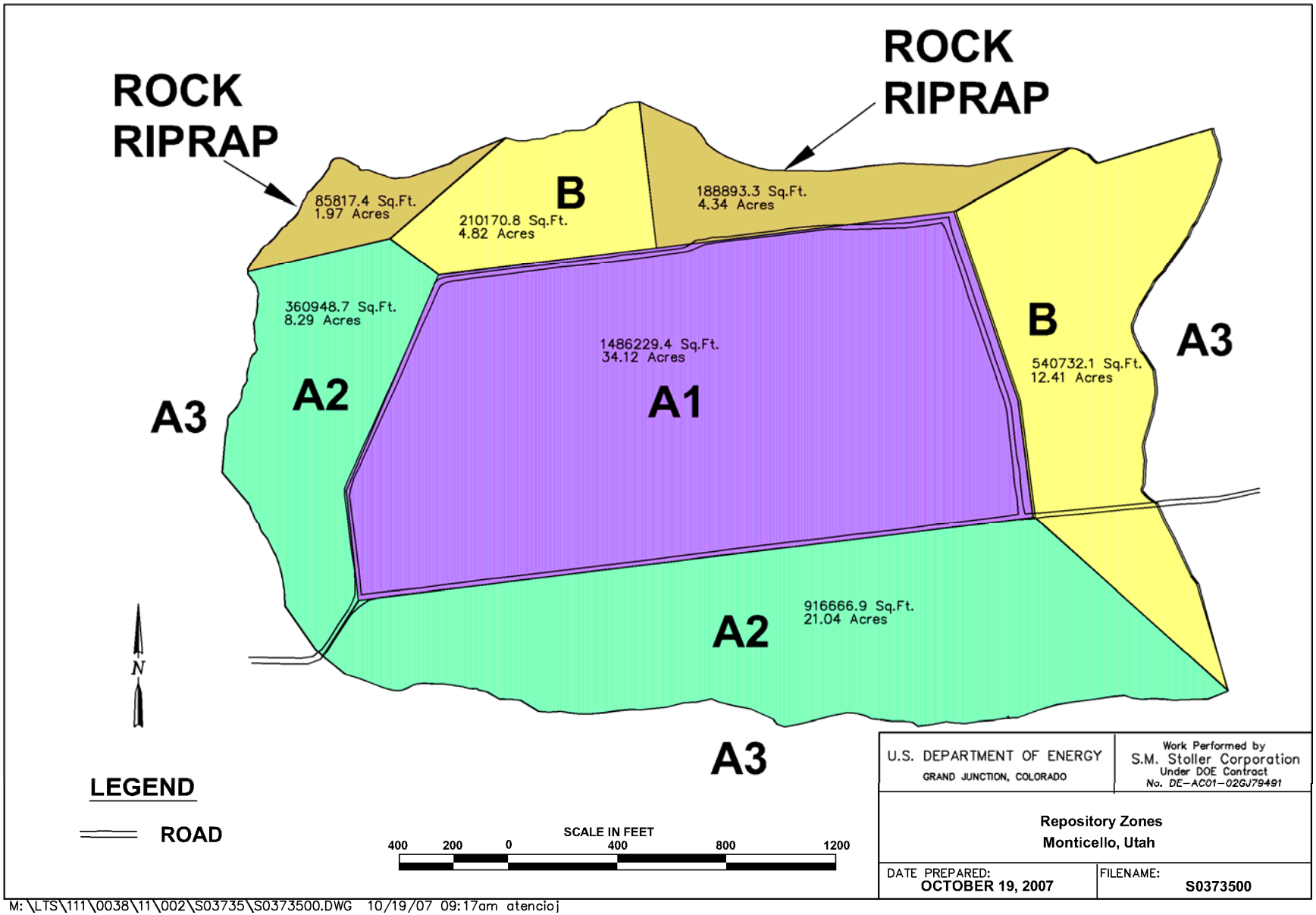

Figure 6. Repository Vegetation Zones

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Appendix A

2007 Annual Inspection Photographs

Photographs were taken during the 2007 annual inspection to document general site conditions and to show some of the areas of potential concern. The location and orientation of the photographs listed below are identified in Figures 3 and 5.

1. DOE-LM Monticello field office.
2. On-site TSF (behind fence). Covered bin toward back of photo.
3. Perimeter fence crossing ravine along south boundary of repository site.
4. Perimeter fence along east boundary of repository site.
5. Perimeter fence along north boundary of repository site.
6. Erosion channel along west section of repository perimeter fence.
7. Sediment Pond A.
8. Sediment Pond A, south berm.
9. Sediment Pond B.
10. Sediment Pond C.
11. North Toe Trench (rock filled trench at base of rock slope).
12. Near western terminus of North Toe Trench. Inner fence with open wildlife gate in foreground.
13. East Toe Trench.
14. South Drain Ditch.
15. West Drain Ditch.
16. View of West Drain Ditch terminus at North Draw.
17. Pond 4.
18. Disposal cell cover. Field office in background.
19. Mule deer on disposal cell cover.
20. Disposal cell Manhole 3.
21. Overlooking restored millsite. Wetland 2 and willows along Montezuma Creek are visible below Steele's Pond in foreground.
22. Drainage control on south side of former millsite.
23. Drainage control at terminus of Deer Draw.
24. Drainage control on north side of former millsite (below stockyard).
25. Drainage control from Steele's Pond. Washout exposes geotextile beneath riprap.
26. Slump on highway embankment on property MP−01081.
27. Repaired section of ditch separating properties MP−00179 and MP−01077 PH I.

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2. On-site TSF (behind fence). Covered bin toward back of photo.

3. Perimeter fence crossing ravine along south boundary of repository site.

4. Perimeter fence along east boundary of repository site.

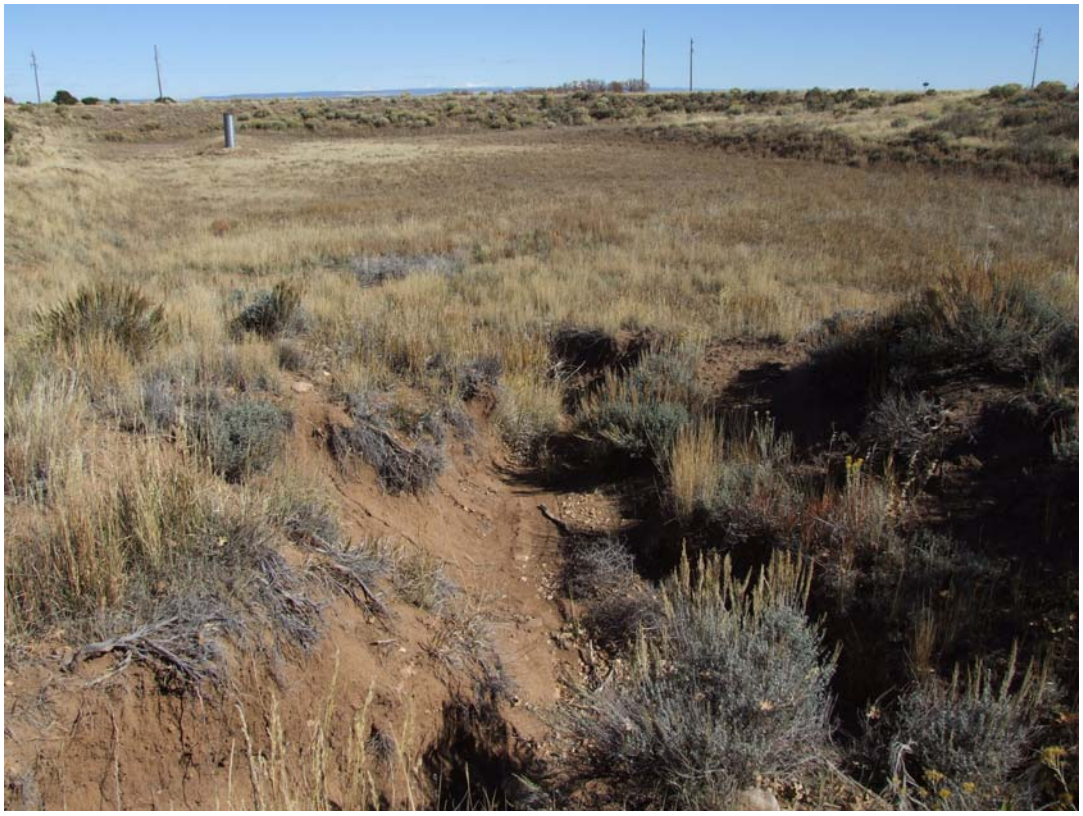
5. Perimeter fence along north boundary of repository site.

6. Erosion channel along west section of repository perimeter fence.

7. Sediment Pond A.

8. Sediment Pond A, south berm.

9. Sediment Pond B.



10. Sediment Pond C.

11. North Toe Trench (rock-filled trench at base of rock slope).

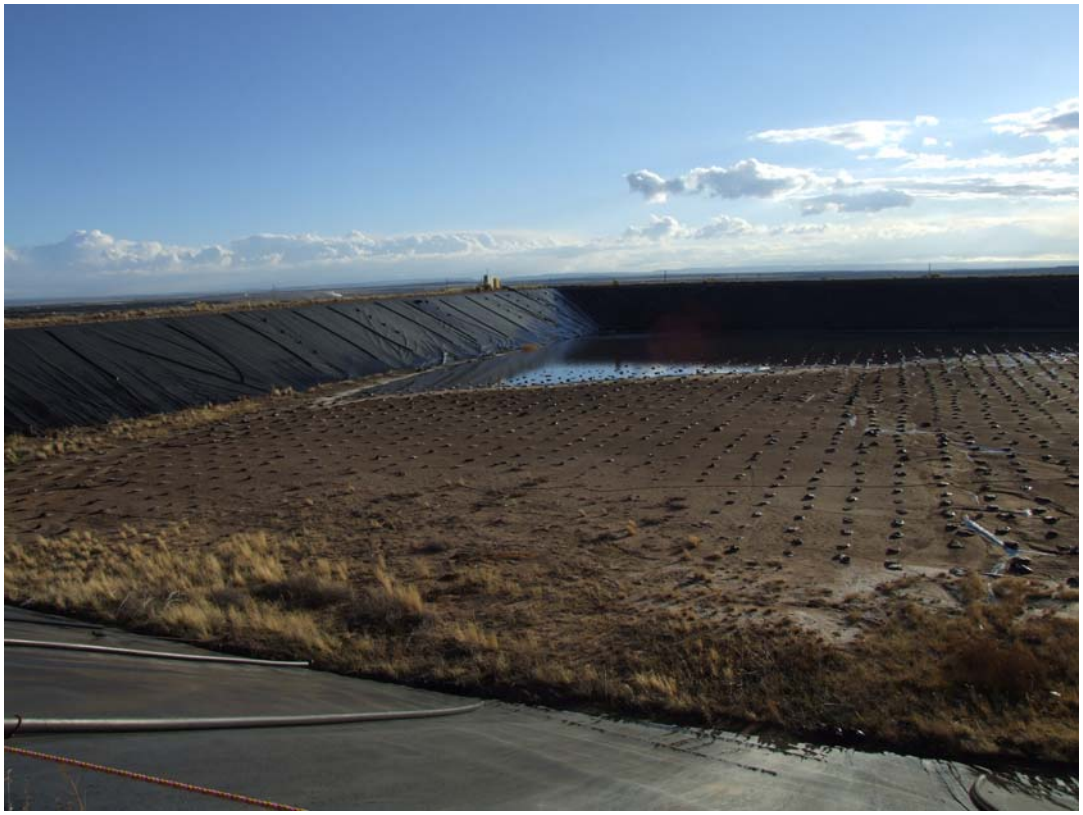
12. Near western terminus of North Toe Trench. Inner fence with open wildlife gate in foreground.

13. East Toe Trench.

14. South Drain Ditch.

15. West Drain Ditch.

16. View of West Drain Ditch terminus at North Draw.



17. Pond 4.

18. Disposal cell cover. Field office in background.

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20. Disposal cell Manhole 3.

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25. Drainage control from Steele's Pond. Washout exposes geotextile beneath riprap.

26. Slump on highway embankment on property MP−01081.

27. Repaired section of ditch separating properties MP−00179 and MP−01077 PH I.

28. Montezuma Creek valley in supplemental standards area. Creek is willow lined in foreground.

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