ROCKY MOUNTAIN ARSENAL

ANNUAL COVERS REPORT FOR INTEGRATED COVER SYSTEM 2023

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Shell Oil Company

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ACRONYMS

ACR	Annual Covers Report
AMA	Army Maintained Areas
FY23	Fiscal Year 2023
FY24	Fiscal Year 2024
ICS	Integrated Cover System
LTCP	Long-Term Care Plan
NRAP	Non-Routine Action Plan
NWS	National Weather Service
O&M	Operations and Maintenance
OCN	O&M Change Notice
RCRA	Resource Conservation and Recovery Act
SDT	Shell Disposal Trenches
SOP	Standard Operating Procedure
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

This 2023 Annual Covers Report (ACR) for the Integrated Cover System (ICS) at the Rocky Mountain Arsenal was prepared in accordance with the *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan*, Revision 3 (LTCP) (Navarro 2021a). The purpose of this ICS ACR is to document cover inspection results and maintenance activities performed on the ICS during the reporting period, and to describe plans to improve or sustain cover conditions. This ICS ACR documents maintenance-related activities performed on the ICS Army Maintained Area (AMA) during Fiscal Year 2023 (FY23), that is, between October 1, 2022 and September 30, 2023.

The rain gauge located west of the Lime Basins Resource Conservation and Recovery Act (RCRA)-Equivalent Cover, near the Lime Basins Metering Building collects precipitation data for the RMA. The precipitation measured at the Lime Basins gauge during FY23 was 20.92 inches. Precipitation data collected by the Lime Basins gauge are provided in Appendix A.

The ICS was in good condition throughout FY23. Cover deficiencies observed during the reporting period include areas of cover surface drainage interruption, noxious or undesirable weeds, tumbleweed accumulation, and areas of poor grass species diversity, all of which are typical for the site and were addressed through routine maintenance activities. All cover soil thickness loss measurements were below the non-routine action trigger level and the compliance standard.

Percolation was below the non-routine action trigger level and the compliance standard for all lysimeters except Lysimeters 001 and 003, located on the Shell Disposal Trenches (SDT) RCRA-Equivalent Cover. Lysimeters 001 and 003 exceeded the percolation compliance standard in June and July of 2023. Due to these exceedances, Percolation Assessment Forms LYS001-2023 and LYS003-2023 were drafted and sent to the regulatory agencies for review and approval in FY23.

The 2023 Vegetation Performance Assessment was conducted in accordance with Standard Operating Procedure (SOP) 002 of the LTCP, Revision 3. Separate assessments were performed on the ICS RCRA-equivalent covers and on the ICS 2-foot and 3-foot soil covers. In all, data from 15 vegetation transects were collected. The dates on which the assessments were conducted were inside the range specified in the LTCP SOP 002. Total live vegetation values were well above the compliance standard of 25 percent for all areas. The two-year average of total ground cover was also comfortably above the compliance standard of 50 percent for all cover areas, and the three-year running average of total ground cover was also well above the compliance standard of 67 percent.

Thirty-seven acres of the ICS were overseeded in May of 2023. The overseeded areas were part of 93 acres of the ICS that experienced poor vigor and growth by native perennial grasses in 2021, as documented in Non-Routine Action Plan (NRAP)-2021-005. These substandard areas were also mowed in August of 2023 to control the growth of annual weedy species and promote perennial grass establishment.

Cost incurred performing Operations and Maintenance of the ICS AMA during FY23, including inspections, repairs, maintenance, and fence replacement, was $209,376. The non-routine fence

replacement work accounted for $97,207 of the incurred cost. A complete budget for Fiscal Year 2024 (FY24) has not been approved as of the issuance of this report. However, the FY24 budget is estimated to be approximately $120,000.

Routine inspections and maintenance of the ICS AMA will continue throughout FY24 in accordance with the requirements of the LTCP. In addition to routine maintenance activity, the Army recommends the following actions.

- The establishment of grass species in the overseeded areas documented in NRAP-2021-005 will be observed to identify maintenance activities may be required to decrease weedy species.
- The condition of the SDT RCRA-Equivalent Cover will be monitored more closely than the rest of the ICS due to the intrusive repairs that were performed during 2020.

These recommendations will be discussed in the 2024 ICS ACR.

1.0 INTRODUCTION

This 2023 Annual Covers Report (ACR) for the Integrated Cover System (ICS) at the Rocky Mountain Arsenal was prepared in accordance with the *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan*, Revision 3 (LTCP) (Navarro 2021a). The purpose of this ICS ACR is to document cover inspection results and maintenance activities performed on the ICS during the reporting period, and to describe plans to improve or sustain cover conditions. This ICS ACR documents maintenance-related activities performed on the ICS Army Maintained Area (AMA) during Fiscal Year 2023 (FY23), that is, between October 1, 2022 and September 30, 2023. Appendix E of this report included the Army's responses to the U.S. Environmental Protection Agency's (EPA) technical comments on the 2022 ICS ACR.

The ICS is currently in the Interim Operations and Maintenance (O&M) Period defined in Section 1.0 of the LTCP. This report addresses the fourteenth year of Interim O&M for the ICS since construction was completed in early 2010.

2.0 METHODOLOGY

The Resource Conservation and Recovery Act (RCRA)-equivalent, 2-foot, and 3-foot covers and associated non-cover areas within the outside shoulder of the perimeter access road, collectively referred to as the ICS AMA, were inspected, monitored, repaired, and maintained in accordance with the LTCP, Revision 3. The results of inspections and monitoring of vegetation, percolation, and cover soil thickness were used to verify cover performance and to trigger cover maintenance and repair work.

2.1 Type I and Type II Cover Inspections

The procedure for inspecting soil cover conditions and infrastructure features is detailed in LTCP Standard Operating Procedure (SOP) 001, *Cover Conditions Inspections*. This SOP includes procedures for Type I and Type II cover inspections, as well as a procedure for collecting cover soil thickness data, which were used to evaluate the actual cover soil thickness against the cover soil thickness compliance standard. Where feasible, multiple inspections were conducted concurrently for efficiency and to minimize traffic on the cover. Copies of the cover inspection forms are provided in Appendix C.

2.2 Vegetation Performance Assessment

LTCP SOP 002, *Cover Vegetation Performance Assessment*, provides the procedure to collect and document vegetation conditions for assessment and future management. This SOP includes a procedure for conducting the annual quantitative vegetation survey. Data collected in accordance with LTCP SOP 002 were used to evaluate the vegetation against the vegetation performance standard. The results of the evaluation are presented in Section 6.1.1 of this report. Refer to Appendix B for photos and other information collected during the 2023 Vegetation Performance Assessment.

2.3 Percolation Monitoring

The procedure for collecting percolation data and operating the lysimeters is provided in LTCP SOP 003, *Percolation Monitoring System Data Collection and Operation*. Data collected in accordance with LTCP SOP 003 were used to evaluate the measured percolation against the

percolation compliance standard. Monthly percolation measurements are provided in Table 7.0-1.

2.4 Maintenance and Repair Activities

Routine maintenance and repair activities are listed in Table 3.2-1 of the LTCP, while conditions requiring non-routine actions are listed in Table 3.2-2 of the LTCP. Routine and non-routine maintenance and repair activities performed in FY23 are discussed in Section 4.0 of this report.

3.0 PRECIPITATION AND WEATHER CONDITIONS

The rain gauge located west of the Lime Basins RCRA-Equivalent Cover, near the Lime Basins Metering Building collects precipitation data for the RMA. The precipitation measured at the Lime Basins gauge during FY23 was 20.92 inches. Precipitation data collected by the Lime Basins gauge are provided in Appendix A.

3.1 National Weather Service Summary

Figures 3.1-1 and 3.1-2 illustrate the Rocky Mountain Region's monthly temperature and precipitation values for FY23 as published by the National Oceanic and Atmospheric Administration, National Weather Service (NWS) Forecast Office for Denver/Boulder, Colorado. Climate data reported by the NWS were collected at the Primary Local Climatological Data Site, located at the Denver International Airport. FY23 had near average temperatures and above normal spring and summer precipitation in the Rocky Mountain Region.

3.2 Significant Storm Events at RMA

RMA experienced two significant storm events in FY23. A significant storm event is defined as a rainstorm event in which greater than 1.0 inch of precipitation falls within 24 hours. On May 12, 2023 and June, 5, 2023, the RMA received 2.92 inches of rain and 1.23 inches of rain, respectively in a 24-hour period.

4.0 SOIL COVER ASSESSMENT, MAINTENANCE AND REPAIR ACTIONS

During FY23, the condition of the ICS AMA was inspected during the Type I and Type II inspections in accordance with the LTCP. Type I inspections were conducted on October 11, 2022, January 17, 2023, and July 19, 2023. The spring Type II inspection was conducted on April 11, 2023.

There were two significant storm events that occurred in FY23 on May 12 and June 5, 2023. Post-storm drive around inspections were performed on May 15 and June 5, 2023 and these inspections were documented in the project logbook. A post-storm inspection was performed on June 21, 2023 and documented on Form SOP 001-1 which is included in Appendix C. No issues were identified during the post-storm inspections.

The soil covers were inspected for the following:

- Surface Conditions
- Vegetative Cover
- Engineering and Access Controls
- Percolation Monitoring

- Surface Drainage Controls
- Erosion/Settlement Monuments
- Other deleterious conditions

The ICS cover was in good condition throughout FY23. Observations of cover conditions listed on Form SOP 001-1 are described below with references to inspection form item numbers where appropriate. Cover inspection documentation is provided in Appendix C of this report. For all inspection categories not listed, no observations were noted, and maintenance was not required.

Other maintenance-related observations were made during normal field activities, independent from formal pre-scheduled inspections. The repair actions associated with these observations are also shown on Figure 4.0-1 and are described below.

4.1 Cover Surface Drainage Interruption

Inspection Form Item 1.2 – Conditions that could interrupt cover surface drainage: Holes greater than three inches in diameter were observed and marked with Global Positioning System coordinates during the Type II inspections in the spring of 2022 and 2023. These holes were filled with soil from the lysimeter soil archive and Long-Term Cover Soil Stockpile in December of 2022 and August of 2023.

4.2 Impeded Drainage in the Channel

Inspection Form Item 4.1 – Impeded drainage or ponding in the channels: Small holes were observed in the grass lined outlet end of Channel 13 during the June 2022 post-storm inspection. These holes were repaired in December of 2022 using soil from the lysimeter soil archive.

4.3 Noxious or Undesirable Weeds

The herbicide Plainview SC® was applied as a ground clear in November of 2022 along the shoulders of the ICS roadways, the cattle guards, the well pads on the Lime Basins access road, around the Lime Basins Metering Building, and at gate entrances.

Inspection Form Item 2.3 – Deep rooted, noxious or undesirable weedy species: Canada and Musk thistles, along with other noxious weeds, were identified on areas of the ICS. Weed control efforts were performed in June of 2023 using the herbicides Escort XP®, and Vison®. Cheatgrass areas were sprayed in August of 2023 using the herbicide Rejuvra®.

4.4 Lysimeters

Standing water was removed from the manhole of Lysimeter 010 in July of 2023. Standing water was removed from the manholes of Lysimeters 008, 009, 012, 013, and 014 in August of 2023.

4.5 Shell Disposal Trenches RCRA-Equivalent Cover Piezometers

O&M Change Notice (OCN)-LTCP-2020-001 (Navarro 2020) documented the frequency of inspection of the Shell Disposal Trenches (SDT) RCRA-Equivalent Cover piezometers. Due to the percolation exceedance at SDT RCRA-Equivalent Cover Lysimeters 001 and 003, the piezometer water level monitoring was performed concurrently with the lysimeter percolation measurements and will continue until compliance is restored. The SDT RCRA-Equivalent

Cover piezometers were measured in June through September 2023. See Table 4.5-1 for the SDT RCRA-Equivalent Cover piezometer measurements.

4.6 Perimeter Fence

OCN-LTCP-2022-001 (Navarro 2022) was approved in July of 2022 and changed the height of the southern perimeter fence from 8 feet to 5 feet-7 inches, and replaced the wooden fence posts with galvanized steel posts. The fence posts, fence fabric and gates were replaced in May and June of 2023 in accordance with the approved OCN.

Inspection Form Item 3.1 – The perimeter fence is damaged: Two wooden fence posts along the west side of the 3-Foot Soil Cover were broken due to high winds and tumbleweed collection. These posts were replaced in conjunction with the eight-foot fence, per approved OCN-LTCP-2022-001.

A bison breached the northwest perimeter fence along Peoria Street in August of 2022 and damaged one t-post. The t-post was replaced in December of 2022.

Inspection Form Item 3.2 – Debris has collected along the perimeter fence: Tumbleweeds were frequently removed from the interior and exterior of the ICS perimeter fence throughout the reporting period. The prescribed burn conducted in October of 2022 by the United States Fish and Wildlife Service (USFWS) also removed the buildup of tumbleweeds along the perimeter fence.

4.7 Perimeter Access Road

OMC personnel used a motor grader as necessary to maintain the ICS perimeter road.

4.8 Bare Areas or Areas of Poor Growth

Non-Routine Action Plan (NRAP)-2021-005 (Navarro 2021b), was prepared to document the sparse grass areas in the southwest corner of the ICS and the maintenance to address the deficiency. Approximately 37 acres of these original areas were drill seeded in May of 2023 at a rate of ten pounds Pure Live Seed per acre. The seed mix was a warm season perennial grass mix consisting of buffalograss (*Buchloe dactyloides),* side oats grama *(Bouteloua curtipendula),* blue grama *(Chondrosum gracile),* alkali sacaton *(Sporobolus airoides),* and rice hulls. Seedlings were sparse during FY23 and the area was overcome with weedy species during the growing season. Mowing was performed in August of 2023 to reduce the weedy population. This area will continue to be monitored for grass establishment, and additional maintenance will be performed as necessary to promote species diversity.

4.9 Mowing

Mowing was performed around sensitive ICS features in preparation for a prescribed burn in October of 2022.

Mowing was performed on approximately 40 acres in August of 2023 to reduce the weedy population on the South Plants, SDT, and Lime Basins RCRA-Equivalent Covers.

4.10 Prescribed Burn

The USFWS conducted a prescribed burn on the entire ICS on October 12, 2022 in accordance with NRAP-2022-002. The burn was not very effective due to recent precipitation, green grass, and the annual weedy species not being dry enough to carry the fire. However, tumbleweeds that accumulated along the perimeter fence were burned.

5.0 COVER SOIL THICKNESS LOSS

The ICS RCRA-equivalent covers and 3-Foot Soil Cover includes a network of 92 erosion/settlement monuments embedded within the cover soil. The monuments are generally positioned on a 500-foot grid, except for the SDT RCRA-Equivalent Cover area, where monuments are positioned at locations selected by the regulatory agencies during the design process. Cover soil thickness loss was measured at each of the monuments during the inspections in October of 2022 and April of 2023 in accordance with SOP 001, *Cover Conditions Inspections*. The measurements for each monument are provided on Table 5.0-1. All cover soil thickness loss measurements were below the compliance standard of 0.5 foot.

6.0 VEGETATION PERFORMANCE ASSESSMENT

The 2023 Vegetation Performance Assessment was conducted in accordance with SOP 002 of the LTCP, Revision 3. Vegetation data were collected and evaluated independently for each of the two cover groups; the ICS RCRA-equivalent covers group (10 transects sampled between September 7 and 12, 2023), and the 2-foot and 3-foot covers group (5 transects sampled on September 13, 2023).

Results of the 2023 Vegetation Performance Assessment are summarized on Table 6.0-1. Appendix B includes additional tables that provide cover and frequency by species, expanded vegetation performance assessments providing two and three year running average comparisons, sample adequacy checks, and raw transect data. These tables meet the reporting requirements set forth by the *Revegetation of the Basin A Soil Cover,* developed during the Basin A dispute resolution process in 1999.

Figures 1 and 2 in Appendix B illustrate the transects that were sampled on the entirety of ICS. The dates on which the assessments were conducted were inside the range specified in LTCP SOP 002. Prior to performing the assessments, transect locations and compass bearings were randomly selected using Geographical Information System software. Maps showing the pre-selected sample locations and bearings are included in Appendix B of this report. Photos, provided in Appendix B, were taken along the compass bearing at the start of each 50-meter transect. A total of 100 observations were made along each transect. All plant species that were present within one meter on either side of the 50-meter transect but had not been observed using the point-intercept sampling method were tallied and used to calculate species density (species per 100 square meters).

Warm season species were prolific and robust at the time the vegetation assessment was conducted. Due to an abundance of precipitation in the spring and summer of 2023, the cool season grasses were larger in stature than they were in previous drought years. There did not appear to be excessive stress due to low soil moisture or biological stressors on the grassland community at the time of the assessment. Insects and other wildlife, such as small rodents, grassland birds and deer were observed in all areas. A list of all vegetation species observed on

the ICS AMA is included in Table 6.0-2. The continued shift in species diversity toward warm season grasses may be an indication of both continued development of plant community complexity, as well as improved performance by individual established plants.

6.1 ICS RCRA-Equivalent Covers Vegetation

During the past few growing seasons, the ICS RCRA-equivalent covers exhibited dramatic changes in species composition. Based on 10 transects sampled in 2023, cool season grasses, primarily western wheatgrass *(Pascopyrum smithii*), provided an average cover of 19.7 percent which is higher than in 2022 when only 11.4 percent of the cover was composed of western wheatgrass. Cover by seeded warm season species also increased when compared to what has been documented in previous years. Warm season grass species provided an average cover of 45.8 percent, with blue grama (*Chondrosum gracile*) providing almost 23 percent cover. Weedy species declined this year with an average cover of about 12.4 percent compared to the 2022 average of 29.5 percent. Average cover by litter was about 9.3 percent.

The lower percentages for weedy species and litter collected this year may be attributed to the above-average precipitation the RMA received in the spring and summer. The perennial grasses were more robust than in previous years and thus were point-intercepted more frequently.

6.1.1 Comparison to the Performance Standard

The total absolute mean live vegetation was estimated to be 84.5 percent. However, since the cover by weedy species exceeded 10 percent, only 80.65 percent of the total can count towards achieving the performance standard of 25 percent. Total ground cover remained very high at 93.8 percent, and corresponding bare ground was 6.2 percent. The two-year running average for total absolute cover was 92.8 percent, well above the standard. The three-year running average for total absolute ground cover was 94.17 percent, also well above the standard.

6.1.2 Comparison to the Non-Routine Action Trigger Level

The results of the quantitative vegetation assessment performed on the ICS RCRA-equivalent covers determined that 14.56 percent of the total live vegetation (relative cover) was comprised of undesirable annual or biennial species. Therefore, the allowable cover was reduced from the total live vegetation cover to better account for live cover provided by desirable vegetation. The allowable total absolute live vegetation cover for this site is 80.65 percent, which is well above the non-routine trigger level established in the LTCP.

6.2 ICS 2-Foot and 3-Foot Soil Covers Vegetation

The vegetation community composition changed during the past few growing seasons where the cover by weedy species has historically been only a small part of the total vegetation cover. Based on data from five samples, relative cover by weedy species increased from less than three percent in 2020 to 18 percent in 2023. The total absolute mean vegetation cover was about 84 percent. However, since the relative cover by weedy species averaged 18 percent, the allowable total absolute live vegetation cover was reduced to 77.42 percent. Average total absolute ground cover remained high at 95.6 percent, with litter contributing about 11 percent cover. Cool season grasses, primarily western wheatgrass, provided an average cover of approximately 30 percent. Average cover by warm season grasses was about 31 percent.

Allowable total absolute live vegetation was estimated to be 77.42 percent, well above the non-routine action trigger level of 25 percent. The estimate for total absolute ground cover was 84.2 percent, and corresponding bare ground was relatively low at 4.4 percent. The two-year running average for total absolute ground cover was 96 percent, well above the standard. The three-year running average for total absolute ground cover was 96.17 percent, also well above the standard.

6.3 Sample Adequacy

Sample adequacy calculations were performed for the ICS RCRA-equivalent covers group and the ICS 2-foot and 3-foot covers group. The intent of the sample adequacy calculation is to determine whether sufficient samples have been gathered to be able to detect a 10 percent reduction in the mean with 90 percent confidence. Sample adequacy was calculated using the formula provided in SOP 002:

$$N_{\min} = t_{\alpha}^{2} s^{2} / (d\bar{x})^{2}$$

To ensure that the sample size is adequate, N_{min} must be less than, or equal to, the number of transects sampled in the respective area. If N_{min} is greater than the number of transects sampled, additional vegetation transects need to be sampled until N_{min} becomes less than, or equal to, the number of transects sampled, or all transect blocks within the respective area have been sampled, whichever comes first. Sample adequacy was calculated for total live vegetation only.

The results of the sample adequacy calculations are provided in Table 6.3-1. Sample adequacy calculations indicated that variability was low for the ICS RCRA-equivalent cover and the ICS 2-foot and 3-foot cover areas and that an acceptable number of samples were collected.

6.4 Poor Vigor and Species Diversity

In May of 2021, the Army observed little or no growth of established perennial grasses over approximately 93 acres of the ICS and this issue was first documented in the 2021 ICS ACR (Navarro 2021c). The affected areas were primarily located on the west side of the South Plants 3-Foot Soil Cover but extended east and north into the South Plants and Lime Basins RCRA-Equivalent Covers.

The substandard condition of the vegetation was also confirmed quantitatively during the annual vegetation assessment performed in September of 2021. NRAP-2021-005 was created to document the substandard condition of the 93 acres of vegetation and to propose the means by which the vegetation would be improved. The NRAP was approved in October of 2021. These substandard areas were mowed, drill seeded, required weed control by herbicide application and additional mowing during the 2022 reporting period.

The area continued to be monitored for grass establishment and species diversity during the 2023 growing season. Additional maintenance was performed on approximately 37 of the original 93 acres. These areas were drill seeded using a warm season perennial grass mix consisting of buffalograss (*Buchloe dactyloides)*, side oats grama *(Bouteloua curtipendula)*, blue grama *(Chondrosum gracile)*, and alkali sacaton *(Sporobolus airoides)* in May and June of 2023. These same areas were then mowed in August of 2023 to reduce the weedy species.

The area will continue to be monitored for grass establishment and species diversity during the 2024 growing season and additional maintenance will be performed as necessary to promote grass establishment.

7.0 PERCOLATION MONITORING

The RCRA-equivalent covers use a network of lysimeters to monitor deep percolation. The ICS covers have 15 lysimeters. Percolation is reported in millimeters, which is calculated by dividing the measured percolation volume by the area of the lysimeter pan, or 1,500 square feet (139.35 square meters).

According to the LTCP, Revision 3, most of the ICS lysimeters are inspected four times per year. The SDT RCRA-Equivalent Cover lysimeters (Lysimeters 001, 002, and 003) will be inspected monthly for five years following the corrective action performed in December of 2020.

The percolation measurements are presented in Table 7.0-1. Table 7.0-2 presents rolling nine-month percolation totals for comparison to the non-routine action trigger level of 1.0 mm in nine months, and Table 7.0-3 presents twelve-month rolling totals for comparison to the compliance standard of 1.3 mm in 12 months. The compliance standard for percolation is the quantity of percolation that, if exceeded, would subject the Army to potential enforcement actions by the regulatory agencies. Enforcement of the compliance standard began on April 21, 2015.

Quarterly submission of percolation monitoring results for all cover lysimeters were issued to the regulatory agencies and included six months of data. Each quarterly submittal included monthly measurements, 9-month cumulative totals, and 12-month cumulative totals. Percolation data for FY23 were transmitted in January (Navarro 2023a), March (Navarro 2023b), June (Navarro 2023c), and September (Navarro 2023d).

7.1 Percolation Exceedances

As shown in Tables 7.0-2 and 7.0-3, most ICS lysimeters were below the non-routine action trigger level and the compliance standard for the entire reporting period. However, in June of 2023 Lysimeter 003 collected 11.90 mm of percolation, which exceeded the non-routine trigger level of 1.0 mm per 9 months, and the compliance standard of 1.3 mm per year. Meanwhile, Lysimeter 001 collected 1.07 mm in June, which exceeded the non-routine trigger level. An additional 0.44 mm was collected by Lysimeter 001 in July, for a total of 1.51 mm, which exceeded the compliance standard.

7.2 Percolation Assessments

In response to these exceedances, the Army drafted Percolation Assessment Forms LYS003-2023 and LYS001-2023 and sent the forms to the regulatory agencies for review on July 26, 2023 and August 18, 2023, respectively. The forms were revised to address comments from the regulatory agencies and to incorporate additional data collected in the field. The final forms were transmitted to the regulatory agencies for approval and signature on September 28, 2023.

The Percolation Assessment Forms emphasized that the precipitation for 2023 was considerably above average for May, June and July. Also, the Corrective Measures performed over these lysimeters in 2019 and 2020 were a significant disturbance to the cover and vegetation root system. Since revegetation occurred in 2020, it is likely that the perennial grass root system has

not developed to full depth. Previously, following cover construction, compliance monitoring for percolation was initiated after a period of five years had passed, to allow the vegetative cover to be properly established. The repaired cover over Lysimeters 001 and 003 should benefit from the same five-year establishment period prior to initiating compliance monitoring in 2025.

The area over Lysimeter 003 was observed to have a significant amount of weed growth that hindered the establishment of native perennial grasses and does a poor job of transpiring soil moisture that is deep in the cover soil column. The Army intends to continue promoting the establishment of native perennial grasses in the area of Lysimeter 003, including persistent weed control and overseeding of desirable species.

8.0 ROUTINE AND NON-ROUTINE ACTIONS

8.1 Routine Actions

Routine maintenance and repairs were performed on the ICS AMA and were intended to ensure that the covers continue to function as designed. Routine maintenance and repair actions were identified during inspections and informal field visits and are discussed in Section 4.0 of this report. Figure 4.0-1 illustrates the locations of routine maintenance and repair activities performed on ICS during FY23. Appendix D includes Contractor Daily Quality Control Reports that describe the work performed.

8.2 Non-Routine Actions

The implementation of non-routine actions is described in the LTCP. The LTCP provides criteria for non-routine actions, and a mechanism for consultation between the parties and documentation of the consultative outcome. Each time a non-routine action is identified, a NRAP would be prepared to document the substandard condition, the actions that will be carried out to remedy the condition, consultation between the parties, and concurrence on the proposed action. There were no NRAPs prepared during this reporting period.

9.0 RECOMMENDATIONS AND CORRECTIVE MEASURES

Routine inspections and maintenance of the ICS AMA will continue throughout FY24 in accordance with the requirements of the LTCP. In addition to routine maintenance activity, the Army recommends the following actions.

- The establishment of grass species in the overseeded areas documented in NRAP-2021-005 will be observed to identify maintenance activities may be required to decrease weedy species.
- The condition of the SDT RCRA-Equivalent Cover will be monitored more closely than the rest of the ICS due to the intrusive repairs that were performed during 2020.

These recommendations will be discussed in the 2024 ICS ACR.

No corrective measures are currently planned for FY24.

10.0 FY23 COSTS AND FY24 BUDGETS

Cost incurred performing Interim O&M of the ICS AMA during FY23, including inspections, repairs, maintenance, and fence replacement, was $209,376. The non-routine fence replacement work accounted for $97,207 of the incurred cost. A complete budget for FY24 has not been

approved as of the issuance of this report. However, the FY24 budget is estimated to be approximately $120,000.

11.0 REFERENCES

Navarro (Navarro Research and Engineering, Inc.)

2023a (Jan 3) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, July 2022 through December 2022.*

2023b (Mar 22) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, October 2022 through March 2023.*

2023c (Jun 28) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, January 2023 through June 2023.*

2023d (Sep 11) *Rocky Mountain Arsenal Integrated Cover System and Basin F Cover Lysimeter Monitoring Data, April 2023 through September 2023.*

2022 (Jul 19) *OCN-LTCP-2022-001: ICS Perimeter Fence.*

2021a (Aug 12) *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan*. Revision 3.

2021b (Oct 12) *NRAP-2021-005: ICS Vegetation Improvement.*

2021c (Nov 17) *Annual Covers Report for Integrated Cover System 2021*. Revision 0.

2020 (Oct 10) *OCN-LTCP-2020-001: SDT Piezometers.*

TABLES

Table 4.5-1: SDT RCRA-Equivalent Cover Piezometer Measurements

Measurement Date	Water Column Within Piezometer (feet)			
	Piezometer 36251	Piezometer 36252	Piezometer 36253	Piezometer 36254
June 21, 2023	2.08	0.00	0.00	0.00
July 27, 2023	1.72	0.00	0.00	0.00
August 16, 2023	1.51	0.00	0.00	0.00
September 20, 2023	0.31	0.00	0.00	0.00

Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Loss (in.) October 11, 2022	Loss (in.) April 11, 2023	Comments
ER01	0.50	0.75	
ER02	1.25	1.00	
ER03	0.25	0.00	
ER04	2.00	2.00	
ER05	1.50	1.25	
ER06	2.50	2.50	
ER07	0.00	0.00	
ER08	2.00	2.00	
ER09	1.25	1.00	
ER10	1.50	1.00	
ER11	1.50	1.25	
ER12	1.25	1.00	
ER13	1.50	1.25	
ER14	1.25	0.75	
ER15	0.00	0.00	
ER16	2.00	2.00	
ER17	0.00	0.00	
ER18	0.00	0.00	
ER19	0.00	0.00	
ER20	1.50	1.00	
ER21	0.25	0.25	
ER22	1.25	1.25	
ER23	0.75	0.75	
ER24	0.00	0.00	
ER25	1.00	1.00	
ER26	0.00	0.00	
ER27	1.50	1.00	
ER28	1.25	1.50	
ER29	2.00	1.75	
ER30	2.75	2.50	
ER31	2.75	2.75	
ER32	0.25	0.25	
ER33	1.25	1.00	
ER34	2.25	1.75	
ER35	1.50	1.50	
ER36	1.75	1.75	
ER37	2.50	2.25	

Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Loss (in.) October 11, 2022	Loss (in.) April 11, 2023	Comments
ER38	2.25	2.00	
ER39	1.00	0.75	
ER40	0.50	0.25	
ER41	2.50	2.00	
ER42	1.25	1.00	
ER43	2.00	1.50	
ER44	2.00	2.00	
ER45	1.50	1.50	
ER46	2.75	3.00	
ER47	2.00	2.00	
ER48	1.25	1.50	
ER49	1.50	1.00	
ER50	0.50	0.00	
ER51	0.00	0.00	
ER52	0.75	0.25	
ER53	0.75	1.00	
ER54	0.00	0.00	
ER55	1.00	1.00	
ER56	0.75	0.25	
ER57	0.00	0.50	
ER58	1.25	1.25	
ER59	1.00	0.50	
ER60	1.75	1.75	
ER61	0.25	0.00	
ER62	0.50	0.00	
ER63	1.75	1.50	
ER64	1.75	1.50	
ER65	1.75	1.50	
ER66	2.00	1.50	
ER67	0.25	0.00	
ER68	1.50	0.75	
ER69	1.00	1.00	
ER70	0.25	0.00	
ER71	1.00	1.00	
ER72	1.75	1.50	
ER73	0.75	0.75	
ER74	0.50	0.00	

Table 5.0-1: Soil Cover Thickness Loss

ICS Monument No.	Loss (in.) October 11, 2022	Loss (in.) April 11, 2023	Comments
ER75	0.50	0.00	
ER76	1.75	1.50	
ER77	0.75	0.25	
ER78	1.50	1.00	
ER79	0.50	0.25	
ER80	0.75	0.75	
ER81	1.50	1.00	
ER82	1.25	1.25	
ER83	0.25	0.00	
ER84	1.50	1.50	
ER85	0.50	0.50	
ER86	0.00	0.00	
ER87	0.00	0.00	
ER88	1.00	1.00	
ER89	1.50	1.00	
ER90	1.00	1.00	
ER91	1.25	1.25	
ER92	0.50	0.00	

Table 6.0-1: 2023 Vegetation Performance Assessment Summary

Performance Criterion and Evaluation	2-Foot and 3-Foot Covers (Note 1)	ICS RCRA-Equivalent Cover
Total Absolute Ground Cover	95.60%	93.80%
Allowable Total Absolute Live Vegetation Cover	77.42%	80.65%
Vegetation Performance Standard for Total Live Vegetation	≥ 25%	≥ 25%
Is Vegetation Performance Standard met? (Enforcement started in fall 2015.)	Yes	Yes
Two Year Running Average for Total Absolute Ground Cover	96.00%	94.35%
Vegetation Performance Standard for Two Year Running Average	≥ 50%	≥ 50%
Is Vegetation Performance Standard met? (Enforcement started in fall 2016.)	Yes	Yes
Three Year Running Average for Total Absolute Ground Cover	96.17%	94.70%
Vegetation Performance Standard for Three Year Running Average	≥ 67%	≥ 67%
Is Vegetation Performance Standard met? (Enforceable starting in fall 2017.)	Yes	Yes
Relative Weed Cover	18.05%	14.56%
Relative Allowable Weed Cover	N/A (Note 3)	≤ 10%
Calculate Total Live Vegetation without the weed fraction?	N/A (Note 3)	No (Note 2)

Note 1: For 2-Foot and 3-Foot soil covers, vegetation performance criteria function as Non-Routine Action Trigger Levels, not compliance standards.

Note 2: The relative weed cover is greater than 10 percent, therefore, subtracting the amount of relative cover by weedy species above 10 percent from the total live vegetation cover is required. The resulting Total Live Vegetation values are within the Non-Routine Action Trigger Levels.

Note 3: The relative weed fraction does not affect vegetation compliance or non-routine actions on the 2-Foot and 3-Foot soil covers.

Table 6.0-2 Plant Species Observed on the ICS Army Maintained Area

Common Name	Scientific Name
Agave family	Agavaceae
Yucca/Soapweed	*Yucca glauca*
Amaranth family	Amaranthaceae
Redroot pigweed *	*Amaranthus retroflexus*
Milkweed family	Asclepiadaceae
Showy milkweed	*Asclepias speciosa*
Sunflower family	Asteraceae
Yarrow	*Achillea lanulosa*
Western ragweed	*Ambrosia psilostachya*
White sagebrush/Louisiana sagewort	*Artemisia ludoviciana*
Musk thistle* (B)	*Carduus nutans*
Canada thistle * (B)	*Cirsium arvense*
Horseweed	*Conyza canadensis*
Praire sunflower	*Helianthus petiolaris*
Hairy false goldenaster	*Heterotheca villosa*
Prickly lettuce *	*Lactuca serriola*
Rush skeletonweed/Rush skeletonplant	*Lygodesmia juncea*
Lacy tansyaster	*Machaeranthera pinnatifida*
Scotch thistle * (B)	*Onopordum acanthium*
Broom groundsel	*Senecio spartioides*
Common dandelion *	*Taraxacum officinale*
Yellow salsify *	*Tragopogon dubius*
Golden crownbeard/Cowpen daisy	*Verbesina encelioides*
Mustard family	Brassicaceae
Pinnate tansy mustard/Western tansymustard	*Descurainia pinnata*
Tall tumble-mustard *	*Sisymbrium altissimum*
Goosefoot family	Chenopodiaceae
Lambsquarters/White goosefoot*	*Chenopodium album*
Narrowleaf goosefoot	*Chenopodium leptophyllum*
Burningbush/Kochia *	*Kochia scoparia*
Slender Russian-thistle *	*Salsola collina*
Russian-thistle *	*Salsola tragus*
Morning glory family	Convolvulaceae
Field bindweed * (C)	*Convolvulus arvensis*
Pea family	Fabaceae
Alfalfa *	*Medicago sativa*
White sweetclover *	*Melilotus albus*
Yellow sweetclover *	*Melilotus officinalis*

Table 6.0-2 Plant Species Observed on the ICS Army Maintained Area

Common Name	Scientific Name
Poppy family	Papaveraceae
Crested prickly poppy	*Argemone polyanthemos*
Grass family	Poaceae
Crested wheatgrass *	*Agropyron cristatum*
Big bluestem	*Andropogon gerardii*
Sand bluestem	*Andropogon hallii*
Purple threeawn	*Aristida purpurea var. purpurea*
Sideoats grama	*Bouteloua curtipendula*
Blue grama	*Bouteloua gracilis*
Smooth brome *	*Bromus inermis*
Japanese brome/Field brome *	*Bromus japonicus*
Cheatgrass/Downy brome *(C)	*Bromus tectorum*
Buffalograss	*Buchloe dactyloides*
Prairie sandreed	*Calamovilfa longifolia*
Squirreltail	*Elymus elymoides*
Needle and thread	*Hesperostipa comata*
Foxtail barley	*Hordeum jubatum*
Little barley	*Hordeum pusillum*
Witchgrass	*Panicum capillare*
Switchgrass	*Panicum virgatum*
Western wheatgrass	*Pascopyrum smithii*
Little bluestem	*Schizachyrium scoparium*
Alkalai sacaton	*Sporobolus airoides*
Sand dropseed	*Sporobolus cryptandrus*
Buckwheat family	Polygonaceae
Curly dock *	*Rumex crispus*
Narrowleaf dock *	*Rumex stenophyllus*
Willow Dock/Mexican dock	*Rumex salicifolius* var. *mexicanus*
Figwort family	Scrophulariaceae
Great Mullein	*Verbascum thapsus*

* Non-native species (A) (B) (C) = Colorado noxious weed listing

Table 6.3-1: Sample Adequacy Results

Cover Area	Sample Size (n)	Minimum Sample Size total live cover (N_{min})
ICS RCRA-Equivalent Covers	10	0.37
ICS 2-Ft and 3-Ft Soil Covers	5	0.92

Note: Based on absolute total live vegetation cover

Table 7.0-1: Monthly Percolation Measurements

Lysimeter No.	Monthly Percolation Measurement (Liters)											
	Oct-22[1]	Nov-22	Dec-22[1]	Jan-23[1]	Feb-23[1]	Mar-23[1]	Apr-23[1]	May-23	Jun-23[1]	Jul-23	Aug-23[1]	Sep-23
Lysimeter 001	0	0	0	0	0	0	0	0	149	61	26	28
Lysimeter 002	0	0	Trace	0	0	0	0	0	0	0	0	0
Lysimeter 003	0	0	0	0	0	0	0	0	1,659	5	3	9
Lysimeter 004		Trace						Trace		0		0
Lysimeter 005		2						Trace		0		0
Lysimeter 006		0						Trace		0		0
Lysimeter 007		Trace						Trace		0		0
Lysimeter 008		Trace						Trace		Trace		0
Lysimeter 009		0						Trace		0		0
Lysimeter 010		0						Trace		110		0
Lysimeter 011		0						Trace		0		0
Lysimeter 012		0						Trace		0		0
Lysimeter 013		1						Trace		0		1
Lysimeter 014		Trace						Trace		1		6
Lysimeter 015		0						Trace		0		0

Note 1: Lysimeters 004 through 015 are inspected in May, July, September, and November.

Table 7.0-2: Rolling Nine-Month Percolation Totals

Lysimeter No.	Rolling Nine-Month Percolation Total (mm)											
	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Lysimeter 001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	1.51	1.69	1.89
Lysimeter 002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.94	11.96	12.03
Lysimeter 004	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Lysimeter 005	0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.00	0.00
Lysimeter 006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 007	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Lysimeter 008	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Lysimeter 009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.79	0.79
Lysimeter 011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 013	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.01	0.00	0.01
Lysimeter 014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05
Lysimeter 015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note 1: Values highlighted in orange exceeded the non-routine action trigger level of 1.0 mm per 9 months.

Table 7.0-3: Rolling Twelve-Month Percolation Totals

Lysimeter No.	Rolling Twelve-Month Percolation Total (mm)											
	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Lysimeter 001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.07	1.51	1.69	1.89
Lysimeter 002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 003	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	11.94	11.96	12.03
Lysimeter 004	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Lysimeter 005	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01
Lysimeter 006	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 007	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Lysimeter 008	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00
Lysimeter 009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 010	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.79	0.79
Lysimeter 011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lysimeter 013	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01
Lysimeter 014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05
Lysimeter 015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note 1: Values highlighted in red exceeded the performance standard of 1.3 mm/year.

FIGURES

Figure 3.1-1: Average Monthly Temperature for FY23

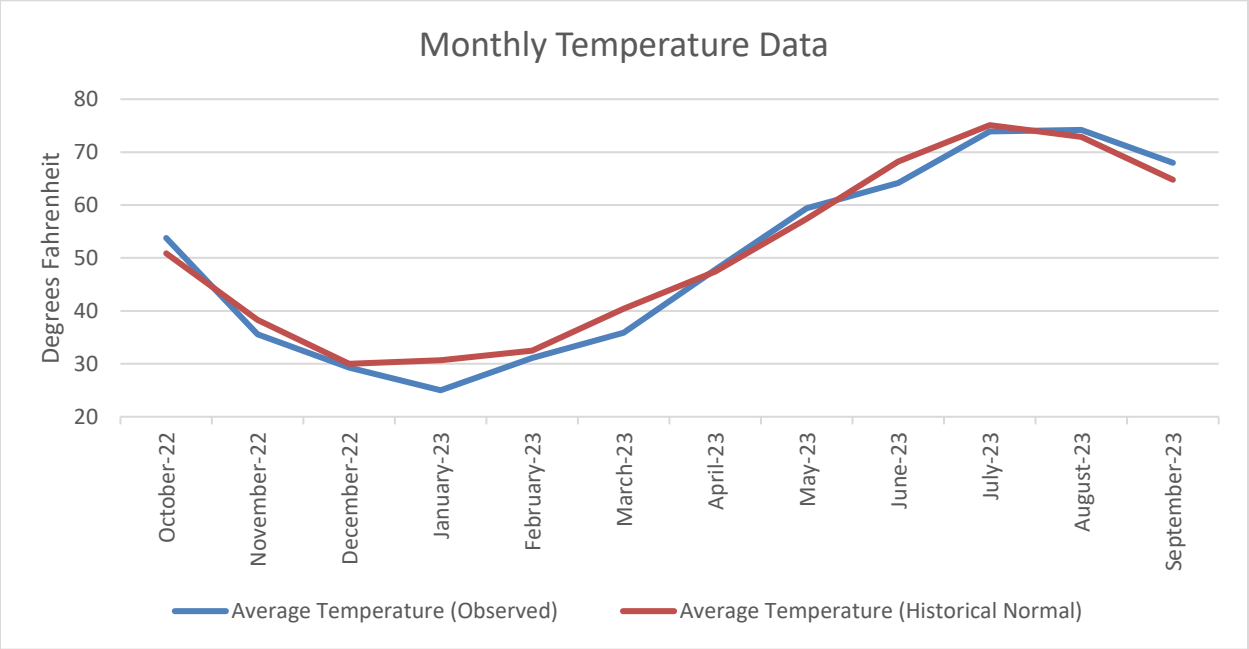
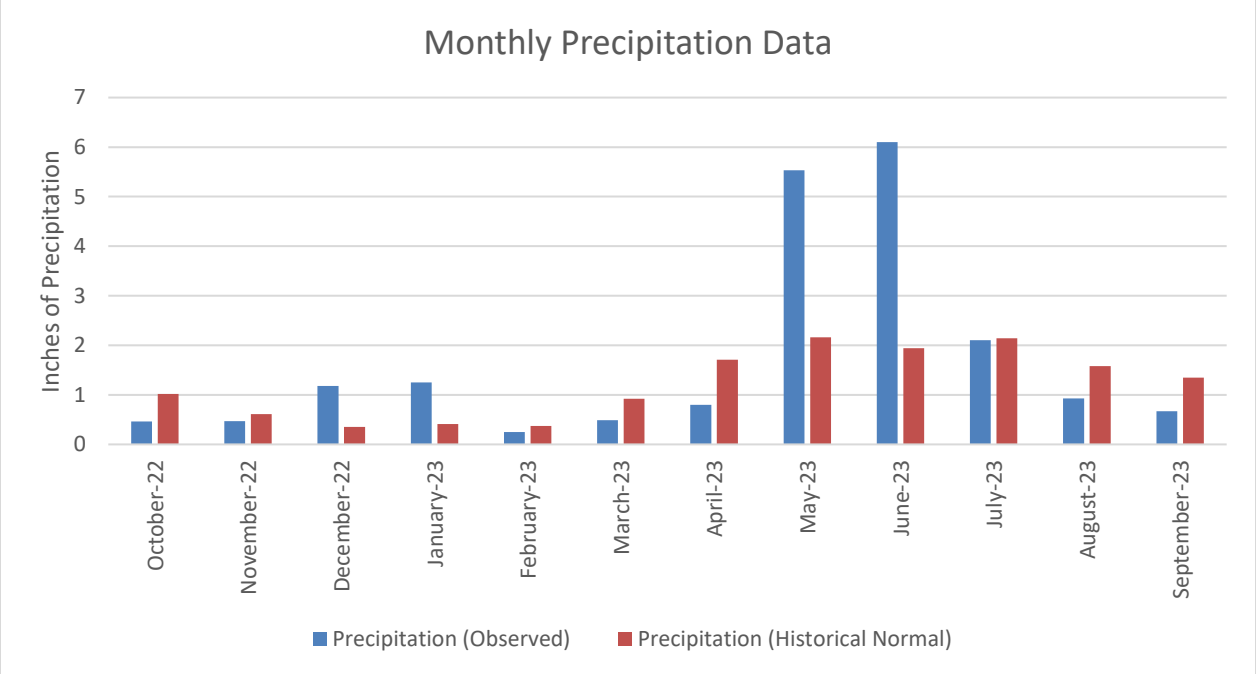
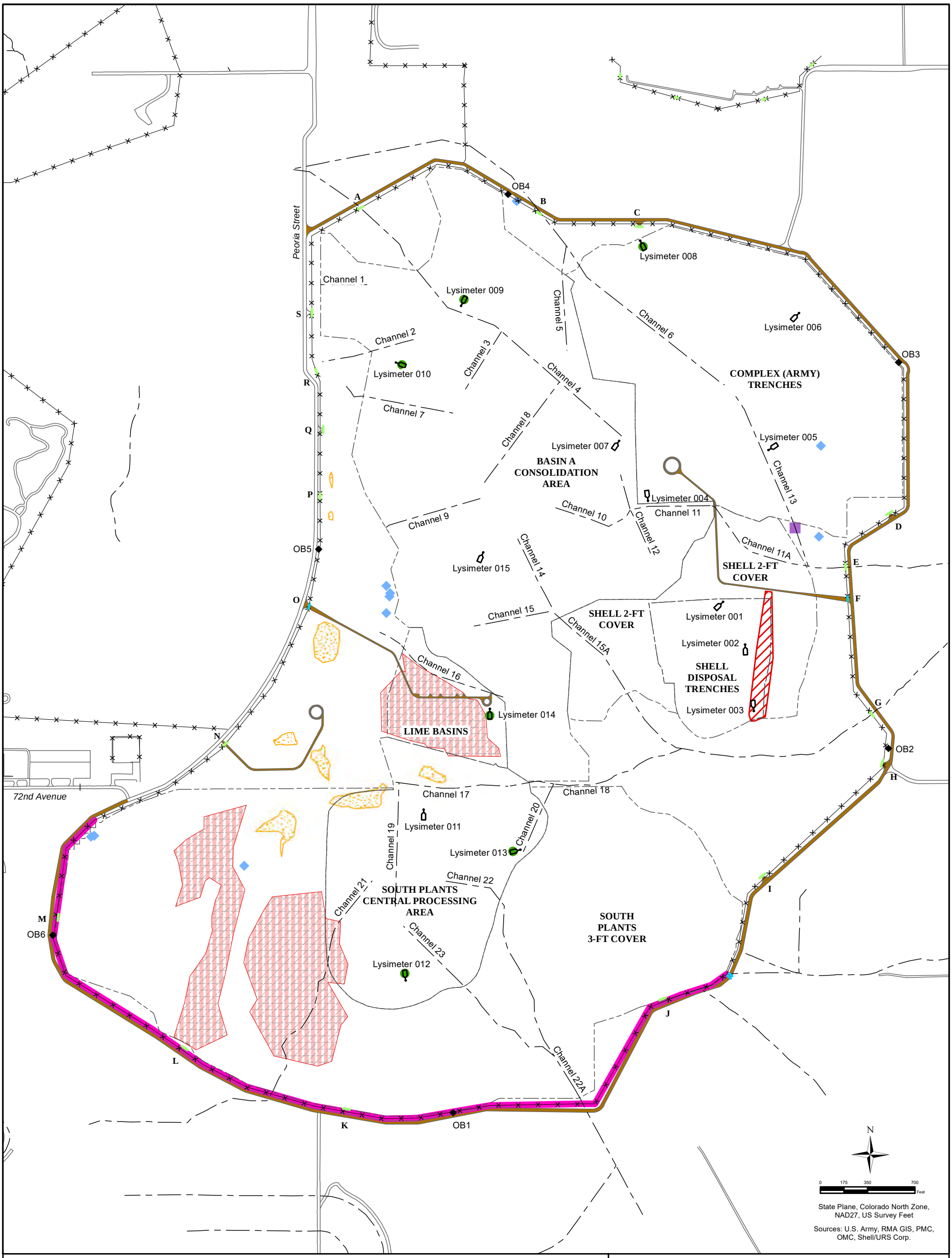


Figure 3.1-2: Average Monthly Precipitation for FY23





Legend

- Cover Boundary
- Perimeter Access Road
- Fence
- Cattle Guard
- Gate
- Lysimeter
- Channel Flow Line
- Obelisk
- Lysimeter Maintenance
- Repaired Cover Surface Drainage Interruption
- Repaired Impeded Drainage in Channel
- Replaced Fence in Accordance with OCN-LTCP-2022-001
- Mowed Area
- Mowed and Overseeded Area
- Cheatgrass Herbicide Application Area
- Ground Clear Herbicide Application Area
- G — Labeled Gates and Cattle Guards

Note 1. The outside shoulder of the Perimeter Access Road defines the Army Maintained Area Boundary (AMA).
Note 2. The ICS Perimeter Road was maintained by a motor grader as needed.
Note 3. Tumbleweeds were removed from the Perimeter Fence.
Note 4: Posts and fence fabric were repaired along the perimeter fence where necessary.
Note 5: There was a prescribed burn over the entire ICS AMA.

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Figure 4.0-1

2023 Integrated Cover System
Routine and Non-Routine
Maintenance Activities

ICS_RoutineMaintenanceActivities_Nov2023.mxd
11/7/2023

APPENDICES

A Precipitation Data (October 1, 2022 through September 30, 2023)

B 2023 Vegetation Performance Assessment Documentation

C Cover Inspection Documentation (October 1, 2022 through September 30, 2023)

D Maintenance and Repair Documentation (October 1, 2022 through September 30, 2023)

E Army Response to EPA Comments on the 2022 ICS ACR

APPENDIX A

Precipitation Data

(October 1, 2022 through September 30, 2023)

Appendix A: Precipitation Data (October 1, 2022 through September 30, 2023)

Note 1: This table provides precipitation data for all dates within the reporting period when precipitation was recorded. For dates not shown, there was no recorded precipitation.

Note 2: The yellow highlighted boxes indicate that there was more than one inch of precipitation in a 24-hour period.

Date	Lime Basins Daily Precipitation (in.)
October 1, 2022	0.03
October 3, 2022	0.55
October 27, 2022	0.25
November 3, 2022	0.02
November 4, 2022	0.05
November 15, 2022	0.09
November 17, 2022	0.01
November 18, 2022	0.05
November 19, 2022	0.01
November 29, 2022	0.04
December 21, 2022	0.03
December 22, 2022	0.01
December 24, 2022	0.25
December 28, 2022	0.19
December 29, 2022	0.22
December 30, 2022	0.06
December 31, 2022	0.14
January 2, 2023	0.09
January 3, 2023	0.04
January 18, 2023	0.18
January 19, 2023	0.03
January 20, 2023	0.02
January 21, 2023	0.01
January 22, 2023	0.04
January 23, 2023	0.04
January 24, 2023	0.04
January 26, 2023	0.01
February 15, 2023	0.01
February 16, 2023	0.06
February 17, 2023	0.07
February 22, 2023	0.02
March 15, 2023	0.12
March 16, 2023	0.07
April 15, 2023	0.12
April 16, 2023	0.01
April 20, 2023	0.02
April 22, 2023	0.06
April 23, 2023	0.09
April 26, 2023	0.19
April 27, 2023	0.05

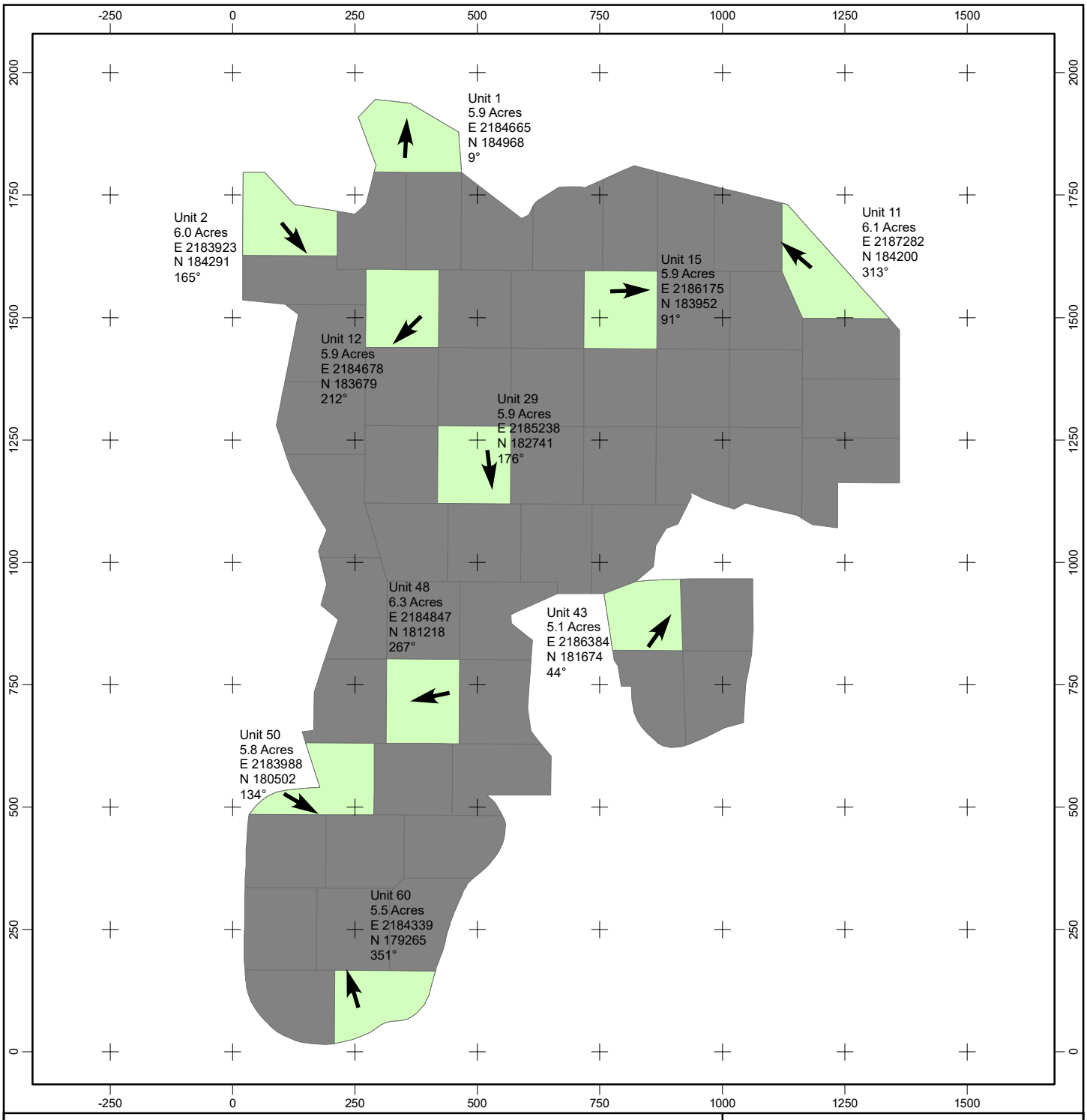
Date	Lime Basins Daily Precipitation (in.)
April 28, 2023	0.21
April 29, 2023	0.01
May 10, 2023	0.01
May 11, 2023	0.62
May 12, 2023	2.92
May 13, 2023	0.85
May 15, 2023	0.28
May 16, 2023	0.02
May 17, 2023	0.22
May 19, 2023	0.14
May 20, 2023	0.01
May 26, 2023	0.11
May 27, 2023	0.37
May 28, 2023	0.42
June 3, 2023	0.46
June 4, 2023	0.24
June 5, 2023	1.23
June 6, 2023	0.05
June 7, 2023	0.01
June 9, 2023	0.99
June 10, 2023	0.01
June 12, 2023	0.14
June 13, 2023	0.09
June 14, 2023	0.03
June 16, 2023	0.40
June 17, 2023	0.26
June 18, 2023	0.01
June 22, 2023	0.62
June 23, 2023	0.15
June 30, 2023	0.63
July 1, 2023	0.21
July 5, 2023	0.91
July 6, 2023	0.07
July 7, 2023	0.01
July 8, 2023	0.08
July 9, 2023	0.03
July 15, 2023	0.21
July 19, 2023	0.06
July 21, 2023	0.53
July 22, 2023	0.11

Appendix A: Precipitation Data (October 1, 2022 through September 30, 2023)

Date	Lime Basins Daily Precipitation (in.)
July 25, 2023	0.36
July 26, 2023	0.07
July 27, 2023	0.43
July 29, 2023	0.01
August 1, 2023	0.12
August 2, 2023	0.03
August 3, 2023	0.50
August 4, 2023	0.30
August 7, 2023	0.02
August 20, 2023	0.20
August 21, 2023	0.01
August 26, 2023	0.62
August 28, 2023	0.20
August 29, 2023	0.01
September 4, 2023	0.27
September 5, 2023	0.01
September 11, 2023	0.09
September 12, 2023	0.12
September 15, 2023	0.26
September 16, 2023	0.17
Total:	**20.92**

APPENDIX B

2023 Vegetation Performance Assessment Documentation



Legend

- Sampled Unit
- Non-Sampled Unit
- Transcription Location and Bearing

N

250 meter grid shown for reference
Coordinates are listed in
Colorado State Plane
North Zone (NAD 1927)

0 50 100 200 300 400

Meters

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Rocky Mountain Arsenal

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Appendix B, Figure 1

ICS RCRA-Equivalent Cover (340.95 Acres) 2023 Random Transect Survey Locations

M:\projects\OMC\Vegetation\mxds\ICS_RCRA_2023.mxd
8/28/2023


ICS RCRA
Unit 1


ICS RCRA
Unit 2


ICS RCRA
Unit 11


ICS RCRA
Unit 12


ICS RCRA
Unit 15


ICS RCRA
Unit 29


ICS RCRA
Unit 43


ICS RCRA
Unit 48


ICS RCRA
Unit 50


S RCRA
Unit 60

Table 6.1.1

Cover and Frequency summary for the ICS RCRA-Equivalent at Rocky Mountain Arsenal. Based on data from 10 sampling locations. 2023 data. +/- values equal the standard deviation. Incidental Species present within 1 meter on either side of the data transect, but not quantitatively encountered.

2023

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.4	1.66	0 - 8.00	40.0	4.55	10.0
Pascopyrum smithii	19.7	23.31	2.00 - 47.00	100.0	11.36	2.0
Sub-Total	21.1	24.97				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	11.2	13.25	0 - 27.00	90.0	10.23	3.0
Buchloe dactyloides	7.4	8.76	0 - 15.00	90.0	10.23	5.0
Chondrosum gracile	22.8	26.98	13.00 - 32.00	100.0	11.36	1.0
Panicum virgatum	0.1	.12	0 - 1.00	10.0	1.14	14.0
Schizachyrium scoparium	0.9	1.07	0 - 9.00	10.0	1.14	11.0
Sporobolus airoides	1.6	1.89	0 - 7.00	50.0	5.68	9.0
Sporobolus cryptandrus	1.8	2.13	0 - 5.00	60.0	6.82	8.0

Sub-Total	45.8	54.2				
ANNUAL GRASSES						
Eragrostis cilianensis	0.3	.36	0 - 1.00	30.0	3.41	13.0
Panicum capillare	4.9	5.8	0 - 17.00	80.0	9.09	6.0
Sub-Total	5.2	6.16				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	9.3	11.01	2.00 - 23.00	100.0	11.36	4.0
Helianthus annuus	0.1	.12	0 - 1.00	10.0	1.14	14.0
[1] Melilotus officinale	0.8	.95	0 - 5.00	40.0	4.55	12.0
[1] Salsola collina	2.2	2.6	0 - 11.00	70.0	7.95	7.0
Sub-Total	12.4	14.68				
SUM OF SPECIES COVER	84.5	100.01				

[3]Total Absolute Mean Vegetation Cover	84.50	+/-1.62
[3]Total Absolute Mean Litter Cover	9.30	+/-1.33
[3]Total Absolute Mean Bare Soil	6.20	+/-1.08
[3]Total Absolute Mean Weedy Cover	12.30	+/-3.89
Total Absolute Ground Cover	93.80	+/-1.08
Relative Weed Cover	14.56	
Relative Allowable Weed Cover	10.0	
Relative Non-Allowable Cover by Weeds	4.56	
Non-Allowable Absolute Weedy Cover	3.85	
Allowable Total Absolute Live Vegetation Cover	80.65	

Incidental Species
i.e < 0.01 Mean Cover

Bromus tectorum
Conyza canadensis
Dyssodia papposa
Erigeron divergens
Helianthus annuus
Lactuca serriola
Medicago sativa
Melilotus officinale
Panicum capillare

Mean Number of Species/Sample	8.8
Mean Species Density/100sq. meters	13.00 +/-1.01

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[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Setaria viridis
Solanum rostratum
Sporobolus airoides
Sporobolus cryptandrus
Tragopogon dubius
Ximenesia encelioides

Table 6.1.2	Vegetation Performance Assessment ICS RCRA-Equivalent Reporting Years 2021, 2022, 2023	2023

Reporting Year: 2021

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	0.30	.49	0 - 2.00	20.00	2.44	10
Pascopyrum smithii	11.50	18.95	3.00 - 21.00	100.00	12.20	2
Sub-Total	11.80	19.44				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	5.80	9.56	0 - 20.00	80.00	9.76	5
Buchloe dactyloides	3.40	5.60	0 - 11.00	60.00	7.32	6
Chondrosum gracile	10.60	17.46	3.00 - 25.00	100.00	12.20	3
Schizachyrium scoparium	0.10	.16	0 - 1.00	10.00	1.22	12
Sporobolus airoides	2.50	4.12	0 - 24.00	20.00	2.44	7
Sporobolus cryptandrus	0.70	1.15	0 - 3.00	40.00	4.88	9
Sub-Total	23.10	38.05				
ANNUAL GRASSES						

Panicum capillare	1.80	2.97	0 - 5.00	50.00	6.10	8
Sub-Total	1.80	2.97				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	7.10	11.70	2.00 - 21.00	100.00	12.20	4
Chenopodium album	0.10	.16	0 - 1.00	10.00	1.22	12
Helianthus annuus	0.10	.16	0 - 1.00	10.00	1.22	12
[1] Lactuca serriola	0.20	.33	0 - 1.00	20.00	2.44	11
[1] Melilotus officinale	0.10	.16	0 - 1.00	10.00	1.22	12
[1] Salsola collina	14.30	23.56	2.00 - 30.00	100.00	12.20	1
[1] Sisymbrium altissimum	1.80	2.97	0 - 11.00	60.00	7.32	8
Solanum triflorum	0.20	.33	0 - 1.00	20.00	2.44	11
Ximenesia encelioides	0.10	.16	0 - 1.00	10.00	1.22	12
Sub-Total	24.00	39.53				
SUM OF SPECIES COVER	60.70	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	96.90
Allowable Total Absolute Live Vegetation Cover 2021	43.27

Reporting Year: 2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.20	1.70	0 - 4.00	40.00	4.94	10
Pascopyrum smithii	10.20	14.49	0 - 32.00	90.00	11.11	4
Sub-Total	11.40	16.19				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	8.40	11.93	0 - 37.00	90.00	11.11	5
Buchloe dactyloides	5.20	7.39	0 - 16.00	80.00	9.88	6
Chondrosum gracile	11.90	16.90	0 - 31.00	90.00	11.11	3
Panicum virgatum	0.20	.28	0 - 2.00	10.00	1.23	13
Sporobolus airoides	1.80	2.56	0 - 10.00	50.00	6.17	8
Sporobolus cryptandrus	1.40	1.99	0 - 5.00	50.00	6.17	9
Sub-Total	28.90	41.05				
INTRODUCED PERENNIAL GRASSES						
Psathyrostachys juncea	0.20	.28	0 - 2.00	10.00	1.23	13
Sub-Total	0.20	0.28				
ANNUAL GRASSES						
[1] Bromus tectorum	0.50	.71	0 - 4.00	20.00	2.47	11
Sub-Total	0.50	0.71				

ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	0.30	.43	0 - 2.00	20.00	2.47	12
[1] Bassia sieversiana	12.50	17.76	0 - 37.00	90.00	11.11	2
[1] Salsola collina	14.40	20.45	0 - 25.00	90.00	11.11	1
[1] Sisymbrium altissimum	2.10	2.98	0 - 5.00	70.00	8.64	7
Ximenesia encelioides	0.10	.14	0 - 1.00	10.00	1.23	14
Sub-Total	29.40	41.76				
SUM OF SPECIES COVER	70.40	100.0				

CRITERIA ASSESSMENT	
Total Absolute Cover	91.80
Allowable Total Absolute Live Vegetation Cover 2022	47.94

Reporting Year: 2023

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.40	1.66	0 - 8.00	40.00	4.55	10

Pascopyrum smithii	19.70	23.31	2.00 - 47.00	100.00	11.36	2
Sub-Total	21.10	24.97				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	11.20	13.25	0 - 27.00	90.00	10.23	3
Buchloe dactyloides	7.40	8.76	0 - 15.00	90.00	10.23	5
Chondrosum gracile	22.80	26.98	13.00 - 32.00	100.00	11.36	1
Panicum virgatum	0.10	.12	0 - 1.00	10.00	1.14	14
Schizachyrium scoparium	0.90	1.07	0 - 9.00	10.00	1.14	11
Sporobolus airoides	1.60	1.89	0 - 7.00	50.00	5.68	9
Sporobolus cryptandrus	1.80	2.13	0 - 5.00	60.00	6.82	8
Sub-Total	45.80	54.20				
ANNUAL GRASSES						
Eragrostis cilianensis	0.30	.36	0 - 1.00	30.00	3.41	13
Panicum capillare	4.90	5.80	0 - 17.00	80.00	9.09	6
Sub-Total	5.20	6.16				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	9.30	11.01	2.00 - 23.00	100.00	11.36	4
Helianthus annuus	0.10	.12	0 - 1.00	10.00	1.14	14
[1] Melilotus officinale	0.80	.95	0 - 5.00	40.00	4.55	12
[1] Salsola collina	2.20	2.60	0 - 11.00	70.00	7.95	7
Sub-Total	12.40	14.68				

SUM OF SPECIES COVER	84.50	100.0

CRITERIA ASSESSMENT

Total Absolute Cover	93.80
Allowable Total Absolute Live Vegetation Cover 2023	80.65
Two year running average for Total Absolute Cover	92.8
Three year running average for Total Absolute Cover	94.17

[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Sample Adequacy Check

ICS RCRA-Equivalent

Year : 2023

Transect	Hits
01 :	81
02 :	89
11 :	83
12 :	87
15 :	83
29 :	92
43 :	81
48 :	85
50 :	82
60 :	82

Sample Adequacy = 0.37

(Mean value: 84.5, Sample Variance: 3.72, One Tailed Value: 1.383)

Table 6.1.4 - ICS RCRA-Equivalent Cover
Raw Data Report

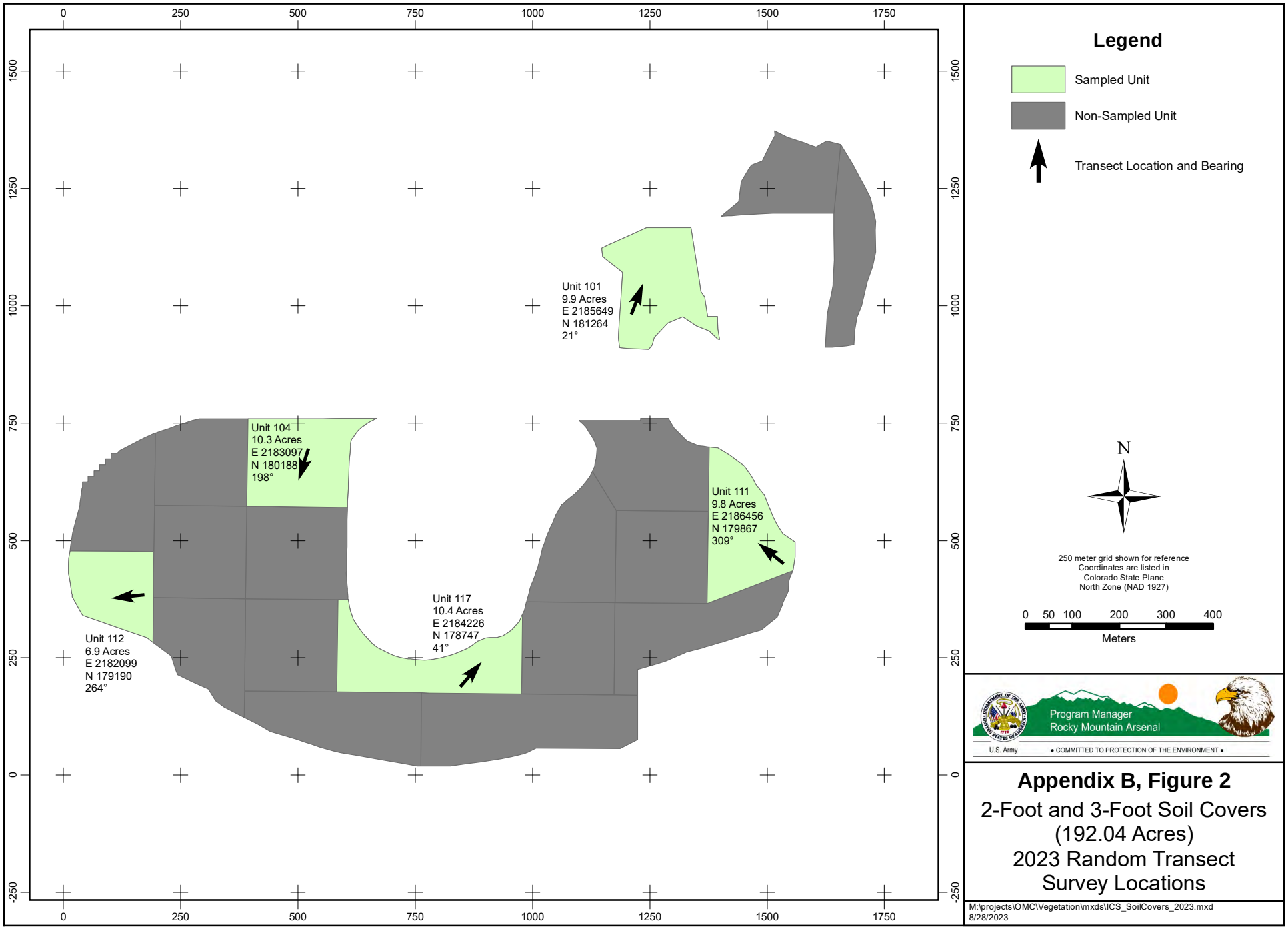
Sampled by: Kimberly Hoffman
Sample Date(s): 9/14/2023

1 - Only plant species that were hit or observed along the transect are recorded in this table.
Blank boxes indicate the species was not present on the transect.
2 - Species with cover values of 0.1 were species observed within the 100 meter zone associated with each transect, but not recorded in the quantitative data collection for each transect.
3 - # of species/100sq meter zone

	Transects									
SPECIES/Other	**01**	**02**	**11**	**12**	**15**	**29**	**43**	**48**	**50**	**60**
BARE SOIL	9.0	5.0	5.0	6.0	10.0	3.0	9.0	5.0	7.0	3.0
LITTER	10.0	6.0	12.0	7.0	7.0	5.0	10.0	10.0	11.0	15.0
BASSIA SIEVERSIANA	4.0	2.0	7.0	6.0	23.0	23.0	2.0	7.0	6.0	13.0
BOUTELOUA CURTIPENDULA	4.0	11.0	3.0	13.0	10.0	15.0	22.0		27.0	7.0
BROMUS TECTORUM			0.1							
BUCHLOE DACTYLOIDES	8.0	9.0	9.0	12.0	3.0		12.0	15.0	2.0	4.0
CHONDROSUM GRACILE	17.0	30.0	17.0	20.0	27.0	13.0	25.0	32.0	20.0	27.0
CONYZA CANADENSIS		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
DYSSODIA PAPPOSA					0.1					
ERAGROSTIS CILIANENSIS					1.0	1.0		1.0		
ERIGERON DIVERGENS	0.1		0.1		0.1					
HELIANTHUS ANNUUS			0.1		0.1	0.1	0.1	0.1	0.1	1.0
HESPEROSTIPA COMATA	2.0	3.0				1.0				8.0
LACTUCA SERRIOLA	0.1		0.1		0.1	0.1	0.1	0.1	0.1	0.1
MEDICAGO SATIVA						0.1				0.1
MELILOTUS OFFICINALE		1.0		1.0	1.0	0.1	5.0	0.1	0.1	0.1
PANICUM CAPILLARE	4.0	17.0	0.1	4.0	2.0	11.0	0.1	7.0	1.0	3.0
PANICUM VIRGATUM				1.0						
PASCOPYRUM SMITHII	40.0	12.0	47.0	23.0	5.0	20.0	8.0	15.0	25.0	2.0
SALSOLA COLLINA		2.0		3.0	2.0	2.0		1.0	1.0	11.0
SCHIZACHYRIUM SCOPARIUM					9.0					
SETARIA VIRIDIS						0.1				
SOLANUM ROSTRATUM					0.1				0.1	0.1

SPOROBOLUS AIROIDES	0.1		0.1	3.0		1.0	7.0	4.0		1.0
SPOROBOLUS CRYPTANDRUS	2.0	2.0	0.1	1.0		5.0		3.0		5.0
TRAGOPOGON DUBIUS		0.1					0.1			
XIMENESIA ENCELIOIDES		0.1			0.1					0.1
Total Hits plus Incidental Species:	**100.3**	**100.3**	**100.8**	**100.1**	**100.7**	**100.6**	**100.5**	**100.4**	**100.5**	**100.6**
Species Density:	**11**	**13**	**13**	**12**	**17**	**16**	**12**	**13**	**12**	**17**

[3] Sample Mean: 13.6, Variance: 2.22



Appendix B, Figure 2

2-Foot and 3-Foot Soil Covers
(192.04 Acres)
2023 Random Transect
Survey Locations

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8/28/2023


ICS 2'-3'
Unit 101


ICS 2'-3'
Unit 104


ICS 2'-3'
Unit 111


ICS 2'-3'
Unit 112


ICS 2'-3'
Unit 117

Table 6.2.1

Cover and Frequency summary for the 2 Foot and 3 Foot at Rocky Mountain Arsenal. Based on data from 5 sampling locations. 2023 data. +/- values equal the standard deviation. Incidental Species present within 1 meter on either side of the data transect, but not quantitatively encountered.

2023

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	5.2	6.18	0 - 23.00	60.0	6.82	5.0
Pascopyrum smithii	25.2	29.93	0 - 54.00	80.0	9.09	1.0
Sub-Total	30.4	36.11				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	4.6	5.46	1.00 - 10.00	100.0	11.36	6.0
Buchloe dactyloides	1.6	1.9	0 - 5.00	60.0	6.82	9.0
Chondrosum gracile	10.4	12.35	1.00 - 20.00	100.0	11.36	3.0
Schizachyrium scoparium	0.6	.71	0 - 3.00	20.0	2.27	10.0
Sporobolus airoides	3.0	3.56	0 - 14.00	40.0	4.55	7.0
Sporobolus cryptandrus	10.4	12.35	0 - 38.00	80.0	9.09	3.0
Sub-Total	30.6	36.33				

ANNUAL GRASSES						
Panicum capillare	6.6	7.84	0 - 13.00	80.0	9.09	4.0
Sub-Total	6.6	7.84				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	2.6	3.09	0 - 7.00	80.0	9.09	8.0
Descurainia incana	0.4	.48	0 - 1.00	40.0	4.55	11.0
Helianthus annuus	0.2	.24	0 - 1.00	20.0	2.27	12.0
Machaeranthera tanacetifolia	0.2	.24	0 - 1.00	20.0	2.27	12.0
[1] Salsola collina	12.6	14.96	0 - 50.00	40.0	4.55	2.0
Solanum rostratum	0.2	.24	0 - 1.00	20.0	2.27	12.0
Tragopogon dubius	0.2	.24	0 - 1.00	20.0	2.27	12.0
Ximenesia encelioides	0.2	.24	0 - 1.00	20.0	2.27	12.0
Sub-Total	16.6	19.73				
SUM OF SPECIES COVER	84.2	100.01				

[3]Total Absolute Mean Vegetation Cover	84.20	+/-3.60
[3]Total Absolute Mean Litter Cover	11.40	+/-4.53
[3]Total Absolute Mean Bare Soil	4.40	+/-1.72
[3]Total Absolute Mean Weedy Cover	15.20	+/-14.04
Total Absolute Ground Cover	95.60	+/-1.72

Incidental Species i.e < 0.01 Mean Cover

Bromus tectorum
Buchloe dactyloides
Conyza canadensis
Dyssodia papposa
Eragrostis cilianensis

Relative Weed Cover	18.05	
Relative Allowable Weed Cover	10.0	
Relative Non-Allowable Cover by Weeds	8.05	
Non-Allowable Absolute Weedy Cover	6.78	
Allowable Total Absolute Live Vegetation Cover	77.42	
Mean Number of Species/Sample	8.8	
Mean Species Density/100sq. meters	12.00	+/- 1.68

Helianthus annuus
Melilotus officinale
Panicum virgatum
Salsola collina
Schizachyrium scoparium
Solanum rostratum
Sporobolus cryptandrus
Ximenesia encelioides

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[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Table 6.2.2 | **Vegetation Performance Assessment 2 Foot and 3 Foot Reporting Years 2021, 2022, 2023** | **2023**

Reporting Year: 2021

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	0.60	1.28	0 - 6.00	25.00	3.50	10
Pascopyrum smithii	15.85	33.69	0 - 59.00	90.00	12.59	1
Sub-Total	16.45	34.97				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	1.60	3.40	0 - 7.00	60.00	8.39	8
Buchloe dactyloides	2.40	5.10	0 - 13.00	60.00	8.39	6
Chondrosum gracile	4.25	9.03	0 - 16.00	85.00	11.89	5
Panicum virgatum	0.45	.96	0 - 6.00	20.00	2.80	12
Schizachyrium scoparium	0.20	.43	0 - 2.00	15.00	2.10	13
Sporobolus airoides	1.55	3.29	0 - 20.00	30.00	4.20	9
Sporobolus cryptandrus	5.55	11.80	0 - 38.00	80.00	11.19	3
Sub-Total	16.00	34.01				

ANNUAL GRASSES						
Eragrostis cilianensis	0.10	.21	0 - 2.00	5.00	.70	14
Panicum capillare	2.15	4.57	0 - 9.00	40.00	5.59	7
Sub-Total	2.25	4.78				
PERENNIAL FORBS						
Argemone polyanthemos	0.05	.11	0 - 1.00	5.00	.70	15
[1] Convolvulus arvensis	0.05	.11	0 - 1.00	5.00	.70	15
Sub-Total	0.10	0.22				
ANNUAL AND BIENNIAL FORBS						
Amaranthus albus	0.05	.11	0 - 1.00	5.00	.70	15
[1] Bassia sieversiana	6.30	13.39	0 - 42.00	70.00	9.79	2
[1] Lactuca serriola	0.05	.11	0 - 1.00	5.00	.70	15
[1] Salsola collina	4.95	10.52	0 - 28.00	70.00	9.79	4
[1] Sisymbrium altissimum	0.10	.21	0 - 1.00	10.00	1.40	14
Solanum rostratum	0.50	1.06	0 - 9.00	10.00	1.40	11
Solanum triflorum	0.20	.43	0 - 2.00	15.00	2.10	13
Ximenesia encelioides	0.05	.11	0 - 1.00	5.00	.70	15
Sub-Total	12.20	25.94				
SHRUBS						
Yucca glauca	0.05	.11	0 - 1.00	5.00	.70	15
Sub-Total	0.05	0.11				
SUM OF SPECIES COVER	47.05	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	96.50
Allowable Total Absolute Live Vegetation Cover 2021	40.31

Reporting Year: 2022

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank
COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	1.20	1.67	0 - 5.00	40.00	5.56	9
Pascopyrum smithii	22.00	30.56	14.00 - 30.00	100.00	13.89	1
Sub-Total	23.20	32.23				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	2.00	2.78	0 - 7.00	40.00	5.56	7
Buchloe dactyloides	1.80	2.50	0 - 5.00	80.00	11.11	8
Chondrosum gracile	7.00	9.72	2.00 - 17.00	100.00	13.89	4
Panicum virgatum	0.20	.28	0 - 1.00	20.00	2.78	10
Sporobolus airoides	2.80	3.89	0 - 7.00	60.00	8.33	6

Sporobolus cryptandrus	12.40	17.22	1.00 - 25.00	100.00	13.89	3
Sub-Total	26.20	36.39				
ANNUAL AND BIENNIAL FORBS						
Amaranthus arenicola	1.20	1.67	0 - 6.00	20.00	2.78	9
[1] Bassia sieversiana	4.20	5.83	0 - 11.00	60.00	8.33	5
[1] Salsola collina	17.20	23.89	5.00 - 32.00	100.00	13.89	2
Sub-Total	22.60	31.39				
SUM OF SPECIES COVER	72.00	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	96.40
Allowable Total Absolute Live Vegetation Cover 2022	57.80

Reporting Year: 2023

Species	Mean Cover (%)	Relative Cover (%)	Range of Cover Values (%)	Percent Frequency (%)	Relative Frequency(%)	[2]Rank

COOL SEASON PERENNIAL GRASSES						
Hesperostipa comata	5.20	6.18	0 - 23.00	60.00	6.82	5
Pascopyrum smithii	25.20	29.93	0 - 54.00	80.00	9.09	1
Sub-Total	30.40	36.11				
WARM SEASON PERENNIAL GRASSES						
Bouteloua curtipendula	4.60	5.46	1.00 - 10.00	100.00	11.36	6
Buchloe dactyloides	1.60	1.90	0 - 5.00	60.00	6.82	9
Chondrosum gracile	10.40	12.35	1.00 - 20.00	100.00	11.36	3
Schizachyrium scoparium	0.60	.71	0 - 3.00	20.00	2.27	10
Sporobolus airoides	3.00	3.56	0 - 14.00	40.00	4.55	7
Sporobolus cryptandrus	10.40	12.35	0 - 38.00	80.00	9.09	3
Sub-Total	30.60	36.33				
ANNUAL GRASSES						
Panicum capillare	6.60	7.84	0 - 13.00	80.00	9.09	4
Sub-Total	6.60	7.84				
ANNUAL AND BIENNIAL FORBS						
[1] Bassia sieversiana	2.60	3.09	0 - 7.00	80.00	9.09	8
Descurainia incana	0.40	.48	0 - 1.00	40.00	4.55	11
Helianthus annuus	0.20	.24	0 - 1.00	20.00	2.27	12
Machaeranthera tanacetifolia	0.20	.24	0 - 1.00	20.00	2.27	12
[1] Salsola collina	12.60	14.96	0 - 50.00	40.00	4.55	2

Solanum rostratum	0.20	.24	0 - 1.00	20.00	2.27	12
Tragopogon dubius	0.20	.24	0 - 1.00	20.00	2.27	12
Ximenesia encelioides	0.20	.24	0 - 1.00	20.00	2.27	12
Sub-Total	16.60	19.73				
SUM OF SPECIES COVER	84.20	100.0				

CRITERIA ASSESSMENT

Total Absolute Cover	95.60
Allowable Total Absolute Live Vegetation Cover 2023	77.42
Two year running average for Total Absolute Cover	96
Three year running average for Total Absolute Cover	96.17

[1] Weedy Species

[2] Based on total cover

[3] Based on 1st hit data

Table 6.2.3

Sample Adequacy Check

2023

2 Foot and 3 Foot

Year : 2023

Transect	Hits
101 :	90
104 :	85
111 :	87
112 :	76
117 :	83

Sample Adequacy = 0.92

(Mean value: 84.2, Sample Variance: 5.26, One Tailed Value: 1.533)

Table 6.2.4 - 2 Foot and 3 Foot Cover
Raw Data Report

Sampled by: Kimberly Hoffman
Sample Date(s): 9/14/2023

1 - Only plant species that were hit or observed along the transect are recorded in this table.
Blank boxes indicate the species was not present on the transect.
2 - Species with cover values of 0.1 were species observed within the 100 meter zone associated with each transect, but not recorded in the quantitative data collection for each transect.
3 - # of species/100sq meter zone

SPECIES/Other	Transects				
	101	104	111	112	117
BARE SOIL	4.0	2.0	7.0	2.0	7.0
LITTER	6.0	13.0	6.0	22.0	10.0
BASSIA SIEVERSIANA	1.0	4.0	1.0		7.0
BOUTELOUA CURTIPENDULA	6.0	1.0	10.0	1.0	5.0
BROMUS TECTORUM	0.1				
BUCHLOE DACTYLOIDES	5.0		0.1	2.0	1.0
CHONDROSUM GRACILE	11.0	1.0	20.0	3.0	17.0
CONYZA CANADENSIS	0.1				
DESCURAINIA INCANA			1.0		1.0
DYSSODIA PAPPOSA					0.1
ERAGROSTIS CILIANENSIS					0.1
HELIANTHUS ANNUUS	0.1	1.0	0.1	0.1	
HESPEROSTIPA COMATA		2.0	23.0	1.0	
MACHAERANTHERA TANACETIFOLIA	1.0				
MELILOTUS OFFICINALE			0.1		
PANICUM CAPILLARE	13.0	9.0	8.0		3.0
PANICUM VIRGATUM	0.1				
PASCOPYRUM SMITHII		54.0	11.0	17.0	44.0
SALSOLA COLLINA		13.0		50.0	0.1
SCHIZACHYRIUM SCOPARIUM	0.1		3.0		
SOLANUM ROSTRATUM		0.1	0.1	0.1	1.0
SPOROBOLUS AIROIDES	14.0		1.0		
SPOROBOLUS CRYPTANDRUS	38.0	0.1	9.0	1.0	4.0

TRAGOPOGON DUBIUS	1.0				
XIMENESIA ENCELIOIDES	0.1	0.1	0.1	1.0	0.1
Total Hits plus Incidental Species:	**100.6**	**100.3**	**100.5**	**100.2**	**100.4**
Species Density:	**15**	**11**	**15**	**10**	**13**

[3] Sample Mean: 12.8, Variance: 2.28

APPENDIX C

Cover Inspection Documentation

(October 1, 2022 through September 30, 2023)

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart

Inspection Date(s): 10-11-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 70's Acceptable/Unacceptable for Inspection *(circle one)*

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

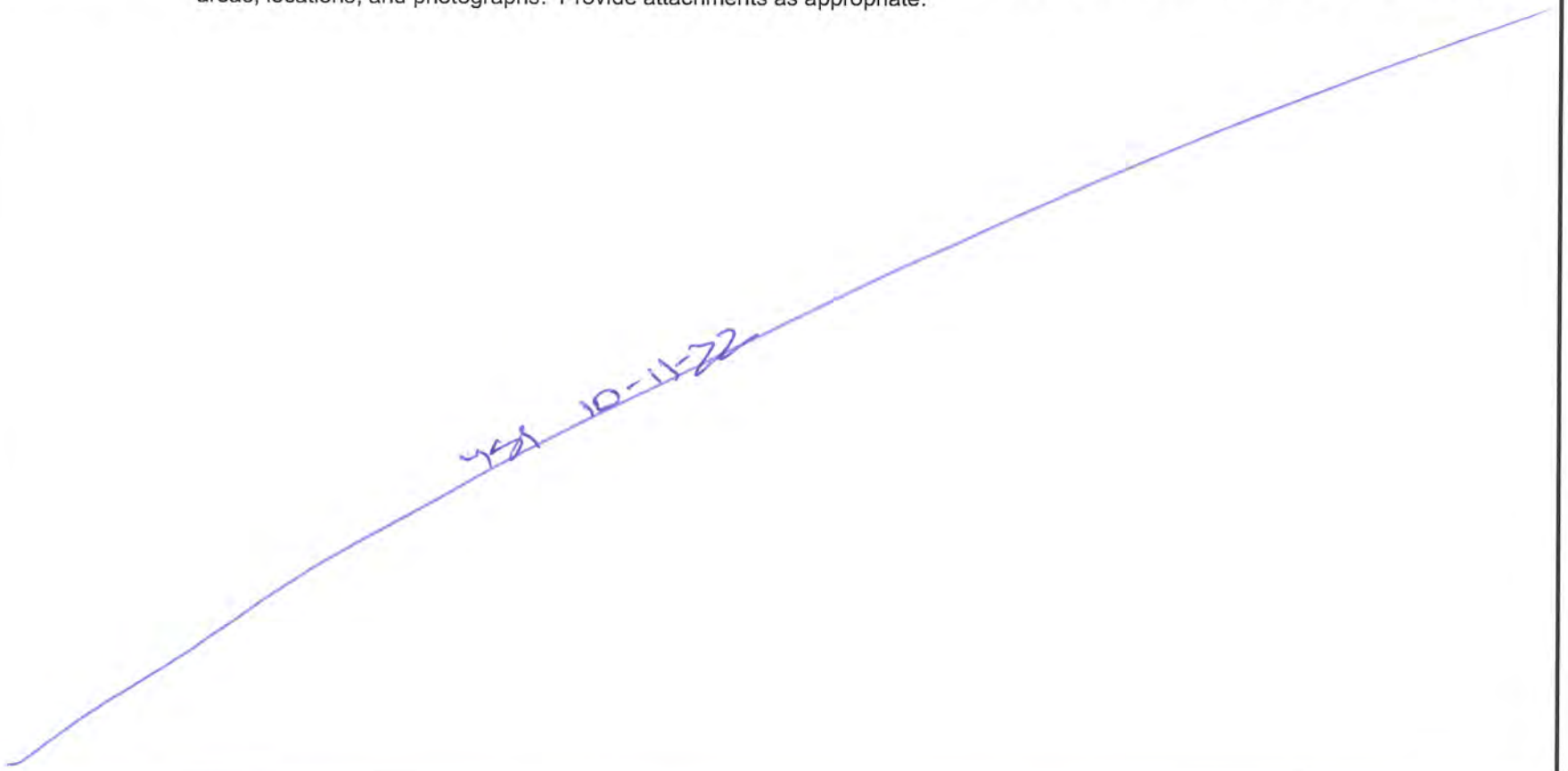
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:**	**Date:** 10-11-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 11/4/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

ICS Percolation Monitoring System Data Collection and Operation Form

pector Name(s): M. Jones, K. Hoffman | **Inspection Date(s):** 11-2-22

nditions:

evious 24-Hour Precipitation: Ø | Weather Conditions: sunny, calm winds, 50's | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
Percolation Collection Manhole (PCM) Condition								
Damage to the PCM or internal components		✓				✓	none	
Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
(SDT)	Ø	006 (CAT)	Ø	011 (SP)	Ø
(SDT)	Ø	007 (Basin A)	trace	012 (SP)	Ø
(SDT)	Ø	008 (CAT)	trace	013 (SP)	1
(CAT)	trace	009 (Basin A)	Ø	014 (LB)	trace
(CAT)	2	010 (Basin A)	Ø	015 (Basin A)	Ø

Form SOP 003-1

ICS Percolation Monitoring System Data Collection and Operation Form

nspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

lysimeters 008, 009, 010 would benefit to have the standing water pumped from inside the manhole.

nspector		
lame: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 11-2-22
:overs Manager Review of Inspection Documentation		
lame: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 11/4/22
:overs Manager Confirmation of Completed Actions		
lame: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman **Inspection Date(s):** 12-7-22

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 30's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	trace	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

12-7-22

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 12-7-22
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:** Michael W. Jones	**Date:** 12/14/22
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. James, K. Hoffman, V. Stewart

Inspection Date(s): 1-11-23

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: snowing, 30's, calm wind Acceptable/Unacceptable for Inspection *(circle one)*

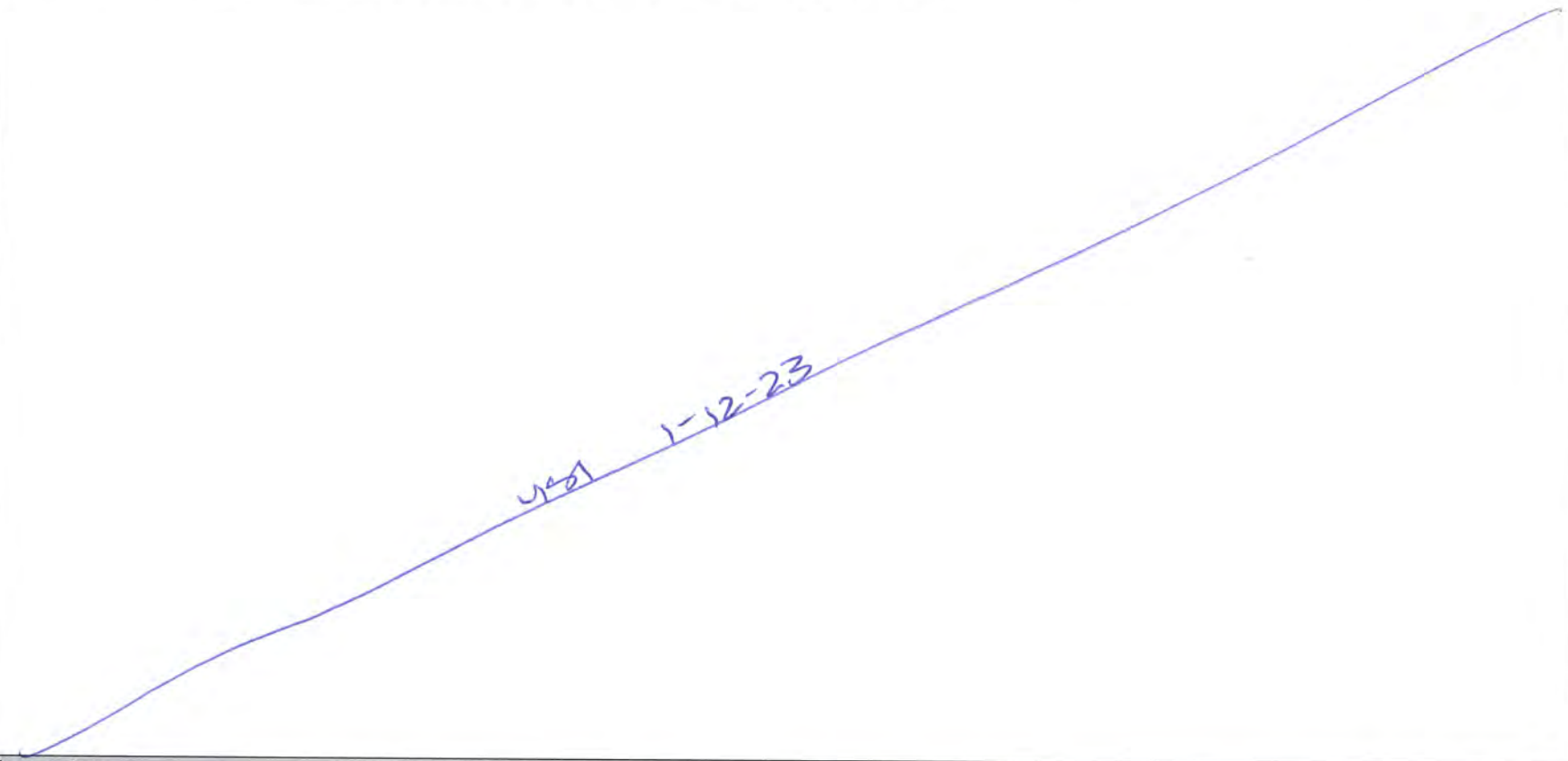
INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	Signature: Kim Hoffman	Date: 1-12-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	Signature:	Date: 1/23/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	Signature: N/A	Date: N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart

Inspection Date(s): 2-1-23

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, upper teens Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 2-1-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 2/13/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

ICS Percolation Monitoring System Data Collection and Operation Form

ıspector Name(s): M. Jones, K. Hoffman, V. Stewart **Inspection Date(s):** 3-1-23

onditions:

revious 24-Hour Precipitation: Ø Weather Conditions: overcast, calm winds, 20's-30's Acceptable/Unacceptable for Inspection ***(circle one)***

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
.0	**Percolation Collection Manhole (PCM) Condition**								
1	Damage to the PCM or internal components		✓				✓	none	
2	Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

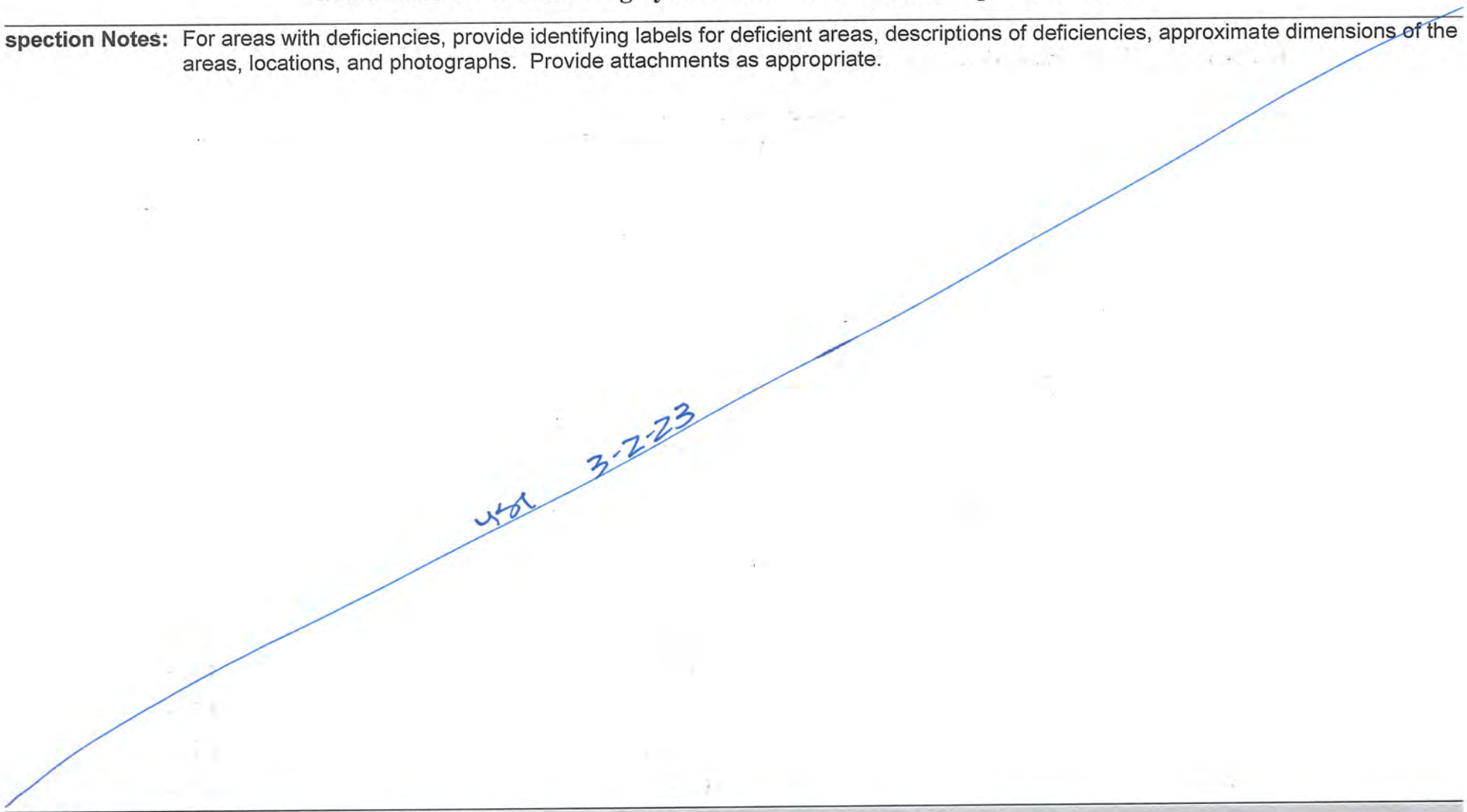
3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

0 Percolation Collection

ysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
1 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
2 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
3 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
4 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
5 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

ICS Percolation Monitoring System Data Collection and Operation Form

spection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



spector		
ame: Kim Hoffman	**Signature:**	**Date:** 3-2-23
overs Manager Review of Inspection Documentation		
ame: Michael W. Jones	**Signature:**	**Date:** 4/24/23
overs Manager Confirmation of Completed Actions		
ame: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): K. Hoffman, V. Stewart | **Inspection Date(s):** 4-11-23

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: Sunny, calm, 80's | Acceptable/Unacceptable for Inspection *(circle one)*

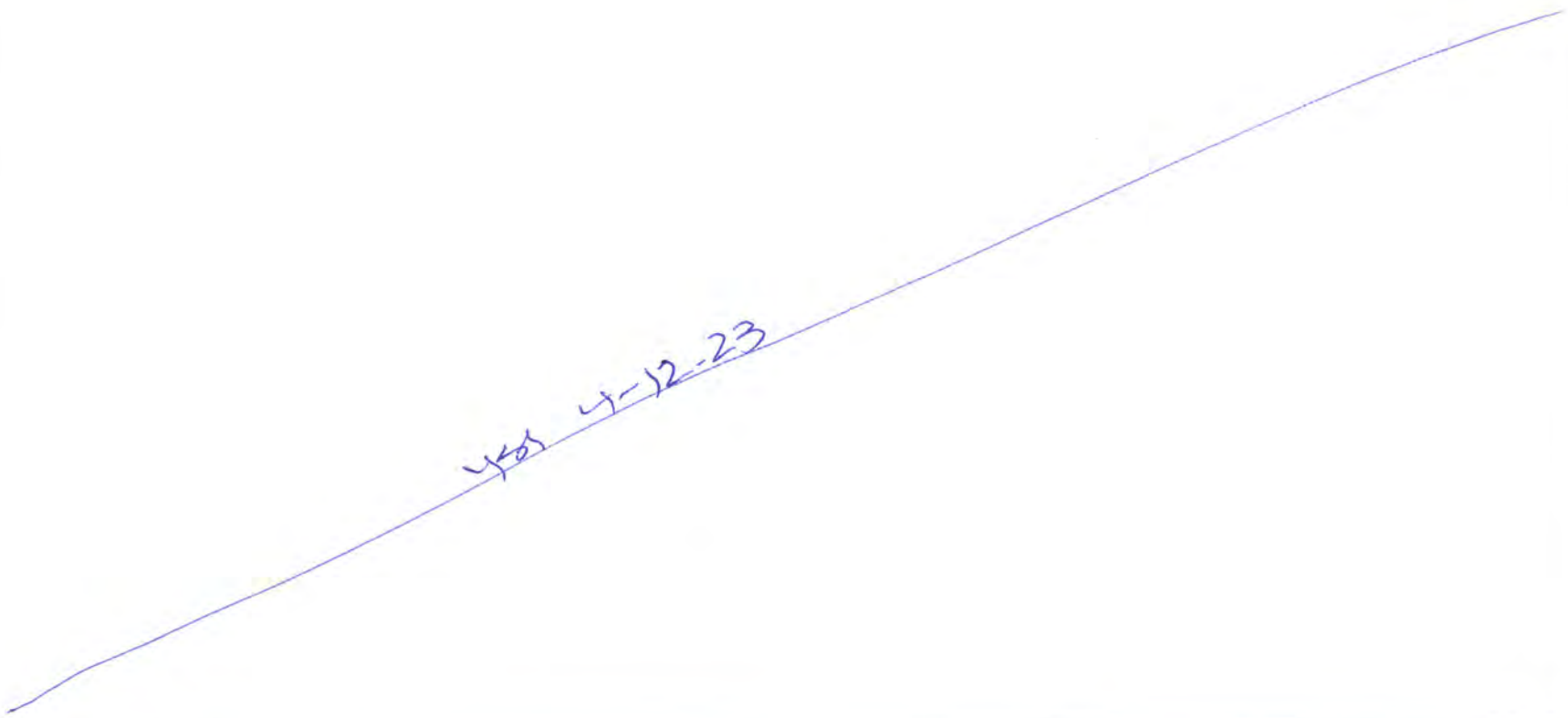
INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	Ø	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 4-12-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 4/24/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart

Inspection Date(s): 5-3-23

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: sunny, calm winds, 70's Acceptable/Unacceptable for Inspection *(circle one)*

INSPECTION ITEM	CONDITION IS PRESENT Y	N	N/A	REPEAT OR CHRONIC CONDITION Y	N	N/A	OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	Ø	006 (CAT)	trace	011 (SP)	trace
002 (SDT)	Ø	007 (Basin A)	trace	012 (SP)	trace
003 (SDT)	Ø	008 (CAT)	trace	013 (SP)	trace
004 (CAT)	trace	009 (Basin A)	trace	014 (LB)	trace
005 (CAT)	trace	010 (Basin A)	trace	015 (Basin A)	trace

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Pump standing water from lysimeters 009 and 010.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 5-3-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 6/30/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart	**Inspection Date(s):** 6-21-23

Conditions:
Previous 24-Hour Precipitation: Ø Weather Conditions: Sunny, calm winds, 70's-80's Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	149	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	Ø	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	1,659	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Lysimeter 001 was measured on 6-21-23 and was returned to on 6-22-23 when percolation stopped. TSK 6-27-23

Lysimeter 003 was measured on 6-21-23 and determined to be out of compliance. The valve was left open to allow the percolation to be collected in the manhole. The percolation was pumped from the manhole and measured on 6-22-23 and 6-27-23. Percolation stopped on 6-27-23.

Inspector		
Name: Kim Hoffman	Signature: Kim Hoffman	Date: 6-27-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	Signature: Michael W. Jones	Date: 6/30/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	Signature: N/A	Date: N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart	**Inspection Date(s):** 7-19-23

Conditions:
Previous 24-Hour Precipitation: ∅ Weather Conditions: Sunny, calm winds, 80's (Acceptable)/Unacceptable for Inspection *(circle one)*

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	

1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): ∅

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	61	006 (CAT)	∅	011 (SP)	∅
002 (SDT)	∅	007 (Basin A)	∅	012 (SP)	∅
003 (SDT)	5	008 (CAT)	trace	013 (SP)	∅
004 (CAT)	∅	009 (Basin A)	∅	014 (LB)	1
005 (CAT)	∅	010 (Basin A)	110	015 (Basin A)	∅

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

lysimeters 001 and 010 were returned to on 7-20-23 to complete the percolation collection.

lysimeters 008, 009, 012, 013, and 014 would benefit to have the standing water pumped from inside the manhole.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 7-20-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 7/24/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman, V. Stewart **Inspection Date(s):** 8-2-23

Conditions:
Previous 24-Hour Precipitation: 0.02" Weather Conditions: sunny, calm winds, 70's Acceptable/Unacceptable for Inspection ***(circle one)***

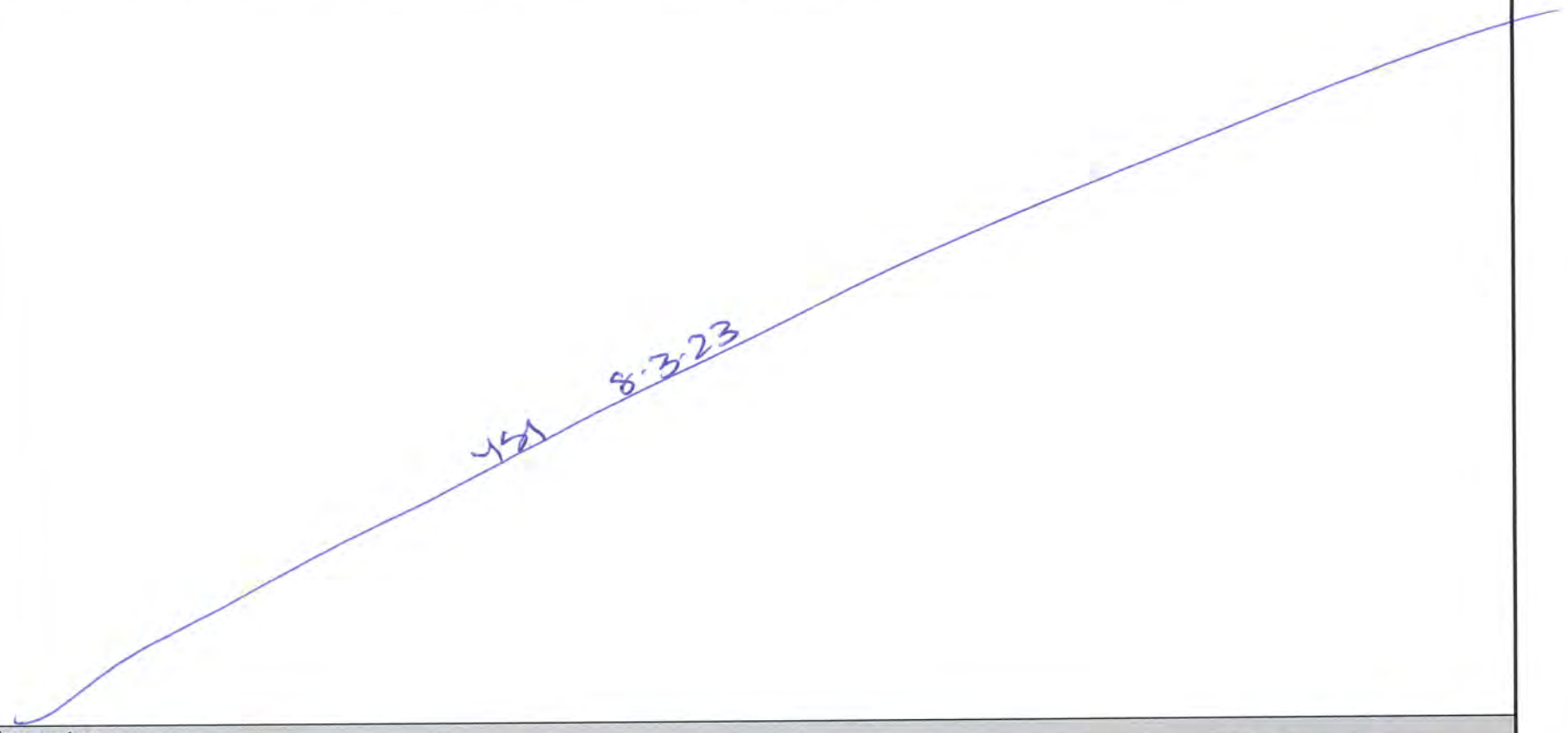
INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): 0								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	26	006 (CAT)	N/A	011 (SP)	N/A
002 (SDT)	0	007 (Basin A)	N/A	012 (SP)	N/A
003 (SDT)	3	008 (CAT)	N/A	013 (SP)	N/A
004 (CAT)	N/A	009 (Basin A)	N/A	014 (LB)	N/A
005 (CAT)	N/A	010 (Basin A)	N/A	015 (Basin A)	N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.



Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 8-3-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 9/7/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspector Name(s): M. Jones, K. Hoffman | **Inspection Date(s):** 9-6-23

Conditions:
Previous 24-Hour Precipitation: Ø | Weather Conditions: calm winds, 70's, sunny | Acceptable/Unacceptable for Inspection ***(circle one)***

INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			OBSERVATION Indicate recommended action, if required.	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Percolation Collection Manhole (PCM) Condition								
1.1 Damage to the PCM or internal components		✓				✓	none	
1.2 Accumulation of a quantity of water greater than that caused by natural condensation in the manhole		✓				✓	none	
1.3 If the water level observed in the PCM impacts the ability to measure percolation, remove water accumulated in the PCM, and record the quantity here. Quantity removed from the PCM (liters): Ø								

2.0 Percolation Collection

Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)	Lysimeter Number	Measured Water Volume (liter)
001 (SDT)	28	006 (CAT)	Ø	011 (SP)	Ø
002 (SDT)	Ø	007 (Basin A)	Ø	012 (SP)	Ø
003 (SDT)	9	008 (CAT)	Ø	013 (SP)	1
004 (CAT)	Ø	009 (Basin A)	Ø	014 (LB)	6
005 (CAT)	Ø	010 (Basin A)	Ø	015 (Basin A)	Ø

Form SOP 003-1
ICS Percolation Monitoring System Data Collection and Operation Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations, and photographs. Provide attachments as appropriate.

Lysimeters 004, 005, 006, 007, 011 and 015 would benefit to have the standing water pumped from the lysimeter manhole.

Inspector		
Name: Kim Hoffman	**Signature:** Kim Hoffman	**Date:** 9-6-23
Covers Manager Review of Inspection Documentation		
Name: Michael W. Jones	**Signature:**	**Date:** 9/28/23
Covers Manager Confirmation of Completed Actions		
Name: N/A	**Signature:** N/A	**Date:** N/A

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, V. Stewart, K. Hoffman | **Date(s):** 10-11-22 **Time of Inspection:** 10:30

Type I inspection ☑ **Type II inspection** ☐ **Post-Storm inspection** ☐
with EP measurements

Drive-around Post-Storm Inspection:
Drive-around inspection date (taken from Logbook): N/A
*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:
Previous 24-hour precipitation: 0 Weather Conditions: sunny, calm winds, 70's Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☑ Figures ☐ Other

INSPECTION ITEM		CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions**								
1.1*	Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2*	Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	Repaired in December 2022. MJ 6/30/23
1.3	Excessive animal trails		✓				✓	none	
1.4	Widespread burrowing animal holes		✓				✓	none	
1.5*	Extensive linear cracks		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet		✓				✓	none	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species	✓				✓		Note 2.	Weed control is ongoing. MJ 6/30/23
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 3.	Addressed in June 2023. MJ 6/30/23
3.2	Debris has collected along the perimeter fence	✓				✓		tumble weed accumulation along fence line	Addressed in May 2023. MJ 6/30/23
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)	(Y) N	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.2* Inadequate protective vegetation	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.3* Erosion rills or gullies in the grass-lined channel	Y (N)	Y (N)	Y (N)			Y (N)	Y N	Y N	Y N	Y (N)			Y (N)		Y (N)	Y (N)		Y (N)		Y (N)	Y N	Y N	Y (N)		Y (N)
4.4* Cracked or degraded concrete				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.5* Expansion joint damage (missing caulk)				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.7* Subsidence or undercutting of the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	

→ 4.1: A couple of small holes were observed near the outlet of Ch. 13. See attached figure.
Repaired in December 2022.
MN 6/30/23

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	(Y) / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	(Y) / N
5.2 Measured Soil Thickness Loss (inches)	0.5	1.25	0.25	2	1.5	2.5	Ø	2	1.25	1.5	1.5	1.25	1.5	1.75	Ø	2	Ø	Ø	Ø

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	(Y) / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	(Y) / N
5.2 Measured Soil Thickness Loss (inches)	1.5	0.25	1.25	0.75	Ø	1	Ø	1.5	1.25	2	2.75	2.75	0.25	1.25	2.75	1.5	1.75	2.5	2.25

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	(Y) / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	(Y) / N
5.2 Measured Soil Thickness Loss (inches)	1.0	0.5	2.5	1.25	2	2	1.5	2.75	2	1.25	1.5	0.5	Ø	0.75	0.75	Ø	1	0.75	Ø

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	(Y) / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	(Y) / N
5.2 Measured Soil Thickness Loss (inches)	1.25	1	1.75	0.25	0.5	1.75	1.75	1.75	2	0.25	1.5	1	0.25	1	1.75	0.75	0.5	0.5	1.75

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	(Y) / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	(Y) / N
5.2 Measured Soil Thickness Loss (inches)	0.75	1.5	0.5	0.75	1.5	1.25	0.25	1.5	0.5	Ø	Ø	1	1.5	1	1.25	0.5

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: (16) areas of holes were observed during the spring 2022 Type II inspection. See attached figure for location information.

Note 2: Areas of germinating cheatgrass were observed along with Russian thistle and Kochia.

Note 3: There are (2) broken wooden fence posts along the 8-ft perimeter fence. There is a missing T-post on NW perimeter fence from a bison breach event.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 10-13-22
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 11/8/22
Covers Manager Confirmation of Completed Actions	
Name:	**Signature and Date:**

LEGEND

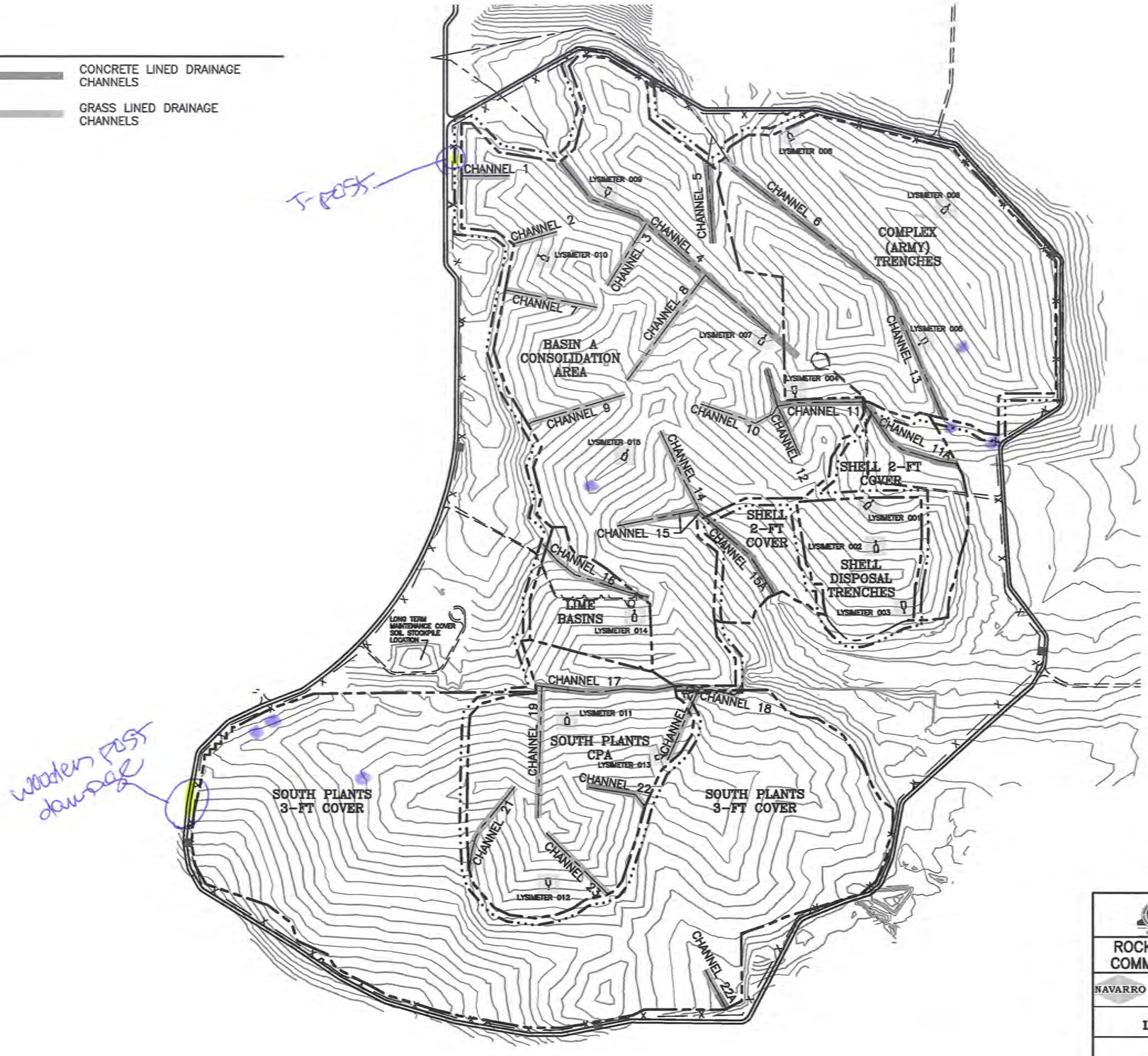
- COVER BOUNDARY
- BIOTA BARRIER MATERIAL BOUNDARY
- WELL ACCESS ROAD
- AS–BUILT CONTOURS (RECORD CONDITIONS)
- PERIMETER FENCE
- ARMY MAINTAINED AREA BOUNDARY (SEE NOTE)
- LYSIMETER
- OBELISK (OUTSIDE FENCE)
- CONCRETE LINED DRAINAGE CHANNELS
- GRASS LINED DRAINAGE CHANNELS

NOTE: THE OUTSIDE SHOULDER OF THE ACCESS ROAD DEFINES THE ARMY MAINTAINED AREA BOUNDARY.

holes

T-post

wooden post



0 400 800
Scale In Feet

Program Manager
Rocky Mountain Arsenal

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO
Research and Engineering, I

PROJECT NAME
LONG–TERM CARE PLAN

TITLE
ICS SURFACE WATER DRAINAGE CHANNEL PLAN

CAD FILE: | DATE | FIGURE NUMB

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffman, V. Stewart **Date(s):** 5-17-23 **Time of Inspection:** 10:00

Type I inspection ☑ **Type II inspection** ☐ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:

Drive-around inspection date (taken from Logbook): N/A

*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:

Previous 24-hour precipitation: ∅ Weather Conditions: mostly sunny, calm winds, 30's (Acceptable/Unacceptable for Inspection ***(circle one)***)

Attachments: ☐ Photographs ☐ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)		✓				✓	none	
1.3 Excessive animal trails		✓				✓	none	
1.4 Widespread burrowing animal holes		✓				✓	none	
1.5* Extensive linear cracks		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet		✓				✓	none	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species		✓				✓	none	
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 1.	Addressed in June 2023. MJ 6/30/23
3.2	Debris has collected along the perimeter fence	✓				✓		tumble weed accumulation along fence line	Addressed in May 2023. MJ 6/30/23
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2* Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3* Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4* Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5* Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7* Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER20**	**ER21**	**ER22**	**ER23**	**ER24**	**ER25**	**ER26**	**ER27**	**ER28**	**ER29**	**ER30**	**ER31**	**ER32**	**ER33**	**ER34**	**ER35**	**ER36**	**ER37**	**ER38**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER39**	**ER40**	**ER41**	**ER42**	**ER43**	**ER44**	**ER45**	**ER46**	**ER47**	**ER48**	**ER49**	**ER50**	**ER51**	**ER52**	**ER53**	**ER54**	**ER55**	**ER56**	**ER57**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER58**	**ER59**	**ER60**	**ER61**	**ER62**	**ER63**	**ER64**	**ER65**	**ER66**	**ER67**	**ER68**	**ER69**	**ER70**	**ER71**	**ER72**	**ER73**	**ER74**	**ER75**	**ER76**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER77**	**ER78**	**ER79**	**ER80**	**ER81**	**ER82**	**ER83**	**ER84**	**ER85**	**ER86**	**ER87**	**ER88**	**ER89**	**ER90**	**ER91**	**ER92**			
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N			
5.2 Measured Soil Thickness Loss (inches)																			

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: There are (2) broken wooden fence posts along the 8-foot perimeter fence. These are located in the SW section of the ICS AMA.

Inspection postponed from 1-11-23 to 1-17-23 due to snow.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 1-18-23
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 1/23/23
Covers Manager Confirmation of Completed Actions	
Name: Michael W. Jones	**Signature and Date:** 6/30/23

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffman, V. Stewart | **Date(s):** 4-11-23 | **Time of Inspection:** 0800

Type I inspection ☐ **Type II inspection** ☑ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:

Drive-around inspection date (taken from Logbook): N/A

*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:

Previous 24-hour precipitation: Ø | Weather Conditions: calm, sunny, 70's | Acceptable/Unacceptable for Inspection *(circle one)*

Attachments: ☑ Photographs ☑ Figures ☑ Other : coordinate list

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1	Repaired in August 2023. MJ 8/2/23
1.3 Excessive animal trails		✓				✓	none	
1.4 Widespread burrowing animal holes	✓				✓		see General Notes	
1.5* Extensive linear cracks		✓				✓	none	

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INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet	✓				✓		see General Notes	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species	✓				✓		Note 2	Weed control is on-going. MJ 4/24/23
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged	✓				✓		Note 3.	Addressed in June 2023. MJ 6/30/23
3.2	Debris has collected along the perimeter fence	✓				✓		tumble weed accumulation along fence line	Addressed in May 2023. MJ 6/30/23
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

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4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.2* Inadequate protective vegetation	Y (N)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y (N)
4.3* Erosion rills or gullies in the grass-lined channel	Y (N)	Y N	Y (N)			Y (N)	Y N	Y N	Y N	Y (N)			Y (N)		Y (N)	Y (N)		Y (N)		Y (N)	Y N	Y N	Y (N)		Y (N)
4.4* Cracked or degraded concrete				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.5* Expansion joint damage (missing caulk)				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	
4.7* Subsidence or undercutting of the concrete-lined channel				Y (N)	Y N	Y (N)					Y (N)	Y N	Y N	Y (N)		Y (N)	Y N	Y N	Y N	Y (N)				Y (N)	

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5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	0.75	1	Ø	2	1.25	2.5	Ø	2	1	1	1.25	1	1.25	0.75	Ø	2	Ø	Ø	Ø

INSPECTION ITEM	ER20	ER21	ER22	ER23	ER24	ER25	ER26	ER27	ER28	ER29	ER30	ER31	ER32	ER33	ER34	ER35	ER36	ER37	ER38
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	1	0.25	1.25	0.75	Ø	1	Ø	1	1.5	1.75	2.5	2.75	0.25	1	1.75	1.5	1.75	2.25	2

INSPECTION ITEM	ER39	ER40	ER41	ER42	ER43	ER44	ER45	ER46	ER47	ER48	ER49	ER50	ER51	ER52	ER53	ER54	ER55	ER56	ER57
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	0.75	0.25	2	1	1.5	2	1.5	3	2	1.5	1	Ø	Ø	025	1	Ø	1	0.25	0.5

INSPECTION ITEM	ER58	ER59	ER60	ER61	ER62	ER63	ER64	ER65	ER66	ER67	ER68	ER69	ER70	ER71	ER72	ER73	ER74	ER75	ER76
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	1.25	0.5	1.75	Ø	Ø	1.5	1.5	1.5	1.5	Ø	0.75	1	Ø	1	1.5	0.75	Ø	Ø	1.5

INSPECTION ITEM	ER77	ER78	ER79	ER80	ER81	ER82	ER83	ER84	ER85	ER86	ER87	ER88	ER89	ER90	ER91	ER92
5.1 Was the monument free of damage and legible?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	(Y) N
5.2 Measured Soil Thickness Loss (inches)	0.25	1	0.25	0.75	1	1.25	Ø	1.5	0.5	Ø	Ø	1	1	1	1.25	Ø

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ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

General Notes:

- There were observations of holes approximately 3" deep by 6-8" wide along all the transect routes. These holes were backfilled with existing soil when encountered and not recorded as open inspection items. See attached Photos 1 and 2 for examples of these holes.
- There was an observation of a bare area at Waypoint KH0001 on the east transects. This area was located on a patch of ICS that had successfully burned in the prescribed burn conducted by the USFWS in October of 2022. This area is not considered an open inspection item due to the fact the vegetation is still mostly dormant but was marked with GPS to continue to inspect for growth. Please see attached Photo 3.

Note 1: There were a few sinkholes marked on the west transects as Waypoints MJ0003-0005. These sinkholes were repaired with archived lysimeter soil from 5-gallon buckets that were carried on the inspection vehicles due to being larger in size and no existing soil on the surface to repair. See Photos 4 and 5.
There were three sinkholes identified under the north perimeter fence at Waypoint KH0002 and these were not repaired during the inspection. See Photo 6.
Note 2: Cheatgrass was observed at Waypoints MJ0001 and MJ0002 on the west transects.
Note 3: There are two broken wooden fence posts along the southwest portion of the 8-foot perimeter fence.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 4-19-23
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 4/24/23
Covers Manager Confirmation of Completed Actions	
Name: Michael W. Jones	**Signature and Date:** 8/2/23

An example of a hole observed and backfilled

Photo 1

Photo 2

Photo 3
The bare area observed in the prescribed burn area

Sinkhole repaired using soil in buckets on west transects

Photos 4 and 5

Photo 6
Sinkholes under perimeter fence

2023 Spring Type II Coordinate List

ICS West Transects

Waypoint	Coordinates		Description
MJ 0001	N39 50.153	W104 50.776	cheatgrass
MJ 0002	N39 49.973	W104 50.741	cheatgrass
MJ 0003	N39 49.868	W104 50.693	sinkhole (repaired during inspection)
MJ 0004	N39 49.864	W104 50.694	sinkhole (repaired during inspection)
MJ 0005	N39 49.844	W104 50.699	sinkhole (repaired during inspection)

ICS East Transects

Waypoint	Coordinates		Description
KH 0001	N39 49.761	W104 50.429	burned/bare area (keep inspecting area)
KH 0002	N39 50.345	W104 50.488	sinkholes under perimeter fenceline

LEGEND

- RCRA–EQUIVALENT COVER BOUNDARY
- SHELL DISPOSAL TRENCHES 2–FT COVER BOUNDARY
- SOUTH PLANTS 3–FT COVER BOUNDARY
- BBM BOUNDARY
- FENCE
- ROAD
- CHANNEL
- BOUNDARY POINT
- GRID POINT

MATCHLINE SEE FIGURE 1 (SHEET 2 OF 2)

0001 cheatgrass

0002 cheatgrass

0003/0004 sinkholes (Repaired)

0005 sinkhole (Repaired)

BASIN A CONSOLIDATION AREA

LIME BASINS

SOUTH PLANTS CPA

SOUTH PLANTS 3–FT COVER

'D' STREET

7th AVE (72nd Ave)

COLORADO STATE PLANE

0 250 500

Scale In Feet

Program Manager
Rocky Mountain Arsenal
U.S. Army
• COMMITTED TO PROTECTION OF THE ENVIRONMENT •

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO Research and Engineering, Inc.

PROJECT NAME
INTEGRATED COVER SYSTEM
TYPE II INSPECTION

TITLE
NORTH/SOUTH TRANSECTS
200' SPACING AT +25'
(SHEET 1 OF 2)

CAD FILE:	DATE	FIGURE NUMBER
FIGURE 1 – ICS SH 1 OF 2–25'.DWG	05.04.22	1
BY: S. GILBERT CHK'D: M. JONES		

S:\G PROJECTS\2022 Inspection Transect Figures\

MATCHLINE SEE FIGURE 1 (SHEET 1 OF 2)

2002 sinkholes

COMPLEX (ARMY) TRENCHES

BASIN A CONSOLIDATION AREA

SHELL 2-FT COVER

SHELL DISPOSAL TRENCHES

SHELL 2-FT COVER

000! buried area

SOUTH PLANTS 3-FT COVER

7th AVE (72nd Ave)

MATCHLINE SEE FIGURE 1

LEGEND

- RCRA-EQUIVALENT COVER BOUNDARY
- SHELL DISPOSAL TRENCHES 2-FT COVER BOUNDARY
- SOUTH PLANTS 3-FT COVER BOUNDARY
- BBM BOUNDARY
- FENCE
- ROAD
- CHANNEL
- BOUNDARY POINT
- GRID POINT

COLORADO STATE PLANE

0 250 500

Scale In Feet

Program Manager
Rocky Mountain Arsenal
U.S. Army
• COMMITTED TO PROTECTION OF THE ENVIRONMENT •

ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO

NAVARRO Research and Engineering, Inc.

PROJECT NAME
INTEGRATED COVER SYSTEM
TYPE II INSPECTION

TITLE
NORTH/SOUTH TRANSECTS
200' SPACING AT +25'
(SHEET 2 OF 2)

CAD FILE:		DATE	FIGURE NUMBER
FIGURE 1 – ICS SH 2 OF 2–25'.DWG			
BY: S. GILBERT	CHK'D: M. JONES	05.04.22	1

S:\G PROJECTS\2022 Inspection Transect Figures\

Post-Storm

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffman, V. Stewart **Date(s):** 6-21-23 **Time of Inspection:** 0800

Type I inspection ☐ **Type II inspection** ☐ **Post-Storm inspection** ☑

Drive-around Post-Storm Inspection:
Drive-around inspection date (taken from Logbook): 5-11-23, 5-15-23, 6-5-23
*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: 5-10-23, 5-11-23, 6-4-23

Total Precipitation (in): 1.03", 2.92", 1.23"

Inspection Conditions:
Previous 24-hour precipitation: 0 Weather Conditions: Sunny, calm winds, 70's - 80's Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☐ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	Repaired in August 2023. MJ 8/2/23
1.3 Excessive animal trails			✓			✓	N/A	
1.4 Widespread burrowing animal holes			✓			✓	N/A	
1.5* Extensive linear cracks		✓				✓	none	

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ICS Inspection Form

	INSPECTION ITEM	CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls			✓			✓	N/A	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet			✓			✓	N/A	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)			✓			✓	N/A	
2.3	Deep rooted, noxious or undesirable weedy species			✓			✓	N/A	
2.4	Excessive litter accumulation			✓			✓	N/A	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged			✓			✓	N/A	
3.2	Debris has collected along the perimeter fence			✓			✓	N/A	
3.3	Obelisks are damaged, not visible, or not legible			✓			✓	N/A	
3.4	Warning signs are not legible from 25 feet			✓			✓	N/A	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

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ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2* Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3* Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4* Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5* Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7* Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER20**	**ER21**	**ER22**	**ER23**	**ER24**	**ER25**	**ER26**	**ER27**	**ER28**	**ER29**	**ER30**	**ER31**	**ER32**	**ER33**	**ER34**	**ER35**	**ER36**	**ER37**	**ER38**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER39**	**ER40**	**ER41**	**ER42**	**ER43**	**ER44**	**ER45**	**ER46**	**ER47**	**ER48**	**ER49**	**ER50**	**ER51**	**ER52**	**ER53**	**ER54**	**ER55**	**ER56**	**ER57**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER58**	**ER59**	**ER60**	**ER61**	**ER62**	**ER63**	**ER64**	**ER65**	**ER66**	**ER67**	**ER68**	**ER69**	**ER70**	**ER71**	**ER72**	**ER73**	**ER74**	**ER75**	**ER76**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER77**	**ER78**	**ER79**	**ER80**	**ER81**	**ER82**	**ER83**	**ER84**	**ER85**	**ER86**	**ER87**	**ER88**	**ER89**	**ER90**	**ER91**	**ER92**			
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N			
5.2 Measured Soil Thickness Loss (inches)																			

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Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note: (3) sinkholes observed during spring 2022 Type II inspection remain open. The sinkholes are under the north perimeter fence line.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 6.26.23
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 6/30/23
Covers Manager Confirmation of Completed Actions	
Name: Michael W. Jones	**Signature and Date:** 8/2/23

Form SOP 001-1
ICS Inspection Form

Inspector Names: M. Jones, K. Hoffmann, V. Stewart | **Date(s):** 7-19-23 | **Time of Inspection:** 0800

Type I inspection ☑ **Type II inspection** ☐ **Post-Storm inspection** ☐

Drive-around Post-Storm Inspection:
Drive-around inspection date (taken from Logbook): N/A
*Note: Post-storm event inspection items are indicated with a * next to the Inspection Item number.*

Date(s) of Significant Storm Event: N/A

Total Precipitation (in): N/A

Inspection Conditions:
Previous 24-hour precipitation: Ø | Weather Conditions: Sunny, calm winds, 80's | Acceptable/Unacceptable for Inspection ***(circle one)***

Attachments: ☐ Photographs ☐ Figures ☐ Other

INSPECTION ITEM	CONDITION PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
	Y	N	N/A	Y	N	N/A		
1.0 Surface Conditions								
1.1* Erosion rills, gullies, or sheet erosion		✓				✓	none	
1.2* Conditions that could interrupt cover surface drainage (ponding areas, ruts, hole greater than 3" in diameter)	✓				✓		Note 1.	Repaired in August 2023. MJ 8/2/23
1.3 Excessive animal trails		✓				✓	none	
1.4 Widespread burrowing animal holes		✓				✓	none	
1.5* Extensive linear cracks		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

INSPECTION ITEM		CONDITION IS PRESENT			REPEAT OR CHRONIC CONDITION			INSPECTION NOTE	CONFIRMATION THAT ACTION IS COMPLETE (Initial and Date)
		Y	N	N/A	Y	N	N/A		
1.0	**Surface Conditions (Continued)**								
1.6	Vandalism, or intrusive damage such as unplanned excavation, drilling, grading, damage to engineering or access controls		✓				✓	none	
2.0	**Vegetative Cover**								
2.1	Bare area or areas of poor growth greater than 100 square feet		✓				✓	none	
2.2	Areas of vegetation stress greater than 100 square feet (over grazing, discoloration, pedestalling)		✓				✓	none	
2.3	Deep rooted, noxious or undesirable weedy species		✓				✓	none	
2.4	Excessive litter accumulation		✓				✓	none	
3.0	**Engineering and Access Controls**								
3.1	The perimeter fence is damaged		✓				✓	none	
3.2	Debris has collected along the perimeter fence		✓				✓	none	
3.3	Obelisks are damaged, not visible, or not legible		✓				✓	none	
3.4	Warning signs are not legible from 25 feet		✓				✓	none	
3.5*	Damage to the Perimeter Access Road such as potholes, washouts, washboard, or burrowing		✓				✓	none	

Form SOP 001-1
ICS Inspection Form

4.0 Surface Drainage Controls: *Were the following conditions observed during the inspection of the stormwater drainage controls? (circle all that apply)*

INSPECTION ITEM	CHANNEL NUMBER																								
	1	2	3	4	5	6	7	8	9	10	11	11A	12	13	14	15	15A	16	17	18	19	20	21	22	23
4.1* Impeded drainage or ponding in the channel (siltation/debris present)	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.2* Inadequate protective vegetation	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
4.3* Erosion rills or gullies in the grass-lined channel	Y N	Y N	Y N			Y N	Y N	Y N	Y N	Y N			Y N		Y N	Y N		Y N		Y N	Y N	Y N	Y N		Y N
4.4* Cracked or degraded concrete				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.5* Expansion joint damage (missing caulk)				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.6* Inhibited drainage from the soil to the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	
4.7* Subsidence or undercutting of the concrete-lined channel				Y N	Y N	Y N					Y N	Y N	Y N	Y N		Y N	Y N	Y N	Y N	Y N				Y N	

Form SOP 001-1
ICS Inspection Form

5.0 Erosion/Settlement Monuments: *Inspect monuments for damage and legibility, and record the soil thickness loss, if any. Perform during spring Type II and fall Type I inspections.*

INSPECTION ITEM	ER01	ER02	ER03	ER04	ER05	ER06	ER07	ER08	ER09	ER10	ER11	ER12	ER13	ER14	ER15	ER16	ER17	ER18	ER19
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER20**	**ER21**	**ER22**	**ER23**	**ER24**	**ER25**	**ER26**	**ER27**	**ER28**	**ER29**	**ER30**	**ER31**	**ER32**	**ER33**	**ER34**	**ER35**	**ER36**	**ER37**	**ER38**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER39**	**ER40**	**ER41**	**ER42**	**ER43**	**ER44**	**ER45**	**ER46**	**ER47**	**ER48**	**ER49**	**ER50**	**ER51**	**ER52**	**ER53**	**ER54**	**ER55**	**ER56**	**ER57**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER58**	**ER59**	**ER60**	**ER61**	**ER62**	**ER63**	**ER64**	**ER65**	**ER66**	**ER67**	**ER68**	**ER69**	**ER70**	**ER71**	**ER72**	**ER73**	**ER74**	**ER75**	**ER76**
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
5.2 Measured Soil Thickness Loss (inches)																			
INSPECTION ITEM	**ER77**	**ER78**	**ER79**	**ER80**	**ER81**	**ER82**	**ER83**	**ER84**	**ER85**	**ER86**	**ER87**	**ER88**	**ER89**	**ER90**	**ER91**	**ER92**			
5.1 Was the monument free of damage and legible?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N			
5.2 Measured Soil Thickness Loss (inches)																			

Form SOP 001-1
ICS Inspection Form

Inspection Notes: For areas with deficiencies, provide identifying labels for deficient areas, descriptions of deficiencies, approximate dimensions of the areas, locations with GPS coordinates, and photographs as needed. Provide attachments as appropriate.

Note 1: (3) sinkholes were observed during the spring 2022 Type II inspection and remain open. The holes are under the north perimeter fence line.

Inspector	
Name: Kim Hoffman	**Signature and Date:** Kim Hoffman 7-21-23
Covers Manager Review of Inspection Documentation	
Name: Michael W. Jones	**Signature and Date:** 7/24/23
Covers Manager Confirmation of Completed Actions	
Name: Michael W. Jones	**Signature and Date:** 8/2/23

APPENDIX D

Maintenance and Repair Documentation

(October 1, 2022 through September 30, 2023)

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 10/4/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
The Lime Basins precipitation gauge is functioning, but the data is not being stored due a power outage. On 10/3/22 a storm produced 0.55" of rain and the storm damaged a transformer. The LB precipitation gauge data is stored at the computer in the LSLF building and the power outage affected the landfills.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: [signature]	Date: 12/6-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: [signature]	Date: 12/14/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 10/11/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC placed a manual rain gauge near the Lime Basins precipitation gauge due to the power outage and power not being restored. No precipitation has occurred since the power outage on 10/3/22. OMC also set up the LSLF computer in the LB Metering Building to resume storage of the LB precipitation gauge data.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
Power was restored on October 21, 2022.	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature: [signature]	Date: 12.30.22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature: [signature]	Date: 12/14/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: USFWS	Project: ICS O&M
Task: maintenance/repair	Date: 10/12/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
The USFWS performed a prescribed burn on the ICS AMA. The burn was not very successful due to recent precipitation, green vegetation, and the annual weeds not being dry enough to carry the fire. The tumbleweed accumulation along the entire perimeter fence line was successfully burned so this maintenance item can be closed out. OMC also used a motor grader on the ICS perimeter road.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature:	Date: 11-30-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/14/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 11/7/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers used a ground clear herbicide around ICS to spray the roads, cattleguards, gate entrances, and other hard working surfaces. Weed Wranglers used the herbicide Plainview SC®.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Caps and Covers Lead/Navarro
Signature:	Date: 11-30-22
Reviewer Name: Michael Jones	Title/company: Caps and Covers Manager/Navarro
Signature:	Date: 12/14/22

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 12/7/22
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC used soil from the archived lysimeter buckets to backfill the following holes: Type II spring inspection 2022 waypoints KH1, KH2, KH4 and KH11. Post-storm June 22 inspection: holes identified in Channel 13 coordinates (N39 49.9439 W104 50.0516)	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 6.23.23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 12/8/22
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

OMC replaced three wooden posts that were damaged during the October 2022 prescribed burn. Two T-posts were straightened. One T-post was damaged during a bison breach in August of 2022 and the other T-post was damaged due to tumbleweed accumulation.

OMC also repaired Hole 001 and Hole 002 from the east ICS spring 2022 Type II inspection using soil from the archived lysimeter buckets.

Summary Meetings and Discussions Held or Attended, including Job Safety:

N/A

Comments:

N/A

Additional Documentation Submitted:

N/A

Sign Off:

Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date:
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 4/27/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel used a motor grader to grade the ICS perimeter road.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: [illegible]
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/3/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel used the USFWS tractor and OMC fence cleaner to remove accumulated tumble weeds from the ICS perimeter fence. OMC also reattached the fence fabric to wooden posts where necessary.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 5-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/11/23
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

OMC performed a drive around post-storm inspection due to the RMA receiving 1.03" of precipitation in a 24-hour period. No observations were noted.

Summary Meetings and Discussions Held or Attended, including Job Safety:

N/A

Comments:

N/A

Additional Documentation Submitted:

N/A

Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 6-2-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 5/15/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel performed a drive-around post-storm inspection due to the RMA receiving the following precipitation: **5/10/23** 0.62" **5/11/23** 2.92" **5/12/23** 0.85" **5/14/23** 0.28" No observations were noted.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date:
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 5/31/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 used a John Deere tractor and drill seeder to overseed approximately 40 acres on Lime Basins and South Plants. These areas were also over seeded in April of 2022, but remained sparse for established grasses. This work was not completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date:
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: H2	Project: ICS O&M
Task: maintenance/repair	Date: 6/1/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
H2 used a John Deere tractor and drill seeder to continue over seeding the remainder of the 40 acres on Lime Basins and South Plants. These areas were also over seeded in April of 2022, but remained sparse for established grasses. This work was completed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
(7) seed tags	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 6-27-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 6/5/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC performed a drive around post-storm inspection due to the RMA receiving 1.23" of rain in a 24-hour period on June 4. No observations were noted.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 6/23/23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: CE Fence	Project: ICS O&M
Task: maintenance/repair	Date: 5/8/23 through 6/8/23
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

CE Fence mobilized onsite on May 8, 2023. CE cut down existing brace supports to match the new height of the shortened fence and welded braces back onto the shorter level. CE removed all existing fence posts (wooden and T posts) and replaced them with 9-foot long, 2-3/8 inch galvanized Schedule 40 pipe. All the Schedule 40 pipe had fence caps installed. The existing 8-foot tall fence fabric was removed and replaced with a 49-inch Bekaert Solidlock Pro 30 949-6 cattle fence that was hung with a minimum gap of 18-inches from the ground surface. The nominal height of the modified fence is 67 inches. The fence was tied into the existing corner braces. Perimeter warning signs were relocated from the wooden posts to the new metal pipe posts. Four double swing gates were replaced with single 50-inch tall gates by Wellscroft Fence Systems, LLC. The former wooden gate stops were replaced with 9 foot long, 2-3/8 inch galvanized Schedule 40 pipe. The old gate latch hardware was reattached to all the gate components. Alphabetical gate signs were reattached near the gates. CE Fence removed all existing fence parts for offsite recycle and disposal. CE Fence demobilized on June 8, 2023 after the fence was inspected and the gates were operable.

Summary Meetings and Discussions Held or Attended, including Job Safety:

See daily tailgates.

Comments:

During this timeframe, the RMA received precipitation. CE Fence only worked onsite when conditions were favorable and OMC approved.

Additional Documentation Submitted:

N/A

Sign Off:

Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 6-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 6/30/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 6/21/23
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

Weed Wranglers drove around half of ICS and spot sprayed noxious weeds. Weed Wranglers was given the liberty to spray weeds whenever encountered. Thistles, bindweed, and deep-rooted weeds were sprayed with Escort XP®, Vision®, and surfactant.

OMC personnel measured the SDT piezometers due to the percolation exceedance at Lysimeter 003. Monitoring will continue monthly until the lysimeter percolation compliance is restored.

36251: 2.08 feet
36252: dry
36253: dry
36254: dry

Summary Meetings and Discussions Held or Attended, including Job Safety:

N/A

Comments:

N/A

Additional Documentation Submitted:

N/A

Sign Off:

Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 10-26-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 6/27/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers drove around the second half of ICS and spot sprayed noxious weeds. Weed Wranglers was given the liberty to spray weeds whenever encountered. Thistles, bindweed, and deep-rooted weeds were sprayed with Escort XP®, Vision®, and surfactant.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10/23/23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 7/20/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel pumped the standing water from inside of the Lysimeter 010 manhole. Approximately 175 liters were removed.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-26-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 7/25/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel used a motor grader to grade the ICS perimeter road.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-26-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 7/27/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel measured the SDT piezometers due to percolation exceedances at Lysimeters 001 and 003. Monitoring will continue monthly until the lysimeter percolation compliance is restored. 36251: 1.72 feet 36252: dry 36253: dry 36254: dry	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-25-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 8/2/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel used soil from the Long Term Care Stockpile to backfill the three sinkholes under the north perimeter fence. These holes were identified during the spring 2023 Type II inspection and were labelled waypoint KH0002 on the east transects.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-22-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 8/16/23
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

OMC personnel measured the SDT piezometers due to percolation exceedances at Lysimeters 001 and 003. Monitoring will continue monthly until the lysimeter percolation compliance is restored.

36251: 1.51 feet
36252: dry
36253: dry
36254: dry

Summary Meetings and Discussions Held or Attended, including Job Safety:

N/A

Comments:

N/A

Additional Documentation Submitted:

N/A

Sign Off:

Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 10-26-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: MRC Services	Project: ICS O&M
Task: maintenance/repair	Date: 8/23/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
MRC Services began mowing areas identified on ICS to be weedy. The topsoil area on the SDT cover (2.33 acres), the Lime Basins area that was overseeded in 2023 (8.22 acres), and the west South Plants area that was overseeded in 2023 (11.3 acres) were all mowed today.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: MRC Services	Project: ICS O&M
Task: maintenance/repair	Date: 8/24/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
MRC Services continued mowing areas identified on ICS to be weedy. The east South Plants area that was overseed in 2023 (17 acres) and an area near the Channel 17 outlet (1.2 acres) were mowed today. All of the necessary areas were mowed and MRC Services demobilized the John Deere tractor and batwing mower.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 8/30/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
OMC personnel pumped the standing water from the inside of the following lysimeter manholes: Lysimeter 014=144L Lysimeter 013=167L Lysimeter 012=131L Lysimeter 009=185L Lysimeter 008=140L The standing water inside the manhole made percolation measurements difficult.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: Weed Wranglers	Project: ICS O&M
Task: maintenance/repair	Date: 9/7/23
Weather AM: acceptable	Weather PM: acceptable
Activities Inspected and Observed:	
Weed Wranglers was onsite to spray cheatgrass areas. Weed Wranglers used 5 oz of Rejuvra® mixed with surfactant for herbicide application.	
Summary Meetings and Discussions Held or Attended, including Job Safety:	
N/A	
Comments:	
N/A	
Additional Documentation Submitted:	
N/A	
Sign Off:	
Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature: [signature]	Date: 10-26-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature: [signature]	Date: 10/26/23

CONTRACTOR DAILY QUALITY CONTROL REPORT

Project Information	
Subcontractor/Partner: N/A	Project: ICS O&M
Task: maintenance/repair	Date: 9/20/23
Weather AM: acceptable	Weather PM: acceptable

Activities Inspected and Observed:

OMC personnel measured the (4) SDT piezometers.
36251=0.31 feet
36252 dry
36253 dry
36254 dry
Percolation has continued to be exceeded at Lysimeters 001 and 003 and piezometer measurements will resume until compliance is restored.

Summary Meetings and Discussions Held or Attended, including Job Safety:

N/A

Comments:

N/A

Additional Documentation Submitted:

N/A

Sign Off:

Inspector Name: Kim Hoffman	Title/company: Landfills and Covers Lead/Navarro
Signature:	Date: 10-23-23
Reviewer Name: Michael Jones	Title/company: Landfills and Covers Manager/Navarro
Signature:	Date: 10/26/23

APPENDIX E

Army Response to EPA Comments on the 2022 ICS ACR

U.S. Department of the Army Responses to
U.S. Environmental Protection Agency (EPA)
January 3, 2023 Technical Comments on the
Annual Covers Report for Integrated Cover System 2022

GENERAL COMMENTS

Comment 1. Monitoring activities, operations and maintenance (O&M) repair actions, and recommendations for the upcoming reporting period are inconsistently discussed throughout the Report. For example, the RMA Resource Conservation and Recovery Act (RCRA)-Equivalent, 2- and 3-Foot Covers Long-Term Care Plan (RMA LTCP) specifies that Type I and Type II cover inspections shall include the following elements in accordance with standard operating procedures (SOP) 001: soil cover conditions, vegetative cover, engineering and access controls, cover thickness, surface water drainage system, and detrimental impacts to wildlife. However, the Report does not coherently address detrimental impacts to wildlife or discuss surface drainage interruption despite the observation of holes greater than three inches in diameter within the Integrated Cover System (ICS). Please revise the Report to ensure all elements of SOP 001 for Type I and Type II cover inspections are addressed and consistently discussed throughout the text.

Response: The LTCP does not require an assessment of detrimental impacts to wildlife as described in the comment, but rather, an assessment of detrimental impacts by wildlife. Inspectors look for evidence of damage to the covers and engineering controls, then summarize those observations in the annual report. Damage to the perimeter fence, which was caused by bison, is addressed in Section 4.6 of the report.

Some burrowing animal holes were identified in the cover soil. While the holes are mentioned in Section 4.1 of the report, and documentation of the holes is included in the inspection documentation in Appendix C of the report, the subject could have been described more completely in the text.

Section 9.0 also includes continued examination of “areas that could interrupt cover drainage” as a recommendation for 2023.

Comment 2. Photographs documenting maintenance and repair work during the reporting period are not included in the Report. Per the RMA LTCP/SOP 001 – Procedure #10, following maintenance and repair work, “verify completion of appropriate actions and provide digital photograph(s) and original cover inspection form to the Covers Manager for signature approval that all items on the form have been completed.” Please revise the Report to include photographs documenting all maintenance/repair work performed during the reporting period or provide an explanation to address this discrepancy.

Response: Photographs of repair work were not included in the report because they are not listed in Section 3.9 of the LTCP as required report elements. Per Item 4.c of LTCP SOP 001, photographs of deficiencies are only required if applicable. Operational experience has shown that photographs of routine deficiencies such as holes, ruts, weeds, bare areas, etc. are typically of little value and are rarely collected. Some example photos of holes in the cover soil are attached at the end of this document. By contrast, photographic documentation of significant, widespread, or non-routine repairs can be useful and are typically shared at quarterly O&M status meetings.

SPECIFIC COMMENTS

Comment 1. **Section 4.1, Cover Surface Drainage Interruption, Page 3:** During the spring 2022 Type II inspection, holes greater than three inches in diameter were observed and marked using Global Positioning System (GPS) coordinates; however, a total count of holes was not identified at each marked location and there is no indication if wildlife burrowing activity was observed at these locations. In addition, the text states that, "these holes were not repaired during this reporting period and will be further discussed in the 2023 ICS [Annual Covers Report] ACR." According to Section 3.3.1 of the RMA LTCP, isolated animal burrows larger than three inches in diameter should be filled with soil as part of a routine maintenance action to avoid interruption or impediment of drainage on the ICS. Please revise the Report to state how many holes were observed at each marked location and confirm if the holes were the result of wildlife burrowing activity; as mentioned previously, a supplemental photolog of all marked holes should also be included as a baseline for future inspections. In addition, please explain why the holes were not repaired during the reporting period and include this routine maintenance action in Section 9 (Recommendations and Corrective Measures) for FY23.

Response: Holes identified during inspections are individually located with GPS coordinates, unless otherwise noted. Refer to the documentation of the April 26, 2022 Type II cover inspection provided in Appendix C of the report (PDF pages 129-136). Five of the holes were attributed to burrowing animals as shown on the inspection form figure and coordinate list.

As described in the repose to General Comment 2, operational experience has shown that photographic documentation of holes in the soil cover provides little value. Example photos of holes are included below. Holes observed in the cover soil have typically been in the range of 3 to 12 inches in diameter with depths ranging from 4 to 12 inches, but larger and smaller holes have been observed on occasion.

Future reports will list the outstanding maintenance items in Section 9.

Prairie Dog Hole from June 2010

Hole Photo from May 2013

Hole Photo from May 2012

Comment 2. **Section 4.3, Noxious or Undesirable Weeds, Page 3:** It is unclear if the herbicide Telar® was used to target Canada and musk thistle during weed control efforts conducted during July/August 2022 or if additional weed management methods (e.g., mechanical, cultural, biological) were implemented in addition to herbicide application. The text states that Telar® was one of the herbicides used to control Canada thistle, musk thistle, and "other noxious weeds" on areas of the ICS; however, Telar® is not listed as a chemical control method for Canada and musk thistle in Table 3.3.3-1 (Summary of Weed Management Methods for Use on Covers at the Rocky Mountain Arsenal) of the RMA LTCP. In addition, discussion of the mechanical, cultural, and biological methods listed in Table 3.3.3-1 for control/suppression of all weeds is not included in Section 4.3. Please revise the text to clarify what species comprise "other noxious weeds" and identify whether Telar® was used for Canada and musk thistle. Furthermore,

please revise Section 4.3 to include discussion of the mechanical, cultural, and biological methods used for site weed control efforts during the reporting period.

Response: The herbicide Telar® was used to control Canada and musk thistles as described in Section 4.3 of the report. The comment is correct in stating that Telar® is not listed as a chemical control for thistles in RMA LTCP Table 3.3.3-1, however, Note 4 in the same table states "…Other herbicides not listed but approved by the Army for use at RMA will be considered. Herbicide will be determined based on professional recommendation." The professional judgement of the OMC Vegetation Specialist and herbicide application subcontractor is relied upon for best weed control practices, recommendations for herbicide selection, and application rates. Herbicide product labels dictate the species to which they may be applied and the maximum application concentrations. The Army Technical Representative is routinely briefed on the conditions in the field and concurrence is granted prior to proceeding with weed control actions.

A description of mechanical weed control (i.e., mowing) is provided in Section 4.8 of the report. Cultural and biological controls were not used during the reporting period.

The primary noxious weed species encountered on the ICS are kochia, Russian thistle, cheatgrass, bindweed, Canada thistle and musk thistle. However, other species are occasionally observed during inspections or performance of maintenance activities and noted as "other noxious weeds." Kochia and Russian thistle are usually mowed rather than sprayed with herbicide, though both chemical and mechanical means were used to control these species in 2022. The mix of herbicides described in Section 4.3 of the report was intentionally created as a broad-spectrum herbicide, i.e., effective on a wide variety of weedy species. The state-licensed herbicide applicators are trained in species identification, and spray noxious weeds as they are identified in the field.

Several factors are considered when determining the method of weed control. These factors include the time of year, the point within the plant's growth cycle, meteorological conditions, drought conditions, size of the affected area, condition of native grass species that may be affected, spot spraying verses broadcast spraying, available budget, and others. The Army spends considerable effort and resources to control the weed population within the Army-Maintained Area while promoting the growth of native perennial grass species.

Comment 3. **Section 4.6, Perimeter Fence and Road, Page 4:** It is unclear why the perimeter fence was not replaced during the reporting period. The text states, "[O&M Change Notice (OCN)] OCN-LTCP-2022-001 (Navarro 2022d) was approved in July of 2022 and changes the eight-foot height perimeter fence to 5 feet-7 inches and replaces the wooden fence posts with galvanized steel posts. The fence was not replaced during this reporting period and will be addressed in the 2023 ICS ACR." Please revise Section 4.6 to include clarification regarding why the fence

was not replaced during the reporting period in accordance with OCN-LTCP-2022-00.

Response: The southern portion of the ICS fence was not replaced because of budgetary limitations and constraints within the prior O&M contract. Despite the high level of maintenance required in 2022, the existing fence remained functional throughout the reporting period. Minor repairs were made to the existing fence to ensure that it functions as intended until the upgraded fence described in OCN-LTCP-2022-001 is installed.

Comment 4. **Section 4.6, Perimeter Fence and Road, Page 4:** It is unclear why two wooden fence posts along the west side of the 3-Foot Soil Cover and one t-post from the northwest perimeter fence along D street were not replaced during the reporting period. The text indicates that the fence posts and t-post required replacement but were not replaced. Please revise the Report to include clarification regarding why the two wooden fence posts and t-post were not replaced during the reporting period. In addition, please revise Section 9.0 (Recommendations and Corrective Measures) to include these fence repairs as recommendations for FY23.

Response: The wooden posts requiring replacement, as described in Section 4.6, are included in the length of fence that will be replaced in accordance with OCN-LTCP-2022-001. The Army determined that the fence remained functional and decided that post replacement was unnecessary considering the upcoming replacement work.

Likewise, the functionality of the perimeter fence was not affected by the missing t-post and therefore the replacement was added to the worklist as a routine maintenance issue. The t-post was replaced in December 2022 and will be documented in the 2023 ACR.

Future reports will list the outstanding maintenance items in Section 9.

Comment 5. **Section 5.0, Cover Soil Thickness Loss, Page 5 and Table 5.0-1, Soil Cover Thickness Loss, PDF Page 23:** It appears that cover soil thickness measurements were not compared to historical readings per Procedure #6 of the RMA LTCP/SOP 001. The information provided in Section 5.0 and Table 5.0-1 indicates that thickness measurements from April 2022 were only compared to measurements from October 2021. Without additional, historical measurements for comparison, it is not possible to evaluate total change in soil cover thickness from baseline conditions. Please revise the Report to include historical measurements and provide discussion in Section 5.0 regarding thickness measurements from the recent reporting period to historical readings.

Response: Erosion/settlement monuments installed throughout the ICS covers were designed to indicate the total soil thickness loss at any particular time. Fluctuations in the measurements between the soil surface and the top of the monument represent the total change in soil thickness loss at the respective monument location.

Therefore, the measurements shown in Table 5.0-1 indicate the total change in cover soil thickness at each monument location.

The comparison of April 2022 measurements to October 2021 measurements constitutes historical comparison. Semiannual comparisons are presented in each annual report and at semiannual meetings conducted in May and October of each year. If a lengthier historical comparison is warranted, please refer to prior annual reports.

Comment 6. **Section 7.0, Percolation Monitoring, Pages 8-9 and Table 7.0-1, Monthly Percolation Measurements (PDF Page 30):** Percolation monitoring data are not consistent between Section 7.0 and Table 7.0-1. According to Section 3.2.6 (Shell Piezometers) of the RMA LTCP, four piezometers were installed outside of the Shell Disposal Trenches-Resource Conservation and Recovery Act (SDT RCRA)-Equivalent Cover in December of 2018; however, these piezometers are not mentioned in Section 7.0 and corresponding percolation data are not presented in Table 7.0-1. Please revise Section 7.0 to include discussion of the four piezometers and update Table 7.0-1 to include corresponding percolation monitoring data.

Response: The SDT RCRA-Equivalent Cover piezometers are not mentioned in Section 7.0 of the report because they are not used to measure percolation. Only lysimeters are used to measure the percolation performance of the ICS RCRA-equivalent covers (including the SDT RCRA-Equivalent Cover).

Comment 7. **Table 6.3-1, Sample Adequacy Results (PDF Page 29) and Vegetation Sample Adequacy Check (PDF Page 65):** Table 6.3-1 and the corresponding Vegetation Sample Adequacy Check do not provide the 90th percentile confidence level estimate as specified in Procedure #10 of the RMA LTCP SOP 002. In addition, corresponding Form SOP 002-1(Vegetation Assessment Data Collection Form) does not appear to have been included in the Report. Please revise the Report to include Form SOP 002-1 and update Table 6.3-1 and the Vegetation Sample Adequacy Check to reflect the 90th percentile confidence level estimate.

Response: As described in Section 6.3 of the report, the minimum sample size (N_{min}) must be less than, or equal to, the number of transects sampled in the respective area (n). Table 6.3-1 lists the minimum sample size and the actual sample size. The minimum sample size was exceeded in both cases, therefore the sample sizes were adequate to detect a 10 percent reduction in the mean with 90 percent confidence.

Form SOP 002-1 is not required if data are collected using a handheld electronic data collector (LTCP SOP 002 Item 8). The Inspection crew used a handheld data collector to record the data and a database to manage the data and generate the tables provided in Appendix B of the report.