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DEPARTMENT OF PLANNING
AND DEVELOPMENT

229 West 12th Street, Pueblo, CO 81003-2810~719-583-6100

1041 2008-002

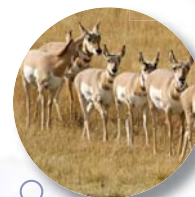
September 17, 2015

Southern Delivery System
Revegetation Compliance Summary Notebook
1041 Permit 2008-002
Pueblo County Work Packages S1, S2 and S3



September 25, 2015

Submitted to
Pueblo County
Planning and Development Department





Board of Pueblo County Commissioners
Pueblo County Courthouse
215 W. 10th Street
Pueblo, Colorado 81003

RE: Public Hearing on SDS Reclamation and Revegetation

Dear County Commissioners:

Colorado Springs Utilities, on behalf of itself and its partners in the Southern Delivery System (SDS), hereby submits the attached Revegetation Compliance Summary Notebook (Notebook) in conjunction with the September 25, 2015 public hearing on Condition of Approval No. 22 (Reclamation of Disturbed Lands) and Condition of Approval No. 28, Mitigation Appendix C-9 (Site Restoration) of the Pueblo County 1041 permit for the SDS Project. The Notebook contains an Executive Summary, a Technical Section and a Public Communications section. The Notebook is intended to be a part of the administrative record for the hearing.

Based upon the documentation provided herein, Colorado Springs Utilities requests that at the conclusion of the hearing, and upon consideration of the entire record before it, the Board of County Commissioners enter a finding of compliance by the SDS project with the reclamation and revegetation conditions of the SDS 1041 permit and approve the release of the bonds posted by Colorado Springs Utilities for segments S1, S2, and S3 of the project as located in Pueblo County.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mark Pifher', is written over a horizontal line.

Mark Pifher
Permitting and Compliance Manager



Pueblo County Revegetation Compliance Notebook

S1, S2 and S3 Work Packages

Notebook Executive Summary

Technical Section

Tab 1 – Permit Vegetation Requirements, Revegetation Bonds and Comparison Documentation

- Pueblo County 1041 Permit (2008-002) Exerpts
- Pueblo County Revegetation Bonds (S1, S2 and S3)
- SDS Work Package S1, S2 and S3 Revegetation Timelines
- Pre-Construction Vegetation and Post-Construction Vegetation Comparison Examples
- Western States Reclamation Inc., Technical Proposal for Segments S2 and S3

Tab 2 – Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3 CNHP Report (November 2011)

Tab 3 – Pueblo County Revegetation Cover Establishment Protocol for the Southern Delivery System Pipeline Project - CNHP Technical Memorandum (January 30, 2014)

Tab 4 – SDS Construction Phase Completion Letter to Pueblo County (Pueblo County 1041 Permit No. 2008-002 Compliance for SDS Mitigations Appendix Conditions C-1 through C-22, SE-1, CR-1 through CR-11, and General Conditions 13 and 20) – Dated July 28, 2015

Tab 5 – Revegetation Waivers and Area Reductions

- SDS Work Package S2 Temporary License and Trail Construction Agreement Between PWMD and City of Colorado Springs (April 6, 2012)
- Dees Waiver – 623 N Canvas Drive (S2)
- Casey Waiver - 353 N. Escambria Drive (S2)
- Galaviz Acosta – 6963 Young Hollow Road (S3)
- Walsh Email Correspondence – 1131 N. Kirkwood Drive (S2)

Tab 6 – Post-Restoration Seedling Density Reports – CNHP (October 2013)

- Measurements of Post-restoration Seedling Density for Pueblo County Work Package S1
- Measurements of Post-restoration Seedling Density for Pueblo County Work Package S2
- Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-12
- Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-13

Tab 7 – Post-Restoration Vegetation Cover Reports – CNHP (October 2013)

- Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S1
- Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S2
- Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-12
- Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-13

Tab 8 – Restored Vegetation Cover Monitoring Reports – CNHP (September 2014)

- Restored Vegetation Cover Monitoring – Work Segment S1
- Restored Vegetation Cover Monitoring – Work Segment S2
- Restored Vegetation Cover Monitoring – Work Segment S3-12
- Restored Vegetation Cover Monitoring – Work Segment S3-13N
- Restored Vegetation Cover Monitoring – Work Segment S3-13S



Tab 9 – Review of Revegetation in SDS Segment S3-13N – CNHP Technical Memorandum (July 10, 2015)

Tab 9 – Restored Vegetation Cover Monitoring – Work Segment S3 (September, 2015)

Tab 10 – Keammerer Ecological Consultants, Inc. Completion Reports

- Review Of: Colorado Springs Utilities Southern Delivery System, Restored Vegetation Cover Monitoring – WORK SEGMENT S1 (March, 2015)
- Review Of: Colorado Springs Utilities Southern Delivery System, Restored Vegetation Cover Monitoring – WORK SEGMENT S2 (March, 2015)

Tab 11 – S1 Agency Revegetation Completion Acceptance Documentation

- Lake Pueblo SDS Pipeline Easement Photo Monitoring Guide – Colorado Parks & Wildlife (June 2015)
- S1 Agency Revegetation Acceptance Emails (State Parks, BOR, City of Pueblo)

Tab 12 – Noxious Weed Control Documentation Example (July 28, 2015)

Public Communication Section

Tab 1 – Pre-Construction Communications

- Sample of pre-existing condition assessment invitation, acceptance letter and sample disc containing video and photos
- SDS What To Expect Brochure

Tab 2 – Post-Construction Communications

- Grade acceptance memo to outline process
- Sample of reveg license agreement packets: What to Expect Brochure, MOA example and 3 annual agreement examples

Tab 3 – Revegetation-Phase Communications

- Samples of yearly revegetation-related newsletters and letters to property owners
- Sample of Revegetation care guide

Tab 4 – Post-Revegetation Communications

- Irrigation lateral and fence removal resident communication examples
- 2015 land owner communication follow-up log

**Revegetation Compliance Summary Notebook for
Southern Delivery System (SDS) 1041 Permit 2008-002
Pueblo County Work Packages S1, S2 and S3**

Executive Summary

The information contained herein is provided as an aid in documenting the reclamation and revegetation efforts conducted by the SDS Program on the SDS construction work package alignments S1, S2 and S3 through Pueblo County in compliance with Pueblo County Resolution No. P&D 09-22, Condition of Approval No. 22 (Reclamation of Disturbed Lands) and Condition of Approval No. 28, Mitigation Appendix C-9 (Site Restoration).

This document is divided into two sections, a Technical Section and a Public Communications Section. The technical section serves to document the requirements of the permit and the scientific evaluations used to demonstrate compliance with the permit requirements for reclamation of disturbed land. The public communications section serves to document the public communications and outreach conducted by the SDS Program Team during the reclamation and revegetation phases in an effort to keep property owners informed and engaged in accordance with Condition of Approval No. 28, Mitigation Appendix C-10 (Public Communications).

Technical Section Overview

Condition of Approval 22 states: “Upon reclamation of the site, the vegetation cover shall be of the same seasonal variety native to the area of the disturbed land, or a reasonable substitute pursuant to the agreement with the landowner. The revegetated area will be considered acceptable if its cover will be not less than 90 percent of the pre-construction vegetation cover with similar species diversity.”

Condition of Approval 28, Mitigation Appendix C-9 states: “Applicant shall provide Pueblo County residents with replacement vegetation and property to match pre-construction conditions or better.”

In order to comply with the above conditions, the SDS Program retained the Colorado Natural Heritage Program (CNHP) as a third-party vegetation expert to assist in the independent evaluation of the revegetation efforts along the SDS pipeline alignment. CNHP’s tasks included the following:

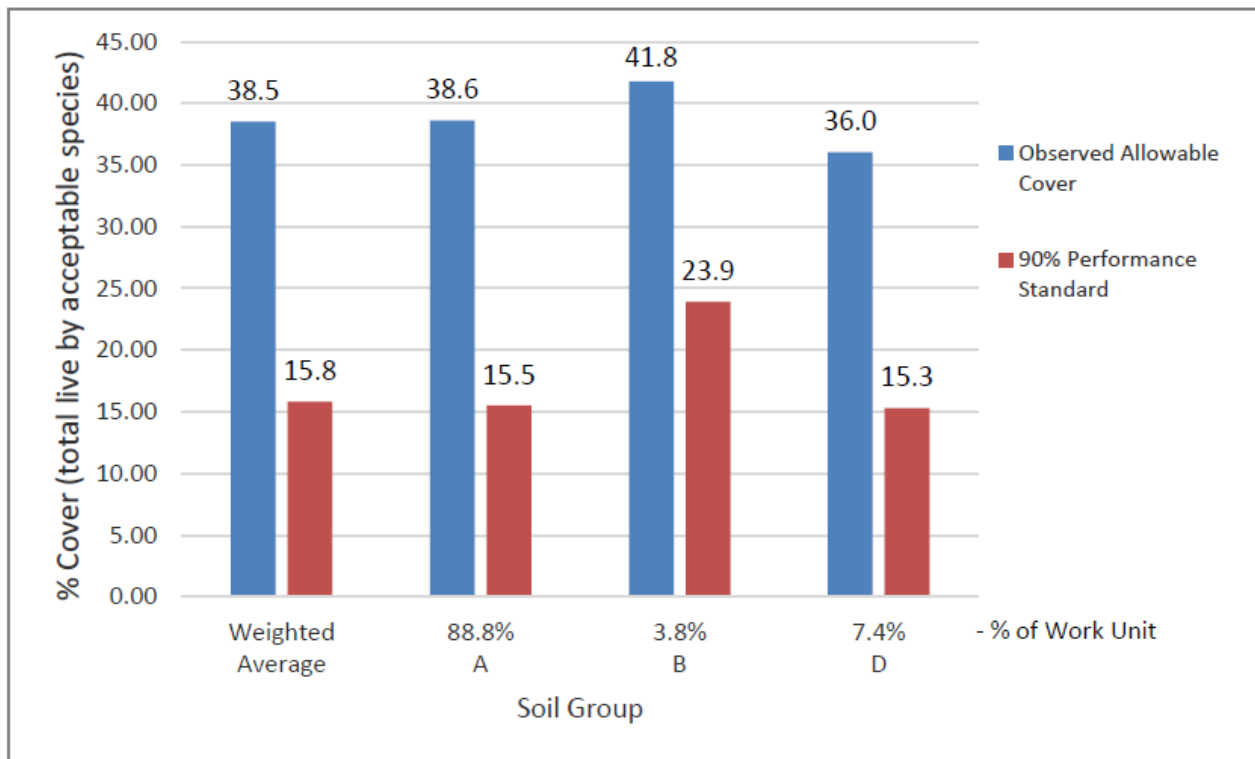
- Conducting measurements of pre-existing vegetation cover prior to start of construction activities
- Developing a revegetation cover establishment protocol outlining the procedures necessary to document compliance with the 1041 revegetation requirements
- Assisting with the selection of native seed mixes to be included in contractor specifications
- Monitoring revegetation progress periodically and providing advisement on recommended irrigation rates
- Conducting measurements of post-restoration seedling density in each work package following the first growing season after planting
- Conducting measurements of post-restoration vegetation cover within each work package in accordance with the developed revegetation cover establishment protocol to scientifically confirm that the restoration of vegetation to at least 90 percent of the pre-construction vegetation cover with similar species diversity had been achieved.

The technical section of this document includes the technical reports, documents and findings necessary to verify compliance with Condition of Approval No. 22 and Condition of Approval No. 28, Mitigation Appendix C-9, including concurrence reports provided by Pueblo County's independent third-party expert, Keammerer Ecological Consultants, Inc.

The following excerpts are taken from CNHP's September 2014 Restored Vegetation Cover Monitoring reports for SDS construction work packages S1 and S2:

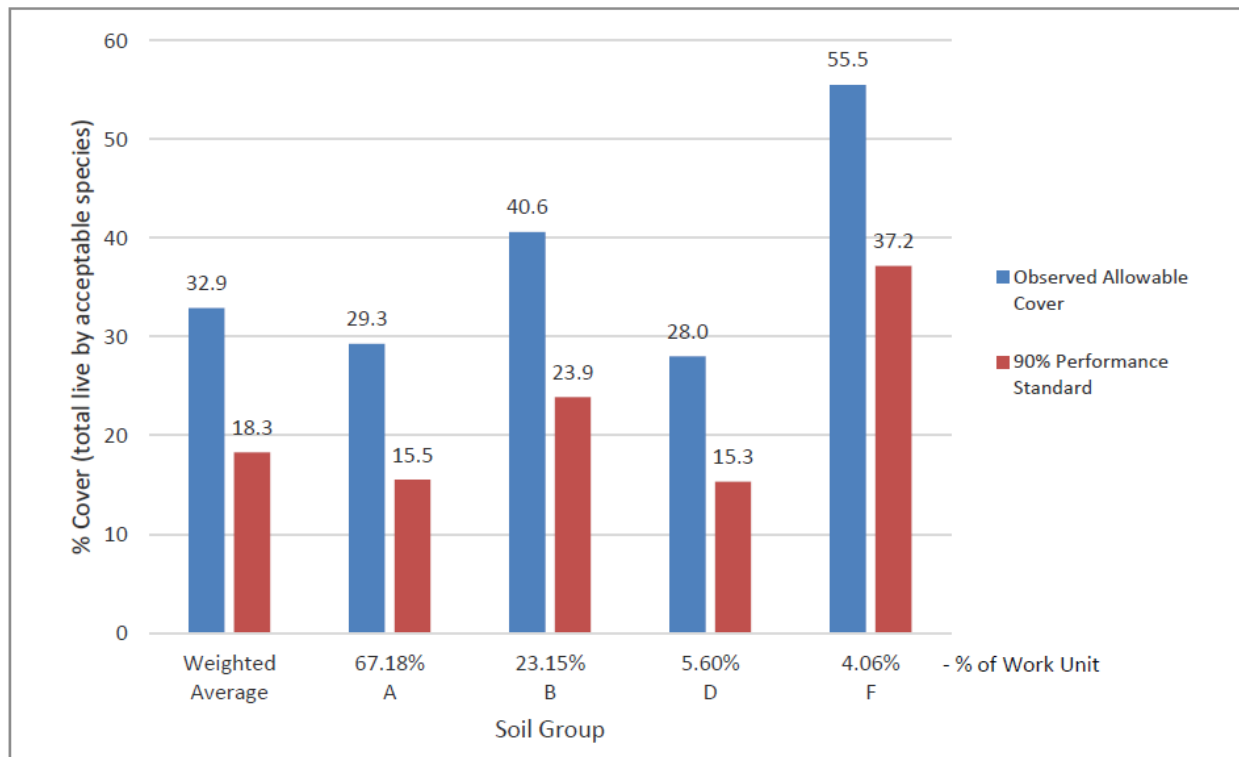
S1 (Pueblo Dam State Park to Pueblo West) – "In all soil groups, post-construction vegetation cover exceeded the 90% revegetation performance standards (see Table below). As an area weighted average, revegetation cover within the S1 work segment is 38.5% and exceeded the 90% performance standard (15.8%) by 22.7%."

"The results of revegetation monitoring on S1 support the conclusion that the restored vegetation exceeds the 90% performance standard and that the currently observable positive revegetation trends will continue. That the cover by acceptable species after two growing seasons is over 60% greater than pre-existing cover suggests that, barring unforeseen events, the re-established vegetation will be persistent for years to come."



S2 (Pueblo West) – “In all soil groups, post-construction vegetation cover exceeded the 90% revegetation performance standards. As an area weighted average, revegetation cover within the S2 work segment is 32.9% and exceeded the 90% performance standard (18.3%) by 14.6%.”

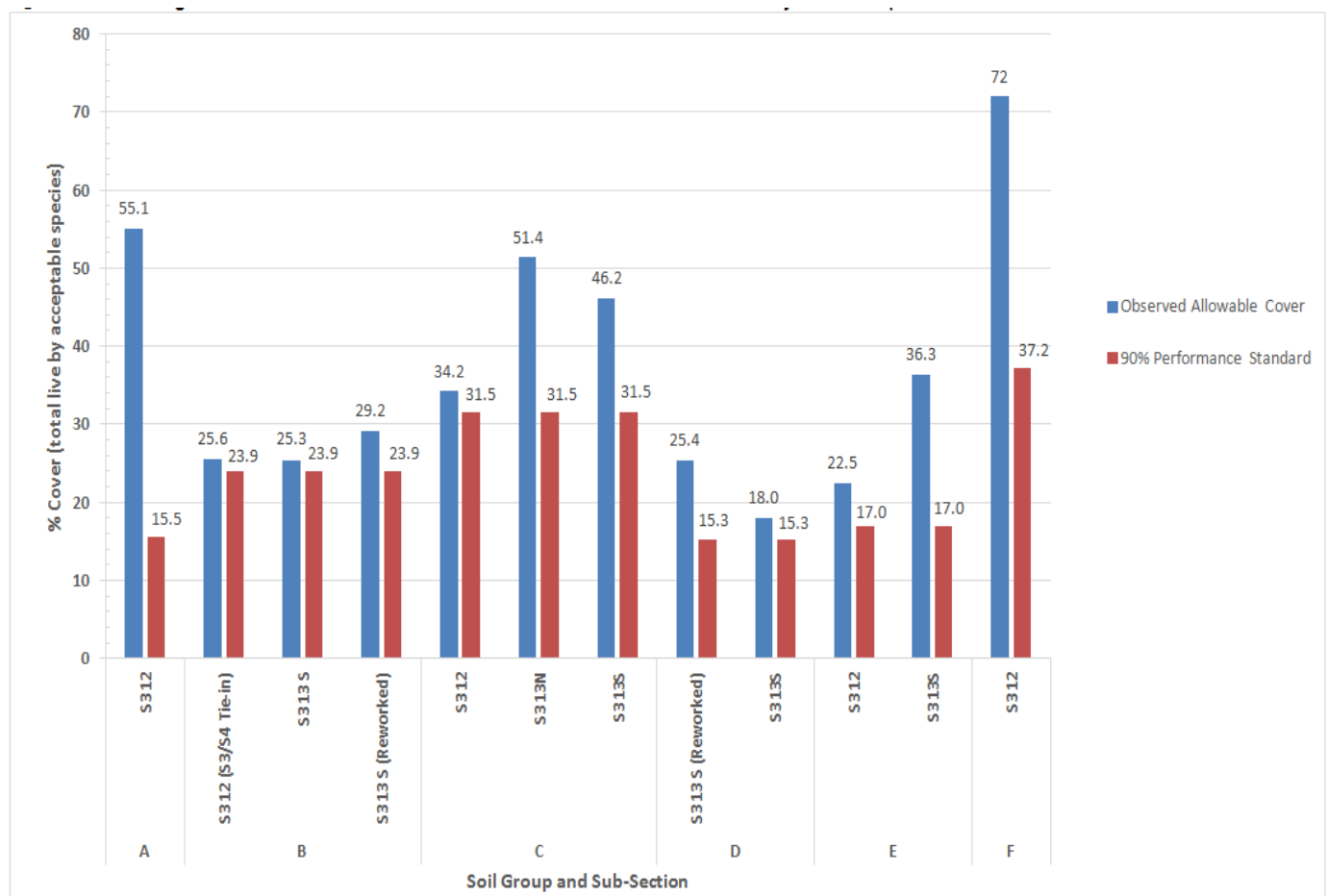
“The results of revegetation monitoring on S2 support the conclusion that the restored vegetation exceeds the 90% performance standard and that the currently observable positive revegetation trends will continue. That the cover by acceptable species after two growing seasons is over 60% greater than pre-existing cover suggests that, barring unforeseen events, the re-established vegetation will be persistent for years to come.”



According to CNHP's September 2015 Overall Review of Revegetation on SDS Segment S3 memorandum report for the S3 work package:

S3 (Walker Ranches and Midway Ranches to El Paso County Line) – “A total of 116 transects were sampled in the segment S3 area during the post-construction surveys in August 2014, June 2015, and August 2015. Samples collected in 2015 were limited to the isolated areas where vegetation cover in 2014 was not yet ready to satisfy the 90% standard. Data from 2014 provides a conservative assessment of current vegetation cover over the entire area since increases in cover in the 2015 growing season is unaccounted for in the 2014 data.”

“In all soil groups, revegetation cover by acceptable species has exceeded the 90% revegetation performance standards. Using the data from 2014 and 2015 surveys, vegetation cover within all areas of the S3 work segment exceeds the 90% performance standard.”



Noxious Weed Control

As a part of the reclamation activities conducted by the SDS Program, monitoring and treatment of noxious weeds have been performed in accordance with the vegetation section of the U.S. Bureau of Reclamation's Record of Decision (ROD Reference No. GP-2009-01) and Pueblo County Resolution No. P&D 09-22, Condition of Approval No. 28, Mitigation Appendix C-16 (Noxious Weed Control). Mitigation Appendix C-16 states, "Applicant shall control spread of noxious weeds resulting from project construction" and requires the implementation of an eradication program for existing Class A and B noxious weed species within the project limits. No Class A noxious weed species or populations were identified within the SDS project limits prior to construction or during the reclamation activities. Prior to construction, identified Class B noxious weed populations (e.g., Salt Cedar) were eradicated and monitoring for the recurrence of noxious weed species within the construction work limits was conducted for three years following completion of the construction activities. These activities included, at the request of U.S. Bureau of Reclamation, treatments to control the spread of identified Class C noxious weed populations (e.g., Halogeton) in addition to the identified Class B species.

Public Communications Section Overview

Restoration of native grasses in the areas disturbed by construction of the SDS pipeline has been a collaborative process, involving Pueblo County residents and property owners at every step. The following is a summary of key steps taken during the restoration process to involve residents and land owners:

Pre-Existing Condition Assessments: Prior to commencement with the SDS pipeline construction activities, land owners along the construction alignment were invited to attend pre-existing condition assessments of their properties as required under Construction Conditions C-5 and C-9 of the SDS 1041 permit. These assessments included both photographic and video recordings of the pre-existing vegetative condition prior to any land disturbance. Copies of the photographic and video recordings of the pre-existing condition assessment were provided to each property owner for review and acceptance. A copy was additionally provided to Pueblo County to be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of the SDS operations in accordance with Project Detail 4 of Construction Condition C-5. Examples of these property owner communications are provided in Tab 1 of the Public Communications section of this notebook.

Revegetation License Agreements: After the SDS pipeline was installed, property owners along the construction alignment were invited to enter into Revegetation License Agreements, which provided them with compensation in exchange for access to enable workers to maintain restoration areas. All but a handful of property owners signed agreements for all three years and received compensation; two residents preferred to receive no payment but permitted access through verbal agreement; and a few residents have waived further work over the years because they wished to graze livestock or use the land in other ways. Examples of the property owner revegetation license agreement communications are provided in Tab 2 of the Public Communications section of this notebook.

Mailings: Letters have been sent each spring and fall, providing timely updates on planned activities; newsletters containing updates and helpful tips have been mailed to those residents and to neighbors within 1,000 feet of the SDS alignment; and property owners have received two guides tailored to the local climate and vegetation needs, "What to Expect During Revegetation" and a "Revegetation Care

Guide.” Examples of these communication efforts are provided in Tabs 3 and 4 of the Public Communications section of this notebook.

Direct Involvement: During the three-year revegetation process, property owners have collaborated with the SDS team on placement of the irrigation systems necessary to further the success of the grasses and placement/removal of fencing that was necessary to protect the restoration area and their property. These and other steps have helped ensure that property owners are satisfied with the restoration activities.

Staff Liaisons: During construction and restoration, two SDS staff have been dedicated to communicating by mail, telephone and in person with property owners; the SDS Hotline continues to be used by property owners and neighbors to ask questions and stay in touch.



Pre-Construction Vegetation and Post-Construction Revegetation Comparison Examples

SDS Work Package S1, S2 and S3

329 S. Birchwood Drive, Pueblo West, CO (S1)

Pre-Construction Photo:



Post-Revegetation Photo:



Pre-Construction Photo:



Post-Revegetation Photo:



1115 E. Ivanhoe Drive, Pueblo West, CO (S2)

Pre-Construction Photo:

Station 453 +00 - E - 9-30-11 11:31 AM



Post-Revegetation Photo:

09 / 03 / 2015



Pre-Construction Photo:

Station 453 +50 - E - 9-30-11 11:33 AM



Post-Revegetation Photo:

09 / 03 / 2015



Young Hollow Rd and Salt Cedar Rd, Midway Ranches (S3)

Pre-Construction Photo:



Post-Revegetation Photo:



Pre-Construction Photo:



Post-Revegetation Photo:





TECHNICAL TAB 1 –

- **Pueblo County 1041 Permit (2008-002) Excerpts**
- **Pueblo County Revegetation Bonds (S1, S2, S3)**
- **SDS Work Package S1, S2 and S3 Revegetation Timelines**
- **Pre-Construction Vegetation and Post-Construction Vegetation Comparison Examples**
- **Western States Reclamation Inc., Technical Proposal for Segments S2 and S3**

RESOLUTION NO. P&D 09- 22

THE BOARD OF COUNTY COMMISSIONERS
OF PUEBLO COUNTY COLORADO

**A RESOLUTION APPROVING 1041 PERMIT NO. 2008-002
WITH TERMS AND CONDITIONS FOR CONSTRUCTION AND USE OF A
MUNICIPAL WATER PROJECT KNOWN AS THE SOUTHERN DELIVERY SYSTEM WITHIN
PUEBLO COUNTY, COLORADO**

WHEREAS, the Board of County Commissioners has held public hearings on the Permit referenced above and having considered the testimony and the documentary evidence submitted does hereby find and conclude as is hereinafter set forth:

1. The Pueblo County Board of County Commissioners has adopted regulations for areas and activities of State and local interest pursuant to §§ 24-65.1-101, et seq., C.R.S. (2008) ("HB 1041"), §§ 29-20-101, et seq., C.R.S. (2008) ("HB 1034"), and other applicable land use and regulatory powers of Pueblo County. These regulations, titled "Pueblo County Regulations for Area and Activities of State and Local Interest," are set forth in Title 17, Land Use, Division II of the Pueblo County Code ("Areas and Activities Regulations"). Chapter 17.148 contains the general administrative provisions applicable to all designated areas and activities regulated in the County, and subsequent chapters address each specific area or activity which has been designated by the County for regulation.
2. An Application has been submitted to Pueblo County for approval of a permit to conduct certain activities under Chapters 17.164 and 17.172, Pueblo County Code, for the Southern Delivery System project within Pueblo County (the "SDS Project"). The SDS Project, as proposed and as is more particularly set forth in the Application for this Permit, is a regional water delivery project. As proposed, the SDS Project would use Pueblo Reservoir, a feature of the Frypan-Arkansas Project, located in Pueblo County to regulate storage and would deliver untreated water through a proposed 53-mile pipeline to treatment and distribution facilities.
3. Chapter 17.164, "Local Regulations of Site Selection and Construction of Major New Domestic Water and Sewage Treatment Systems and Major Extensions of Existing Domestic Water and Sewage Treatment Systems," contains procedures and criteria for permitting major new water and sewer systems or major extensions of existing systems.
4. Chapter 17.172, "Regulations for Efficient Utilization of Municipal and Industrial Water Projects," contains procedures and criteria for development of municipal and industrial water projects.
5. Section 17.140.010(F) of the Pueblo County Code provides that any proposed activity or use, which requires a permit pursuant to the Areas and Activities Regulations, shall not require application for and issuance of a Special Use Permit otherwise required by Pueblo County zoning regulations.

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RESOLUTION NO. P&D 09-22 (CONT.)

28. With mitigation pursuant to the terms and conditions of this Permit, the Board finds that the benefits of the SDS Project outweigh the losses of resources and environmental and socioeconomic impacts to the County and its residents.

29. Subject to Applicant's compliance with the terms and conditions of the Permit and its satisfaction of its commitments herein described, the SDS Project complies with the criteria set forth in Sections 17.164.030 (A) through (O), and 17.172.130 (B)(1) through (29).

NOW, THEREFORE, BE IT RESOLVED that the Board of Pueblo County Commissioners does hereby approve a permit for construction, operation and use of the SDS Project within Pueblo County, Colorado, on the basis and terms of the findings set forth above in this Resolution, and further based upon the Record made in this matter including specifically, but not limited to, the documentary and other evidence submitted by Pueblo County staff and consultants, and subject to the following general terms, conditions and commitments, together with the detailed descriptions of those terms, conditions and commitments contained in the Mitigation Appendix referenced herein and incorporated herein:

1. **Commitments of Applicant.**

The following terms and conditions contain the specific commitments of the Applicant and shall be met as herein described.

2. **Term of Permit.**

This Permit is valid indefinitely for the life of the SDS Project, provided Applicant is in compliance with this Permit. If the Applicant fails to take substantial steps to construct the permitted development within thirty-six (36) months from the date of the Permit, then the Permit may be revoked or suspended by the County in accordance with its Areas and Activities Regulations. The Applicant may submit a written request to Pueblo County for an extension of the time period to begin construction under the Permit for good cause.

3. **Transfer of Permit.**

This Permit may be transferred in whole or part to another party only with the written consent of the Board of Pueblo County Commissioners. A proposed transferee shall demonstrate that it can and will comply with all the requirements, terms, and condition contained in the Permit.

4. **Compliance with other Regulatory Requirements.**

Applicant shall comply with applicable local, State, and federal regulatory requirements and permits. See *Mitigation Appendix C-7*. Prior to commencement of construction of any phase or work package of the SDS Project in Pueblo County, and within 60 days of said permit approvals, Applicant shall provide copies to Pueblo County of permits applicable to that work package of construction. If any such permits or approvals result in a material change in the SDS Project or are inconsistent with the terms and conditions of this Permit, Applicant shall notify Pueblo County, and Pueblo County shall determine whether a Permit amendment or suspension is required.

RESOLUTION NO. P&D 09-22 (CONT.)

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- Lighting control
- Dust control
- Noise control
- Drainage and erosion control
- Traffic control
- Weed control
- Protection of plants and wildlife/vegetation surveys
- Hazardous waste management
- Management of surface and ground water flows
- Protection of livestock
- Site restoration

Applicant shall assign a point of contact for responding to public questions, comments, and concerns during construction in Pueblo County and one-year following final construction in Pueblo County. Applicant shall also develop notices to affected residents and a website for information on construction scheduling.

21. **Juniper Pump Station Architectural Review.**

Applicant shall allow Pueblo County to appoint a representative who will participate in the final selection of the architecture and landscaping for the Juniper Pump Station, along with representatives of Colorado State Parks and the Bureau of Reclamation.

22. **Reclamation of Disturbed Lands.**

Applicant shall conduct a preconstruction evaluation of existing vegetation to be disturbed during construction of the SDS Project within Pueblo County. Upon reclamation of the site, the vegetation cover shall be of the same seasonal variety native to the area of the disturbed land, or a reasonable substitute pursuant to agreement with the landowner. The revegetated area will be considered acceptable if its cover will be not less than 90 percent of the pre-construction vegetation cover with similar species diversity. Applicant shall provide to Pueblo County a security bond equal to \$2,000/acre of land in permanent or temporary construction easement in each work package. The security bond shall be released upon establishing 90 percent of pre-construction vegetation cover on the impacted land segment. See Mitigation Appendix C-9.

23. **Stormwater Management.**

The Applicant shall maintain stormwater controls and other regulations intended to ensure that Fountain Creek peak flows resulting from new development served by the SDS project within the Fountain Creek basin are no greater than existing conditions. This requirement can only apply to Project Participants who have the legal authority to regulate in this manner. Regulations shall comprehensively address peak flow conditions, runoff volumes, and flood hazards, incorporating at a minimum all relevant components of existing regulations of Colorado Springs and the other Project Participants including: regional drainage planning for low-flow and major storm events; detention; erosion and sediment control for land disturbance, construction, and similar activities; structural measures such as channel protection and engineered outfalls; prohibition of activities that infringe on the designated floodway; water quality controls, including water quality capture volume and a determination of the need for

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RESOLUTION NO. P&D 09-27 (CONT.)

30. Integrated Terms and Conditions.

In issuing this Permit, the Board of County Commissioners has determined that the benefits accruing to the County and its citizens from the SDS Project (subject to the terms and conditions set forth herein) outweigh the unavoidable impacts and losses of resources within the County. Consequently, if any term or condition herein is deemed invalid and unenforceable, this Permit shall be rescinded or suspended unless the Board of County Commissioners, in its discretion, approves a Permit amendment.

The foregoing resolution is hereby made the official act of Pueblo County by and through the action of the Board of County Commissioners on this 21st day of April, 2009. In addition to the Board's approval and adoption of this resolution, the Board further directs that this resolution is certified by the Clerk to the Board through his attestation and signature below and that it shall be delivered for recordation to the Office of the Pueblo County Clerk and Recorder.


J.E. Chostner, Chairman


Anthony Nuñez


John B. Cordova, Sr.

ATTEST:

By: 
Gilbert Ortiz, County Clerk



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MITIGATION APPENDIX

Resolution No. P&D 09- 22

A Resolution Approving Pueblo County
1041 Permit No. 2008-002
Southern Delivery System

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12. Inspect site safety measures each work day and periodically during non-working days.
13. Provide 24/7 security services including mobile patrols, lighting and video surveillance.

C-4	Control of Access to Properties
	Applicant shall prevent unauthorized access to properties.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Work with property owners, both public and private, to understand the conditions of ingress and egress, security issues, property control and protection issues, regarding the property, prior to mobilization to a specific work area. 2. Establish mutually agreeable conditions of access with property owner, and require all personnel accessing the site to sign a statement indicating that they understand and will abide by the conditions of access. 3. Grant access to enter the property only to those individuals that have a legitimate SDS related need to access the property, and then shall only do so under the previously agreed access conditions. 4. Provide signs at gates and access points notifying individuals that specific conditions of entry exist. 5. Close and secure gates and entry points by a locking mechanism when not in use. Conditions of entry will specify approved access times and conditions on open gates. 6. Strictly control access to keys to entry point locks. Recipients of keys will be required to sign when receiving the key, and again when returning the key. Recipients will be required to advise the Site Health & Safety Officer when they have lost or misplaced a key. Keys will be required to be of a non-duplicating type. Locks and keys will be changed when a key is reported lost or misplaced. 7. Designate the Site Health and Safety Officer to monitor the access control system. 	

C-5	Pre-existing Condition Assessment
	Applicant shall determine the condition of Pueblo County residents' existing property so that it can be restored to preconstruction condition or better.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Perform an examination of pre-construction existing conditions of land surface, drainage, vegetation and structures adjacent to the construction site that could be damaged or altered by construction operations. The property owner will be invited to attend. 2. Perform periodic reexaminations, if required, to document any changes, including, but not limited to, cracks in structures, settlement, leakage, and similar conditions. 	

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Examinations may include photography, sampling and expert assessments of existing or current conditions.

3. Document examinations in writing, and by photographs and audio-video recordings. Photography shall be by a professional commercial photographer, experienced in shooting interior/exterior construction photos, in daylight and nighttime conditions, and in good and inclement weather.
4. Provide a copy of documentation to property owner for review and acceptance. A copy of the documentation shall be provided to the County. Applicant and the County shall each maintain a copy of the documentation. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Applicant's operations.

C-6	Work Hours
	Applicant shall limit work hours to minimize disturbance to Pueblo County residents.
PROJECT DETAIL	
1.	Perform work within the hours of 7:00 am to 6:00 pm Monday through Friday. Work outside of these hours will be restricted to maintenance of traffic, safety, and construction controls, maintenance of construction equipment, and approved exceptions. Pueblo County and residences within 500 feet of the affected portion of the work site shall be notified 48 hours in advance of work outside of these hours, other than maintenance or emergency work.

C-7	Permitting
	Applicant shall obtain all applicable permits.
PROJECT DETAIL	
1.	Obtain permits and comply with permit conditions and applicable regulations. Permits may include those listed below and in Section C, Table C-1 of the 1041 Application, as well as other permits that may be required under Federal, State, County, or local regulatory jurisdiction. <ul style="list-style-type: none"> • Bureau of Reclamation <ul style="list-style-type: none"> ○ Execution of Contracts (Reclamation Project Act 43 CFR 427) ○ Record of Decision (ROD) • U.S. Fish and Wildlife Service <ul style="list-style-type: none"> ○ Depredation Permit ○ Section 7 Consultation (Endangered Species Act 50 CFR 402) • U.S. Army Corps of Engineers <ul style="list-style-type: none"> ○ 404 Permit (Clean Water Act 33 CFR 320) • Colorado Department of Transportation (CDOT)

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ground and surface water control facilities including, but not limited to: equipment, methods, standby equipment and power supply, pollution control facilities, discharge locations, and provisions for temporary water supply; drawings showing locations, dimensions, and relationships of elements of each system; design calculations demonstrating accuracy of proposed dewatering system and components. Copies of plan will be provided to Pueblo County within 60 days of approval by CDPHE.

3. Control water during the course of construction, including weekends and holidays and during periods of work stoppages. Adequate backup systems shall be in place to maintain control of water.
4. Remove surface water controls when they are no longer needed.
5. Furnish, operate and maintain dewatering systems of sufficient size and capacity to continuously maintain excavations free of water, regardless of source, until backfilled to final grade.
6. Design and operate dewatering systems to prevent loss of soil as water is removed, to avoid inducing settlement or damage to existing facilities, completed work, or adjacent property, and to relieve artesian pressures and resultant uplift of excavation bottom.
7. Be responsible to obtain and comply with the requirements set forth in any applicable well permits required by the State.

C-9	Site Restoration
	Applicant shall provide Pueblo County residents with replacement vegetation and property to match pre-construction conditions or better.
<p style="text-align: center;">PROJECT DETAIL</p> <ol style="list-style-type: none"> 1. Grade disturbed areas to preconstruction contours so preconstruction drainage paths are reestablished. 2. Reclaim disturbed land, except water areas and surface areas of roads, by seeding or planting to achieve a permanent vegetation cover as specified below. <ol style="list-style-type: none"> a. In accordance with Construction Condition C-5, a pre-construction evaluation of existing vegetation will be conducted to determine species diversity, woody plant density, and seasonal variety. b. Vegetation cover will be of the same seasonal variety native to the area of disturbed land, or species that support the post-construction land use. In those areas of disturbed vegetation where such seeds are not commercially available, seeds will be collected on-site to be used in revegetation, including, rare plants identified in the FEIS, by the Colorado Natural Heritage Program or by other qualified investigators. c. Seeding and planting of disturbed areas will be conducted during the first normal 	

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period for favorable planting conditions after final preparation for seeding or planting.

- d. Soil stabilization practices will be used on all regraded and topsoiled areas.
 - e. The revegetated area will be considered acceptable if the revegetated area cover is not less than 90 percent of the pre-construction vegetation cover with similar species diversity. The pipeline access road will not be included in the 90 percent coverage calculation.
3. Restore roads and driveways so that:
 - a. Surfaces are finished level with existing surfaces.
 - b. Sealed roadways are finished to match existing seal (asphalt, spray seal, etc).
 - c. Unsealed roadways are to be finished to match existing surface. Concrete roadways/driveways shall be reinstated in such a manner as to match existing surface. Portions of slab damaged or rendered unstable by undermining (whether inadvertently or deliberately) should be included in the portion to be restored.
 4. Restore damaged or injured property including outbuildings, to a condition similar or better to that existing before the damage or injury occurred, by repairing, rebuilding, or restoring the property.
 5. Restore or replace fences and gates that are disturbed during construction.
 6. Provide Pueblo County a security bond equal to \$2,000 per acre of land in permanent or temporary construction easement in each work package. The security bond shall be released in full to the Applicant two years following the final completion of the construction contract, upon successful revegetation, as described above. If successful revegetation is not achieved, the security bond will be forfeited in the amount of \$2,000 for each acre, or fraction of an acre, that has not been successfully revegetated.

C-10	Public Communications
	Applicant shall keep Pueblo County residents informed of the SDS project and upcoming construction activities.

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PROJECT DETAIL

1. Assign a point of contact for responding to public questions, comments and concerns. The point of contact shall continue for one year following the final construction in Pueblo County.
2. Establish a local telephone number (a "hot-line") to allow citizens' access to the Public Communications Office and team throughout the duration of the Project. This telephone number will be included in the public information measures listed below, as well as on job site signage. The hot-line will be a combination of pre-recorded and live operator communications.
3. Develop and maintain a website that will include details of current and future project activities (i.e., schedules, type of work, phases, etc.)
4. Deliver individual resident "mailers" notifying each resident of future construction activity near their home. Residences within 500 feet of an upcoming construction zone will be informed thirty (30) days prior to construction. The mailers will include details of when construction will begin, when completion is planned, what types of activities are expected, an overview of the Project; and the hotline number.
5. Distribute individual resident "door hangers" to properties within 500 feet of the construction site. These will serve as reminders of future construction activities, and will be distributed approximately seven (7) days prior to construction.

C-11	Dust and Other Air Emission Controls (Dust Control)
	Applicant shall minimize fugitive dust impacts to County residents.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Prepare, submit and implement a fugitive dust control plan as required by the Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division. A copy of the plan will be submitted to Pueblo County. 2. Implement standard fugitive dust control practices as specified in the fugitive dust control plan, including: <ol style="list-style-type: none"> a. Watering unpaved roads on site. b. Limiting vehicle speeds to 30 mph on site. c. Covering excavated material with synthetic or natural cover or preventing sediment movement from the pile using silt fence. d. Installing vehicle tracking control at access points to the site. e. Re-vegetating disturbed areas as described in Construction Condition C-9 as soon as appropriate to reduce dust sources. f. Sweeping paved streets as necessary to remove construction dust. 3. Perform particulate monitoring using real-time particulate monitors that are capable of 	

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2. Comply with the Haul Route Plan accepted by Pueblo County.

C-15	Protection of Plants and Wildlife
	Applicant shall control impacts to native endangered and threatened flora and fauna.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Protect native endangered and threatened flora and fauna in accordance with the Final Environmental Impact Statement. 2. Submit a wildlife mitigation plan to the Colorado Division of Wildlife in accordance with their regulations prior to construction. This Plan will include actions the Applicant proposes to mitigate impacts that the SDS Project may have on fish and wildlife. As required by statute, the Wildlife Commission will evaluate the probable impact of the project on fish and wildlife. The Applicant shall provide the official wildlife mitigation plan and official state position to Pueblo County Staff prior to construction. 3. Coordinate with Bureau of Reclamation to release flows to the Arkansas River through the flood control gates when the North Outlet Works is unavailable due to construction activities. 	

C-16	Noxious Weed Control
	Applicant shall control spread of noxious weeds resulting from project construction.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Provide a person experienced in field identification of noxious weeds to locate existing noxious weeds that will be disturbed during construction in advance of ground-disturbing construction activities. 2. If List A species are found, provide to the State Weed Coordinator mapping data pertinent to each population including: <ol style="list-style-type: none"> a. Species name b. Population location(s) including distribution and abundance c. Estimated infested acreage 3. Implement an eradication program within the project limits. Eradicate existing Class A and B noxious weed populations. 4. Adopt the following methods to prevent the spread of noxious weeds during 	

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construction.

- a. Major equipment (track equipment, rubber tire loaders, and backhoes) will be cleaned by high pressure air or water spray before being delivered to the project site.
 - b. Use weed free seed, mulch, and borrow material.
 - c. Use 100-percent certified weed free seed and mulch. Locally or regionally available seed and mulch will be used when practicable.
5. Disturbed areas will be re-seeded as soon as practicable after the disturbance ends.

C-17	Hazardous Waste Management
	Applicant shall ensure that hazardous wastes are appropriately managed.
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Follow regulations to the handling, storage, transportation, and disposal of hazardous materials as set forth in the Code of Federal Regulations (CFR) 1910.120, DOT, EPA and NRC regulations, as applicable. The type and quantity of these materials will be small quantities (paints, solvents, fuels, etc.). 2. Development and implement Health, Safety and Environmental plans including hazardous material management in compliance with Federal, State and Local regulations prior to mobilizing on-site for Project construction. 	

C-18	Sustainable Design
	Applicant shall, where practical, design SDS facilities to be sustainable or "green".
PROJECT DETAIL	
<ol style="list-style-type: none"> 1. Make an effort to balance cut and fill for site grading and backfill to reduce imported or exported material. 2. Use site and building design to promote energy and resource conservation. 3. Motors and electrical equipment will be high-efficiency rated. Efficiencies will be determined by testing as set forth in ANSI/IEEE 112-Standard Test Procedures for Polyphase Induction Motors and Generators, Method B or Method F. 	

C-19	Sustainable Construction Practices
	Applicant shall, where practicable, use sustainable construction practices.
PROJECT DETAIL	

Pueblo County Revegetation Bond

Bond Number: 105692962

KNOW ALL BY THESE PRESENTS that **Colorado Springs Utilities**, as Principal, and **Travelers Casualty and Surety Company of America**, a corporation organized and existing under the laws of the State of Connecticut and duly authorized to transact a corporate surety business in the State of Colorado, as Surety, are hereby held and firmly bound unto **Pueblo County, Colorado**, as Obligee, in the maximum penal sum of **Two Hundred and Five Thousand Dollars (\$205,000.00)** for the payment whereof Principal and Surety hereby bind themselves, jointly and severally, as provided herein.

Whereas, the Principal has agreed to certain terms and conditions (the "Terms and Conditions") contained in a 1041 land-use permit and its mitigation appendix, Pueblo County 1041 Permit No. 2008-002 issued by Obligee ("1041 Permit") as part of the Principal's construction of the Southern Delivery System in and around Pueblo County, Colorado; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is required to re-vegetate lands in permanent or temporary construction easements pertaining to South Pipeline 1 (S1) – A 4.3-mile raw water pipeline extending from the Juniper Pump Station site adjacent to Pueblo Dam north and northeast to Spaulding Avenue within Pueblo West; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is also required to establish a security bond acceptable to the Obligee guaranteeing the re-vegetation of Impacted Lands to no less than 90% of the value of the preconstruction vegetation cover with similar species diversity ("Minimum Standard"), as further outlined in the Mitigation Appendix C-9, part 2.

Now, therefore, the condition of this obligation is such, that if the Principal shall re-vegetate Impacted Lands to the Minimum Standard, and obtain a release by the Obligee, then this obligation shall be void; otherwise to remain in full force and effect.

Obligee shall be entitled to receive payment from the Surety if, after completion of the non-binding mediation process described in Condition 29 of the 1041 Permit, the Principal has neither revegetated Impacted Lands to Minimum Standard nor paid to Obligee either 1) the amount demanded by the Obligee to re-vegetate Impacted Lands to the Minimum Standard, or 2) such lesser amount as may be agreed to by Obligee as part of the non-binding mediation process ("Re-vegetation Costs").

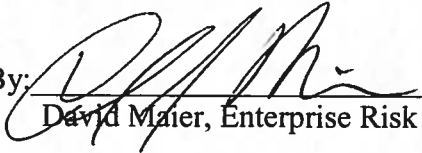
Payment of the Re-vegetation Costs shall be made by the Surety within thirty (30) days after receiving the tender by the Obligee of the invoice together with a written Claim for payment signed by the Obligee substantially in the form attached hereto. The Claim by Obligee to Surety shall be sent registered or certified mail to Travelers Casualty and Surety Company of America, Attn: Vice President, Commercial Surety Claim, One Tower Square, Hartford, CT 06183. Payment to Obligee by Surety shall be made by check or other method acceptable to Obligee, payable to Board of County Commissioners of Pueblo County, and delivered to the Pueblo County Attorney, 215 W. 10th Street, Room 312, Pueblo, Colorado, 81003.

Any claim under this Bond shall be made no later than December 31, 2015.

In no event shall the aggregate liability of the Surety hereunder exceed the penal sum of this Bond.

IN WITNESS WHEREOF, We have hereunto set our hands this 29th day of March, 2012.

Colorado Springs Utilities (Principal)

By: 
David Maier, Enterprise Risk Manager

Travelers Casualty and Surety Company of America (Surety)

By: 
Holly Hildebran, Attorney-in-Fact



POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 224085

Certificate No. 004576407

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Steven J. Ewing, Bryan K. Brenning, Ronald L. Agee, Renee McReynolds, Holly Hildebran, and Katie Klimek

of the City of Loveland, State of Colorado, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 6th day of October, 2011.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company



State of Connecticut
City of Hartford ss.

By:

George W. Thompson
George W. Thompson, Senior Vice President

On this the 6th day of October, 2011, before me personally appeared George W. Thompson, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2016.



Marie C. Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this _____ day of _____, 20 ____.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

Claim for Payment

1. Bond No. 105692962 was issued 29th of March, 2012, by Travelers Casualty and Surety Company of America, as Surety, on behalf of Colorado Springs Utilities, as Principal, and in favor of Pueblo County, as Obligee, to guarantee Principal's re-vegetation obligations to Obligee (the "Bond").
2. Nonbinding Mediation between Obligee and Principal was completed on _____ and it was determined by Obligee that the re-vegetation of Impacted Lands to the Minimum Standard is deficient.
3. Obligee submitted to Principal written notice (copy attached hereto) dated _____ of the Re-vegetation costs as defined in the Bond.
4. Obligee hereby submits a claim for \$ _____, to be paid by Surety by a check, or other method acceptable, to Obligee, and payable to Board of County Commissioners of Pueblo County, Colorado, and delivered to Pueblo County Attorney, 215 W. 10th Street, Room 312, Pueblo, Colorado 81003 within thirty (30) business days of the date of this claim.

Dated: _____

Obligee: Pueblo County, Colorado

By: _____
Pueblo County Attorney



Colorado Springs Utilities

It's how we're all connected

June 4, 2012

City of Pueblo
530 North Main Street, Suite 203
Pueblo, Colorado 81003
Attention: Mr. Tom Florczak, City Attorney

**Subject: City of Pueblo Revegetation Bond, Southern Delivery System
No. 105765212 for South Pipeline 1 (S1)**

Dear Mr. Florczak:

The subject bond is enclosed. This security bond is a guarantee for revegetation of lands owned by the City of Pueblo and impacted by construction of a Work Package referred to as Southern Delivery System South Pipeline 1 (S1). The revegetation standard, the associated security bond requirement, and pertinent terms and conditions set out in Condition 22 of Pueblo County 1041 Permit No. 2008-002, Article I, Section 3(a) of the January 9, 2012 agreement between Colorado Springs Utilities and the City of Pueblo, Section 2 of the easement agreement recorded at Reception No. 1896813, and Section 2 of the temporary construction easement recorded at Reception No. 1896812 are identified in the bond.

Work Package S1 is a 4.3-mile raw water pipeline extending from the Juniper Pump Station site adjacent to Pueblo Dam north and northeast to Spaulding Avenue in Pueblo West within Pueblo County, Colorado. The maximum penal sum of the revegetation bond is \$55,000.00. This amount is based on the Work Package S1 area owned by the City of Pueblo that is covered by temporary easements or permanent easements (27.32 acres) multiplied by \$2,000.00 per acre, as required in Condition 22. A table summarizing this information is enclosed. The calculated amount of \$54,640.45 was then rounded up to \$55,000.00 for bonding.

Please contact me at 719-668-8037 with any questions regarding this information.

Sincerely,

John A. Fredell
Program Director
Southern Delivery System

enclosures: City of Pueblo Revegetation Bond No. 105765212
Claim for Payment Form
Power of Attorney
S1 Bond Table

cc: Dan Higgins, SDS Deputy Program Director – Design and Construction
Keith Riley, SDS Deputy Program Director – Permitting, Land & Controls
David W. Robbins

121 South Tejon Street, Third Floor
P.O. Box 1103, Mail Code 930
Colorado Springs, CO 80947-0930

Phone 719/668-4800
Fax 719/668-8734
<http://www.csu.org>

Land Restoration Bond

Bond Number: 105765212

KNOW ALL BY THESE PRESENTS that the City of Colorado Springs, a Colorado home rule city and municipal corporation, for the use and benefit of **Colorado Springs Utilities**, as Principal ("Principal"), and **Travelers Casualty and Surety Company of America**, a corporation organized and existing under the laws of the State of Connecticut and duly authorized to transact a corporate surety business in the State of Colorado, as Surety ("Surety"), are hereby held and firmly bound unto the **City of Pueblo, a Municipal Corporation**, as Obligee ("Pueblo" or "Obligee"), in the maximum penal sum of **Fifty-five Thousand Dollars (\$55,000.00)** for the payment whereof Principal and Surety hereby bind themselves, jointly and severally, as provided herein.

Whereas, the Principal has agreed to certain terms and conditions (the "Terms and Conditions") contained in a 1041 land-use permit and its mitigation appendix, Pueblo County 1041 Permit No. 2008-002 issued by Pueblo County ("1041 Permit") as part of the Principal's construction of the Southern Delivery System in and around Pueblo County, Colorado; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is required to re-vegetate lands in permanent or temporary construction easements pertaining to South Pipeline 1 (S1) – A 4.3-mile raw water pipeline extending from the Juniper Pump Station site adjacent to Pueblo Dam north and northeast to Spaulding Avenue within Pueblo West, some of which lands are owned by Pueblo; and

Whereas, pursuant to the provisions of Article I, Section 3 (a) of that certain Agreement, dated January 9, 2012 between Principal and Pueblo (the "Agreement"), the Principal has agreed, with respect to all land disturbed by construction and installation of the Southern Delivery System which is owned by Pueblo, to furnish a surety bond naming Pueblo as Obligee to secure Principal's obligations under the Agreement to properly provide dust control, revegetation and remediation and to backfill, grade, re-seed and to restore the surface of the ground to the condition which it was in immediately preceding the construction, to the extent reasonably possible, as required by the terms of Section 2 of the Easement Agreement recorded in the records of the Clerk and Recorder of Pueblo County, Colorado at Reception No. 1896813 and the terms of Section 2 of the Temporary Construction Easement recorded in the records of the Pueblo County Clerk and Recorder at Reception No. 1896812 (collectively, the "Easement Requirements"), and to meet the revegetation requirements of the 1041 Permit, and in case of any conflict among those instruments, with the most restrictive and environmentally protective requirement to apply (all of the requirements being referred to collectively as the "Land Restoration");

Now, therefore, the condition of this obligation is such, that if the Principal shall fully perform the Land Restoration as agreed, and obtain a release by the Obligee, then this obligation shall be void; otherwise to remain in full force and effect.

Obligee shall be entitled to receive payment from the Surety if, after completion of the non-compliance notice, corrective action, and dispute processes described in Article I, Section 3(a) and 3(b) of the Agreement, the Principal has failed to comply with the Land Restoration requirements on all or a portion of the land covered by the Agreement.

Payment of the costs of correction of Principal's non-compliance with its Land Restoration obligations, plus 10% thereof for administrative expenses, shall be made by the Surety within thirty (30) days after Obligees transmits to Surety an invoice therefor together with a written Claim for payment signed by the Obligees substantially in the form attached hereto. The Claim by Obligees to Surety shall be sent by certified mail, return receipt requested, to Travelers Casualty and Surety Company of America, Attn: Vice President, Commercial Surety Claim, One Tower Square, Hartford, CT 06183. Payment to Obligees by Surety of the Claim shall be made by check or other method acceptable to Obligees, payable to City of Pueblo and delivered to the City Attorney, 503 North Main Street, Suite 203, Pueblo, Colorado 81003

Any claim under this Bond shall be made no later than December 31, 2015.

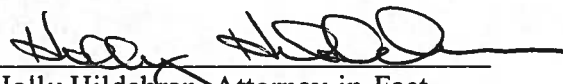
In no event shall the aggregate liability of the Surety hereunder exceed the penal sum of this Bond.

IN WITNESS WHEREOF, We have hereunto set our hands this 1st day of June, 2012.

**The City of Colorado Springs, Colorado, a Home rule
City and Colorado municipal Corporation,
On behalf of its enterprise Colorado
Springs Utilities (Principal)**

By: 
David Maier, Enterprise Risk Manager

Travelers Casualty and Surety Company of America (Surety)

By: 
Holly Hildebran, Attorney-in-Fact

Claim for Payment

1. Land Restoration Bond, Bond No. 105765212 was issued June 1st, 2012, by Travelers Casualty and Surety Company of America, as Surety, on behalf of Colorado Springs Utilities, as Principal, and in favor of the City of Pueblo, a Municipal Corporation, as Obligee, to guarantee the City of Colorado Springs, for the use and benefit of Colorado Springs Utilities' ("Principal") Land Restoration obligations to Obligee (the "Bond").
2. Non-compliance notice, corrective action, and dispute processes between Obligee and Principal were completed on _____ and it was determined by Obligee that the Principal has failed, in part or whole, to fulfill its Land Restoration obligations to Obligee.
3. Obligee submitted to Principal written notice (copy attached hereto) dated _____ of the costs for correction of Principal's non-compliance with its Land Restoration obligations plus administrative expenses equal to 10% of such cost.
4. Obligee hereby submits a claim for \$ _____, to be paid by Surety by a check, or other method acceptable, to Obligee, and payable to City of Pueblo, Colorado, and delivered to: City Attorney, 530 North Main Street, Suite 203, Pueblo, Colorado 81003 within thirty (30) business days of the date of this claim.

Dated: _____

Obligee: City of Pueblo, Colorado

By: _____

Name:

Title: _____



POWER OF ATTORNEY

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 224085

Certificate No. 004576410

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Steven J. Ewing, Bryan K. Brenning, Ronald L. Agee, Renee McReynolds, Holly Hildebran, and Katie Klimek

of the City of Loveland, State of Colorado, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 6th day of October, 2011.

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company



State of Connecticut
 City of Hartford ss.

By:

George W. Thompson
 George W. Thompson, Senior Vice President

On this the 6th day of October, 2011, before me personally appeared George W. Thompson, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
 My Commission expires the 30th day of June, 2016.



Marie C. Tetreault
 Marie C. Tetreault, Notary Public

City of Pueblo Easement Areas

S1

APN	Segment	Owner	Fee SF	PE SF	TE SF	Total SF
500000002	S1	CITY OF PUEBLO	-	135,163	64,694	199,857
500000023	S1	CITY OF PUEBLO	-	101,455	63,639	165,094
500000024	S1	CITY OF PUEBLO	-	159,735	199,060	358,795
500000025	S1	CITY OF PUEBLO	-	308,217	158,106	466,323
TOTALS			-	704,570	485,499	1,190,069

SF - square feet

Fee - land acquired in fee

PE - permanent easement

TE - temporary easement

Conversion of Square Feet (SF) to Acres	27.32
Calculated Bond Amount (\$2,000.00/acre)	\$ 54,640.45

Pueblo County Revegetation Bond

Bond Number: 105692956

KNOW ALL BY THESE PRESENTS that **Colorado Springs Utilities**, as Principal, and **Travelers Casualty and Surety Company of America**, a corporation organized and existing under the laws of the State of Connecticut and duly authorized to transact a corporate surety business in the State of Colorado, as Surety, are hereby held and firmly bound unto **Pueblo County, Colorado**, as Obligee, in the maximum penal sum of **One Hundred Fifty Seven Thousand Dollars (\$157,000.00)** for the payment whereof Principal and Surety hereby bind themselves, jointly and severally, as provided herein.

Whereas, the Principal has agreed to certain terms and conditions (the "Terms and Conditions") contained in a 1041 land-use permit and its mitigation appendix, Pueblo County 1041 Permit No. 2008-002 issued by Obligee ("1041 Permit") as part of the Principal's construction of the Southern Delivery System in and around Pueblo County, Colorado (the "SDS Project"); and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is required to re-vegetate lands in permanent or temporary construction easements pertaining to South Pipeline 2 (S2) a 6.4 mile raw water pipeline extending northerly from Spaulding Avenue within Pueblo West to the north boundary of Pueblo West within Pueblo County, Colorado ("Impacted Lands") which have been disturbed by the SDS Project; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is also required to establish a security bond acceptable to the Obligee guaranteeing the re-vegetation of Impacted Lands to no less than 90% of the value of the preconstruction vegetation cover with similar species diversity ("Minimum Standard"), as further outlined in the Mitigation Appendix C-9, part 2.

Now, therefore, the condition of this obligation is such, that if the Principal shall re-vegetate Impacted Lands to the Minimum Standard, then this obligation shall be void; otherwise to remain in full force and effect.

Obligee shall be entitled to receive payment from the Surety if, after completion of the non-binding mediation process described in Condition 29 of the 1041 Permit, the Principal has neither re-vegetated Impacted Lands to the Minimum Standard nor paid to Obligee either 1) the amount demanded by Obligee to re-vegetate Impacted Lands to the Minimum Standard, or 2) such lesser amount as may be agreed to by Obligee as part of the non-binding mediation process ("Re-vegetation Costs").

Payment of the Re-vegetation Costs shall be made by the Surety within thirty (30) days after receiving the tender by the Obligee of a written Claim for payment signed by the Obligee substantially in the form attached hereto. The Claim by Obligee to Surety shall be sent registered or certified mail to Travelers Casualty and Surety Company of America, Attn: Vice President, Commercial Surety Claim, One Tower Square, Hartford, CT 06183. Payment to Obligee by Surety shall be made by check or other method acceptable to Obligee, payable to Board of County Commissioners of Pueblo County, and delivered to the Pueblo County Attorney, 215 W. 10th Street, Room 312, Pueblo, Colorado, 81003.

Any claim under this Bond shall be made no later than December 31, 2015.

In no event shall the aggregate liability of the Surety hereunder exceed the penal sum of this Bond.

IN WITNESS WHEREOF, We have hereunto set our hands this 7th day of November, 2011.

Colorado Springs Utilities (Principal)

By: _____
David Maier, Enterprise Risk Manager

Travelers Casualty and Surety Company of America (Surety)

By:  _____
Holly Hildebran, Attorney-in-Fact



POWER OF ATTORNEY

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company

Attorney-In Fact No. 224085

Certificate No. 004576403

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Steven J. Ewing, Bryan K. Brenning, Ronald L. Agee, Renee McReynolds, Holly Hildebran, and Katie Klimek

of the City of Loveland, State of Colorado, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 6th day of October, 2011.

Farmington Casualty Company
 Fidelity and Guaranty Insurance Company
 Fidelity and Guaranty Insurance Underwriters, Inc.
 St. Paul Fire and Marine Insurance Company
 St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
 Travelers Casualty and Surety Company
 Travelers Casualty and Surety Company of America
 United States Fidelity and Guaranty Company



State of Connecticut
 City of Hartford ss.

By:

George W. Thompson
 George W. Thompson, Senior Vice President

On this the 6th day of October, 2011, before me personally appeared George W. Thompson, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
 My Commission expires the 30th day of June, 2016.



Marie C. Tetreault
 Marie C. Tetreault, Notary Public

Pueblo County Revegetation Bond

Bond Number: 105692963

KNOW ALL BY THESE PRESENTS that **Colorado Springs Utilities**, as Principal, and **Travelers Casualty and Surety Company of America**, a corporation organized and existing under the laws of the State of Connecticut and duly authorized to transact a corporate surety business in the State of Colorado, as Surety, are hereby held and firmly bound unto **Pueblo County, Colorado**, as Obligee, in the maximum penal sum of **Two Hundred Ninety-Eight Thousand Dollars (\$298,000.00)** for the payment whereof Principal and Surety hereby bind themselves, jointly and severally, as provided herein.

Whereas, the Principal has agreed to certain terms and conditions (the "Terms and Conditions") contained in a 1041 land-use permit and its mitigation appendix, Pueblo County 1041 Permit No. 2008-002 issued by Obligee ("1041 Permit") as part of the Principal's construction of the Southern Delivery System in and around Pueblo County, Colorado; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is required to re-vegetate lands in permanent or temporary construction easements pertaining to South Pipeline 3 (S3) – A 7.6-mile raw water pipeline extending northerly from the north boundary of Pueblo West to the boundary of Pueblo and El Paso counties; and

Whereas, pursuant to Section 22 of the Terms and Conditions of the 1041 Permit, Principal is also required to establish a security bond acceptable to the Obligee guaranteeing the re-vegetation of Impacted Lands to no less than 90% of the value of the preconstruction vegetation cover with similar species diversity ("Minimum Standard"), as further outlined in the Mitigation Appendix C-9, part 2.

Now, therefore, the condition of this obligation is such, that if the Principal shall re-vegetate Impacted Lands to the Minimum Standard, and obtain a release by the Obligee, then this obligation shall be void; otherwise to remain in full force and effect.

Obligee shall be entitled to receive payment from the Surety if, after completion of the non-binding mediation process described in Condition 29 of the 1041 Permit, the Principal has neither revegetated Impacted Lands to Minimum Standard nor paid to Obligee either 1) the amount demanded by the Obligee to re-vegetate Impacted Lands to the Minimum Standard, or 2) such lesser amount as may be agreed to by Obligee as part of the non-binding mediation process ("Re-vegetation Costs").

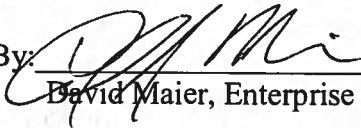
Payment of the Re-vegetation Costs shall be made by the Surety within thirty (30) days after receiving the tender by the Obligee of the invoice together with a written Claim for payment signed by the Obligee substantially in the form attached hereto. The Claim by Obligee to Surety shall be sent registered or certified mail to Travelers Casualty and Surety Company of America, Attn: Vice President, Commercial Surety Claim, One Tower Square, Hartford, CT 06183. Payment to Obligee by Surety shall be made by check or other method acceptable to Obligee, payable to Board of County Commissioners of Pueblo County, and delivered to the Pueblo County Attorney, 215 W. 10th Street, Room 312, Pueblo, Colorado, 81003.

Any claim under this Bond shall be made no later than December 31, 2015.


In no event shall the aggregate liability of the Surety hereunder exceed the penal sum of this Bond.

IN WITNESS WHEREOF, We have hereunto set our hands this 29th day of March, 2012.

Colorado Springs Utilities (Principal)

By: 
David Maier, Enterprise Risk Manager

Travelers Casualty and Surety Company of America (Surety)

By: 
Holly Hildebran, Attorney-in-Fact



POWER OF ATTORNEY

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company

Attorney-In Fact No. 224085

Certificate No. 004576406

KNOW ALL MEN BY THESE PRESENTS: That St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company and St. Paul Mercury Insurance Company are corporations duly organized under the laws of the State of Minnesota, that Farmington Casualty Company, Travelers Casualty and Surety Company, and Travelers Casualty and Surety Company of America are corporations duly organized under the laws of the State of Connecticut, that United States Fidelity and Guaranty Company is a corporation duly organized under the laws of the State of Maryland, that Fidelity and Guaranty Insurance Company is a corporation duly organized under the laws of the State of Iowa, and that Fidelity and Guaranty Insurance Underwriters, Inc., is a corporation duly organized under the laws of the State of Wisconsin (herein collectively called the "Companies"), and that the Companies do hereby make, constitute and appoint

Steven J. Ewing, Bryan K. Brenning, Ronald L. Agee, Renee McReynolds, Holly Hildebran, and Katie Klimek

of the City of Loveland, State of Colorado, their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign, execute, seal and acknowledge any and all bonds, recognizances, conditional undertakings and other writings obligatory in the nature thereof on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

IN WITNESS WHEREOF, the Companies have caused this instrument to be signed and their corporate seals to be hereto affixed, this 6th day of October, 2011.

Farmington Casualty Company
Fidelity and Guaranty Insurance Company
Fidelity and Guaranty Insurance Underwriters, Inc.
St. Paul Fire and Marine Insurance Company
St. Paul Guardian Insurance Company

St. Paul Mercury Insurance Company
Travelers Casualty and Surety Company
Travelers Casualty and Surety Company of America
United States Fidelity and Guaranty Company



State of Connecticut
City of Hartford ss.

By:

George W. Thompson
George W. Thompson, Senior Vice President

On this the 6th day of October, 2011, before me personally appeared George W. Thompson, who acknowledged himself to be the Senior Vice President of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, and that he, as such, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

In Witness Whereof, I hereunto set my hand and official seal.
My Commission expires the 30th day of June, 2016.



Marie C. Tetreault
Marie C. Tetreault, Notary Public

This Power of Attorney is granted under and by the authority of the following resolutions adopted by the Boards of Directors of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company, which resolutions are now in full force and effect, reading as follows:

RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President, any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary may appoint Attorneys-in-Fact and Agents to act for and on behalf of the Company and may give such appointee such authority as his or her certificate of authority may prescribe to sign with the Company's name and seal with the Company's seal bonds, recognizances, contracts of indemnity, and other writings obligatory in the nature of a bond, recognizance, or conditional undertaking, and any of said officers or the Board of Directors at any time may remove any such appointee and revoke the power given him or her; and it is

FURTHER RESOLVED, that the Chairman, the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President may delegate all or any part of the foregoing authority to one or more officers or employees of this Company, provided that each such delegation is in writing and a copy thereof is filed in the office of the Secretary; and it is

FURTHER RESOLVED, that any bond, recognizance, contract of indemnity, or writing obligatory in the nature of a bond, recognizance, or conditional undertaking shall be valid and binding upon the Company when (a) signed by the President, any Vice Chairman, any Executive Vice President, any Senior Vice President or any Vice President, any Second Vice President, the Treasurer, any Assistant Treasurer, the Corporate Secretary or any Assistant Secretary and duly attested and sealed with the Company's seal by a Secretary or Assistant Secretary; or (b) duly executed (under seal, if required) by one or more Attorneys-in-Fact and Agents pursuant to the power prescribed in his or her certificate or their certificates of authority or by one or more Company officers pursuant to a written delegation of authority; and it is

FURTHER RESOLVED, that the signature of each of the following officers: President, any Executive Vice President, any Senior Vice President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary, and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any certificate relating thereto appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such Power of Attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or understanding to which it is attached.

I, Kevin E. Hughes, the undersigned, Assistant Secretary, of Farmington Casualty Company, Fidelity and Guaranty Insurance Company, Fidelity and Guaranty Insurance Underwriters, Inc., St. Paul Fire and Marine Insurance Company, St. Paul Guardian Insurance Company, St. Paul Mercury Insurance Company, Travelers Casualty and Surety Company, Travelers Casualty and Surety Company of America, and United States Fidelity and Guaranty Company do hereby certify that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this _____ day of _____, 20 ____.

WARNING: THIS POWER OF ATTORNEY IS INVALID WITHOUT THE RED BORDER


Kevin E. Hughes, Assistant Secretary



To verify the authenticity of this Power of Attorney, call 1-800-421-3880 or contact us at www.travelersbond.com. Please refer to the Attorney-In-Fact number, the above-named individuals and the details of the bond to which the power is attached.

Claim for Payment

1. Bond No. 105692963 was issued 29th of March, 2012, by Travelers Casualty and Surety Company of America, as Surety, on behalf of Colorado Springs Utilities, as Principal, and in favor of Pueblo County, as Obligee, to guarantee Principal's re-vegetation obligations to Obligee (the "Bond").
2. Nonbinding Mediation between Obligee and Principal was completed on _____ and it was determined by Obligee that the re-vegetation of Impacted Lands to the Minimum Standard is deficient.
3. Obligee submitted to Principal written notice (copy attached hereto) dated _____ of the Re-vegetation costs as defined in the Bond.
4. Obligee hereby submits a claim for \$ _____, to be paid by Surety by a check, or other method acceptable, to Obligee, and payable to Board of County Commissioners of Pueblo County, Colorado, and delivered to Pueblo County Attorney, 215 W. 10th Street, Room 312, Pueblo, Colorado 81003 within thirty (30) business days of the date of this claim.

Dated: _____

Obligee: Pueblo County, Colorado

By: _____
Pueblo County Attorney

SDS PUEBLO COUNTY REVEGETATION SUMMARY
(S1, S2, S3)

Segment (S to N)	S1	S2	S3 - 2013	S3 - 2012
Miles in Work Package	4.30	6.40	5.20	2.30
Total Acres	102.40	78.49	100.34	48.60
Construction Substantial Completion	1/22/2013	8/9/2012	7/27/2012	7/27/2012
Revegetation NTP	2/28/2013	5/9/2012	5/9/2012	5/9/2012
Construction Final Completion	2/27/2013	9/11/2012	11/30/2012	11/30/2012
Initial Planting Activities Completed	5/24/2013	8/12/2012	1/29/2014	9/12/2012
90 % Cover Established	Sep-14	Sep-14	Sep-15	Sep-14

* Revegetation Bond Claims Expire December 31, 2015



Pre-Construction Vegetation and Post-Construction Vegetation Comparison Examples

SDS Work Package S1



1146 E. Spaulding Avenue, Pueblo West, CO (S1)

Pre-Construction Photos:



Post-Revegetation Photo:



329 S. Birchwood Drive, Pueblo West, CO (S1)

Pre-Construction Photo:



Post-Revegetation Photo:



Pre-Construction Photo:



Post-Revegetation Photo:



407 S. Birchwood Drive, Pueblo West, CO (S1)

Pre-Construction Photos:



Post-Revegetation Photo:



Holman/Douglas, Pueblo West, CO (S1)

Pre-Construction Photo:



Post-Revegetation Photo:



City of Pueblo Honor Farm (S1)

Pre-Construction Photo:



Post-Revegetation Photo:





Pre-Construction Vegetation and Post-Construction Vegetation Comparison Examples

SDS Work Package S2



1115 E. Ivanhoe Drive, Pueblo West, CO (S2)

Pre-Construction Photo:

Station 453 +00 - E - 9-30-11 11:31 AM



Post-Revegetation Photo:

09 / 03 / 2015



Pre-Construction Photo:

Station 453 +50 - E - 9-30-11 11:33 AM



Post-Revegetation Photo:

09 / 03 / 2015



1104 E. Ranch Drive, Pueblo West, CO (S2)

Pre-Construction Photo:



Post-Revegetation Photo:



Pre-Construction Photo:



Post-Revegetation Photo:





E. Sequoya Drive, Pueblo West, CO (S2)

Pre-Construction Photo:



Post-Revegetation Photo:





1073 N. Kirkwood Drive, Pueblo West, CO (S2)

Pre-Construction Photo:



Post-Revegetation Photo:





1131 N. Kirkwood Drive, Pueblo West, CO (S2)

Pre-Construction Photo:

1131 Kirkwood- SW corner of backyard +87 - 9-29-2011- E 9:05 AM



Post-Revegetation Photo:

09 / 03 / 2015



Pre-Construction Photo:

1131 Kirkwood- NW corner of backyard - 9-29-2011- S 9:06 AM



Post-Revegetation Photo:

09 / 03 / 2015





Pre-Construction Vegetation and Post-Construction Vegetation Comparison Examples

SDS Work Package S3



Young Hollow Rd and Antelope Rd, Midway Ranches (S3)

Pre-Construction Photo:

Nov 8/2011 11:00 AM -- Staging area- North end- S1092 +20ft- North fence +0 -S



Post-Revegetation Photo:



Pre-Construction Photo:

Nov 14/2011 9:04 AM -- S 1093+00 N



Post-Revegetation Photo:



Young Hollow Rd and Pronghorn Rd, Midway Ranches (S3)

Pre-Construction Photo:

Nov 8/2011 2:02 PM -- S 1144+00 S Pronghorn Rd.



Post-Revegetation Photo:



Pre-Construction Photo:

Nov 8/2011 2:03 PM -- S 1144+00 N Pronghorn Rd.



Post-Revegetation Photo:



Young Hollow Rd and Salt Cedar Rd, Midway Ranches (S3)

Pre-Construction Photo:



Post-Revegetation Photo:



Pre-Construction Photo:



Post-Revegetation Photo:





**Western States Reclamation Inc., Technical Proposal
Segments S2 and S3**

**Scope of Revegetation Services
Performed on all SDS Pipeline Work Packages
in Pueblo County**



**RFP-95723 Southern Delivery System (SDS)
Revegetation Services**

**TECHNICAL PROPOSAL
SEGMENT S2 & S3**

Prepared for:
Colorado Springs Utilities
Procurement and Contract Services Office
121 South Tejon Street, Suite 200
Colorado Springs, CO 80903

Prepared by:
Western States Reclamation, Inc.
3756 Imperial Street
Frederick, CO 80516

1. INTRODUCTION

Western States Reclamation, Inc. (WSRI) is pleased to present this proposal for revegetation services to Colorado Springs Utilities. WSRI for 29 years has maintained a reputation of taking on and delivering complex revegetation projects throughout the western United States. WSRI has enjoyed researching the challenges and the solutions for the revegetation of the Southern Delivery System right-of-way (ROW) and would look forward to working with the multiple stakeholders involved in the project if selected by the review committee.

2. PROJECT NARRATIVE

2.1 Coordination With Utilities and the Pipeline Construction Contractors

Pre-vegetation Services

To fulfill all of the specified requirements WSRI anticipates staffing the project upon notice to proceed with a full time administrative team to coordinate contracts and meetings, and to prepare project schedules, documentation, plans and submittals. The administrative team will also be responsible for acquiring all necessary permits in a timely fashion. WSRI realizes the owner's and stakeholder's desire and the necessity to get site revegetation/stabilization underway. With the size and experience of WSRI's staff the administrative and pre-vegetation professional services will be expedient and completed correctly.

Site acceptance

When notified that a phase or section of Segment S2 or S3 is completed Western States Reclamation will coordinate with Utilities and the pipeline contractor a site walk through to confirm that the condition of the soils and stormwater BMPs are acceptable and ready for turnover. WSRI's Stormwater Manager and Revegetation Specialist will attend the meeting and will perform the inspections. WSRI will require that soil preparation has been completed according to the project specifications and that it is in a condition that is ready for revegetation. WSRI will verify the pipeline contractors grading, topsoil placement, decompaction and rock/clod removal meets specifications.

If any soils are not ready for revegetation and/or stormwater BMPs are not in proper condition WSRI will coordinate with the pipeline contractor and Utilities the completion of the desired work. WSRI has worked on, and is currently working on projects with the pipeline contractors and has good working relationships.

Permitting

Western States Reclamation, Inc. has researched and will obtain and provide copies of the various permits and plans that are required for this project including the SWMP, Excavation and APEN.

Western States will apply for and purchase an Air Pollution Emission Notice (APEN) and General Construction Permit through the Colorado Department of Health and Environment.

Western States Reclamation will submit an application for the reassignment of permit coverage to the Colorado Department of Health and Environment, requesting that the Construction Stormwater General Permit and in turn Stormwater Management Plan included in the RFP library be reassigned to WSRI from the pipeline contractor. WSRI intends on submitting a reassignment form for the phases of pipeline that are completed and being turned over to WSRI for revegetation. Upon completion of all phases of pipeline construction on S2 and S3, WSRI through the transfer of ownership will hold the entire Construction Stormwater General Permit for the Segments.

Once all permits have been obtained, WSRI will staff the project accordingly to insure that all permit requirements are being met at all times. WSRI understands that communication and coordination are critical elements to a safe, legal and sustainable construction site.

Photo Documentation

WSRI will be subcontracting Ricardo Villa of Great Scenic Photos to complete the photo and video documentation on S2 and S3. Ricardo is currently working with Garney Construction and Reynolds to meet their requirements for photo and video documentation.

2.2 Schedule/Proposed Phasing of Work

Schedule for Completing One or Both Pipeline Segments

WSRI anticipates mobilizing to the job site as soon as the project contracts, permits, submittals, plans and other required documentation are in place and project meetings and phase acceptance is completed. WSRI anticipates completing revegetation and irrigation installation as soon as phases/sections of pipe are released and accepted.

Production

Revegetation

It is anticipated that a three tractor crew could complete approximately 10-12 acres of revegetation per day. With the inclusion of Revegetation Alternates and potential areas to receive Soil Amendments it is estimated that seeding and mulching could be completed in a total of 16 working days for the 97 disturbed acres on Segment S2 and 25 working days for the 150 disturbed acres on Segment S3.

An additional crew of 3 laborers and 1 reclamation foreman will complete inaccessible and steep slope areas (Revegetation Alternates). The hand crew will work simultaneous with the tractor crews and will be able to complete the steep slope sections within the working days allotted for the tractor crew.

Irrigation Water

As pipeline ROW becomes available for revegetation construction WSRI will begin all mainline activities (trenching, installation, backfill and roll compacting). After mainline is installed on a section of pipeline ROW revegetation will follow and then individual above ground laterals and zones will be installed. WSRI will schedule mainline installation as soon as possible on the

project ROW to maintain schedule and minimize disturbance. If mainline activities are necessary after revegetation WSRI will touch up seed areas that are affected.

Overall Project Management

Crew sizes will be the same for S2 and S3.

Proposed crews/staff sizing

Admin

- 1 – Project Manager
- 1 – Project Administrator
- 1 – Site Superintendent

Revegetation

- 1 - Reclamation Superintendent
- 3 – Reclamation Operators
- 3 – Reclamation Laborers

Irrigation

- 1 – Irrigation Superintendent
- 3 – Project Foreman/Operators
- 8 – Reclamation Laborers

Mobilization

- 1 – Semi Truck Driver

Inspection Maintenance

- 1 – SWMP Inspector
- 1 – Licensed Herbicide Applicator/Ecologist
- 2 – Reclamation Laborer
- 1 – Revegetation Specialist

Key Staffing

David Chenoweth – President/Certified Soil Scientist/Quality Control (Resume Provided SOQ)

Colby Reid – Project Manager (Resume Provided SOQ)

Joe Schneider - Project Administration (Resume Provided SOQ)

Shawn Finch – Site Superintendent (Resume Provided SOQ)

Justin Keith – Reclamation Superintendent (Resume Provided SOQ)

Clint Snow – Irrigation Superintendent (Resume in Appendix I RFP)

Proposed equipment

- 3 – John Deere Tractors 6000 to 8000 Series and Implements (Haybuster Drill, Disks, Cultipacker, Harrow, Bale Blower, Disk Crimper)
- 1 – Finn 4,000 Gallon Water Tank + Kenworth Semi
- 6 – 1 Ton Pick Ups
- 1 – John Deere 670 Motor Grader

1 – Large Trencher - Vermeer 1250
1 – Back Hoe – John Deere 410
1 – 3 - 4CY Loader – JD644
1 - Road Grader
1- Drum Compactor
1 – Fusion Machine for HDPE Pipe
2 – Goose Neck Trailers
1 – Semi Truck
2 – 6 Wheeled UTVs with Roll Bars

Record Keeping

WSRI in-house procedure is for each crew leader to complete a daily report on a printed form that contains the following information:

- Weather conditions
- Soil moisture conditions
- Crew members hours and task completed
- Quantities of work task completed
- Equipment on the site and daily hours of use
- Materials received and materials used
- Notes of any site issues discussed with inspectors or client
- Reports of any close calls
- Job Safety Analysis Reports

WSRI is in the process of converting several crews to a computerized software application that allows the crew leader to record all daily report information contained above to office locations or to a central website.

Safety

Safety is taken very seriously at WSRI from ownership to seasonal labor. It is critical for WSRI's business to have high safety ratings and comprehensive in-house procedures. Upon hiring at Western States Reclamation employees are trained with in house procedures (available upon request). With every new job comes new safety meetings and the expectations that the safety expectations with other entities on the project site are met. Several key features to WSRI's in house procedures are outlined below.

- Job Site Analysis JSA – WSRI superintendents are required to fill out a job safety analysis form and discuss the day's activities and potential safety hazards for the work to be performed. Working around large agricultural equipment and public safety will be main topics that will be addressed on a daily basis.
- Safety clothing – Safety clothing including shoes, vests, hard hats, hearing protection and safety glasses are required on all projects. Additional safety clothing is worn when project conditions require.

- Pre-Job Safety meeting – Outlining project specific safety measures along with review of in house procedures. All involved parties are able to address concerns and safety plan for the project.
- Incident reporting – All incidents on WSRI work sites are required to be reported. Incidents will be reviewed and immediate actions will be taken to solve associated safety hazards.
- Communication – WSRI crew members will be in constant communication with 2-Way radios and cell phones. Communication with SDS team will be critical.

Dust control

- Dust will be controlled by a 4,000 Gallon Finn Hydromulcher and Semi-Tractor as needed.
- Vehicle speed limits and access will be strictly controlled
- Stabilization of the site with straw, mulch and guar tack will be completed as soon as possible after turn over.
- The temporary irrigation system and establishing vegetation will provide dust control as soon as the system is completed and operational.

Application of seed

Site Preparation

Proper soil tillage is critical to proper seed placement, straw mulch crimping, and water infiltration into the soil profile after seeding is completed. WSRI anticipates that several tillage implements and processes will be needed for the project to handle various soil textures and slope conditions.

WSRI believes that optimum soil preparation consist of somewhat loose friable soils to a minimum depth of 6 inches, soil clods no greater than 2 inches in size, and no greater than 20 percent rock fragments on the soil surface. Not all areas of the pipeline will allow for optimum soil tillage utilizing equipment due to steep slope conditions and rocky surfaces.

WSRI anticipates utilizing the following equipment and implements for soil preparation:

- Soil Subsoiler
- Chisel Plow
- Rhome Style Disk
- Farm Disk
- Culti packer

Seeding Methods

Varying site conditions along the pipeline will dictate whether drill seeding, hydroseeding or hand seeding will be utilized. Drill seeding will be utilized any place where slopes are less than

2.5 to 1 and stable. Hand seeding will be utilized on steep slopes and in accessible areas. WSRI anticipates drill seeding and hay mulch crimping over 95% of the project ROW.

Drill Seeding

WSRI will use rangeland type seed drills wherever conditions described above allow. WSRI's Rangeland drills are equipped with small grain, fluffy, and cool season species seed boxes. The seed mixtures to be used on the pipeline contain various size and textures. WSRI recognizes from past experience that different seeds require not only placement in the proper seed box, but may also require an individual seeding methods to plant respective seed species at the proper depth. WSRI will have the seed bagged into separate Fluffy, Large Smooth and Small Smooth bags so they can be placed into the proper seed box.

The seed drill will be cleaned by vacuuming out the seed boxes with a shop vacuum before changing seed mixtures. This process will help prevent contamination of different seed mixture treatment areas.

All seeding equipment will be calibrated and checked continually to meet the seeding rates specified in the Upland and Lowland seed mixtures.

Hand Broadcast Seeding (Alt. Vegetation Method)

WSRI may employ hand seeding on steep slopes, rocky areas, and generally where equipment access is restricted or it is unsafe to utilize equipment. Hand seeding will be completed at double the drill seed application rate. Hand held cyclone type seeders will be utilized for areas that require hand seeding. Hand raking with hard tine rakes will be utilized to prepare the seed bed and then lightly cover the seed with soil after broadcasting.

Hydroseeding (Alt. Vegetation Method)

WSRI may choose to utilize hydroseeding on steep slopes where drill seeding cannot be employed. Utilizing hydroseeding as a seeding option will also depend on the close proximity of an adequate water source to the area of seeding. The seed rate will be doubled over the drill seed rate to help compensate for less than optimum seed placement.

Areas where hydroseeding is employed will be checked to make sure that seed is properly covered with soil. If seed is found to be lying on the soil surface it will be hand raked, harrowed, or slope chained to properly cover the seed with soil.

Hay Mulching and Crimping

WSRI will provide certified weed free hay mulch for the project. WSRI commonly contracts for hay with vendors on the Front Range of Colorado and Kansas for several hundred tons of product per year.

Hay mulch will be applied at a minimum rate of 1.5 tons per acre with a big bale mulching machine. WSRI has found that rates less than 1.5 tons per acre do not provide long lasting cover. Immediately following hay mulch application a commercial crimper will be used to tuck the hay into the soil surface.

Guar Mulch Tack

Guar tackifier will be applied at a rate of 80 pounds of guar per acre. A hydromulch tracer will be used with the tackifier at the rate of 300 pounds per acre.

Hydromulching (Alt. Vegetation Method)

WSRI may choose to utilize hydromulching on steep slopes where hay blowing cannot be employed. Utilizing hydromulching as a mulching option will also depend on the close proximity of an adequate water source to the area of work. The mulch rate will be 3,000 pounds per acre of wood cellulose hydromulch and will be applied with a guar tackifier.

Erosion Control Fabric/Matting

WSRI will place erosion control blankets on steep slopes and areas where access is limited and prohibits effective hay mulching. Blanket recommendations (Straw, Coconut, Excelsior) will be based on severity of slopes, erodibility index of the site soil type, slope aspect and previous experiences with the erosion blanket by WSRI on similar projects. All blankets used will be biodegradable and will not contain photodegradable material of any kind.

In areas of concentrated flow, creek areas, WSRI will install a TRM mat equal to North American Green C350 according to the manufacturer's specifications.

Soil Conditioning

WSRI will evaluate the soils prior to revegetation. WSRI's owner David Chenoweth is a certified soil scientist and will perform all soil investigations. If the topsoil is determined to be inadequate for revegetation through soil lab test and analysis (completed at WSRI's expense) several soil conditioners may be recommended for the area. WSRI commonly uses organic based fertilizers such as Biosol, Sustane and Richlawn. WSRI does not recommend the application of inorganic fertilizers based on their stimulation of weed growth.

Fencing

Fencing, if required, will be based on the individual land owner's preferences. All fencing construction complete by WSRI will include proper post alignment and tamping, solid cross braces with tension wires, and stretched wire to avoid excessive sagging.

Steele Hollow Segment 3

It is anticipated that seeding at Steele Hollow will be completed by hand raking and broadcasting methodologies due to access concerns and slopes. Soil surfaces will be prepared by hand raking followed by the broadcasting of seed (2 X Drill Rate) and soil conditioners (if necessary) and then completed by hand rake incorporation into the soil's upper .25 to .5 inch. Erosion control blankets will be used to stabilize all slopes over 3:1. It is anticipated that a coconut or jute mat will be used to stabilize Steele Hollows slopes.

In areas of concentrated flow, Steele Hollows bottom channel, WSRI will install a TRM mat equal to North American Green C350 according to the manufacturer's specifications.

The irrigation zones that will water the Steele Hollow area will have to be designed in the field to account for the irregularities in the banks after they are set back into place by others. It is

anticipated that irrigation heads will be placed at the top of the banks and will overhead irrigate into Steele Hollow. Irrigation rotors will have the capability of throwing a 65' radius. If necessary irrigation heads will be placed on extended risers to achieve proper coverage. The irrigation mainline will be buried at a minimum 2' depth through the Steele Hollow Channel area.

Application of Irrigation Water

WSRI has subcontracted with Aqua Engineering of Ft. Collins Colorado to design a temporary irrigation system for the Southern Delivery System Segment S2 and S3. See attached resumes in Appendix I.

A temporary irrigation system will irrigate and establish seeded grasses for Segments S2 and S3 of the SDS raw water pipeline. Pop-up rotors on risers will irrigate the seeded grass. See plan sheets in Appendix II.

Fountain Valley Authority water will be used for irrigation. The point of connections (p.o.c.s) will be immediately downstream of existing blow offs. Electric booster pumps on Segment 2 and are required at each p.o.c. to provide sufficient pressure to the systems rotors. Black Hills Utilities has been contacted and has provided a quote to WSRI for the 460 volt 3 phase electrical connection required at the Segment S2 pump locations.

A two wire controller will be at each p.o.c. A master valve and flow sensor will be installed at each p.o.c to shut down the irrigation in case of mainline break.

The irrigation mainline pipe is intended to be installed within a shallow trench, approximately 12 inches of cover, and buried on the edge of the pipeline ROW. Remote control valves will be installed at grade. Lateral pipe routed from the remote control valves to rotors will be at grade.

System Removal

Once the establishment period is complete WSRI intends on removing all equipment on grade and abandoning the mainline in place. There are several factors WSRI considered with the irrigation engineer that went into the decision to bury and abandon.

1. WSRI feels that if the mainline is buried and abandoned that disturbance to the ROW after establishment would be minimized and the mainline would be in place if any additional irrigation to the ROW in the future is required. A marking tape will be included in the mainline trench identifying it as abandoned.
2. If the mainline was left on the surface WSRI estimates that up to 20 feet of the pipeline ROW would be disturbed upon its removal and revegetation efforts would be lost.
3. Burying the mainline will restrain the pipe from expanding and contracting and becoming a maintenance and potential erosion problem.

Irrigation Scheduling

If seeding and irrigation installation is completed on a section of pipeline between May 15th and July 31st WSRI would not force germination and supplemental irrigation water would not be

applied until August 1st on these sections. WSRI would not force germination based on past experiences with supplemental irrigation during the summer months. It has been found by WSRI that during periods of extreme heat grass seedlings do not put on necessary height or root growth and that there is a regression of success by forcing germination.

After installation and during the proper germination window, WSRI anticipates watering the ROW daily with .20 inches of water until germination flush (This will vary based on weather patterns and soil conditions). The cycle times for watering will occur in a 9-10 hour water window. It is estimated that 1-1.4" of water will be applied per week from August 1st through mid to late September. The objective of daily watering is to keep the surface inch of soil moist through germination without causing surface erosion. At germination flush, which will be determined by one of three factors listed below, watering at .20 inches of water will be reduced to 2 times per week or less until irrigation system winterization to harden off the seedlings. Once irrigation is reduced after germination flush the ROW will be closely watched and areas that may require more water because of site condition (soils, exposure, slope) will be scheduled for additional watering.

1. 6-8 seedlings per square foot
2. Grasses are 1 to 1.5 inches in height
3. Adequate rooting determined by revegetation specialist

In the following growing seasons after germination, as the grasses continue to establish, WSRI will manage the system to only water during excessive dry periods. A Revegetation Specialist will be continually evaluating the ROW and the progress of the establishing grasses during the 2 year establishment period. With full automation WSRI will be able to apply precise amounts of water to areas that need supplemental irrigation for establishment.

WSRI believes that it is in everyone's interest to only use as much water as necessary and to deliver a site that can sustain itself without supplemental irrigation.

2.3 Monitoring/Maintenance Period

Revegetation Monitoring/Maintenance

WSRI will use a combination of videographer films and pictures with on the ground inspections of revegetated areas. After initial seeding operations are complete in 2012 the revegetation specialist will evaluate the ROW in mid to late August for weeds and once again in mid to late September after germination flush for establishment. In subsequent growing seasons the WSRI Revegetation Specialist will perform revegetation evaluations twice during the growing season, once during May and once during August. A one foot square quadrant will be placed randomly at .5 mile intervals along the pipeline. All species of plants will be counted within the quadrant and identified by desirable planted species and weed species when possible. Any quadrant with less than 4 desirable species will be noted and the location documented on a GPS unit. If less than the desired 4 desirable species are identified, the WSRI Revegetation Specialist will make general visual observations of the aerial extent that appears to be deficient in the adequate

number of desirable species. The GPS unit will then be utilized to map location and square footage requiring touch up seeding. The information from the GPS can be utilized to develop a shape file for field crews who will be performing touch up seeding operations. If small localized areas exist which require touch up seeding, the Revegetation Specialist will perform the task at that time.

WSRI will employ 2 local part time workers for the 2.5 growing seasons that the ROW is establishing and being irrigated. The workers tasks will be to maintain all stormwater BMPs, irrigation equipment and help inspect the ROW for weed infestations. The two man team will be equipped with an ATV and Pick-Up.

Noxious Weed Monitoring/Maintenance

The same methodology will be utilized for monitoring noxious weeds as described above under Revegetation Monitoring. If more than 4 species of noxious weeds can be identified, additional visual observations will be made to determine the extent of potential infestations. If limited densities of noxious weeds are identified in localized areas, weeds will be hand pulled and bagged for disposal in a land fill. Otherwise, a GPS unit will be utilized to locate the aerial extent of the infestation. A Shape File will transfer to a site map for a WSRI Foreman to utilize for mechanical or chemical weed control (Mechanical weed control only in 2012). Mechanical weed control will consist of hand pulling and bagging small infestations of noxious weed infestations. Larger areas of noxious weed infestations will require use of a Bush Hog Mower to cut weeds before seed head development. Mowing equipment will be dispatched for work completion no later than one week from the field inspection identifying maintenance needs. Approved herbicides applied by an approved applicator will only be used when desirable grass species are mature enough to sustain chemical treatment without risk of damage. Chemical applications are typically only recommended after grasses reach mowing height.

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GENERAL DESCRIPTION

TEMPORARY IRRIGATION SYSTEMS WILL IRRIGATE AND ESTABLISH SEEDED GRASS FOR SECTIONS 2 AND 3 OF THE SOUTHERN DELIVERY SYSTEM RAW WATER PIPELINE LOCATED IN SOUTHERN COLORADO. POP-UP ROTORS ON RISERS WILL IRRIGATE THE SEEDED GRASS.

MUNICIPAL (POTABLE) WATER WILL BE USED FOR IRRIGATION. THE POINT-OF-CONNECTIONS (P.O.C.s) WILL BE IMMEDIATELY DOWNSTREAM OF EXISTING BLOW OFFS. BOOSTER PUMPS ARE REQUIRED FOR SOME OF THE P.O.C.s (REFER TO PLANS) TO PROVIDE SUFFICIENT PRESSURE TO THE ROTORS.

A TWO WIRE IRRIGATION CONTROLLER IS REQUIRED AT EACH P.O.C. SOME OF THE IRRIGATION CONTROLLERS WILL REQUIRE SOLAR POWER (REFER TO PLANS).

A MASTER VALVE AND FLOW SENSOR WILL BE INSTALLED AT EACH P.O.C. TO SHUT DOWN THE IRRIGATION SYSTEM IN CASE OF A MAINLINE PIPE BREAK.

THE IRRIGATION MAINLINE PIPE IS INTENDED TO BE INSTALLED WITHIN A SHALLOW TRENCH AND BURIED. REMOTE CONTROL VALVES WILL BE INSTALLED AT GRADE. LATERAL PIPE ROUTED FROM REMOTE CONTROL VALVES TO ROTORS WILL BE AT GRADE.

⏏

BACKFLOW PREVENTER ASSEMBLY
*FEBCO OR EQUAL
*REDUCED PRESSURE
*SIZE: 4-INCH

————

MAINLINE PIPE
*HDPE SDR-11 W/PE4710 RESIN
*SIZE: AS SHOWN

————

LATERAL PIPE
*CLASS 160 PVC
*SIZE: 1-INCH UNLESS OTHERWISE INDICATED

Ⓜ

MASTER VALVE (NOT SHOWN ON PLANS)
*GRISWOLD OR EQUAL
*NORMALLY CLOSED
*SIZE: 4-INCH

Ⓣ

FLOW SENSOR (NOT SHOWN ON PLANS)
*RAIN BIRD INSERT STYLE

⚙

REMOTE CONTROL VALVE ASSEMBLY
*HUNTER INDUSTRIES ICV
*SIZE: 2-INCH
*INSTALL HUNTER ACCU-SYNC ON ALL SPRINKLER ZONES. ADJUST PRESSURE TO ACHIEVE SPRINKLER PRESSURE INDICATED ON PLANS.

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IRRIGATION CONTROLLER ASSEMBLY
*RAIN BIRD LXD (DECODER, WALL MOUNT)
*CAPABLE OF FLOW SENSING AND CLOSING NORMALLY CLOSED MASTER VALVE
*SOLAR POWER ARRAY REQUIRED FOR CONTROLLERS INDICATED ON PLAN
*SEE PLANS FOR TWO WIRE CABLE GAUGE

Quantity Estimate Southern Delivery System (State Hwy 50)		
Description	Units	Quantity
Backflow, Master Valve, and Flow Sensor	EA	1
Irrigation HDPE Mainline - 4-inch	LF	400
Mainline Air Vacuum/Relief Valves	EA	2
Irrigation PVC CL160 Lateral - 1-inch	LF	400
Irrigation PVC CL160 Lateral - 1.25-inch	LF	880
Irrigation PVC CL160 Lateral - 1.5-inch	LF	880
Irrigation PVC CL160 Lateral - 2.0-inch	LF	800
Irrigation PVC CL160 Lateral - 2.5-inch	LF	640
Irrigation PVC CL160 Lateral - 3.0-inch	LF	1,750
Pop-Up Rotor Sprinklers (RB Falcon #6 Noz.)	EA	120
Irrigation Controller	EA	1
Remote Control Valve	EA	4
Decoders	EA	4
Two Wire Surge Protection	EA	3
12AWG Two Wire Cable	LF	400

Quantity Estimate Southern Delivery System (SECTION 2 - POC "A")		
Description	Units	Quantity
Booster Pump	EA	1
Backflow, Master Valve, and Flow Sensor	EA	1
Irrigation HDPE Mainline - 4-inch	LF	4,900
Irrigation HDPE Mainline - 6-inch	LF	9,800
Mainline Air Vacuum/Relief Valves	EA	15
Irrigation PVC CL160 Lateral - 1.25-inch	LF	5,590
Irrigation PVC CL160 Lateral - 1.5-inch	LF	130
Irrigation PVC CL160 Lateral - 2.0-inch	LF	5,590
Irrigation PVC CL160 Lateral - 2.5-inch	LF	2,925
Irrigation PVC CL160 Lateral - 3.0-inch	LF	2,135
Pop-Up Rotor Sprinklers (RB 8005 #22 Noz.)	EA	258
Irrigation Controller	EA	1
Remote Control Valve	EA	43
Decoders	EA	43
Two Wire Surge Protection	EA	29
12AWG Two Wire Cable	LF	14,700

Quantity Estimate Southern Delivery System (SECTION 2 - POC "B")		
Description	Units	Quantity
Booster Pump	EA	1
Backflow, Master Valve, and Flow Sensor	EA	1
Irrigation HDPE Mainline - 4-inch	LF	5,775
Irrigation HDPE Mainline - 6-inch	LF	6,750
Mainline Air Vacuum/Relief Valves	EA	13
Irrigation PVC CL160 Lateral - 1.25-inch	LF	4,680
Irrigation PVC CL160 Lateral - 1.5-inch	LF	130
Irrigation PVC CL160 Lateral - 2.0-inch	LF	4,680
Irrigation PVC CL160 Lateral - 2.5-inch	LF	2,470
Irrigation PVC CL160 Lateral - 3.0-inch	LF	1,890
Pop-Up Rotor Sprinklers (RB 8005 #22 Noz.)	EA	216
Irrigation Controller	EA	1
Remote Control Valve	EA	36
Decoders	EA	36
Two Wire Surge Protection	EA	25
10AWG Two Wire Cable	LF	12,525

Quantity Estimate Southern Delivery System (SECTION 3 - POC "A")		
Description	Units	Quantity
Pressure Regulating Valve	EA	1
Backflow, Master Valve, and Flow Sensor	EA	1
Irrigation HDPE Mainline - 4-inch	LF	3,300
Irrigation HDPE Mainline - 6-inch	LF	20,300
Mainline Air Vacuum/Relief Valves	EA	24
Irrigation PVC CL160 Lateral - 1-inch	LF	6,480
Irrigation PVC CL160 Lateral - 1.25-inch	LF	14,560
Irrigation PVC CL160 Lateral - 1.5-inch	LF	12,880
Irrigation PVC CL160 Lateral - 2.0-inch	LF	11,600
Irrigation PVC CL160 Lateral - 2.5-inch	LF	3,560
Irrigation PVC CL160 Lateral - 3.0-inch	LF	2,500
Pop-Up Rotor Sprinklers (RB Falcon #6 Noz.)	EA	1,260
Irrigation Controller	EA	1
Solar Unit	EA	1
Remote Control Valve	EA	42
Decoders	EA	42
Two Wire Surge Protection	EA	47
10AWG Two Wire Cable	LF	23,600

Quantity Estimate Southern Delivery System (SECTION 3 - POC "B")		
Description	Units	Quantity
Backflow, Master Valve, and Flow Sensor	EA	1
Irrigation HDPE Mainline - 4-inch	LF	200
Irrigation HDPE Mainline - 6-inch	LF	17,250
Mainline Air Vacuum/Relief Valves	EA	17
Irrigation PVC CL160 Lateral - 1-inch	LF	4,860
Irrigation PVC CL160 Lateral - 1.25-inch	LF	10,960
Irrigation PVC CL160 Lateral - 1.5-inch	LF	9,680
Irrigation PVC CL160 Lateral - 2.0-inch	LF	8,800
Irrigation PVC CL160 Lateral - 2.5-inch	LF	2,810
Irrigation PVC CL160 Lateral - 3.0-inch	LF	2,300
Pop-Up Rotor Sprinklers (RB Falcon #6 Noz.)	EA	960
Irrigation Controller	EA	1
Solar Unit	EA	1
Remote Control Valve	EA	32
Decoders	EA	32
Two Wire Surge Protection	EA	35
10AWG Two Wire Cable	LF	17,450

NOTE: QUANTITIES ARE PROVIDE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT INTENDED FOR BIDDING PURPOSES. ABOVE QUANTITIES DO NOT ACCOUNT FOR WASTAGE AND ACCOUNT FOR MAIN IRRIGATION COMPONENTS (I.E. PUMPS, PIPE, SPRINKLERS, ETC.).

1 ESTIMATED QUANTITIES

1"=20'

Western States Reclamation, Inc.
SDS Pipeline S2 & S3
Irrigation Schematic Design

DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

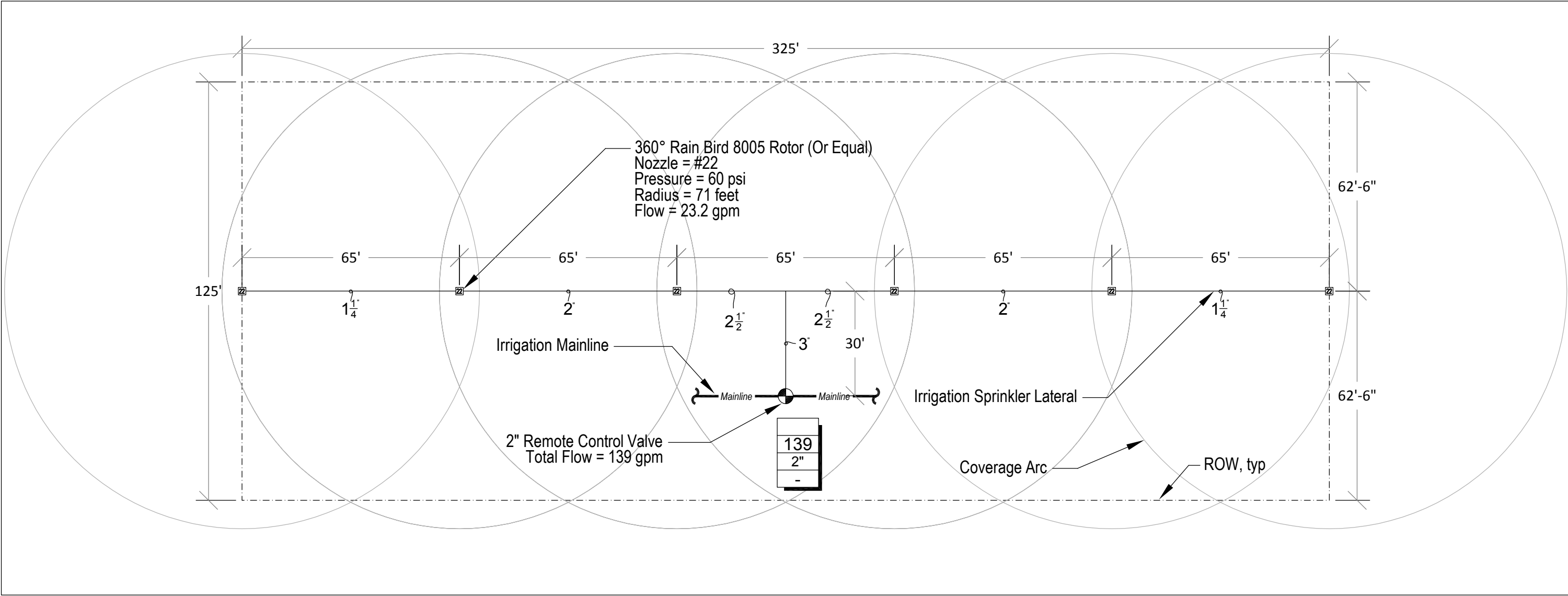
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IR1

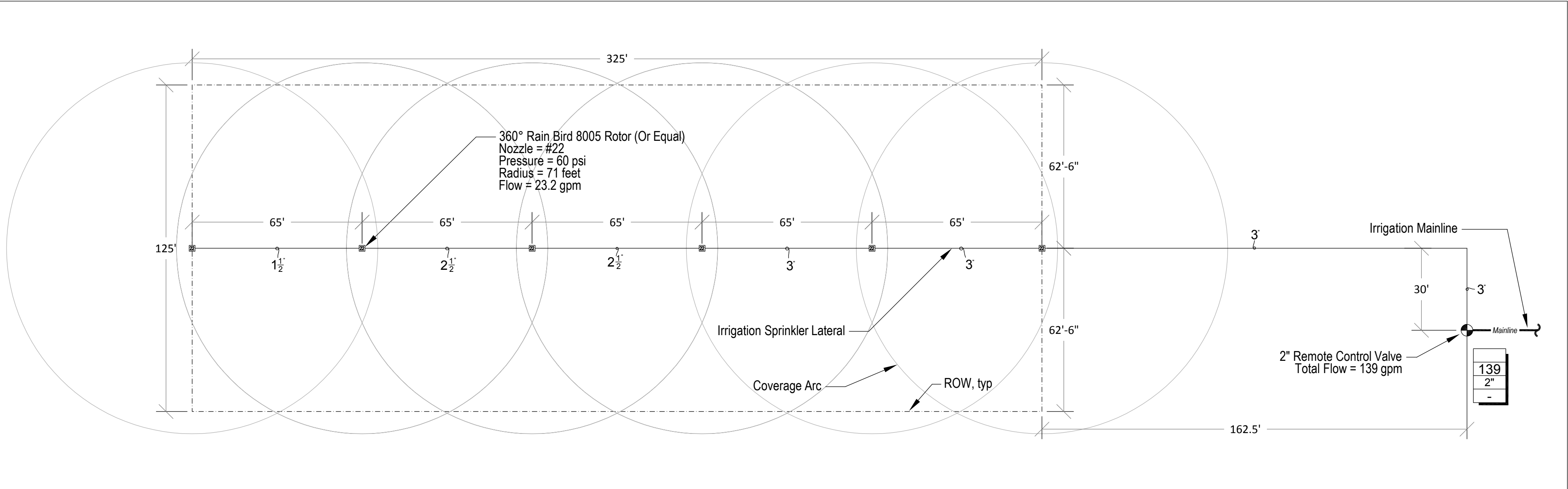
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NOT FOR CONSTRUCTION

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1 SECTION 2 TYPICAL ZONE LAYOUT

1"=20'



2 SECTION 2 DISTAL ZONE LAYOUT

1"=20'

DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS
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-
-
-

SHEET NO.
IR2

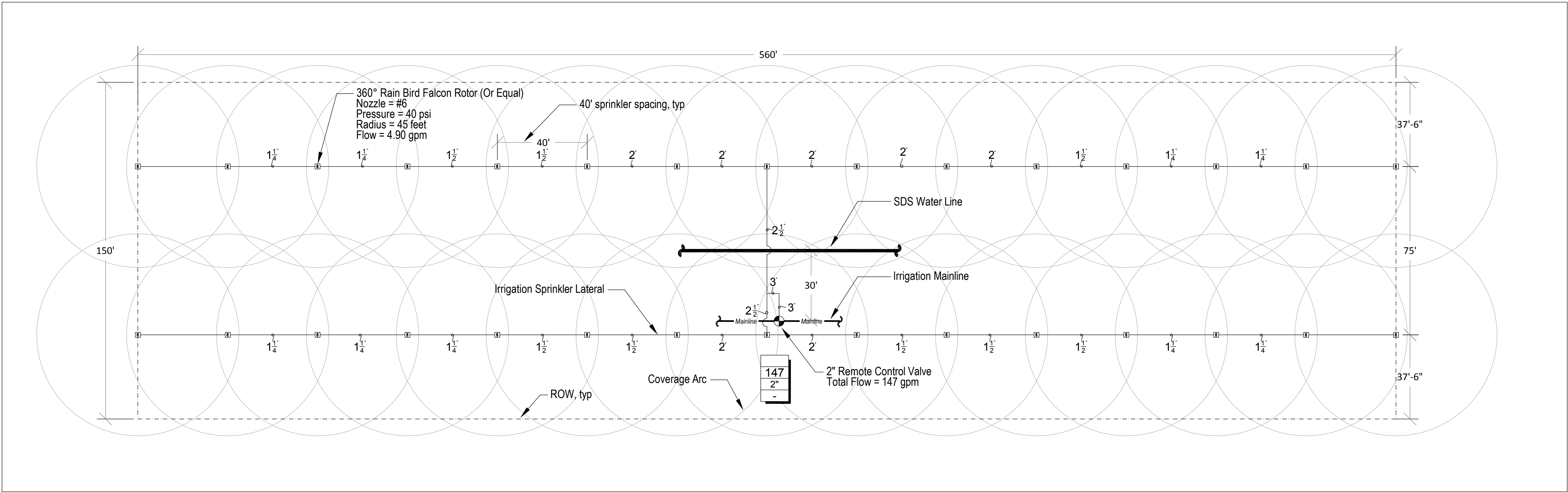
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DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS

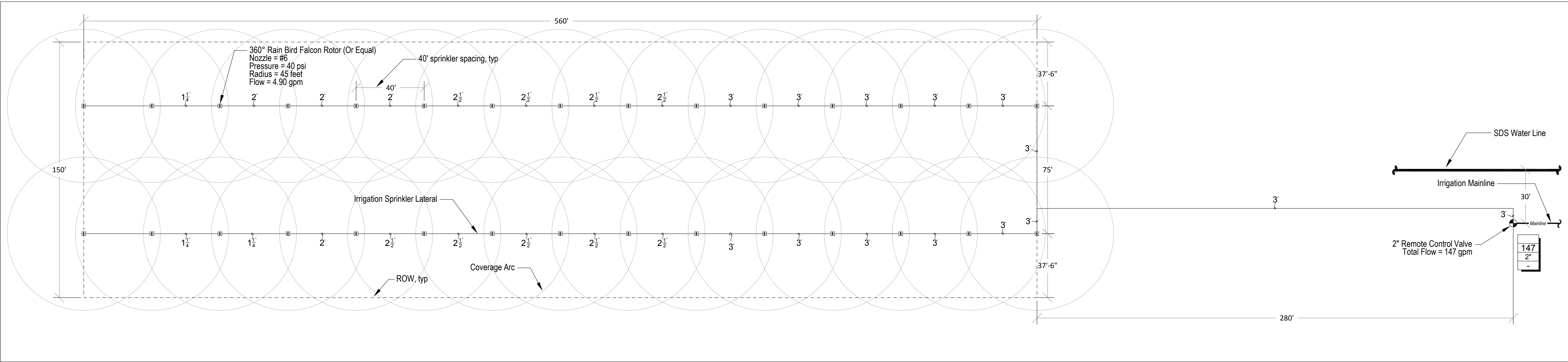
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PRELIMINARY DESIGN
NOT FOR CONSTRUCTION



1 SECTION 3 TYPICAL ZONE LAYOUT

1"=20'



2 SECTION 3 DISTAL ZONE LAYOUT

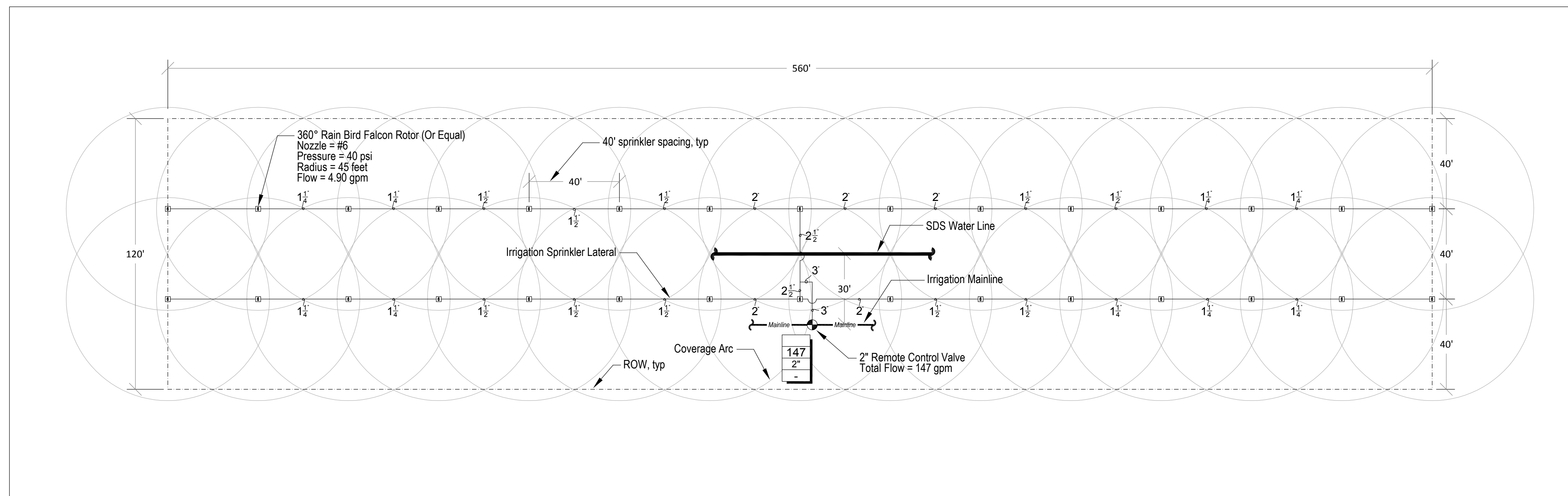
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DATE	5-18-12
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DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS

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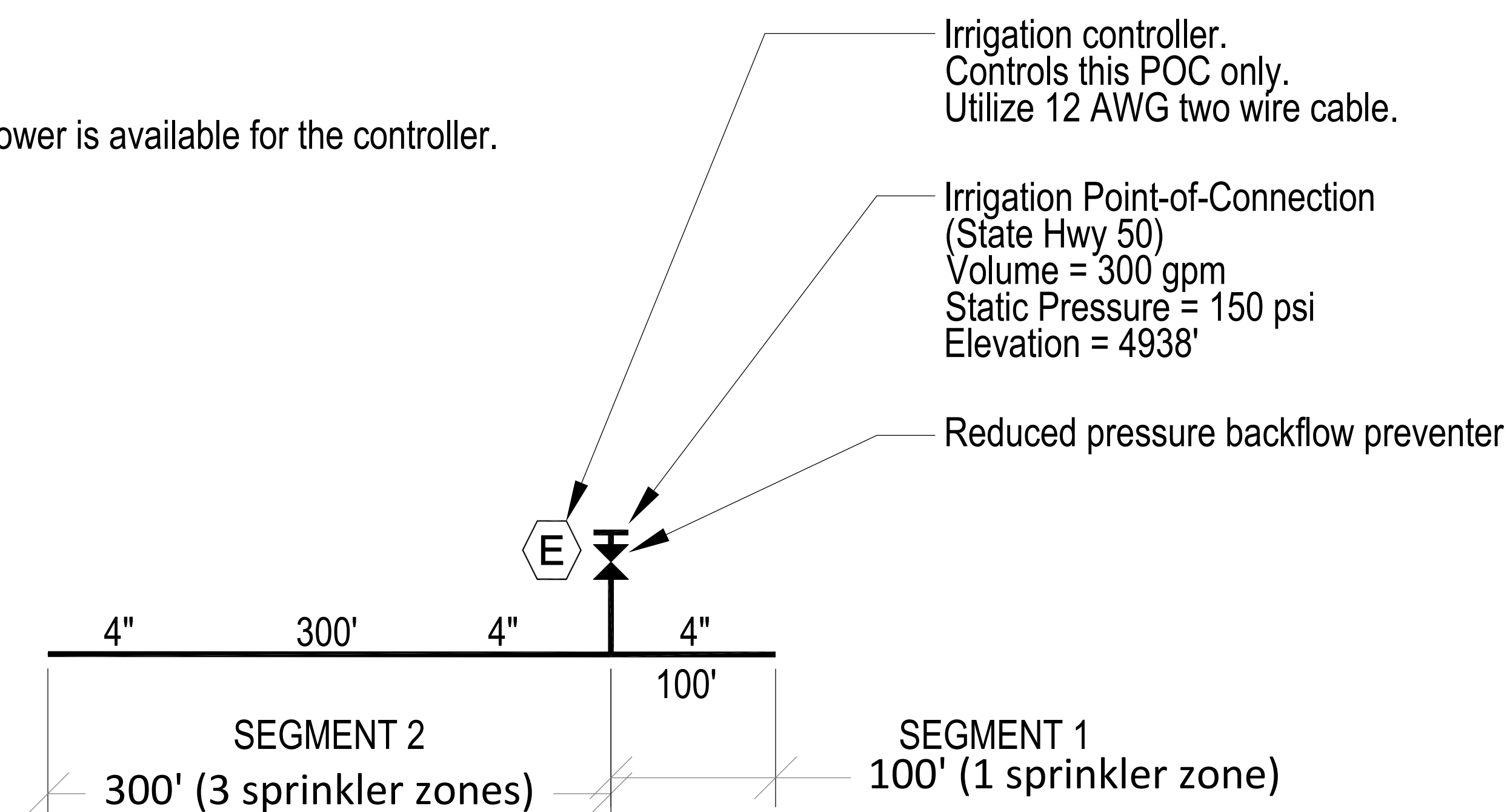
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION



1 SECTION 2 TYPICAL ZONE LAYOUT
NEAR STATE HWY 50

1"=20'

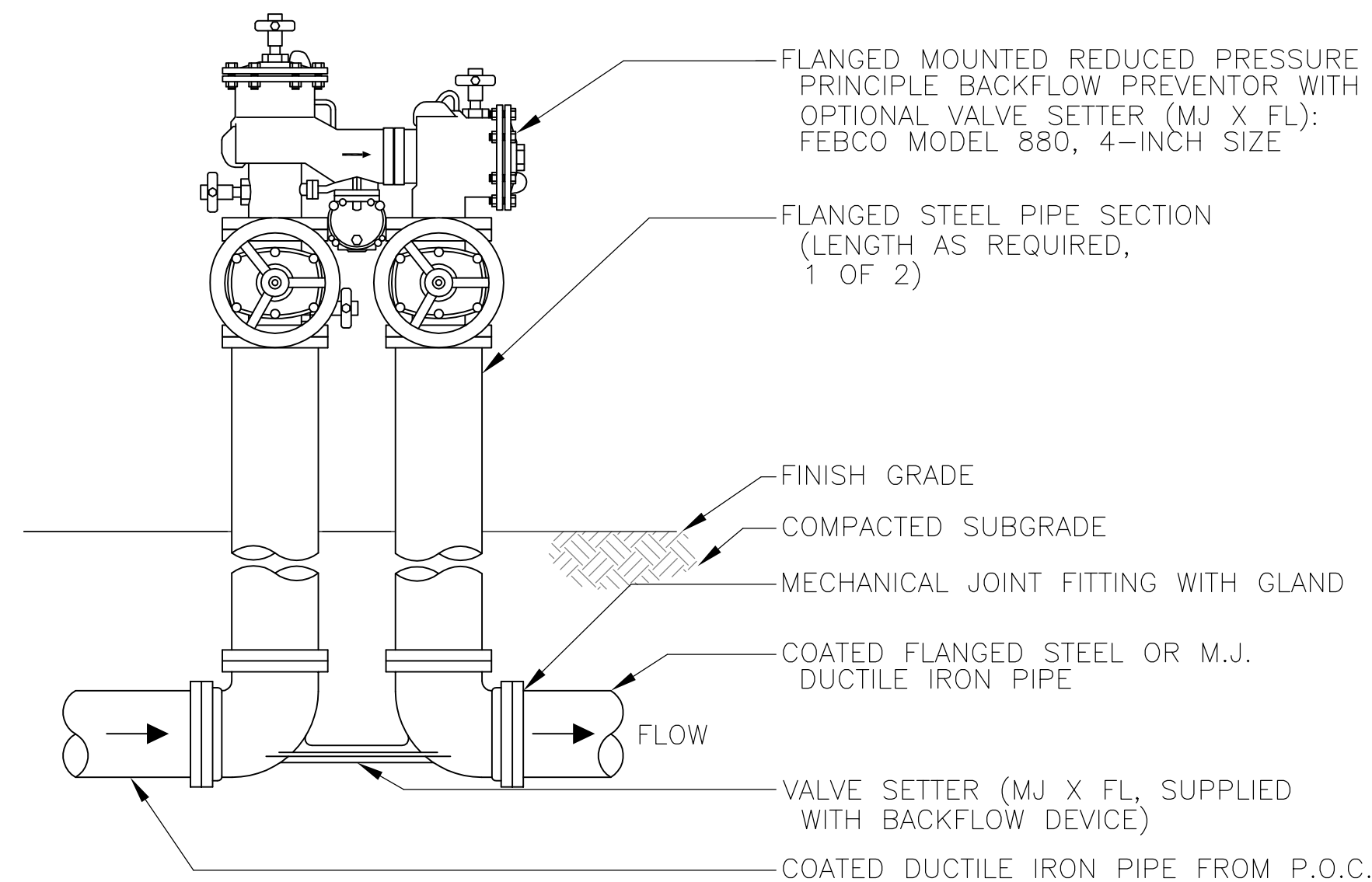
NOTE: Electrical power is available for the controller.



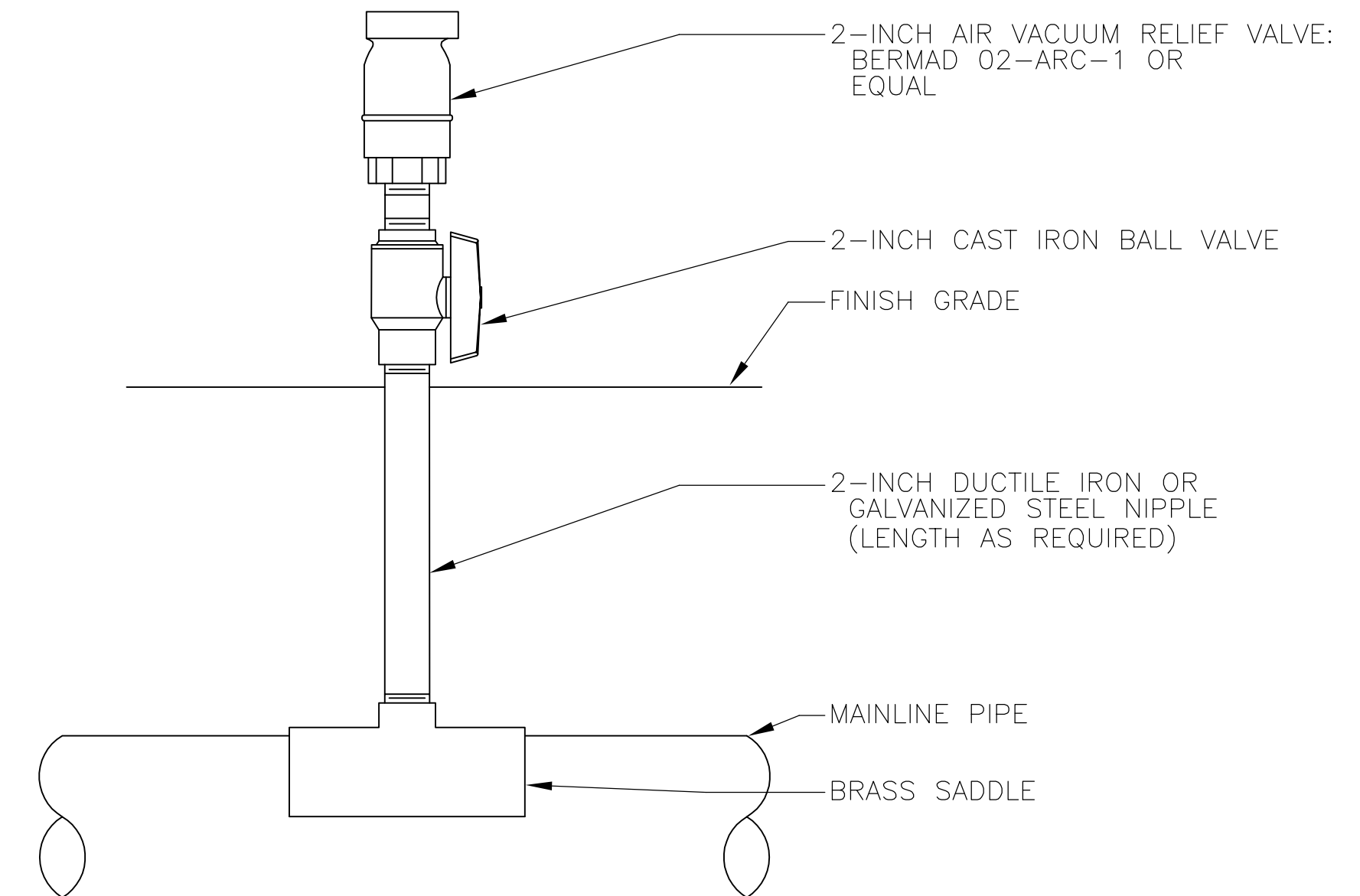
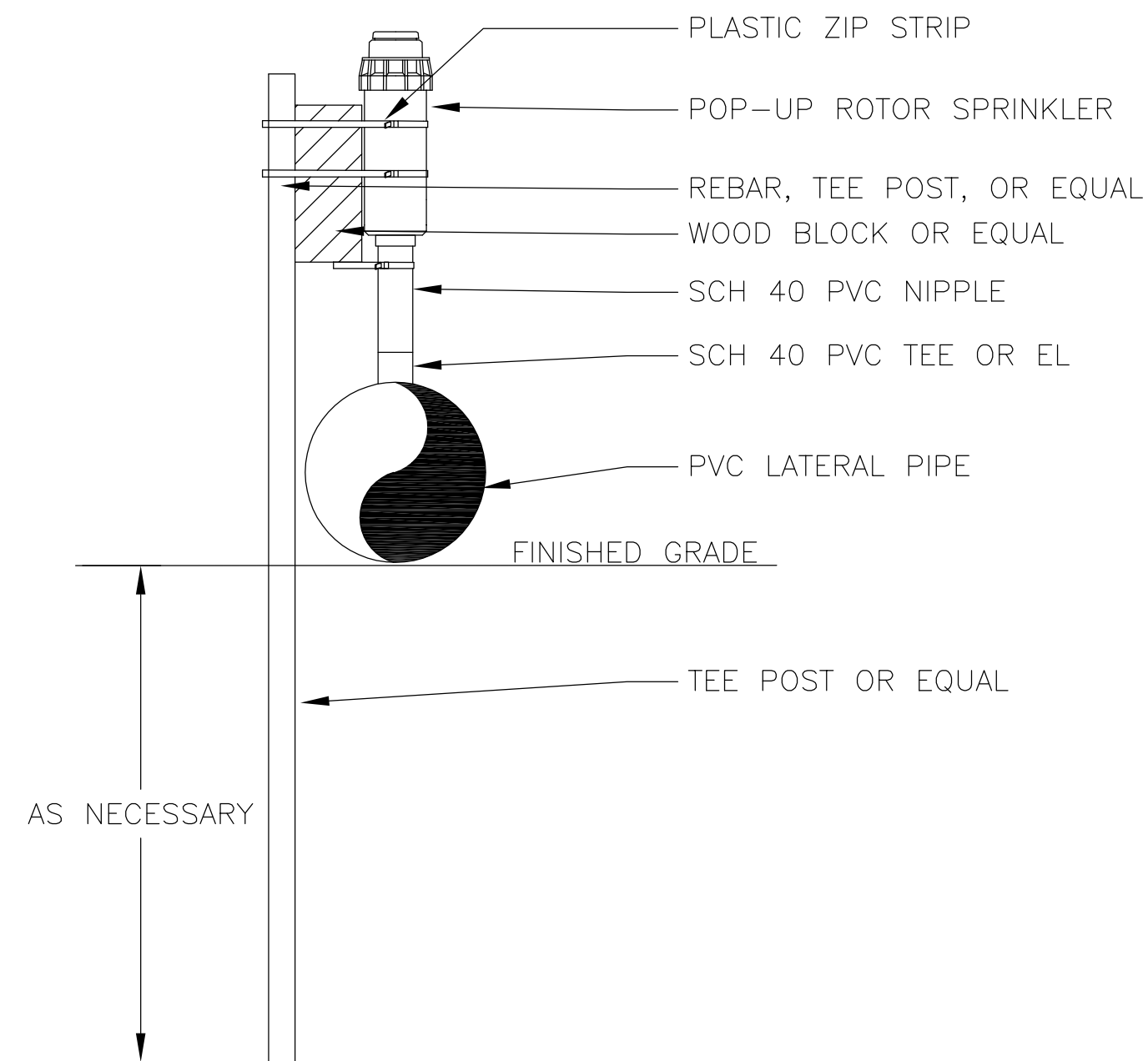
- IRRIGATION OPERATION NOTES:
1. Operate one (1) sprinkler at a time.
 2. Approximate watering window is 2-hours to provide 0.2-inches of applied irrigation depth per day.

2 STATE HWY 50 POC
SECTION 2

1"=20'



- NOTES:
 1. FURNISH NOMINAL SIZE PIPE AND FITTINGS TO NOMINAL SIZE OF BACKFLOW PREVENTOR.
 2. INSTALLATION OF BACKFLOW PREVENTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL AND STATE CODES.



- NOTES:
 1. OPEN BALL VALVE IN ASSEMBLY 1/4 TURN UNTIL IRRIGATION SYSTEM IS FULLY CHARGED WITH WATER.
 2. CLOSE VALVE DURING WINTERIZATION AND OPEN 1/2 TURN AFTER WINTERIZATION OF SYSTEM TO PROTECT VALVE DURING FREEZING WEATHER.
 3. MINIMUM RECOMMENDED PLACEMENT GUIDELINE: AT HIGH POINTS ON MAINLINE, DEAD ENDS, AND 1000-FT INCREMENTS.

1 BACKFLOW PREVENTION ASSEMBLY

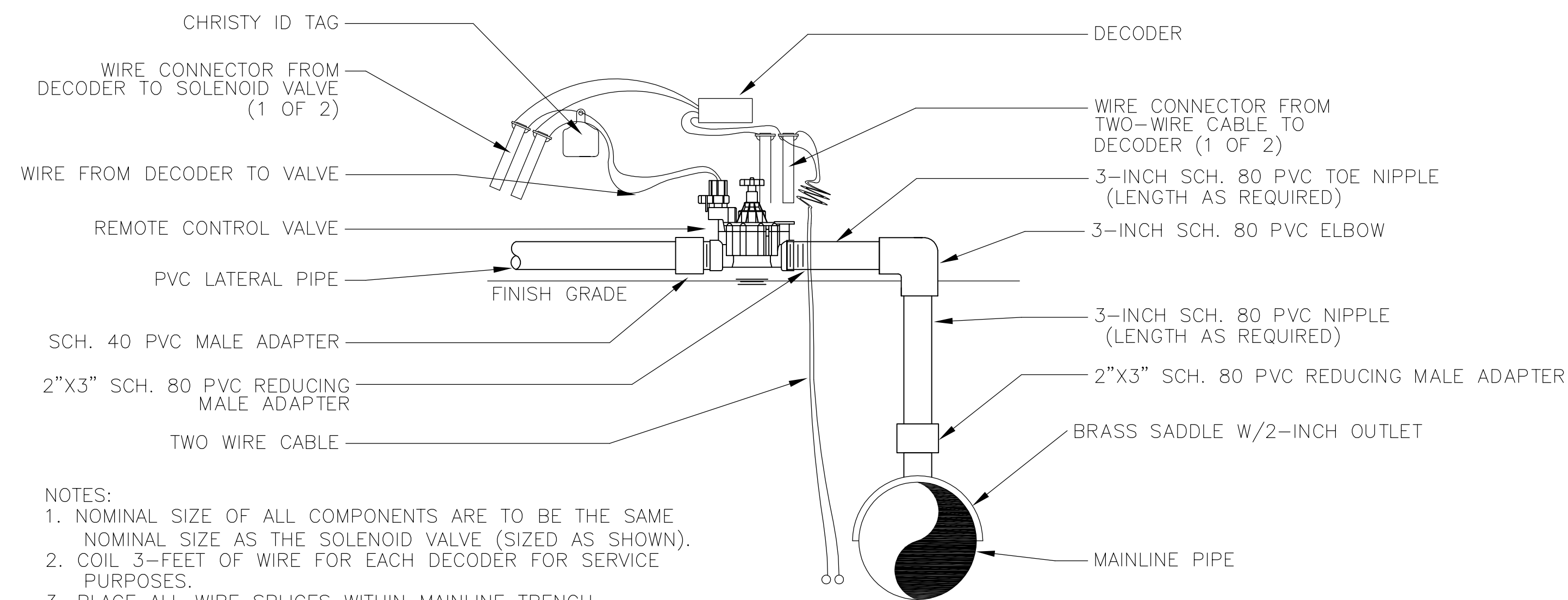
N.T.S.

2 POP-UP ROTOR ASSEMBLY

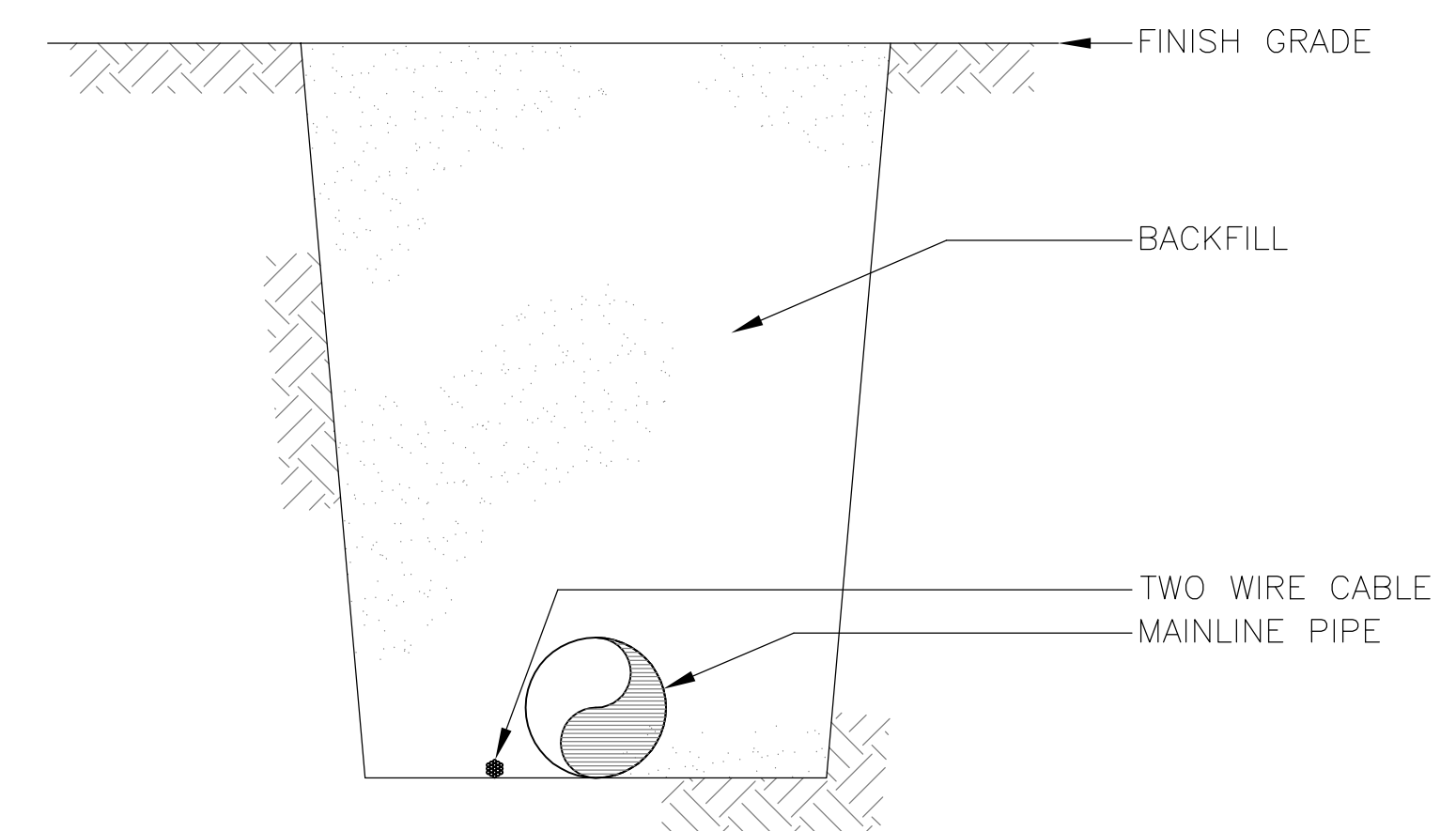
N.T.S.

3 AIR VACUUM RELIEF VALVE ASSEMBLY

N.T.S.



- NOTES:
 1. NOMINAL SIZE OF ALL COMPONENTS ARE TO BE THE SAME NOMINAL SIZE AS THE SOLENOID VALVE (SIZED AS SHOWN).
 2. COIL 3- FEET OF WIRE FOR EACH DECODER FOR SERVICE PURPOSES.
 3. PLACE ALL WIRE SPLICES WITHIN MAINLINE TRENCH. LOCATIONS SHOWN ON DETAIL ARE SCHEMATIC FOR CLARITY.



- NOTES:
 1. MAINLINE DEPTH APPROXIMATE 18-INCHES TOP OF PIPE TO FINISH GRADE.
 2. LATERAL PIPE TO BE INSTALLED ON GRADE.

4 REMOTE CONTROL VALVE ASSEMBLY

N.T.S.

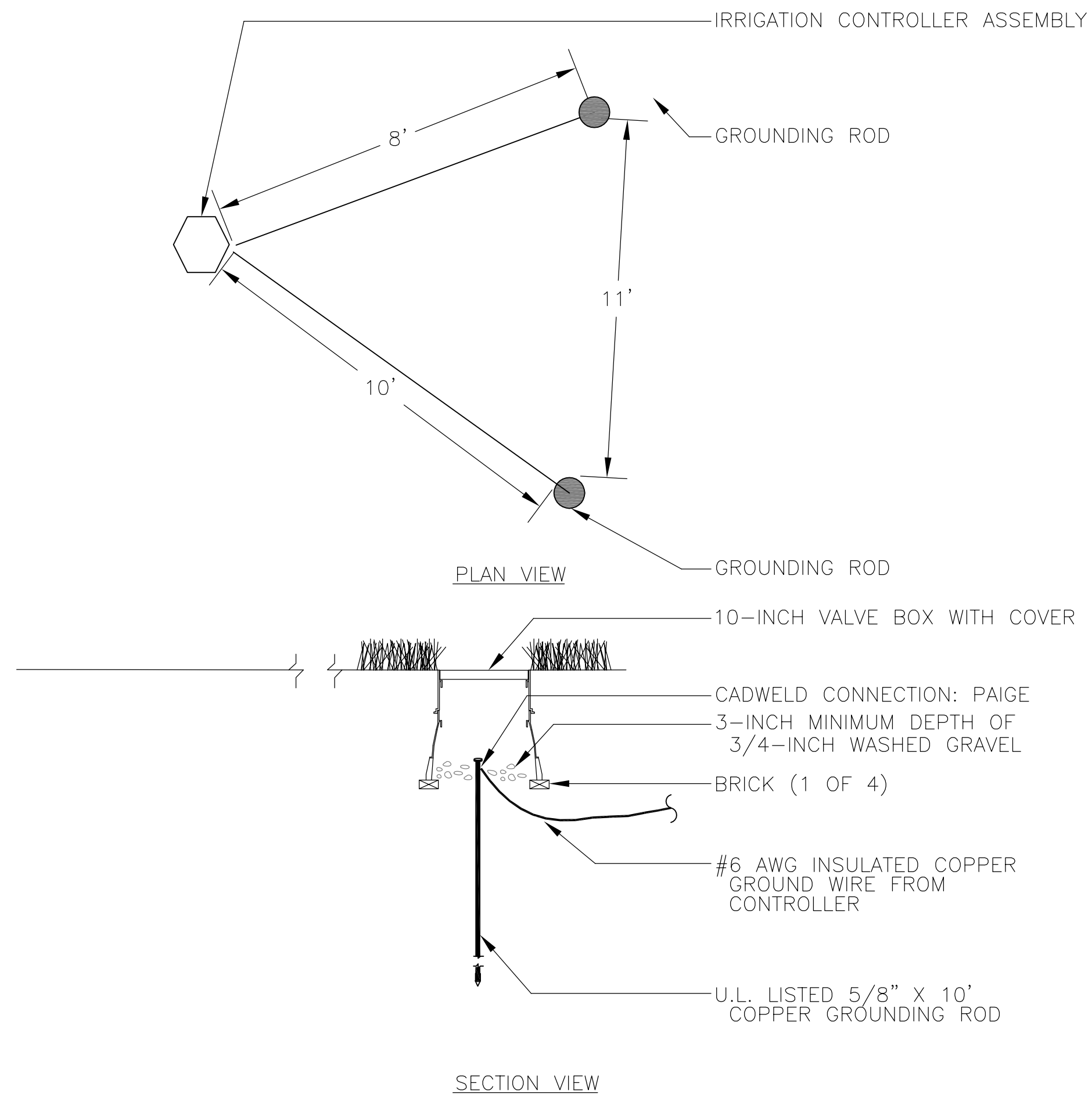
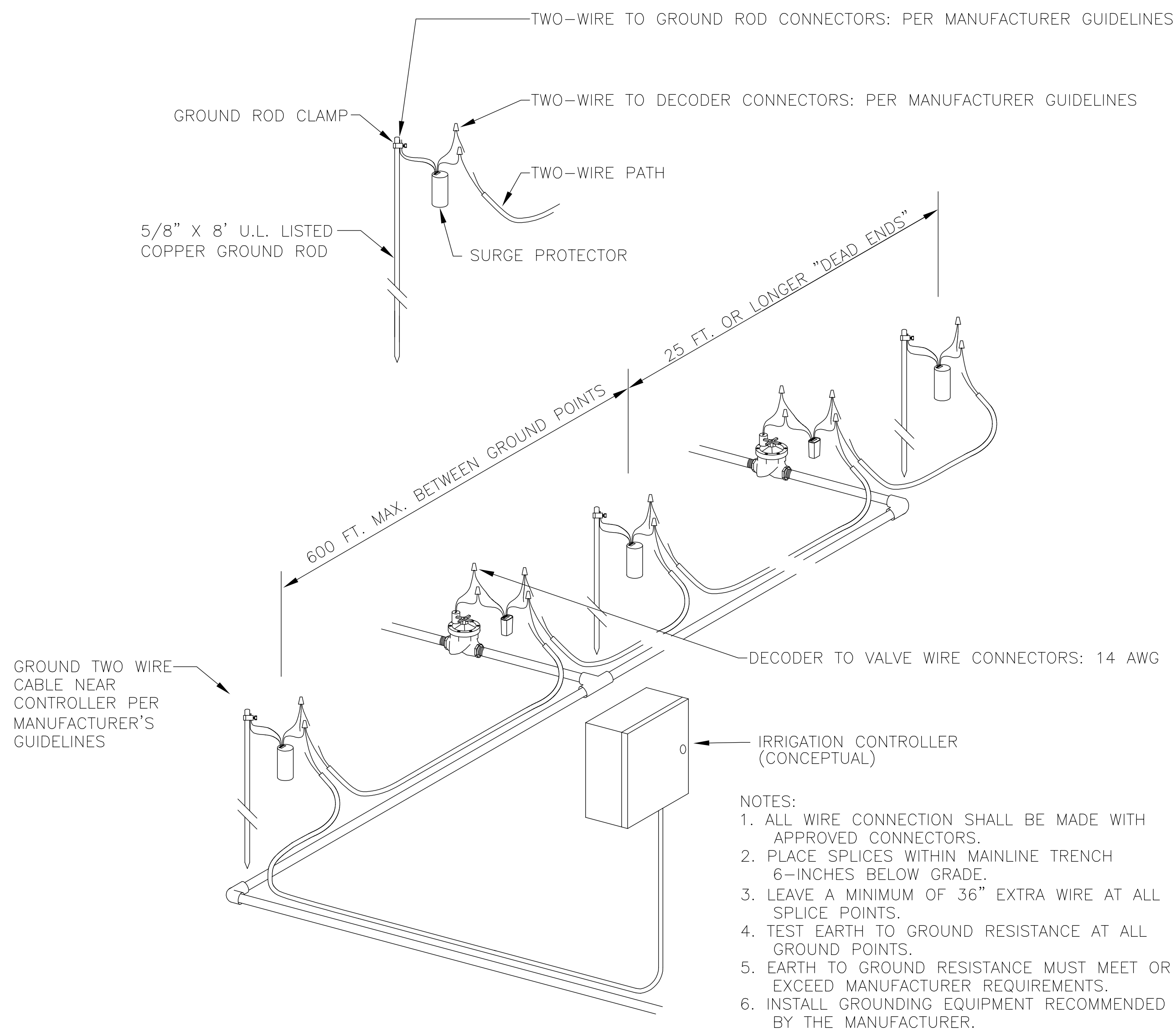
5 TRENCH DETAIL

N.T.S.

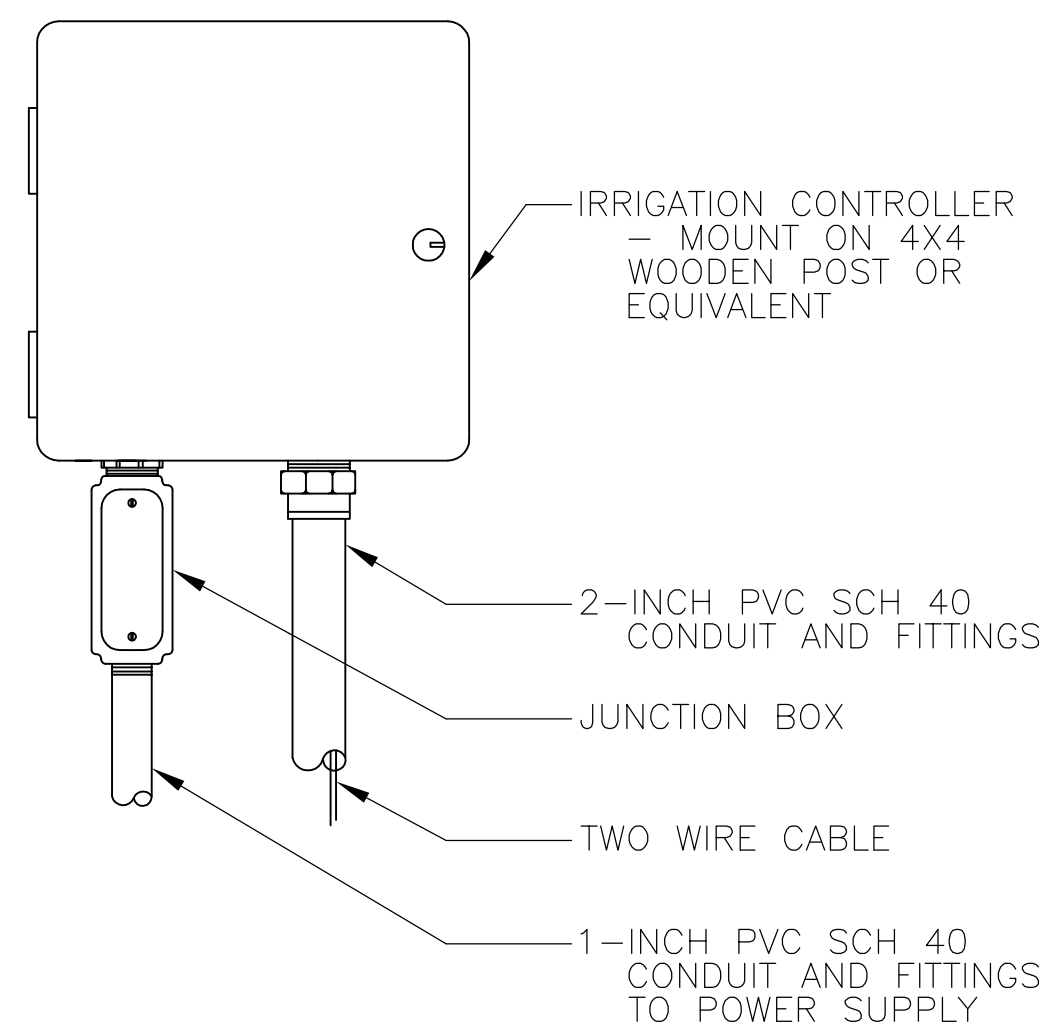
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

File: C:\MSR\SDS 2 and 3\CAD\Schematic Design\SDS-SDS.dwg printed by Jason Krauner on 5/18/2012 1:40:31 PM using AutoCAD Version: 17.2a (LMS Tech)

1 TWO-WIRE ROUTING CONCEPT



2 IRRIGATION CONTROLLER GROUNDING DETAIL



3 IRRIGATION CONTROLLER ASSEMBLY

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS

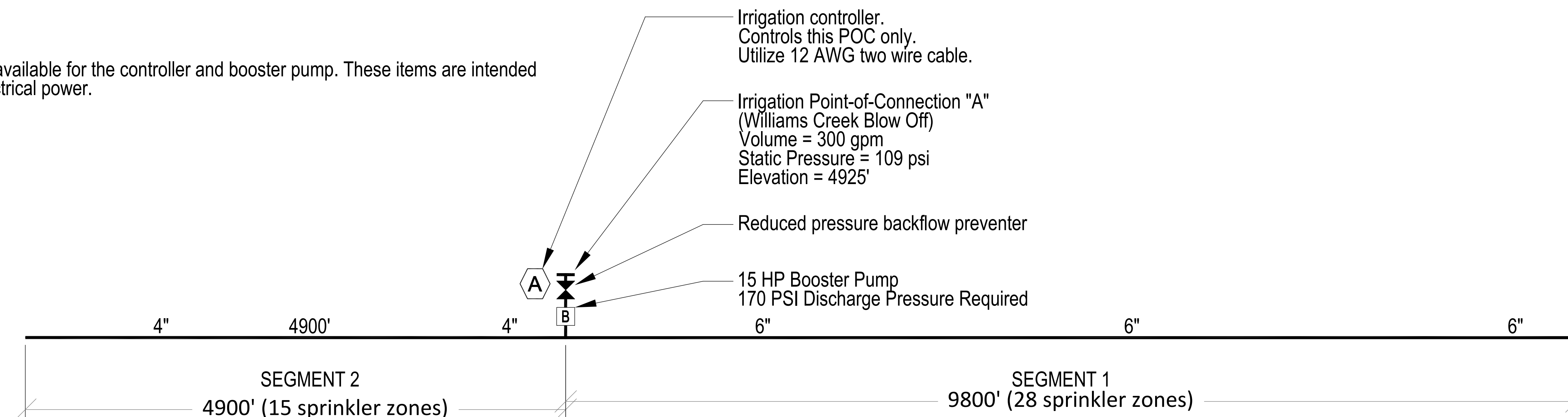
DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS
-
-
-
-

SHEET NO.
IR7

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

NOTE: Electrical power is available for the controller and booster pump. These items are intended to utilize the available electrical power.

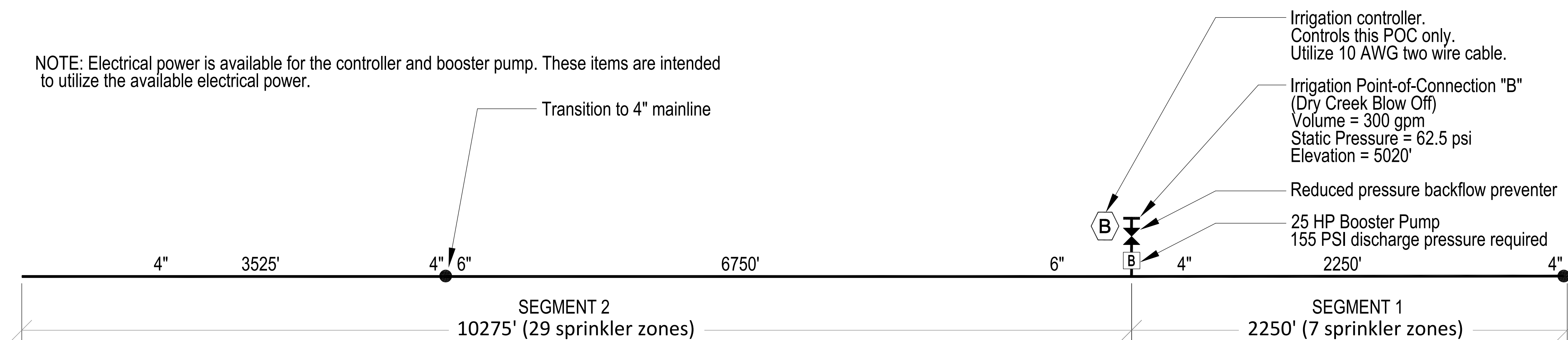


- IRRIGATION OPERATION NOTES:
1. Operate one (1) sprinkler zone on each Segment concurrently.
 2. Approximate watering window is 13-hours to provide 0.2-inches of applied irrigation depth per day.

1 P.O.C. "A" SECTION 2

N.T.S.

NOTE: Electrical power is available for the controller and booster pump. These items are intended to utilize the available electrical power.

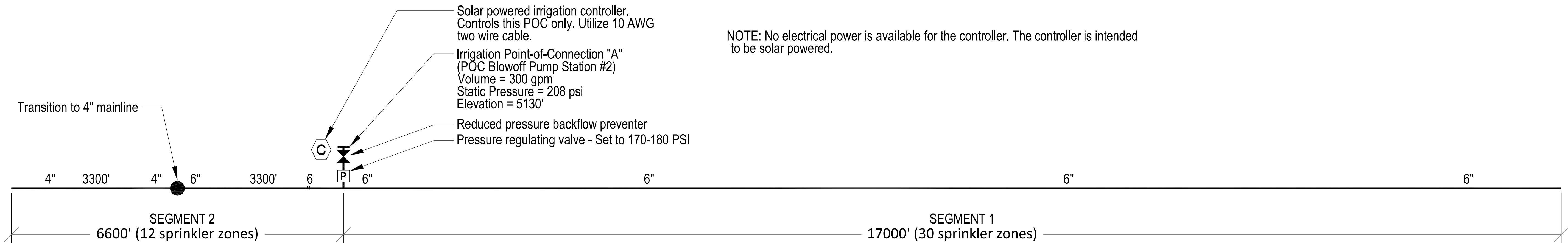


- IRRIGATION OPERATION NOTES:
1. Operate one (1) sprinkler zone on each Segment concurrently.
 2. Approximate watering window is 15-hours to provide 0.2-inches of applied irrigation depth per day.

2 P.O.C. "B" SECTION 2

N.T.S.

File: C:\WPBREC\SDS 2 and 3\CAD\Schematic Design\SDS-SDS.dwg, printed by Jason Krauner on 5/18/2012 1:40:33 PM, using AutoCAD Version: 17.2a (LMS Tech)

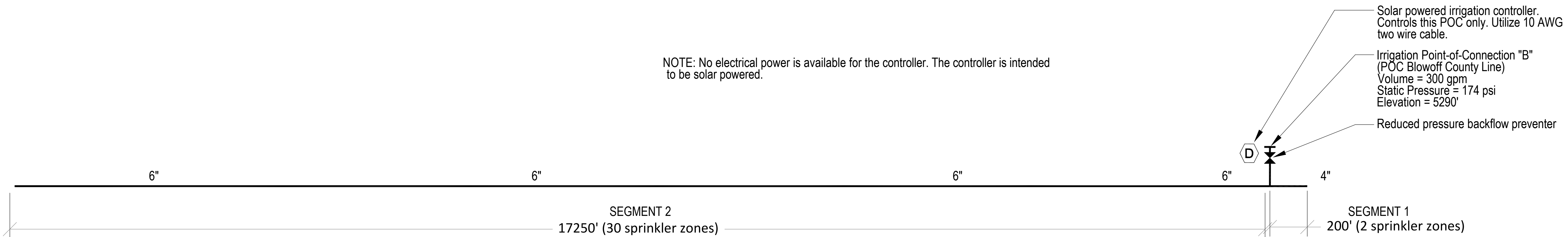


NOTE: No electrical power is available for the controller. The controller is intended to be solar powered.

IRRIGATION OPERATION NOTES:
1. Operate one (1) sprinkler zone on each Segment concurrently.
2. Approximate watering window is 15-hours to provide 0.2-inches of applied irrigation depth per day.

1 P.O.C. "A" SECTION 3

N.T.S.



NOTE: No electrical power is available for the controller. The controller is intended to be solar powered.

IRRIGATION OPERATION NOTES:
1. Operate one (1) sprinkler zone on each Segment concurrently.
2. Approximate watering window is 15-hours to provide 0.2-inches of applied irrigation depth per day.

2 P.O.C. "B" SECTION 3

N.T.S.

DATE	5-18-12
DESIGNED BY	JHK/RJP
DRAWN BY	JHK/RJP
CHECKED BY	CBK

REVISIONS

SHEET NO.

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IR8



TECHNICAL TAB 2 –

- **Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3 (CNHP Report - November 2011)**

Colorado Springs Utilities Southern Delivery System

Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3



Prepared for:
Colorado Springs Utilities
Southern Delivery System
Colorado Springs, CO 80947

Prepared by:
Colorado Natural Heritage Program
Colorado State University
Fort Collins, CO 80523

November, 2011



Prepared in conjunction with:

ESCO Associates, Inc.
Boulder, CO



Cover Photo: Four-wing saltbush (*Atriplex canescens*) - sand drop seed (*Sporobolus cryptandrus*) shrubland on Limon Silty Clay Soil in S2 (by David Buckner, ESCO Assoc. Inc.)



Introduction

This report documents the pre-construction vegetation cover present along sections of the Southern Delivery System pipeline route in Pueblo County, Colorado, specifically work packages S1, S2, and S3. The Colorado Natural Heritage Program, in consultation with ESCO Associates, completed the pre-construction surveys under contract to Colorado Springs Utilities. This pre-construction vegetation survey establishes the base cover values that should be used to evaluate revegetation success in those sections.

The following provides the methods used, the results, and a discussion of factors affecting vegetation cover on the sites prior to any construction activities. Maps, tabular data, and photographs of the S1, S2, and S3 work packages are contained in separate Appendices A, B, and C, respectively.

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Methods

As per an established protocol (Appendix D), pre-existing vegetation cover was measured along the S1, S2, and S3 portions of the Southern Delivery System (SDS) water pipeline route. Quantitative line intercept samples were placed at intervals along the right-of-way to document percent cover by live plants as of the date of observation. All observations took place between 10/5/11 and 10/21/11.

Sampling in each work package was grouped by broad soil types. For simplicity, soil series of similar nature as plant growth media were grouped. Within each soil type within a single work package, transects were placed at representative locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil types present within the alignment of each work package and the location of sample transect origin points are included in Appendices A, B, and C.

Results

A total of 52 transects were sampled on the S1, S2, and S3 work package areas. The various soils across the extent of these work packages were grouped for simplicity into six units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The six groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Tables 4, 7, and Samples 5, 7 and 8 of Table 8):

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Tables 1, 5, and 11):

C. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex; Shingle series; Tables 9 and 13):

D. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Tables 10 and 15):

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 14):

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 6 and 16):

The distribution of these Soil Groups is indicated on: Maps S1-1 and -2 (Appendix A); S2-1, -2, and -3 (Appendix B); and S3-1, -2, -3, and -4 (Appendix C).

Plant cover as observed from sampling was related to the above soil groups and used to establish base values from which revegetation performance standards are calculated.

The S1 work package is located on four different soil groups (A, B, C, and D) and includes eight vegetation sample transects.

The S2 work package is located on five different soil groups (A, B, D, and F) and includes 22 vegetation sample transects.

The S3 work package is located on six different soil groups (A, B, C, D, E, and F) and includes 22 vegetation sample transects.

Base Cover Values for Evaluation of Revegetation Success

The following are recommended base vegetation cover values (to be multiplied by 0.9 in accordance with Pueblo County 1041 permit requirements). They are to apply to the listed soils wherever they occur (in S1, S2 and S3). It is to be understood that the year of measurement (2011) was extremely dry and was preceded by three dry years. There exists no accepted formula to adjust values upward for years of more average moisture. The base values here are on the low end of what can be expected in the natural variation of vegetation cover in response to yearly moisture levels.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Tables 4 and 7, and Samples 5, 7 and 8 of Table 8): **17.2%**

(Note that locations where past prairie dog activity had destroyed vegetation cover (Tables 2, 3 and Samples 1 and 2 of Table 8) set unrealistically low goals and are not included in the calculation of mean cover for these soils).

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Tables 1, 5, and 11): **26.5%**

(Note that this represents the level found on Limon soils in ungrazed S1 (Table 1) and S2 (Table 5); levels on these same soils in grazed areas of S3 (Table 12) are about half this level)

C. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex; Shingle series; Tables 9 and 13): **17.0%**

D. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Tables 10 and 15): **35.0%**

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 14): **23.3%**

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 6 and 16): **47.0%**

Map Code	Work Unit S1			
	<i>Soils Group*</i>	<i>% of Work Unit</i>	<i>Base Veg. Cover **</i>	<i>Revegetation Cover Performance Std. (0.9 x Base)</i>
A	Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series)	78.7	17.2%	15.5%
B	Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series)	4.2	26.5%	23.9%
C	Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series)	10.2	35.0%	31.5%
D	Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex; Shingle series)	6.9	17.0%	15.3%

* See Maps S1-1 and S1-2

** See report and tables for documentation

Map Code	Work Unit S2			
	<i>Soils Group*</i>	<i>% of Work Unit</i>	<i>Base Veg. Cover **</i>	<i>Revegetation Cover Performance Std. (0.9 x Base)</i>
A	Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series)	66.4	17.2%	15.5%
B	Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series)	24.0	26.5%	23.9%
D	Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex; Shingle series)	5.6	17.0%	15.3%
F	Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents)	4.0	47.0%	42.3%

* See Maps S2-1, -2, and -3

** See report and tables for documentation

Map Code	Work Unit S3			
	<i>Soils Group*</i>	<i>% of Work Unit</i>	<i>Base Veg. Cover **</i>	<i>Revegetation Cover Performance Std. (0.9 x Base)</i>
A	Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series)	3.7	17.2%	15.5%
B	Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series)	32.0	26.5%	23.9%
C	Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series)	19.0	35.0%	31.5%
D	Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex; Shingle series)	10.8	17.0%	15.3%
E	Soils on Deeply Weathered Shales (without active erosional removal) (Razor series)	34.1	23.3%	21.0%
F	Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents)	0.4	47.0%	42.3%

* See Maps S3-1,-2, -3, and -4

** See report and tables for documentation

Discussion

At the time of the survey, vegetation on the sites had been effected by several years of drought conditions. Additionally, several areas within the alignment for the work packages are grazed by prairie dogs. Both of these factors affect the cover of vegetation sampled.

Effect of 2010-2011 Drought on Vegetation Cover

The study area receives on average about 12.5 inches of precipitation per year. During the 12 months prior to the observations reported here, precipitation was between 55 and 60% of the long term average¹, strongly restricting vegetation growth. Under normal climactic conditions, vegetative cover across most areas could be expected to be nominally higher than presently observed.

Other Environmental Factors Effecting Vegetation Cover

Beyond the overarching restriction of vegetation cover by drought conditions in 2011, there are two variables that locally affect the magnitude of live vegetation cover. These are soils and grazing by prairie dogs. The soil/geologic situation with the least potential production of vegetation is likely those that are shallow (less than one foot mostly) over limestone and shale bedrock in the south portion of the Pueblo County of the SDS pipeline (i.e. S1 and the southern portion of S2). Soils involved with this condition include the Penrose, Manvel and Minnequa series. Soils of recent very fine grained and salt-rich alluvia along active drainages are of the Limon and Heldt series. Heavy clay texture, high salt content and frequent overbank flood disturbance are factors that affect vegetation growth on the Limon and Heldt soils. Haverson soils

¹ National Weather Service, National Climatic Data Center, Annual Climate Report for Pueblo, CO. Web site accessed 11/17/2011.

also developed on comparatively recent alluvium are of more moderate texture and are much less salt-affected. In the central and northern portions of S3, soils developed from shales are prevalent. On some areas (Midway - Shale complex), erosional removal of weathered material is sufficiently active that soils are shallow and poorly developed. Vegetation development here is limited. On some other areas deeply weathered shale has remained in place and moderately deep soils with clay-rich texture and gypsum accumulations in the subsoil prevail (Razor series). In the far-north portion of S3 are limited areas of early Pleistocene age alluvium with deep well-developed soils of moderate texture in the Stoneham series. These soils support the most well-developed vegetation growth of any upland areas included along the SDS in Pueblo County.

Recent history of grazing use of these areas can substantially limit the extent of vegetation cover in addition to drought and soil limitations. Especially in the S1 portion of the SDS, very heavy grazing by prairie dogs (*Cynomys ludovicianus*) has strongly limited and to a large degree destroyed herbaceous perennial vegetation cover. In combination with soil limitations and drought the percent of the ground covered by perennial herbaceous vegetation in these areas is in the low single digits and much that exists is fourwing saltbush (*Atriplex canescens*) that prairie dogs avoid). Historical season-long grazing of vegetation by livestock in the S3 portion of the route has also strongly limited the extent of vegetation cover.

Appendix A: Work Package S1 - Maps, Tabular Data, and Transect photos

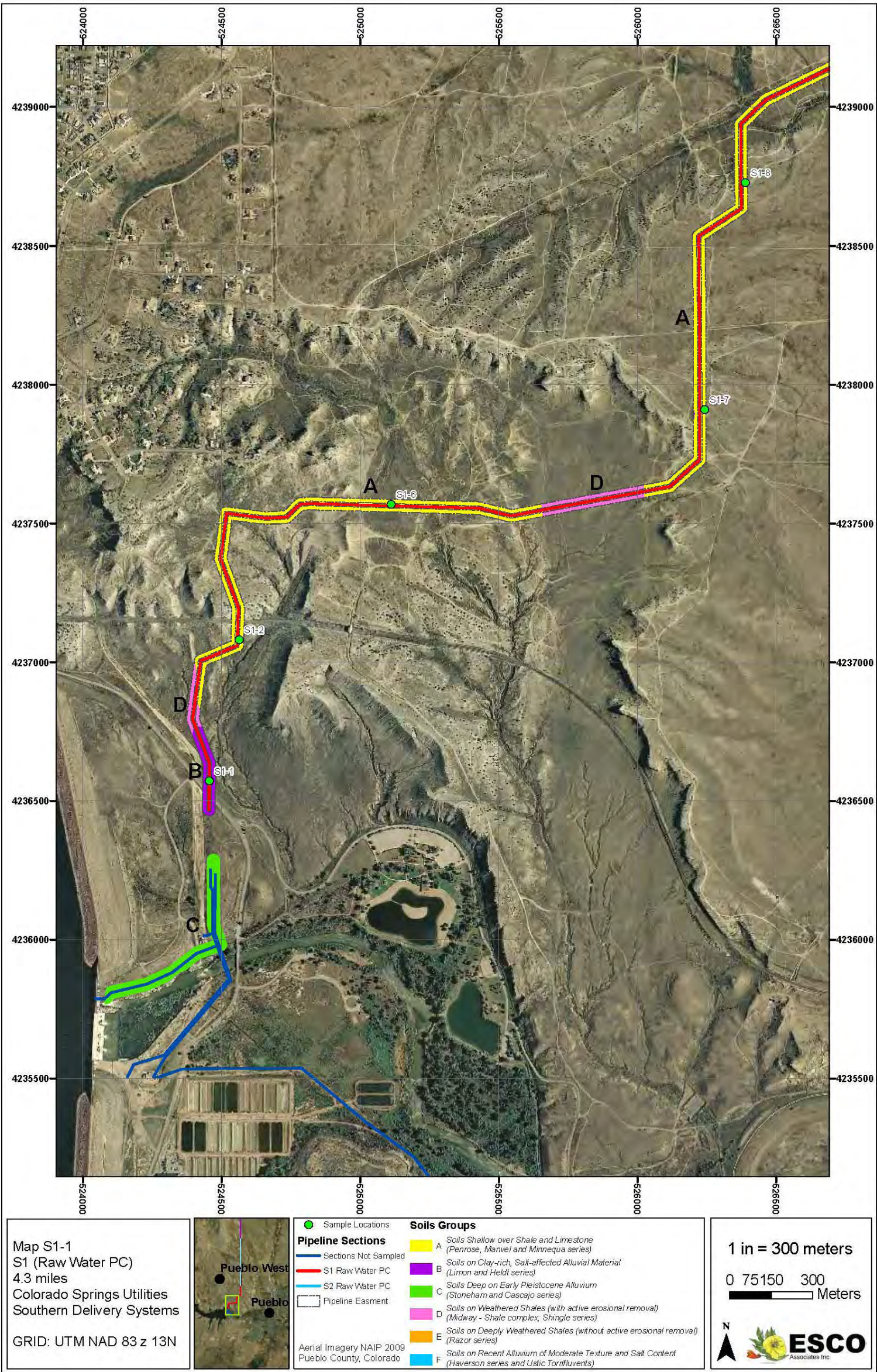


Table 1: Work Package S1 on Limon Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-A LLd (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S1-1
NATIVE ANNUAL & BIENNIAL FORBS						
Chamaesyce glyptosperma	0.00	100.00	0.00	0.00	0.00	P
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P
Grindelia squarrosa	1.00	100.00	2.94	1.00	2.94	1
Helianthus petiolaris	0.00	100.00	0.00	0.00	0.00	P
Oenothera villosa	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	1.0	100.0	2.9	1.0	2.9	1
INTRODUCED ANNUAL & BIENNIAL FORBS						
Amaranthus retroflexus	4.00	100.00	11.76	4.00	11.76	4
Salsola collina	0.00	100.00	0.00	0.00	0.00	P
Xanthium strumarium	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	4.0	100.0	11.8	4.0	11.8	4
NATIVE PERENNIAL FORBS						
Artemisia ludoviciana	0.00	100.00	0.00	0.00	0.00	P
Glandularia bipinnatifida	0.00	100.00	0.00	0.00	0.00	P
Sphaeralcea angustifolia	1.00	100.00	2.94	1.00	2.94	1
TOTAL NATIVE PERENNIAL FORBS	1.0	100.0	2.9	1.0	2.9	1
INTRODUCED PERENNIAL FORBS						
Sonchus arvensis	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL GRASSES (cool)						
Muhlenbergia arenacea	1.00	100.00	2.94	1.00	2.94	1
Pascopyrum smithii	3.00	100.00	8.82	3.00	8.82	3
Poa fendleriana ssp fendleriana	11.00	100.00	32.35	11.00	32.35	11
TOTAL NATIVE PERENNIAL GRASSES (c)	15.0	100.0	44.1	15.0	44.1	15
INTRODUCED PERENNIAL GRASSES (cool)						
Agropyron desertorum	1.00	100.00	2.94	1.00	2.94	1
Dactylis glomerata	1.00	100.00	2.94	1.00	2.94	1
TOTAL INTRO. PERENNIAL GRASSES (c)	2.0	100.0	5.9	2.0	5.9	2
NATIVE PERENNIAL GRASSES (warm)						
Aristida purpurea	0.00	100.00	0.00	0.00	0.00	P
Bouteloua curtipendula	0.00	100.00	0.00	0.00	0.00	P
Chondrosum gracile	0.00	100.00	0.00	0.00	0.00	P
Pleuraphis jamesii	1.00	100.00	2.94	1.00	2.94	1
Sporobolus airoides	3.00	100.00	8.82	3.00	8.82	3
Sporobolus cryptandrus	4.00	100.00	11.76	4.00	11.76	4
TOTAL NATIVE PERENNIAL GRASSES (w)	8.0	100.0	23.5	8.0	23.5	8
NATIVE SUBSHRUBS						
Gutierrezia sarothrae	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SUBSHRUBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE SHRUBS						
Chrysothamnus nauseosus	3.00	100.00	8.82	3.00	8.82	3
TOTAL NATIVE SHRUBS	3.0	100.0	8.8	3.0	8.8	3
SUCCULENTS						
Opuntia macrorhiza	0.00	100.00	0.00	0.00	0.00	P
TOTAL SUCCULENTS	0.0	100.0	0.0	0.0	0.0	P
Standing dead	2.00	100.00		2.00		2
Litter	45.00	100.00		45.00		45
Bare soil	19.00	100.00		19.00		19
TOTALS	100.0			100.0		100
TOTAL VEGETATION COVER	34.0			34.0		34
GROUND COVER	(s=0.0)		100.0	(s=0.0)	100.0	
(Litter+Rock+Veg+St.Dead)	81.0			81.0		81
SPECIES DENSITY (# of species/100 sq.m.)						26
(AVERAGE= 26.0 Std.Dev.= 0.0)						
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.						
^b Frequency = Percent of the samples in which a species or lifeform occurred						
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform						
^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not						
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform						

Table 2: Work Package S1 on Manvel Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-A LL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number	
						S1-3	S1-5
NATIVE ANNUAL & BIENNIAL FORBS							
Chamaesyce glyptosperma	0.50	50.00	7.69	0.50	7.69		1
Dyssodia aurea	1.50	100.00	23.08	1.50	23.08	3	P
TOTAL NATIVE ANN. & BIEN. FORBS	2.0	100.0	30.8	2.0	30.8	3	1
INTRODUCED ANNUAL & BIENNIAL FORBS							
Salsola australis	0.00	100.00	0.00	0.00	0.00	P	P
Ximenesia encelioides	0.00	50.00	0.00	0.00	0.00	P	
TOTAL INTRO. ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P	P
NATIVE PERENNIAL FORBS							
Leucelene ericoides	0.00	100.00	0.00	0.00	0.00	P	P
Sphaeralcea angustifolia	0.00	100.00	0.00	0.00	0.00	P	P
TOTAL NATIVE PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P	P
NATIVE PERENNIAL GRASSES (cool)							
Scleropogon brevifolius	0.00	50.00	0.00	0.00	0.00		P
TOTAL NATIVE PERENNIAL GRASSES (c)	0.0	50.0	0.0	0.0	0.0	---	P
NATIVE PERENNIAL GRASSES (warm)							
Aristida purpurea	0.00	50.00	0.00	0.00	0.00		P
Chondrosum gracile	1.00	50.00	15.38	1.00	15.38		2
TOTAL NATIVE PERENNIAL GRASSES (w)	1.0	50.0	15.4	1.0	15.4	---	2
NATIVE SHRUBS							
Atriplex canescens	3.50	50.00	53.85	3.50	53.85		7
TOTAL NATIVE SHRUBS	3.5	50.0	53.8	3.5	53.8	---	7
Standing dead	1.00	50.00		1.00			2
Litter	20.00	100.00		20.00		17	23
Bare soil	67.50	100.00		67.50		73	62
Rock	5.00	100.00		5.00		7	3
TOTALS	100.0			100.0		100	100
TOTAL VEGETATION COVER	6.5 (s=4.9)		100.0	6.5 (s=4.9)	100.0	3	10
GROUND COVER (Litter+Rock+Veg+St.Dead)	32.5			32.5		27	38
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 7.0 Std.Dev.= 2.8)						5	9
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.							
^b Frequency = Percent of the samples in which a species or lifeform occurred							
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform							
^d All Hit Cover = Absolute percent cover in verticle view accounthting for all cover by the species or lifeform, wether over-arched by other plants or not							
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform							

Table 3: Work Package S1 on Minnequa Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-A LLd (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S1-4
NATIVE ANNUAL & BIENNIAL FORBS						
Dyssodia aurea	1.00	100.00	25.00	1.00	25.00	1
TOTAL NATIVE ANN. & BIEN. FORBS	1.0	100.0	25.0	1.0	25.0	1
INTRODUCED ANNUAL & BIENNIAL FORBS						
Salsola australis	0.00	100.00	0.00	0.00	0.00	P
Ximenesia encelioides	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL FORBS						
Sphaeralcea angustifolia	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE SHRUBS						
Atriplex canescens	3.00	100.00	75.00	3.00	75.00	3
TOTAL NATIVE SHRUBS	3.0	100.0	75.0	3.0	75.0	3
Standing dead	2.00	100.00		2.00		2
Litter	42.00	100.00		42.00		42
Bare soil	40.00	100.00		40.00		40
Rock	12.00	100.00		12.00		12
TOTALS	100.0			100.0		100
TOTAL VEGETATION COVER	4.0 (s=0.0)		100.0	4.0 (s=0.0)	100.0	4
GROUND COVER (Litter+Rock+Veg+St.Dead)	60.0			60.0		60
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 5.0 Std.Dev.= 0.0)						5
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.						
^b Frequency = Percent of the samples in which a species or lifeform occurred						
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform						
^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not						
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform						

Table 4: Work Package S1 on Penrose Series Soils

PLANT SPECIES	AVERAGE COVER ^a	FREQUENCY ^b	RELATIVE	AVERAGE	RELATIVE	Percent			
			VEGETATION	COVER-A	VEGETATION	Foliar Cover*			
			COVER ^c	LLd	COVER-ALL ^e	Sample Number			
	(%)	(%)	(%)	(%)	(%)	S1- 2	S1- 6	S1- 7	S1- 8
INTRODUCED ANNUAL & BIENNIAL FORBS									
Amaranthus retroflexus	0.00	50.00	0.00	0.00	0.00	P			P
Salsola collina	0.25	50.00	1.61	0.25	1.61			P	1
Sisymbrium altissimum	0.00	25.00	0.00	0.00	0.00		P		
Ximenesia encelioides	0.00	25.00	0.00	0.00	0.00	P			
TOTAL INTRO. ANN. & BIEN. FORBS	0.3	100.0	1.6	0.3	1.6	P	P	P	1
NATIVE PERENNIAL FORBS									
Adenolinum lewisii	0.00	25.00	0.00	0.00	0.00			P	
Astragalus tridactylus	0.00	25.00	0.00	0.00	0.00			P	
Evolvulus nuttallianus	0.00	25.00	0.00	0.00	0.00			P	
Leucelene ericoides	0.00	25.00	0.00	0.00	0.00			P	
Lygodesmia juncea	0.00	25.00	0.00	0.00	0.00			P	
Phlox hoodii ssp. canescens	0.00	25.00	0.00	0.00	0.00			P	
Sphaeralcea angustifolia	0.00	25.00	0.00	0.00	0.00			P	
Zinnia grandiflora	0.00	25.00	0.00	0.00	0.00			P	
TOTAL NATIVE PERENNIAL FORBS	0.0	25.0	0.0	0.0	0.0	---	---	P	---
NATIVE PERENNIAL GRASSES (cool)									
Achnatherum sp.	2.75	50.00	17.74	2.75	17.74			6	5
Scleropogon brevifolius	0.25	75.00	1.61	0.25	1.61	P		P	1
Tridens muticus	0.00	25.00	0.00	0.00	0.00			P	
TOTAL NATIVE PERENNIAL GRASSES (c)	3.0	75.0	19.4	3.0	19.4	P	---	6	6
NATIVE PERENNIAL GRASSES (warm)									
Bouteloua curtipendula	0.00	50.00	0.00	0.00	0.00			P	P
Chondrosum gracile	0.75	75.00	4.84	0.75	4.84	1		P	2
Pleuraphis jamesii	6.25	100.00	40.32	6.25	40.32	11	12	1	1
Sporobolus airoides	2.25	50.00	14.52	2.25	14.52	5	4		
Sporobolus cryptandrus	1.00	25.00	6.45	1.00	6.45	4			
TOTAL NATIVE PERENNIAL GRASSES (w)	10.3	100.0	66.1	10.3	66.1	21	16	1	3
NATIVE SUBSHRUBS									
Atriplex confertifolia	0.25	25.00	1.61	0.25	1.61	1			
Eriogonum tenellum	0.25	50.00	1.61	0.25	1.61			P	1
Frankenia jamesii	0.00	25.00	0.00	0.00	0.00		P		
Gutierrezia sarothrae	0.25	50.00	1.61	0.25	1.61	1		P	
TOTAL NATIVE SUBSHRUBS	0.8	100.0	4.8	0.8	4.8	2	P	P	1
NATIVE SHRUBS									
Artemisia bigelovii	0.25	50.00	1.61	0.25	1.61			1	P
Atriplex canescens	0.50	75.00	3.23	0.50	3.23	1	1	P	
Krascheninnikovia lanata	0.00	25.00	0.00	0.00	0.00				P
TOTAL NATIVE SHRUBS	0.8	100.0	4.8	0.8	4.8	1	1	1	P
SUCCULENTS									
Coryphantha vivipara var. vivipara	0.00	50.00	0.00	0.00	0.00		P	P	
Cylindropuntia imbricata	0.00	25.00	0.00	0.00	0.00			P	
Opuntia phaeacantha	0.25	50.00	1.61	0.25	1.61		1		P
TOTAL SUCCULENTS	0.3	75.0	1.6	0.3	1.6	---	1	P	P
AGAVOIDS									
Yucca glauca	0.25	25.00	1.61	0.25	1.61				1
TOTAL AGAVOIDS	0.3	25.0	1.6	0.3	1.6	---	---	---	1
Standing dead	6.75	100.00		6.75		1	8	8	10
Litter	37.25	100.00		37.25		49	54	28	18
Bare soil	18.50	100.00		18.50		22	20	14	18
Rock	22.00	75.00		22.00		4		42	42
TOTALS	100.0			100.0		100	100	100	100
TOTAL VEGETATION COVER	15.5 (s=7.0)		100.0	15.5 (s=7.0)	100.0	24	18	8	12
GROUND COVER (Litter+Rock+Veg+St.Dead)	81.5			81.5		78	80	86	82
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 12.5 Std.Dev.= 6.0)						10	7	21	12
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.									
^b Frequency = Percent of the samples in which a species or lifeform occurred									
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform									

^d All Hit Cover = Absolute percent cover in verticle view accountnting for all cover by the species or lifeform, wether over-arched by other plants or not
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

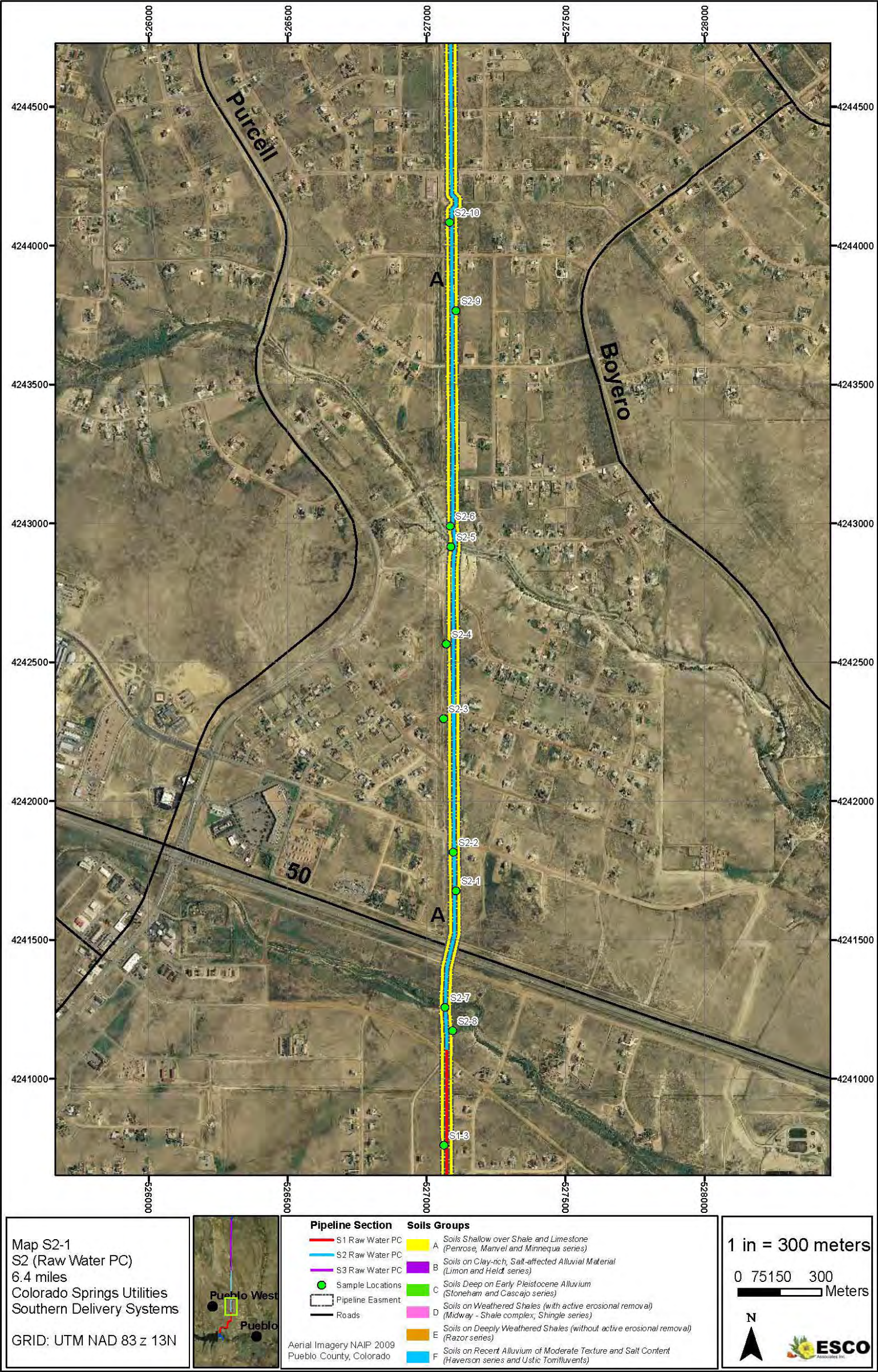


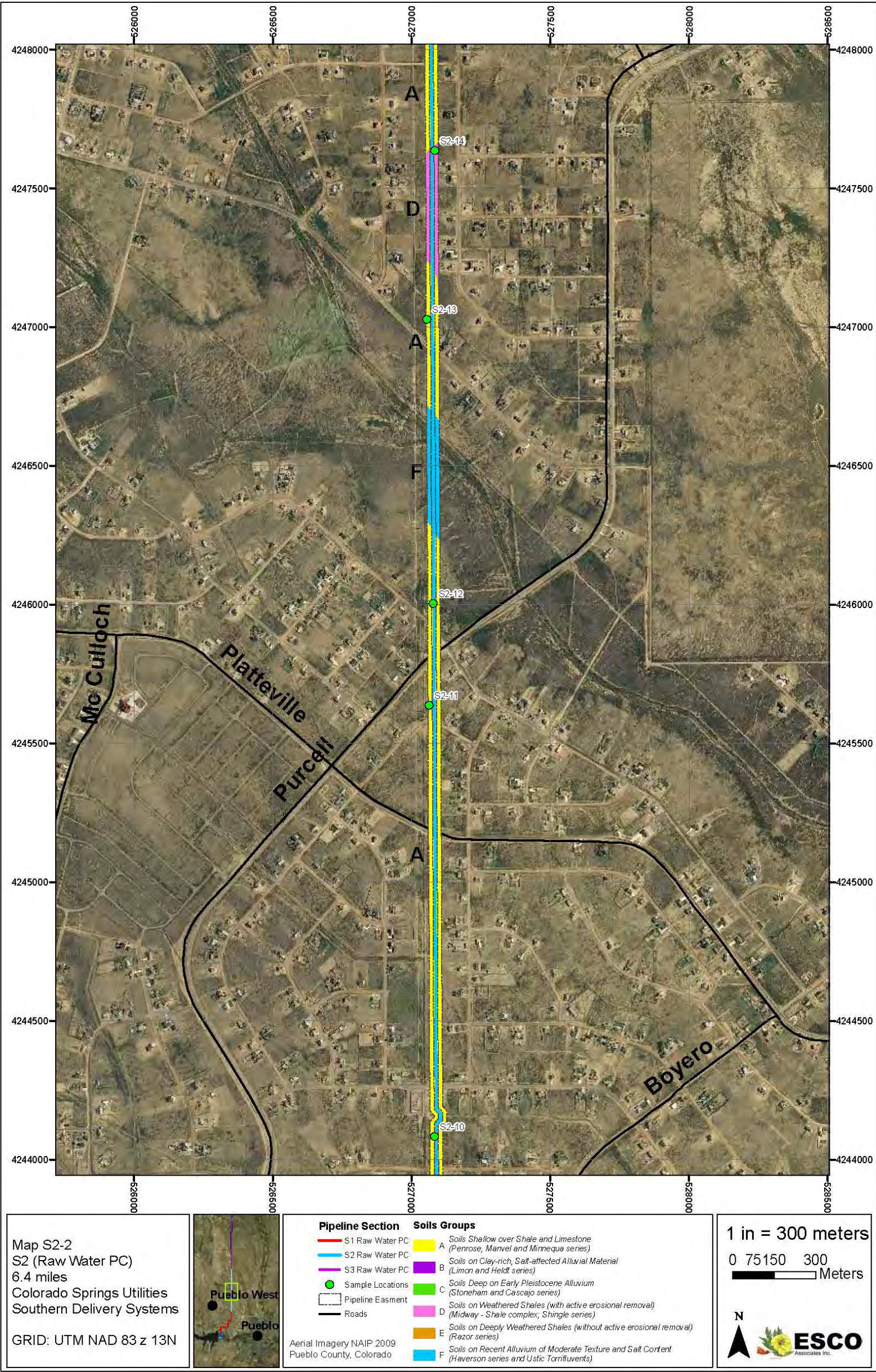






Appendix B: Work Package S2 - Maps, Tabular Data, and Transect photos





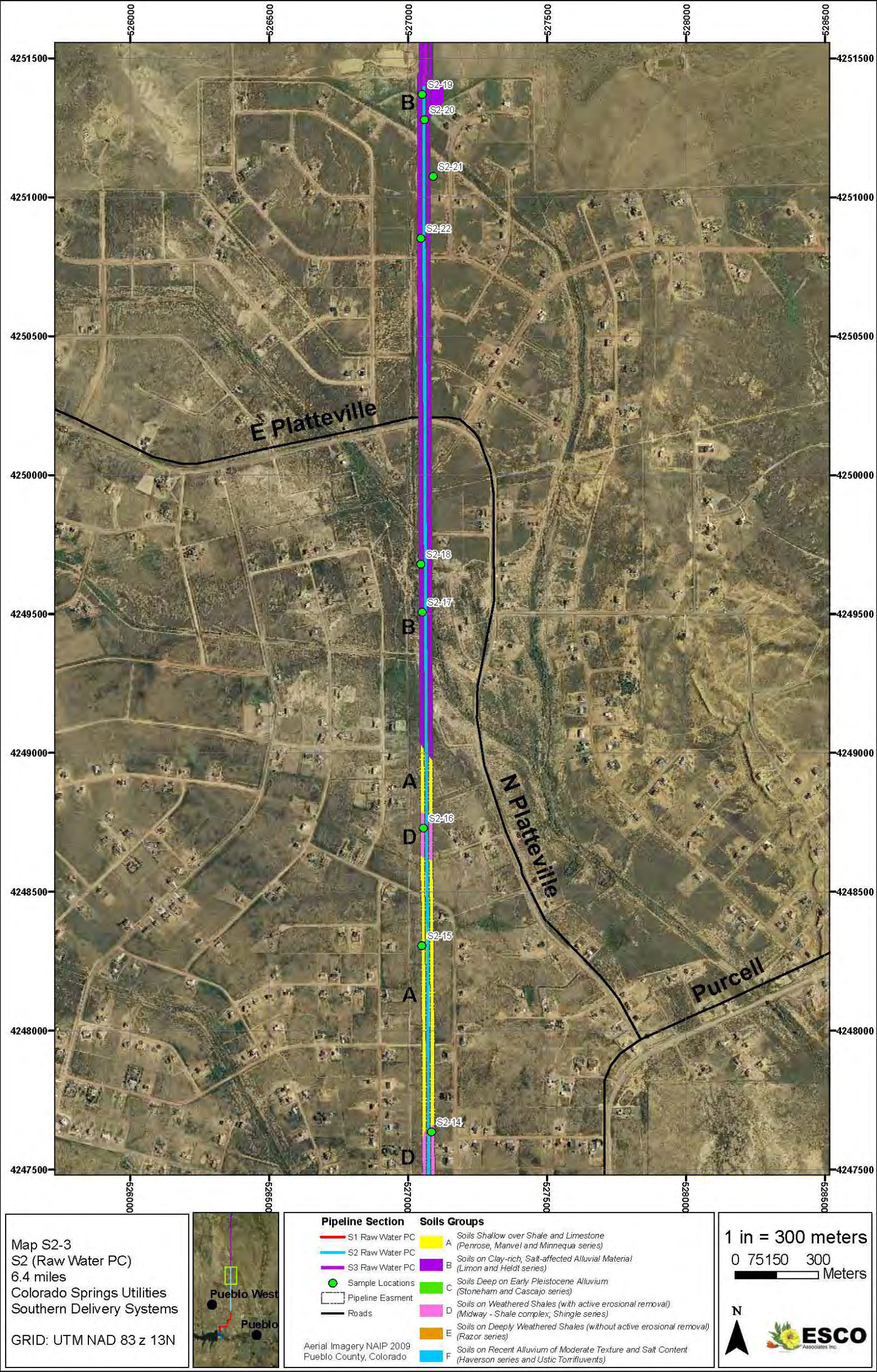


Table 5: Work Package S2 on Limon Series Soils											
PLANT SPECIES	AVERAGE COVER ^a	FREQUENCY ^b	RELATIVE	AVERAGE COVER-ALL ^d	RELATIVE	Percent			Percent		
			VEGETATION		VEGETATION	Foliar Cover*			Foliar Cover*		
			COVER ^c		COVER-ALL ^e	Sample Number S2-1 7	S2- 18	S2- 19	Sample Number S2-2 0	S2- 21	S2- 22
	(%)	(%)	(%)	(%)	(%)						
NATIVE ANNUAL & BIENNIAL FORBS											
Chamaesyce glyptosperma	2.67	100.00	9.76	2.67	9.58	2	3	8	2	P	1
Chenopodium subglabrum	0.00	16.67	0.00	0.00	0.00			P			
Dyssodia aurea	0.17	100.00	0.61	0.17	0.60	P	P	P	1	P	P
Grindelia squarrosa	0.00	16.67	0.00	0.00	0.00	P					
Hedeoma hispidum	0.17	16.67	0.61	0.17	0.60			1			
Helianthus annuus	0.00	50.00	0.00	0.00	0.00		P	P	P		
Nuttallia decapetala	0.00	16.67	0.00	0.00	0.00	P					
Oonopsis foliosa	0.00	33.33	0.00	0.00	0.00		P			P	
Physalis foetens var neomexicana	0.33	50.00	1.22	0.33	1.20	P	2			P	
TOTAL NATIVE ANN. & BIEN. FORBS	3.3	100.0	12.2	3.3	12.0	2	5	9	3	P	1
INTRODUCED ANNUAL & BIENNIAL FORBS											
Bassia sieversiana	0.17	16.67	0.61	0.17	0.60			1			
Chamaesyce serpyllifolia	0.33	33.33	1.22	0.33	1.20		1		1		
Euphorbia davidii	0.33	16.67	1.22	0.33	1.20			2			
Halogeton glomeratus	0.00	16.67	0.00	0.00	0.00		P				
Salsola collina	0.17	66.67	0.61	0.33	1.20	P		1	(1)		P
Solanum rostratum	0.00	16.67	0.00	0.00	0.00			P			
Xanthium strumarium	0.00	16.67	0.00	0.00	0.00		P				
Ximenesia encelioides	0.33	83.33	1.22	0.33	1.20	P	P	P	2		P
TOTAL INTRO. ANN. & BIEN. FORBS	1.3	83.3	4.9	1.5	5.4	P	1	4	3(1)	---	P
NATIVE PERENNIAL FORBS											
Asclepias subverticillata	0.17	33.33	0.61	0.17	0.60	P		1			
Brickellia rosmarinifolia ssp. chlorolepis	0.00	16.67	0.00	0.00	0.00	P					
Glandularia bipinnatifida	0.00	66.67	0.00	0.00	0.00		P	P	P	P	
Picradeniopsis oppositifolia	0.00	16.67	0.00	0.00	0.00					P	
Sphaeralcea angustifolia	0.17	50.00	0.61	0.17	0.60	P		P	1		
Sphaeralcea coccinea	0.00	66.67	0.00	0.00	0.00	P	P	P		P	
Vicia angustifolia	0.00	16.67	0.00	0.00	0.00					P	
TOTAL NATIVE PERENNIAL FORBS	0.3	83.3	1.2	0.3	1.2	P	P	1	1	P	---
NATIVE PERENNIAL GRASSES (cool)											
Pascopyrum smithii	1.33	66.67	4.88	1.50	5.39	4(1)	1	1		2	
Tridens muticus	0.00	16.67	0.00	0.00	0.00	P					
TOTAL NATIVE PERENNIAL GRASSES (c)	1.3	66.7	4.9	1.5	5.4	4(1)	1	1	---	2	---
NATIVE PERENNIAL GRASSES (warm)											
Aristida purpurea	0.00	16.67	0.00	0.00	0.00	P					
Bouteloua curtipendula	0.00	16.67	0.00	0.17	0.60	(1)					
Chondrosium gracile	0.17	33.33	0.61	0.17	0.60	P					1
Pleuraphis jamesii	0.17	33.33	0.61	0.17	0.60	1				P	
Sporobolus airoides	15.17	100.00	55.49	15.17	54.49	1	3	28	36	9	14
Sporobolus cryptandrus	0.83	33.33	3.05	0.83	2.99	4				1	
TOTAL NATIVE PERENNIAL GRASSES (w)	16.3	100.0	59.8	16.5	59.3	6(1)	3	28	36	10	15
NATIVE SUBSHRUBS											
Atriplex confertifolia	0.33	16.67	1.22	0.33	1.20	2					
Gutierrezia sarothrae	0.00	16.67	0.00	0.00	0.00	P					
TOTAL NATIVE SUBSHRUBS	0.3	16.7	1.2	0.3	1.2	2	---	---	---	---	---
NATIVE SHRUBS											
Atriplex canescens	3.83	100.00	14.02	3.83	13.77	6	16	P	1	P	P
TOTAL NATIVE SHRUBS	3.8	100.0	14.0	3.8	13.8	6	16	P	1	P	P
SUCCULENTS											
Cylindropuntia imbricata	0.00	16.67	0.00	0.00	0.00					P	
Mammillaria sp.	0.00	16.67	0.00	0.00	0.00	P					
Opuntia phaeacantha	0.50	50.00	1.83	0.50	1.80			P		3	P
TOTAL SUCCULENTS	0.5	66.7	1.8	0.5	1.8	P	---	P	---	3	P
Standing dead	10.50	100.00		10.50		16	12	2	2	23	8
Litter	27.50	100.00		27.50		32	19	36	20	33	25
Bare soil	34.33	100.00		34.33		30	43	19	34	29	51
Rock	0.33	16.67		0.33		2					
TOTALS	100.0			100.5		100	100	100	100	100	100
TOTAL VEGETATION COVER	27.3 (s=13.1)		100.0	27.8 (s=13.2)	100.0	20(2)	26	43	44(1)	15	16
GROUND COVER (Litter+Rock+Veg+St.Dead)	65.7			66.2		70(2)	57	81	66(1)	71	49
SPECIES DENSITY (# of species/100 sq.m.)						23	14	18	10	15	8
(AVERAGE= 14.7 Std.Dev.= 5.4)											
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.											

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform
^d All Hit Cover = Absolute percent cover in verticle view accounthting for all cover by the species or lifeform, wether over-arched by other plants or not
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 6: Work Package S2 on Haverson Series Soils

PLANT SPECIES	AVERAGE COVER ^a	FREQUENCY ^b	RELATIVE VEGETATION COVER ^c	AVERAGE COVER-ALL ^d	RELATIVE VEGETATION COVER-ALL ^e	Percent	
						Foliar Cover*	Sample
						Number	S2-1
	(%)	(%)	(%)	(%)	(%)	S2-12	3
NATIVE ANNUAL & BIENNIAL FORBS							
Chamaesyce glyptosperma	0.00	50.00	0.00	0.00	0.00	P	
Chamaesyce stictospora	1.00	50.00	3.33	1.00	2.78		2
Dyssodia aurea	3.50	100.00	11.67	3.50	9.72	7	P
Helianthus annuus	0.00	50.00	0.00	0.00	0.00	P	
Oenothera villosa	0.00	50.00	0.00	1.00	2.78	(2)	
Physalis foetens var neomexicana	0.00	50.00	0.00	0.00	0.00	P	
TOTAL NATIVE ANN. & BIEN. FORBS	4.5	100.0	15.0	5.5	15.3	7(2)	2
INTRODUCED ANNUAL & BIENNIAL FORBS							
Bassia sieversiana	0.00	50.00	0.00	0.00	0.00	P	
Chamaesyce serpyllifolia	2.50	100.00	8.33	4.00	11.11	3(3)	2
Lactuca serriola	0.00	50.00	0.00	0.00	0.00	P	
Salsola collina	4.50	100.00	15.00	5.00	13.89	9(1)	P
Ximenesia encelioides	2.00	100.00	6.67	2.50	6.94	4(1)	P
TOTAL INTRO. ANN. & BIEN. FORBS	9.0	100.0	30.0	11.5	31.9	16(5)	2
NATIVE PERENNIAL FORBS							
Astragalus racemosus	0.50	50.00	1.67	0.50	1.39	1	
Brickellia rosmarinifolia ssp. chlorolepis	0.00	50.00	0.00	0.00	0.00	P	
Glandularia bipinnatifida	1.50	100.00	5.00	2.00	5.56	3(1)	P
Oxybaphus linearis	0.50	50.00	1.67	0.50	1.39	1	
Sphaeralcea angustifolia	0.00	50.00	0.00	0.00	0.00	P	
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P	P
Zinnia grandiflora	0.00	50.00	0.00	0.00	0.00	P	
TOTAL NATIVE PERENNIAL FORBS	2.5	100.0	8.3	3.0	8.3	5(1)	P
NATIVE PERENNIAL GRASSES (cool)							
Muhlenbergia arenacea	3.00	50.00	10.00	4.50	12.50	6(3)	
Pascopyrum smithii	0.00	50.00	0.00	0.00	0.00	P	
TOTAL NATIVE PERENNIAL GRASSES (c)	3.0	50.0	10.0	4.5	12.5	6(3)	---
NATIVE PERENNIAL GRASSES (warm)							
Aristida purpurea	5.00	100.00	16.67	5.00	13.89	7	3
Buchloe dactyloides	0.00	50.00	0.00	0.00	0.00		P
Chondrosium gracile	1.00	100.00	3.33	1.00	2.78	2	P
Chondrosium hirsutum	0.00	50.00	0.00	0.00	0.00		P
Sporobolus cryptandrus	1.00	100.00	3.33	1.00	2.78	2	P
TOTAL NATIVE PERENNIAL GRASSES (w)	7.0	100.0	23.3	7.0	19.4	11	3
NATIVE SUBSHRUBS							
Gutierrezia sarothrae	0.00	50.00	0.00	0.00	0.00		P
TOTAL NATIVE SUBSHRUBS	0.0	50.0	0.0	0.0	0.0	---	P
NATIVE SHRUBS							
Artemisia tripartita	0.00	50.00	0.00	0.00	0.00	P	
Atriplex canescens	0.00	50.00	0.00	0.00	0.00	P	
Krascheninnikovia lanata	4.00	50.00	13.33	4.50	12.50		8(1)
TOTAL NATIVE SHRUBS	4.0	100.0	13.3	4.5	12.5	P	8(1)
SUCCULENTS							
Opuntia macrorhiza	0.00	50.00	0.00	0.00	0.00	P	
TOTAL SUCCULENTS	0.0	50.0	0.0	0.0	0.0	P	---
Standing dead	8.00	100.00		8.00		6	10
Litter	21.00	100.00		21.00		18	24
Bare soil	36.00	100.00		36.00		29	43
Rock	5.00	100.00		5.00		2	8
TOTALS	100.0			106.0		100	100
TOTAL VEGETATION COVER	30.0 (s=21.2)		100.0	36.0 (s=28.3)	100.0	45(11)	15(1)
GROUND COVER (Litter+Rock+Veg+St.Dead)	64.0			70.0		71(11)	57(1)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 19.5 Std.Dev.= 7.8)						25	14
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.							
^b Frequency = Percent of the samples in which a species or lifeform occurred							
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform							
^d All Hit Cover = Absolute percent cover in verticle view accountng for all cover by the species or lifeform, wether over-arched by other plants or not							
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform							

Table 7: Work Package S2 on Manvel and Minnequa Series Soils

PLANT SPECIES	AVERA GE	FREQ UENC Y ^b	RELATIVE VEGETAT ION	AVERAGE	RELATIVE VEGETATIO N	Percent Foliar Cover*				Percent Foliar Cover*			
	COVER ^a		COVER ^c	COVER-ALL ^d	COVER-ALL ^e	Percent Foliar Cover*				Percent Foliar Cover*			
						Percent Foliar Cover*				Percent Foliar Cover*			
						Percent Foliar Cover*				Percent Foliar Cover*			
(%)	(%)	(%)	(%)	(%)	---Sample Number---				---Sample Number---				
						S2-3	S2-4	S2-6	S2-9	S2-10	S2-11	S2-14	S2-15
NATIVE ANNUAL & BIENNIAL FORBS													
Chamaesyce glyptosperma	0.13	25.00	0.75	0.13	0.75				P	1			
Chamaesyce stictospora	0.38	50.00	2.26	0.38	2.26	P			2		P		1
Dyssodia aurea	1.25	100.00	7.52	1.25	7.52	P	P	P	7	P	1	P	2
Hedeoma hispidum	0.00	12.50	0.00	0.00	0.00				P				
Oenothera villosa	0.00	12.50	0.00	0.00	0.00				P				
Oonopsis foliosa	0.00	12.50	0.00	0.00	0.00					P			
Physalis foetens var neomexicana	0.00	12.50	0.00	0.00	0.00				P				
TOTAL NATIVE ANN. & BIEN. FORBS	1.8	100.0	10.5	1.8	10.5	P	P	P	9	1	1	P	3
INTRODUCED ANNUAL & BIENNIAL FORBS													
Bassia sieversiana	0.13	12.50	0.75	0.13	0.75		1						
Chamaesyce serpyllifolia	1.50	75.00	9.02	1.50	9.02	3		4		P	P	5	P
Salsola australis	0.13	12.50	0.75	0.13	0.75		1						
Salsola collina	4.25	100.00	25.56	4.25	25.56	6	7	12	P	P	5	1	3
Ximenesia encelioides	0.13	87.50	0.75	0.13	0.75	P	P	P	1	P		P	P
TOTAL INTRO. ANN. & BIEN. FORBS	6.1	100.0	36.8	6.1	36.8	9	9	16	1	P	5	6	3
NATIVE PERENNIAL FORBS													
Ambrosia psilostachya var. coronopifolia	0.13	12.50	0.75	0.13	0.75					1			
Asclepias subverticillata	0.00	25.00	0.00	0.00	0.00	P			P				
Astragalus sp.	0.00	25.00	0.00	0.00	0.00				P				P
Gaura coccinea	0.13	12.50	0.75	0.13	0.75								1
Glandularia bipinnatifida	0.00	37.50	0.00	0.00	0.00				P	P			P
Leucelene ericoides	0.00	12.50	0.00	0.00	0.00								P
Lithospermum sp.	0.00	12.50	0.00	0.00	0.00								P
Lygodesmia juncea	0.00	12.50	0.00	0.00	0.00					P			
Machaeranthera pinnatifida	0.00	50.00	0.00	0.00	0.00	P	P		P	P			
Solanum elaeagnifolium	0.13	37.50	0.75	0.13	0.75				P			1	P
Sphaeralcea angustifolia	0.00	37.50	0.00	0.00	0.00				P	P			P
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P	P	P	P	P	P	P	P
Zinnia grandiflora	0.25	12.50	1.50	0.25	1.50							2	
TOTAL NATIVE PERENNIAL FORBS	0.6	100.0	3.8	0.6	3.8	P	P	P	P	1	P	3	1
NATIVE PERENNIAL GRASSES (cool)													
Muhlenbergia arenacea	0.63	37.50	3.76	0.63	3.76				P	3			2
TOTAL NATIVE PERENNIAL GRASSES (c)	0.6	37.5	3.8	0.6	3.8	---	---	---	P	3	---	---	2
NATIVE PERENNIAL GRASSES (warm)													
Aristida purpurea	3.25	100.00	19.55	3.25	19.55	P	1	P	5	11	4	3	2
Chondrosum gracile	0.50	50.00	3.01	0.50	3.01					3	P	1	P
Muhlenbergia torreyi	0.13	12.50	0.75	0.13	0.75						1		
Pleuraphis jamesii	3.13	50.00	18.80	3.13	18.80	P				3		17	5
Sporobolus cryptandrus	0.00	25.00	0.00	0.00	0.00				P			P	
TOTAL NATIVE PERENNIAL GRASSES (w)	7.0	100.0	42.1	7.0	42.1	P	1	P	5	17	5	21	7
NATIVE SUBSHRUBS													
Gutierrezia sarothrae	0.00	37.50	0.00	0.00	0.00	P	P	P					
TOTAL NATIVE SUBSHRUBS	0.0	37.5	0.0	0.0	0.0	P	P	P	---	---	---	---	---
NATIVE SHRUBS													
Atriplex canescens	0.38	37.50	2.26	0.38	2.26			2	1	P			
TOTAL NATIVE SHRUBS	0.4	37.5	2.3	0.4	2.3	---	---	2	1	P	---	---	---
BRYOPHYTES													
Moss	0.00	12.50	0.00	0.00	0.00				P				
TOTAL BRYOPHYTES	0.0	12.5	0.0	0.0	0.0	---	---	---	P	---	---	---	---
LICHENS													
Lichen	0.13	12.50	0.75	0.13	0.75					1			
TOTAL LICHENS	0.1	12.5	0.8	0.1	0.8	---	---	---	---	1	---	---	---
Standing dead	6.63	100.00		6.63		6	3	3	8	9	12	10	2
Litter	21.13	100.00		21.13		28	13	9	34	18	14	27	26
Bare soil	52.88	100.00		52.88		56	74	65	40	50	56	32	50
Rock	2.75	75.00		2.75		1		5	2		7	1	6
TOTALS	100.0			100.0		100	100	100	100	100	100	100	100
TOTAL VEGETATION COVER	16.6 (s=7.1)		100.0	16.6 (s=7.1)	100.0	9	10	18	16	23	11	30	16
GROUND COVER (Litter+Rock+Veg+St.Dead)	47.1			47.1		44	26	35	60	50	44	68	50
SPECIES DENSITY (# of species/100 sq.m.)						11	9	8	20	18	8	11	17

(AVERAGE= 12.8 Std.Dev.= 4.8)			
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.			
^b Frequency = Percent of the samples in which a species or lifeform occurred			
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform			
^d All Hit Cover = Absolute percent cover in verticle view accountning for all cover by the species or lifeform, wether over-arched by other plants or not			
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform			

Table 8: Work Package S2 on Penrose and Minnequa Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION	AVERAGE COVER-AL Ld	RELATIVE VEGETATION	Percent Foliar Cover*		Percent Foliar Cover*		
			COVER ^c (%)		COVER-ALL ^e (%)	Sample Num.		Sample Num.		
						S2-1	S2-2	S2-5	S2-7	S2-8
NATIVE ANNUAL & BIENNIAL FORBS										
Chamaesyce stictospora	0.00	20.00	0.00	0.00	0.00	P				
Cryptantha sp.	0.40	40.00	2.82	0.40	2.82			2		P
Dyssodia aurea	0.00	20.00	0.00	0.00	0.00			P		
Grindelia squarrosa	0.00	20.00	0.00	0.00	0.00					P
TOTAL NATIVE ANN. & BIEN. FORBS	0.4	60.0	2.8	0.4	2.8	P	---	2	---	P
INTRODUCED ANNUAL & BIENNIAL FORBS										
Atriplex patula	0.00	20.00	0.00	0.00	0.00					P
Bassia sieversiana	4.20	20.00	29.58	4.20	29.58				21	
Cardaria draba	0.00	20.00	0.00	0.00	0.00	P				
Chamaesyce serpyllifolia	0.00	20.00	0.00	0.00	0.00		P			
Salsola collina	0.00	100.00	0.00	0.00	0.00	P	P	P	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	4.2	100.0	29.6	4.2	29.6	P	P	P	21	P
NATIVE PERENNIAL FORBS										
Asclepias subverticillata	0.00	20.00	0.00	0.00	0.00					P
Astragalus sp.	0.00	20.00	0.00	0.00	0.00			P		
Brickellia rosmarinifolia ssp. chlorolepis	0.00	20.00	0.00	0.00	0.00		P			
Dalea cylindriceps	0.20	20.00	1.41	0.20	1.41			1		
Eriogonum fendlerianum	0.00	20.00	0.00	0.00	0.00			P		
Evolvulus nuttallianus	0.00	40.00	0.00	0.00	0.00		P			P
Heterotheca villosa	0.00	20.00	0.00	0.00	0.00			P		
Hymenopappus filifolius	0.00	20.00	0.00	0.00	0.00			P		
Iva axillaris	0.00	20.00	0.00	0.00	0.00		P			
Lesquerella calcicola	0.20	20.00	1.41	0.20	1.41			1		
Lesquerella ovalifolia	0.20	20.00	1.41	0.20	1.41			1		
Lithospermum incisum	0.00	20.00	0.00	0.00	0.00			P		
Machaeranthera pinnatifida	0.00	40.00	0.00	0.00	0.00		P			P
Machaeranthera sp.	0.00	20.00	0.00	0.00	0.00			P		
Psoralidium tenuiflorum	0.00	20.00	0.00	0.00	0.00			P		
Solidago sp.	0.20	20.00	1.41	0.20	1.41			1		
Sphaeralcea coccinea	0.00	60.00	0.00	0.00	0.00			P	P	P
Tetraneuris acaulis	0.20	20.00	1.41	0.20	1.41			1		
Veronica catenata	0.00	20.00	0.00	0.00	0.00				P	
TOTAL NATIVE PERENNIAL FORBS	1.0	80.0	7.0	1.0	7.0	---	P	5	P	P
INTRODUCED PERENNIAL FORBS										
Breea arvensis	0.00	20.00	0.00	0.00	0.00					P
Pseudognaphalium canescens	0.00	20.00	0.00	0.00	0.00		P			
TOTAL INTRO. PERENNIAL FORBS	0.0	40.0	0.0	0.0	0.0	---	P	---	P	---
NATIVE PERENNIAL GRASSES (cool)										
Achnatherum hymenoides	0.00	40.00	0.00	0.00	0.00		P	P		
Bolboschoenus maritimus ssp. paludosus	0.20	20.00	1.41	0.20	1.41				1	
Critesion jubatum	0.00	20.00	0.00	0.00	0.00				P	
Elymus elymoides	0.00	20.00	0.00	0.00	0.00		P			
Scleropogon brevifolius	0.00	20.00	0.00	0.00	0.00		P			
Typha angustifolia	0.60	20.00	4.23	0.60	4.23				3	
TOTAL NATIVE PERENNIAL GRASSES (c)	0.8	60.0	5.6	0.8	5.6	---	P	P	4	---
INTRODUCED PERENNIAL GRASSES (cool)										
Phalaroides arundinacea	0.60	20.00	4.23	0.60	4.23				3	
Psathyrostachys juncea	0.40	40.00	2.82	0.40	2.82				2	P
TOTAL INTRO. PERENNIAL GRASSES (c)	1.0	40.0	7.0	1.0	7.0	---	---	---	5	P
NATIVE PERENNIAL GRASSES (warm)										
Aristida purpurea	3.00	100.00	21.13	3.00	21.13	2	6	P	P	7
Bouteloua curtipendula	0.60	40.00	4.23	0.60	4.23		P	3		
Chondrosum gracile	0.00	40.00	0.00	0.00	0.00			P		P
Muhlenbergia asperifolia	0.60	20.00	4.23	0.60	4.23				3	
Pleuraphis jamesii	0.00	20.00	0.00	0.00	0.00			P		
Sporobolus airoides	0.20	40.00	1.41	0.20	1.41				P	1
Sporobolus cryptandrus	0.00	60.00	0.00	0.00	0.00	P	P			P
TOTAL NATIVE PERENNIAL GRASSES (w)	4.4	100.0	31.0	4.4	31.0	2	6	3	3	8
NATIVE SUBSHRUBS										
Gutierrezia sarothrae	0.20	40.00	1.41	0.20	1.41			P		1
TOTAL NATIVE SUBSHRUBS	0.2	40.0	1.4	0.2	1.4	---	---	P	---	1
NATIVE SHRUBS										
Artemisia bigelovii	0.00	20.00	0.00	0.00	0.00			P		
Atriplex canescens	1.00	20.00	7.04	1.00	7.04					5
Atriplex gardneri	0.00	20.00	0.00	0.00	0.00	P				
Chrysothamnus nauseosus	0.80	40.00	5.63	0.80	5.63				4	P
TOTAL NATIVE SHRUBS	1.8	80.0	12.7	1.8	12.7	P	---	P	4	5

Table 8: Work Package S2 on Penrose and Minnequa Series Soils

INTRODUCED SHRUBS										
Tamarix ramosissima	0.40	20.00	2.82	0.40	2.82	2				
TOTAL INTRODUCED SHRUBS	0.4	20.0	2.8	0.4	2.8	---	---	---	2	---
AGAVOIDS										
Yucca glauca	0.00	40.00	0.00	0.00	0.00	P P				
TOTAL AGAVOIDS	0.0	40.0	0.0	0.0	0.0	---	---	P	---	P
Standing dead	6.20	100.00		6.20		1	6	3	13	8
Litter	30.60	100.00		30.60		41	27	19	41	25
Bare soil	32.80	100.00		32.80		54	41	13	6	50
Rock	16.20	100.00		16.20		2	20	55	1	3
TOTALS	100.0			100.0		100	100	100	100	100
TOTAL VEGETATION COVER	14.2 (s=14.6)		100.0	14.2 (s=14.6)	100.0	2	6	10	39	14
GROUND COVER (Litter+Rock+Veg+St.Dead)	67.2			67.2		46	59	87	94	50
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 15.0 Std.Dev.= 6.5)						6	13	24	17	15

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform

^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 9: Work Package S2 on Shingle Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-ALL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S2-16
NATIVE ANNUAL & BIENNIAL FORBS						
Cryptantha sp.	0.00	100.00	0.00	0.00	0.00	P
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P
Oenopsis foliosa	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Chamaesyce serpyllifolia	0.00	100.00	0.00	0.00	0.00	P
Salsola collina	0.00	100.00	0.00	0.00	0.00	P
Ximenesia encelioides	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL FORBS						
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P
Zinnia grandiflora	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL GRASSES (cool)						
Achnatherum lettermanii	6.00	100.00	50.00	6.00	50.00	6
TOTAL NATIVE PERENNIAL GRASSES (c)	6.0	100.0	50.0	6.0	50.0	6
NATIVE PERENNIAL GRASSES (warm)						
Aristida purpurea	0.00	100.00	0.00	0.00	0.00	P
Bouteloua curtipendula	0.00	100.00	0.00	0.00	0.00	P
Chondrosium gracile	0.00	100.00	0.00	0.00	0.00	P
Pleuraphis jamesii	6.00	100.00	50.00	6.00	50.00	6
Schizachyrium scoparium	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL GRASSES (w)	6.0	100.0	50.0	6.0	50.0	6
NATIVE SUBSHRUBS						
Frankenia jamesii	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SUBSHRUBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE SHRUBS						
Artemisia bigelovii	0.00	100.00	0.00	0.00	0.00	P
Krascheninnikovia lanata	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SHRUBS	0.0	100.0	0.0	0.0	0.0	P
Standing dead	16.00	100.00		16.00		16
Litter	28.00	100.00		28.00		28
Bare soil	44.00	100.00		44.00		44
TOTALS	100.0			100.0		100
TOTAL VEGETATION COVER	12.0 (s=0.0)		100.0	12.0 (s=0.0)	100.0	12
GROUND COVER (Litter+Rock+Veg+St.Dead)	56.0			56.0		56
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 17.0 Std.Dev.= 0.0)						17

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of their species or lifeform

^d All Hit Cover = Absolute percent cover in vertical view accounting for all cover by the species or lifeform, whether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of their species or lifeform















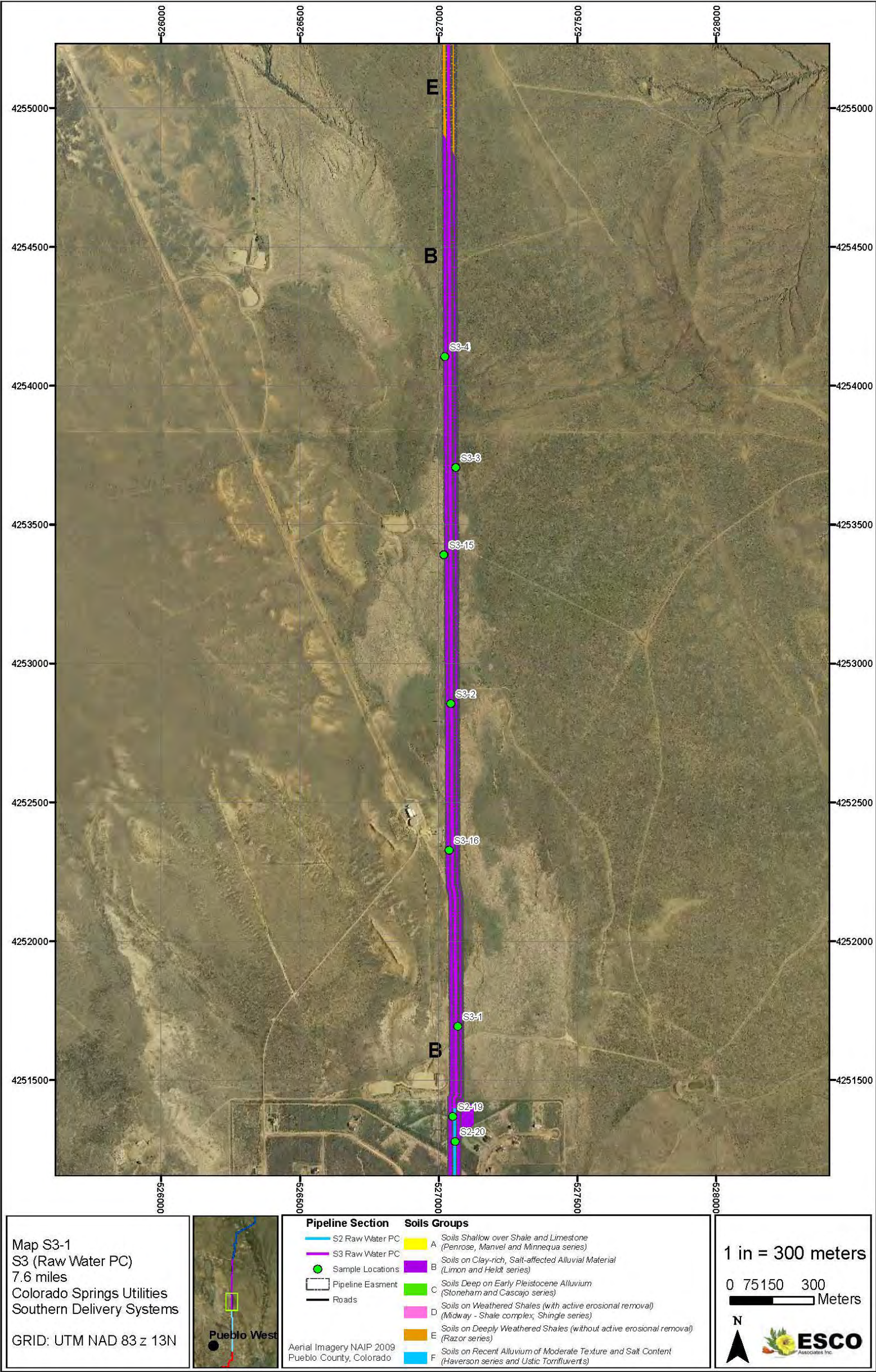


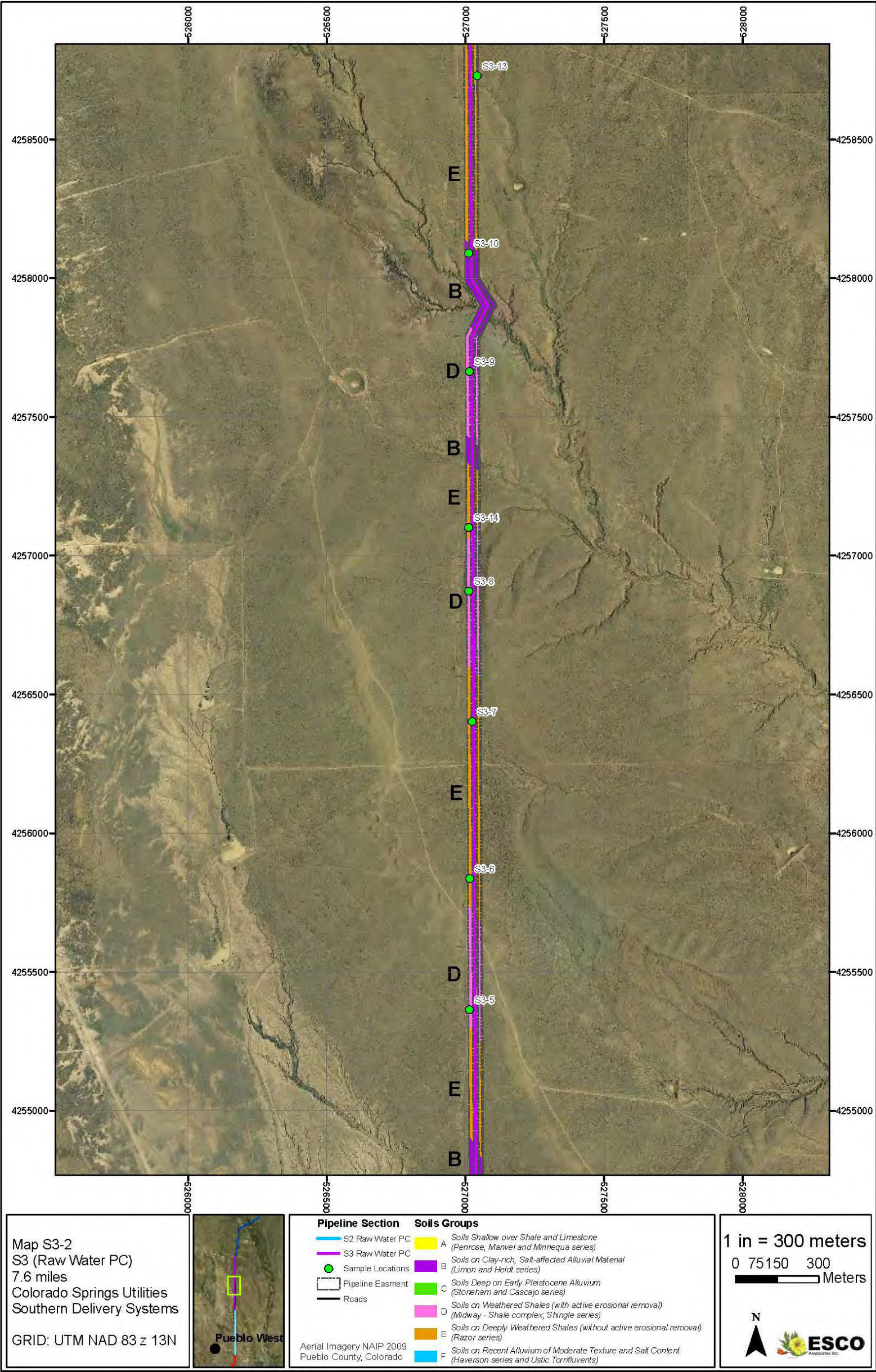


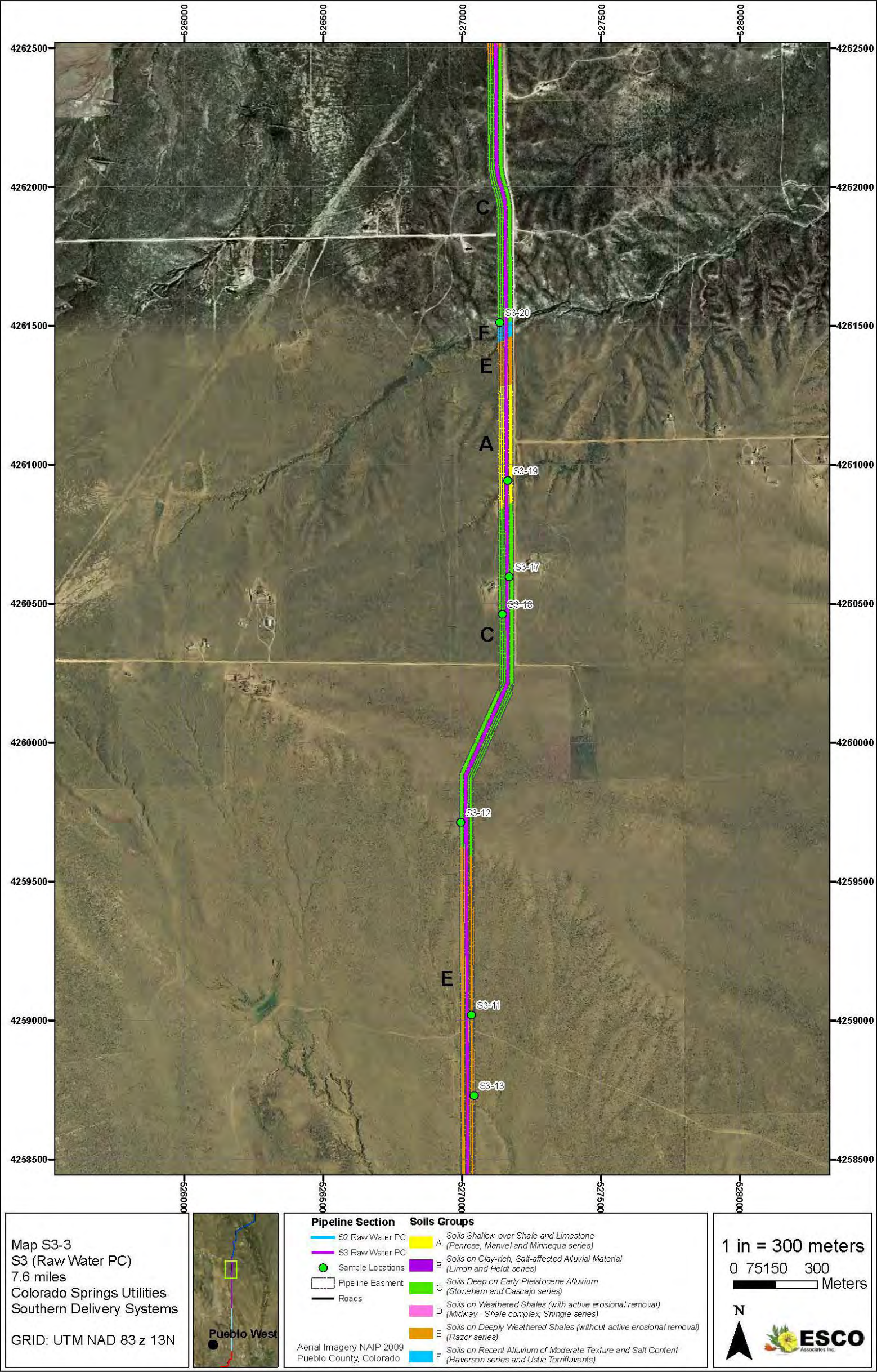




Appendix C: Work Package S3 - Maps, Tabular Data, and Transect photos







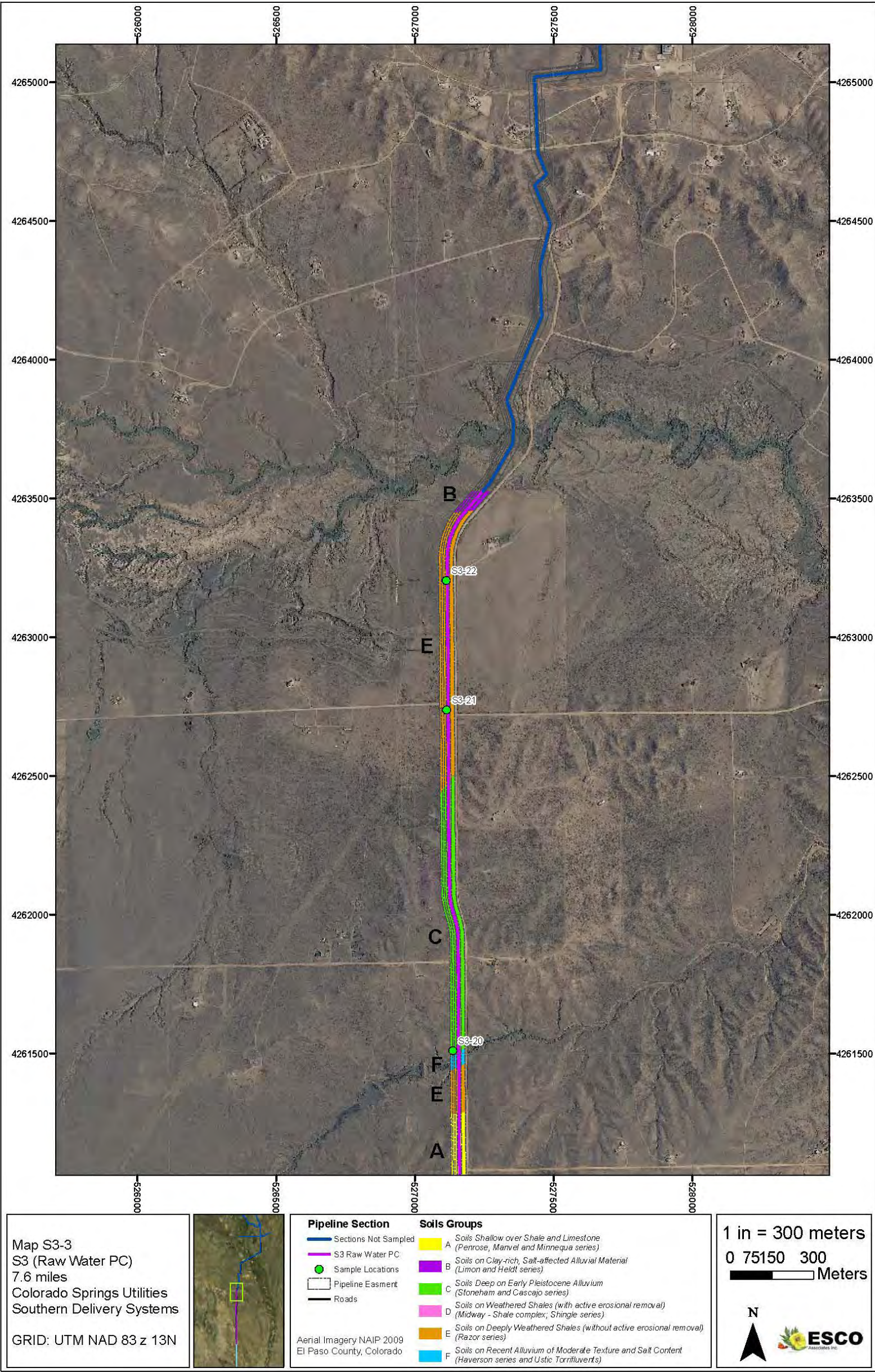


Table 10: Work Package S3 on Cascajo Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-ALL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S3-20
NATIVE ANNUAL & BIENNIAL FORBS						
Chamaesyce stictospora	1.00	100.00	2.38	1.00	2.38	1
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	1.0	100.0	2.4	1.0	2.4	1
INTRODUCED ANNUAL & BIENNIAL FORBS						
Salsola collina	4.00	100.00	9.52	4.00	9.52	4
Ximenesia encelioides	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	4.0	100.0	9.5	4.0	9.5	4
NATIVE PERENNIAL FORBS						
Ambrosia confertiflora	1.00	100.00	2.38	1.00	2.38	1
Astragalus racemosus	0.00	100.00	0.00	0.00	0.00	P
Eriogonum fendlerianum	1.00	100.00	2.38	1.00	2.38	1
Glandularia bipinnatifida	0.00	100.00	0.00	0.00	0.00	P
Physalis heterophylla	0.00	100.00	0.00	0.00	0.00	P
Picradeniopsis oppositifolia	1.00	100.00	2.38	1.00	2.38	1
Solanum elaeagnifolium	0.00	100.00	0.00	0.00	0.00	P
Sphaeralcea coccinea	1.00	100.00	2.38	1.00	2.38	1
Zinnia grandiflora	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE PERENNIAL FORBS	4.0	100.0	9.5	4.0	9.5	4
NATIVE PERENNIAL GRASSES (warm)						
Aristida purpurea	1.00	100.00	2.38	1.00	2.38	1
Chondrosium gracile	7.00	100.00	16.67	7.00	16.67	7
Muhlenbergia torreyi	0.00	100.00	0.00	0.00	0.00	P
Pleuraphis jamesii	22.00	100.00	52.38	22.00	52.38	22
TOTAL NATIVE PERENNIAL GRASSES (w)	30.0	100.0	71.4	30.0	71.4	30
NATIVE SHRUBS						
Atriplex canescens	1.00	100.00	2.38	1.00	2.38	1
TOTAL NATIVE SHRUBS	1.0	100.0	2.4	1.0	2.4	1
SUCCULENTS						
Cylindropuntia imbricata	1.00	100.00	2.38	1.00	2.38	1
Opuntia polyacantha	1.00	100.00	2.38	1.00	2.38	1
TOTAL SUCCULENTS	2.0	100.0	4.8	2.0	4.8	2
Standing dead	8.00	100.00		8.00		8
Litter	15.00	100.00		15.00		15
Bare soil	34.00	100.00		34.00		34
Rock	1.00	100.00		1.00		1
TOTALS	100.0 42.0 (s=0.0)			100.0		100
TOTAL VEGETATION COVER			100.0	42.0 (s=0.0)	100.0	42
GROUND COVER (Litter+Rock+Veg+St.Dead)	66.0			66.0		66
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 20.0 Std.Dev.= 0.0)						20
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.						
^b Frequency = Percent of the samples in which a species or lifeform occurred						
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform						
^d All Hit Cover = Absolute percent cover in verticle view accounthting for all cover by the species or lifeform, wether over-arched by other plants or not						
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform						

Table 11: Work Package S3 on Heldt Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-ALL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S3-5
NATIVE ANNUAL & BIENNIAL FORBS						
Chamaesyce stictospora	0.00	100.00	0.00	0.00	0.00	P
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL GRASSES (cool)						
Muhlenbergia arenacea	3.00	100.00	21.43	3.00	21.43	3
TOTAL NATIVE PERENNIAL GRASSES (c)	3.0	100.0	21.4	3.0	21.4	3
NATIVE PERENNIAL GRASSES (warm)						
Bouteloua curtipendula	0.00	100.00	0.00	0.00	0.00	P
Chondrosum gracile	4.00	100.00	28.57	4.00	28.57	4
Pleuraphis jamesii	0.00	100.00	0.00	0.00	0.00	P
Sporobolus airoides	4.00	100.00	28.57	4.00	28.57	4
TOTAL NATIVE PERENNIAL GRASSES (w)	8.0	100.0	57.1	8.0	57.1	8
NATIVE SUBSHRUBS						
Gutierrezia sarothrae	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SUBSHRUBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE SHRUBS						
Krascheninnikovia lanata	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SHRUBS	0.0	100.0	0.0	0.0	0.0	P
SUCCULENTS						
Cylindropuntia imbricata	1.00	100.00	7.14	1.00	7.14	1
Opuntia phaeacantha	2.00	100.00	14.29	2.00	14.29	2
TOTAL SUCCULENTS	3.0	100.0	21.4	3.0	21.4	3
Litter	25.00	100.00		25.00		25
Bare soil	60.00	100.00		60.00		60
Rock	1.00	100.00		1.00		1
TOTALS	100.0			100.0		100
TOTAL VEGETATION COVER	14.0 (s=0.0)		100.0	14.0 (s=0.0)	100.0	14
GROUND COVER (Litter+Rock+Veg+St.Dead)	40.0			40.0		40
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 11.0 Std.Dev.= 0.0)						11
^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.						
^b Frequency = Percent of the samples in which a species or lifeform occurred						
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform						
^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not						
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform						

Table 12: Work Package S3 on Limon Series Soils

PLANT SPECIES	AVERAGE COVER ^a	FREQUENCY ^b	RELATIVE VEGETATION	AVERAGE COVER-ALL ^d	RELATIVE VEGETATION	Percent Foliar Cover*			Percent Foliar Cover*		
			COVER ^c		COVER-ALL ^e	Sample Number			Sample Number		
			(%)		(%)	S3- 1	S3- 2	S3- 3	S3- 4	S3- 15	S3- 16
NATIVE ANNUAL & BIENNIAL FORBS											
Chamaesyce glyptosperma	0.00	16.67	0.00	0.00	0.00					P	
Chamaesyce stictospora	0.17	66.67	1.20	0.17	1.20	P	1		P		P
Dyssodia aurea	0.00	83.33	0.00	0.00	0.00	P	P		P	P	P
Oonopsis foliosa	0.00	33.33	0.00	0.00	0.00	P					P
TOTAL NATIVE ANN. & BIEN. FORBS	0.2	83.3	1.2	0.2	1.2	P	1	---	P	P	P
INTRODUCED ANNUAL & BIENNIAL FORBS											
Halogeton glomeratus	0.00	16.67	0.00	0.00	0.00					P	
Portulaca oleracea	0.00	16.67	0.00	0.00	0.00			P			
Salsola collina	0.00	66.67	0.00	0.00	0.00		P	P		P	P
Solanum rostratum	0.17	33.33	1.20	0.17	1.20		1			P	
Ximenesia encelioides	0.00	50.00	0.00	0.00	0.00		P		P		P
TOTAL INTRO. ANN. & BIEN. FORBS	0.2	83.3	1.2	0.2	1.2	---	1	P	P	P	P
NATIVE PERENNIAL FORBS											
Glandularia bipinnatifida	0.00	16.67	0.00	0.00	0.00		P				
Sphaeralcea coccinea	0.00	16.67	0.00	0.00	0.00				P		
TOTAL NATIVE PERENNIAL FORBS	0.0	33.3	0.0	0.0	0.0	---	P	---	P	---	---
INTRODUCED PERENNIAL FORBS											
Acetosella vulgaris	0.00	16.67	0.00	0.00	0.00			P			
TOTAL INTRO. PERENNIAL FORBS	0.0	16.7	0.0	0.0	0.0	---	---	P	---	---	---
NATIVE PERENNIAL GRASSES (cool)											
Muhlenbergia arenacea	0.17	16.67	1.20	0.17	1.20				1		
Pascopyrum smithii	1.50	33.33	10.84	1.50	10.84	8			1		
Scleropogon brevifolius	0.00	16.67	0.00	0.00	0.00					P	
TOTAL NATIVE PERENNIAL GRASSES (c)	1.7	50.0	12.0	1.7	12.0	8	---	---	2	P	---
NATIVE PERENNIAL GRASSES (warm)											
Bouteloua curtipendula	0.00	16.67	0.00	0.00	0.00	P					
Chondrosum gracile	1.83	50.00	13.25	1.83	13.25		P		5		6
Pleuraphis jamesii	0.50	33.33	3.61	0.50	3.61				1		2
Sporobolus airoides	4.17	83.33	30.12	4.17	30.12	4	10	4	6	1	
TOTAL NATIVE PERENNIAL GRASSES (w)	6.5	100.0	47.0	6.5	47.0	4	10	4	12	1	8
NATIVE SUBSHRUBS											
Atriplex confertifolia	1.00	33.33	7.23	1.00	7.23		1			5	
TOTAL NATIVE SUBSHRUBS	1.0	33.3	7.2	1.0	7.2	---	1	---	---	5	---
NATIVE SHRUBS											
Atriplex canescens	1.67	50.00	12.05	1.67	12.05			8	1		1
Krascheninnikovia lanata	0.00	16.67	0.00	0.00	0.00						P
TOTAL NATIVE SHRUBS	1.7	50.0	12.0	1.7	12.0	---	---	8	1	---	1
SUCCULENTS											
Cylindropuntia imbricata	1.67	66.67	12.05	1.67	12.05		1	3	3	3	
Opuntia phaeacantha	1.00	33.33	7.23	1.00	7.23			3		3	
Opuntia polyacantha	0.00	50.00	0.00	0.00	0.00		P		P		P
TOTAL SUCCULENTS	2.7	83.3	19.3	2.7	19.3	---	1	6	3	6	P
Standing dead	2.33	66.67		2.33			3	1	5		5
Litter	15.50	100.00		15.50		13	23	21	9	9	18
Bare soil	67.83	100.00		67.83		75	60	60	68	78	66
Rock	0.50	33.33		0.50						1	2
TOTALS	100.0			100.0		100	100	100	100	100	100
TOTAL VEGETATION COVER	13.8 (s=3.6)		100.0	13.8 (s=3.6)	100.0	12	14	18	18	12	9
GROUND COVER (Litter+Rock+Veg+St.Dead)	32.2			32.2		25	40	40	32	22	34
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 9.3 Std.Dev.= 2.3)						6	11	7	12	10	10

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform

^d All Hit Cover = Absolute percent cover in verticle view accounthting for all cover by the species or lifeform, wether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 13: Work Package S3 on Midway Shale Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE	AVERAGE COVER-ALL ^d (%)	RELATIVE	Percent		
			VEGETATION		VEGETATION	Foliar Cover*		
			COVER ^c (%)		COVER-ALL ^e (%)	Sample Number		
						S3-8	S3-9	S3-10
NATIVE ANNUAL & BIENNIAL FORBS								
Chamaesyce stictospora	2.33	100.00	12.50	2.33	12.07	1	2	4
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P	P	P
Grindelia squarrosa	0.00	33.33	0.00	0.00	0.00			P
Oonopsis foliosa	0.00	33.33	0.00	0.00	0.00		P	
TOTAL NATIVE ANN. & BIEN. FORBS	2.3	100.0	12.5	2.3	12.1	1	2	4
INTRODUCED ANNUAL & BIENNIAL FORBS								
Portulaca oleracea	0.33	33.33	1.79	0.33	1.72		1	
Salsola collina	0.00	66.67	0.00	0.00	0.00		P	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.3	66.7	1.8	0.3	1.7	---	1	P
NATIVE PERENNIAL FORBS								
Astragalus racemosus	0.00	33.33	0.00	0.00	0.00	P		
Glandularia bipinnatifida	0.33	66.67	1.79	0.33	1.72		P	1
Lygodesmia juncea	0.00	33.33	0.00	0.00	0.00	P		
Sphaeralcea coccinea	0.00	66.67	0.00	0.00	0.00	P		P
Vexibia nuttalliana	0.33	33.33	1.79	0.33	1.72	1		
TOTAL NATIVE PERENNIAL FORBS	0.7	100.0	3.6	0.7	3.4	1	P	1
INTRODUCED PERENNIAL FORBS								
Acetosella vulgaris	0.00	33.33	0.00	0.00	0.00	P		
TOTAL INTRO. PERENNIAL FORBS	0.0	33.3	0.0	0.0	0.0	P	---	---
NATIVE PERENNIAL GRASSES (cool)								
Muhlenbergia arenacea	1.33	66.67	7.14	1.33	6.90		3	1
Scleropogon brevifolius	0.33	33.33	1.79	0.33	1.72	1		
TOTAL NATIVE PERENNIAL GRASSES (c)	1.7	100.0	8.9	1.7	8.6	1	3	1
NATIVE PERENNIAL GRASSES (warm)								
Chondrosum gracile	0.67	100.00	3.57	1.00	5.17	P	2(1)	P
Pleuraphis jamesii	10.00	100.00	53.57	10.33	53.45	7	10(1)	13
Sporobolus cryptandrus	0.00	33.33	0.00	0.00	0.00	P		
TOTAL NATIVE PERENNIAL GRASSES (w)	10.7	100.0	57.1	11.3	58.6	7	12(2)	13
NATIVE SHRUBS								
Atriplex canescens	1.67	100.00	8.93	1.67	8.62	1	4	P
TOTAL NATIVE SHRUBS	1.7	100.0	8.9	1.7	8.6	1	4	P
SUCCULENTS								
Cylindropuntia imbricata	0.33	66.67	1.79	0.33	1.72		1	P
Opuntia phaeacantha	0.33	33.33	1.79	0.33	1.72		1	
Opuntia polyacantha	0.67	66.67	3.57	0.67	3.45	1		1
TOTAL SUCCULENTS	1.3	100.0	7.1	1.3	6.9	1	2	1
Standing dead	2.00	66.67		2.00		1		5
Litter	25.33	100.00		25.33		20	24	32
Bare soil	51.00	100.00		51.00		62	50	41
Rock	3.00	100.00		3.00		5	2	2
TOTALS	100.0			100.7		100	100	100
TOTAL VEGETATION COVER	18.7 (s=6.1)		100.0	19.3 (s=7.0)	100.0	12	24(2)	20
GROUND COVER (Litter+Rock+Veg+St. Dead)	49.0			49.7		38	50(2)	59
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 12.3 Std.Dev.= 0.6)						13	12	12

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform

^d All Hit Cover = Absolute percent cover in verticle view accountng for all cover by the species or lifeform, wether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 14: Work Package S3 on Razor Series Soils

PLANT SPECIES	AVERA GE	FREQ UENC Y ^b	RELATIVE VEGETAT ION	AVERAGE	RELATIVE VEGETATIO N	Percent Foliar Cover*			Percent Foliar Cover*			
	COVER _a		COVER ^c	COVER-ALL _d	COVER-ALL _e	Sample Number			Sample Number			
	(%)	(%)	(%)	(%)	(%)	S3-6	S3-7	S3-11	S3-13	S3-14	S3-21	S3-22
NATIVE ANNUAL & BIENNIAL FORBS												
Chamaesyce glyptosperma	0.43	28.57	1.84	0.43	1.82			2	1			
Chamaesyce stictospora	2.29	57.14	9.82	2.29	9.70	1	P			1	14	
Chenopodium leptophyllum	0.00	14.29	0.00	0.00	0.00	P						
Dyssodia aurea	0.57	100.00	2.45	0.57	2.42	1	P	P	2	1	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	3.3	100.0	14.1	3.3	13.9	2	P	2	3	2	14	P
INTRODUCED ANNUAL & BIENNIAL FORBS												
Amaranthus retroflexus	0.71	14.29	3.07	0.71	3.03						5	
Bassia sieversiana	0.14	14.29	0.61	0.14	0.61						1	
Chenopodium album	0.00	14.29	0.00	0.00	0.00						P	
Salsola collina	0.00	28.57	0.00	0.00	0.00		P					P
Ximenesia encelioides	0.00	71.43	0.00	0.00	0.00	P	P	P			P	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.9	71.4	3.7	0.9	3.6	P	P	P	---	---	6	P
NATIVE PERENNIAL FORBS												
Adenolinum lewisii	0.00	14.29	0.00	0.00	0.00							P
Astragalus racemosus	0.14	28.57	0.61	0.14	0.61	P		1				
Glandularia bipinnatifida	0.14	71.43	0.61	0.14	0.61		P	1	P		P	P
Heterotheca foliosa	0.00	14.29	0.00	0.00	0.00						P	
Lygodesmia juncea	0.00	14.29	0.00	0.00	0.00						P	
Oxybaphus linearis	0.00	14.29	0.00	0.00	0.00						P	
Pectis angustifolia	0.00	14.29	0.00	0.00	0.00						P	
Picradeniopsis oppositifolia	0.00	14.29	0.00	0.00	0.00						P	
Solanum elaeagnifolium	0.29	14.29	1.23	0.29	1.21						2	
Sphaeralcea angustifolia	0.00	14.29	0.00	0.00	0.00		P					
Sphaeralcea coccinea	0.00	42.86	0.00	0.00	0.00	P					P	P
Vexibia nuttalliana	0.00	14.29	0.00	0.00	0.00	P						
Vicia angustifolia	0.00	14.29	0.00	0.00	0.00		P					
TOTAL NATIVE PERENNIAL FORBS	0.6	85.7	2.5	0.6	2.4	P	P	2	P	---	2	P
NATIVE PERENNIAL GRASSES (cool)												
Muhlenbergia arenacea	3.00	57.14	12.88	3.14	13.33	5(1)	6	9	1			
Scleropogon brevifolius	0.57	14.29	2.45	0.57	2.42	4						
TOTAL NATIVE PERENNIAL GRASSES (c)	3.6	57.1	15.3	3.7	15.8	9(1)	6	9	1	---	---	---
NATIVE PERENNIAL GRASSES (warm)												
Chondrosium gracile	6.14	100.00	26.38	6.14	26.06	2	2	2	7	14	P	16
Muhlenbergia torreyi	0.00	14.29	0.00	0.00	0.00							P
Pleuraphis jamesii	3.86	100.00	16.56	3.86	16.36	4	7	4	2	4	1	5
Sporobolus airoides	1.14	14.29	4.91	1.14	4.85				8			
TOTAL NATIVE PERENNIAL GRASSES (w)	11.1	100.0	47.9	11.1	47.3	6	9	6	17	18	1	21
NATIVE SHRUBS												
Atriplex canescens	0.57	71.43	2.45	0.57	2.42	2		1		P	1	P
Krascheninnikovia lanata	0.14	28.57	0.61	0.14	0.61		P			1		
TOTAL NATIVE SHRUBS	0.7	85.7	3.1	0.7	3.0	2	P	1	---	1	1	P
SUCCULENTS												
Cylindropuntia imbricata	2.29	100.00	9.82	2.29	9.70	3	7	3	1	1	1	P
Opuntia phaeacantha	0.43	71.43	1.84	0.43	1.82		P	1	1		1	P
Opuntia polyacantha	0.43	42.86	1.84	0.57	2.42	2(1)				1		P
TOTAL SUCCULENTS	3.1	100.0	13.5	3.3	13.9	5(1)	7	4	2	2	2	P
AGAVOIDS												
Yucca glauca	0.00	14.29	0.00	0.00	0.00							P
TOTAL AGAVOIDS	0.0	14.3	0.0	0.0	0.0	---	---	---	---	---	---	P
Standing dead	3.29	57.14		3.29		3				1	2	17
Litter	20.71	100.00		20.71		19	24	29	21	14	23	15
Bare soil	51.71	100.00		51.71		54	54	47	51	62	47	47
Rock	1.00	28.57		1.00					5		2	
TOTALS	100.0			100.3		100	100	100	100	100	100	100
TOTAL VEGETATION COVER	23.3 (s=1.6)		100.0	23.6 (s=1.9)	100.0	24(2)	22	24	23	23	26	21
GROUND COVER (Litter+Rock+Veg+St.Dead)	48.3			48.6		46(2)	46	53	49	38	53	53
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 12.6 Std.Dev.= 3.7)						14	13	11	9	8	19	14

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.
^b Frequency = Percent of the samples in which a species or lifeform occurred
^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform
^d All Hit Cover = Absolute percent cover in verticle view accounthting for all cover by the species or lifeform, wether over-arched by other plants or not
^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 15: Work Package S3 on Stoneham Series Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-ALL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover*		
						Sample Number		
						S3-12	S3-17	S3-18
NATIVE ANNUAL & BIENNIAL FORBS								
Chamaesyce stictospora	1.33	66.67	4.08	1.33	4.08	3	1	
Dyssodia aurea	2.67	100.00	8.16	2.67	8.16	1	5	2
TOTAL NATIVE ANN. & BIEN. FORBS	4.0	100.0	12.2	4.0	12.2	4	6	2
INTRODUCED ANNUAL & BIENNIAL FORBS								
Amaranthus retroflexus	0.00	33.33	0.00	0.00	0.00			P
Salsola australis	0.33	66.67	1.02	0.33	1.02		1	P
Salsola collina	0.33	66.67	1.02	0.33	1.02	P	1	
Ximenesia encelioides	0.00	100.00	0.00	0.00	0.00	P	P	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.7	100.0	2.0	0.7	2.0	P	2	P
NATIVE PERENNIAL FORBS								
Adenolinum lewisii	0.00	33.33	0.00	0.00	0.00	P		
Astragalus racemosus	0.00	33.33	0.00	0.00	0.00	P		
Glandularia bipinnatifida	0.00	66.67	0.00	0.00	0.00	P		P
Machaeranthera pinnatifida	0.00	33.33	0.00	0.00	0.00		P	
Solanum elaeagnifolium	0.00	66.67	0.00	0.00	0.00	P		P
TOTAL NATIVE PERENNIAL FORBS	0.0	100.0	0.0	0.0	0.0	P	P	P
NATIVE PERENNIAL GRASSES (cool)								
Muhlenbergia arenacea	0.67	33.33	2.04	0.67	2.04			2
TOTAL NATIVE PERENNIAL GRASSES (c)	0.7	33.3	2.0	0.7	2.0	---	---	2
NATIVE PERENNIAL GRASSES (warm)								
Aristida purpurea	0.00	33.33	0.00	0.00	0.00			P
Chondrosium gracile	23.33	100.00	71.43	23.33	71.43	25	17	28
Muhlenbergia torreyi	0.33	33.33	1.02	0.33	1.02	1		
Pleuraphis jamesii	1.67	66.67	5.10	1.67	5.10	2		3
Sporobolus cryptandrus	1.00	33.33	3.06	1.00	3.06			3
TOTAL NATIVE PERENNIAL GRASSES (w)	26.3	100.0	80.6	26.3	80.6	28	17	34
NATIVE SHRUBS								
Atriplex canescens	0.33	33.33	1.02	0.33	1.02			1
Krascheninnikovia lanata	0.00	100.00	0.00	0.00	0.00	P	P	P
TOTAL NATIVE SHRUBS	0.3	100.0	1.0	0.3	1.0	P	P	1
SUCCULENTS								
Cylindropuntia imbricata	0.33	66.67	1.02	0.33	1.02	1		P
Opuntia phaeacantha	0.33	33.33	1.02	0.33	1.02			1
Opuntia polyacantha	0.00	33.33	0.00	0.00	0.00	P		
TOTAL SUCCULENTS	0.7	66.7	2.0	0.7	2.0	1	---	1
Standing dead	2.67	66.67		2.67			2	6
Litter	10.00	100.00		10.00		10	9	11
Bare soil	54.33	100.00		54.33		56	64	43
Rock	0.33	33.33		0.33		1		
TOTALS	100.0			100.0		100	100	100
TOTAL VEGETATION COVER	32.7 (s=7.5)		100.0	32.7 (s=7.5)	100.0	33	25	40
GROUND COVER (Litter+Rock+Veg+St.Dead)	45.7			45.7		44	36	57
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 12.3 Std.Dev.= 3.8)						14	8	15

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform

^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform

Table 16: Work Package S3 on Ustic Torrifuvent Soils

PLANT SPECIES	AVERAGE COVER ^a (%)	FREQUENCY ^b (%)	RELATIVE VEGETATION COVER ^c (%)	AVERAGE COVER-ALL ^d (%)	RELATIVE VEGETATION COVER-ALL ^e (%)	Percent Foliar Cover* Sample Number S3-19
NATIVE ANNUAL & BIENNIAL FORBS						
Dyssodia aurea	0.00	100.00	0.00	0.00	0.00	P
Nuttallia decapetala	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
INTRODUCED ANNUAL & BIENNIAL FORBS						
Salsola collina	0.00	100.00	0.00	0.00	0.00	P
TOTAL INTRO. ANN. & BIEN. FORBS	0.0	100.0	0.0	0.0	0.0	P
NATIVE PERENNIAL FORBS						
Ambrosia confertiflora	16.00	100.00	25.00	17.00	25.37	16(1)
Asclepias speciosa	0.00	100.00	0.00	0.00	0.00	P
Astragalus gracilis	1.00	100.00	1.56	1.00	1.49	1
Oligosporus dracunculus ssp. glaucus	4.00	100.00	6.25	4.00	5.97	4
Psoralidium tenuiflorum	0.00	100.00	0.00	0.00	0.00	P
Sphaeralcea coccinea	0.00	100.00	0.00	1.00	1.49	(1)
TOTAL NATIVE PERENNIAL FORBS	21.0	100.0	32.8	23.0	34.3	21(2)
INTRODUCED PERENNIAL FORBS						
Convolvulus arvensis	7.00	100.00	10.94	7.00	10.45	7
TOTAL INTRO. PERENNIAL FORBS	7.0	100.0	10.9	7.0	10.4	7
NATIVE PERENNIAL GRASSES (cool)						
Pascopyrum smithii	22.00	100.00	34.38	22.00	32.84	22
TOTAL NATIVE PERENNIAL GRASSES (c)	22.0	100.0	34.4	22.0	32.8	22
NATIVE PERENNIAL GRASSES (warm)						
Chondrosum gracile	11.00	100.00	17.19	12.00	17.91	11(1)
Sporobolus cryptandrus	1.00	100.00	1.56	1.00	1.49	1
TOTAL NATIVE PERENNIAL GRASSES (w)	12.0	100.0	18.8	13.0	19.4	12(1)
NATIVE SHRUBS						
Atriplex canescens	2.00	100.00	3.13	2.00	2.99	2
Chrysothamnus nauseosus ssp graveolans	0.00	100.00	0.00	0.00	0.00	P
TOTAL NATIVE SHRUBS	2.0	100.0	3.1	2.0	3.0	2
Standing dead	3.00	100.00		3.00		3
Litter	12.00	100.00		12.00		12
Bare soil	21.00	100.00		21.00		21
TOTALS	100.0			103.0		100
TOTAL VEGETATION COVER	64.0					
GROUND COVER (Litter+Rock+Veg+St.Dead)	(s=0.0)		100.0	67.0 (s=0.0)	100.0	64(3)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 15.0 Std.Dev.= 0.0)						15

^a First Hit Cover = Absolute percent cover in vertical view with no account of plants obscured by first (i.e. top) hit.

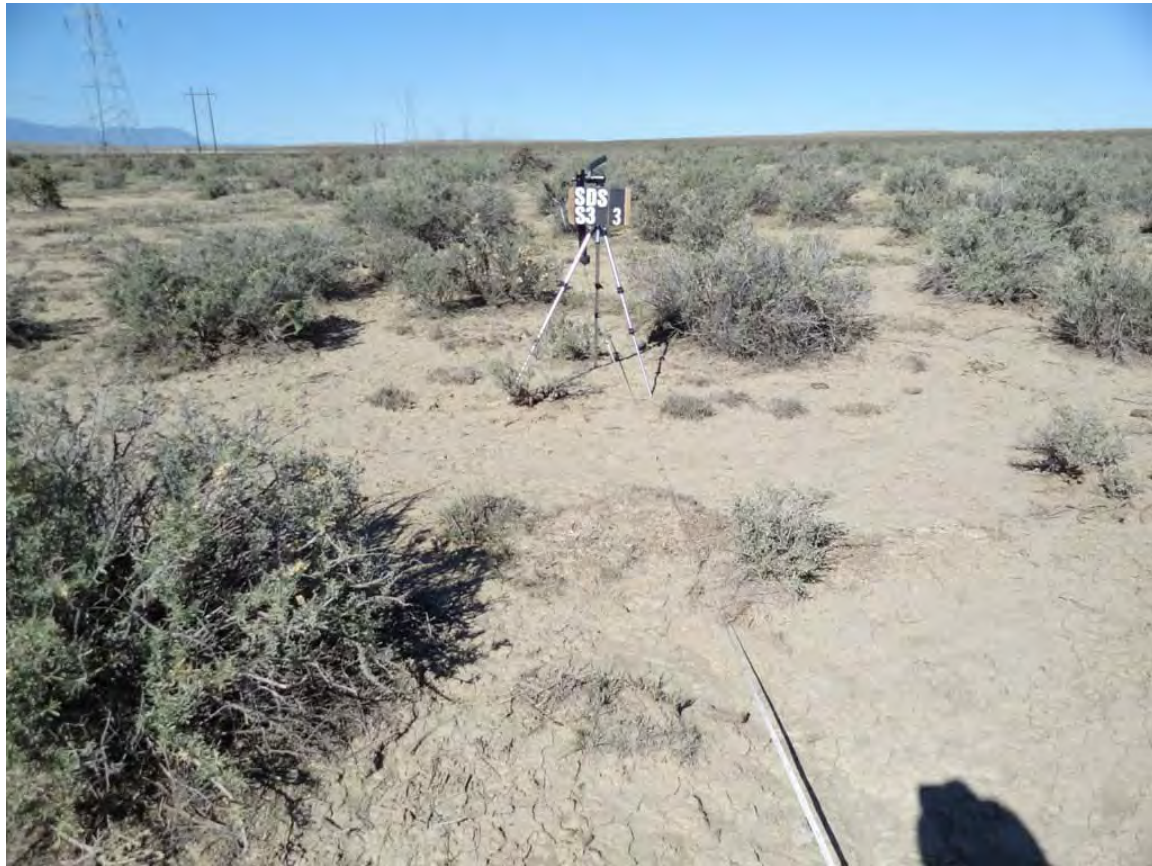
^b Frequency = Percent of the samples in which a species or lifeform occurred

^c First Hit Relative Cover = Percent of the First Hit vegetation cover comprised of theis species or lifeform

^d All Hit Cover = Absolute percent cover in verticle view accounhting for all cover by the species or lifeform, wether over-arched by other plants or not

^e All Hit Relative Cover = Percent of the All Hit vegetation cover comprised of theis species or lifeform





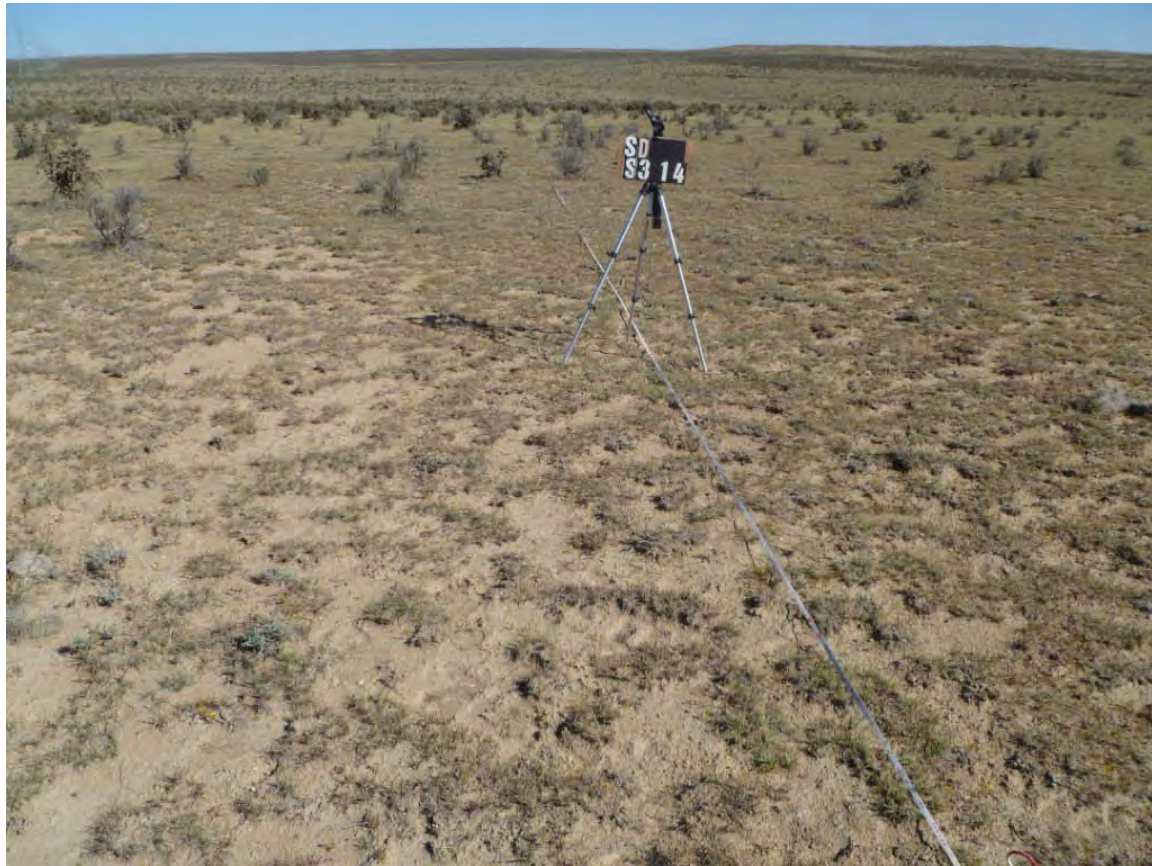


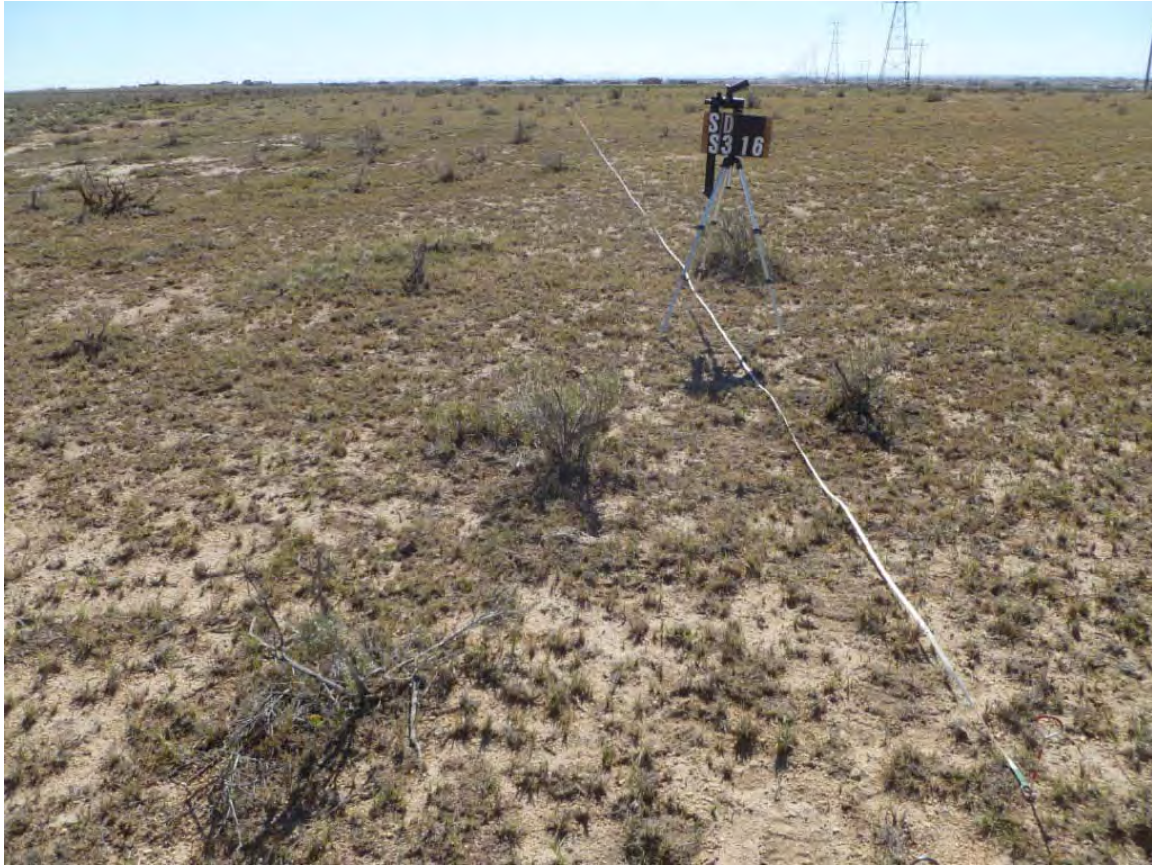












Appendix D: Established Vegetation Sampling Protocol

Protocol for Establishing Pre-Existing Vegetation Conditions Southern Delivery System El Paso and Pueblo Counties, Colorado

For the purpose of establishing baseline levels of plant cover in areas to be affected by the Southern Delivery System Project and subsequently re-vegetated, the following protocol is described.

Within an area to be disturbed, vegetation will be quantitatively sampled as described below to establish:

- 1) The percent cover by species as well as total vegetation cover and
- 2) Determine species richness

These data will provide a basis for assessment of the percent of vegetation cover returned in post-revegetation evaluations.

Vegetation Unit Identification

As vegetation varies along the length of the proposed area of disturbance, variations in plant community at the “Alliance” level will be mapped (as per National Vegetation Classification system of the Nature Conservancy). Should such significant soil variation as might substantially affect plant cover growth potential be encountered within a single Alliance in a particular reach, these will be subdivided and the number of sample measurements adjusted accordingly.

This mapping addresses both the need to document natural variation in the pre-existing vegetation and the need to set plant cover standard levels consistent with the varying potentials of varying environments.

Sample Location

Samples will be placed in locations representative of the general vegetation type and its condition. Areas of high disturbance and abundant presence of weeds will be avoided.

Cover Sampling Methods

A minimum of three (3) samples will be collected from a segment (work package) with the total number being determined based on actual soil and vegetation variations observed in the field. At each sample site, cover data will be collected using a point-intercept method in which data are tabulated as interceptions of a projected point with plant species, bare ground, litter, standing dead, or rock. The cover sampling points will be optically projected using a Cover-Point Optical Point Projection Device. Sampling will occur along 50 m transects. At each meter from one to fifty along the transect, a point will be vertically projected from a location 50 cm to the left of the transect and a point will be vertically projected from a location 50 cm to the right of the transect (avoiding trampled vegetation along the tape itself). Thus, data from a total of 2 x 50, or 100 points will be recorded. Plant interceptions will be tallied by species upon interception of the projected point with any attached plant part produced during the current growing season. “First

hit" data (the first interception of any of the materials listed below) will be recorded. In addition to this, "additional hit" data (any additional live species intercepted between the first hit and the ground) will also be collected.

- Litter will be considered to be any organic material that had fallen, or had begun to fall to the soil surface.
- Standing dead will be any dead plant material that was produced in previous years but which was still standing and had not lodged or broken off to become litter.
- Rock will be considered to be any inorganic fragment with a diameter greater than or equal to 1 cm.
- Bare soil will be considered to be inorganic fragments with a diameter less than 1 cm or organic debris too small to be of readily identifiable origin.

First hit interceptions will be used to calculate absolute top layer (first hit) foliar cover by dividing the number of interceptions for a particular species or material by the total number of points taken (100). First hit relative vegetation cover will be calculated by dividing first hit absolute cover for each species by the total first hit vegetation cover. All-layer absolute cover will be calculated by dividing all hits for particular species by the total number of points taken (100). In addition, all-layer relative cover will be calculated using all hits for particular species divided by the total vegetation hits accumulated during sampling of the transect.

Species Density/ Diversity Methods

All plant species occurring within one meter to either side of the 50m transect will be recorded. This will provide a full indication of plant species richness in the sampled area and account for the species with small abundance that may not have been encountered in the point sampling.

Photographic Documentation Methods

Each sample site will be documented with a photograph including a placard indicating the construction reach, vegetation type, and sample number. GPS coordinates of sample locations will be recorded for use in map documentation.



TECHNICAL TAB 3 –

- **Pueblo County Revegetation Cover Establishment Protocol for the Southern Delivery System Pipeline Project (CNHP Technical Memorandum - January 30, 2014)**



Colorado Natural Heritage Program

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Memo

To: Mark Pifher, Southern Delivery System (SDS) Program

From: Joe Stevens and Renee Rondeau, Colorado Natural Heritage Program
David Buckner, ESCO Associates, Inc. (subcontractor to CNHP)

CC: Allison Mosser, Colorado Springs Utilities, SDS Program,
Alec Hart, MWH Americas, Inc.,
Ed Redente, Redente Ecological Consultants

Date: January 30, 2014

Re: Pueblo County Revegetation Cover Establishment Protocol for the Southern Delivery System Pipeline Project

Purpose

This memo describes the protocol to be used to assess and document revegetation success on the Southern Delivery System (SDS) pipeline alignment in Pueblo County. These protocols will serve as the basis for determining that revegetation meets the requirements of the stormwater permit issued by the Colorado Department of Public Health and Environment (CDPHE) and the 1041 permit issued by Pueblo County. Those permits require that revegetation of the disturbed areas contains at least 70 percent and 90 percent, respectively, of the cover existing on the site prior to construction, together with similar species diversity.

The protocol uses a point-intercept method with a stratified random sampling design to assess percent ground cover and species richness. The post-revegetation sampling will be stratified by work package and functional soil type, and will include ten (10) samples in work package/soil unit areas up to one mile in length, and fifteen (15) samples in areas greater than one mile in length. In areas with very limited total extent of a soil group (0.1 mile or less), best professional judgment will be used and three (3) to five (5) samples will be placed. Compiled data will be compared to the applicable standard (90 percent of pre-existing vegetation cover) using a one sample t-test to evaluate confidence level of the determination of revegetation success.

The memo includes a discussion of the underlying permit language, describes the management and sampling objectives of the protocol, explains the likely progression of vegetation development, describes how progress and sustainable growth will be evaluated over the two year revegetation period, and describes the methods for determining final revegetation success. In support of the protocol, three Technical Memos are attached describing the procedure for point-intercept cover and seedling density sampling (Technical Memo 1), the pre-disturbance sampling methods (Technical Memo 2), and the post revegetation sampling methods and statistical evaluation (Technical Memo 3).

During the first growing season following seeding, seedling density data will be collected. At the end of the first growing season (typically September) cover data will be collected for the purpose of assessing compliance with the CDPHE Stormwater Permit criterion of 70 percent of pre-existing cover. If in the judgment of the SDS Program, the extent of vegetation cover at that time might also satisfy the Pueblo County 90 percent of pre-existing cover criterion, the full sampling design described below will be implemented.

Introduction

The Southern Delivery System Program has conducted pre-disturbance vegetation surveys to document the density and type of vegetation that existed on the pipeline work packages (S1, S2 and S3) prior to construction-related work activities starting. These evaluations were completed by the Colorado Natural Heritage Program (CNHP), a research unit within the Warner College of Natural Resources at Colorado State University. The data were acquired for the purpose of establishing performance standards for post-construction revegetation.

CNHP used a point-intercept method developed by ESCO Associates for establishing percent vegetation cover by species and determining species richness. Pre-disturbance vegetation sampling was conducted by soil type within the SDS work packages. A copy of the methodology used is attached to this memo as Technical Memo 1. CNHP will use this same point-intercept protocol for evaluating reclamation progress and final reclamation success determination. Post-revegetation sampling will occur at randomly located and oriented transects to establish an estimate of the mean cover of plant species by soil types within work packages. CNHP has determined that sample size of ten (10) transects in each soil unit cumulatively less than one mile in length, or fifteen (15) transects in each soil unit cumulatively longer than one mile in length is sufficient to estimate the mean and variance to confidently determine post-restoration revegetation success in accordance with Pueblo County 1041 Permit number 2008-002. In areas with very limited total extent of a soil group (0.1 mile or less), best professional judgment will be used and three (3) to five (5) samples will be placed. The following describe in more detail the level of effort for both progress and final cover evaluations. A detailed description of the Pre-Construction vegetation survey and the establishment of Cover Performance Standards from those data are attached in Technical Memo 2.

Background

SDS Permit Language

In addition to the Bureau of Reclamation's 2009 Record of Decision (GP-2009-01), regulations requiring reclamation of disturbed lands by the SDS Project include the CDPHE Construction General Stormwater Permit (COR 030000) and Pueblo County Resolution P&D 09-22 approving 1041 Permit 2008-002.

The CDPHE General Stormwater Permit associated with construction activities stipulates, *"Final stabilization is reached when all ground surface disturbing activities at the site have been completed, and uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels..."*

Under the Pueblo County 1041 permit, SDS is required to conduct a pre-construction evaluation of existing vegetation to be disturbed during construction of the SDS project within Pueblo County and upon reclamation of the site, vegetative cover is required to be, *"... of the same seasonal variety native to the area of the disturbed land, or species that support the post-construction land use ..."*

The revegetated area will be considered acceptable if its cover is not less than 90 percent of the pre-construction vegetation cover with similar species diversity. SDS will achieve this objective by utilizing a seed mixture that reflects pre-construction species diversity and which, as more fully explained below, is anticipated to result in a re-establishment of the required percent vegetative cover which will, in turn, through time experience a natural succession in species dominance until the original conditions are duplicated.

Management Objectives and Sampling / Monitoring Objectives

The management objective of the revegetation effort in Pueblo County is to ensure that by the earliest opportunity the average cover of native and non-noxious opportunistic plant species occurring on each soil type within each work package is at least 90 percent of the vegetation cover that existed on those same soils prior to disturbance for construction.

The sampling objective is to quantitatively document whether revegetation has achieved the requirements of the permit standard of 90 percent of pre-disturbance vegetation cover. The monitoring objective is to quantitatively assess and document progress toward the management objective.

Likely Progression of Vegetation Development

The reality of revegetation in the arid west is that the period following seeding until treated areas are fully re-established with the same species mix, as compared to undisturbed areas, is generally longer than two years. Usually, a minimum of five years will pass before the main perennial plants comprise the bulk of cover and the prevalence of early successional species that initially colonized the disturbance area diminish. At the end of two years, even with irrigation, it is likely that species other than the target

shortgrass species will dominate the seeded community. As an example, slender wheatgrass (*Elymus trachycaulus*) was included in the seed mixture to perform the function of occupying space and pre-empting weeds while blue grama (*Bouteloua gracilis*), galleta (*Pleuraphis jamesii*), and other perennials slowly establish and begin to dominate. Slender wheatgrass is short-lived and will disappear from the community after three to four years, allowing the cover of the long-term desired warm season grasses to achieve dominance. This natural maturation of the ecosystem will allow for the re-planted areas to achieve the same seasonal variety with similar species diversity as required by Pueblo County.

In addition to the seeded species, it can be expected that opportunistic early-seral species will have colonized the area naturally and will establish at varying densities. The seeds of most of these species were in the soil prior to disturbance and were suppressed by perennial competition. Irrigation will enhance the seeded species, but it will also allow development of these naturally present opportunists. Most of these opportunistic plants are native species and do not represent the potential for long-term weed problems. Noxious weed species listed by the State or County, if identified on the work package alignment, will be controlled as detailed in each work packages' contract documents and specifications and in accordance with Colorado Department of Agriculture noxious weed management regulations. Typically, the non-noxious opportunistic species will not damage the growth of the long-term native species and will not be treated. It is inevitable that they will be present and visually conspicuous for two or more years as the perennial species expand their presence. As native perennial species increase, the opportunistic species will be suppressed by competition and will decline to insignificant levels. In recognition of the natural processes described here and their inherent rates of progress, all non-noxious perennial and native annual/biennial species will be included along with non-native annual/biennial species to the extent of their original presence in the assessment of cover during quantitative evaluations of revegetation success.

Protocol

Progress Evaluations

To ensure revegetation is progressing as planned and to communicate the status to the SDS Program, regular progress meetings will be held with the revegetation contractor(s) and periodic site inspections will be coordinated with Pueblo County, U.S. Bureau of Reclamation and other stakeholder representatives. The frequency of progress evaluations will be every other month (bi-monthly) during the growing season (April through September) and quarterly in the non-growing season (October through March). Quantitative sampling of the vegetation will be conducted during the first and second growing season to determine the progress of revegetation.

Quantitative sampling and evaluations (Seedling Density and Cover evaluations) for the SDS project pipeline work packages (S2 and S3) are expected to be undertaken as per the following schedule:

- July 2013 - Seedling Density assessment,

- September 2013 - Seedling density assessment and cover evaluation for CDPHE stormwater permit evaluation for determination of 70 percent of pre-existing cover,
- At the discretion of SDS, evaluation for assessment of 90 percent of pre-existing cover will also be completed during the September 2013 assessment,
- August/September 2014 - Evaluation for assessment of 90 percent of pre-existing cover if not achieved in 2013 and/or to demonstrate 90 percent cover is being maintained.

Quantitative sampling and evaluations for the SDS project S1 pipeline work package will have the same milestones on a schedule anticipated to be one year following those shown for the S2 and S3 work packages which were planted earlier. All evaluations (both seeding density and cover assessment) are somewhat dependent on soil and air temperature and occurrence of natural precipitation which drives the timing of each growing season.

Qualitative evaluations, using photo documentation, will be completed in conjunction with quantitative sampling events described above. Qualitative sampling will occur at the same locations of the randomly selected sampling points. GPS coordinates will be used to relocate photo points each year. The photos will serve to provide visual indication of the progress of plant community development.

For seedling density evaluation, CNHP will use a 0.5 square meter plot frame to assess and report seedling density (see Technical Memo 1, Seedling Density Sampling). For the separate cover evaluations, CNHP will use the same point-intercept protocol as the pre-disturbance survey (see Technical Memo 1, Cover Sampling Methods). A summary memorandum will be prepared with photographs to document the site conditions, findings, and percent cover established after each evaluation. For progress evaluations during the first growing season, three (3) transects from each soil type identified in the pre-disturbance report will be conducted within each work package. If in the judgment of the SDS Program, the extent of vegetation cover at that time might also satisfy the 90 percent of pre-existing cover criterion, the full sampling design described below will be implemented.

Milestones of specific interest for all Pueblo County pipeline work packages include:

- Initial application of irrigation water
- Successful germination and seedling stand establishment
- Revegetation reaches 70 percent of pre-existing cover
- Revegetation reaches 90 percent of pre-existing cover

As mentioned above, dates will vary by work package and irrigation schedule with the start of irrigation being driven by soil and air temperature. SDS staff will coordinate with Pueblo County representatives during assessment of achievement of 70 percent pre-existing cover. Under the CDPHE construction

stormwater permit program, the revegetation contractor(s) can be released from their construction stormwater permit once this percent of pre-existing cover has been reached.

Sustainable Growth

The seedling density data from the first growing season will be used as evidence of sustainable growth of the established community, as will cover and species diversity data from the second growing season. Pursuant to third party (CNHP) recommendations and contract specifications, the target to ensure sustainable growth will be the presence of an average of at least four seedlings per square foot of planted or otherwise desirable perennial species. At this density, the likelihood of continued development toward a mature shortgrass prairie vegetation cover is high. The progression of that target to a mature prairie grassland assumes management by landowners is not deleterious to long-term health of the plant community. The early presence of an adequate number of plants per square foot is the best available basis for predicting sustainability.

Final Cover Evaluations

To document re-establishment of cover across each work package, trained ecologists will randomly locate sample points within separate soil types utilizing the random point generating tool in the ESRI ArcMap GIS software application. CNHP will use the same point-intercept sampling protocol as the pre-disturbance surveys and will prepare a summary memorandum with photographs, tables, and calculations to document site conditions and findings concerning percent vegetation cover established.

To make this determination, CNHP will complete a minimum of 10 sample transects in work package/soil units that cumulatively comprise a small area (a length of one mile or less), and fifteen (15) transects in each soil unit that cumulatively comprise a larger area (greater than one mile in length). The completion of sampling in each work package/soil type identified during the pre-disturbance surveys will provide Pueblo County adequate data to determine whether the 90 percent of pre-existing cover standard has been met. Pueblo County, U.S. Bureau of Reclamation and other stakeholder representatives will be invited to participate in these evaluations and Pueblo County provided the opportunity to review and accept the report(s) and will eventually be required to certify compliance with the terms and conditions of the 1041 Permit. Details of the post-construction evaluation procedure are provided in Technical Memo 3.

Following receipt and acceptance of the Final Cover Evaluations document, Pueblo County representatives will provide SDS with a letter concurring with SDS's written request to close out 1041 Construction Conditions. A separate request will be submitted for each specific pipeline work package segment (S1, S2 or S3).

Species Diversity

Species diversity will be determined from simple counts of species present by plant-life form as obtained from the sampling data.

Technical Memo 1

Sampling Procedure for Point Intercept Cover and Seedling Density Data Collection

The following procedure establishes baseline levels of plant cover in areas affected by the Southern Delivery System Project and will be used to determine seedling density following revegetation.

Within an area that was disturbed, vegetation will be quantitatively sampled as described below to establish:

- 1) The percent cover by species as well as total vegetation cover and
- 2) Species richness

These data will provide a basis for assessment of the percent of vegetation cover re-established in post-revegetation evaluations.

Vegetation Unit Identification

As vegetation varies along the length of the proposed area of disturbance, variations in plant community at the “alliance” level of the US National Vegetation Classification system (FGDC 2008) will be documented. Association and alliance level classification is based on the premise that a vegetation type represents a group of stands that have similar plant composition and physiognomy enabling their recognition. Should such significant soil variation as might substantially affect plant cover growth potential be encountered within a single alliance in a particular reach, these will be subdivided and the number of sample measurements adjusted accordingly.

This mapping methodology addresses both the need to document natural variation in the pre-existing vegetation and the need to set plant cover standard levels consistent with the varying potentials of varying environments.

Sample Location

Samples will be placed in locations representative of the general vegetation type and condition.

Cover Sampling Methods

At each sample site, cover data will be collected using a point-intercept method in which data are tabulated as interceptions of a projected point with plant species, bare ground, litter, standing dead vegetation, or rock. The cover sampling points will be optically projected using a Cover-Point Optical Point Projection Device. Sampling will occur along 50 meter transects. At each meter from one to fifty along the transect, a point will be vertically projected from a location 50 centimeters (cm) to the left of the transect and a point will be vertically projected from a location 50 cm to the right of the transect (avoiding harm to vegetation along the tape itself). Thus, data from a total of 2 x 50, or 100 points will be recorded. Plant interceptions will be tallied by species upon interception of the projected point with any attached plant part produced during the current growing season. “First hit” data (the first interception of any of the

materials listed below) will be recorded. In addition to this, "additional hit" data (any additional live species intercepted between the first hit and the ground) will also be collected.

- Litter will be considered to be any organic material that had fallen, or had begun to fall to the soil surface.
- Standing dead vegetation will be any dead plant material that was produced in previous years but which was still standing and had not lodged or broken off to become litter.
- Rock will be considered to be any inorganic fragment with the largest diameter greater than or equal to 1 cm.
- Bare soil will be considered to be inorganic fragments with a diameter less than 1 cm largest diameter or organic debris too small to be of readily identifiable origin.

First hit interceptions will be used to calculate absolute top layer (first hit) foliar cover by dividing the number of interceptions for a particular species or material by the total number of points taken (100). First hit relative vegetation cover will be calculated by dividing first hit absolute cover for each species by the total first hit vegetation cover. All-layer absolute cover will be calculated by dividing all hits for particular species by the total number of points taken (100). In addition, all-layer relative cover will be calculated using all hits for particular species divided by the total vegetation hits accumulated during sampling of the transect.

Seedling Density Sampling (Post-Revegetation Analyses)

Seedlings of seeded or perennial plant species will be counted within randomly placed 0.5 square meters (5.37 square feet) circular plots. The results will be averaged and divided by 5.37 to obtain number of seedlings per square foot.

References

FGDC. 2008. Vegetation Classification Standard, Version 2. Federal Geographic Data Committee, Vegetation Subcommittee. FGDC Secretariat, U.S. Geological Survey. Reston, VA.
FGDC-STD-005-2008 (Version 2). 62p. plus Appendices.

Technical Memo 2

Pre-construction Survey

This Technical Memo describes the general conditions and methodology CNHP used to sample and assess pre-construction vegetation cover and describes the results.

Measurements of Pre-existing Vegetation Cover in Pueblo County

As per a pre-established Protocol (attached Technical Memo 1) pre-existing vegetation cover was measured along the planned alignment of the SDS raw water pipeline in Pueblo County, Colorado. Quantitative sampling was conducted at intervals along the alignment to document percent cover by live plants. All observations took place between October 5, 2011 and October 21, 2011. Locations of quantitative samples are indicated on Maps S1-1 and 2, S2-1 through 4 and S3-1 through 4 (see attached).

The study area is in the valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

2010-2011 Drought

The study area receives on average about 12.5 inches of precipitation per year. During the 12 months prior to the observations reported here, precipitation in the subject area was less than 50 percent of the long term average (Western Regional Climate Center 2012).

Other Environmental Effects on Vegetation

There are two particularly important variables that locally affect the magnitude of live vegetation cover. These are soils and the presence of prairie dogs. The soil/geologic conditions with the least potential production of vegetation are likely those that are shallow (less than one foot) over limestone and shale bedrock in the south portion of the Pueblo County portion of the SDS pipeline (i.e. S1 and the southern portion of S2). Soils possessed of these characteristics include the Penrose, Manvel and Minnequa series. Soils of recent very fine grained and salt-rich alluvia along active drainages are of the Limon and Heldt series. Heavy clay texture, high salt content and frequent overbank flood disturbance are factors that affect vegetation growth on these soils. Haverson soils also developed on comparatively recent alluvium but are of more moderate texture and are much less salt-affected.

In the central and northern portions of S3, soils developed from shale are prevalent. On some areas (Midway- Shale complex), erosional removal of weathered material is sufficiently active that soils are shallow and poorly developed. On some other areas deeply weathered shale has remained in place and moderately deep soils with clay-rich texture and gypsum accumulations in the subsoil prevail (Razor series). In the far north portion of S3 are limited areas of early Pleistocene age alluvium with deep well-developed soils of moderate texture in the Stoneham series. These soils support the most well-developed vegetation growth of any upland areas included along the SDS in Pueblo County.

Recent history of grazing use of these areas can substantially limit the extent of vegetation cover in addition to drought and soil limitations. Especially in the S1 portion of the SDS alignment, very heavy grazing by prairie dogs (*Cynomys ludovicianus*) has strongly limited, and to a large degree destroyed, herbaceous perennial vegetation cover. In combination with soil limitations and drought the percent of the ground covered by perennial herbaceous vegetation in these areas is in the low single digits and much of what exists is fourwing saltbush (*Atriplex canescens*) that prairie dogs avoid. Historical season-long grazing of vegetation by livestock in the S3 portion of the route has also strongly limited the extent of vegetation cover.

Observance during pre-disturbance evaluations identified some sampled areas in Soil Groups A and B below that had experienced prior land use which degraded, and in some areas eliminated, vegetation cover. In these areas, what remained was deemed un-representative of healthy vegetation and cover and values from these areas were not included when CNHP developed the quantitative pre-existing percent cover base levels reported in 2011. Therefore, base values are biased high, representing healthy cover in those areas where over-grazing or previous land development/disturbance was observed.

Base Values for Evaluation of Revegetation Success

The following are suggested base vegetation cover values (to be multiplied by 0.9 in accordance with 1041 permit requirements for 90 percent revegetation). They are to apply to the listed soils wherever they occur (in S1, S2 and S3). For work on the Federal land associated with connection of the SDS project to the Pueblo Dam North Outlet Works (PDC1A and PDC1B), Juniper Pump Station (JPS) and the portion of S1 on Federal land, the base cover values will also be multiplied by 0.9 in accordance with governing documents and bonds for this work.

The various soils of the Pueblo County portion of the SDS pipeline have been grouped by functional similarity into the following Soil Groups. These Groups are judged to be similar in their revegetation potential. The distribution of these units is indicated on Maps S1-1 and -2, S2-1, -2, and -3, and S3-1, -2, -3, and -4. All tables referenced are in the 2011 pre-disturbance survey report.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Tables 4, 7, and Samples 5, 7 and 8 of Table 8): **17.2 percent**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Tables 1, 5, and 11): **26.5 percent**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Tables 10 and 15): **35.0 percent**

D. Soils on Weathered Shale (with active erosional removal) (Midway – Shale complex; Shingle series; Tables 9 and 13): **17.0 percent**

E. Soils on Deeply Weathered Shale (without active erosional removal) (Razor series; Table 14): **23.3 percent**

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 6 and 16): **41.3 percent**

LITERATURE CITED

Western Regional Climate Center. 2012. <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?co6765>

Pre Construction Cover Survey Maps for Work Packages S1, S2, and S3

The attached maps depict the locations of the preconstruction cover survey transects completed on work segments S1, S2, and S3. The maps are oriented with north at the top and are organized from south to north, starting at the connection point of S1 with Pueblo Dam and ending at the northern end of S3 at the El Paso County line. Each map depicts the location of the survey transects and the various functional soil groups within the pipeline alignment overlain on aerial photography of the surrounding landscape.

Technical Memo 3

Post-Revegetation Sampling

This Technical Memo describes the design and methodology CNHP will use to sample and quantitatively assess post-disturbance revegetation success. For the practicality of achieving an unbiased evaluation, the approach is based on random sampling and the use of resulting means to compare results to previously established performance standards. By the nature of plant growth in response to varying conditions along the length of the revegetated area, and by the nature of random sampling, variability in levels of plant abundance are to be expected both on the ground and in sample results. The use of 50 meter-long transects tends to encompass variability though a certain amount of variability can be expected at scales larger than this.

Creditable Vegetation Cover

Cover provided by plants included in the Colorado A-, B-, or C-list of noxious plant species, if any, will not be acceptable in the evaluation of cover. Cover by all other plants will be acceptable in assessment of adequate revegetation cover, except as follows: cover by non-native annual / biennial plants in excess of the relative cover by those plants in the pre-construction sample data will not be counted toward establishment of proof of successful revegetation (see below).

Maximum allowable relative cover by Introduced Annual and Biennial Species:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Tables 4, 7, and Samples 5, 7 and 8 of Table 8): **22.2 percent**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Tables 1, 5, and 11): **2.6 percent**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Tables 10 and 15): **3.9 percent**

D. Soils on Weathered Shale (with active erosional removal) (Midway – Shale complex; Shingle series; Tables 9 and 13): **1.3 percent**

E. Soils on Deeply Weathered Shale (without active erosional removal) (Razor series; Table 14): **3.6 percent**

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 6 and 16): **16.7 percent**

Sampling Design

Cover Sampling Method

Sampling to assess compliance with the standard of 90 percent of pre-existing cover will proceed separately within each work package (S1, S2 and S3) and separately within each soil functional group as identified during the pre-construction vegetation survey (see Technical Memo 2). All sample locations will be randomly located by delineating the soil functional groups in each work package in ESRI ArcMap GIS application and using the random point generation tool to place the correct number of random points in that area.

For sample units with a total (cumulative) length of one mile or less, ten (10) segments of equal length will be established and a randomly located and oriented sample placed in each. For units greater than one mile in cumulative length, fifteen (15) segments of equal length will be identified and a sample randomly located within each. Sample points will be located in the field using hand-held GPS units with coordinates of the random points pre-loaded.

In areas with total Soil Group length less than 0.1 mile, three (3) to five (5) samples will be made. Professional judgment will be used in these small sample areas (e.g. Soil Groups B and F in S3) to determine the location and number of samples collected.

Orientation of the 50-meter transect will be randomly selected by using a random number ranging from 1 to 360 as an azimuth. Sampling transects will not extend outside the Permanent Easement (PE), Temporary Construction Easement (TCE) or work limits areas. Should a boundary be encountered, a new orientation that remains within these limits will be chosen in the same manner. Ineligible sites (see below) will be excluded from sampling.

Sampling to assess compliance with the CDPHE criterion of 70 percent of pre-existing cover will proceed within separate work packages and soil reaches. If the 70 percent cover standard alone is being assessed, the sample intensity will be five (5) samples in reaches of one mile or less in cumulative length and eight (8) samples in those greater than one mile in cumulative length. Professional judgment will be used in small sample areas (e.g. Soil Groups B and F in S3) to determine the location and number of samples collected.

Informational Cover Composition Sampling Method

Data on species composition will be collected for informational purposes outside the scope of the 1041 permit requirements. Ten (10) 1 x1 meter plots will be placed at 5-meter intervals along the right side of the cover sampling transect (as viewed from the origin) beginning at the 5-meter mark. Within each of the resulting ten plots the presence of desirable species will be noted by species. For this purpose, desirable species will mean any seeded species plus any other native annual, biennial, or perennial species plus any non-native perennial species. Native will mean species noted as native in and occurring in the Southeast ¼ of Colorado in Biota of North America Project distribution mapping. The resulting frequency data will be tabulated by species. For example, if Species A is noted as present in 7 of the 10 plots it will have a frequency value of 70 percent.

Frequency values from all transects within a given soil group will then be averaged. For these evaluations, average frequency values by species will be used as follows: The average frequencies of all acceptable species will be summed. A sum for all desirable species present that equals or exceeds 200 percent will be deemed adequate evidence of successful establishment of acceptable species. This supplemental criterion addresses the reality that vegetation at the time of evaluation will still be juvenile. Many planted or otherwise desirable species grow slowly and though they may be only a small percentage of the total plant cover at the time of measurement, will eventually become more abundant. This frequency evaluation allows documentation of the presence of the desirable species sought in the long term vegetation cover.

Seedling Density

Seedlings of seeded or perennial plant species will be counted within randomly placed 0.5 square meter (5.37 square foot) circular plots. The results will be averaged and divided by 5.37 to obtain number of seedlings per square foot.

Plots will be thirty per Work Package/Soil Group area. All sample points will be randomly located via GIS-generated coordinates.

Sites Ineligible for Sampling

Areas within the revegetation zone in which the vegetation cover has been negatively affected by land management of private owners after SDS construction or for which a waiver has been executed/granted will be excluded from the sample universe (i.e., no samples will be placed in these areas). Within the disturbed alignment no sampling will occur on access roads, trails, above-ground SDS infrastructure, other above-ground public or private infrastructure, waterways, or other areas where sampling is determined not to be practical, safe or meaningful. Such areas will be manually delineated in the GIS and excluded from the eligible sampling area when creating the random point coverage.

Sampling Schedule

During the first growing season following seeding, seedling density data will be collected. At the end of the first growing season (typically September) cover data will be collected for the purpose of assessing compliance with the CDPHE Stormwater Permit criterion of 70 percent of pre-existing cover. If in the judgment of the SDS Program, the extent of vegetation cover at that time might also satisfy the 90 percent of pre-existing cover criterion, the full sampling design described above will be implemented. If only the CDPHE criterion is being tested, sample intensity within a work package will be five samples in soil reaches one mile or less in cumulative length and eight in those greater than one mile in cumulative length. During the second growing season, sampling intensity will be ten (10) samples in soil reaches one mile or less in cumulative length and fifteen (15) samples in those greater than one mile in cumulative length.

Hypothesis Testing

Statistical evaluation of the success of revegetation for each soil functional group within a work package will be tested via a one-sample t-test of the following null hypothesis:

The (traditional) null hypothesis being tested would be that the revegetated area mean (\bar{x}) is indistinguishable from 90 percent of the pre-existing cover, stated as $H_0: \bar{x} = Q$. If t_c is less than or equal to the 1-tailed t -table value for alpha error probability of 0.05, at $(n-1)$ degrees of freedom, then H_0 is accepted, and revegetation is deemed successful (i.e., indistinguishable from 90 percent of the standard).

The sample data will be evaluated for normality and transformed if appropriate. The formula for the one sample t-test is:

$$t_c = \frac{Q - \bar{x}}{S_{\bar{x}}}$$

Where: \bar{x} = Revegetated Area Sample Mean
 Q = 90 percent of pre-existing cover
 $S_{\bar{x}}$ = Standard error of mean [s/\sqrt{n}]
 s = Sample standard deviation
 n = Sample size
 t_c = Calculated t -value
 t_t = Table t -value (alpha = 0.05)

Photographic Documentation

Photo documentation will be conducted during the growing seasons and in conjunction with the point-intercept cover sampling. Photos will be taken at each transect location during all sampling. Photo points will be relocated using a handheld GPS receiver.



TECHNICAL TAB 4 –

- **SDS Construction Phase Completion Letter to Pueblo County – Dated July 28, 2015**
(Pueblo County 1041 Permit No. 2008-002 Compliance for SDS Mitigations Appendix
Conditions C-1 through C-22, SE-1, CR-1 through CR-11, and General Conditions 13 and 20)



Colorado Springs Utilities
it's how we're all connected

July 28, 2015

Ms. Joan Armstrong
Director of Planning & Development
Pueblo County
229 West 12th Street
Pueblo, CO 81003-2810

RE: Pueblo County 1041 Permit No. 2008-002 Compliance for Southern Delivery System (SDS) Mitigations Appendix Conditions C-1 through C-22, SE-1, CR-1 through CR-11, and General Conditions 13 and 20

Dear Ms. Armstrong,

As has been reported during our monthly SDS project status meetings with Pueblo County staff, major construction activities associated with installation of the SDS pipeline through Pueblo County have been completed. In fact, the SDS Program has now moved from the construction phase of the project to the testing and commissioning phase of the project (where the system will be tested and inspected to confirm proper operation prior to delivery of water).

With this transition, Colorado Springs Utilities (on behalf of the SDS Participants) believes it has satisfactorily completed the Pueblo County 1041 Permit No. 2008-002 Mitigation Appendix Construction Conditions C-1 through C-22, Socio-Economic Condition SE-1, and County Roads Conditions CR-1 through CR-11 for the pipeline construction activities associated with the SDS construction activities through Pueblo County in compliance with General Condition 13 (County Road Improvements and Restorations) and General Condition 20 (Construction Impact Mitigation), with those exceptions specified below. Further evidence of such completion can be found in the quarterly and annual reports filed with the County, as well as the Environmental Closeout Documentation Manual provided to the U.S. Bureau of Reclamation (copy attached).

Though the SDS Program has offered to prepare additional construction condition compliance summary documentation for each project segment within Pueblo County in accordance with the "Draft" summary document for Segment S2, as provided to Pueblo County staff on May 14, 2013 and again on June 15, 2015, it is our understanding that such further documentation will not be necessary.

Exceptions:

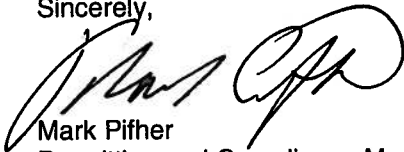
- C-9, Site Restoration, Project Detail 2.e:
"The revegetated area will be considered acceptable if the revegetated area cover is not less than 90 percent of the pre-construction vegetation cover with similar species diversity. The pipeline access road will not be included in the 90 percent coverage calculation".
 - Concurrence will be requested from the Pueblo County Board of Commissioners following completion of a publically held meeting regarding achievement of this condition.
- C-9, Site Restoration, Project Detail 6:
"Provide Pueblo County a security bond equal to \$2,000 per acre of land in permanent or temporary construction easement in each work package. The security bond shall be released in full to the Applicant two years following the final completion of the construction contract, upon successful revegetation, as described above. If successful revegetation is not achieved, the security bond will be forfeited in the amount of \$2,000 for each acre, or fraction of an acre, that has not been successfully revegetated".
 - Request for bond release will be made at the completion of the publically held meeting regarding achievement of this condition.

- C-10, Public Communication, Project Detail 1:
"Assign a point of contact for responding to public questions, comments and concerns. The point of contact shall continue for one year following the final construction in Pueblo County".
 - The SDS Hotline (1-855-SDS-4YOU) will continue to operate until at least one year following the initial delivery of water through the SDS Project.
- C-16, Noxious Weed Control, Project Detail 3:
"Implement an eradication program within the project limits. Eradicate existing Class A and B noxious weed populations".
 - Per the conditions of the U.S. Bureau of Reclamation Record of Decision (ROD), the SDS Program will continue to monitor construction areas for 3 years after completion of construction activities to assess if noxious weeds have invaded the site, and will mitigate as necessary.
- SE-2, Payment in Lieu of Property Taxes:
"Applicant shall reimburse Pueblo County for property taxes lost due to acquisition of land in fee".
 - The City of Colorado Springs will continue to follow the requirements of this condition until such time that the affected properties are sold or transferred to another party.
- CR-10, Future Roadways / Utilities:
"Applicant shall not unreasonably prohibit the installation of future roadways and utilities across the utility easement. Future roadways are expected to be surface crossings at existing grade for a typically defined roadway section in the Pueblo County Roadway Design and Construction Standards today or as modified in the future".
 - Colorado Springs Utilities will continue to abide by this condition now and into the future.

In relation to compliance with other General Terms and Conditions and Mitigation Appendix Conditions outlined in the Pueblo County 1041 Permit No. 2008-002 not discussed in this letter, the SDS Program will continue to provide quarterly reports to Pueblo County through completion of the project commissioning in accordance with Mitigation Appendix ENF-1, Compliance Monitoring and Reporting, Project Detail 1; and annually beginning the year following commencement of water delivery in accordance with Mitigation Appendix ENF-1, Project Detail 2. In addition, the SDS Program will continue to submit Project Commitment Annual Reports (PCARs) to the U.S. Bureau of Reclamation in accordance with the ROD conditions and provide copies to Pueblo County for review.

We appreciate your attention to this matter and should you have any questions or comments, please feel free to contact me directly at 719-668-8693.

Sincerely,



Mark Pifher
Permitting and Compliance Manager
Southern Delivery System

Cc: John Fredell, SDS Program Director, Colorado Springs Utilities
Keith Riley, SDS Deputy Program Director, Colorado Springs Utilities
Allison Mosser, Sr. Project Manager, Colorado Springs Utilities
Kevin Binkley, SDS Permitting and Compliance Specialist, MWH
Alec Hart, SDS Restoration Project Manager, MWH
Gary Raso, Pueblo County Attorney
Terry Stroh, Environmental Specialist, U.S. Bureau of Reclamation



TECHNICAL TAB 5 –

- SDS Revegetation Waivers and Area Reductions

- SDS Work Package S2 Temporary License and Trail Construction Agreement Between PWMD and City of Colorado Springs (April 6, 2012)
- Dees Waiver – 623 N Canvas Drive (S2)
- Casey Waiver - 353 N. Escambria Drive (S2)
- Galaviz Acosta Waiver – 6963 Young Hollow Road (S3)
- Walsh Email Correspondence – 1131 N. Kirkwood Drive (S2)

TEMPORARY LICENSE AND TRAIL CONSTRUCTION AGREEMENT

THIS TEMPORARY LICENSE AND TRAIL CONSTRUCTION AGREEMENT ("Agreement") is made this 6th day of April 2012 ("Effective Date") by and between the PUEBLO WEST METROPOLITAN DISTRICT herein referred to as "District", and the CITY OF COLORADO SPRINGS, a home rule city and Colorado municipal corporation, on behalf of its enterprise Colorado Springs Utilities herein referred to as "Licensee" (whether grammatically singular or plural).

RECITALS

WHEREAS, the District owns the real property described in Exhibits A-1 through A-8, attached hereto and made a part hereof by reference ("District Property"); and

WHEREAS, the term "Licensee" shall include employees, agents and contractors of Licensee; and

WHEREAS, the District grants through this Agreement a Temporary License to Licensee over the District Property; and

WHEREAS, the District has requested that Licensee construct a gravel trail ("The Trail") over certain portions of the District Property, as further described herein, in lieu of revegetating the District Property in those locations where there has been land disturbance associated with the construction of the Southern Delivery System Project, with specific reference to the installation of pipeline segments associated with the Project; and

WHEREAS, the parties hereby enter into this Agreement.

AGREEMENT

1. **Prior Agreement to Construction:** This Agreement provides further documentation regarding the terms and conditions under which the Licensee shall construct the Trail on District property for the benefit of the District. Such construction was previously considered and committed to by both the District and Licensee by letter dated January 5, 2011, labeled Exhibit C attached hereto and incorporated herein by reference.
2. **Granting of License:** For and in consideration of the construction of the Trail, the District without warranting title or interest, and subject to the covenants hereinafter set forth, does hereby authorize the Licensee, its successors and assigns to enter, occupy, use, and construct the Trail on the District Property, generally known as Sections 5 and 8, Township 19 South, Range 65 West and Sections 8, 17, 20, 29, and 32, Township 20 South, Range 65 West of the 6th P.M., Pueblo County, State of Colorado, more particularly described on Exhibits A-1 through A-8.

Licensee shall have the right of reasonable ingress and egress in, to through, over, under, and across the District Property to perform its obligations established in this Agreement.

The District has previously acknowledged, and hereby confirms, Licensee's right to occupy and utilize a portion of the areas described in the above-referenced Exhibits A-1 through A-8, as work limits shown on construction drawings. In addition, the District has also granted to Licensee, through separate instruments, permanent easements for the pipeline corridor and temporary construction easements for construction purposes in platted and developable lots.

3. **The Trail:** Licensee shall construct a variable width gravel trail (the "Trail") generally 8 ft. wide all situated in a portion of inclusive and depicted in the locations shown on the construction drawings labeled Exhibit B, all attached hereto and made a part hereof by reference. The District has reviewed the construction drawings included in Exhibit B and approves the construction standards and location of the Trail.
4. **Term:** The term of this agreement ("Term") shall commence the Effective Date and run 270 days from the date construction begins on the Trail as noted by Section 5 below, but in no event shall last longer than two (2) years from the Effective Date. Upon the close of the Term, the District shall be solely liable for the totality of the Trail and all Licensee liabilities and obligations shall be fulfilled.
5. **Notice of Construction:** The Licensee shall notify the District's District Manager at least three (3) working days prior to commencement of the construction of Licensee's intended installation so that the District may make such inspections as it considers necessary.
6. **Reservation of Rights in Property:** In granting the License within this Agreement, the District reserves the right to make full use of the property involved as may be necessary or convenient and the District retains all rights to operate, maintain, install, repair, remove or relocate any of its facilities located within the District's property at any time and in such a manner as it deems necessary or convenient.
7. **Completion and Cleanup:** The Licensee shall complete the Trail installation, clear the area of all construction debris and restore, to the extent practicable, the area to its pre-existing condition, excluding the physical space taken by the Trail. This shall be accomplished within 270 days from the date of commencement of construction.
8. **Restoration of Roads, Fences and Facilities:** All District roads, fencing and other facilities which are disturbed by the construction of Licensee's installation shall, within the time prescribed in Section 7: Completion and Cleanup, be restored as commercially and practically reasonable, to the pre-existing condition.
9. **Markers:** Licensee shall be responsible for the initial installation of signage related to the operation of the Trail, with Licensee and the District to mutually agree upon the size, number, location and content of such signage. The Licensee shall have no responsibility for

maintaining or replacing such signage or markers nor any liability related to such signage or markers after initial installation or after the completion of the Term of this Agreement.

10. Indemnification:

- a. To the extent specifically authorized by law, Licensee shall indemnify and save harmless the District, its officers, employees and agents, against any and all claims, damages, actions or causes of action and expense to which it, or they, may be subjected by reason of Licensee's construction activities within and across the property of the District.
- b. To the extent specifically authorized by law, the District, for itself, its representatives, successors and assigns hereby releases Licensee and shall fully protect, defend, indemnify and hold harmless Licensee and Colorado Springs Utilities, together with their officers, City Council, Utilities Board, directors, employees, agents, contractors and representatives from and against any and all losses, claims of personal injury, death or property damage, causes of action, costs and expenses, including attorney's fees, or liability of any nature arising out of or related to any and all uses of the Trail whether by the District or others.
- c. Nothing in this License shall be interpreted to limit or prevent the protections afforded to Licensee under the Colorado Governmental Immunity Act, C.R.S. § 24-10-101, *et seq.*

11. Ownership and Future Maintenance: All work authorized by this Agreement shall be performed by the Licensee at no expense to the District. Following the completion of the Trail construction as provided herein, District shall own and be solely liable for the totality of all operation, repair, maintenance, costs, and replacement of the Trail.

12. No Warranty of Title: The rights and privileges granted in this Agreement are subject to prior Agreements, Licenses and conveyances, recorded or unrecorded. District covenants that it owns or holds a possessory interest in the land upon which the Trail is to be constructed and it shall be the District's sole responsibility to determine the existence of any rights, uses or installations conflicting with the Licensee's use of the District's property hereunder and to resolve any conflict.

13. Assignment: The rights granted hereunder shall not be assigned without the written consent of both parties.

14. Fees: No fees are applicable in connection with this Agreement.

15. Special Conditions: This Agreement is subject to the foregoing conditions and to the following special conditions:

- a. In relation to Section 4, Licensee shall be released and held harmless from any requirement to re-vegetate the area occupied by the Trail.

- b. The construction of the Trail, in lieu of re-vegetation, is subject to the approval of Pueblo County. Such approval shall be obtained by the District with the assistance of Licensee prior to construction commencing.

16. **Notice:** Wherever herein notice is required to be given to any party hereto, such notice shall be given by U.S. Postal Service first class delivery, or by personal hand delivery addressed as follows:

To the District:

District Manager
Pueblo West Metropolitan District
P.O. Box 7005
Pueblo West, CO 81007

To the Licensee:

SDS Deputy Program Director
Colorado Springs Utilities
P.O. Box 1103, Mail Code 930
Colorado Springs, CO 80947

17. **Recordation:** Following execution of this Agreement by both parties hereto, the District shall cause this Agreement to be recorded with the County Clerk and Recorder's Office in Pueblo County, Colorado.
18. **Governing Law and Jurisdiction:** This Agreement shall be governed by and interpreted in accordance with the laws of the State of Colorado, the Colorado Springs City Charter, City Code, Ordinances, Rules and Regulations. The Parties consent to venue and jurisdiction in the District Court in and for El Paso County, Colorado, or in the United States District Court for the District of Colorado in any action commenced relating to this License or the transactions contemplated hereby.
19. **Environmental:** Licensee shall comply with all applicable local, state and federal laws, regulations, and rules related to the environment or public health in Licensee's activities related to this Agreement.
20. **Appropriation of Funds:** In accord with the Colorado Springs City Charter, performance of any of Licensee's obligations that require expenditure of funds under this Agreement is expressly subject to appropriation of funds by the Colorado Springs City Council. In the event funds are not appropriated in whole or in part sufficient for performance of Licensee's obligations under this Agreement, or appropriated funds may not be expended due to City Charter spending limitations, then this Agreement shall thereafter become null and void by operation of law, and Licensee shall thereafter have no liability for compensation or damages to the District in excess of Licensee's authorized appropriation for this Agreement or the applicable spending limit, whichever is less. Licensee shall notify the District as soon as reasonably practicable in the event of non-appropriation or in the event a spending limitation becomes applicable.

21. **Survival of Obligations.** All express representations and indemnifications shall survive this Agreement, including any duties or obligations that are required in the event of termination.
22. **Entire Agreement.** This Agreement and the incorporated exhibits represent the entire agreement between the parties concerning the topic of the Trail, and no additional or different oral representation, promise or agreement shall be binding on any of the parties hereto with respect to the subject matter of this instrument, unless stated in writing signed by the parties.

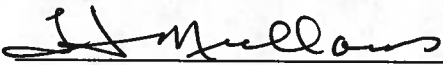
[Signatures on following page]

IN WITNESS WHEREOF, this instrument has been executed as of the day and year first above written.


PUEBLO WEST METROPOLITAN DISTRICT

By:  4/4/12
District Manager

Approved as to form:


Tom Mullans

CITY OF COLORADO SPRINGS, a home rule city and Colorado municipal corporation on behalf of its enterprise, Colorado Springs Utilities

By: 
Title: Keith Riley, SDS Deputy Program Director, Colorado Springs Utilities

Approved as to form:

Reviewed by:

By: 
City Attorney's Office – Utilities

By: 
Ingrid Richter, Manager of Real Estate Services



Colorado Springs Utilities

It's how we're all connected

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Page: 1 of 8 R 46.00 D 0.00 T 46.00
Gilbert Ortiz Clerk/Recorder, Pueblo County, Co



Memorandum of Agreement

For Revegetation

Southern Delivery System

Property Address: 623 N Canvas Dr, Pueblo West, CO 81007

Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

APN. 9532006040

Property Owner Thomas C. Dees

Segment Work Package S2

1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

The parcel proposed to be revegetated contains 4,903 square feet in Permanent Easement;
7,004 square feet in Temporary Construction Easement
and improvements as follows: _____

Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Colorado Springs Utilities

Owner

[Signature] 9/6/12
Real Estate Specialist Date

Owner Date

APPROVED:

[Signature] 9/11/12
SDS Land Team Date

Owner Date

[Signature] 9/13/12
City Attorney's Office Date

Owner Date

[Signature] 9-11-12
SDS Director/Deputy Director Date

APN 9532006040

I, Thomas Dees, would like no revegetation to occur on my property at 623 N. Canvas Drive in Pueblo West as a part of the revegetation program for the Southern Delivery System. I plan on constructing a corral using the rear of my property for my horses and the proposed revegetation program would interfere with my plans. I acknowledge that I will not be paid for the license agreement, however, believe that this course is in my best interest. Staff from SDS has explained the program and been professional and courteous and I appreciate their time and effort. David Marciniak had told me that by putting portable panels around my property where the water line exists would not interfere with my plans for my property.

Regards,
(sign)



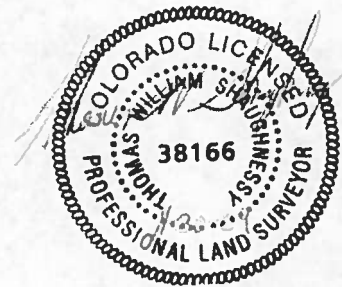
Thomas Dees



PARCEL DESIGNATION:	9532006040	DATE:	November 10, 2009
OWNER:	NOWACK, JARED M., (Owner current as of the date of certification hereon)		

EXHIBIT A

LOT 39, BLOCK 6, TRACT NO. 233, PUEBLO WEST COLORADO, located in the South Half of Section 32, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1667 at Page 727 of the records of Pueblo County.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

9532006040_EXA.doc



PARCEL DESIGNATION:	9532006040	DATE:	November 10, 2009
OWNER:	NOWACK, JARED M., (Owner current as of the date of certification hereon)		

EXHIBIT B
LEGAL DESCRIPTION

A permanent easement situated in LOT 39, BLOCK 6, TRACT NO. 233, PUEBLO WEST COLORADO, located in the South Half of Section 32, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, as recorded in Book 1667 at Page 727 of the records of Pueblo County, more particularly described as follows:

The east 35.01 feet of the west 60.01 feet of said Lot 39.

Said easement contains 4,903 square feet or 0.113 acres more or less.

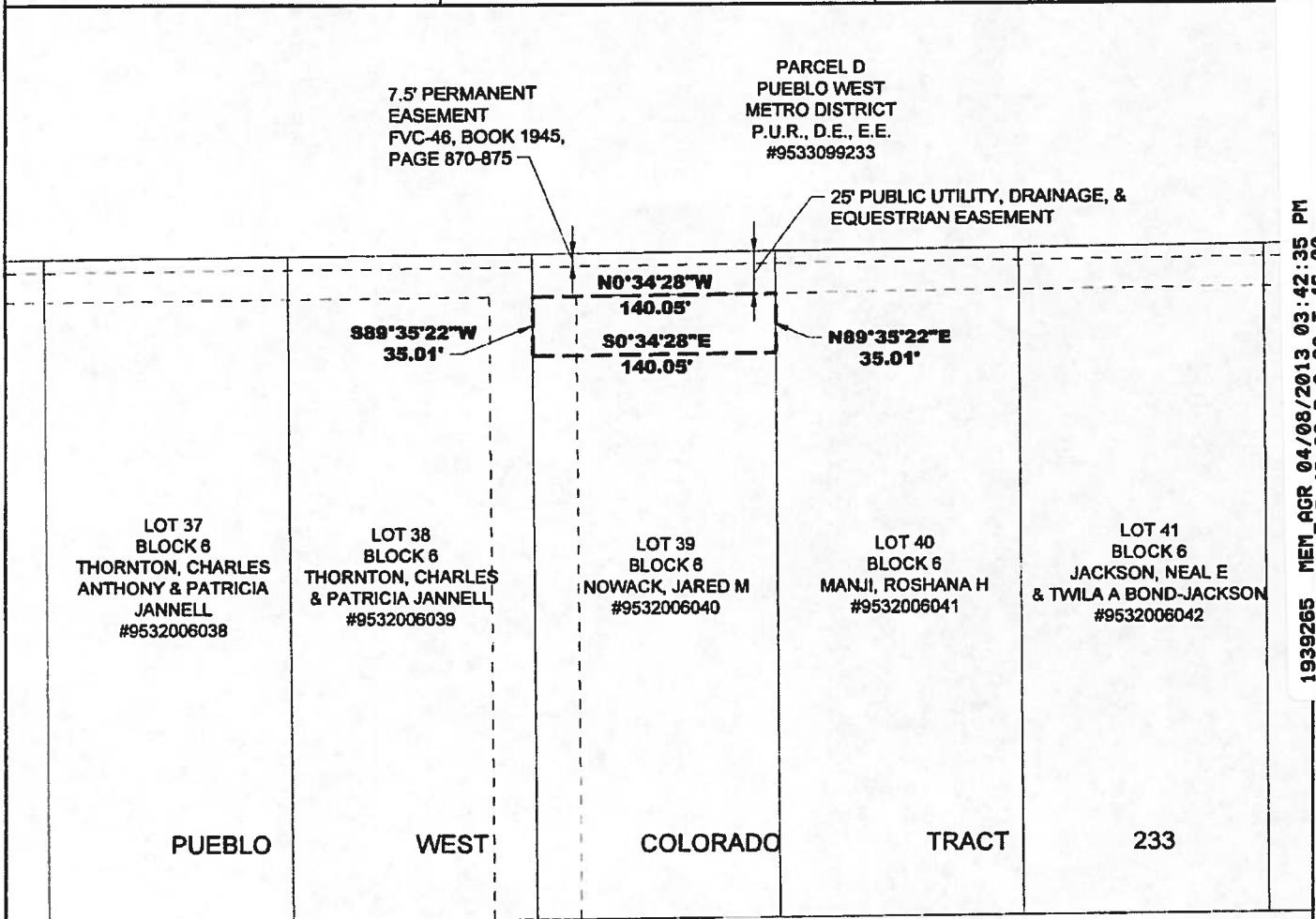
EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

9532006040_EXB.doc

DATE: 18-NOV-2009	EXHIBIT C SKETCH PERMANENT EASEMENT PARCEL #9532006040 SECTION 32 T19S, R65W, 6TH P.M. PUEBLO COUNTY, COLORADO	CITY OF COLORADO SPRINGS
DRAWN BY: L STUDER		
CHECKED BY: B HANSON		
APPROVED BY: T SHAUGHNESSY		
DRAWING: 9532006040_EXC		



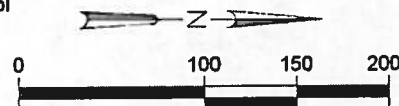
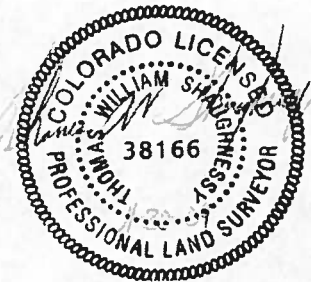
CANVAS DRIVE

NOTES.

1. This sketch does not constitute a land survey plat by CRITIGEN, LLC., and is only intended to depict Exhibit B - Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.

2. Bearings are based on a line from NGS Station "Pueblo CBL 973" (PID JK1355), monumented by a 3" brass disk set in 1.5' diameter concrete pad to NGS Station "Clevenger" (PID JK1353), monumented by a stainless steel rod set in concrete, said line was assumed to bear North 13°33'20" West according to a survey control diagram prepared by Kirkham Michael Consulting Engineers deposited with the El Paso County Surveyor on August 10, 2004 at Survey Deposit Number 204900110.

3. P.U.E., D.E., E.E. = Public Utility Easement, Drainage Easement and Equestrian Easement. Per Subdivision Plat.



SCALE: 1" = 100'

SHEET 1 OF 1



PARCEL DESIGNATION:	9532006040	DATE:	December 14, 2009
OWNER:	NOWACK, JARED M. (Owner current as of the date of certification hereon)		

EXHIBIT A

LOT 39, BLOCK 6, TRACT NO. 233, PUEBLO WEST COLORADO, located in the South Half of Section 32, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1667 at Page 727 of the records of Pueblo County.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, CO, 80903



PARCEL DESIGNATION:	9532006040	DATE:	December 14, 2009
OWNER:	NOWACK, JARED M. (Owner current as of the date of certification hereon)		

EXHIBIT B
LEGAL DESCRIPTION

A temporary construction easement situated in LOT 39, BLOCK 6, TRACT NO. 233, PUEBLO WEST COLORADO, located in the South Half of Section 32, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, as recorded in Book 1667 at Page 727 of the records of Pueblo County, more particularly described as follows:

The east 50.01 feet of the west 110.02 feet of said Lot 39.

Said easement contains 7,004 square feet or 0.161 acres more or less.

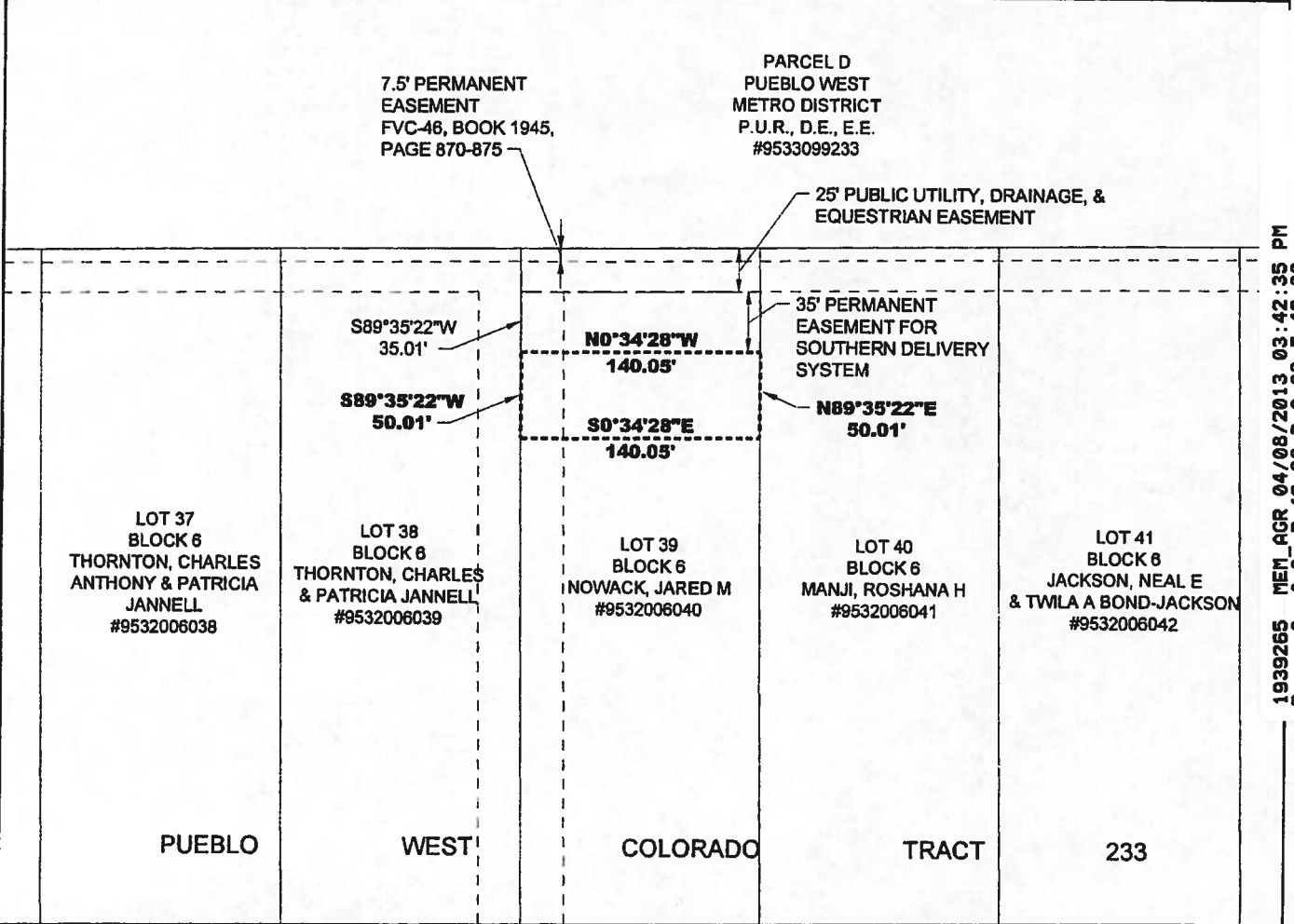
EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, CO, 80903

9532006040TE_EXB.doc

DATE: 11-DEC-2009	EXHIBIT C SKETCH TEMPORARY CONSTRUCTION EASEMENT PARCEL #9532006040 SECTION 32 T19S, R65W, 6TH P.M. PUEBLO COUNTY, COLORADO	CITY OF COLORADO SPRINGS
DRAWN BY: L STUDER		
CHECKED BY: B HANSON		
APPROVED BY: T SHAUGHNESSY		
DRAWING: 9532006040TE_EXC		



CANVAS DRIVE

NOTES:

1. This sketch does not constitute a land survey plat by CRITIGEN, LLC., and is only intended to depict Exhibit B - Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.
2. Bearings are based on a line from NGS Station "Pueblo CBL 973" (PID JK1355), monumented by a 3" brass disk set in 1.5' diameter concrete pad to NGS Station "Clevenger" (PID JK1353), monumented by a stainless steel rod set in concrete, said line was assumed to bear North 13°33'20" West according to a survey control diagram prepared by Kirkham Michael Consulting Engineers deposited with the El Paso County Surveyor on August 10, 2004 at Survey Deposit Number 204900110.
3. P.U.E., D.E., E.E. = Public Utility Easement, Drainage Easement and Equestrian Easement. Per Subdivision Plat.

SCALE: 1" = 100'

SHEET 1 OF 1

1939265 MEM AGR 04/08/2013 03:42:35 PM
 Page: 8 of 8 R 45.00 D 0.00 T 45.00
 Gilbert Ortiz Clerk/Recorder, Pueblo County, Co



Colorado Springs Utilities

It's how we're all connected

Memorandum of Agreement
For Revegetation
Southern Delivery System

APN. 9532006040

Property Owner Thomas C. Dees

Segment Work Package S2

Property Address: 623 N Canvas Dr, Pueblo West, CO 81007

Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

The parcel proposed to be revegetated contains 4,903 square feet in Permanent Easement;
7,004 square feet in Temporary Construction Easement
and improvements as follows:

Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Colorado Springs Utilities
[Signature] 9/6/12
Real Estate Specialist Date

Owner

Owner Date

APPROVED:
[Signature] 9/11/12
SDS Land Team Date

Owner Date

Owner Date

City Attorney's Office Date

SDS Director/Deputy Director Date

Revegetation Waiver

I hereby decline having my property revegetated following construction of the Southern Delivery System pipeline, waive any obligation that Colorado Springs Utilities has to do so, and understand that I will not be offered the opportunity to include my property in the revegetation activities in the future.

Owner Thomas C. Dees Date 8/22/12

March 6, 2015

I, Donald Casey, am satisfied with the revegetation efforts of the Southern Delivery System program on my property at 353 N. Escambria Drive in Pueblo West but wish for the SDS revegetation efforts to cease so that I may graze and house horses on my property. I understand that I will receive no further payment for revegetation access on my property and that no further irrigation or maintenance will occur as I begin to use my property for livestock. I have requested that the above-ground irrigation system present on my property be removed as soon as possible and that Margaret Radford meet with me to discuss the requirements of the SDS permanent easement and fence boundaries. I understand that when I am ready to install fencing or anything else that would involve below-ground footings that I am required to get locates from the 811 service and avoid affecting the SDS pipeline or fiber optic cable. I am willing to work together with the SDS program regarding these matters.

Thank you

Donald R. Casey

A handwritten signature in cursive script, appearing to read "Donald Casey", written in dark ink.



Colorado Springs Utilities

It's how we're all connected

Memorandum of Agreement

For Revegetation

Southern Delivery System

Property Address: 353 North Escambia Drive, Pueblo West, CO 81007

Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

APN. 5050-05-031

Property Owner Donald R. Casey

Segment Work Package S2

1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

This memorandum is created for the purposes of Mr. Casey's waiver of revegetation, which he requested verbally in early March 2015.

The parcel proposed to be revegetated contains 22,213 square feet in Permanent Easement;
31,600 square feet in Temporary Construction Easement
and improvements as follows: _____

Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Colorado Springs Utilities

Owner

Real Estate Specialist

Date

Owner

Date

APPROVED:

Owner

Date

SDS Land Team

Date

Owner

Date

City Attorney's Office

Date

SDS Director/Deputy Director

Date

Revegetation Waiver

I hereby decline having my property revegetated following construction of the Southern Delivery System pipeline, waive any obligation that Colorado Springs Utilities has to do so, and understand that I will not be offered the opportunity to include my property in the revegetation activities in the future.

Owner

Donald Casey

Date

3/6/15

March 6, 2015

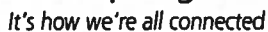
I, Miguel Galaviz Acosta, am satisfied with the revegetation efforts of the Southern Delivery System program on my property at 6963 Young Hollow Road in Pueblo County but wish for the SDS revegetation efforts to cease so that I may graze and house horses on my property. I understand that I will receive no further payment for revegetation access on my property and that no further irrigation or maintenance will occur as I begin to use my property for livestock. I am aware of my fence boundaries and wish to retain SDS fencing currently on my property. I understand that when I am ready to install water lines, fencing or anything else that would involve below-ground footings that I am required to get locates from the 811 service and avoid affecting the SDS pipeline or fiber optic cable. I am willing to work together with the SDS program regarding these matters.

Thank you

Miguel Galaviz Acosta



3/6/15



Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

Segment Work Package: S3

1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

The parcel proposed to be revegetated contains 155,366 square feet in Permanent Easement;
77,683 square feet in Temporary Construction Easement
and improvements as follows:

Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Owner

 SDS Director/Deputy Director Date

Owner Miguel Valqui, M.D. Date 3/6/15

Kevin Binkley

From: Alec Hart
Sent: Thursday, September 26, 2013 8:53 AM
To: 'jschneider@wsreclamation.com'; Clint Snow (csnow@wsreclamation.com)
Cc: Mark Pifher; Jed Chambers; Kevin Binkley; SDS Document Control Mail/csu; Erin Powers
Subject: FW: SDS revegetation "Opt Out" on S2 (Walsh)

From: David Marciniak
Sent: Thursday, September 26, 2013 8:39 AM
To: Alec Hart
Subject: Fw: SDS revegetation

From: HERB WALSH Owner
Sent: Thursday, September 12, 2013 2:29:02 PM
To: David Marciniak
Subject: Re: SDS revegetation

Mr. David, in regards to your e-mail relating to removing sprinkler pipes in my property, you seem to have all your bases covered. I would also like to add, without your tireless effort everything pertaining to this project on my property would have been a lot more difficult to come to any agreements. You should be considered a valuable asset to the entire Colorado Springs Utilities project. Please forward a copy of this e-mail to your supervisor and the person they report to. Thank you for all your help in my meeting and dealing with all of my issues on this project. Herb Walsh----- Original Message -----

From: David Marciniak <dmarciniak@csu.org>
To: hkwalsh@q.com
Sent: Thu, 12 Sep 2013 13:30:25 -0400 (EDT)
Subject: SDS revegetation

Hi Mr. Walsh!

Thank you for calling to discuss revegetation of the easements for SDS on your property at 1131 Kirkwood Drive in Pueblo West. As we discussed, this email is to document our conversation. It is my understanding that you want to not engage in further SDS revegetation activities and that you are electing to not sign a year 2 license agreement. In addition, you expressed that you want our contractor to remove the sprinkler system associated with the SDS revegetation from your property, and we will work with you to remove the sprinklers at a mutually convenient time before Oct. 4, 2013.

If you agree I have summarized our conversation and your direction accurately, please respond to this email indicating that you concur.

Thanks

David Marciniak

Construction Facilitator

Southern Delivery System Program

(719) 668-3595 (office)

(719) 291-2481 (cell)

CONFIDENTIALITY NOTICE - This email transmission, and any documents, files or previous email messages attached to it, may contain information that is legally privileged or otherwise confidential to include customer and business information. If you are not the intended recipient, or an authorized person for the intended recipient, you are hereby notified that any disclosure, copying or distribution of this information, or any action taken in reliance on the information contained within this email, is strictly prohibited. If you have received this email message in error, please notify the sender and then delete the message (and any attachments) from your computer and/or network. Thank you.



TECHNICAL TAB 6 –

- **SDS Post-Restoration Seedling Density Reports – CNHP (October 2013)**
 - Measurements of Post-restoration Seedling Density for Pueblo County Work Package S1
 - Measurements of Post-restoration Seedling Density for Pueblo County Work Package S2
 - Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-12
 - Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-13

Colorado Springs Utilities Southern Delivery System

Measurements of Post-restoration Seedling Density for Pueblo County Work Package S1



Prepared for:
Colorado Springs Utilities
Southern Delivery System
Colorado Springs, CO 80947

Prepared by:
Colorado Natural Heritage Program
Colorado State University
Fort Collins, CO 80523

October, 2013

Prepared in conjunction with:

**ESCO Associates, Inc.
Boulder, CO**



Cover Photo: Sample site 6 on Soil Group B in work package S1 (by ESCO Assoc. Inc.)



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Introduction	2
Methods	3
Results.....	3
Discussion	4
Appendix A: Maps – Work Package S1.....	1

Introduction

As the first look at success of seeding efforts in the Pueblo county portion of the Southern Delivery System (SDS) Pipeline, a quantitative evaluation of seedling density was carried out in late July, 2013. This report documents post-construction seedling densities during the first growing season along the S1 section of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction seedling density survey under contract to Colorado Springs Utilities.

The following includes the methods used, the results, and a discussion of the seedling density evaluation on the sites after any construction activities. Maps of Work Package S1 are contained in Appendix A.

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Given the important effect of soils on details of pre-existing vegetation and the outcome of revegetation efforts, pre-existing conditions and revegetation performance standards for plant cover were separated by soil group. These groups differ from each other in such characteristics as depth, texture, and salt content, all of which along with other variable factors have the potential to affect the extent and nature of the revegetation process as well as the rate of establishment and development. Within the “soil groups” identified in the Pueblo County portions of the SDS pipeline, three occurred in the portion of Work Package S1 that was irrigated beginning in the spring of 2013:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa Series): 71.7% of Work Package S1

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt Series): 17.9% of Work Package S1

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale Complex; Shingle Series): 10.4% of Work Package S1

The distribution of these Soil Groups (based on previous mapping in SCS (1979)) is indicated on the maps of S1 included in Appendix A

Although Soil Group C is present in Work Package S1, the seedling density of this soil group was not measured during this sampling effort as this portion of the pipeline had not yet been irrigated. Due to the recent string of drought years, vegetation in this region is dependent on irrigation for seedling germination. Consequently, without irrigation in place, seedling density values for this Soil Group would have been misrepresentative of the revegetation progress.

Methods

As per the Pueblo County Revegetation Cover Establishment Protocol (Protocol), within each Soil Group in Work Package S1, 30 points were randomly selected using GIS software. These computer-selected points were visited in the field using handheld GPS units during the period of July 29-31, 2013. At each point a 0.5 square meter circular plot was placed on the ground by blind drop at the point indicated by the GPS device. Within the plot, all seedlings of perennial plants were tallied. Acceptable species are those from the seed mix as well as all other non-noxious perennial plant species.

Data were tallied and converted from the number of seedlings per 0.5 sq. m. to the number per sq. ft., which is the unit of measure specified in construction specifications and the Protocol.

Results

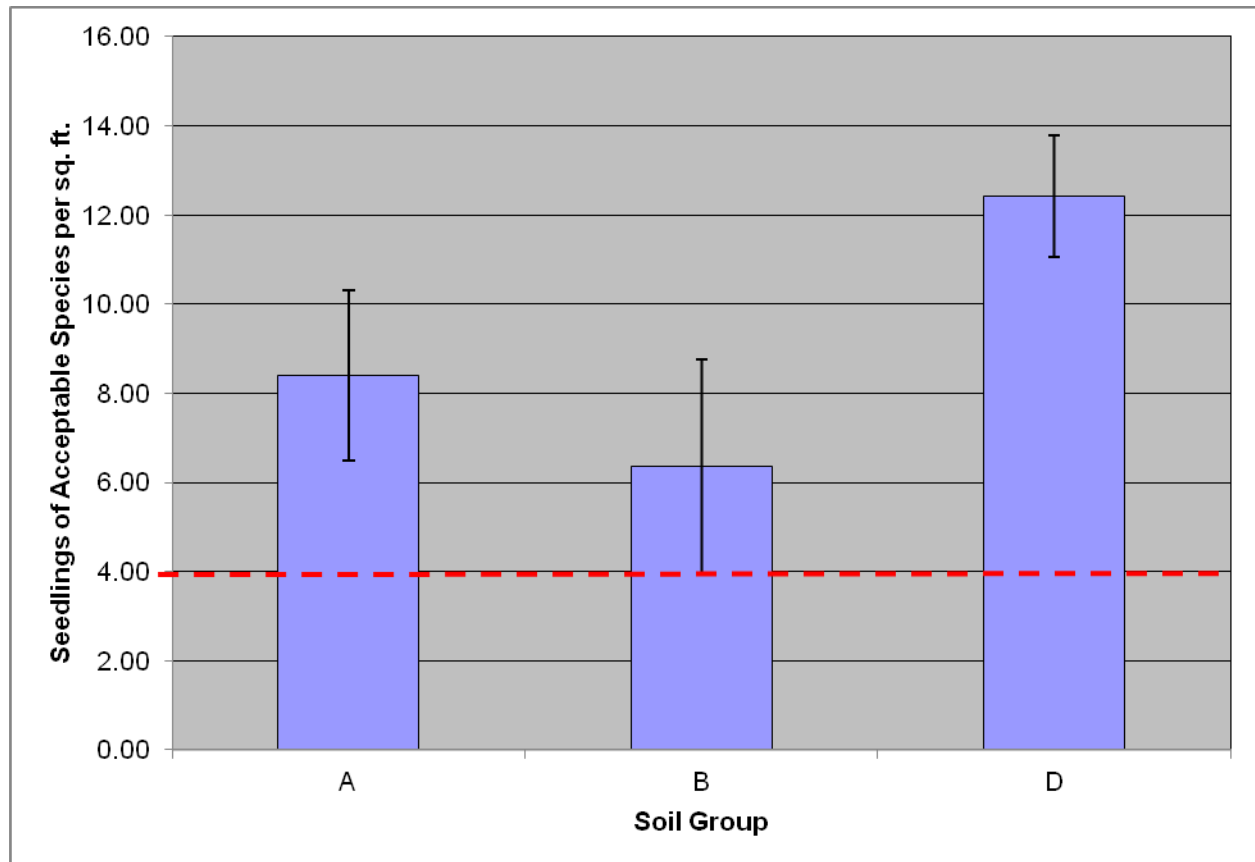
Sample data are presented in Table. 1. As can be seen in Figure 1, all Soil Groups within Work Package S1 have seedling density levels above 4 per sq. ft.

Table 1. Results of Seedling Density Sampling of Seeded Area in Southern Delivery System Work Package S1

Work Package	Soil Group	Mean Seedlings per sq. ft.*	90% Confidence Interval (+/-)	Sample Size (n)
S1	A	8.40	1.91	30
S1	B	13.62	2.40	14
S1	D	12.43	1.37	30

* Seedlings of acceptable species are defined as those included in the seed mix and any other non-noxious perennial species

Figure 1. Preliminary Seedling Density of Work Package S1



Discussion

The recent string of drought years in Pueblo County has continued in 2013. This scarcity of water has made the presence of irrigation on the seeded pipeline right-of-way essential for seed germination to occur. In addition to water availability, it is apparent from these data that soil characteristics have an effect on seedling density. In the earlier stages of the revegetation process, the seedling density metric is the most direct indicator of the progress of the seeded areas toward the ultimate goal of vigorous self-sustaining plant cover. The presence of (a minimum of) 4 seedlings per sq. ft. is the level that would be expected in irrigated areas after a full growing season. Since the seedling density in all Soil Groups in S1 surpassed the 4 seedlings per sq. ft. standard, the initial progress of vegetation regrowth in this Work Package is indicative that revegetation efforts are likely to be successful. Revegetation progress will continue to be monitored through future evaluations of vegetation cover as the planted vegetation begins to mature.

Literature Cited

USDA Soil Conservation Service (SCS). 1979. Soil Survey of Pueblo Area, Colorado: Parts of Pueblo and Custer Counties. U.S. Dept. of Agric. Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. 92 pp. plus maps.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Seedling Density for Pueblo County
Work Package S2*



Prepared for:
**Colorado Springs Utilities
Southern Delivery System
Colorado Springs, CO 80947**

Prepared by:
**Colorado Natural Heritage Program
Colorado State University
Fort Collins, CO 80523**

October, 2013

Prepared in conjunction with:

**ESCO Associates, Inc.
Boulder, CO**



Cover Photo: Sample site 14 on Soil Group A in work package S2 (by ESCO Assoc. Inc.)



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Introduction

As the first look at success of seeding efforts in the Pueblo county portion of the Southern Delivery System (SDS) Pipeline, a quantitative evaluation of seedling density was carried out in late July, 2013. This report documents post-construction seedling densities during the first growing season along the S2 section of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction seedling density survey under contract to Colorado Springs Utilities.

The following includes the methods used, the results, and a discussion of the seedling density evaluation on the sites after any construction activities. Maps of Work Package S2 are contained in Appendix A.

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Given the important effect of soils on details of pre-existing vegetation and the outcome of revegetation efforts, pre-existing conditions and revegetation performance standards for plant cover were separated by soil group. These groups differ from each other in such characteristics as depth, texture, and salt content, all of which along with other variable factors have the potential to affect the extent and nature of the revegetation process as well as the rate of establishment and development. Within the “soil groups” identified in the Pueblo County portions of the SDS pipeline, four occurred in Work Package S2:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa Series): 66.4% of work package S2

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt Series): (Note that this represents the level found on Limon soils in ungrazed S2): 24.0% of work package S2

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale Complex; Shingle Series): 5.6% of work package S2

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson Series and Ustic Torrifluvents): 4.0 % of work package S2

The distribution of these Soil Groups (based on previous mapping in SCS (1979)) is indicated on the maps of S2 included in Appendix A

Methods

As per the Pueblo County Revegetation Cover Establishment Protocol (Protocol), within each Soil Group in Work Package S2, 30 points were randomly selected using GIS software. These computer-selected points were visited in the field using handheld GPS units during the period of July 29-31, 2013. At each point a 0.5 square meter circular plot was placed on the ground by blind drop at the point indicated by the GPS device. Within the plot, all seedlings of perennial plants

were tallied. Acceptable species are those from the seed mix as well as all other non-noxious perennial plant species.

Data were tallied and converted from the number of seedlings per 0.5 sq. m. to the number per sq. ft., which is the unit of measure specified in construction specifications and the Protocol.

Results

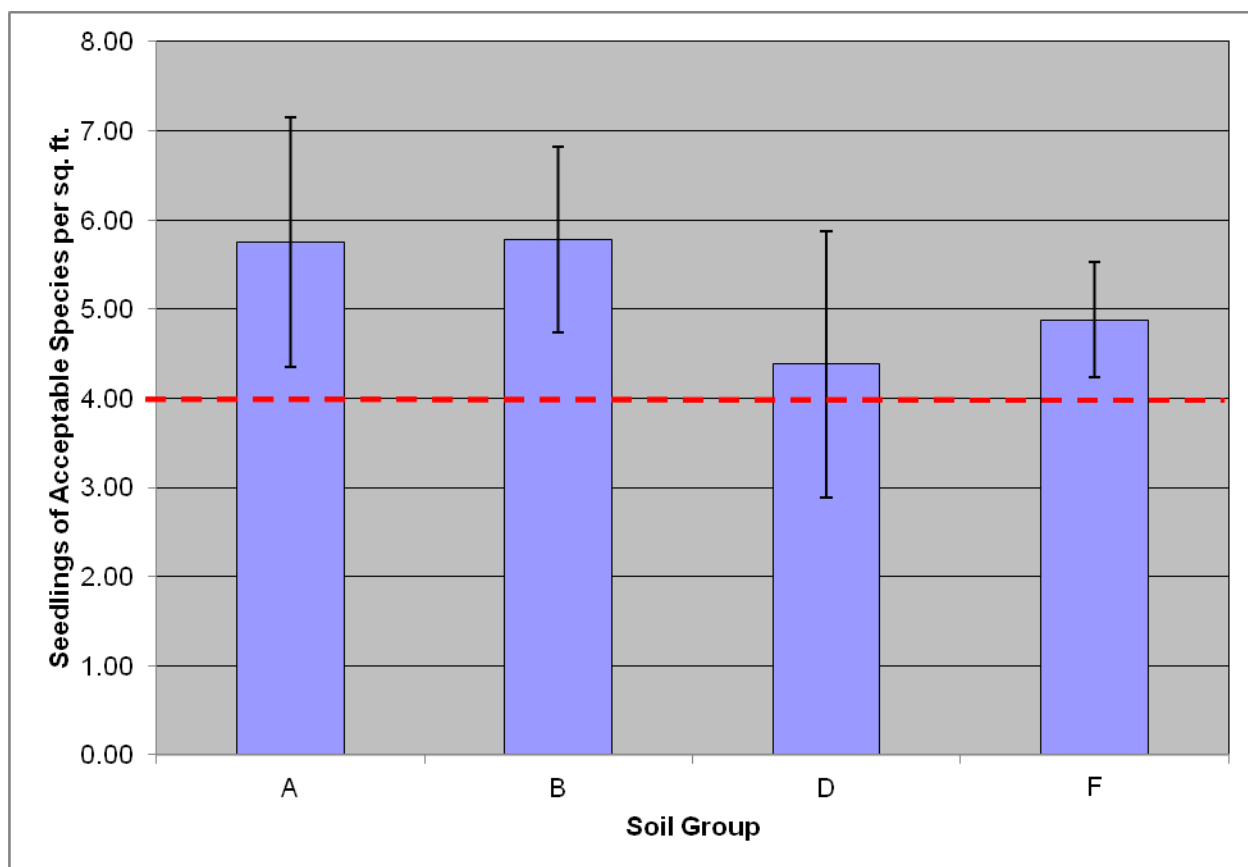
Sample data are presented in Table. 1. As can be seen in Figure 1, all Soil Groups within Work Package S2 have seedling density levels above 4 per sq. ft.

Table 1. Results of Seedling Density Sampling of Seeded Area in Southern Delivery System Work Package S2

Work Package	Soil Group	Mean Seedlings per sq. ft.*	90% Confidence Interval (+/-)	Sample Size (n)
S2	A	5.75	1.40	30
S2	B	5.78	1.04	30
S2	D	4.38	1.50	30
S2	F	4.88	0.65	30

* Seedlings of acceptable species are defined as those included in the seed mix and any other non-noxious perennial species

Figure 1. Preliminary Seedling Density of Work Package S2



Discussion

The recent string of drought years in Pueblo County has continued in 2013. This scarcity of water has made the presence of irrigation on the seeded pipeline right-of-way essential for seed germination to occur. In addition to water availability, it is apparent from these data that soil characteristics have an effect on seedling density. In the earlier stages of the revegetation process, the seedling density metric is the most direct indicator of the progress of the seeded areas toward the ultimate goal of vigorous self-sustaining plant cover. The presence of (a minimum of) 4 seedlings per sq. ft. is the level that would be expected in irrigated areas after a full growing season. Since the seedling density in all Soil Groups in S2 surpassed the 4 seedlings per sq. ft. standard, the initial progress of vegetation regrowth in this Work Package is indicative that revegetation efforts are likely to be successful. Revegetation progress will continue to be monitored through future evaluations of vegetation cover as the planted vegetation begins to mature.

Literature Cited

USDA Soil Conservation Service (SCS). 1979. Soil Survey of Pueblo Area, Colorado: Parts of Pueblo and Custer Counties. U.S. Dept. of Agric. Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. 92 pp. plus maps.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Seedling Density for Pueblo County
Work Package S3-12*



Prepared for:
**Colorado Springs Utilities
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Colorado Springs, CO 80947**

Prepared by:
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October, 2013

Prepared in conjunction with:

**ESCO Associates, Inc.
Boulder, CO**



**Cover Photo: Sample site 9 on Soil Group A (Penrose, Manuel and Minnequa Series) in work package S3-12
(by ESCO Assoc. Inc.)**



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Introduction

As the first look at success of seeding efforts in the Pueblo county portion of the Southern Delivery System (SDS) Pipeline, a quantitative evaluation of seedling density was carried out in late July, 2013. This report documents post-construction seedling densities during the first growing season along the section of pipeline that was seeded and on which irrigation was initiated in 2012. This section is specifically labeled S3-12 and extends from Antelope Road northward to the end of work package S3. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction seedling density survey under contract to Colorado Springs Utilities.

The following includes the methods used, the results, and a discussion of the seedling density evaluation on the sites after any construction activities. Maps of Work Package S3-12 are contained in Appendix A.

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Given the important effect of soils on details of pre-existing vegetation and the outcome of revegetation efforts, pre-existing conditions and revegetation performance standards for plant cover were separated by soil group. These groups differ from each other in such characteristics as depth, texture, and salt content, all of which along with other variable factors have the potential to affect the extent and nature of the revegetation process as well as the rate of establishment and development. Within the "soil groups" identified in the Pueblo County portions of the SDS pipeline, five occurred in Work Package S3-12 :

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa Series): 13.1% of Work Package S3-12

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt Series): 2.8% of Work Package S3-12

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo Series): 47.2% of Work Package S3-12

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor Series): 35.6% of Work Package S3-12

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson Series and Ustic Torrifluvents): 1.3% of Work Package S3-12.

The distribution of these Soil Groups (based on previous mapping in SCS (1979)) is indicated on the maps of S3-12 included in Appendix A

Methods

As per the Pueblo County Revegetation Cover Establishment Protocol (Protocol), seedling density sample size was 30 per Soil Group for Work Package S3 in its entirety. Thus the samples in the S3-12 section represent only a portion of the total samples in S3. The area of Soil Group F (Haverson Series) in the S3 section of the pipeline is only approximately 1500 square feet, consequently, 30 samples could not be placed in this group. The computer-selected sample points were visited in the field using handheld GPS units during the period of July 29-31, 2013. At each point a 0.5 square meter circular plot was placed on the ground by blind drop at the point indicated by the GPS device. Within the plot, all seedlings of perennial plants were tallied. Acceptable species are those from the seed mix as well as all other non-noxious perennial plant species.

Data were tallied and converted from the number of seedlings per 0.5 sq. m. to the number per sq. ft., which is the unit of measure specified in construction specifications and the Protocol.

Results

Sample data are presented in Table. 1. As can be seen in Figure 1, all Soil Groups within Work Package S3-12, with the exception of Soil Group E (Razor Series) and F (Haverson Series), have seedling density levels above 4 per sq. ft.

Table 1. Results of Seedling Density Sampling of Seeded Area in Southern Delivery System Work Package S3-12

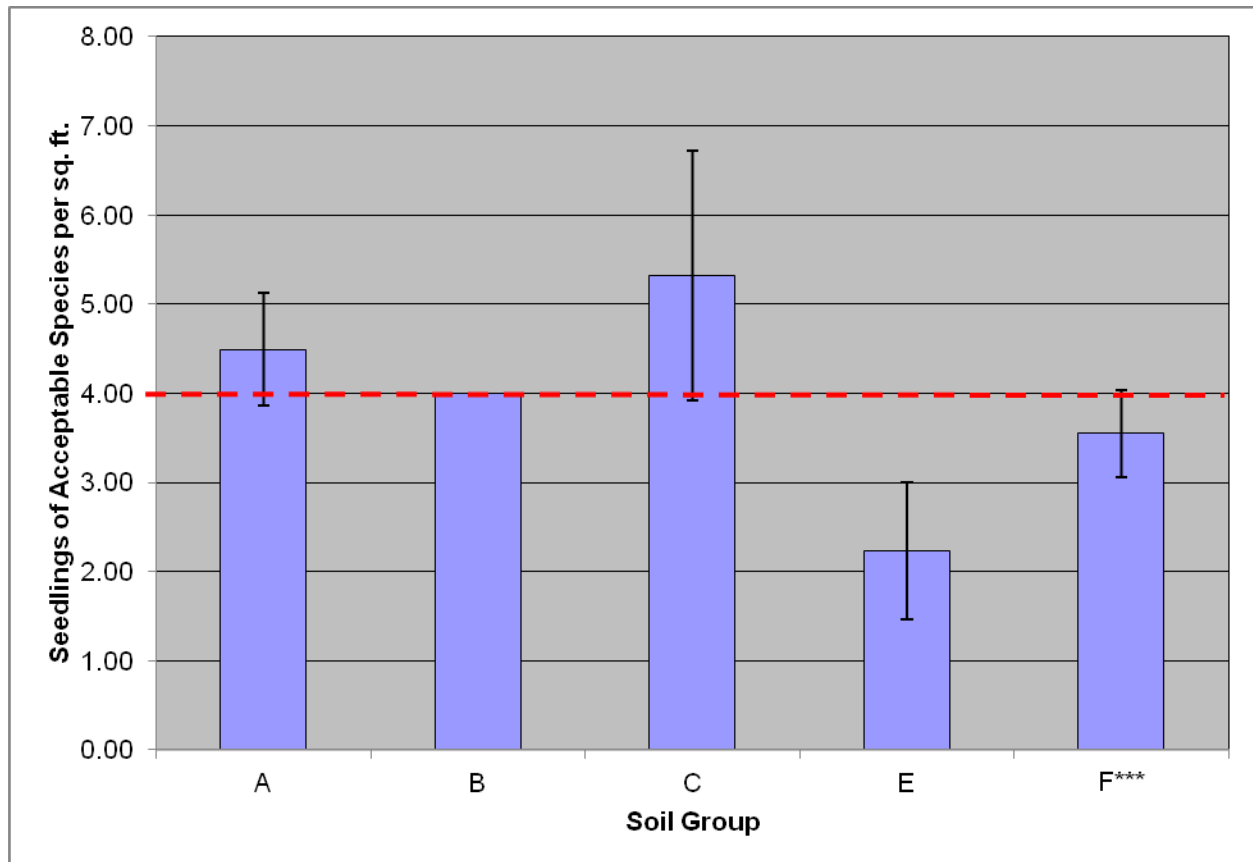
Work Package	Soil Group	Mean Seedling per sq. ft.*	90% Confidence Interval (+/-)	Sample Size (n)
S3 2012**	A	4.49	0.63	30
S3 2012**	B	4.00	0.00	1
S3 2012**	C	5.32	1.40	12
S3 2012**	E	2.23	0.77	9
S3 2012	F***	3.55	0.49	10

* Seedlings of acceptable species meaning those included in the Seed Mix and any other non-noxious perennials

** Note that as per the Pueblo County Protocol, Seedling Density sample size was 30 per Work Package / Soil Group. This is true of Work Package S3, but the separation shown reflects the fact that on the northernmost portion of S3 (north of Antelope Road) irrigation was initiated in fall 2012 while on the southern portion, irrigation was not initiated until part way into the 2013 growing season due to on-going work.

*** This unit of approximately 1500 square feet was too small to justify 30 samples.

Figure 1. Preliminary Seedling Density of Work Package S3-12



Discussion

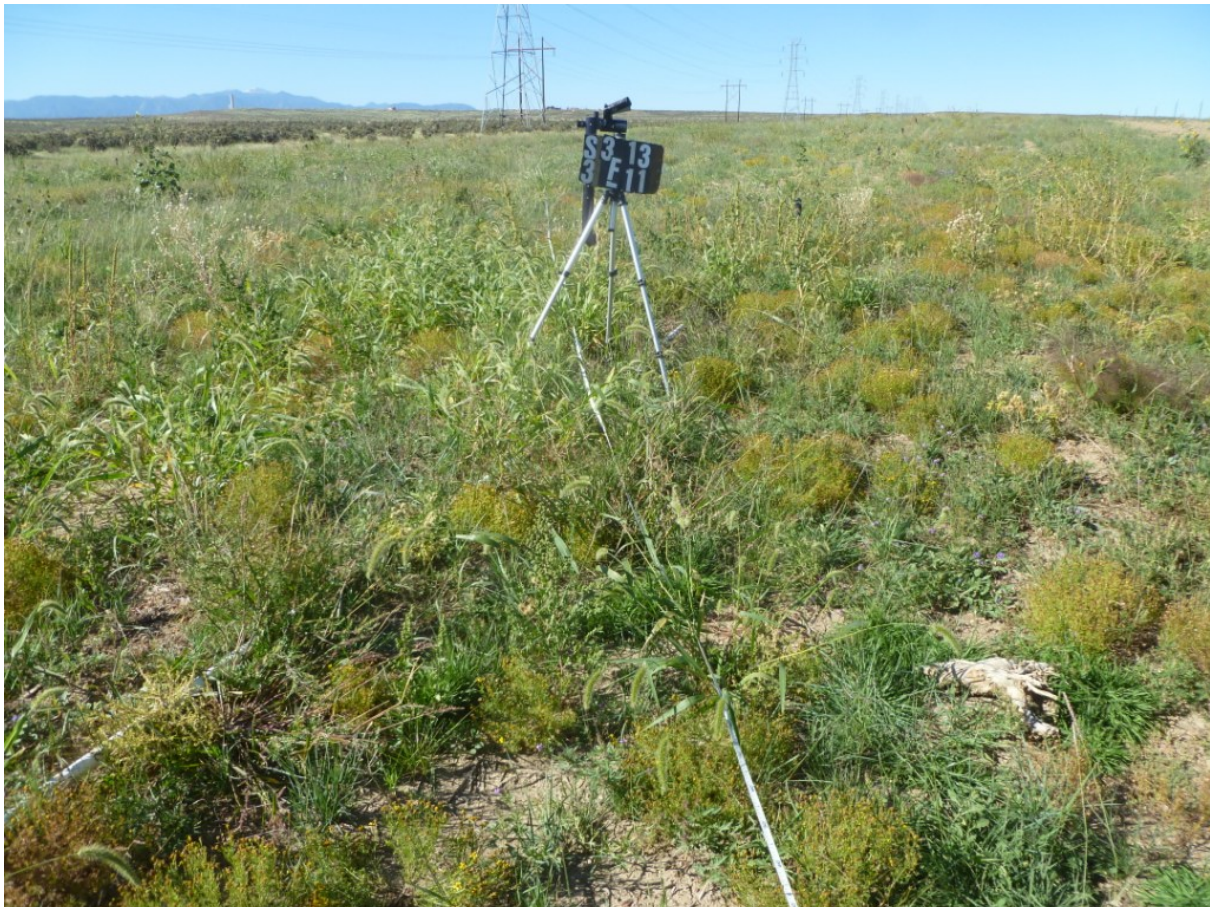
The recent string of drought years in Pueblo County has continued in 2013. This scarcity of water has made the presence of irrigation on the seeded pipeline right-of-way essential for seed germination to occur. The earlier implementation of irrigation on the S3-12 section resulted in higher seedling densities compared to sections irrigated later (See Seedling Density Report for S3-13). In addition to water availability, it is apparent from these data that soil characteristics have an effect on seedling density. In the earlier stages of the revegetation process, the seedling density metric is the most direct indicator of the progress of the seeded areas toward the ultimate goal of vigorous self-sustaining plant cover. The presence of (a minimum of) 4 seedlings per sq. ft. is the level that would be expected in irrigated areas after a full growing season. Since the seedling density in all but two (Groups E and F) of the Soil Groups in S3-12 surpassed the 4 seedlings per sq. ft. standard, the initial progress of vegetation regrowth in this Work Package is indicative that revegetation efforts are likely to be successful. Revegetation progress will continue to be monitored through future evaluations of vegetation cover as the planted vegetation begins to mature

Literature Cited

USDA Soil Conservation Service (SCS). 1979. Soil Survey of Pueblo Area, Colorado: Parts of Pueblo and Custer Counties. U.S. Dept. of Agric. Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. 92 pp. plus maps.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Seedling Density for Pueblo County
Work Package S3-13*



Prepared for:
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October, 2013

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Cover Photo: Sample Site 11 on Soil Group E (Razor Series) in work package S3-13 (by ESCO Assoc. Inc.)



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Introduction

As the first look at success of seeding efforts in the Pueblo county portion of the Southern Delivery System (SDS) Pipeline, a quantitative evaluation of seedling density was carried out in late July, 2013. This report documents post-construction seedling densities during the first growing season along the section of pipeline that was seeded and on which irrigation was initiated in June 2013. This section is specifically labeled S3-13 and extends from the southern end of the S3 work package north to Antelope Road. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction seedling density survey under contract to Colorado Springs Utilities.

The following includes the methods used, the results, and a discussion of the seedling density evaluation on the sites after any construction activities. Maps of Work Package S3-13 are contained in Appendix A.

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Given the important effect of soils on details of pre-existing vegetation and the outcome of revegetation efforts, pre-existing conditions and revegetation performance standards for plant cover were separated by soil group. These groups differ from each other in such characteristics as depth, texture, and salt content, all of which along with other variable factors have the potential to affect the extent and nature of the revegetation process as well as the rate of establishment and development. Within the “soil groups” identified in the Pueblo County portions of the SDS pipeline, four occurred in Work Package S3-13:

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt Series): 44.0% of Work Package S3-13

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo Series): 7.8% of Work Package S3-13

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale Complex): 14.8% of Work Package S3-13

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor Series): 33.4% of Work package S3-13

The distribution of these Soil Groups (based on previous mapping in SCS (1979)) is indicated on the maps of S3-13 included in Appendix A

Methods

As per the Pueblo County Revegetation Cover Establishment Protocol (Protocol), seedling density sample size was 30 per Soil Group for Work Package S3 in its entirety. Thus the samples in the S3-13 section represent only a portion of the total samples in S3. The computer-selected sample points were visited in the field using handheld GPS units during the period of July 29-31, 2013. At each point a 0.5 square meter circular plot was placed on the ground by blind drop at the point indicated by the GPS device. Within the plot, all seedlings of perennial plants were tallied. Acceptable species are those from the seed mix as well as all other non-noxious perennial plant species.

Data were tallied and converted from the number of seedlings per 0.5 sq. m. to the number per sq. ft., which is the unit of measure specified in construction specifications and the Protocol.

Results

Sample data are presented in Table. 1. As can be seen in Figure 1, all Soil Groups within Work Package S3-13 fell short of the 4 seedlings per square foot target.

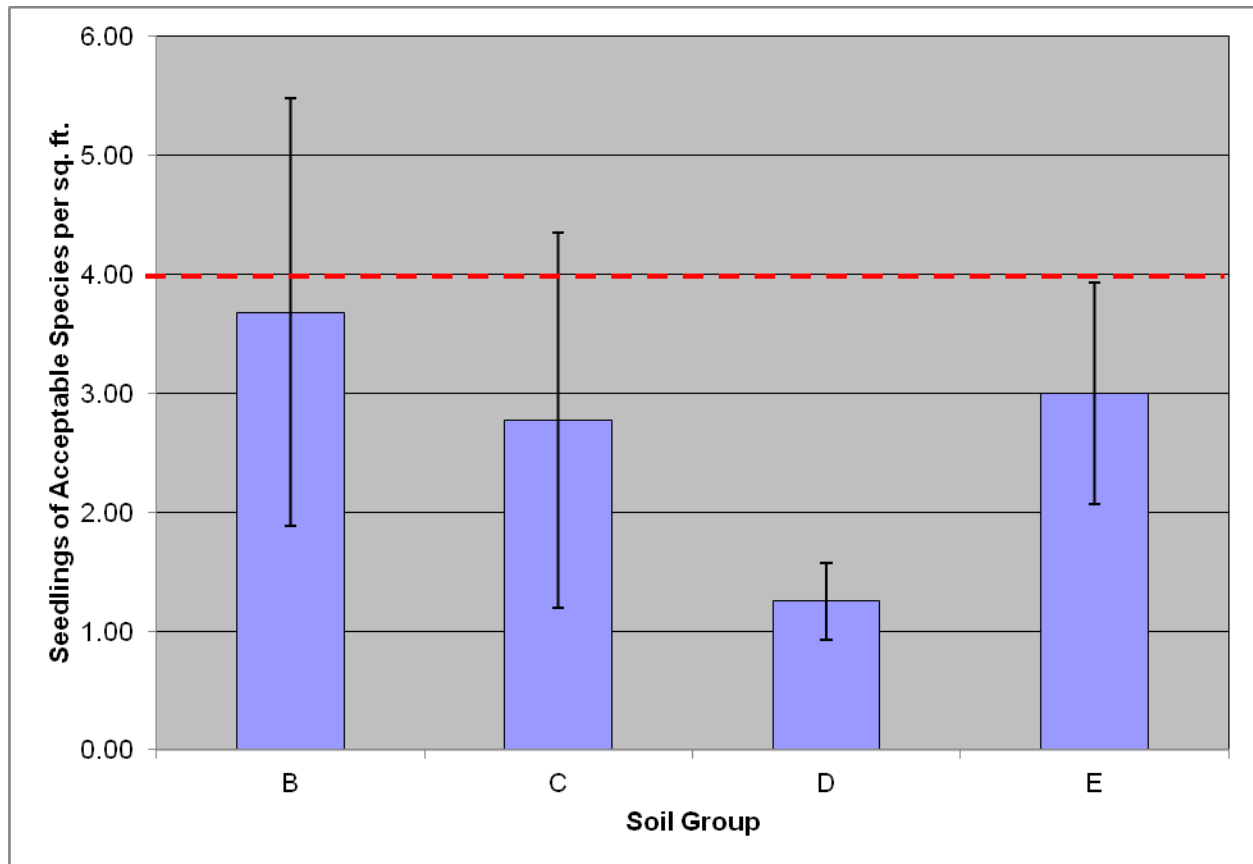
Table 1. Results of Seedling Density Sampling of Seeded Area in Southern Delivery System Work Package S3-13

Work Package	Soil Group	Mean Seedlings per sq. ft.*	90% Confidence Interval (+/-)	Sample Size (n)
S3 2013**	B	3.68	1.80	29
S3 2013**	C	2.77	1.58	18
S3 2013**	D	1.25	0.32	30
S3 2013**	E	3.00	0.93	21

* Seedlings of acceptable species meaning those included in the Seed Mix and any other non-noxious perennials

** Note that as per the Pueblo County Protocol, Seedling Density sample size was 30 per Work Package / Soil Group. This is true of Work Package S3, but the separation shown reflects the fact that on the northernmost portion of S3 (north of Antelope Road) irrigation was initiated in fall 2012 while on the southern portion, irrigation was not initiated until part way into the 2013 growing season due to on-going work.

Figure 1. Preliminary Seedling Density of Work Package S3-13



Discussion

The recent string of drought years in Pueblo County has continued in 2013. This scarcity of water has made the presence of irrigation on the seeded pipeline right-of-way essential for seed germination to occur. Onset of irrigation on the S3-13 section was during the first half of June 2013 and thus by late July, a period of as little as four weeks had elapsed since moisture was first applied. This resulted in lower seedling densities compared to sections irrigated earlier (See for example Seedling Density Report for S3-12). The success of seedlings in the same Soil Groups in the S3-12 section suggests that the seedling densities of section S3-13 will eventually attain higher seedling densities. During data gathering, it was obvious that a very large portion of counted seedlings were comprised of shoots that had emerged from the ground surface very recently, suggesting that the germination process at that time was on-going. Consequently, the seedling density measurements below the goal of 4 seedlings per square feet should not be cause for alarm, it is clear from this sampling that germination is occurring and is expected to continue to progress from this early stage. It is likely that seedling density values will exceed the level of 4 per sq. ft. once full germination is accomplished.

In addition to water availability, it is apparent from these data that soil characteristics have an effect on seedling density. In the earlier stages of the revegetation process, the seedling density metric is the most direct indicator of the progress of the seeded areas toward the ultimate goal of vigorous self-sustaining plant cover. The presence of (a minimum of) 4 seedlings per sq. ft. is the

level that would be expected in irrigated areas after a full growing season. Revegetation progress will continue to be monitored through future evaluations of vegetation cover as the planted vegetation begins to mature.

Literature Cited

USDA Soil Conservation Service (SCS). 1979. Soil Survey of Pueblo Area, Colorado: Parts of Pueblo and Custer Counties. U.S. Dept. of Agric. Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. 92 pp. plus maps.

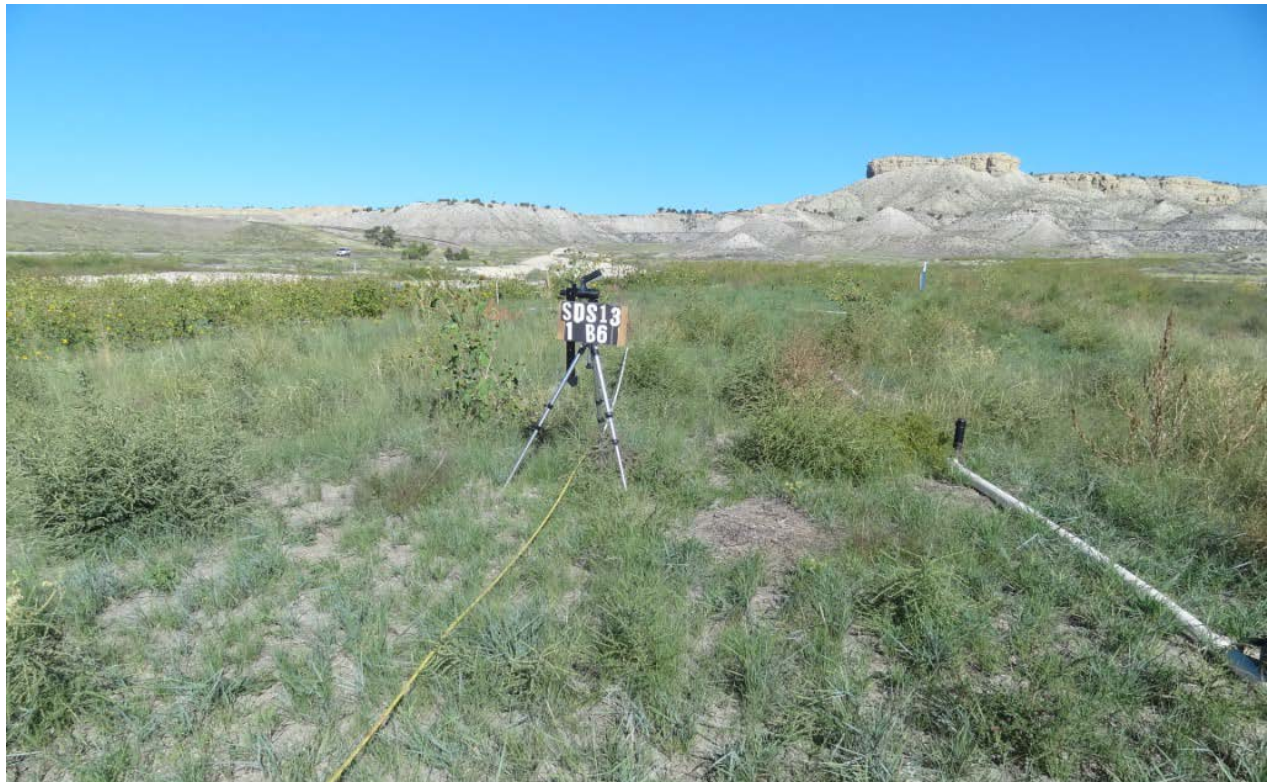


TECHNICAL TAB 7 –

- **SDS Post-Restoration Vegetation Cover Reports – CNHP (October 2013)**
 - Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S1
 - Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S2
 - Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-12
 - Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-13

Colorado Springs Utilities Southern Delivery System

Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S1



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Cover Photo: Sample site 6 on Soil Group B (Limon and Heldt Series) in work package S1 (by ESCO Assoc. Inc.)



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Introduction

This report documents conditions of post-construction vegetation cover after the first growing season along the S1 section of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction survey under contract to Colorado Springs Utilities. This report compares post-construction vegetative cover values to the standards for revegetation prescribed by CDPHE Stormwater Regulations and the Pueblo County 1041 permit in order to evaluate revegetation success in this section. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following includes the methods used, the results, and a discussion of factors affecting vegetation cover on the sites after any construction activities. Maps, tabular data, and photographs of work package S1 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocol (Protocol).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Methods

Assessment of Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late September 2013 as per a formal Protocol developed for the project. Prior to this, in July 2013, the density of seedlings of acceptable species per square foot was assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, but the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013.

The primary parameter assessed in the September work was percent cover by acceptable species as set forth in the protocol. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. It also relates to the requirement under CDPHE Stormwater Regulations that cover attains at least 70% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling in October 2011 prior to construction. Further details on this pre-construction effort can be found in the 2011 report.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures intended to provide Pueblo County with an evaluation of the adequate presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the Protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

Areas that were not seeded or irrigated as part of the revegetation effort were not sampled.

Results

A total of 30 transects were sampled in the work package S1 area during the post-construction survey. The various soils across the extent of the work package were grouped for simplicity into four units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The four groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B)

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 2, Appendix B)

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Post-construction values not yet measured)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B)

The distribution of these Soil Groups is indicated on the maps of S1 included in Appendix A.

Although Soil Group C is present in Work Package S1, the vegetative cover of this soil group was not measured during this sampling effort as this portion of the pipeline had not yet been irrigated. Due to the recent string of drought years, vegetation in this region is dependent on irrigation for seedling germination. Consequently, without irrigation in place, vegetation cover values for this Soil Group would have been misrepresentative of the revegetation progress.

Plant cover observed during sampling was related to the above soil groups and used to establish base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are base vegetation cover values (to be multiplied by 0.9 in accordance with the Protocol) that were measured pre-construction.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%** (Note that this represents the level found on Limon soils in ungrazed S1)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%**.

Post Construction Results

Table 1 (below) displays the base vegetation cover, revegetation cover values at the 90% and 70% levels (established under Pueblo Co. 1041 and CDPHE Stormwater Regulations, respectively), and the post-construction percent cover values by soil groups. Soil group C does not have an associated post-construction cover value as construction in this section was yet to be completed through a significant portion of the 2013 growing season. Vegetation sampling on soil group C will be initiated in 2014. Figure 1 (below) graphically represents this information. As can be seen in Figure 1 and Table 1, total cover by acceptable species exceeded the 70% and 90% levels (prescribed under Pueblo Co. 1041) for all of S1 as of late September 2013. Note, however, that CDPHE cover expectations include all species present (including introduced annual species deemed partially unacceptable in Pueblo Co. evaluations).

Table 1: Vegetation Cover by Soil Group for S1

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Performance Std. (0.9 x Base)	70% Revegetation Cover Performance Std. (0.7 x Base)	% Cover by Acc. Spp
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	71.7	17.2	15.5	12.1	33.3
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	17.9	26.5	23.9	18.6	30.2
D	Soils on Weathered Shales (with active erosional removal) (Midway – shale complex; Shingle series)	10.4	17.0	15.3	11.9	51.3

Figure 1: Fall 2013 S1 SDS Pueblo Co. Restoration Cover Levels vs. 2014 Standards

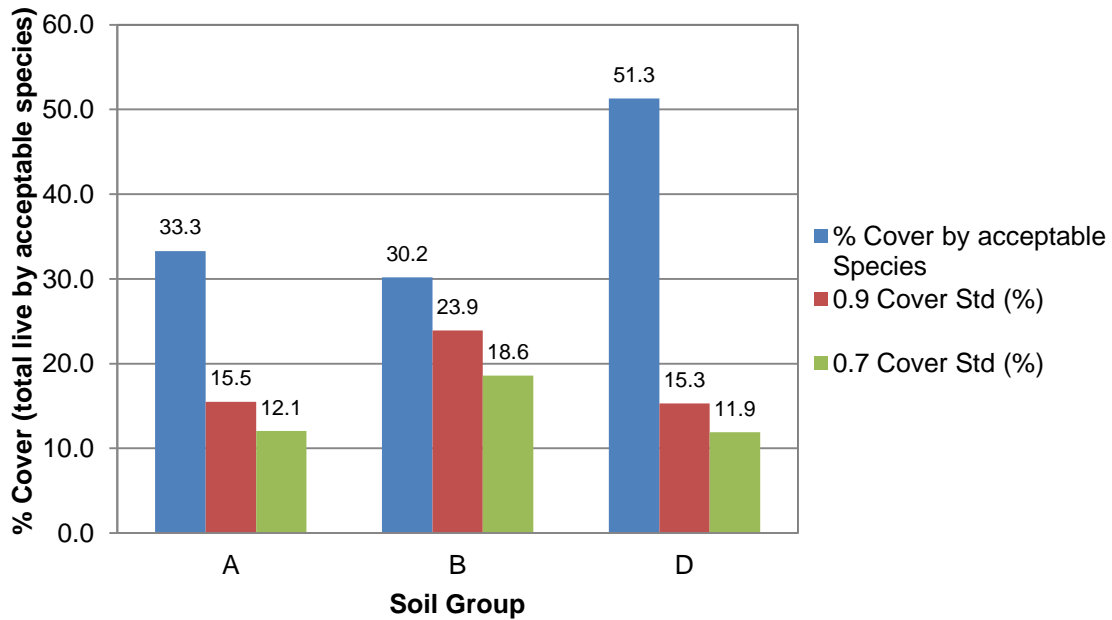


Figure 2: Fall 2013 S1 SDS Pueblo Co. Restoration Presence of Acceptable Species vs. 2014 Standards

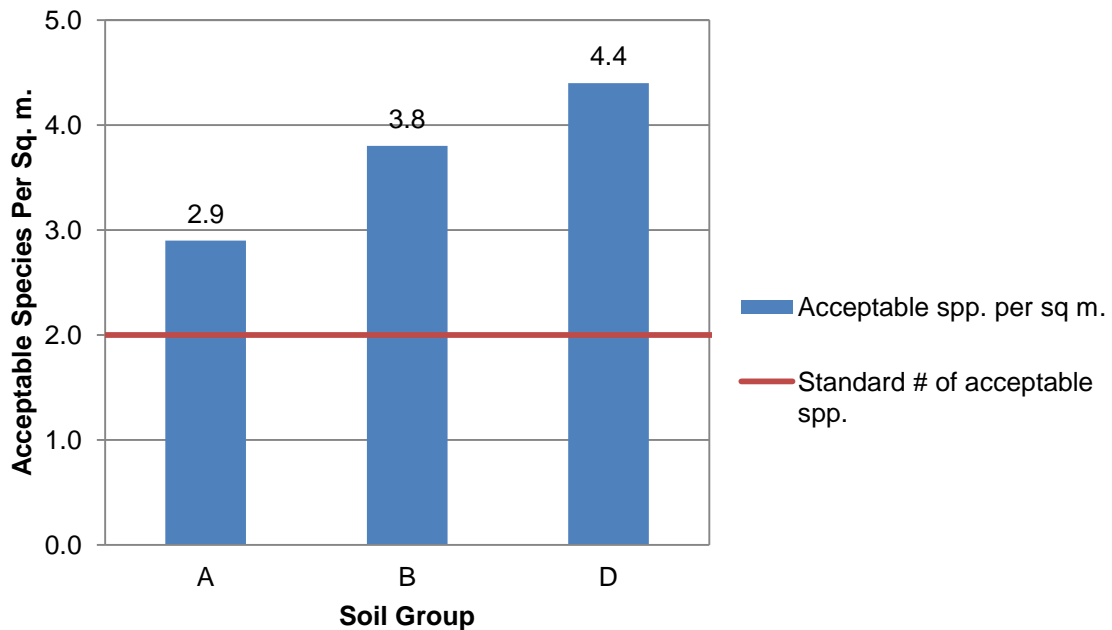


Figure 2 (above) displays the number of acceptable species present on each soil type in S1 compared to the pre-established standard of 2 species per square meter. In all soil groups, the number of acceptable species present surpassed the standard.

Discussion

Post-Construction Revegetation Performance

Vegetation cover by acceptable species in all soil groups in S1 sampled in 2013 surpassed both the Pueblo County 1041 permit standards and the CDPHE Stormwater Regulation standards. All areas of S1 sampled in 2013 surpassed the criterion of 2 acceptable species per square meter in the developing reconstructed vegetation (Figure 2). This supports a conclusion that all areas of the S1 work package have reached the pre-determined acceptable levels of post-construction vegetation cover as of the end of the first growing season. It should be noted that the 90% revegetation cover performance standards set forth in the Pueblo County 1041 permit are applicable over a two-year period. The fact that S1 measurements presented here, taken at the end of the first growing season (September 2013), have already exceeded the 90% standard values suggests that revegetation and post-construction species composition development are moving in the right direction.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Vegetation Cover for Pueblo County
Work Package S2*



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October, 2013

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Cover Photo: Sample site 14 on Soil Group A (Penrose, Manuel and Minnequa Series) in work package S2 (by ESCO Assoc. Inc.)



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Introduction

This report documents conditions of post-construction vegetation cover after the first growing season along the S2 section of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed the post-construction survey under contract to Colorado Springs Utilities. This report compares post-construction vegetative cover values to the standards for revegetation prescribed by CDPHE Stormwater Regulations and the Pueblo County 1041 permit in order to evaluate revegetation success in this section. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following includes the methods used, the results, and a discussion of factors affecting vegetation cover on the sites after any construction activities. Maps, tabular data, and photographs of work package S2 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Methods

Assessment of Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late September 2013 as per the Protocol developed for the project. Prior to this, in July 2013, the density of seedlings of acceptable species per square foot was assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, but the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013.

The primary parameter assessed in the September work was percent cover by acceptable species as set forth in the Protocol. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. It also relates to the requirement under CDPHE Stormwater Regulations that cover attains at least 70% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling in October 2011 prior to construction. Further details on this pre-construction effort can be found in the 2011 report.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures intended to provide Pueblo County with an evaluation of the adequate presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. These groups, established to simplify the process,

include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

Results

A total of 50 transects were sampled in the work package S2 area during the post-construction survey. The various soils across the extent of the work package were grouped for simplicity into four units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The four groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B)

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 2, Appendix B)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B)

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 4, Appendix B)

The distribution of these Soil Groups is indicated on the maps of S2 included in Appendix A.

Plant cover observed during sampling was related to the above soil groups and used to establish base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are base vegetation cover values (to be multiplied by 0.9 in accordance with the Protocol) that were measured pre-construction.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%**
(Note that this represents the level found on Limon soils in ungrazed S2)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%**.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents): **41.3%**

Post Construction Results

Table 1 (below) displays the base vegetation cover, revegetation cover values at the 90% and 70% levels (established under Pueblo Co. 1041 and CDPHE Stormwater Regulations, respectively), and the post-construction percent cover values by the respective soil groups. In all soil groups, post-construction vegetation cover met or exceeded the 70% revegetation performance standards. Soil groups A, B and F surpassed the 90% revegetation performance standards, but soil group D did not. Note, however, that CDPHE cover expectations include all species present (including introduced annual species deemed partially unacceptable in Pueblo Co. evaluations). Figure 1 graphically represents this information.

Table 1: Vegetation Cover per Soil Group for S2

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Performance Std. (0.9 x Base)	70% Revegetation Cover Performance Std. (0.7 x Base)	% Cover by Acc. Spp
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	68.3	17.2	15.5	12.1	29.2
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	23.6	26.5	23.9	18.6	26.4
D	Soils on Weathered Shales (with active erosional removal) (Stoneham and Cascajo series)	4.0	17.0	15.3	11.9	13.1
F	Soils on recent alluvium of moderate texture and salt content (Haverson series and Ustic Torrifluvents)	4.1	41.3	37.2	28.9	38.6

Figure 1: Fall 2013 S2 SDS Pueblo Co. Restoration Cover Levels vs. 2014 Standards

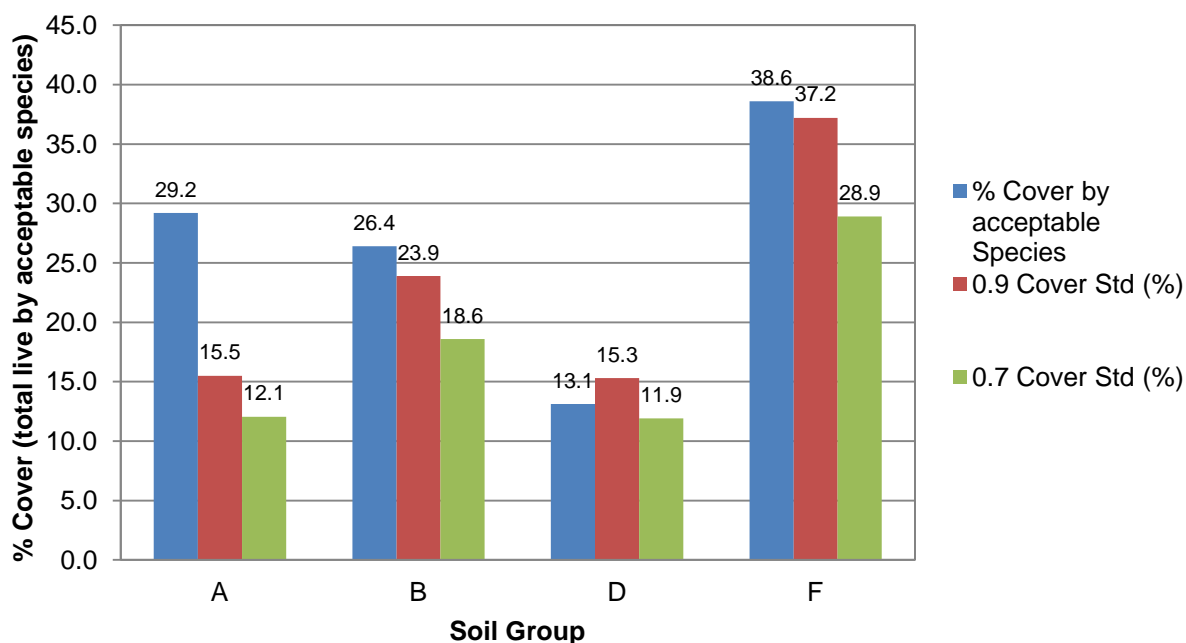


Figure 2: Fall 2013 S2 SDS Pueblo Co. Restoration Presence of Acceptable Species vs. 2014 Standards

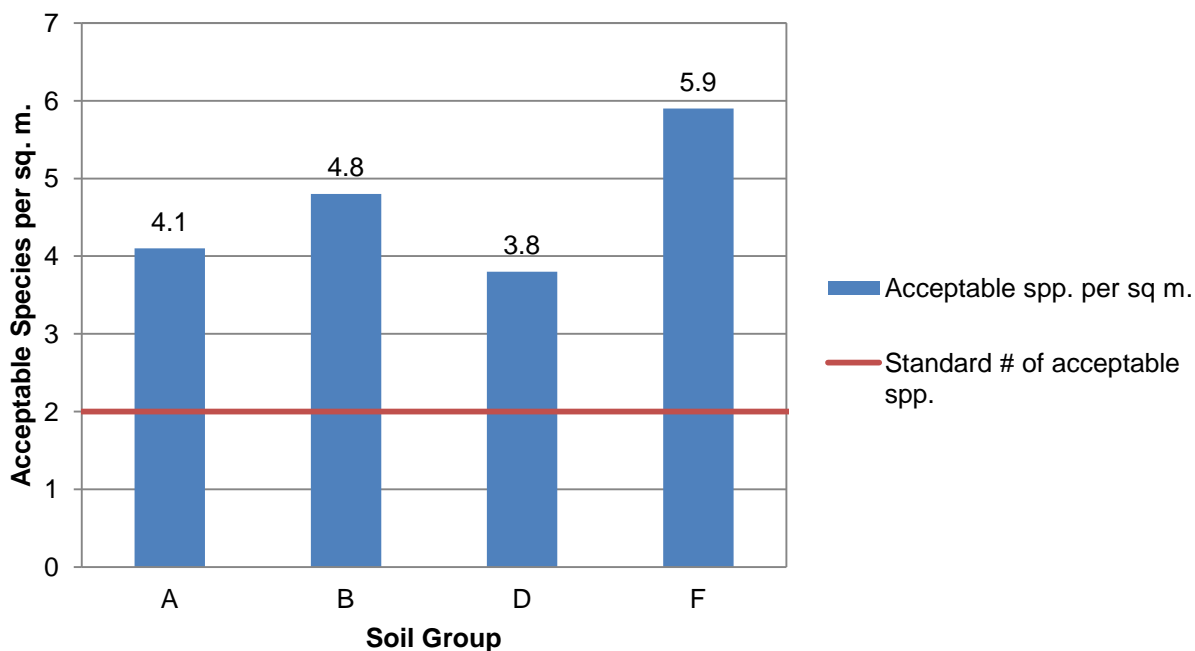


Figure 2 displays the number of acceptable species present on each soil type in S2 compared to the pre-established standard of 2 species per square meter. In all soil groups, the mean number of acceptable species present surpassed the standard.

Discussion

Post-Construction Revegetation Performance

The 70% revegetation CDPHE Stormwater Regulation standards were surpassed in all soil groups within work package S2; however soil group D did not meet the 90% Pueblo County permit 1041 standards. It should be noted that the 90% revegetation cover performance standards stated in the Pueblo County 1041 permit are applicable over a two-year period. The S2 measurements presented here were taken at the end of the first growing season (September 2013). If the currently observable revegetation trends continue in this area, the 90% standards should be met before the 2-year period. Additionally, all areas of S2 surpassed the criterion of 2 acceptable species per square meter in the developing reconstructed vegetation. This supports a projection that, even though not all areas of the S2 work package have reached the 90% revegetation standard levels, post-construction species composition development is moving in the right direction.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Vegetation Cover for Pueblo County
Work Package S3-12*



Prepared for:
**Colorado Springs Utilities
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Prepared by:
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October, 2013

Prepared in conjunction with:

**ESCO Associates, Inc.
Boulder, CO**



**Cover Photo: Sample site 9 on Soil Group A (Penrose, Manuel and Minnequa Series) in work package S3-12
(by ESCO Assoc. Inc.)**



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Introduction

This report documents conditions of post-construction vegetation cover after the first growing season along the section of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado, that was seeded and on which irrigation was initiated in 2012. This section is specifically labeled S3-12 and extends from Antelope Road northward to the end of work package S3.. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed this post-construction survey under contract to Colorado Springs Utilities. This report compares post-construction vegetative cover values to the standards for revegetation prescribed by CDPHE Stormwater Regulations and the Pueblo County 1041 permit in order to evaluate revegetation success in this section. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following includes the methods used, the results, and a discussion of factors affecting vegetation cover on the sites after any construction activities. Maps, tabular data, and photographs of work package S3-12 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Methods

Assessment of Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late September 2013 as per the Protocol developed for the project. Prior to this, in July 2013, the density of seedlings of acceptable species per square foot was assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, but the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013.

The primary parameter assessed in the September work was percent cover by acceptable species as set forth in the Protocol. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. It also relates to the requirement under CDPHE Stormwater Regulations that cover attains at least 70% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling in October 2011 prior to construction. Further details on this pre-construction effort can be referenced in the 2011 report.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures intended to provide Pueblo County with an evaluation of the adequate presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the Protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

Results

A total of 31 transects were sampled in the work package S3-12 area during the post-construction survey. The various soils across the extent of the work package were grouped for simplicity into five units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The five groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B)

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Not Sampled)

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series); Table 2, Appendix B)

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 3, Appendix B)

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Not Sampled)

The distribution of these Soil Groups is indicated on the maps of S3-12 included in Appendix A.

Plant cover observed during sampling was related to the above soil groups and used to establish base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are base vegetation cover values (to be multiplied by 0.9 in accordance with the Protocol) that were measured pre-construction.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **Not Sampled**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series): **35.0%**

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series): **23.3%**

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents): **Not Sampled**

Post Construction Results

Table 1 displays the base vegetation cover, revegetation cover values at the 90% and 70% levels (established under Pueblo Co. 1041 and CDPHE Stormwater Regulations, respectively), and the post-construction percent cover values by the respective soil groups. Figure 1 graphically represents this information. In soil groups A and E, post-construction vegetation cover exceeded the 90% revegetation performance standards. Soil Group C met neither the 70% nor the 90% revegetation standards. Note, however, that CDPHE cover expectations include all species present (including introduced annual species deemed partially unacceptable in Pueblo Co. evaluations). Soil Groups B and F constituted only 2.8% and 1.5%, respectively, of the S3-12 work package area. Sites within soil group F were flooded during the time of sampling and could not be assessed. The Soil Group B area at the far north end of S3 was partially disturbed by the tie-in to the S4AW work package and was not sampled in 2013.

Table 1: Vegetation Cover per Soil Group for S3-12

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Performance Std. (0.9 x Base)	70% Revegetation Cover Performance Std. (0.7 x Base)	% Cover by Acc. Spp
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	13.1	17.2	15.5	12.1	42.0
B	Soils on clay-rich, salt affected alluvial material (Limon and Heldt Series)	2.8	NS	NS	NS	NS
C	Soils deep on early Pleistocene alluvium (Midway – shale complex; Shingle series)	47.2	35.0	31.5	24.5	23.2
E	Soils on deeply weathered shales (without active erosional removal) (Razor series)	35.6	23.3	21.0	16.3	28.6
F	Soils on recent alluvium of moderate texture and salt content (Haverson series and Ustic Torrifluvents)	1.3	NS	NS	NS	NS

NS = Not Sampled

Figure 1: Fall 2013 S3-12 SDS Pueblo Co. Restoration Cover Levels vs. 2014 Standards

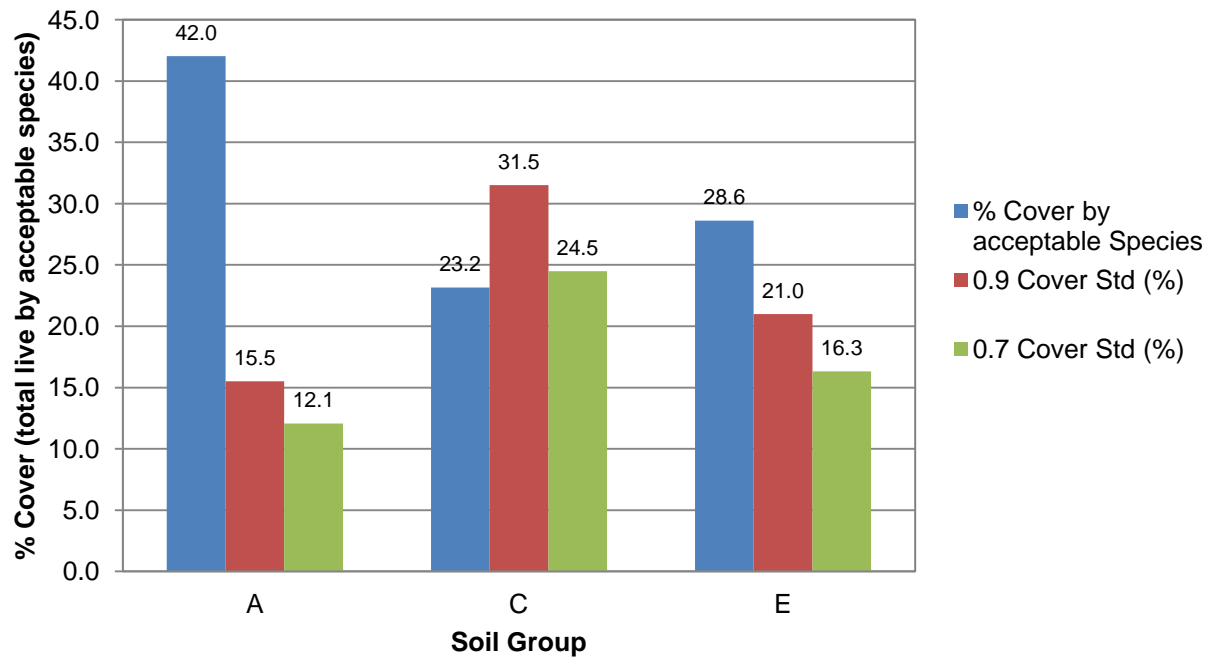


Figure 2: 2014 S3-12 SDS Pueblo Co. Presence of Acceptable Species

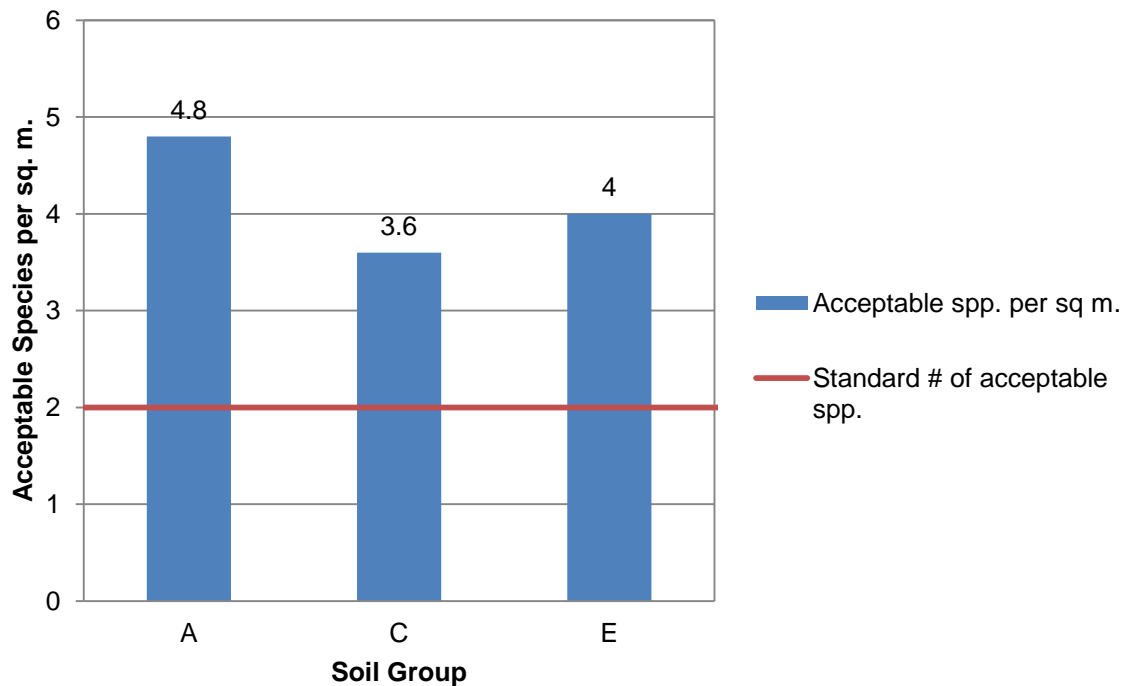


Figure 2 displays the number of acceptable species present on each soil type in S3-12 compared to the pre-established standard of 2 species per square meter. In all soil groups, the number of acceptable species present surpassed the standard.

Discussion

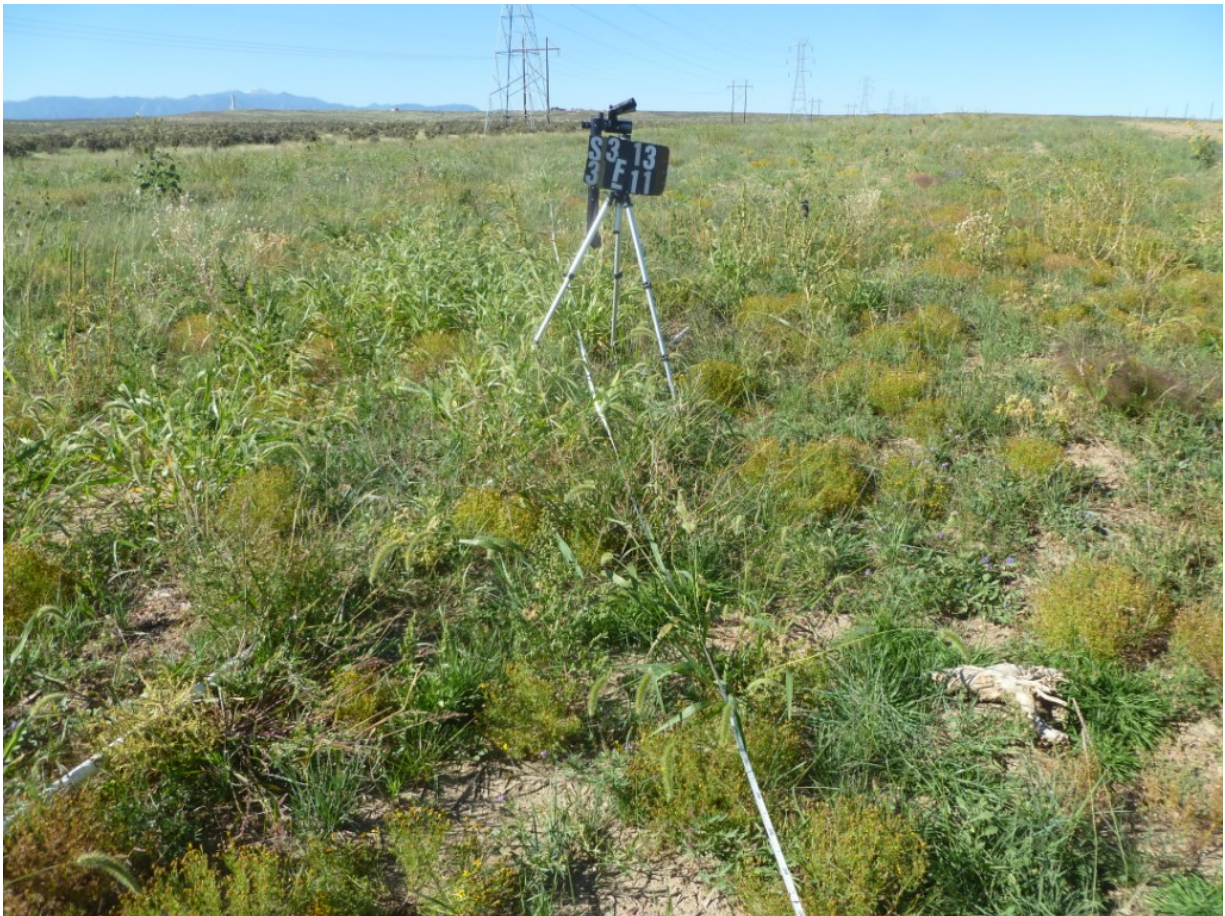
Post-Construction Revegetation Performance

Not all sampled sites in S3-12 had reached the 70% CDPHE Stormwater Regulation standards or the 90% 1041 Pueblo County permit standards at the time of sampling. The portion not meeting the standard as of September 2013 was Soil Group C, comprised of well-developed soils that supported high total vegetation cover, but with much of this cover comprised of Russian thistle as of September 2013. Mean density of acceptable seedlings observed in July 2013 on these areas was greater than 5 per square foot. It is thought likely that the substantial grazing by local livestock has significantly reduced the presence of desirable species and allowed the Russian thistle to grow especially large. If the livestock grazing pressure can be controlled, the potential in 2014 for development of an adequate stand of vegetation here is present. If not, then the performance standards will not apply to this area as per provisions of the Protocols.

It should be noted that the 90% revegetation cover performance standards stated in the Pueblo County 1041 permit are applicable over a two-year period. The S3-12 measurements presented here were taken at the end of the first growing season (September 2013), and vegetation cover can be expected to increase over time. The number of acceptable species surpassed the standard (2 species) in all soil groups. This supports a conclusion that, even though not all areas of the S3-12 work package have reached the revegetation standard levels, species composition is moving in the right direction, though full achievement of target levels may be impossible if excessive livestock grazing continues in some of the areas.

Colorado Springs Utilities Southern Delivery System

*Measurements of Post-restoration Vegetation Cover for Pueblo County
Work Package S3-13*



Prepared for:
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October, 2013

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Cover Photo: Sample Site 11 on Soil Group E (Razor Series) in work package S3-13 (by ESCO Assoc. Inc.)



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Introduction

This report documents conditions of post-construction vegetation cover after the first growing season along the portion of the S3 sections of the Southern Delivery System (SDS) pipeline route in Pueblo County, Colorado, that on which irrigation was initiated in 2013. This reach is labeled S3-13. It extends from the southern end of the S3 work package north to Antelope Road. The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed this post-construction survey under contract to Colorado Springs Utilities. This report compares post-construction vegetative cover values to the standards for revegetation prescribed by CDPHE Stormwater Regulations and the Pueblo county 1041 permit in order to evaluate revegetation success in this section. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following includes the methods used, the results, and a discussion of factors affecting vegetation cover on the sites after any construction activities. Maps, tabular data, and photographs of work package S3-13 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Methods

Assessment of Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late September 2013 as per the Protocol developed for the project. Prior to this, in July 2013, the density of seedlings of acceptable species per square foot was assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, but the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013.

The primary parameter assessed in the September work was percent cover by acceptable species as set forth in the protocol. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. It also relates to the requirement under CDPHE Stormwater Regulations that cover attains at least 70% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling in October 2011 prior to construction. Further details on this pre-construction effort can be referenced in the 2011 report.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures intended to provide Pueblo County with an evaluation of the adequate presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the Protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

Results

A total of 50 transects were sampled in the work package S3-13 area during the post-construction survey. The various soils across the extent of the work package were grouped for simplicity into five units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The five groups are as follows:

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 1, Appendix B)

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Table 2, Appendix B)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B)

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 4, Appendix B)

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Not Sampled)

The distribution of these Soil Groups is indicated on the maps of S3-13 included in Appendix A.

Plant cover observed during sampling was related to the above soil groups and used to establish base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are base vegetation cover values (to be multiplied by 0.9 in accordance with the Protocols) that were measured pre-construction.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series): **35.0%.**

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%.**

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series): **23.3%**

Post Construction Results

Table 1 (below) displays the base vegetation cover, revegetation cover values at the 90% and 70% levels (established under Pueblo Co. 1041 and CDPHE Stormwater Regulations, respectively), and the post-construction percent cover values for vegetation in their respective soil groups. Figure 1 graphically represents this information. In soil groups B, C, D and E post-construction vegetation cover exceeded the 90% revegetation performance standards. Note, however, that CDPHE cover expectations include all species present (including introduced annual species deemed partially unacceptable in Pueblo Co. evaluations. Sites within soil group F were flooded during the time of sampling and could not be assessed. Soil group F constituted only 0.4% of the S3-13 work package area, and had these areas been sampled they would have only yielded space for a single sampling transect.

Table 1: Vegetation Cover per Soil Group for S3-13

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Performance Std. (0.9 x Base)	70% Revegetation Cover Performance Std. (0.7 x Base)	% Cover by Acc. Spp
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	44.0	26.5	23.9	18.6	24.1
C	Soils deep on early Pleistocene alluvium (Stoneham and Cascajo series)	7.8	35.0	31.5	24.5	39.3
D	Soils on Weathered Shales (with active erosional removal) (Midway – shale complex; Shingle series)	14.8	17.0	15.3	11.9	16.9
E	Soils on recent alluvium of moderate texture and salt content (Haverson series and Ustic Torrifluvents)	33.4	23.3	21.0	16.3	30.9

Figure 1: Fall 2013 S3-13 SDS Pueblo Co. Restoration Cover Levels vs. 2014 Standards

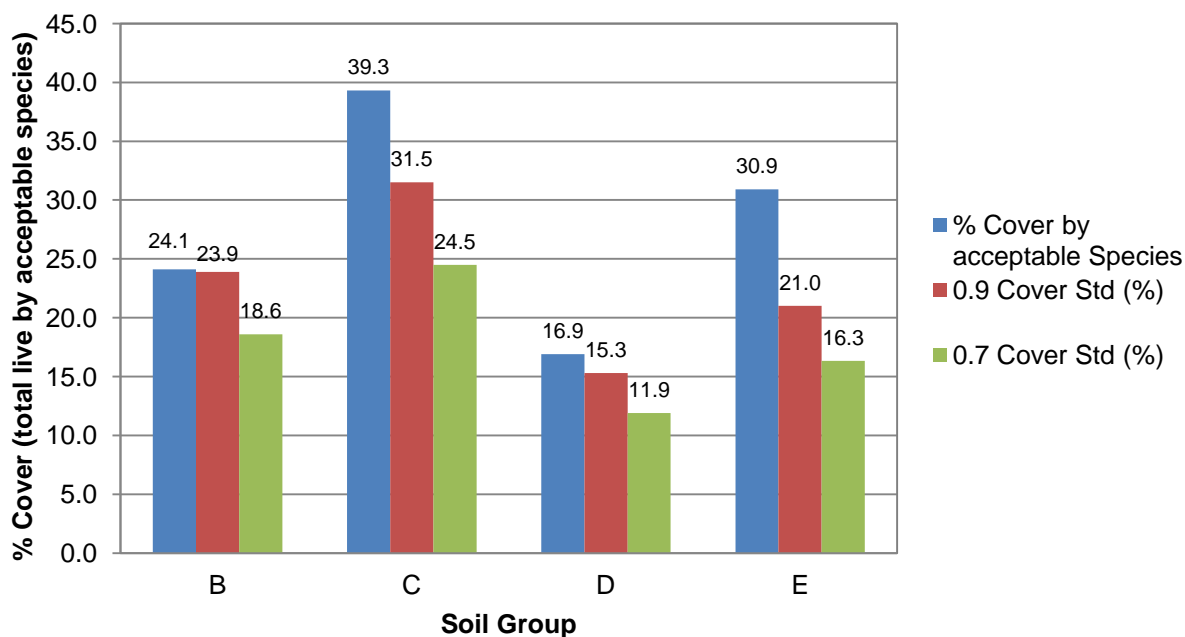


Figure 2: 2014 S3-13 SDS Pueblo Co. Presence of Acceptable Species

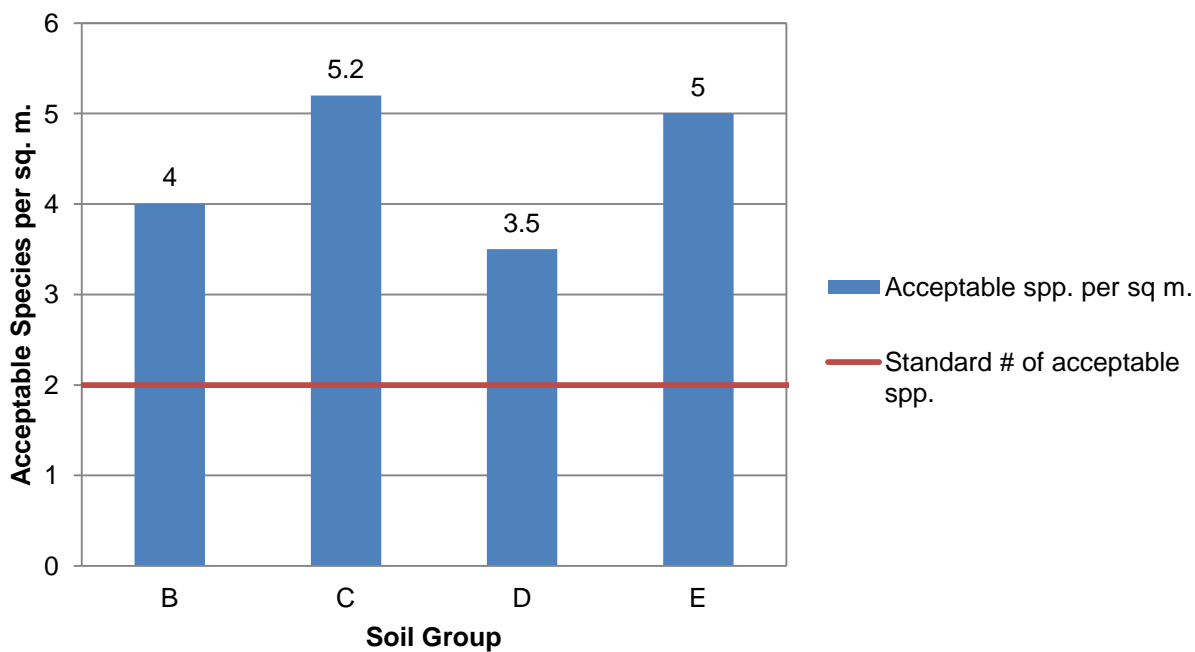


Figure 2 displays the number of acceptable species present on each soil type in S3-13 compared to the pre-established standard of 2 species per square meter. In all soil groups, the number of acceptable species present surpassed the standard.

Discussion

Post-Construction Revegetation Performance

None of the Soil Groups sampled in section S3-13 failed to equal or exceed the Pueblo County 1041 permit standard of 90%. Some areas within this unit had been damaged to varying degrees by broad-scale flooding associated with a large precipitation event in early September 2013. It is anticipated that reseeding the results will bring the low areas upward and the overall soil group B cover values in 2014 will be satisfactory.

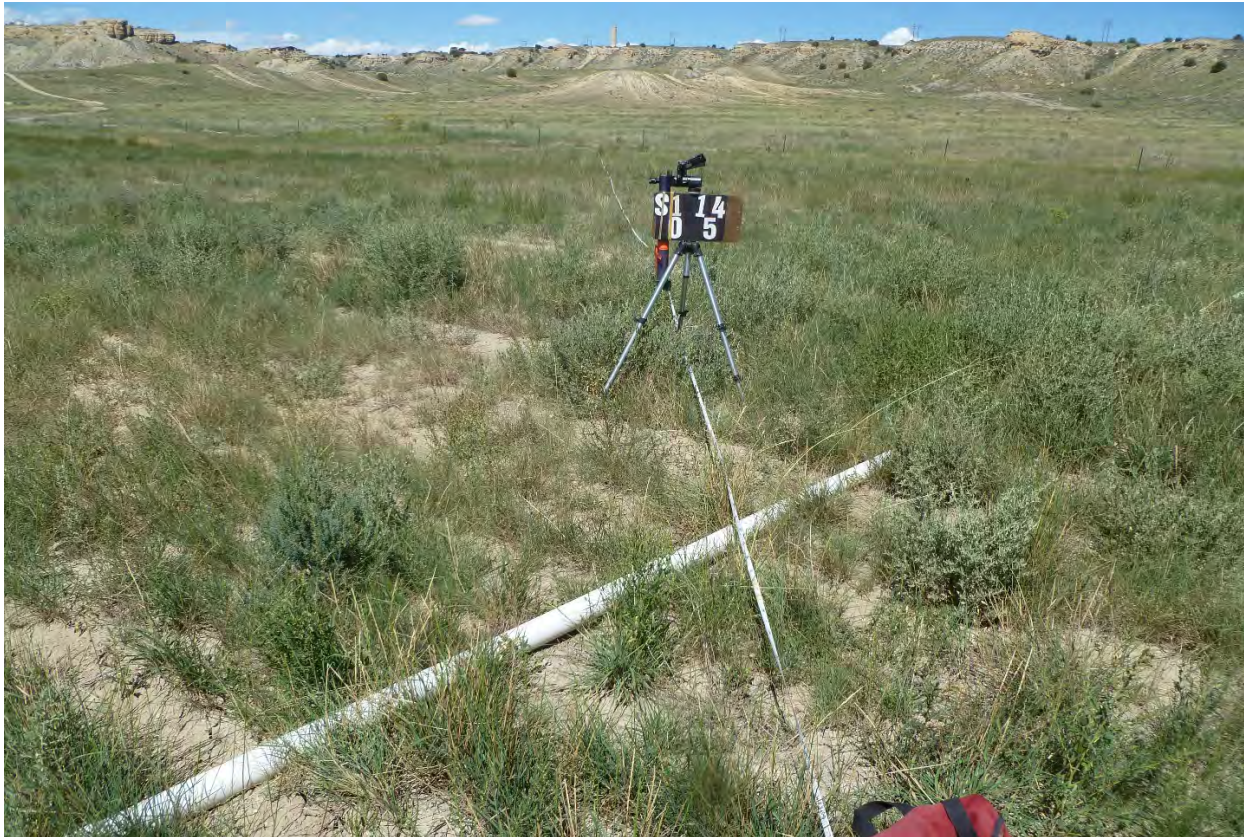
However, it should be noted that the 90% revegetation cover performance standards stated in the Pueblo County 1041 permit are applicable over a two-year period. The S3-13 measurements presented here were taken at the end of the first growing season (September 2013), and vegetation cover can be expected to increase over time. The number of acceptable species surpassed the standard (2 species per square meter) in all soil groups. Despite damage that occurred in September 2013 on the Soil Group B sites, the cover data suggest that compliance with the 90% standard after the 2014 growing season is likely. From species presence data it can also be seen that species composition is also moving in the right direction.

TECHNICAL TAB 8 –

- **SDS Restored Vegetation Cover Monitoring Reports – CNHP (September 2014)**
 - Restored Vegetation Cover Monitoring – Work Segment S1
 - Restored Vegetation Cover Monitoring – Work Segment S2
 - Restored Vegetation Cover Monitoring – Work Segment S3-12
 - Restored Vegetation Cover Monitoring – Work Segment S3-13N
 - Restored Vegetation Cover Monitoring – Work Segment S3-13S

Colorado Springs Utilities Southern Delivery System

Restored Vegetation Cover Monitoring – Work Segment S1



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Cover Photo: Sample site 5 on Soil Group D (Midway – Shale complex, Shingle series) in work package S1 (by ESCO Assoc. Inc.)



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Executive Summary

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. Construction of the S1 segment of the pipeline route was completed in 2013 and the disturbed areas were re-graded to pre-construction contours, seeded, and planting completed by May 24, 2013.

Assessment of Vegetative Cover and the frequency of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) had been assessed along these same reaches of revegetated right-of-way and were reported separately.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by soil series with similar potential for plant growth and revegetation suitability. The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standards. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The weighted average was calculated using the proportion of area each soil group occupied within the work segment.

In all soil groups, post-construction vegetation cover exceeded the 90% revegetation performance standards (see Table below). As an area weighted average, revegetation cover within the S1 work segment is 38.5% and exceeded the 90% performance standard (15.8%) by 22.7%.

Table 1: Vegetation Cover by Soil Group for S1

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Perf. Std. (0.9 x Base)	%Cover by Acc. Spp
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	88.8	17.2	15.5	38.6
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	3.8	26.5	23.9	41.8
D	Soils on Weathered Shales (with active erosional removal) (Midway – shale complex; Shingle series)	7.4	17.0	15.3	36.0
All Soil Groups Weighted Average		100%	17.5	15.8	38.5

In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species

exceeded two per square meter.

Table 2. Average Frequency of Acceptable Species by Soil Group for S1

Work Package	Soil Group	Cumulative Frequency Percentage	Average No. of Acceptable Species per Square Meter
S1	A	290	2.9
	B	310	3.1
	D	330	3.3
Work Package Weighted Average		294	2.9

The results of revegetation monitoring on S1 support the conclusion that the restored vegetation exceeds the 90% performance standard and that the currently observable positive revegetation trends will continue. That the cover by acceptable species after two growing seasons is over 60% greater than pre-existing cover suggests that, barring unforeseen events, the re-established vegetation will be persistent for years to come.

Introduction

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. This report documents the vegetation cover established after the second growing season within the S1 segment of the SDS pipeline route in Pueblo County.

The report compares the restored vegetation cover values to the revegetation standards prescribed by the Pueblo County 1041 permit in order to evaluate revegetation success within this work segment. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following sections include the methods used, the results, and a discussion of factors affecting revegetation cover on the sites. Maps, tabular data, and photographs of work segment S1 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Construction on the S1 segment of the pipeline route was completed in early 2013 and the disturbed areas were re-graded to pre-construction contours, seeded, and replanted by May 24, 2013.

Methods

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, whereas the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013. The results of those assessments are provided in CNHP 2013a and CNHP 2013b.

As set forth in the Revegetation Protocol, the primary parameter assessed is percent vegetative cover by acceptable species. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling prior to the start of construction in October 2011. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures of the presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

The distribution of acceptable species was assessed using frequency plots. Along each 50 meter cover transect, ten 1 meter by 1 meter plots were placed at 5 meter intervals along the right side of the transect as viewed from the origin. Within each plot the presence of all acceptable species (as per the Protocol) was tallied. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beginning with the pre-construction vegetation surveys, results of sampling in this, and other work packages, have been grouped by broad soil types. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standard. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Results

A total of 37 transects were sampled in the work package S1 area during the post-construction survey. The various soils across the extent of the work package were grouped for simplicity into three units that differed in their nature as plant growth media and as to the means by which it will be necessary to salvage and replace them during construction. The three groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B). Represents 88.8% of Work Segment.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 2, Appendix B). Represents 3.8% of Work Segment.

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B). Represents 7.4% of Work Segment.

The distribution of these Soil Groups is indicated on the maps of S1 included in Appendix A.

Plant cover observed from pre-construction sampling within the above soil groups established the base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are the base vegetation cover values measured prior to construction. Multiplying these base values by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%** (Note that this represents the level found on Limon soils in ungrazed S1)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%**.

Post Construction Results

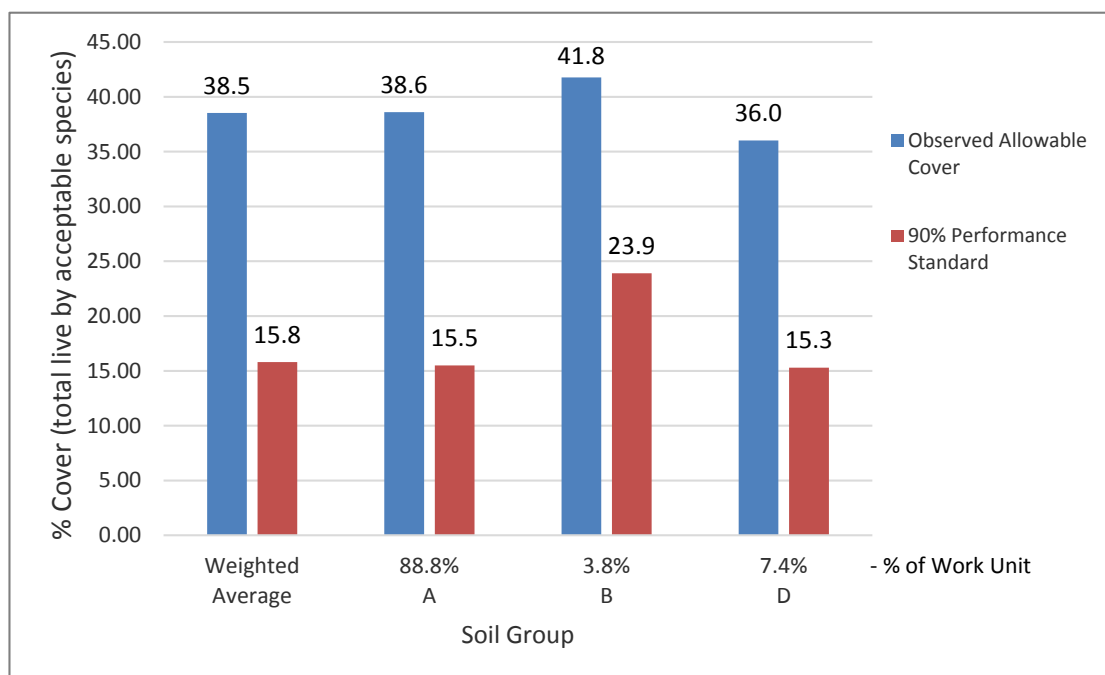
A total of 37 transects were sampled in work segment S1 during the 2014 post-construction revegetation survey. In all soil groups, revegetation cover by acceptable species exceeded the 90% revegetation performance standards. As an area weighted average, vegetation cover within the S1 work segment is 38.5% and exceeded the 90% performance standard (15.8%) by 22.7%.

Table 1 (below) displays the base vegetation cover, revegetation cover values at the 90% level established under Pueblo Co. 1041 permit and the post-construction percent cover values for the respective soil groups. Figure 1 graphically represents this information.

Table 1: Vegetation Cover by Soil Group for S1

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Perf. Std. (0.9 x Base)	%Cover by Acc. Spp
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	88.8	17.2	15.5	38.6
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	3.8	26.5	23.9	41.8
D	Soils on Weathered Shales (with active erosional removal) (Midway – shale complex; Shingle series)	7.4	17.0	15.3	36.0
All Soil Groups Weighted Average		100%	17.5	15.8	38.5

Figure 1. SDS Work Segment S1 Restoration Cover Values vs. Restoration Standards



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in Table 2 below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group for S1

Work Package	Soil Group	Cumulative Frequency Percentage	Average No. of Acceptable Species per Square Meter
S1	A	290	2.9
	B	310	3.1
	D	330	3.3
Work Package Weighted Average		294	2.9

Discussion

Post-Construction Revegetation Performance

Beginning with seedling density and early revegetation data (2013), cover measurements from S1 had consistently shown good results and a positive trend over time. Seedling density measurements completed in July of 2013 indicated all areas of S1 surpassed the criterion of 2 acceptable species per square meter in the developing revegetation (CNHP 2013a). Revegetation cover measurements made at the end of the first growing season (September 2013) indicated that revegetation cover on all soil groups exceeded the 90% performance standard (CNHP 2013b) at that time. The 2014 revegetation cover results presented in this report confirm that trend and indicate that work segment S1 exceeds the 90% revegetation cover standard required under the

Pueblo County 1041 permit.

The presence of an average of approximately three acceptable species per square meter suggests that the young vegetation of the rehabilitated areas is comprised of a diverse mix of native plants and that a monoculture does not exist. With an average of three species present per square meter, it is unlikely that less than two of those will survive over the near-term of several years and relatively certain that the revegetation will continue to mature and will persist into the long-term.

Note that the cover addressed in these assessments does not count any of the locally prominent cover by Russian thistle (*Salsola* spp.) or summer cypress (*Kochia* sp., aka *Bassia* sp.). These two introduced opportunistic plants are very common components of areas that have been disturbed and can be expected to persist for a few years after the disturbance regardless of whether or not re-establishment of desirable perennial plants has been undertaken. In the case of Segment S1, the measured cover by acceptable species alone well exceeds pre-existing cover values, and as those acceptable species mature the cover of Russian thistle and summer cypress will decline.

The two-year (two-growing season) performance period in the Pueblo County 1041 permit for work segment S1 commenced on May 24, 2013. From a growing season standpoint, the second season was effectively spring and summer of 2014. Hence the assessment of conditions in late August/early September. Per the Pueblo County 1041 permit the 90% revegetation cover performance standard is required to be achieved by May 24, 2015.

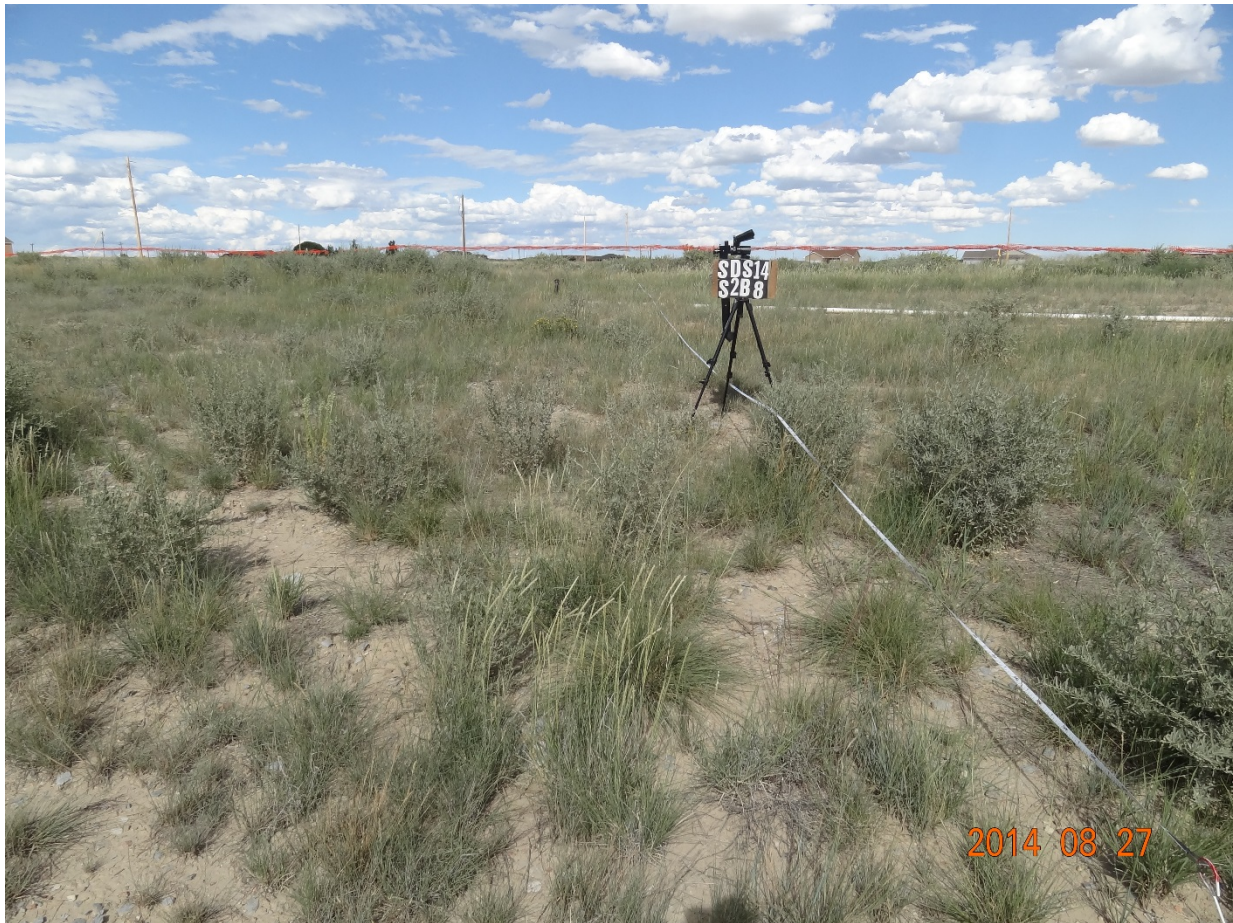
The results of revegetation monitoring on S1 support the conclusion that the restored vegetation currently meets the 90% performance standard and that currently observable positive revegetation trends and conditions will persist.

References

- CNHP 2011. Colorado Springs Utilities Southern Delivery System: Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. November, 2011. 63pp.
- CNHP 2013a. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Seedling Density for Pueblo County Work Package S1. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 9pp.
- CNHP 2013b. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S1. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 42pp.

Colorado Springs Utilities Southern Delivery System

Restored Vegetation Cover Monitoring – Work Segment S2



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Cover Photo: Sample site 8 on Soil Group B (Limon and Heldt series) in work package S2 (by ESCO Assoc. Inc.)



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Executive Summary

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. Construction on the S2 segment of the pipeline route was completed in 2012 and the disturbed areas were re-graded to pre-construction contours, seeded, and planting completed by August 12, 2012.

Assessment of Vegetative Cover and the frequency of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) had been assessed along these same reaches of revegetated right-of-way and were reported separately.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by soil series with similar potential for plant growth and revegetation suitability. The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standards. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The weighted average was calculated using the proportion of area each soil group occupied within the work segment.

In all soil groups, post-construction vegetation cover exceeded the 90% revegetation performance standards. As an area weighted average, revegetation cover within the S2 work segment is 32.9% and exceeded the 90% performance standard (18.3%) by 14.6%.

Table 1. Revegetation Cover by Soil Group for Work Segment S2

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
A	Soils shallow over shale and limestone	67.2	17.2	15.5	29.3
B	Soils on clay-rich, salt- affected alluvial material	23.1	26.5	23.9	40.6
D	Soils on Weathered Shales (with active erosional removal)	5.6	17.0	15.3	28.0
F	Soils on recent alluvium of moderate texture and salt content	4.1	41.3	37.2	55.5
All Soil Groups Weighted Average		100%	20.3	18.3	32.9

In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species exceeded two per square meter.

Table 2. Average Frequency of Acceptable Species by Soil Group for S2

Work Package	Soil Group	Cumulative Frequency Percentage	Avg No. of Acceptable Species per Square Meter
S2	A	320	3.2
	B	410	4.1
	D	380	3.8
	F	460	4.6
Work Package Weighted Average		350	3.5

The results of revegetation monitoring on S2 support the conclusion that the restored vegetation exceeds the 90% performance standard and that the currently observable positive revegetation trends will continue. That the cover by acceptable species after two growing seasons is over 60% greater than pre-existing cover suggests that, barring unforeseen events, the re-established vegetation will be persistent for years to come.

Introduction

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. This report documents the post-construction vegetation cover established after the second growing season along the S2 segment of the SDS pipeline route in Pueblo County. It compares the restored vegetation cover values to the revegetation standards prescribed by the Pueblo County 1041 permit in order to evaluate revegetation success within this work segment. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard as set forth in the Protocol document.

The following sections include the methods used, the results, and a discussion of factors affecting revegetation cover on the sites. Maps, tabular data, and photographs of work segment S2 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Construction on the S2 segment of the pipeline route was completed in 2012 and the disturbed areas were re-graded to pre-construction contours, seeded, and under irrigation by August 12, 2012. On that basis the 90% revegetation cover performance standard was scheduled to have been achieved by August 12, 2014.

Methods

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, whereas the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013. The results of those previous assessments are provided in CNHP 2013a and CNHP 2013b.

As set forth in the Revegetation Protocol, the primary parameter assessed is percent vegetative cover by acceptable species. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling prior to the start of construction in October 2011.

Beyond the return of adequate plant cover, measures of the presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Plant species deemed to be acceptable had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

The distribution of acceptable species was assessed using frequency plots. Along each 50 meter cover transect, ten 1 meter by 1 meter plots were placed at 5 meter intervals along the right side of the transect as viewed from the origin. Within each plot the presence of all acceptable species (as per the Protocol) was tallied. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been placed into groups of soil series. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil group, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each sample location, vegetation cover and ground cover were measured along a 50 meter transect of random orientation via observation at 100 locations spaced at 1 meter intervals along the transect length. All measurements were confined to the revegetated easement. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

An area-weighted average of the revegetated cover values by acceptable species from the different soil groups within a work segment was calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Results

The various soil series across the extent of the work package were grouped into four units that differed in their nature as plant growth media and as to the means by which they were salvaged prior to, and replaced during, construction. The four groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B). Represents 67.2% of work segment.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 2, Appendix B). Represents 23.1% of work segment.

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B). Represents 5.6% of work segment.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 4, Appendix B). Represents 4.1% of work segment.

The distribution of these soil groups is indicated on the maps of work segment S2 in Appendix A. Plant cover sampled within the above soil groups prior to construction established the base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are the base vegetation cover values measured prior to construction. Multiplying these base values by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%** (Note that this represents the level found on Limon soils in ungrazed S2)

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%**.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents): **41.3%**

Post-Restoration Results

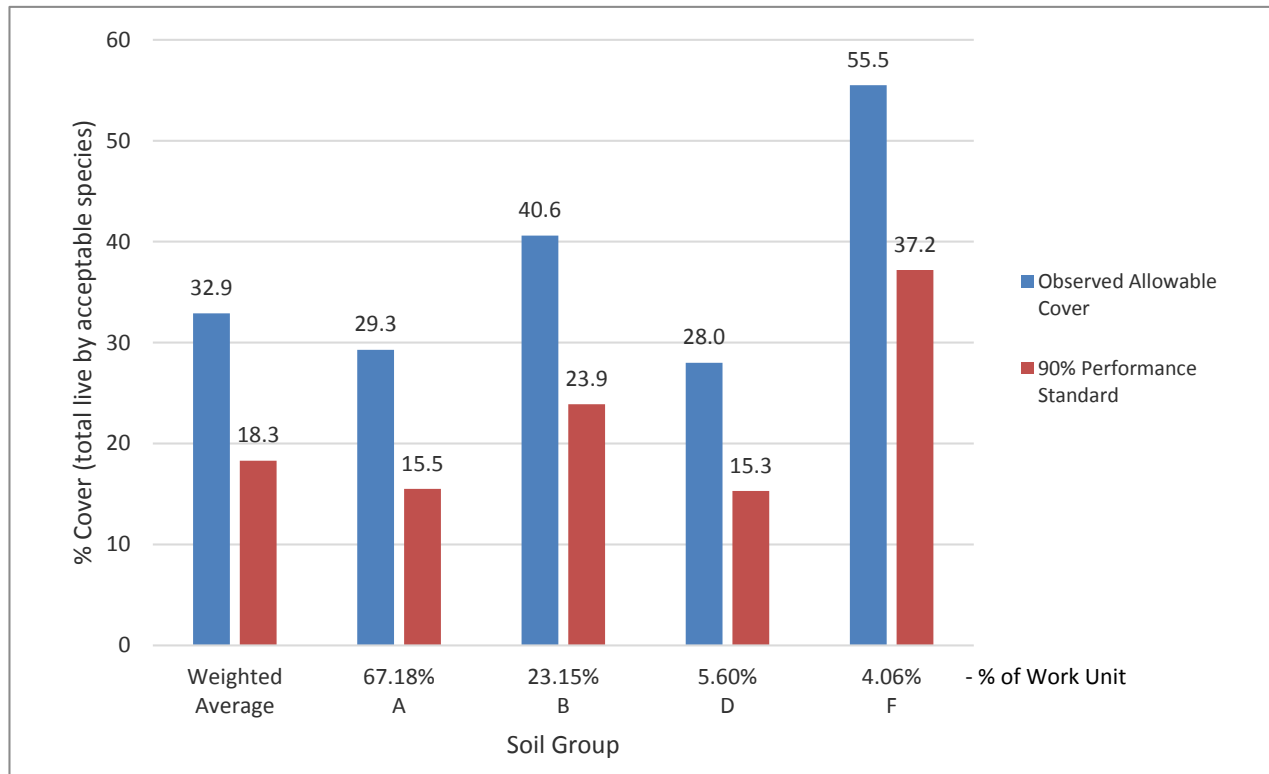
A total of 50 transects were sampled in work segment S2 during the 2014 post-construction revegetation survey. In all soil groups, revegetation cover by acceptable species exceeded the 90% revegetation performance standards. As an area weighted average, vegetation cover within the S2 work segment is 32.9% and exceeded the 90% performance standard (18.3%) by 14.6%.

Table 1 displays the base vegetation cover, revegetation cover standards at the 90% level established under Pueblo Co. 1041 Regulations, and the post-restoration percent cover values for the respective soil groups. Figure 1 graphically represents this information.

Table 1. Revegetation Cover by Soil Group for Work Segment S2

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Cover Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
A	Soils shallow over shale and limestone (Penrose, Marvel and Minnequa series)	67.2	17.2	15.5	29.3
B	Soils on clay-rich, salt-affected alluvial material (Limon and Heldt Series)	23.1	26.5	23.9	40.6
D	Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series)	5.6	17.0	15.3	28.0
F	Soils on recent alluvium of moderate texture and salt content (Haverson series and Ustic Torrifluvents)	4.1	41.3	37.2	55.5
All Soil Groups Weighted Average		100%	20.3	18.3	32.9

Figure 1. SDS Work Segment S2 Restoration Cover Values vs. Restoration Standards



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in Table 2 below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group for S2

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S2	A	320	3.2
	B	410	4.1
	D	380	3.8
	F	460	4.6
Work Package Weighted Average		350	3.5

Discussion

Post-Construction Revegetation Performance

Beginning with seedling density and early revegetation data (2013), cover measurements from S2 had consistently shown good results and a positive trend over time. Seedling density measurements completed in July of 2013 indicated all areas of S2 surpassed the criterion of 2 acceptable species per square meter in the developing revegetation (CNHP 2013a).

Revegetation cover measurements made at the end of the first growing season (September 2013) indicated that revegetation cover on all soil groups exceeded the 90% performance standard (CNHP 2013b) at that time. The 2014 revegetation cover results presented in this report confirm that trend and indicate that work segment S2 exceeds the 90% revegetation cover standard required under the Pueblo County 1041 permit.

The presence of an average of approximately three acceptable species per square meter suggests that the young vegetation of the rehabilitated areas is comprised of a diverse mix of native plants and that a monoculture does not exist. With an average of three species present per square meter, it is unlikely that less than two of those will survive over the near-term of several years and relatively certain that the revegetation will continue to mature and will persist into the long-term.

Note that the cover addressed in these assessments does not count any of the locally prominent cover by Russian thistle (*Salsola* spp.) or summer cypress (*Kochia* sp., aka *Bassia* sp.). These two introduced opportunistic plants are very common components of areas that have been disturbed and can be expected to persist for a few years after the disturbance regardless of whether or not re-establishment of desirable perennial plants has been undertaken. In the case of Segment S2, the measured cover by acceptable species alone well exceeds pre-existing cover values, and as those acceptable species mature the cover of Russian thistle and summer cypress will decline.

The two-year (two-growing season) performance period in the Pueblo County 1041 permit for work segment S2 commenced on August 12, 2012. From a growing season standpoint, the second season was effectively spring and summer of 2014. Hence the assessment of conditions in late August/early September. Per the Pueblo County 1041 permit the 90% revegetation cover performance standard was required to have been achieved by August 12, 2014.

The results of revegetation monitoring on S2 support the conclusion that the restored vegetation currently meets the 90% performance standard and that currently observable positive revegetation trends and conditions will persist.

References

- CNHP 2011. Colorado Springs Utilities Southern Delivery System: Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. November, 2011. 63pp.
- CNHP 2013a. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Seedling Density for Pueblo County Work Package S2. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 9pp.
- CNHP 2013b. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S2. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 42pp.

Colorado Springs Utilities Southern Delivery System

Restored Vegetation Cover Monitoring – Work Segment S3-12



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Cover Photo: Sample site 10 on Soil Group A (Penrose, Manuel and Minnequa Series) in work package S3-12
(by ESCO Assoc. Inc.)



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Executive Summary

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. Construction on the S3-12 segment of the pipeline route was completed in 2012 and the disturbed areas were re-graded to pre-construction contours, seeded, and planting completed by September 12, 2012.

Assessment of Vegetative Cover and the frequency of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) had been assessed along these same reaches of revegetated right-of-way and were reported separately.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by soil series with similar potential for plant growth and revegetation suitability. The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standards. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standard for the work segment as a whole were met. The weighted average was calculated using the proportion of area each soil group occupied within the work segment.

In three of the five soil groups in this work segment, post-construction vegetation cover exceeded the 90% revegetation performance standard. As an area weighted average, revegetation cover within the S3-12 work segment is 30.8% and exceeded the 90% performance standard (25.5%) by 5.3%.

Table 1. Revegetation Cover by Soil Group for Work Segment S3-12

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	%Cover by Acc. Spp.
A	Soils shallow over shale and limestone	13.1	17.2	15.5	55.1
B	Soils on clay-rich, salt affected alluvial material	2.8	26.6	23.9	15.5
C	Soils deep on early Pleistocene alluvium	47.2	35.0	31.5	30.3
E	Soils on deeply weathered shales (without active erosional removal)	35.6	23.3	21.0	22.5
F	Soils on recent alluvium of moderate texture and salt content	1.3	41.3	37.2	72.0
All Soil Groups Weighted Average		100	28.3	25.5	30.8

In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species exceeded two per square meter.

Table 2. Average Frequency of Acceptable Species by Soil Group for S3-12

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-12	A	320	3.2
	B	310	3.1
	C	290	2.9
	E	300	3
	F	280	2.8
Work Package Weighted Average		298	3.0

The results of revegetation monitoring on S3-12 support the conclusion that the restored vegetation exceeds the 90% performance standard and that the currently observable positive revegetation trends will continue. That the cover by acceptable species after two growing seasons is over 20% greater than pre-existing cover suggests that, barring unforeseen events, the re-established vegetation will be persistent for years to come.

Introduction

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. This report documents the post-construction vegetation cover established after the second growing season along the S3-12 segment of the SDS pipeline route in Pueblo County. It compares the restored vegetation cover values to the revegetation standards prescribed by the Pueblo County 1041 permit in order to evaluate revegetation success within this work segment. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard as set forth in the Protocol document.

The following sections include the methods used, the results, and a discussion of factors affecting revegetation cover on the sites. Maps, tabular data, and photographs of work segment S3-12 are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Construction on the S3-12 segment of the pipeline route was completed in 2012 and the disturbed areas were re-graded to pre-construction contours, seeded, and under irrigation by September 12, 2012. On that basis the 90% revegetation cover performance standard was scheduled to have been achieved by September 12, 2014.

Methods

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, whereas the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013. The results of those previous assessments are provided in CNHP 2013a and CNHP 2013b.

As set forth in the Revegetation Protocol, the primary parameter assessed is percent vegetative cover by acceptable species. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling prior to the start of construction in October 2011.

Beyond the return of adequate plant cover, measures of the presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Plant species deemed to be acceptable had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

The distribution of acceptable species was assessed using frequency plots. Along each 50 meter cover transect, ten 1 meter by 1 meter plots were placed at 5 meter intervals along the right side of the transect as viewed from the origin. Within each plot the presence of all acceptable species (as

per the Protocol) was tallied. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been placed into groups of soil series. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil group, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each sample location, vegetation cover and ground cover were measured along a 50 meter transect of random orientation via observation at 100 locations spaced at 1 meter intervals along the transect length. All measurements were confined to the revegetated easement. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

An area-weighted average of the revegetated cover values by acceptable species from the different soil groups within a work segment was calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Results

The various soil series across the extent of the work package were grouped into four units that differed in their nature as plant growth media and as to the means by which they were salvaged prior to, and replaced during, construction. The five groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series; Table 1, Appendix B). Represents 13.1% of work segment.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 2, Appendix B). Represents 2.8% of work segment.

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series); Table 3, Appendix B). Represents 47.2% of work segment.

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 4, Appendix B). Represents 35.6% of work segment.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents; Table 5, Appendix B). Represents 1.3% of work segment.

The distribution of these Soil Groups is indicated on the maps of S3-12 included in Appendix A. Plant cover sampled within the above soil groups prior to construction established the base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are the base vegetation cover values measured prior to construction. Multiplying these base values by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series): **17.2%**

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.6**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series): **35.0%**

E. Soils on Deeply Weathered Shales (without active erosional removal)
(Razor series): **23.3%**

F. Soils on Recent Alluvium of Moderate Texture and Salt Content
(Haverson series and Ustic Torrifluvents): **41.3**

Post Restoration Results

A total of 32 transects were sampled in the work package S3-12 area during the post-construction survey. In soil groups A, E, and F, revegetation cover by acceptable species exceeded the 90% revegetation performance standards. As an area weighted average, vegetation cover within the S3-12 work segment is 30.8% and exceeded the 90% performance standard (25.5%) by 5.3%.

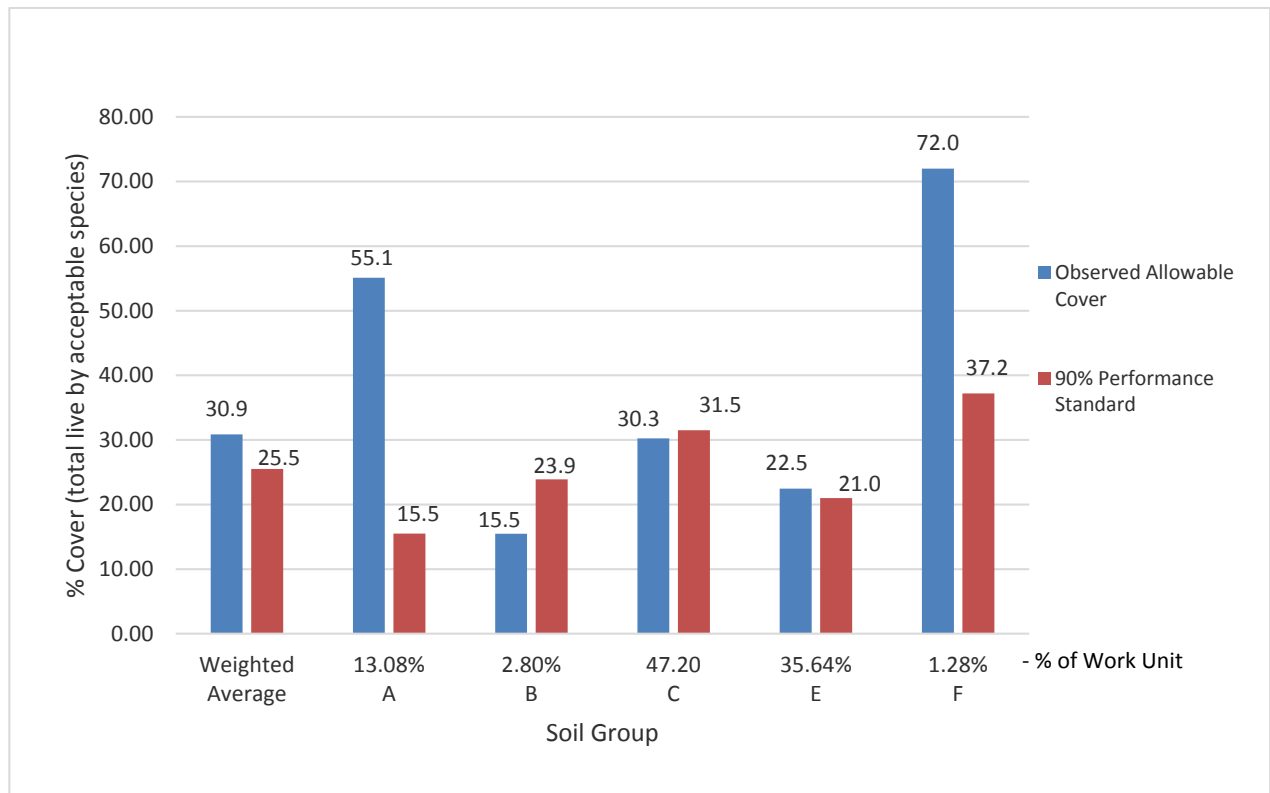
In soil groups B and C, revegetation cover by acceptable species was 8.4% and 1.2% lower than the 90% revegetation performance standards, respectively.

Table 1 displays the base vegetation cover, revegetation cover standards at the 90% level established under Pueblo Co. 1041 Regulations, and the post-restoration percent cover values for the respective soil groups. Figure 1 graphically represents this information.

Table 1. Vegetation Cover per Soil Group for S3-12

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90%Revegetation Cover Performance Std. (0.9 x Base)	%Cover by Acc. Spp.
A	Soils shallow over shale and limestone (Penrose, Manvel and Minnequa series)	13.1	17.2	15.5	55.1
B	Soils on clay-rich, salt affected alluvial material (Limon and Heldt Series)	2.8	26.6	23.9	15.5
C	Soils deep on early Pleistocene alluvium (Midway – shale complex; Shingle series)	47.2	35.0	31.5	30.3
E	Soils on deeply weathered shales (without active erosional removal) (Razor series)	35.6	23.3	21.0	22.5
F	Soils on recent alluvium of moderate texture and salt content (Haverson series and Ustic Torrifluvents)	1.3	41.3	37.2	72.0
All Soil Groups Weighted Average		100	28.3	25.5	30.8

Figure 1. SDS Work Segment S3-12 Restoration Cover Values vs. Restoration Standards



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group for S3-12

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-12	A	320	3.2
	B	310	3.1
	C	290	2.9
	E	300	3
	F	280	2.8
Work Package Weighted Average		298	3.0

Discussion

Post-Construction Revegetation Performance

Seedling density measurements completed on S3-12 in July of 2013 indicated all areas surpassed the criterion of 2 acceptable species per square meter in the developing revegetation (CNHP 2013a). Revegetation cover measurements made at the end of the first

growing season in September 2013 indicated that revegetation cover on soil groups A and E exceeded the 90% performance standard (CNHP 2013b) at that time. Vegetation cover on Soil Group C was below the 90% standard. Soil Groups B and F were not sampled due to impacts from trespass grazing and flooding, respectively.

The 2014 revegetation cover results presented in this report indicate that work segment S3-12 as a whole exceeds the 90% revegetation cover standard required under the Pueblo County 1041 permit. The revegetation cover measured on soil groups A, E, and F significantly exceeded the 90% standard. Together, these three soil groups make up approximately 50% of the area on work package S3-12. Soil group F which accounts for 1.3% of the area had the highest cover at 72%. Soil group A accounts for 13.1% of the area and had cover of 55.1%. Soil group E, with cover of 22.5% exceeded the 90% standard by 1.5% and accounts for 35.6% of the segment area.

While soil group B was 8.4% lower than the 90% standard it constitutes only 2.8% of the S3-12 work package area, thus having a minimal effect on the overall cover of the segment as a whole. Similarly, while soil group C does make up 47.2% of the S3-12 work package area, it was only 1.2% below the standard, and therefore also has a minor influence on the overall cover value for the entire segment. In these data, the deficiency of cover on soil groups B and C is not significant enough to prevent the work segment as a whole from meeting the 90% standard.

The presence of an average of approximately three acceptable species per square meter suggests that the young vegetation of the rehabilitated areas is comprised of a diverse mix of native plants and that a monoculture does not exist. With an average of three species present per square meter, it is unlikely that less than two of those will survive over the near-term of several years and relatively certain that the revegetation will continue to mature and will persist into the long-term.

Note that the cover addressed in these assessments does not count any of the locally prominent cover by Russian thistle (*Salsola* spp.) or summer cypress (*Kochia* sp., aka *Bassia* sp.). These two introduced opportunistic plants are very common components of areas that have been disturbed and can be expected to persist for a few years after the disturbance regardless of whether or not re-establishment of desirable perennial plants has been undertaken. In the case of Segment S3-12, the measured cover by acceptable species alone exceeds pre-existing cover values, and as those acceptable species mature the cover of Russian thistle and summer cypress will decline.

The results of revegetation monitoring on S3-12 support the conclusion that the restored vegetation currently meets the 90% performance standard and that currently observable positive revegetation trends and conditions will persist.

References

- CNHP 2011. Colorado Springs Utilities Southern Delivery System: Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. November, 2011. 63pp.
- CNHP 2013a. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-12. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 9pp.
- CNHP 2013b. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-12. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 42pp.

Colorado Springs Utilities Southern Delivery System

Restored Vegetation Cover Monitoring – Work Segment S3-13N



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September, 2014

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Cover Photo: Sample site 10 on Soil Group C (Stoneham and Cascajo series) in work package S3-13N (by ESCO Assoc. Inc.)



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Executive Summary

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. Construction on segment S3-13N of the pipeline route was completed during 2012 and early 2013. Areas of the S3 work segment were disturbed by flood waters and were re-graded to pre-construction contours and replanted by January 29, 2014. Work Segment S3-13N was administratively separated from the remainder of the S3-13 segment but retains the two-year bond schedule for the S3-13 Segment.

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standard. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Vegetation cover in Segment S3-13N was 7.7 percentage points below the 90% standard. Soil group C represents 2.4% of the larger S3-13 work segment from which it was administratively separated.

Table 1. Revegetation Cover by Soil Group for Work Segment S3-13N

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
C	Soils deep on early Pleistocene alluvium	100	35.0	31.5	23.8

In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species exceeded two per square meter.

Table 2. Average Frequency of Acceptable Species, Soil Group C, S3-13N

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-13N	C	310	3.1
Work Package Weighted Average		310	3.1

When viewed in isolation, revegetation cover on Segment S3-13N did not meet the 90% standard. However, Segment S3-13N is a very small segment that was administratively separated from the overall Segment S3-13. As a result, S3-13N consists entirely of soil group

C. Soil group C represents a small proportion of the soils within the overall S3-13 segment (2.4%) as well as the entire alignment (7.6%). When viewed in the context of the revegetation cover over the S3-13 segment, limitations on Group C soils are not significant enough to prevent the segment as a whole from meeting the 90% standard.

Areas of soil group C on the adjacent S3-12 segment were planted approximately 6 months prior to planting on S3-13N and show higher levels of cover that provide an indication of what can be expected on these areas as the plantings mature with additional time.

The results of revegetation monitoring on S3-13N support the conclusion that the currently observable revegetation trends will continue, and that the restored vegetation will likely progress to meet the 90% performance standard in the foreseeable future.

Introduction

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. This report documents the vegetation cover established after the first growing season within the S3-13N segment of the SDS pipeline route in Pueblo County. The S3-13N segment is located south of Antelope road at the north end of the larger S3 work segment and consists of a 1,366 foot segment of the pipeline alignment as well as an approximately 9 acre laydown area.

The report compares the restored vegetation cover values to the revegetation standards prescribed by the Pueblo County 1041 permit in order to evaluate revegetation success within this work segment. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following sections include the methods used, the results, and a discussion of factors affecting revegetation cover on the sites. Maps, tabular data, and photographs of work segment S3-13N are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Construction on the S3-13N segment of the pipeline route was completed in 2013 and the disturbed areas were re-graded to pre-construction contours, seeded, and planting completed by January 29, 2014.

Methods

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, whereas the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013. The results of those assessments are provided in CNHP 2013a and CNHP 2013b.

As set forth in the Revegetation Protocol, the primary parameter assessed is percent vegetative cover by acceptable species. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling prior to the start of construction in October 2011. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures of the presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

The distribution of acceptable species was assessed using frequency plots. Along each 50 meter cover transect, ten 1 meter by 1 meter plots were placed at 5 meter intervals along the right side of the transect as viewed from the origin. Within each plot the presence of all acceptable species (as per the Protocol) was tallied. See CNHP (2011) for further details on the pre-construction sampling effort.

Beginning with the pre-construction vegetation surveys, results of sampling in this, and other work packages, have been grouped by broad soil types. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each representative sample location, vegetation cover and ground cover were measured via observation at 100 locations spaced at 1 meter intervals along the transect length. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standard. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Results

The soils across the extent of this work package consisted only of the Stoneham soil series, which is classed as a deep loam on early Pleistocene alluvium. The Stoneham series is referenced throughout this and other work segments of the SDS project as follows:

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series);
Represents 100% of this work segment.

The distribution of this soil group is indicated on the map of work segment S3-13N in Appendix A. Plant cover observed from sampling within the above soil groups established the base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following is the base vegetation cover value measured on Soil Group C soils prior to construction. Multiplying this base value by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series): **35.0%.**

Post-Restoration Results

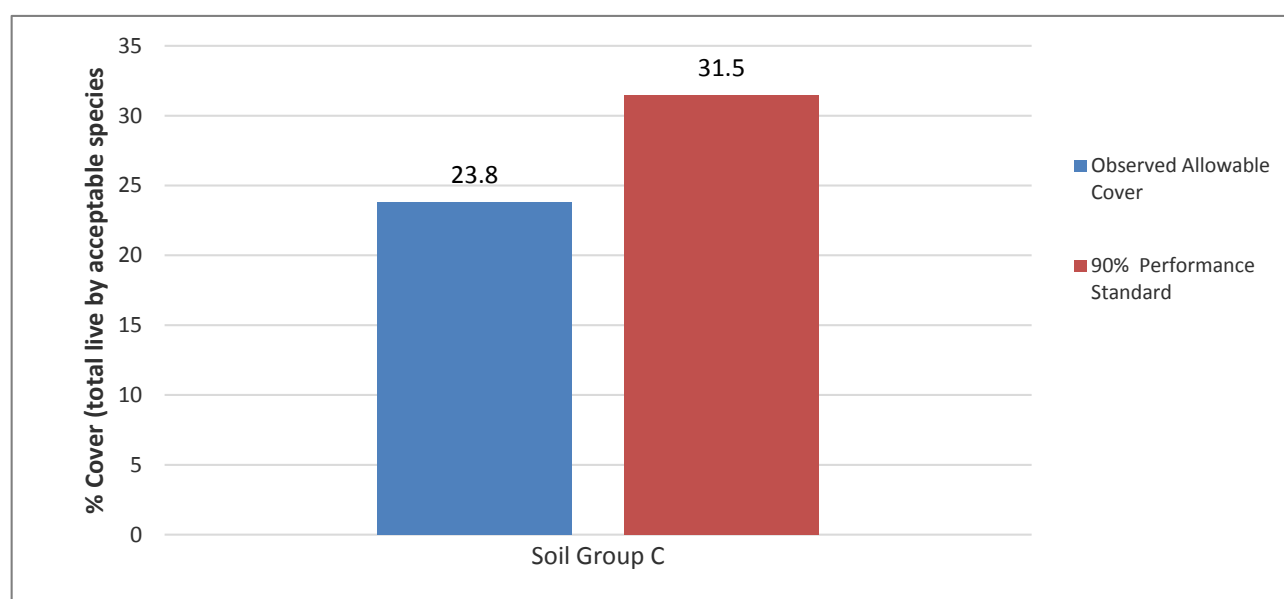
A total of 10 transects were sampled in the work segment S3-13N area during the post-construction survey. Vegetation cover in soil group C was 23.8%, or 7.7 percentage points below the 90% revegetation performance standard (31.5%).

Table 1 displays the base vegetation cover, revegetation cover standards at the 90% levels (established under Pueblo Co. 1041), and the post-restoration percent cover values for the C soil group. Figure 1 presents the revegetation information graphically.

Table 1. Revegetation Cover for Work Segment S3-13N

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90%Revegetation Cover Perf. Std. (0.9 x Base)	%Cover by Acc. Spp.
C	Soils deep on early Pleistocene alluvium (Stoneham and Cascajo series)	100.0	35.0	31.5	23.8

Figure 1. Work Segment S3-13N Restoration Cover Values vs. Restoration Standard



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in Table 2 below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species, Soil Group C, S3-13N

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-13N	C	310	3.1
Work Package Weighted Average		310	3.1

Discussion

Post-Construction Revegetation Performance

Revegetation cover values in Soil Group C did not meet the 90% Pueblo County permit 1041 standards. As a result, the S3-13N segment as a whole does not meet the 90% performance standard because Soil Group C represents 100% of the segment area. It should be noted that Segment S3-13N was administratively separated from the larger S3 Segment and if that were not the case the S3 segment as a whole would meet the 90% standard with the Soil Group C soils included.

The observed presence of an average of approximately three acceptable species per square meter suggests that the young vegetation of the rehabilitated areas is comprised of a diverse mix of native plants and that monoculture conditions do not exist. With an average of three species present per square meter, it is unlikely that less than two of those will survive over the near-term of several years and relatively certain that the revegetation will continue to mature and will persist into the long-term.

Note that the cover addressed in these assessments does not count any of the locally prominent cover by Russian thistle (*Salsoia* spp.) or summer cypress (*Kochia* sp., aka *Bassia* sp.). These two introduced opportunistic plants are very common components of areas that have been disturbed and can be expected to persist for a few years after the disturbance regardless of whether or not re-establishment of desirable perennial plants has been undertaken. In the case of Segment S3-13N, the measured cover by acceptable species alone well exceeds pre-existing cover values, and as those acceptable species mature the cover of Russian thistle and summer cypress will decline.

This supports a projection that, even though not all areas of the S3-13N work package have reached the 90% revegetation standard levels, post-construction species composition and density are acceptable and that development of the is progressing in the right direction.

References

- CNHP 2011. Colorado Springs Utilities Southern Delivery System: Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. November, 2011. 63pp.
- CNHP 2013a. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-13. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 9pp.
- CNHP 2013b. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-13. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 42pp.

Colorado Springs Utilities Southern Delivery System

Restored Vegetation Cover Monitoring – Work Segment S3-13S



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Cover Photo: Sample site 4 on Soil Group E (Razor series) in work package S3-13S (by ESCO Assoc. Inc.)



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Executive Summary

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. Construction on the S3-13S segment of the pipeline route was completed during 2012 and early 2013. Certain areas disturbed by flood waters were re-graded to pre-construction contours, seeded, and fully replanted by January 29, 2014.

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil types. The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standards. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Vegetation cover in soil groups B, D and E surpassed the 90% revegetation performance standard. Vegetation cover in soil group C was 3.2 percentage points below the 90% standard. Soil group C represents 3% of the S3-13S work segment. As an area weighted average, vegetation cover within the S3-13S work segment was 28.1% and exceeded the 90% performance standard (21.8%) by 6.3%

Table 1. Revegetation Cover by Soil Group for Work Segment S3-13S

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
B	Soils on clay-rich, salt- affected alluvial material	46.3	26.5	23.9	25.2
C	Soils deep on early Pleistocene alluvium	3.0	35.0	31.5	28.3
D	Soils on Weathered Shales (with active erosional removal)	15.5	17.0	15.3	18.0
E	Soils on Deeply Weathered Shales (without active erosional removal)	35.2	23.3	21.0	36.3
All Soil Groups Weighted Average		100%	24.2	21.8	28.1

In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in Table2 below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group for S3-13S

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-13S	B	290	2.9
	C	430	4.3
	D	320	3.2
	E	390	3.9
Work Package Weighted Average		334	3.3

The results of revegetation monitoring on S3-13S support the conclusion that re-establishment of pre-existing levels of plant cover have been met and exceeded within the S3-13S area.

Introduction

The Colorado Natural Heritage Program, in cooperation with ESCO Associates, completed post-construction monitoring of restored vegetation along the Colorado Springs Utilities' Southern Delivery System (SDS) pipeline. This report documents the vegetation cover established after the first growing season along the S3-13S segment of the SDS pipeline route in Pueblo County. It compares the restored vegetation cover values to the revegetation standards prescribed by the Pueblo County 1041 permit in order to evaluate revegetation success within this work segment. It also reports frequency-based quantitative measures of the presence of acceptable species in comparison to a pre-determined standard.

The following sections include the methods used, the results, and a discussion of factors affecting revegetation cover on the sites. Maps, tabular data, and photographs of work segment S3-13S are contained in separate Appendices A, B, and C, respectively. Appendix D includes applicable portions of the Pueblo County Revegetation Cover Establishment Protocols (Protocols).

The study area is in a tributary valley of the Arkansas River downstream (east) from its emergence from the mountain front. Along some reaches of the pipeline route, exposed shale and limestone are the predominant soil parent materials, while on other reaches recent alluvium predominates and on high terrace sites older deposits of Arkansas River alluvium in the form of sands and gravels predominate.

Construction on the S3-13S segment of the pipeline route was completed in 2012 and early 2013. Following damage to revegetated areas by flood waters, disturbed areas were re-graded to pre-construction contours, seeded, and fully replanted by January 29, 2014.

Methods

Assessment of Vegetative Cover and the Presence of Acceptable Species in revegetated and irrigated areas along the SDS Pipeline in Pueblo County was completed in late August and early September 2014 as per the Protocol developed for the project. Prior to this assessment, the density of seedlings (July 2013) and revegetation cover (late September 2013) were assessed along these same reaches of revegetated right-of-way. The July assessment provided an early look into revegetation results, whereas the September 2013 effort included evaluation of two different parameters that were applicable to vegetation somewhat more mature than in July 2013. The results of those assessments are provided in CNHP 2013a and CNHP 2013b.

As set forth in the Revegetation Protocol, the primary parameter assessed is percent vegetative cover by acceptable species. This measure relates to the Pueblo County 1041 permit requirement that cover on revegetated areas comprise at least 90% of pre-existing levels. Pre-existing levels of cover on the Pueblo County work package reaches were established by quantitative sampling prior to the start of construction in October 2011. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beyond the return of adequate plant cover (detailed in the Protocol document), measures of the presence of Acceptable Species in the reconstructed vegetation were also made as per provisions in the protocol. Acceptable species had been determined in consultation with the Pueblo County vegetation representative to include all native species and all introduced

perennial species other than those included on the current State of Colorado A, B or C-lists of noxious species.

The distribution of acceptable species was assessed using frequency plots. Along each 50 meter cover transect, ten 1 meter by 1 meter plots were placed at 5 meter intervals along the right side of the transect as viewed from the origin. Within each plot the presence of all acceptable species (as per the Protocol) was tallied. Further details on the pre-construction sampling effort can be found in CNHP 2011.

Beginning with the pre-construction vegetation surveys, results of sampling in this work package have been grouped by broad soil groups. These groups, established to simplify the process, include soil series of similar nature as plant growth media. Within each soil type, sample transects (See Protocol Technical Memos 1 and 3, Appendix D) were placed at random locations in an effort to capture the variability of vegetative cover present. At each sample location, vegetation cover and ground cover were measured along a 50 meter transect of random orientation via observation at 100 locations spaced at 1 meter intervals along the transect length. All measurements were confined to the revegetated easement. Maps showing the extent of the soil groups present within the alignment of the work package and the location of sample transect origin points are included in Appendix A.

The average revegetated cover of acceptable species was calculated for each soil group and compared to the 90% standards. The area weighted average of the revegetated cover values from the different soil groups within a work segment was also calculated to determine if the performance standards for the work segment as a whole were met. The area weighted average was calculated using the proportion of distance each soil group occupied within the work segment.

Results

The various soil series across the extent of the work package were grouped into five units that differed in their nature as plant growth media and as to the means by which they were salvaged prior to, and replaced during, construction. The five groups are as follows:

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series; Table 1, Appendix B). Represents 46.3% of work segment.

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series; Table 2, Appendix B). Represents 3% of work segment.

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series; Table 3, Appendix B). Represents 15.5% of work segment.

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series; Table 4, Appendix B). Represents 35.2% of work segment.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents). Represents 0.4% of work segment and was not sampled.

The distribution of these soil groups is indicated on the maps of work segment S3-13S in Appendix A. Soil group F constituted only 0.4% of the S3-13S work package area and would

have only yielded space for a single sampling transect and therefore was not sampled. Plant cover observed from sampling within the above soil groups established the base values from which revegetation performance standards were calculated.

Base Cover Values for Evaluation of Revegetation Success

The following are the base vegetation cover values measured prior to construction. Multiplying these base values by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series): **26.5%**

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series): **35.0%**.

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series): **17.0%**.

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series): **23.3%**

Post-Restoration Results

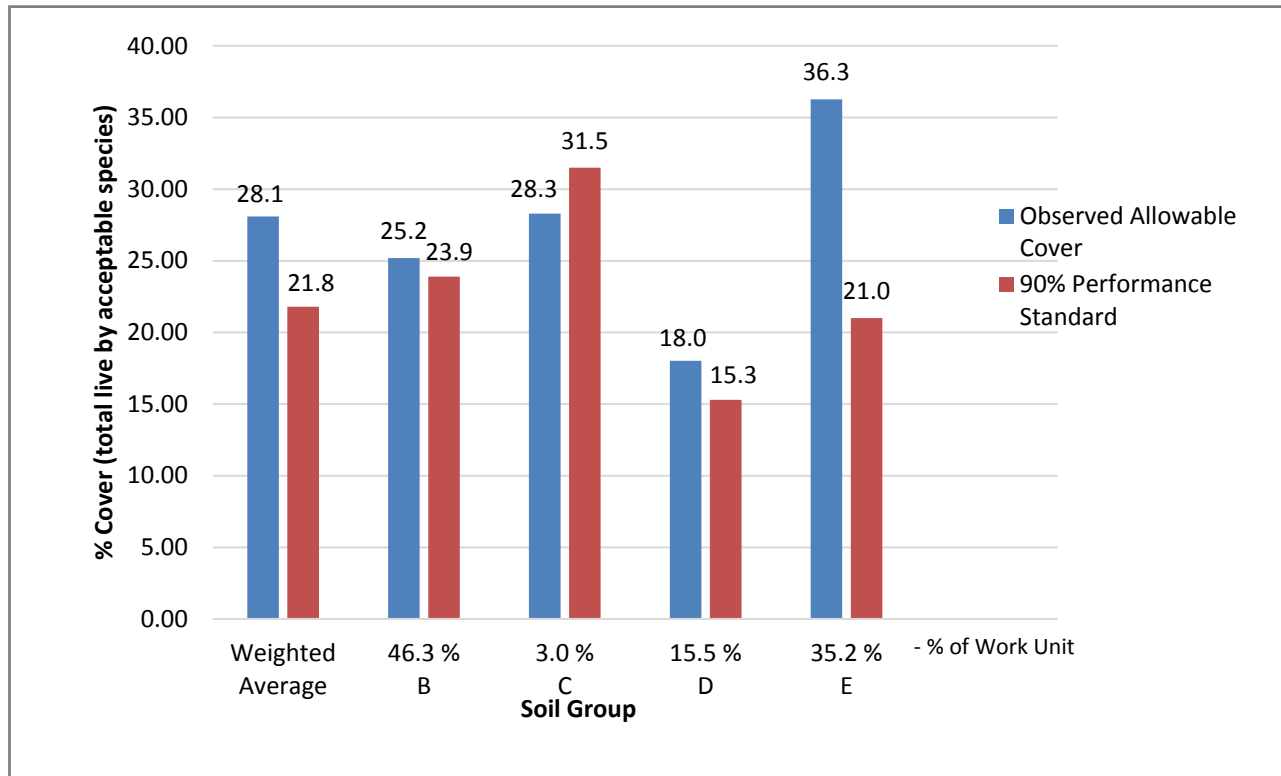
A total of 42 transects were sampled in work segment S3-13S area during the post-construction survey. Vegetation cover in soil groups B, D and E surpassed the 90% revegetation performance standard. Vegetation cover in soil group C (comprising 3% of the S3-13S area) was 3.2 percentage points below the 90% standard. As an area weighted average, vegetation cover within the S3-13S work segment was 28.1% and exceeded the 90% performance standard (21.8%) by 6.3%

Table 1 displays the base vegetation cover, revegetation cover standards at 90% (Pueblo Co. 1041 Regulations), and the post-restoration percent cover values for the respective soil groups. Figure 1 presents the revegetation information graphically.

Table 1. Revegetation Cover by Soil Group for Work Segment S3-13S

Map Code	Soil Group	% of Work Unit	% Base Veg. Cover	90% Revegetation Perf. Std. (0.9 x Base)	%Cover by Acc. Spp.
B	Soils on clay-rich, salt-affected alluvial material (Limon & Heldt Series)	46.3	26.5	23.9	25.2
C	Soils deep on early Pleistocene alluvium (Stoneham & Cascajo series)	3.0	35.0	31.5	28.3
D	Soils on Weathered Shales (with active erosional removal) (Midway shale complex; Shingle series)	15.5	17.0	15.3	18.0
E	Soils on Deeply Weathered Shales (without active erosional removal) (Razor series)	35.2	23.3	21.0	36.3
All Soil Groups Weighted Average		100%	24.2	21.8	28.1

Figure 1. SDS Work Segment S3-13S Restoration Cover Values vs. Restoration Standards



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine the average presence of at least two acceptable species per square meter (i.e. an average frequency of acceptable species of at least 200%). Results in the table below show that for all soil groups in the work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group for S3-13S

Work Package	Soil Group	Cumulative Frequency Percentage	Avg. No. of Acceptable Species per Square Meter
S3-13S	B	290	2.9
	C	430	4.3
	D	320	3.2
	E	390	3.9
Work Package Weighted Average		334	3.3

Discussion

Post-Construction Revegetation Performance

Previous seedling density and revegetation cover measurements taken on S3-13S had consistently shown good results and a positive trend over time. The seedling density measurements completed in July of 2013 indicated all areas of S3-13S surpassed the criterion

of 2 acceptable species per square meter in the developing revegetation (CNHP 2013a). Revegetation cover measurements made at the end of the first growing season (September 2013) indicated that revegetation cover on all soil groups exceeded the 90% performance standard (CNHP 2013b) at that time. The revegetation cover values presented in this report indicate that overall work segment S3-13S exceeds the 90% revegetation cover standard required under the Pueblo County 1041 permit.

The observed presence of an average of approximately three acceptable species per square meter suggests that the young vegetation of the rehabilitated areas is comprised of a diverse mix of native plants and that monoculture conditions do not exist. With an average of three species present per square meter, it is unlikely that less than two of those will survive over the near-term of several years and relatively certain that the revegetation will continue to mature and will persist into the long-term.

Note that the cover addressed in these assessments does not count any of the locally prominent cover by Russian thistle (*Salsola* spp.) or summer cypress (*Kochia* sp., aka *Bassia* sp.). These two introduced opportunistic plants are very common components of areas that have been disturbed and can be expected to persist for a few years after the disturbance regardless of whether or not re-establishment of desirable perennial plants has been undertaken. In the case of Segment S3-13S, the measured cover by acceptable species alone exceeds pre-existing cover values, and as those acceptable species mature the cover of Russian thistle and summer cypress will decline.

The revegetation cover values in soil groups B, D, and E surpassed the 90% Pueblo County 1041 permit standard. Although revegetation cover values in soil group C were 3.2 percentage points below the 90% standard, soil group C represents only 3% of the S3-13S work segment. When viewed in the broader context of the cover restored over the work segment as a whole, the cover values on group C soils are not significant enough to reduce the overall cover value and preclude the segment from meeting the 90% performance standard.

Following the completion of repairs made to flood damaged areas of S3-13S, the two-year performance period in the Pueblo County 1041 permit was restarted to commence on January 29, 2014. On that basis the 90% revegetation cover performance standard is required to be achieved by January 29, 2016. Nonetheless, the entire area, including the damaged and repaired areas, was sampled during 2014 measurements and as stated above, already exceeds the 90% criterion.

The results of revegetation monitoring on S3-13S support the conclusion that the currently observable revegetation trends will continue, and that the restored vegetation does, and will continue to, meet the 90% performance standard.

References

- CNHP 2011. Colorado Springs Utilities Southern Delivery System: Measurements of Pre-existing Vegetation Cover for Pueblo County Work Packages S1, S2, and S3. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. November, 2011. 63pp.
- CNHP 2013a. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Seedling Density for Pueblo County Work Package S3-13. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 9pp.
- CNHP 2013b. Colorado Springs Utilities Southern Delivery System: Measurements of Post-restoration Vegetation Cover for Pueblo County Work Package S3-13. Unpublished report prepared for Colorado Springs Utilities by Colorado Natural Heritage Program. October, 2013. 42pp.



TECHNICAL TAB 9 –

- **SDS Restored Vegetation Cover Monitoring Reports – CNHP (2015)**
 - Review of Revegetation in SDS Segment S3-13N –Technical Memorandum (July, 2015)
 - Overall Review of Revegetation on SDS Segment S3 – Technical Memorandum (September 16, 2015)



Colorado Natural Heritage Program

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Memo

To: Alec Hart, MWH
From: Joe Stevens, Colorado Natural Heritage Program
David Buckner, ESCO Associates, Inc. (Sub consultant to CNHP)
CC: Allison Mosser, Colorado Springs Utilities
Mark Pifher, Colorado Springs Utilities
Date: 7/10/2015
Re: Review of Revegetation in SDS Segment S3-13N

Ecologists from ESCO Assoc., Inc. conducted repeat sampling of the revegetation on S3-13N (the "laydown area" south of Antelope Road) on June 30th, 2015. Analysis of the data collected at that time show average cover of acceptable species is 48.7%. The 90% standard for that area (Group C soils) is 31.5%. Based on these results, we conclude that the revegetation on that site exceeds the required revegetation standard.

The pipeline segment S3-13N is located south of Antelope Road, and north of the north boundary of the Walker property. This area includes the pipeline alignment and a laydown area to the west of the pipeline alignment. The area is dominated by Group C soils (Soils deep on early Pleistocene alluvium) and initial sampling conducted in 2014 showed cover in the area did not meet the 90% standard. For full details on the initial sampling see the CNHP (2014) report

Data from repeat sampling were collected at ten randomly selected points in the S3-13N area using the established protocols. Those data were collected on June 30th, 2015 and are attached herewith. The data show average cover of acceptable species to be 48.7% within the S3-13N area. Photos from each of the ten locations, taken at the time of sampling, are also attached.

Table 1. Revegetation Cover in Work Segment S3-13N as of June 30, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
C	Soils deep on early Pleistocene alluvium	100	35.0	31.5	48.7



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Memo

To: Jerad Barnett, Colorado Springs Utilities

From: Joe Stevens, Colorado Natural Heritage Program
David Buckner, ESCO Associates, Inc. (Sub consultant to CNHP)

CC: Allison Mosser, Colorado Springs Utilities
Mark Pifher, Colorado Springs Utilities
Alec Hart, MWH

Date: 9/16/2015

Re: Overall Review of Revegetation on SDS Segment S3

Introduction

Per the established project protocols, revegetation on the Southern Delivery System alignment has been assessed by soil groups within each of the project's major work packages. Within Pueblo County those include segment S1 (roughly from the Pueblo Dam connection north to US Highway 50), segment S2 (roughly from US Highway 50 north to the south boundary of the Walker Ranches property), and segment S3 (roughly from the south boundary of the Walker Ranches property north to the El Paso County line). For revegetation sampling purposes, the extent of segments S1 and S2 have remained consistent throughout the project, while segment S3 was administratively sub-divided on two occasions to account for differences in the timing of reseeding and other management issues. This summary report for the S3 segment combines reporting for the various subdivided reaches in order to provide consistency among the revegetation reports for all three project work segments and the revegetation protocols established for the project.

The S3 segment was first administratively sub-divided into S3-12 and S3-13 to account for differences in the timing of irrigation on areas north and south of Antelope Road. Irrigation commenced on the S3-12 portion of the alignment north of Antelope Road in the latter part of 2012, while irrigation on the S3-13 portion of the alignment south of Antelope Road commenced in the spring of 2013. The S3-12 segment was subdivided to account for the delayed reseeding of the pipeline tie-in area at the north end of the segment at the Pueblo/El Paso County line. At the same time, the S3-13 segment was subdivided to separate a single parcel not part of the Walker Ranches. The Walker Ranches portion was later subdivided to account for differences in the timing of revegetation on areas that were re-worked subsequent to initial reseeding work. These subdivisions have been reseeded for at least one full

growing season and have sufficient vegetation established to assess the status of revegetation on the entire S3 segment.

Revegetation on S3-12, S3-13N, and S3-13S was sampled in August and September of 2014 and documented in three separate reports (CNHP 2014a, CNHP 2014b, and CNHP 2014c). Those reports showed the success of revegetation across the overall S3 segment and identified isolated areas of group B and group C soils where additional time was needed for vegetation growth to reach the 90% standard. Those areas include the group B soils at the north end of S3-12 at the pipeline tie-in of S3 to S4, the group C soils of S3-13N (at the north end of S3-13, south of Antelope Road), group C soils of S3-13S (on Walker Ranches), and the group B soils on the reworked areas of S3-13S (on Walker Ranches). Those areas were resampled in June and August of 2015. This report compiles the data from sampling conducted across all of these areas in August 2014, June 2015, and August 2015 and consolidates the results of the revegetation sampling for the entire S3 segment. It also separately discusses the results of revegetation on the isolated areas of group B and C soils.

Segment S3 Overall Results

The overall results of revegetation on the segment S3 are compiled from sampling across all subdivisions discussed above. The methods used to sample and assess revegetation have been documented in the original reports and are included here by reference. For a full description of those methods please refer to the original reports.

The various soil series across the extent of S3 were grouped into six units that differed in their nature as plant growth media and as to the means by which they were salvaged prior to, and replaced after, construction. The six groups are as follows:

A. Soils Shallow over Shale and Limestone (Penrose, Manvel and Minnequa series).
Represents 3.5% of work segment S3.

B. Soils on Clay-rich, Salt-affected Alluvial Material (Limon and Heldt series).
Represents 33.1% of work segment S3.

C. Soils Deep on Early Pleistocene Alluvium (Stoneham and Cascajo series).
Represents 18.3% of work segment S3.

D. Soils on Weathered Shales (with active erosional removal) (Midway – Shale complex, Shingle series). Represents 10.8% of work segment S3.

E. Soils on Deeply Weathered Shales (without active erosional removal) (Razor series). Represents 34.0% of work segment S3.

F. Soils on Recent Alluvium of Moderate Texture and Salt Content (Haverson series and Ustic Torrifluvents). Represents 0.3% of work segment S3.

Plant cover sampled within the above soil groups prior to construction established the base values from which revegetation performance standards were calculated.

The following are the base vegetation cover values measured prior to construction. Multiplying these base values by 0.9 determines the revegetation standard in accordance with the Pueblo County 1041 protocol.

- A. Soils Shallow over Shale and Limestone** (Penrose, Manvel and Minnequa series): **17.2%**
- B. Soils on Clay-rich, Salt-affected Alluvial Material** (Limon and Heldt series): **26.6%**
- C. Soils Deep on Early Pleistocene Alluvium** (Stoneham and Cascajo series): **35.0%**
- D. Soils on Weathered Shales (with active erosional removal)** (Midway – Shale complex, Shingle series): **17.0%.**
- E. Soils on Deeply Weathered Shales (without active erosional removal)** (Razor series): **23.3%**
- F. Soils on Recent Alluvium of Moderate Texture and Salt Content** (Haverson series and Ustic Torrifluvents): **41.3%**

A total of 116 transects were sampled in the segment S3 area during the post-construction surveys in August 2014, June 2015, and August 2015. Samples collected in 2015 were limited to the isolated areas where vegetation cover in 2014 was not yet ready to satisfy the 90% standard. Data from 2014 provides a conservative assessment of current vegetation cover over the entire area since increases in cover in the 2015 growing season is unaccounted for in the 2014 data.

In all soil groups, revegetation cover by acceptable species has exceeded the 90% revegetation performance standards. Using the data from 2014 and 2015 surveys, vegetation cover within all areas of the S3 work segment exceeds the 90% performance standard.

Table 1 displays the base vegetation cover, revegetation cover standards at the 90% level established under Pueblo Co. 1041 Regulations, and the post-restoration percent cover values for the respective soil groups and the individual sub sections. Figure 1 graphically represents this information.

The distribution of the soil groups within the S3 segment is indicated on the maps in Figure 2. The distribution of the sample transects across soil groups is shown below and is also indicated on the maps listed in Figure 2.

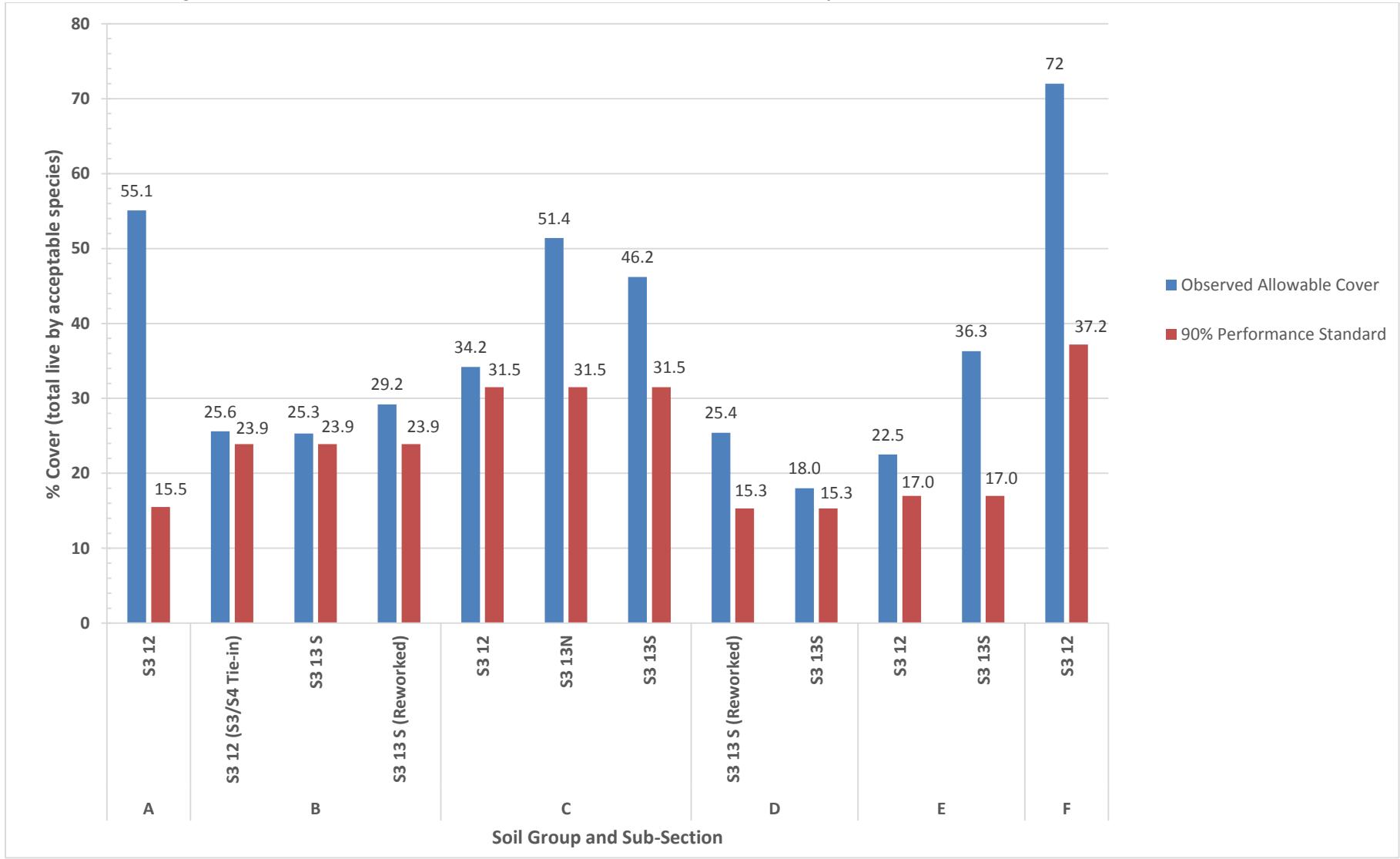
Distribution of Sample Transects across Soil Groups and Years		
Soil Group	August 2014 (# transects)	June and August 2015 (# transects)
A	10	
B	16	14
C	20	20
D	10	
E	25	
F	1	
Total	82	34

Table 1. Vegetation Cover by Soil Group and Sub-Section for Segment S3

Map Code	Soil Group	Sub-section	Date of sampling	Percent of S3 sub-section	Pre-Const. Base Cover (%)	Revegetation Performance Standard (0.9 x base)	Percent Cover by Acceptable Species	
A	Soils shallow over shale and limestone	S3 12	2014	13.1	17.2	15.5	55.1	Pass
B	Soils on clay-rich, salt-affected alluvial materials	S3 12 (Reworked 1 Ac.)	2015	2.8	26.5	23.9	22.4*	Pass
		S3 13 S	2014	46.3	26.5	23.9	25.3	Pass
		S3 13 S (Reworked 5 Ac.)	2015	5.2	26.5	23.9	29.2	Pass
C	Soils deep on early Pleistocene alluvium	S3 12	2014	47.2	35.0	31.5	34.2*	Pass
		S3 13N	2015	100.0	35.0	31.5	51.4	Pass
		S3 13S	2015	3.0	35.0	31.5	46.2	Pass
D	Soils on weathered shales (with active erosional removal)	S3 13S	2014	15.4	17.0	15.3	18.0	Pass
		S3 13 S (Reworked 1 Ac.)	2015	1.0	17.0	15.3	25.4	Pass
E	Soils on deeply weathered shales (without active erosional removal)	S3 12	2014	35.6	23.3	17.0	22.5	Pass
		S3 13S	2014	35.2	23.3	17.0	36.3	Pass
F	Soils on recent alluvium	S3 12	2014	5.3	41.3	37.2	72.0	Pass

* Upper 90% confidence limit

Figure 1. Work Segment S3 Restoration Cover Values vs. Restoration Standards by Soil Group and Sub-Section



In conformance with the provisions of the Protocol, the goal of the frequency assessment was to determine assess the minimum presence of at least two acceptable species per square meter (i.e. an average cumulative frequency of acceptable species of at least 200%). Results in Table 2 below show that for all soil groups and sub-sections in the S3 work package, the average presence of acceptable species well exceeded two per square meter (200% cumulative frequency).

Table 2. Average Frequency of Acceptable Species by Soil Group and Sub-Section for Segment S3

Map Code	Soil Group	Sub-section	Date of sampling	% of S3 sub-section	Observed # Acceptable Species / sq. m.	
A	Soils shallow over shale and limestone	S3 12	2014	13.1	3.2	Pass
B	Soils on clay-rich, salt-affected alluvial materials	S3 12	2014	2.8	3.1	Pass
		S3 13 S	2014	46.3	2.9	Pass
C	Soils deep on early Pleistocene alluvium	S3 12	2014	47.2	2.9	Pass
		S3 13N	2014	100.0	3.1	Pass
		S3 13S	2014	3.0	4.3	Pass
D	Soils on weathered shales (with active erosional removal)	S3 13S	2014	15.4	3.2	Pass
E	Soils on deeply weathered shales (without active erosional removal)	S3 12	2014	35.6	3.0	Pass
		S3 13S	2014	35.2	3.9	Pass
F	Soils on recent alluvium	S3 12	2014	5.3	2.8	Pass

Previous sampling of revegetation cover reported for administrative subdivisions of S3 indicated that revegetation cover on all soil groups approached or exceeded the 90% performance standard and identified areas of Group B and C soils where additional time was needed for sufficient cover to develop. Data collected from those limited areas indicate that all areas now exceed the 90% standard and support the required species diversity. The revegetation cover values presented in this report indicate that overall work segment S3 exceeds the 90% revegetation cover standard required under the Pueblo County 1041 permit.

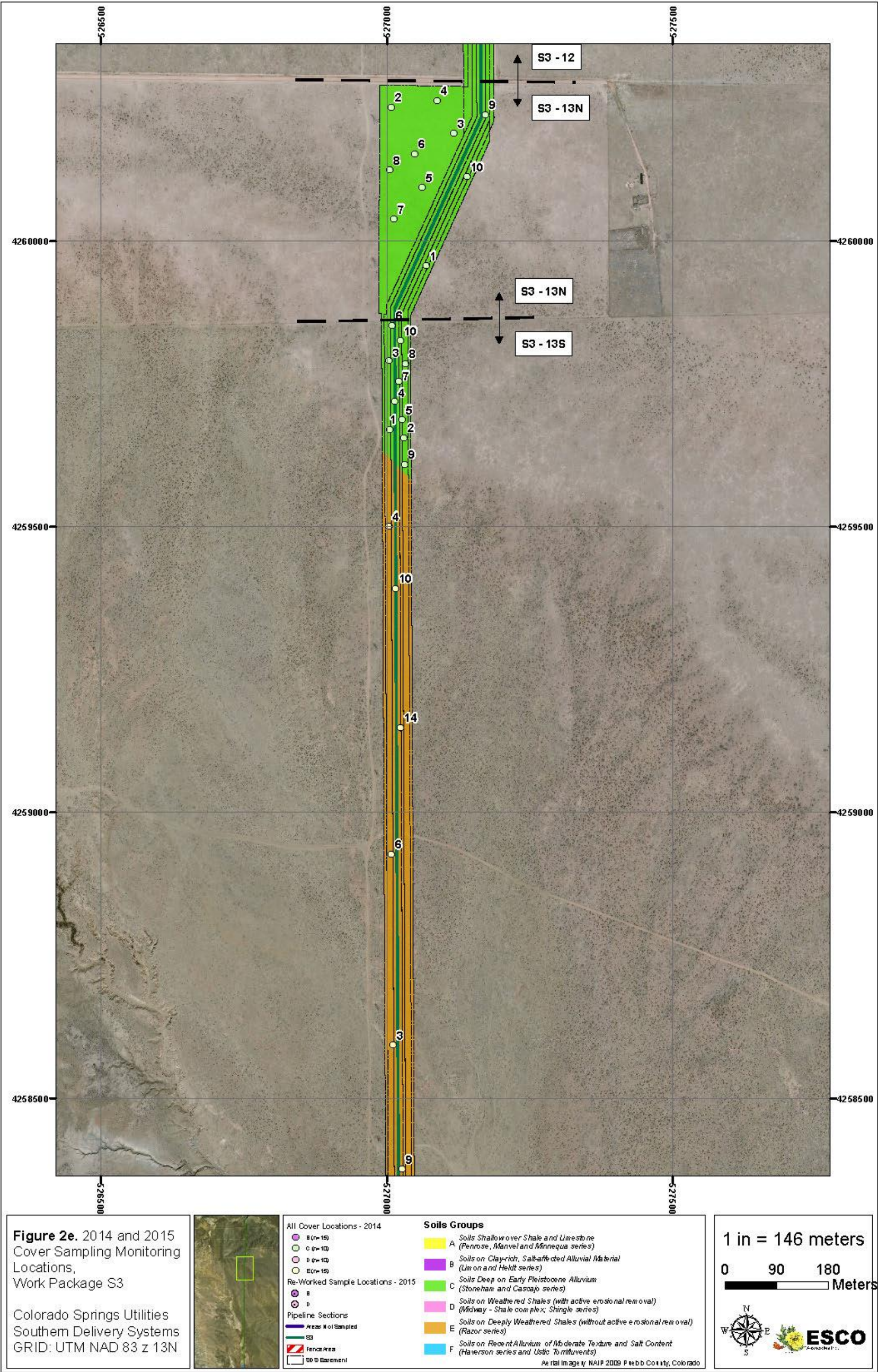
The data and analysis of the limited areas of Group B and C soils that were sampled in June and August of 2015 is presented in the following Appendices A through D.

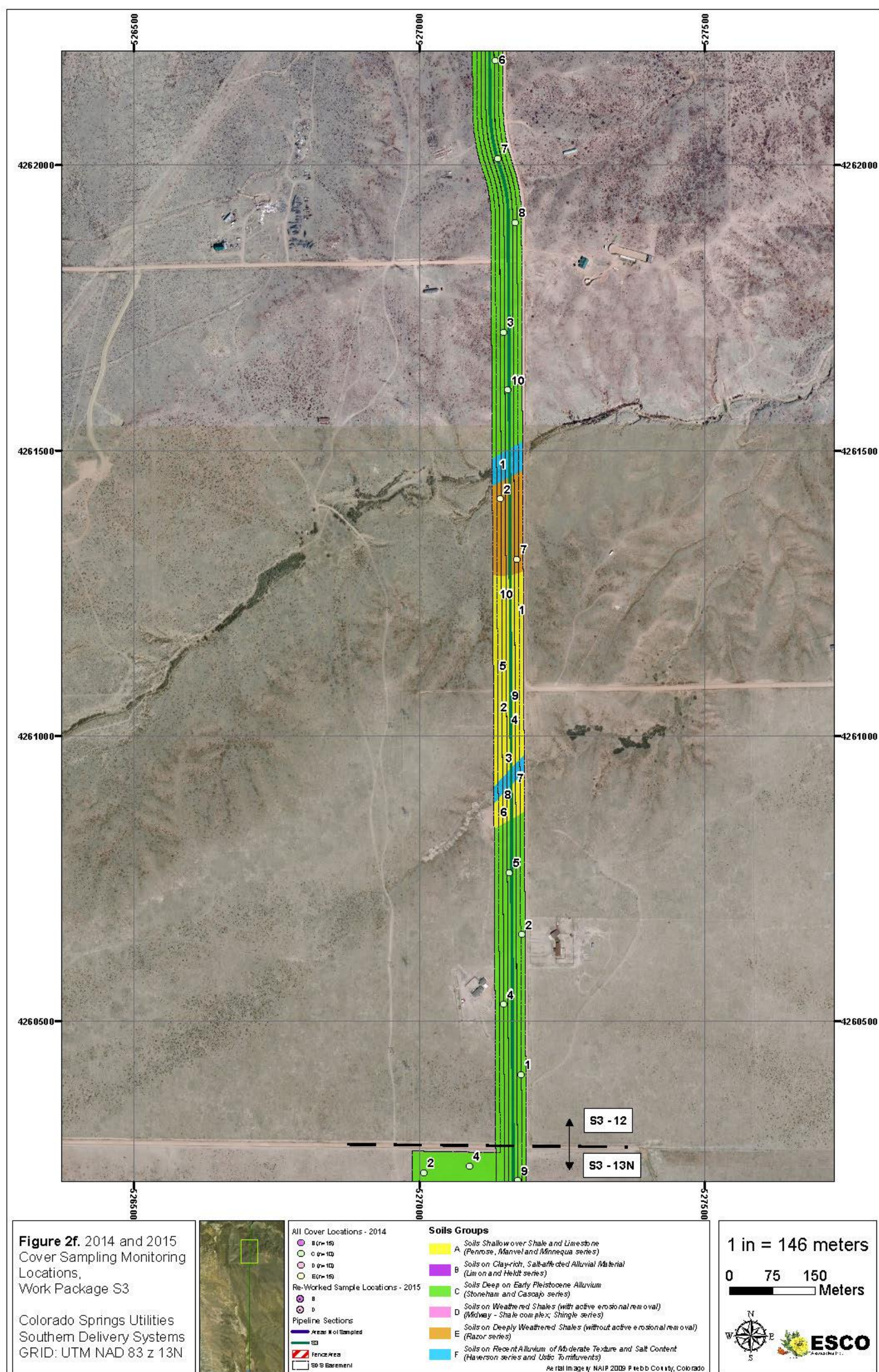
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CNHP. 2014a. Colorado Springs Utilities Southern Delivery System: Restored Vegetation Cover Monitoring – Work Segment S3-12. Report produced for Colorado Springs Utilities by the Colorado Natural Heritage Program, Colorado State University. Fort Collins, Colorado.

CNHP. 2014b. Colorado Springs Utilities Southern Delivery System: Restored Vegetation Cover Monitoring – Work Segment S3-13N. Report produced for Colorado Springs Utilities by the Colorado Natural Heritage Program, Colorado State University. Fort Collins, Colorado.

CNHP. 2014c. Colorado Springs Utilities Southern Delivery System: Restored Vegetation Cover Monitoring – Work Segment S3-13S. Report produced for Colorado Springs Utilities by the Colorado Natural Heritage Program, Colorado State University. Fort Collins, Colorado.





Appendix A

Sampling of Revegetation on S3-12N (S3 to S4 Pipeline Tie-in)

On August 18th and 19th, 2015, ecologists from ESCO Assoc., Inc. conducted sampling of revegetation at the S3 to S4 pipeline tie-in location (located at the Pueblo County/El Paso County Line). Revegetation cover in this area had not previously been sampled because reseeding was not completed there until 2014. The area sampled consists entirely of Group B soils (soils on Clay-rich, Salt-affected Alluvial Material) that encompass approximately 0.69 ac.

Data were collected along transects originating at four randomly selected sample points in the S3-S4 pipeline tie-in area using the established protocols. Analysis of data from the sampled area show average cover of acceptable species is 22.4%, with an upper 90% confidence interval of 25.6%. The 90% revegetation standard for Group B soils is 23.9%. When evaluated at the 90% confidence interval the revegetation cover meets the required revegetation standard.

Although revegetation in this isolated area is just completing its first growing season, average cover values meet the 90% revegetation standard at this time and are reasonably expected to further exceed the standard by the end of the second growing season.

The data collected at four points in the S3-S4 pipeline tie-in area on August 18th and 19th, 2015 are attached herewith. Photos from each of the four sample locations, taken at the time of sampling, are also attached.

Table 1. Revegetation Cover at S3 -12N (S3-S4 pipeline tie-in) as of August 18th and 19th, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	Avg. % Cover by Acc. Spp. (Upper 90% CI)
B	Soils on Clay-rich, Salt-affected Alluvial Material	100	26.5	23.9	22.4(25.6)

S3 to S4 Tie-In Cover Data, August 2015

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover*			
						----- Sample Number -----			
						1	2	3	4
NATIVE ANNUAL & BIENNIAL FORBS									
Chenopodium berlandieri	0.00	25.00	0.00	0.00	0.00		P		
Conyza canadensis	0.00	50.00	0.00	0.00	0.00	P	P		
Dyssodia aurea	0.25	75.00	0.39	0.25	0.38	P	1	P	
Dyssodia papposa	0.50	50.00	0.78	0.50	0.75	1.00		1	
Hedeoma hispidum	0.00	50.00	0.00	0.00	0.00	P		P	
Helianthus annuus	5.50	100.00	8.63	5.50	8.27	1.00	8.00	7.00	6.00
Verbesina encelioides ssp. encelioides	1.00	100.00	1.57	1.50	2.26	P	2(1)	2(1)	P
TOTAL NATIVE ANN. & BIEN. FORBS	7.30	100.00	11.40	7.80	11.70	2	11(1)	10(1)	6
INTRODUCED ANNUAL & BIENNIAL FORBS									
Bassia sieversiana	35.25	100.00	55.29	36.75	55.26	49	22(3)	34(1)	36(2)
Chenopodium album	0.00	50.00	0.00	0.00	0.00	P		P	
Lactuca serriola	0.00	25.00	0.00	0.00	0.00			P	
Polygonum ramosissimum	0.00	50.00	0.00	0.00	0.00		P	P	
Salsola collina	7.75	100.00	12.16	8.00	12.03	7(1)	7	13	4
Xanthium strumarium	0.00	75.00	0.00	0.00	0.00	P		P	P
TOTAL INTRO. ANN. & BIEN. FORBS	43.00	100.00	67.50	44.80	67.30	56(1)	29(3)	47(1)	40(2)
NATIVE PERENNIAL FORBS									
Picradeniopsis oppositifolia	0.00	25.00	0.00	0.00	0.00			P	
Quincula lobata	0.25	50.00	0.39	0.25	0.38	1		P	
Sphaeralcea angustifolia	0.00	25.00	0.00	0.00	0.00			P	
TOTAL NATIVE PERENNIAL FORBS	0.30	50.00	0.40	0.30	0.40	1	---	P	---
NATIVE PERENNIAL GRASSES (cool)									
Achnatherum hymenoides	0.00	25.00	0.00	0.00	0.00			P	
Elymus trachycaulus	4.75	100.00	7.45	5.00	7.52	2(1)	10	1	6

S3 to S4 Tie-In Cover Data, August 2015

PLANT SPECIES	AVERAGE COVER (%)	FREQUENCY (%)	RELATIVE VEGETATION COVER (%)	AVERAGE COVER-ALL (%)	RELATIVE VEGETATION COVER-ALL (%)	Percent Foliar Cover* ----- Sample Number -----			
						1	2	3	4
Pascopyrum smithii	7.50	100.00	11.76	7.75	11.65	3	9	1(1)	17
TOTAL NATIVE PERENNIAL GRASSES (c)	12.30	100.00	19.20	12.80	19.20	5(1)	19	2(1)	23
NATIVE PERENNIAL GRASSES (warm)									
Bouteloua curtipendula	0.25	50.00	0.39	0.25	0.38		P	1	
Chondrosum gracile	0.00	25.00	0.00	0.00	0.00	P			
Pleuraphis jamesii	0.25	50.00	0.39	0.25	0.38	1		P	
Sporobolus airoides	0.25	50.00	0.39	0.25	0.38	P		1	
Sporobolus cryptandrus	0.00	25.00	0.00	0.00	0.00			P	
TOTAL NATIVE PERENNIAL GRASSES (w)	0.80	75.00	1.20	0.80	1.10	1	P	2	---
NATIVE SUBSHRUBS									
Gutierrezia sarothrae	0.25	25.00	0.39	0.25	0.38				1
TOTAL NATIVE SUBSHRUBS	0.30	25.00	0.40	0.30	0.40	---	---	---	1
Standing dead	0.75	50.00		0.75		1		2	
Litter	11.25	100.00		11.25		8	7	19	11
Bare soil	22.75	100.00		22.75		25	29	18	19
Rock	1.50	50.00		1.50		1	5		
TOTALS	100.00			102.80		100	100	100	100
TOTAL VEGETATION COVER	63.8 (s=4.9)		100	66.5 (s=4.0)	100	65(2)	59(4)	61(3)	70(2)
GROUND COVER (Litter+Rock+Veg+St.Dead)	77.3			80		75(2)	71(4)	82(3)	81(2)
SPECIES DENSITY (# of species/100 sq.m.) (AVG= 14.0 Std.Dev.= 5.7)						16.00	11.00	21.00	8.00





Appendix B

Sampling of Revegetation on S3-13N (C Soils south of Antelope Road)

Ecologists from ESCO Assoc., Inc. conducted repeat sampling of the revegetation on S3-13N (the “laydown area” south of Antelope Road) on June 30th, 2015. Data from that repeat sampling were collected at ten randomly selected points in the S3-13N area using the established protocols. Analysis of the data collected at that time show average cover of acceptable species is 51.4%. The 90% standard for that area (Group C soils) is 31.5%. Based on these results, we conclude that the revegetation on that site exceeds the required revegetation standard.

The pipeline segment S3-13N is located south of Antelope Road, and north of the north boundary of the Walker property. This area includes the pipeline alignment and a laydown area to the west of the pipeline alignment. The area is dominated by Group C soils (Soils deep on early Pleistocene alluvium) and initial sampling conducted in 2014 showed cover in the area did not meet the 90% standard. For full details on the initial sampling see the CNHP (2014) report

Those data were collected on June 30th, 2015 and are attached herewith. The data show average cover of acceptable species to be 48.7% within the S3-13N area. Photos from each of the ten locations, taken at the time of sampling, are also attached.

Table 1. Revegetation Cover in Work Segment S3-13N as of June 30, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
C	Soils deep on early Pleistocene alluvium	100	35.0	31.5	51.4

Southern Delivery System - Cover Data S313N (C Soils @ Antelope Rd.) - June 2015

PLANT SPECIES	AVG.	RELATIVE VEGETATION		AVG.	RELATIVE	Percent Foliar Cover*									
	COVER (%)	FREQ. (%)	COVER (%)	COVER- ALL (%)	COVER-ALL (%)	----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS															
Chenopodium berlandieri	0.10	60.00	0.15	0.10	0.14	P	P	1	P					P	P
Chenopodium leptophyllum	0.00	10.00	0.00	0.00	0.00							P			
Coreopsis tinctoria	0.00	10.00	0.00	0.00	0.00				P						
Dyssodia aurea	1.80	100.00	2.69	2.10	3.00	P	4	2(2)	P	P	3	1	P	1	7(1)
Hedeoma hispidum	0.10	30.00	0.15	0.10	0.14			P			P	1			
Helianthus annuus	0.40	90.00	0.60	0.40	0.57	P	P	2		P	P	2	P	P	P
Helianthus petiolaris	0.00	20.00	0.00	0.00	0.00			P	P						
Lappula occidentalis	0.00	20.00	0.00	0.00	0.00	P			P						
Machaeranthera tanacetifolia	0.00	10.00	0.00	0.00	0.00			P							
Nuttallia decapetala	0.00	20.00	0.00	0.00	0.00	P						P			
Poinsettia dentata	0.00	10.00	0.00	0.00	0.00	P									
Verbesina encelioides ssp. encelioides	0.60	100.00	0.90	0.60	0.86	1	1	P	P	P	P	3	1	P	P
TOTAL NATIVE ANN. & BIEN. FORBS	3.0	100.0	4.5	3.3	4.7	1	5	5(2)	P	P	3	7	1	1	7(1)
INTRODUCED ANNUAL & BIENNIAL FORBS															
Bassia sieversiana	6.00	100.00	8.97	6.60	9.43	P	6(1)	18(3)	5(1)	7	3	2	7	8	4(1)
Medicago lupulina	0.00	30.00	0.00	0.00	0.00			P						P	P
Melilotus officinalis	0.00	20.00	0.00	0.00	0.00	P									P
Salsola collina	12.10	100.00	18.09	13.70	19.57	20(5)	6	16(1)	15(2)	11	13	16(3)	4(2)	6	14(3)
Tragopogon dubius ssp. major	0.00	10.00	0.00	0.00	0.00						P				
TOTAL INTRO. ANN. & BIEN. FORBS	18.1	100.0	27.1	20.3	29.0	20(5)	12(1)	34(4)	20(3)	18	16	18(3)	11(2)	14	18(4)
INTRODUCED ANNUAL GRASSES															
Bromus japonicus	0.10	10.00	0.15	0.10	0.14										1
Triticum aestivum	0.00	20.00	0.00	0.00	0.00	P					P				
TOTAL INTRO. ANN. GRASSES	0.1	30.0	0.1	0.1	0.1	P	---	---	---	---	P	---	---	---	1

Southern Delivery System - Cover Data S313N (C Soils @ Antelope Rd.) - June 2015

PLANT SPECIES	AVG.	RELATIVE VEGETATION		AVG.	RELATIVE	Percent Foliar Cover*									
	COVER (%)	FREQ. (%)	COVER (%)	COVER-ALL (%)	COVER-ALL (%)	----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
NATIVE PERENNIAL FORBS															
Achillea millefolium	0.00	20.00	0.00	0.00	0.00						P			P	
Astragalus bisulcatus	0.00	10.00	0.00	0.00	0.00				P						
Astragalus shortianus	0.00	30.00	0.00	0.00	0.00	P			P					P	
Chamaesaracha coronopus	0.30	50.00	0.45	0.40	0.57	(1)		P	1					1	1
Gaillardia pinnatifida	0.00	30.00	0.00	0.00	0.00						P	P			P
Glandularia bipinnatifida	0.00	80.00	0.00	0.00	0.00	P	P	P	P	P	P		P	P	
Lepidium alyssoides var. alyssoides	0.10	20.00	0.15	0.10	0.14							1	P		
Leucelene ericoides	0.00	10.00	0.00	0.00	0.00			P							
Machaeranthera pinnatifida	0.00	10.00	0.00	0.00	0.00								P		
Sphaeralcea coccinea	0.00	100.00	0.00	0.00	0.00	P	P	P	P	P	P	P	P	P	P
Vexibia nuttalliana	0.10	40.00	0.15	0.10	0.14		P		P				1	P	
Zinnia grandiflora	0.10	10.00	0.15	0.10	0.14								1		
TOTAL NATIVE PERENNIAL FORBS	0.6	100.0	0.9	0.7	1.0	(1)	P	P	1	P	P	1	2	1	1
INTRODUCED PERENNIAL FORBS															
Convolvulus arvensis	0.00	20.00	0.00	0.00	0.00		P						P		
Potentilla recta	0.00	10.00	0.00	0.00	0.00										P
Rumex crispus	0.10	40.00	0.15	0.10	0.14	P					P			P	1
Taraxacum officinale	0.00	10.00	0.00	0.00	0.00										P
Trifolium pratense	0.10	10.00	0.15	0.10	0.14									1	
TOTAL INTRO. PERENNIAL FORBS	0.2	60.0	0.3	0.2	0.3	P	P	---	---	---	P	---	P	1	1
NATIVE PERENNIAL GRASSES (cool)															
Achnatherum hymenoides	0.10	10.00	0.15	0.10	0.14					1					
Elymus elymoides	0.30	80.00	0.45	0.30	0.43	P	1	P	1	P			P	1	P
Elymus trachycaulus	1.10	30.00	1.64	1.10	1.57					4	1		6		
Pascopyrum smithii	9.10	100.00	13.60	9.20	13.14	11	7	7(1)	7	10	13	7	7	11	11
Poa compressa	0.00	10.00	0.00	0.00	0.00										P

Southern Delivery System - Cover Data S313N (C Soils @ Antelope Rd.) - June 2015

PLANT SPECIES	AVG.		RELATIVE VEGETATION		RELATIVE VEGETATION		Percent Foliar Cover*									
	COVER (%)	FREQ. (%)	COVER (%)	AVG. COVER- ALL (%)	COVER-ALL (%)		----- Sample Number -----									
							1	2	3	4	5	6	7	8	9	10
TOTAL NATIVE PERENNIAL GRASSES (c)	10.6	100.0	15.8	10.7	15.3		11	8	7(1)	8	15	14	7	13	12	11
INTRODUCED PERENNIAL GRASSES (cool)																
Bromopsis inermis	0.00	10.00	0.00	0.00	0.00											P
Dactylis glomerata	0.00	10.00	0.00	0.00	0.00											P
TOTAL INTRO. PERENNIAL GRASSES (c)	0.0	10.0	0.0	0.0	0.0		---	---	---	---	---	---	---	---	---	P
NATIVE PERENNIAL GRASSES (warm)																
Bouteloua curtipendula	10.90	100.00	16.29	10.90	15.57		6	19	6	11	18	16	11	10	4	8
Chondrosum gracile	12.60	100.00	18.83	13.00	18.57		26(1)	16(2)	9	19	7	6	12	13	13	5(1)
Distichlis stricta	0.00	10.00	0.00	0.00	0.00				P							
Pleuraphis jamesii	4.40	100.00	6.58	4.40	6.29		P	4	2	3	5	11	4	7	6	2
Schedonnardus paniculatus	0.00	20.00	0.00	0.00	0.00			P								P
Sporobolus airoides	2.80	90.00	4.19	2.80	4.00		3	4	P	4	1	3	3	6	4	
Sporobolus cryptandrus	3.50	90.00	5.23	3.50	5.00		3	2	5	3	1		2	2	4	13
TOTAL NATIVE PERENNIAL GRASSES (w)	34.2	100.0	51.1	34.6	49.4		38(1)	45(2)	22	40	32	36	32	38	31	28(1)
NATIVE SUBSHRUBS																
Gutierrezia sarothrae	0.10	30.00	0.15	0.10	0.14		P								P	1
TOTAL NATIVE SUBSHRUBS	0.1	30.0	0.1	0.1	0.1		P	---	---	---	---	---	---	---	P	1
NATIVE SHRUBS																
Atriplex canescens	0.00	10.00	0.00	0.00	0.00			P								
Chrysothamnus viscidiflorus	0.00	10.00	0.00	0.00	0.00							P				
TOTAL NATIVE SHRUBS	0.0	20.0	0.0	0.0	0.0		---	P	---	---	---	P	---	---	---	---
SUCCULENTS																
Opuntia polyacantha	0.00	10.00	0.00	0.00	0.00									P		
TOTAL SUCCULENTS	0.0	10.0	0.0	0.0	0.0		---	---	---	---	---	---	---	P	---	---

Southern Delivery System - Cover Data S313N (C Soils @ Antelope Rd.) - June 2015

PLANT SPECIES	AVG.	FREQ.	RELATIVE VEGETATION	AVG.	RELATIVE VEGETATION	Percent Foliar Cover*									
	COVER (%)		COVER (%)	COVER- ALL (%)	COVER-ALL (%)	----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
Standing dead	2.70	90.00		2.70		1		4	4	2	2	3	3	6	2
Litter	13.00	100.00		13.00		17	6	17	12	11	11	8	23	9	16
Bare soil	16.70	100.00		16.70		10	24	11	14	22	18	23	9	23	13
Rock	0.70	50.00		0.70		2			1			1		2	1
TOTALS	100.0			103.1		100	100	100	100	100	100	100	100	100	100
TOTAL VEGETATION COVER	66.9			70.0											
GROUND COVER	(s=3.1)		100.0	(s=5.2)	100.0	70(7)	70(3)	68(7)	69(3)	65	69	65(3)	65(2)	60	68(6)
(Litter+Rock+Veg+St.Dead)	83.3			86.4		90(7)	76(3)	89(7)	86(3)	78	82	77(3)	91(2)	77	87(6)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 20.9 Std.Dev.= 3.1)						24	19	22	21	16	20	17	21	23	26











Appendix C

Sampling of Revegetation on S3-13S (Group C Soils on North End of Walker Ranches)

On August 18th and 19th, 2015, ecologists from ESCO Assoc., Inc. conducted sampling of revegetation on the Group C soils on the north end of the Walker Ranches. The area sampled consists entirely of Group C soils that encompass approximately 3.0% of the Group C soils on the S3-13S sub-section.

Data were collected at ten randomly selected sample points in this S3-13S area using the established protocols. Analysis of data from the sampled area show average cover of acceptable species is 46.2%. The 90% standard for Group C soils is 31.5%.

Based on the data collected, cover values meet the 90% revegetation standard at this time. The data collected at ten points in the S3-13S group C soils area on August 18th and 19th, 2015 are attached herewith. Photos from each of the ten sample locations, taken at the time of sampling, are also attached.

Table 1. Revegetation Cover at S3 -13S (C Soils on north end of Walker Ranches) as of August 18th and 19th, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
C	Soils deep on early Pleistocene alluvium	3.0	35.0	31.5	46.2

S3 13S Soil Type C - Cover Data, August 2015

	AVG. COVER	FREQ.	RELATIVE VEGETATION COVER	AVG. COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover*									
						----- Sample Number -----									
PLANT SPECIES	(%)	(%)	(%)	(%)	(%)	1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS															
Chamaesyce sp.	0.00	10.00	0.00	0.00	0.00	P									
Chenopodium berlandieri	0.00	10.00	0.00	0.00	0.00								P		
Chenopodium leptophyllum	0.00	20.00	0.00	0.00	0.00				P			P			
Cirsium sp.	0.00	10.00	0.00	0.00	0.00									P	
Dyssodia aurea	0.00	40.00	0.00	0.00	0.00	P	P		P		P				
Dyssodia papposa	0.10	60.00	0.17	0.10	0.17	1		P	P	P	P			P	
Grindelia squarrosa	0.10	30.00	0.17	0.10	0.17			1				P	P		
Hedeoma hispidum	0.00	40.00	0.00	0.00	0.00	P			P	P	P				
Helianthus annuus	0.20	90.00	0.34	0.20	0.33	P		P	P	P	1	P	P	1	P
Machaeranthera bigelovii	0.00	20.00	0.00	0.00	0.00			P							P
Oonopsis foliosa	0.10	40.00	0.17	0.10	0.17			P			P	P			1
Verbesina encelioides ssp. encelioides	0.00	70.00	0.00	0.00	0.00	P		P	P	P	P	P			P
TOTAL NATIVE ANN. & BIEN. FORBS	0.5	100.0	0.9	0.5	0.8	1	P	1	P	P	1	P	P	1	1
INTRODUCED ANNUAL & BIENNIAL FORBS															
Bassia sieversiana	0.00	30.00	0.00	0.00	0.00			P	P					P	
Salsola collina	14.20	100.0	24.44	14.80	24.67	23	8	P	14	18	17(2)	15(2)	10	23	14(2)
Xanthium strumarium	0.00	10.00	0.00	0.00	0.00		P								
TOTAL INTRO. ANN. & BIEN. FORBS	14.2	100.0	24.4	14.8	24.7	23	8	P	14	18	17(2)	15(2)	10	23	14(2)
INTRODUCED ANNUAL GRASSES															
Bromus japonicus	0.10	50.00	0.17	0.10	0.17			P	P		P			P	1

S3 13S Soil Type C - Cover Data, August 2015

PLANT SPECIES	AVG. COVER	FREQ.	RELATIVE VEGETATION COVER	AVG. COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover*									
						----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
TOTAL INTRO. ANN. GRASSES	0.1	50.0	0.2	0.1	0.2	---	---	P	P	---	P	---	---	P	1
NATIVE PERENNIAL FORBS															
Achillea millefolium	0.00	10.00	0.00	0.00	0.00				P						
Astragalus bisulcatus	0.00	10.00	0.00	0.00	0.00				P						
Astragalus laxmannii	0.00	10.00	0.00	0.00	0.00						P				
Chamaesaracha coronopus	0.00	20.00	0.00	0.00	0.00		P	P							
Gaillardia pinnatifida	0.00	20.00	0.00	0.00	0.00		P				P				
Heterotheca villosa	0.00	10.00	0.00	0.00	0.00				P						
Machaeranthera pinnatifida	0.00	20.00	0.00	0.00	0.00							P		P	
Oxybaphus linearis	0.00	10.00	0.00	0.00	0.00								P		
Phlox sp.	0.00	10.00	0.00	0.00	0.00					P					
Picradeniopsis oppositifolia	0.00	30.00	0.00	0.00	0.00						P		P		P
Psoralidium tenuiflorum	0.10	10.00	0.17	0.10	0.17	1									
Senecio flaccidus ssp. douglasii	0.00	10.00	0.00	0.00	0.00						P				
Sphaeralcea angustifolia	0.00	70.00	0.00	0.00	0.00	P	P		P		P	P	P		P
Sphaeralcea coccinea	0.00	90.00	0.00	0.10	0.17	P	P	P	P	P	P	P		P	(1)
Vexibia nuttalliana	0.60	30.00	1.03	0.60	1.00			4				1	1		
TOTAL NATIVE PERENNIAL FORBS	0.7	100.0	1.2	0.8	1.3	1	P	4	P	P	P	1	1	P	(1)
INTRODUCED PERENNIAL FORBS															
Medicago sativa	0.10	20.00	0.17	0.10	0.17	P	1								
Rumex crispus	0.00	30.00	0.00	0.00	0.00			P	P				P		

S3 13S Soil Type C - Cover Data, August 2015

PLANT SPECIES	AVG. COVER	FREQ.	RELATIVE VEGETATION COVER	AVG. COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover*									
						----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
TOTAL INTRO. PERENNIAL FORBS	0.1	50.0	0.2	0.1	0.2	P	1	P	P	---	---	---	P	---	---
NATIVE PERENNIAL GRASSES (cool)															
Elymus elymoides	0.70	90.00	1.20	0.80	1.33	1	(1)	P	P	2	P	2	1		1
Elymus lanceolatus lanceolatus	2.00	30.00	3.44	2.00	3.33			9					7		4
Elymus trachycaulus	0.30	30.00	0.52	0.30	0.50			2	P				1		
Pascopyrum smithii	10.00	100.0	17.21	10.00	16.67	10	14	12	18	4	2	19	12	8	1
TOTAL NATIVE PERENNIAL GRASSES (c)	13.0	100.0	22.4	13.1	21.8	11	14(1)	23	18	6	2	21	21	8	6
INTRODUCED PERENNIAL GRASSES (cool)															
Bromopsis inermis	0.00	10.00	0.00	0.00	0.00		P								
Schedonnardus arundinaceus	0.10	40.00	0.17	0.10	0.17			P	P		P				1
TOTAL INTRO. PERENNIAL GRASSES (c)	0.1	50.0	0.2	0.1	0.2	---	P	P	P	---	P	---	---	---	1
NATIVE PERENNIAL GRASSES (warm)															
Andropogon hallii	0.00	10.00	0.00	0.00	0.00							P			
Aristida purpurea	0.00	20.00	0.00	0.00	0.00			P					P		
Bouteloua curtipendula	3.90	100.0	6.71	3.90	6.50	4	4	6	4	8	1	4	5	1	2
Chondrosum gracile	1.90	100.0	3.27	1.90	3.17	1	2	2	5	4	P	3	1	1	P
Leptochloa dubia	0.00	40.00	0.00	0.00	0.00	P		P		P	P				
Muhlenbergia richardsonis	0.00	10.00	0.00	0.00	0.00	P									

S3 13S Soil Type C - Cover Data, August 2015

PLANT SPECIES	AVG. COVER	FREQ.	RELATIVE VEGETATION COVER	AVG. COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover*									
						----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
Panicum virgatum	0.00	30.00	0.00	0.00	0.00		P			P		P			
Pleuraphis jamesii	4.30	100.0	7.40	4.30	7.17	1	4	7	2	8	3	4	2	12	P
Schedonnardus paniculatus	0.10	10.00	0.17	0.10	0.17								1		
Schizachyrium scoparium	0.10	10.00	0.17	0.10	0.17			1							
Sporobolus airoides	3.00	100.0	5.16	3.10	5.17	5	7	P	5	1	1	P	4	2(1)	5
Sporobolus cryptandrus	15.70	100.0	27.02	16.70	27.83	8(2)	2	12	10	16(1)	40(4)	16(1)	22(1)	P	31(1)
TOTAL NATIVE PERENNIAL GRASSES (w)	29.0	100.0	49.9	30.1	50.2	19(2)	19	28	26	37(1)	45(4)	27(1)	35(1)	16(1)	38(1)
INTRODUCED PERENNIAL GRASSES (warm)															
Bothriochloa sp.	0.20	50.00	0.34	0.20	0.33	1	P				1		P		P
TOTAL INTRO. PERENNIAL GRASSES (w)	0.2	50.0	0.3	0.2	0.3	1	P	---	---	---	1	---	P	---	P
NATIVE SUBSHRUBS															
Gutierrezia sarothrae	0.10	100.0	0.17	0.10	0.17	P	1	P	P	P	P	P	P	P	P
TOTAL NATIVE SUBSHRUBS	0.1	100.0	0.2	0.1	0.2	P	1	P	P	P	P	P	P	P	P
NATIVE SHRUBS															
Atriplex canescens	0.10	50.00	0.17	0.10	0.17			P		P	P		1		P
TOTAL NATIVE SHRUBS	0.1	50.0	0.2	0.1	0.2	---	---	P	---	P	P	---	1	---	P
SUCCULENTS															
Cylindropuntia imbricata	0.00	70.00	0.00	0.00	0.00	P	P	P			P	P	P		P
TOTAL SUCCULENTS	0.0	70.0	0.0	0.0	0.0	P	P	P	---	---	P	P	P	---	P
AGAVOIDS															

S3 13S Soil Type C - Cover Data, August 2015

PLANT SPECIES	AVG. COVER	FREQ.	RELATIVE VEGETATION COVER	AVG. COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover*									
						----- Sample Number -----									
	(%)	(%)	(%)	(%)	(%)	1	2	3	4	5	6	7	8	9	10
Yucca glauca	0.00	10.00	0.00	0.00	0.00		P								
TOTAL AGAVOIDS	0.0	10.0	0.0	0.0	0.0	---	P	---	---	---	---	---	---	---	---
Standing dead	3.00	100.0		3.00		2	2	6	1	5	2	4	3	4	1
Litter	20.80	100.0		20.80		23	18	26	12	22	21	20	21	19	26
Bare soil	15.30	100.0		15.30		15	34	11	22	9	10	12	8	20	12
Rock	2.80	70.00		2.80		4	3	1	7	3	1			9	
TOTALS	100.0			101.9		100	100	100	100	100	100	100	100	100	100
TOTAL VEGETATION COVER	58.1 (s=7.8)		100.0	60.0 (s=8.8)	100.0	56(2)	43(1)	56	58	61(1)	66(6)	64(3)	68(1)	48(1)	61(4)
GROUND COVER (Litter, Rock, Veg, Standing dead)	84.7			86.6		85(2)	66(1)	89	78	91(1)	90(6)	88(3)	92(1)	80(1)	88(4)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 22.5 Std.Dev.= 4.2)						23	21	29	25	18	27	20	25	15	22











Appendix D

Sampling of Revegetation on S3-13S (Reworked Group D Soils on Walker Ranches)

On August 18th and 19th, 2015, ecologists from ESCO Assoc., Inc. conducted sampling of revegetation on the reworked areas of Group D soils on the Walker Ranches. Revegetation cover in this area was resampled following completion of earth work and reseeding during the fourth quarter of 2014. The area sampled consists entirely of Group D soils that encompass approximately 1.0% of the Group D soils on the S3-13S sub-section.

Data were collected at one randomly selected sample point in the S3-13S reworked area using the established protocols. Analysis of data from the sampled area show average cover of acceptable species is 25.4%. The 90% standard for Group D soils is 15.3%.

Although revegetation in this isolated area is just completing its first growing season, cover values meet the 90% revegetation standard at this time and are reasonably expected to further exceed the standard by the end of the second growing season.

The data collected at one point in the S3-13S Group D soils rework area on August 18th and 19th, 2015 are attached herewith. Photos from the one sample location, taken at the time of sampling, is also attached.

Table 1. Revegetation Cover at S3 -13S (Group D Soils on Walker Ranches rework area) as of August 18th and 19th, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
D	Soils on weathered shales (with active erosional removal)	1.0	17.0	15.3	25.4

SDS S3 Soil Type D Reworked August 2015

PLANT SPECIES	AVERAGE COVER	FREQUENCY	RELATIVE VEGETATION COVER	AVERAGE COVER-ALL	RELATIVE VEGETATION COVER-ALL	Percent Foliar Cover* (Sample #)
	(%)	(%)	(%)	(%)	(%)	(1)
NATIVE ANNUAL & BIENNIAL FORBS						
Chenopodium berlandieri	8.00	100.00	25.81	8.00	25.00	8
Helianthus annuus	4.00	100.00	12.90	4.00	12.50	4
TOTAL NATIVE ANN. & BIEN. FORBS	12.0	100.0	38.7	12.0	37.5	12
INTRODUCED ANNUAL & BIENNIAL FORBS						
Bassia sieversiana	2.00	100.00	6.45	3.00	9.38	2(1)
Salsola collina	4.00	100.00	12.90	4.00	12.50	4
TOTAL INTRO. ANN. & BIEN. FORBS	6.0	100.0	19.4	7.0	21.9	6(1)
NATIVE PERENNIAL GRASSES (cool)						
Elymus trachycaulus	11.00	100.00	35.48	11.00	34.38	11
Pascopyrum smithii	1.00	100.00	3.23	1.00	3.13	1
TOTAL NATIVE PERENNIAL GRASSES (c)	12.0	100.0	38.7	12.0	37.5	12
NATIVE PERENNIAL GRASSES (warm)						
Chondrosum gracile	1.00	100.00	3.23	1.00	3.13	1
TOTAL NATIVE PERENNIAL GRASSES (w)	1.0	100.0	3.2	1.0	3.1	1
Litter	6.00	100.00		6.00		6
Bare soil	62.00	100.00		62.00		62
Rock	1.00	100.00		1.00		1
TOTALS	100.0			101.0		100
TOTAL VEGETATION COVER	31.0 (s=0.0)		100.0	32.0 (s=0.0)	100.0	31(1)
GROUND COVER (Litter+Rock+Veg+St.Dead)	38.0			39.0		38(1)
SPECIES DENSITY (# of species/100 sq.m.)						7
(AVERAGE= 7.0 Std.Dev.= 0.0)						



Appendix E

Sampling of Revegetation on S3-13S (Reworked Group B Soils on Walker Ranches)

On August 18th and 19th, 2015, ecologists from ESCO Assoc., Inc. conducted sampling of revegetation on the reworked areas of Group B soils on the Walker Ranches. Revegetation cover in this area was resampled following completion of earth work and reseeding during the fourth quarter of 2014. The area sampled consists entirely of Group B soils that encompass approximately 5.2% of the Group B soils on the S3-13S sub-section.

Data were collected at ten randomly selected sample points in the S3-13S reworked area using the established protocols. Analysis of data from the sampled area show average cover of acceptable species is 29.2%. The 90% standard for Group B soils is 23.9%.

Although revegetation in this isolated area is just completing its first growing season, cover values meet the 90% revegetation standard at this time and are reasonably expected to further exceed the standard by the end of the second growing season.

The data collected at ten points in the S3-13S Group B soils rework area on August 18th and 19th, 2015 are attached herewith. Photos from the ten sample locations, taken at the time of sampling, is also attached.

Table 1. Revegetation Cover at S3 -13S (Group B Soils on Walker Ranches rework area) as of August 18th and 19th, 2015

Soil Group	Soil Group	% of Work Unit	% Base Veg. Cover	90% Perf. Std. (0.9 x Base)	% Cover by Acc. Spp.
B	Soils on clay-rich, salt-affected alluvial materials	5.2	26.5	23.9	29.2

SDS S3 Soil Type B Reworked August 2015

PLANT SPECIES	AVG. COVER (%)	FREQ. (%)	RELATIVE VEG. COVER (%)	AVG. COVER- ALL (%)	RELATIVE VEG. COVER- ALL (%)	Percent Foliar Cover*									
						'----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
NATIVE ANNUAL & BIENNIAL FORBS															
Chenopodium berlandieri	0.60	30.00	0.98	0.70	1.07						P			P	6(1)
Dyssodia aurea	0.00	10.00	0.00	0.00	0.00									P	
Grindelia squarrosa	0.00	10.00	0.00	0.00	0.00	P									
Helianthus annuus	2.00	30.00	3.25	2.00	3.04						7			1	12
Oonopsis foliosa	0.20	30.00	0.33	0.40	0.61	1					P				1(2)
Verbesina encelioides ssp. encelioides	0.00	50.00	0.00	0.00	0.00		P	P	P		P		P		
TOTAL NATIVE ANN. & BIEN. FORBS	2.8	80.0	4.6	3.1	4.7	1	P	P	P	---	7	---	P	1	19(3)
INTRODUCED ANNUAL & BIENNIAL FORBS															
Amaranthus retroflexus	0.00	10.00	0.00	0.00	0.00			P							
Bassia sieversiana	31.10	100.00	50.57	34.30	52.21	45(5)	44(4)	27(4)	25(2)	53(3)	14(5)	26(8)	37	35	5(1)
Polygonum ramosissimum	0.10	10.00	0.16	0.10	0.15									1	
Salsola australis	0.20	10.00	0.33	0.20	0.30								2		
Salsola collina	2.10	60.00	3.41	2.20	3.35	1		1			11	1(1)	4	3	
TOTAL INTRO. ANN. & BIEN. FORBS	33.5	100.0	54.5	36.8	56.0	46(5)	44(4)	28(4)	25(2)	53(3)	25(5)	27(9)	43	39	5(1)
NATIVE ANNUAL GRASSES															
Panicum capillare	0.30	20.00	0.49	0.30	0.46								2	1	
TOTAL NATIVE ANN. GRASSES	0.3	20.0	0.5	0.3	0.5	---	---	---	---	---	---	---	2	1	---
INTRODUCED ANNUAL GRASSES															
Bromus tectorum	0.10	10.00	0.16	0.10	0.15										1
Setaria viridis	0.10	10.00	0.16	0.10	0.15								1		
TOTAL INTRO. ANN. GRASSES	0.2	20.0	0.3	0.2	0.3	---	---	---	---	---	---	---	1	---	1
NATIVE PERENNIAL FORBS															

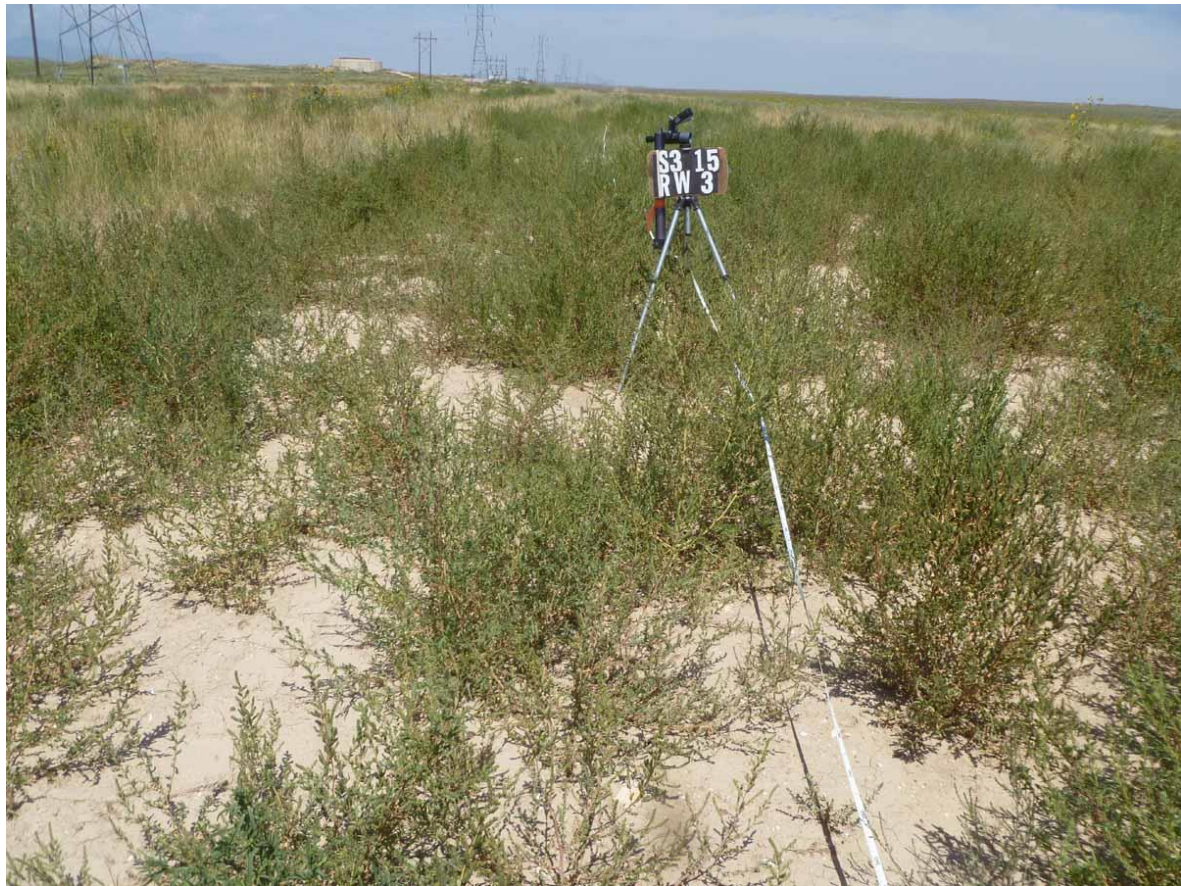
SDS S3 Soil Type B Reworked August 2015

PLANT SPECIES	AVG. COVER (%)	FREQ. (%)	RELATIVE VEG. COVER (%)	AVG. COVER- ALL (%)	RELATIVE VEG. COVER- ALL (%)	Percent Foliar Cover*									
						'----- Sample Number -----									
						1	2	3	4	5	6	7	8	9	10
Asclepias stenophylla	0.00	10.00	0.00	0.00	0.00						P				
Astragalus bisulcatus	0.70	30.00	1.14	0.80	1.22				1		2				4(1)
Quincula lobata	0.00	20.00	0.00	0.00	0.00						P		P		
Sphaeralcea angustifolia	0.10	10.00	0.16	0.10	0.15						1				
Vexibia nuttalliana	0.00	10.00	0.00	0.00	0.00			P							
TOTAL NATIVE PERENNIAL FORBS	0.8	50.0	1.3	0.9	1.4	---	---	P	1	---	3	---	P	---	4(1)
NATIVE PERENNIAL GRASSES (cool)															
Achnatherum hymenoides	0.10	10.00	0.16	0.10	0.15							1			
Elymus trachycaulus	8.50	100.00	13.82	8.50	12.94	2	2	P	25	7	16	4	15	5	9
Pascopyrum smithii	9.70	100.00	15.77	9.90	15.07	8	7	11	3	12	18(2)	22	4	9	3
TOTAL NATIVE PERENNIAL GRASSES (c)	18.3	100.0	29.8	18.5	28.2	10	9	11	28	19	34(2)	27	19	14	12
NATIVE PERENNIAL GRASSES (warm)															
Bouteloua curtipendula	0.30	30.00	0.49	0.40	0.61			1			(1)	2			
Chondrosum gracile	0.40	30.00	0.65	0.40	0.61			2			1	1			
Pleuraphis jamesii	0.60	80.00	0.98	0.60	0.91		1	1	1		1	P	1	P	1
Sporobolus airoides	4.30	90.00	6.99	4.50	6.85	4	2	10	8	1	3(2)	14	P		1
TOTAL NATIVE PERENNIAL GRASSES (w)	5.6	100.0	9.1	5.9	9.0	4	3	14	9	1	5(3)	17	1	P	2
NATIVE SHRUBS															
Atriplex canescens	0.00	10.00	0.00	0.00	0.00			P							
TOTAL NATIVE SHRUBS	0.0	10.0	0.0	0.0	0.0	---	---	P	---	---	---	---	---	---	---
Standing dead	0.30	10.00		0.30					3						
Litter	5.80	90.00		5.80		9	2	3	13		10	4	2	1	14

SDS S3 Soil Type B Reworked August 2015

PLANT SPECIES	AVG. COVER (%)	FREQ. (%)	RELATIVE VEG. COVER (%)	AVG. COVER- ALL (%)	RELATIVE VEG. COVER- ALL (%)	Percent Foliar Cover*									
						'----- Sample Number -----'									
						1	2	3	4	5	6	7	8	9	10
Bare soil	32.40	100.00		32.40		30	42	44	21	27	16	25	32	44	43
TOTALS	100.0			104.2		100	100	100	100	100	100	100	100	100	100
TOTAL VEGETATION COVER	61.5 (s=9.9)		100.0	65.7 (s=11.5)	100.0	61(5)	56(4)	53(4)	63(2)	73(3)	74(10)	71(9)	66	55	43(5)
GROUND COVER (Litter+Rock+Veg+St.Dead)	67.6			71.8		70(5)	58(4)	56(4)	79(2)	73(3)	84(10)	75(9)	68	56	57(5)
SPECIES DENSITY (# of species/100 sq.m.) (AVERAGE= 9.2 Std.Dev.= 3.4)						7	6	12	7	4	16	9	11	10	10













TECHNICAL TAB 10 –

- **Keammerer Ecological Consultants, Inc. Completion Reports**
 - Review Of: Colorado Springs Utilities Southern Delivery System, Restored Vegetation Cover Monitoring – WORK SEGMENT S1 (March, 2015)
 - Review Of: Colorado Springs Utilities Southern Delivery System, Restored Vegetation Cover Monitoring – WORK SEGMENT S2 (March, 2015)

*****FINAL REPORT*****



REVIEW OF:

COLORADO SPRINGS UTILITIES SOUTHERN DELIVERY SYSTEM

RESTORED VEGETATION COVER MONITORING - WORK SEGMENT S1

September, 2014

Report prepared by:
Colorado Natural Heritage Program
and
ESCO Associates

Review Prepared by:

Warren R. Keammerer, Ph.D.
Keammerer Ecological Consultants, Inc.
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Boulder, Colorado

March, 2015

INTRODUCTION

This review of the 2014 report addressing vegetation sampling by CSU-SDS along the S1 Segment of the Southern Delivery System water pipeline in Pueblo County focuses on the degree to which the revegetation requirements of the 1041 Permit issued by Pueblo County are being met. The overall goal of revegetation in the 1041 Permit is stated as:

“Applicant shall provide Pueblo County residents with replacement vegetation and property to match pre-construction conditions or better.”

This overall goal is clarified by describing that “matching pre-construction condition or better” will be based on evaluating vegetation cover by acceptable species, evaluating species diversity and assessing the abundance of noxious weeds (as defined by lists prepared by the State of Colorado). The requirements associated with these vegetation attributes are described in the following section.

REVEGETATION PERFORMANCE STANDARDS IDENTIFIED IN THE 1041 PERMIT

Vegetation Cover. The 1041 Permit states that successful vegetation establishment will consist of (in part) attaining cover values that are equal to (or greater than) 90 percent of the values that were present prior to construction of the water pipeline. Before construction of the pipeline, a vegetation study was conducted in October 2011 by CSU-SDS consultants to determine what the existing vegetation cover values were along the length of the water line right-of-way (ROW). The sampling program was stratified based on six different soil groups that had been identified along the water line route. Additionally, the ROW was divided into

three segments: S1, S2 and S3. Not all of the six soil groups occurred in each of the segments. Vegetation cover data were collected at 52 locations along the entire length of the ROW. After reviewing the data from the vegetation sampling transects, some of the results were dropped from the set of transects used to develop the base vegetation cover values. The reason for excluding some of the transects was that the excluded sites had low vegetation cover values that were not consistent with values measured at other sites within a particular soil group. The low values were related to impacts from grazing by livestock and prairie dogs. After excluding the data from 11 transects, base vegetation values were developed for each of the soil groups using the data from 41 transects. The vegetation cover standards were developed by multiplying the base values by 0.9 (90 percent). The transect locations for the 2011 study were distributed among the three ROW Segments as shown in the following table:

Soil Group	Number of Transects (2011 Study)					
	S1		S2		S3	
	Total Sampled	Used to develop standard	Total Sampled	Used to develop standard	Total Sampled	Used to develop standard
Type A (Penrose, Manvel and Minnequa Soils)	7	4	13	11		
Type B (Limon and Heldt Soils)	1	1	6	6	7	1
Type C (Stoneham and Cascajo Soils)					4	4
Type D (Midway Shale Complex – Shingle Series)			1	1	3	3
Type E (Razor Series)					7	7
Type F (Haverson Series and Ustic Torrifluvents)			2	2	1	1

Species Diversity. There is no specific standard for species diversity presented in the 1041 Permit revegetation requirements. There are however provisions for species diversity to be considered. The permit states that “*Vegetation cover will be of the same seasonal variety native to the area of disturbed land, or species that support the post-construction land use.*” Also, the permit states that the revegetated area will be considered acceptable if “*..the revegetated area cover is not less than 90 percent of the pre-construction vegetation cover with similar species diversity.*” The CSU-SDS report evaluates species diversity based on the number of acceptable species per square meter. Their target number for acceptable revegetation is a mean value of two species per square meter. Data for this type of evaluation were collected from the reclaimed areas following construction. There are no comparable pre-construction data, however the two species per square meter value is not an unreasonable target. It is also possible to evaluate species diversity by comparing the number of species per 100 square meters. The vegetation transect sampling approaches used in 2011 and in 2014 were conducted in the same manner so it is possible to make pre- and post-construction comparisons.

Noxious Weeds. No specific standard for noxious weed species is included in the 1041 Permit. However, the provision is included that “*Applicant shall control spread of noxious weeds resulting from project construction.*”

RESULTS OF 2014 CSU-SDS STUDY

The primary purpose of the CSU-SDS report was to present data that showed that the revegetation performance standards presented in the 1041 Permit had been met by the end of the 2014 growing season. Their interpretation of how to evaluate the success of revegetation relative to the 1041 Permit was presented in a Technical Memo submitted to Pueblo County in January 2014. While the approaches presented in this memo have been discussed with Pueblo County, there has been no specific agreement that the interpretation of the 1041 Permit requirements by CSU-SDS is completely consistent with what the intentions of Pueblo County were relative to the 1041 Permit. However, the results presented by CSU-SDS address in general the requirements of the Permit.

The evaluations conducted by CSU-SDS were based on comparisons of pre- and post-construction vegetation characteristics present with identified soil groups along the water pipeline ROW in Segment S1. There are three soil groups that were sampled in the S1 Section – Post Construction:

Soil Group Type A (Penrose, Manvel and Minnequa Soils)
Soil Group Type B (Limon and Heldt Soils)
Soil Group Type D (Midway Shale Complex; Shingle Series Soils)

In addition to these three evaluated types, a fourth type (Soil Group C – Stoneham and Cascajo) was identified as occurring at the extreme southern end of the S1 Segment. Apparently, this area was not disturbed during construction so post construction sampling was not required in this area. In the sections which follow, the results from each of the three soil groups are discussed separately.

Type A Soil Group (Penrose, Manvel and Minnequa Soils) Approximately 88.8 percent of the S1 Segment

Pre-Construction Sampling and Base Values for Performance Standards.

Seven transects were sampled in the Type A Soil Group in 2011, but only four of them were included in the set of transects used to develop the performance standard. The three transects that were not included were sampled in areas with high prairie dog use so the vegetation cover was limited (4, 3 and 10 percent). Cover for the four transects that were included in the performance standard was 24, 18, 8 and 12 percent. The mean cover for the seven sampled Type A soils in the S1 Section (pre-construction) was 11.3 percent compared with the base value of 17.2 percent for the cover performance standard for the Type A soil group (based on 15 transects: 4 from S1 and 11 from S2).

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 17 transects in the Type A Soil Group in the S1 Segment. The primary focus for success evaluation is the percent cover by acceptable species. For the Type A soils, the performance standard was established as 90 percent of 17.2 percent, or 15.5 percent (based on 2011 data). The mean total vegetation cover from the CSU-SDS study for the Type A Soil Group in 2014 was 51.2 percent of which 27.1 percent came from acceptable native species. Of this total, seeded species had a mean cover of 21.4 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species (mostly from two species of Russian thistle) was 24 percent. Based on these results, the conclusion is that the 90 percent cover standard was met.

For the 17 sampled transects, cover by acceptable species ranged between 12 and 42 percent which is above the range that was sampled with the seven pre-construction transects (3-24 percent) in the S1 Segment. Only four transects had less than the performance standard of 15.5 percent cover and the cover along those transects was 12, 14, 15 and 15 percent.

Species Diversity. The pre-construction data for the Type A Soil Group in the S1 Section showed that 34 species were encountered along the sampled transects. Of this total, 30 were native species and 4 were introduced. Following construction, 35 species were encountered with 26 native species and nine introduced species. While the total number of species was approximately the same, the CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 1). The large increase in cover by introduced annual and biennial forbs is a common result on disturbed and revegetated areas. Most of the cover in this group was provided by two species of Russian thistle that are well-adapted to the growing conditions present on newly disturbed sites. In general, the abundance of these species should become less over time, especially on sites where perennial species have become well established. The other two groups that showed notable changes were the native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded.

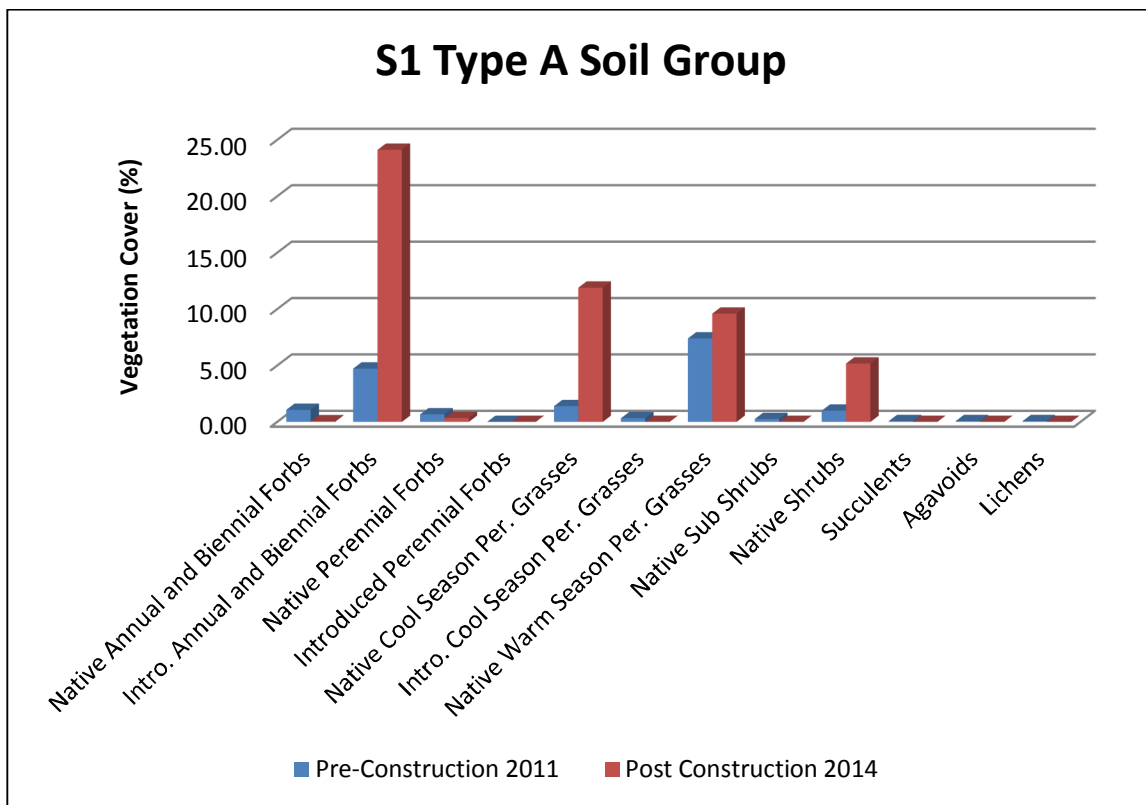


Figure 1. Pre- and Post-Construction vegetation cover by various life form groups in the Type A Soil Group (S1). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on all the transects that were used to establish the base value for the performance standard (Data from S1 and S2).

Prior to construction, mean species density per 100 square meters was 13.8 species based on transects sampled in the S1 and S1 Segments. Following construction, the mean species density was 11.5 species per 100 square meters (see the Table below). Native species decreased from 11.5 to 8.12 species per 100 square meter and introduced species increased from 2.3 to 3.4 species per 100 square meters. These changes are not unusual. The disturbances caused by the construction of the waterline tend to enhance the conditions required by introduced weedy species. Also, native species may require more time for re-establishment.

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S1 Native Species Post Construction (17 Transects)	Introduced Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S1 Introduced Species - Post Construction (17 Transects)	Total Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S1 Total Species - Post Construction (17 Transects)
Type A (Penrose, Manvel and Minnequa)	11.5	8.12	2.3	3.35	13.8	11.47

Noxious Weeds. Only one noxious weed species (Canada thistle – a List B Species) was encountered in the 2014 CSU-SDS vegetation sampling in the Type A Soil Group. This species was found on only one transect and the cover was less than one percent.

Type B Soil Group (Limon and Heldt Soils) **Approximately 3.8 percent of the S1 Segment**

Pre-Construction Sampling and Base Values for Performance Standards

One transect was sampled in the Type B Soil Group in 2011. Total vegetation cover for the transect was 34 percent compared with the base value of 26.5 percent for the cover performance standard for the Type B soil group (based on 8 transects: one from S1, six from S2 and one from S3).

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 10 transects in the Type B Soil Group in the S1 Segment. For the Type B soils, the performance standard was established as 90 percent of 26.5 percent, or 23.9 percent (based on 2011 data). The mean total vegetation cover from the CSU-SDS study for the Type B Soil Group in 2014 was 45.7 percent of which 40.3 percent came from acceptable native species. Of this total, seeded species had a mean cover of 36.8 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species [mostly from summer cypress (*Bassia sieversiana*) and Russian thistle] was 5.1 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 10 sampled transects, cover by acceptable species ranged between 28 and 54 percent. All of the transects had cover values greater than the performance standard of 23.9 percent cover.

Species Diversity. The pre-construction data for the Type B Soil Group in the S1 Section showed that 26 species were encountered along the sampled transect. Of this total, 20 were native species and 6 were introduced. Following construction, 41 species were encountered with 29 native species and 12 introduced species. While the total number of species was

somewhat higher following construction, the difference is likely related to the difference between the number of sampled transects (one in 2011 and ten in 2014). The CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 2). The largest increases in cover occurred in the native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded.

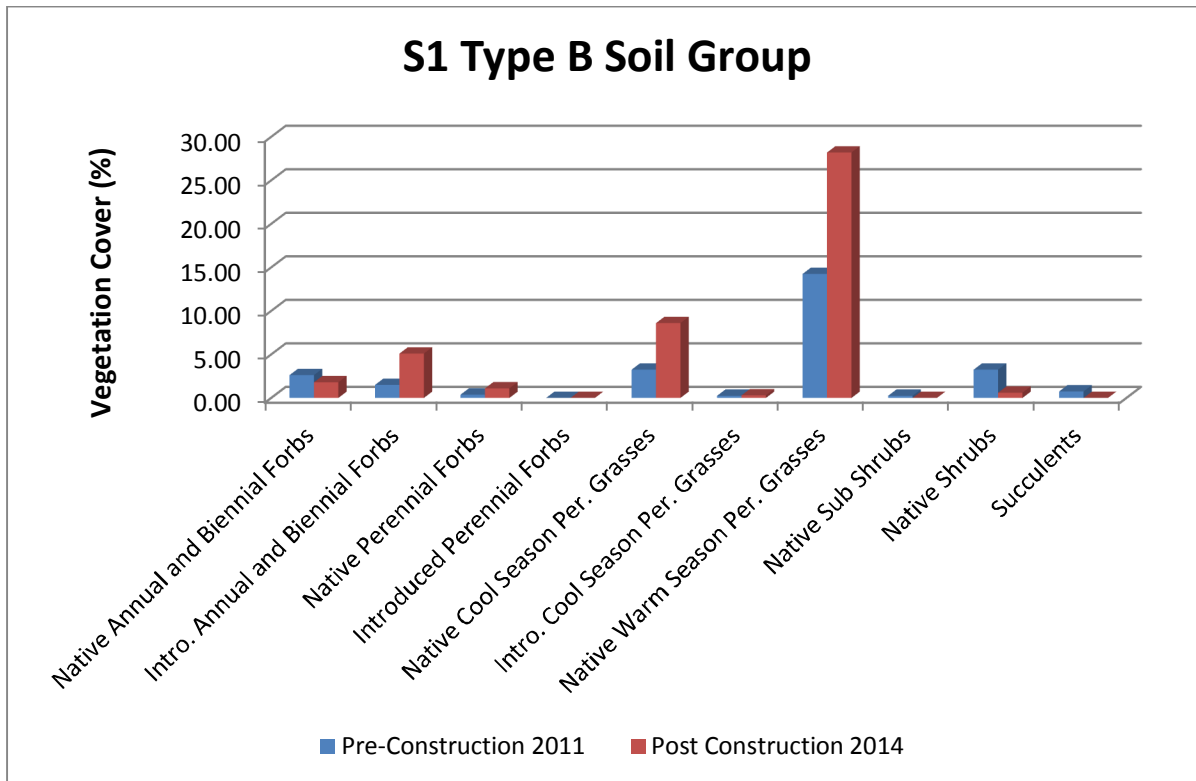


Figure 2. Pre- and Post-Construction vegetation cover by various life form groups in the Type B Soil Group (S1). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on all transects that were used to establish the base value for the performance standard (Data from S1, S2 and S3).

Changes were also noted in the number of species per 100 m². Overall, there was an increase in the total number of species per 100 m². This occurred as a result of an increase in the number of introduced species. There was a slight decrease in the number of native species. (See the Table below.)

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S1 Native Species Post Construction (10 Transects)	Introduced Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S1 Introduced Species - Post Construction (10 Transects)	Total Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S1 Total Species - Post Construction (10 Transects)
Type B (Limon and Heldt)	13.6	12.1	2.0	5.2	15.6	17.3

Noxious Weeds. Two noxious weed species (Halogeton and Cheatgrass – Both List C Species) were encountered in the 2014 CSU-SDS vegetation sampling in the Type B Soil Group. Halogeton and cheatgrass were each found on three transects. Where they were encountered, the cover was less than one percent.

Type D Soil Group (Midway-Shale Complex; Shingle Series Soils)
Approximately 7.4 percent of the S1 Segment

Pre-Construction Sampling and Base Values for Performance Standards.

The base vegetation cover values used to develop the performance standard for the Type D Soil Group were derived from four transects sampled in October 2011. Three transects were sampled in the S3 Segment and one transect was sampled in the S2 Segment. None of the transects were sampled in the S1 Segment. The mean cover for the four sampled Type D soils in the S2 and S3 Sections was 17.0 percent with a range of 12 to 24 percent. The 90 percent performance standard for this soil group is 15.3 percent cover by acceptable species.

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 10 transects in the Type D Soil Group in the S1 Segment. The mean total vegetation cover for this soil group in 2014 was 46.6 percent of which 35.5 percent came from acceptable native species. Of this total, seeded species had a mean cover of 33.4 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species (mostly from two species of Russian thistle and summer cypress) was 11.1 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 10 sampled transects cover by acceptable species ranged between 19 and 56 percent which is above the range that was sampled with the four pre-construction transects (12-24 percent). All of sampled transects exceeded the performance standard for the Type D Soil Group (15.3 percent cover by acceptable species).

Species Diversity. The pre-construction data for the Type D Soil Group showed that 32 species were encountered along the four sampled transects. Of this total, 27 were native species and 5 were introduced. Following construction, 30 species were encountered with 20 native species and 10 introduced species. While the total number of species was somewhat higher following construction, part of the difference is likely related to the difference between the number of sampled transects (four in 2011 and 10 in 2014). The CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 3). The large increase in cover by introduced annual and biennial forbs is a common result on disturbed and revegetated areas. Most of the cover in this group was provided by two species of Russian thistle and summer cypress. These species are well-adapted to the growing conditions present on newly disturbed sites. Large increases were also noted for native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded.

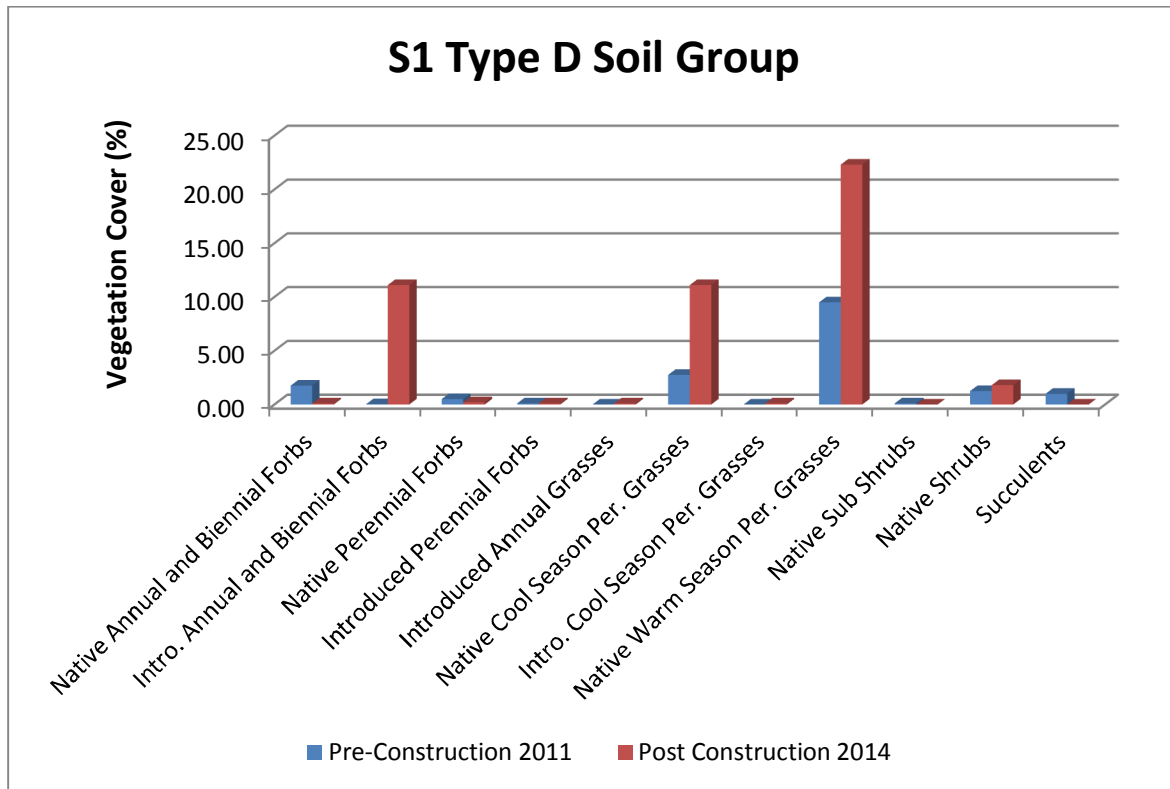


Figure 3. Pre- and Post-Construction vegetation cover by various life form groups in the Type D Soil Group (S1). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on the four transects that were used to establish the base value for the performance standard (Data from S2 and S3).

Changes were also noted in the number of species per 100 m². Overall, there was an increase in the total number of species per 100 m². This occurred as a result of an increase in the number of introduced species. There was a slight decrease in the number of native species. (See the Table below.)

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S1 Native Species Post Construction (10 Transects)	Introduced Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S1 Introduced Species - Post Construction (10 Transects)	Total Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S1 Total Species - Post Construction (10 Transects)
Type D (Midway- Shale Complex; Shingle Series)	11.75	10.8	1.75	3.8	13.5	14.6

Noxious Weeds. Two noxious weed species (Halogeton and Cheatgrass – Both List C Species) were encountered in the 2014 CSU-SDS vegetation sampling in the Type D Soil Group. Halogeton was observed along one transect and cheatgrass was found on three transects. Vegetation cover by each of these species was less than one percent.

SUMMARY

- All of the Soil Groups that were sampled in the S1 Section met the mean cover performance standard (attaining at least 90 percent of the mean cover values that were present before construction).
- All of the sampled transects in Soil Group B and Soil Group D exceeded the cover standard for their soil group. All but four of the transects in Soil Group A exceeded the cover standard. The four transects that did not exceed the standard were only slightly below the standard.
- While changes in species diversity have occurred, numerous species were encountered on all of the sampled transects. Adequate levels of species diversity have been accomplished in the reclaimed areas.
- Some changes in cover by different life form groups have occurred. Introduced annual and biennial forbs have increased in the amount of cover compared to pre-conditions. Also, cover by native cool and warm season grasses has increased. This should be viewed as a positive result since these species have the potential for providing long-term vegetation stability on the reclaimed areas. These grass species were included in the seed mix used to reclaim the areas.
- While several noxious weed species were noted in the reclaimed areas, they had low cover values and never occurred at mean amounts greater than one percent cover.
- Based on the information presented in the CSU-SDS report, the conclusion should be made that the revegetation requirements of the 1041 Permit have been met.

FINAL REPORT



REVIEW OF:

COLORADO SPRINGS UTILITIES SOUTHERN DELIVERY SYSTEM

RESTORED VEGETATION COVER MONITORING - WORK SEGMENT S2

September, 2014

Report prepared by:
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March, 2015

INTRODUCTION

This review of the 2014 report addressing vegetation sampling by CSU-SDS along the S2 Segment of the Southern Delivery System water pipeline in Pueblo County focuses on the degree to which the revegetation requirements of the 1041 Permit issued by Pueblo County are being met. The overall goal of revegetation in the 1041 Permit is stated as:

“Applicant shall provide Pueblo County residents with replacement vegetation and property to match pre-construction conditions or better.”

This overall goal is clarified by describing that “matching pre-construction condition or better” will be based on evaluating vegetation cover by acceptable species, evaluating species diversity and assessing the abundance of noxious weeds (as defined by lists prepared by the State of Colorado). The requirements associated with these vegetation attributes are described in the following section.

REVEGETATION PERFORMANCE STANDARDS IDENTIFIED IN THE 1041 PERMIT

Vegetation Cover. The 1041 Permit states that successful vegetation establishment will consist of (in part) attaining cover values that are equal to (or greater than) 90 percent of the values that were present prior to construction of the water pipeline. Before construction of the pipeline, a vegetation study was conducted in October 2011 by CSU-SDS consultants to determine what the existing vegetation cover values were along the length of the water line right-of-way (ROW). The sampling program was stratified based on six different soil groups

that had been identified along the water line route. Additionally, the ROW was divided into three segments: S1, S2 and S3. Not all of the six soil groups occurred in each of the segments. Vegetation cover data were collected at 52 locations along the entire length of the ROW. After reviewing the data from the vegetation sampling transects, some of the results were dropped from the set of transects used to develop the base vegetation cover values. The reason for excluding some of the transects was that the excluded sites had low vegetation cover values that were not consistent with values measured at other sites within a particular soil group. The low values were related to impacts from grazing by livestock and prairie dogs. After excluding the data from 11 transects, base vegetation values were developed for each of the soil groups using the data from 41 transects. The vegetation cover standards were developed by multiplying the base values by 0.9 (90 percent). The transect locations for the 2011 study were distributed among the three ROW Segments as shown in the following table:

Soil Group	Number of Transects (2011 Study)					
	S1		S2		S3	
	Total Sampled	Used to develop standard	Total Sampled	Used to develop standard	Total Sampled	Used to develop standard
Type A (Penrose, Manvel and Minnequa Soils)	7	4	13	11		
Type B (Limon and Heldt Soils)	1	1	6	6	7	1
Type C (Stoneham and Cascajo Soils)					4	4
Type D (Midway Shale Complex - Shingle Series)			1	1	3	3
Type E (Razor Series)					7	7
Type F (Haverson Series and Ustic Torrifluvents)			2	2	1	1

Species Diversity. There is no specific standard for species diversity presented in the 1041 Permit revegetation requirements. There are however provisions for species diversity to be considered. The permit states that “*Vegetation cover will be of the same seasonal variety native to the area of disturbed land, or species that support the post-construction land use.*” Also, the permit states that the revegetated area will be considered acceptable if “*..the revegetated area cover is not less than 90 percent of the pre-construction vegetation cover with similar species diversity.*” The CSU-SDS report evaluates species diversity based on the number of acceptable species per square meter. Their target number for acceptable revegetation is a mean value of two species per square meter. Data for this type of evaluation were collected from the reclaimed areas following construction. There are no comparable pre-construction data, however the two species per square meter value is not an unreasonable target. It is also possible to evaluate species diversity by comparing the number of species per 100 square meters. The vegetation transect sampling approaches used in 2011 and in 2014 were conducted in the same manner so it is possible to make pre- and post-construction comparisons.

Noxious Weeds. No specific standard for noxious weed species is included in the 1041 Permit. However, the provision is included that “*Applicant shall control spread of noxious weeds resulting from project construction.*”

RESULTS OF 2014 CSU-SDS STUDY

The primary purpose of the CSU-SDS report was to present data that showed that the revegetation performance standards presented in the 1041 Permit had been met by the end of the 2014 growing season. Their interpretation of how to evaluate the success of revegetation relative to the 1041 Permit was presented in a Technical Memo submitted to Pueblo County in January 2014. While the approaches presented in this memo have been discussed with Pueblo County, there has been no specific agreement that the interpretation of the 1041 Permit requirements by CSU-SDS is completely consistent with what the intentions of Pueblo County were relative to the 1041 Permit. However, the results presented by CSU-SDS address, in general, the requirements of the Permit.

The evaluations conducted by CSU-SDS were based on comparisons of pre- and post-construction vegetation characteristics present within the identified soil groups along the water pipeline ROW in Segment S2. There are four soil groups that were sampled in the S2 Section – Post Construction:

Soil Group Type A (Penrose, Manvel and Minnequa Soils)
Soil Group Type B (Limon and Heldt Soils)
Soil Group Type D (Midway Shale Complex; Shingle Series Soils)
Soil Group Type F (Haverson Series Soils; Ustic Torrifluvents)

In the sections which follow, the results from each of the four soil groups are discussed separately.

Type A Soil Group (Penrose, Manvel and Minnequa Soils) Approximately 67.2 percent of the S2 Segment

Pre-Construction Sampling and Base Values for Performance Standards.

Thirteen transects were sampled in the Type A Soil Group in the S2 segment in 2011. Data from eleven of these transects were included in the set of transects used to develop the performance standard for the Type A Soil Group. The two transects that were not included were sampled in areas with high prairie dog use so the vegetation cover was limited (2 and 6 percent). Mean total vegetation cover for the 11 transects that were included in the performance standard was 16 percent. The mean cover for all 13 sampled transects in the Type A soils in the S2 Section (pre-construction) was 15.7 percent compared with the base vegetation cover value of 17.2 percent used to derive the cover performance standard for the Type A soil group (based on 15 transects: 4 from S1 and 11 from S2). In general, these results show that if all the sampled Type A transects in the S2 Section are included in the pre-construction evaluation, the mean total vegetation cover value is somewhat less than the base value developed for the Type A soils in the S1 and S2 sections combined. Also, the range of cover values was greater (2-39% in S2 and 8-39% for S1 and S2 combined).

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 15 transects in the Type A Soil Group in the S2 Segment. The primary focus for success evaluation is the percent cover by acceptable species. For the Type A soils, the performance standard was established as 90 percent of 17.2 percent, or 15.5 percent (based on 2011 data). The mean total vegetation cover from the CSU-SDS study for the Type A Soil Group in 2014 was 43.2 percent of which 19.5 percent came from acceptable native species. Of this total, seeded species had a mean cover of 16.9 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species (mostly from Russian thistle and summer cypress) was 23.7 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 15 sampled transects, cover by acceptable species ranged between <1 and 36 percent which is somewhat outside the range that was sampled with the 13 pre-construction transects (2-39 percent) in the S2 Segment. Five of the transects had less cover than the performance standard of 15.5 percent cover, and the cover along those transects was <1, 3, 6, 11 and 15 percent. These results suggest that some sparse areas still occur along the S2 Segment. In places where the cover by acceptable species was low (Transects with <1, 3 and 6 percent cover), the cover by introduced annual and biennial forbs (Russian thistle and summer cypress, mostly) was 30, 35 and 43 percent, respectively. It is important to note that sparse areas were also encountered during the pre-construction study in 2011. However, the CSU-SDS report does not include any evaluation of whether the sparse areas noted in 2011 coincide with the sparse areas noted in 2014.

Species Diversity. The pre-construction data for the Type A Soil Group in the S2 Section showed that 67 species were encountered along the sampled transects. Of this total, 55 were native species and 12 were introduced. Following construction, 65 species were encountered with 49 native species and 16 introduced species. While the total number of species was approximately the same (pre- and post-construction), the CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 1). The large increase in cover by introduced annual and biennial forbs is a common result on disturbed and revegetated areas. Most of the cover in this group was provided by Russian thistle and summer cypress (*Bassia sieversiana*). These species are well-adapted to the growing conditions present on newly disturbed sites. In general, the abundance of these species should become less over time, especially on sites where perennial species have become well established. The other two groups that showed notable changes were the native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded. The changes in abundance of the different species groups in the S2 Segment were similar to what was observed in the S1 Segment for this Soil Group.

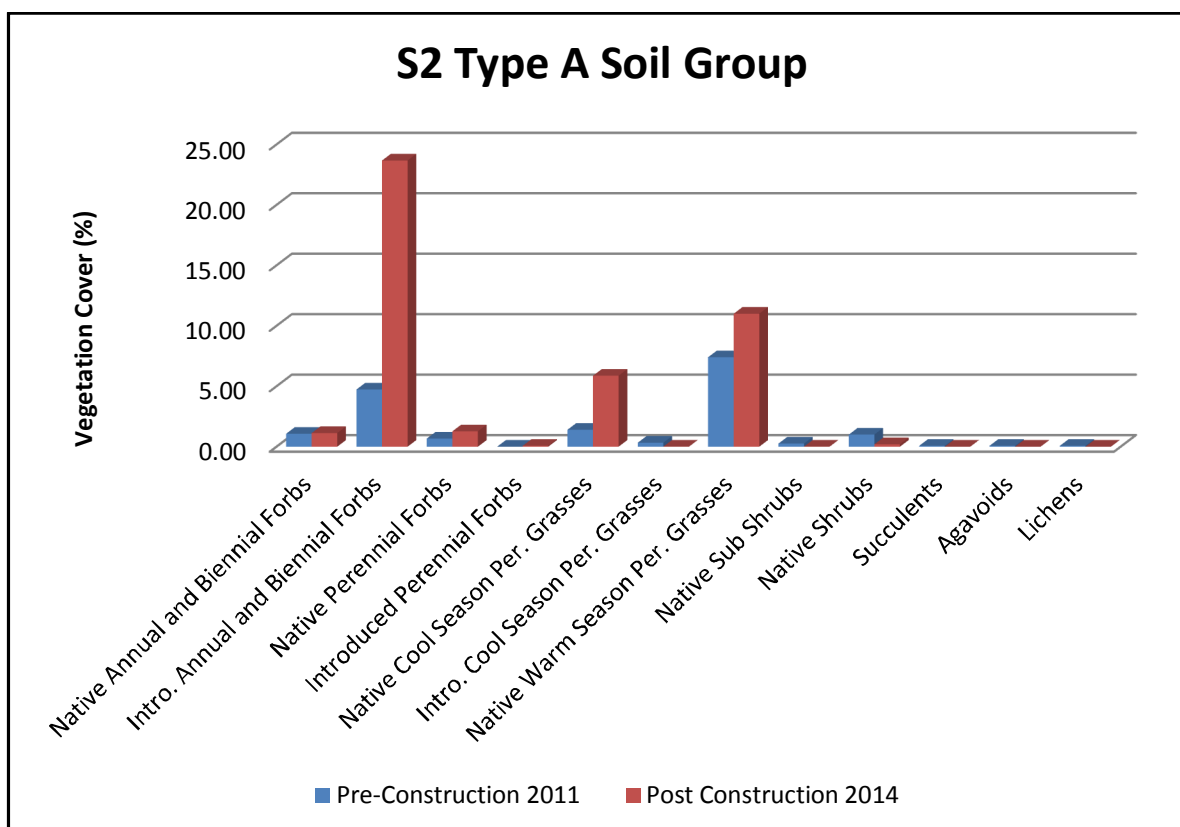


Figure 1. Pre- and Post-Construction vegetation cover by various life form groups in the Type A Soil Group (S2). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on all the transects that were used to establish the base value for the performance standard (Data from S1 and S2).

Prior to construction, mean species density per 100 square meters was 13.8 species based on transects sampled in the S1 and S2 Segments. Following construction, the mean species density was 21.9 species per 100 square meters (see the Table below). Native species increased from 11.5 to 16.5 species per 100 square meters and introduced species increased from 2.3 to 5.3 species per 100 square meters. These changes are not unusual. The disturbances caused by the construction of the waterline tend to enhance the conditions required by introduced weedy species. The increase in native species was related to the increased abundance of the seeded species.

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S2 Native Species Post Construction (15 Transects)	Introduced Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S2 Introduced Species - Post Construction (15 Transects)	Total Species - Pre Construction (Data from 15 Transects sampled in 2011: S1 and S2)	S2 Total Species - Post Construction (15 Transects)
Type A (Penrose, Manvel and Minnequa)	11.5	16.5	2.3	5.3	13.8	21.9

Noxious Weeds. Two noxious weed species (cheatgrass and halogeton – both List C Species) were encountered in the 2014 CSU-SDS vegetation sampling in the Type A Soil Group in the S2 Segment. These species were encountered infrequently, and the mean cover for each of the species was less than one percent.

Type B Soil Group (Limon and Heldt Soils)
Approximately 23.1 percent of the S2 Segment

Pre-Construction Sampling and Base Values for Performance Standards

In 2011 prior to construction, six transects were sampled in the Type B Soil Group in the S2 Segment. Total vegetation cover for these six transect was 27.3 percent compared with the base value of 26.5 percent for the cover performance standard for the Type B soil group (based on 8 transects: one from S1, six from S2 and one from S3). In the S2 Segment, cover values ranged between 15 and 44 percent. Four of the transects had cover values that were less than mean S2 value of 27.3 percent (15, 16, 20 and 26).

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 15 transects in the Type B Soil Group in the S2 Segment. For the Type B soils, the performance standard was established as 90 percent of 26.5 percent, or 23.9 percent (based on 2011 data). The mean total vegetation cover from the CSU-SDS study for the Type B Soil Group in 2014 was 45.3 percent of which 38.7 percent came from acceptable native species. Of this total, seeded species had a mean cover of 31.2 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species (from a variety of species) was 6.6 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 15 sampled transects, cover by acceptable species ranged between 19 and 61 percent. Only one transect had a cover value by native species that was less than the performance standard of 23.9 percent cover.

Species Diversity. The pre-construction data for the Type B Soil Group in the S2 Section showed that 49 species were encountered along the sampled transects. Of this total, 37 were native species and 12 were introduced. Following construction, 72 species were encountered with 52 native species and 20 introduced species. While the total number of species was somewhat higher following construction, the difference is likely related to the difference between the number of sampled transects (six in 2011 and 15 in 2014). The CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 2). The largest increases in cover occurred in the native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded.

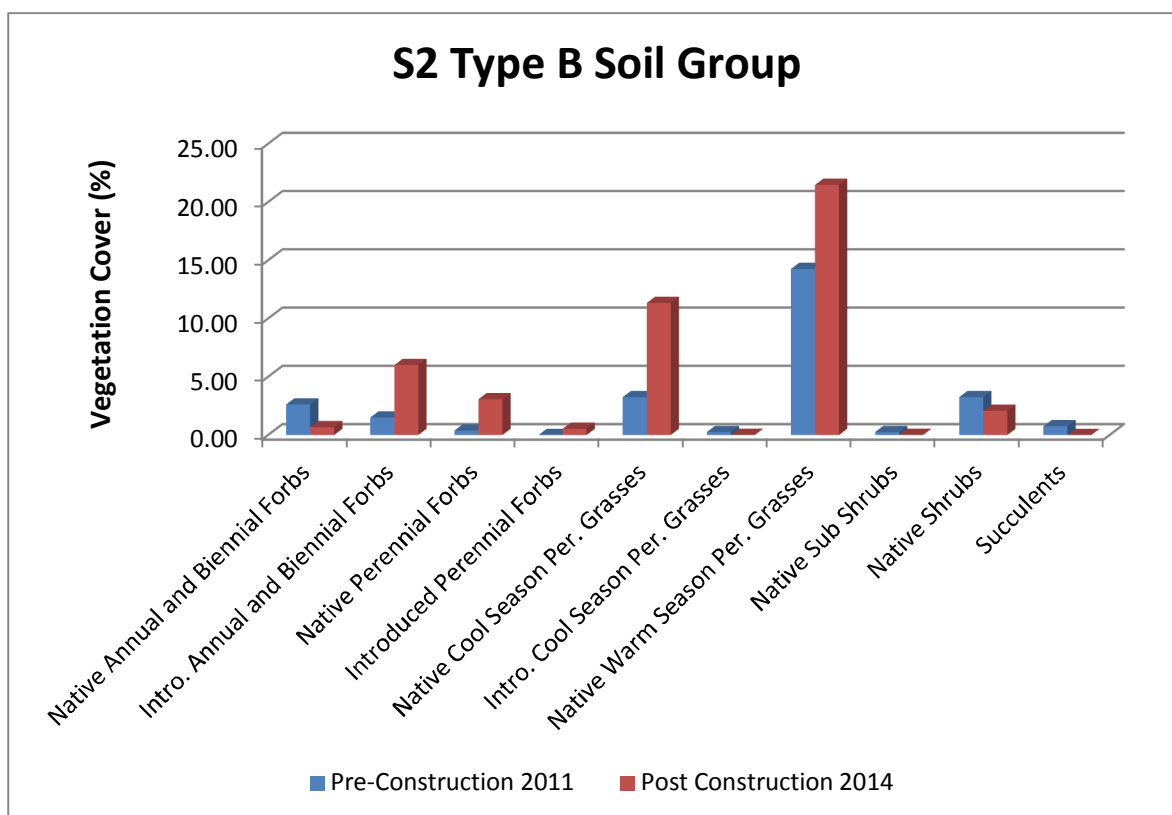


Figure 2. Pre- and Post-Construction vegetation cover by various life form groups in the Type B Soil Group (S2). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on all transects that were used to establish the base value for the performance standard (Data from S1, S2 and S3).

Changes were also noted in the number of species per 100 m². Overall, there was an increase in the total number of species per 100 m². This occurred as a result of an increase in the number of introduced species. The increase in the number of native species mostly results from the widespread abundance of the seeded species (See the Table below.)

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S2 Native Species Post Construction (15 Transects)	Introduced Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S2 Introduced Species - Post Construction (15 Transects)	Total Species - Pre Construction (Data from 8 Transects sampled in 2011: S1, S2 and S3)	S2 Total Species - Post Construction (15 Transects)
Type B (Limon and Heldt)	13.6	17.1	2.0	5.6	15.6	22.7

Noxious Weeds. One B List noxious weed species (Canada thistle – *Cirsium arvense*) was encountered in the Type B Soil Group in the S2 Segment. Cover by this species was less than one percent. Three C List noxious weed species [*Halogeton* (*Halogeton glomeratus*), Cheatgrass (*Bromus tectorum*) and field bindweed (*Convolvulus arvensis*)] were encountered in the S2 Segment Type B Soil Group. Cheatgrass was encountered along six of the 15 transects and had a mean cover of less than one percent. Field bindweed was encountered along one transect and had a mean cover of less than one percent. Halogeton was encountered on 11 of the 15 transects and had a mean cover of 1.6 percent. The abundance of halogeton was variable. Mostly the

cover values were less than one percent, but on one of the transects, cover by halogeton was 18 percent. Prior to construction, halogeton was encountered along only one of the six transects sampled in the S2 segment and the cover by halogeton along that transect was less than one percent. These results suggest that some additional weed control for this noxious weed species may be required.

Type D Soil Group (Midway-Shale Complex; Shingle Series Soils)
Approximately 5.6 percent of the S2 Segment

Pre-Construction Sampling and Base Values for Performance Standards.

The base vegetation cover values used to develop the performance standard for the Type D Soil Group were derived from four transects sampled in October 2011. Three transects were sampled in the S3 Segment and one transect was sampled in the S2 Segment. Total vegetation cover for the single transect in the S2 Segment was 12 percent. The mean cover for the four sampled Type D soils in the S2 and S3 Sections was 17.0 percent with a range of 12 to 24 percent. The 90 percent performance standard for this soil group is 15.3 percent cover by acceptable species.

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 10 transects in the Type D Soil Group in the S2 Segment. The mean total vegetation cover for this soil group in 2014 was 39.5 percent of which 27.3 percent came from acceptable native species. Of this total, seeded species had a mean cover of 22.7 percent compared to the performance standard of 15.3 percent, which points to the overall success of the revegetation effort. Cover by introduced annual weedy species (mostly from a species of Russian thistle) was 12.2 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 10 sampled transects cover by acceptable species ranged between 7 and 45 percent which was a higher range that was sampled with the four pre-construction transects (12-24 percent). Seven of the sampled transects exceeded the performance standard for the Type D Soil Group (15.3 percent cover by acceptable species). Cover values along transects that were less than the standard were 7, 12 and 14 percent. The single transect that was sampled in 2011 in Soil Group D along the S2 segment had a cover value of 12 percent.

Species Diversity. The pre-construction data for the Type D Soil Group showed that 32 species were encountered along the four sampled transects. Of this total, 27 were native species and 5 were introduced. Following construction, 65 species were encountered with 51 native species and 14 introduced species. While the total number of species was higher following construction, part of the difference is likely related to the difference between the number of sampled transects (four in 2011 and 10 in 2014). The CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 3). The large increase in cover by introduced annual and biennial forbs is a common result on disturbed and revegetated areas. Most of the cover in this group was provided by a species of Russian thistle. This species is well-adapted to the growing conditions present on newly disturbed sites. Large increases were also noted for native perennial grasses (both cool and warm season). The increases in these two groups occurred because these were the species that were seeded.

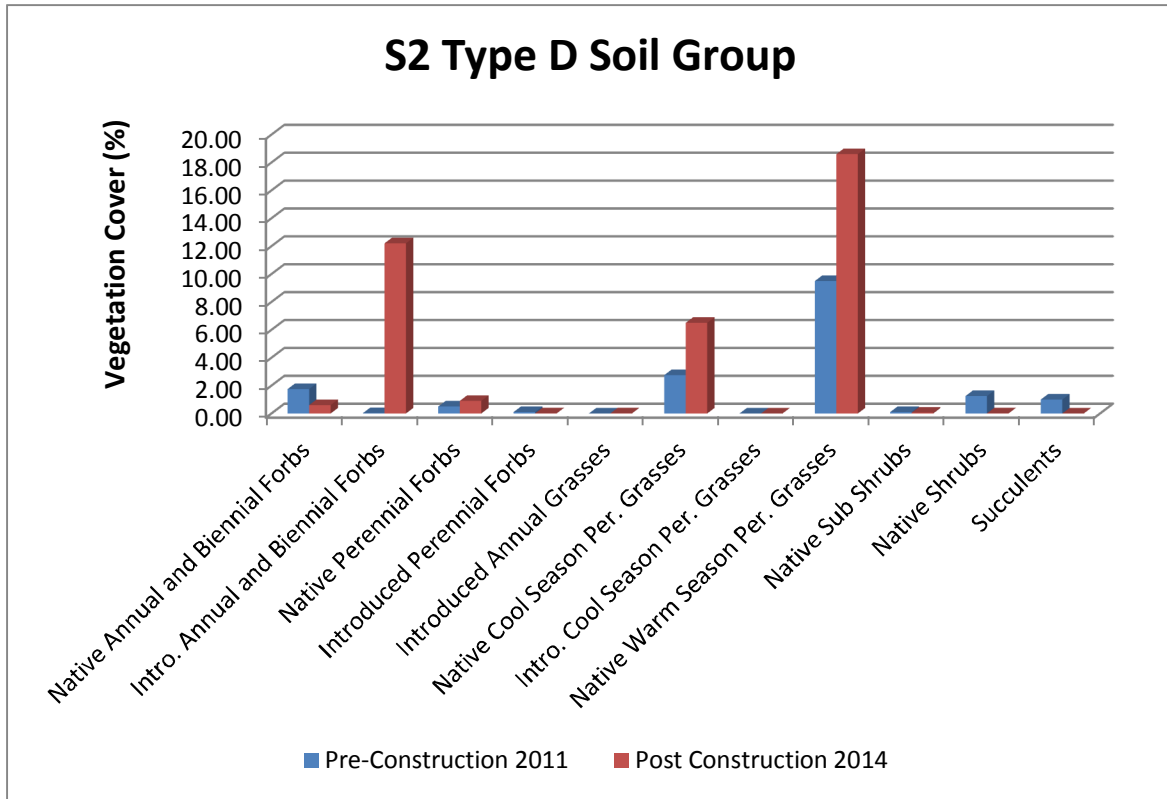


Figure 3. Pre- and Post-Construction vegetation cover by various life form groups in the Type D Soil Group (S2). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on the four transects that were used to establish the base value for the performance standard (Data from S2 and S3).

Changes were also noted in the number of species per 100 m². Overall, there was an increase in the total number of species per 100 m². This occurred as a result of an increase in the number of native species. There was also a slight increase in the number of introduced species. (See the Table below.)

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S2 Native Species Post Construction (10 Transects)	Introduced Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S2 Introduced Species - Post Construction (10 Transects)	Total Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S2 Total Species - Post Construction (10 Transects)
Type D (Midway- Shale Complex; Shingle Series)	11.75	17.3	1.75	3.9	13.5	21.2

Noxious Weeds. One noxious weed species (Halogeton - a List C Species) was encountered in the 2014 CSU-SDS vegetation sampling in the Type D Soil Group. Halogeton was observed along one transect and the cover was less than one percent.

Type F Soil Group (Haverson Series and Ustic Torrfluvents)
Approximately 4.1 percent of the S2 Segment

Pre-Construction Sampling and Base Values for Performance Standards.

The base vegetation cover values used to develop the performance standard for the Type F Soil Group were derived from three transects sampled in October 2011. Two transects were sampled in the S2 Segment and one transect was sampled in the S3 Segment. Mean total vegetation cover for the transects in the S2 Segment was 30 percent. The mean cover for the three sampled Type F soils in the S2 and S3 Sections was 41.3 percent with a range of 15 to 64 percent. The 90 percent performance standard for this soil group is 37.2 percent cover by acceptable species.

Post Construction Results

Vegetation Cover. In 2014, the vegetation consultants for CSU-SDS sampled 10 transects in the Type F Soil Group in the S2 Segment. The mean total vegetation cover for this soil group in 2014 was 61.2 percent of which 45 percent came from acceptable native species. Of this total, seeded species had a mean cover of 33.1 percent compared to the performance standard of 37.2 percent. The remainder of the cover by acceptable species comes from native species which have re-grown on the disturbed areas. Cover by introduced annual weedy species (mostly from a species of Russian thistle and summer cypress) was 15.9 percent. Based on these results, the conclusion is that the 90 percent cover standard was met. For the 10 sampled transects cover by acceptable species ranged between 34 and 61 percent which was better than the range that was recorded with the three pre-construction transects (15-64 percent). Eight of the sampled transects exceeded the performance standard for the Type F Soil Group (37.2 percent cover by acceptable species). Cover values along transects that were less than the standard were 34 and 37 percent. The two transects that were sampled in 2011 in Soil Group F along the S2 segment had a mean cover value of 30 percent.

Species Diversity. The pre-construction data for the Type F Soil Group showed that 37 species were encountered along the three sampled transects. Of this total, 31 were native species and six were introduced. Following construction, 51 species were encountered with 41 native species and 10 introduced species. While the total number of species was higher following construction, part of the difference is likely related to the difference between the number of sampled transects (three in 2011 and 10 in 2014). The CSU-SDS data show that the percent cover in the different life form groups was different from what was encountered prior to construction (Figure 4). The large increase in cover by introduced annual and biennial forbs is a common result on disturbed and revegetated areas. Most of the cover in this group was provided by a species of Russian thistle and summer cypress. These species are well-adapted to the growing conditions present on newly disturbed sites. Large increases were also noted for native perennial grasses (mostly warm season). The increases in these two groups occurred because these were the species that were seeded.

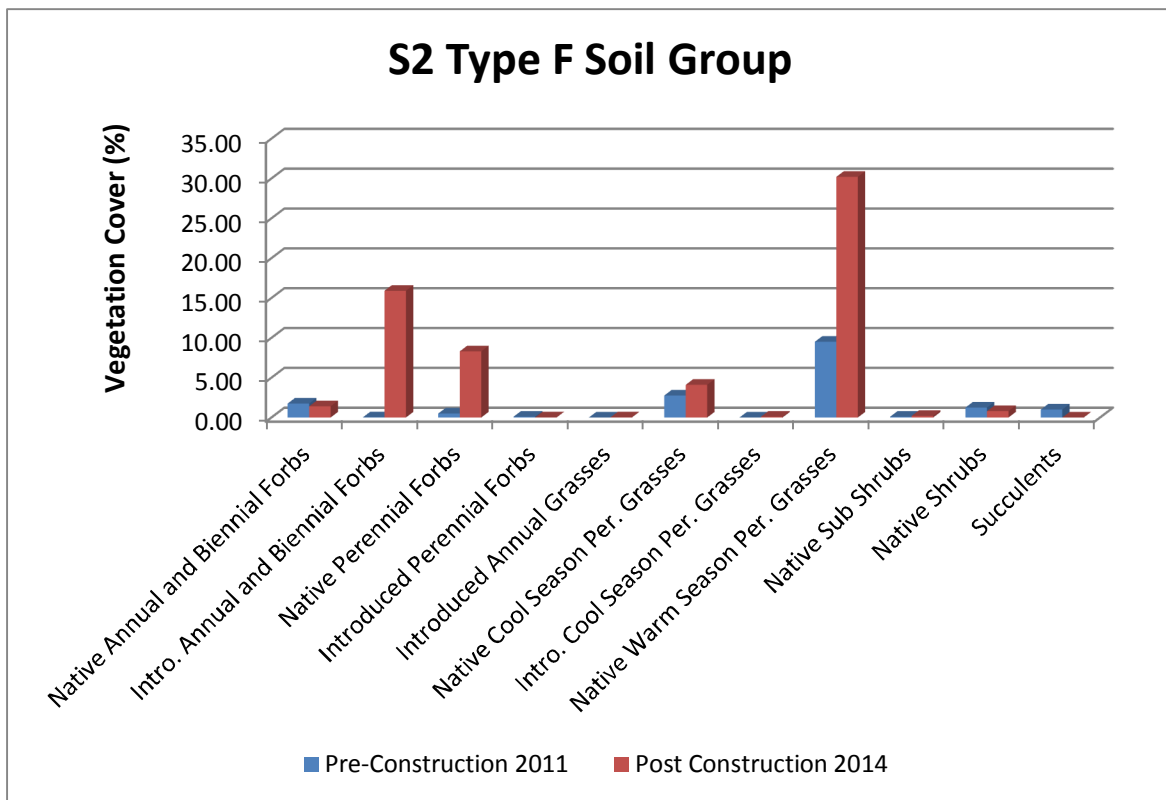


Figure 4. Pre- and Post-Construction vegetation cover by various life form groups in the Type F Soil Group (S2). Pre-construction data from October 2011; post construction data from late August 2014. The pre-construction data are based on the three transects that were used to establish the base value for the performance standard (Data from S2 and S3).

Changes were also noted in the number of species per 100 m². Overall, there was an increase in the total number of species per 100 m². This occurred as a result of an increase in the number of native species. There was also a slight increase in the number of introduced species. (See the Table below.)

SOIL GROUP	Mean Number of Species per 100 m ²					
	Native Species - Pre Construction (Data from 3 Transects sampled in 2011: S2 and S3)	S2 Native Species Post Construction (10 Transects)	Introduced Species - Pre Construction (Data from 3 Transects sampled in 2011: S2 and S3)	S2 Introduced Species - Post Construction (10 Transects)	Total Species - Pre Construction (Data from 4 Transects sampled in 2011: S2 and S3)	S2 Total Species - Post Construction (10 Transects)
Type F (Haverson Series; Ustic Torrifluvents)	14.7	20.7	3.3	5.1	18.0	25.8

Noxious Weeds. No noxious weed species were encountered in Type F Soil Group along the S2 Segment.

SUMMARY

- All of the Soil Groups that were sampled in the S2 Section met the mean cover performance standard (attaining at least 90 percent of the mean cover values that were present before construction).
- Cover by acceptable species along most of the sampled transects in the four Soil Groups exceeded the cover standard for their soil group. Several transects in Soil Group A had very low cover by seeded species.
- While changes in species diversity have occurred, numerous species were encountered on all of the sampled transects. Adequate levels of species diversity have been accomplished in the reclaimed areas.
- Some changes in cover by different life form groups have occurred. Introduced annual and biennial forbs have increased in the amount of cover compared to pre-construction conditions. Also, cover by native cool and warm season grasses has increased. The increase in cover by native grasses should be viewed as a positive result since these species have the potential for providing long-term vegetation stability on the reclaimed areas. These grass species were included in the seed mix used to reclaim the areas.
- While several noxious weed species were noted in the reclaimed areas, they mostly had mean cover values that were less than one percent. The only exception to this was halogeton which was commonly encountered in the Type B Soil Group where it occurred along 11 of 15 of the sampled transects and had a mean cover of 1.6 percent. (Note: On Transect 12 in the Type B Soil Group, halogeton had a cover value of 18 percent).
- Based on the information presented in the CSU-SDS report, the conclusion should be made that the revegetation requirements of the 1041 Permit have mostly been met, however some issues remain:
 1. It appears that some sites with very sparse cover by seeded species occur in the Type A Soil Group (Penrose, Manvel and Minnequa). One of the sampled transects had less than one percent cover by seeded species. Two other transects had only two and six percent cover by seeded species. These low values were offset by high values along other transects so that the mean cover standard was met. It would be useful to know the extent of the sparse areas, especially with regard to the potential for increasing cover by the seeded species.
 2. Halogeton (a List C noxious weed species) commonly occurs in the Type B Soil Group (Limon and Heldt). The transect data show that in one location the cover by this species was measured at 18 percent. The noxious weed provision in the 1041 permit states that *"Applicant shall control spread of noxious weeds resulting from project construction."* Prior to construction, cover by halogeton in the Type B Soil Group in the S2 Section was less than one percent.



TECHNICAL TAB 11 –

- **S1 Agency Revegetation Completion Acceptance Documentation**
 - Lake Pueblo SDS Pipeline Easement Photo Monitoring Guide – Colorado Parks & Wildlife (2015)
 - S1 Agency Revegetation Acceptance Emails (State Parks, BOR, City of Pueblo)



Lake Pueblo

SDS Pipeline Easement

Photo Monitoring Guide



Questions? Please Contact:

Jeff Thompson – Resource Stewardship Coordinator

Colorado State Parks

6060 Broadway

Denver, CO 80216

303.291.7156

Jeff.Thompson@state.co.us

Photo Points – Photo Descriptions

Six photopoints were established in June of 2015 to assist with the monitoring of the revegetation efforts along the SDS pipeline corridor easement. An attempt was made to take eight photos at each point, with two photos taken in each of the four cardinal directions (one photo aimed 10m from the point, and one with skyline showing for reference). At point two, photos were taken on bearings to best capture the revegetation in the photo. And at some points, photos were omitted because they did not depict the revegetation at that bearing.

When duplicating this monitoring, be sure to bring photos from previous monitoring sessions to duplicate what is in the frame of previous photos as close as possible. Photo points begin where the pipeline corridor enters the park's north boundary and end at the point where the 'Honor Farm' parcel meets the City of Pueblo property just north of the railroad grade near Pueblo West.

Project Area

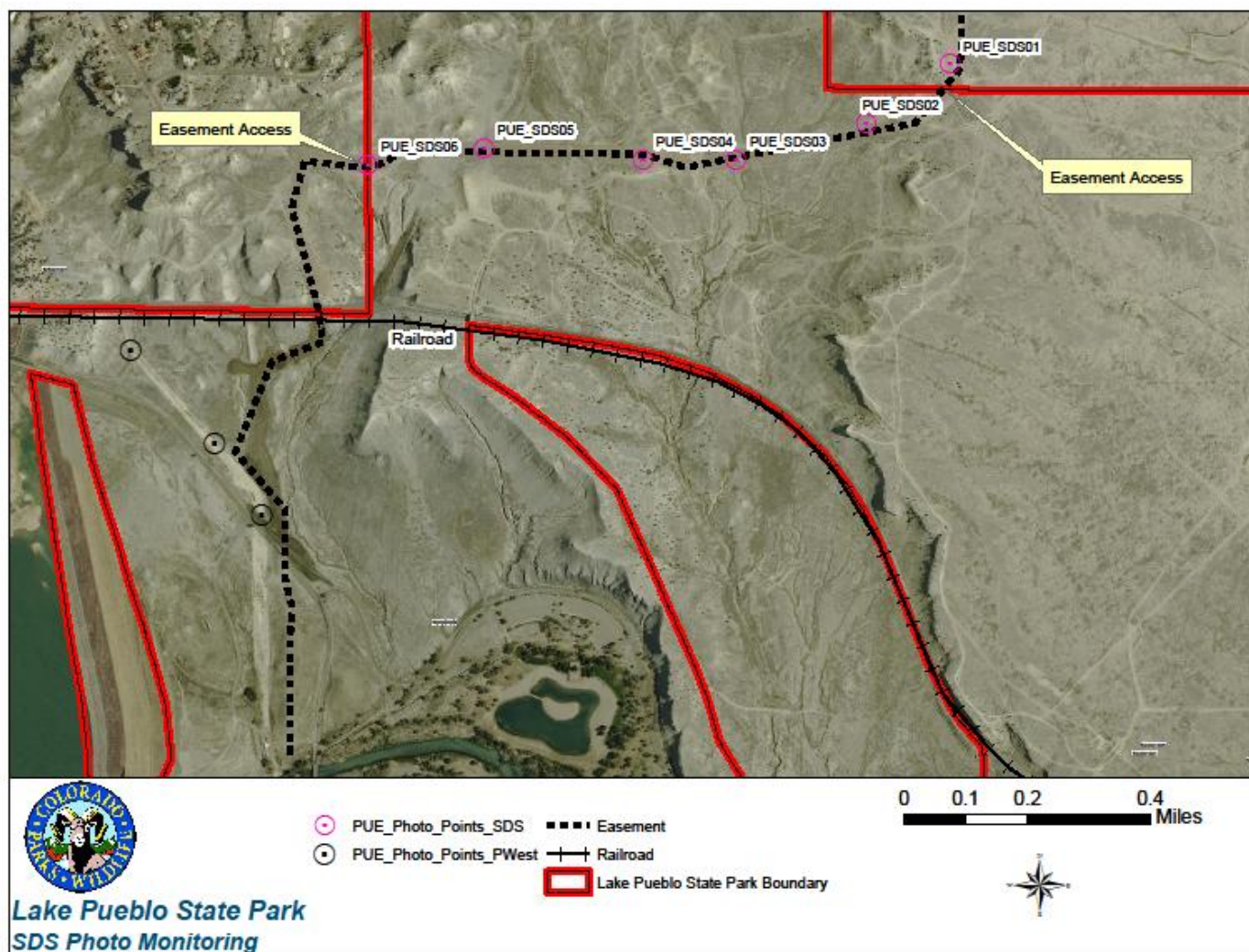


Table: Photo Monitoring Coordinates

Photo Point	X_coordinate	Y_coordinate
Point 1 SDS	104° 42'01"W	38° 17'16"N
Point 2 SDS	104° 42'10"W	38° 17'11"N
Point 3 SDS	104° 42'24"W	38° 17'8"N
Point 4 SDS	104° 42'34"W	38° 17'8"N
Point 5 SDS	104° 42'51"W	38° 17'9"N
Point 6 SDS	104° 42'65"W	38° 17'9"N

Photo Monitoring Protocols

A. Monitoring Protocols

- a. Bring this guide and photos from previous monitoring visits so that you can duplicate photos
- b. Each photo should include vegetation and mimic the photos previously taken at that location
 - i. Photos taken of close up vegetation should include markers
 - ii. Photos taken of distant vegetation should include horizon/skyline
- c. Download photos from camera
 - i. Preferably to a computer at the park visitors center
 - ii. Label file folder in the following way:
 1. PUE_SDS_Photomonitoring_month_day_year
- d. Naming photos – name in the following format:
 - i. PUE_SDS_photopointX_N/E/S/W_month_day_year
 1. The “X” in photopoint is the corresponding photo point number
 2. N/E/S/W = choose the approximate direction of this photo
- e. Input photos into the Photo Monitoring Report format found on the next page
 - i. Change the date on the Report to reflect the date your photos were taken
 - ii. Copy and paste each photo into the appropriate text box – see photo point descriptions
- f. Report and a file of the photos should be immediately sent to:
 - i. Jeff Thompson – State Parks Resource Stewardship Coordinator – jeff.thompson@state.co.us
- g. State Parks Stewardship section will file reports on photo monitoring.

Photo Point 1

Description – this photo point is one of two mid-creek points and is the northern of these two points (the nearer to Photo Point 8), on the west side of the creek. 6 photos total.

- Photo 1 – North 10m from photopoint
- Photo 2 – North with skyline
- Photo 3 – East 10m from photopoint
- Photo 4 – East with skyline
- Photo 5 – South 10m from photopoint
- Photo 6 – South with skyline
- Photo 7 – West 10m from photopoint
- Photo 8 – West with skyline

1



2



3



4



5



6



7



8



Photo Point 2

Description – The road crosses the pipeline at this point

- Photo 1 – aimed 138° down
- Photo 2 – aimed 138° up
- Photo 3 – aimed 258° down
- Photo 4 – aimed 258° up

1



2



3



4



Photo Point 3

Description – this photo point is located at a valve midway along the pipeline corridor

- Photo 1 – North 10m from photopoint
- Photo 2 – North with skyline
- Photo 3 – East 10m from photopoint
- Photo 4 – East with skyline
- Photo 5 – South 10m from photopoint
- Photo 6 – South with skyline
- Photo 7 – West 10m from photopoint
- Photo 8 – West with skyline



1



2



3



4





7



8



Photo Point 4

Description – this photo point is on top of a rise along the pipeline corridor

- Photo 1 – North 10m from photopoint
- Photo 2 – North with skyline
- Photo 3 – East 10m from photopoint
- Photo 4 – East with skyline
- Photo 5 – South 10m from photopoint
- Photo 6 – South with skyline
- Photo 7 – West 10m from photopoint
- Photo 8 – West with skyline

1



2



3



4



5



6



7



8



Photo Point 5

Description – this photo point is located on the road where it crosses the pipeline corridor

- Photo 1 – East 10m from photopoint
- Photo 2 – East with skyline
- Photo 3 – West 10m from photopoint
- Photo 4 – West with skyline

1



2



3



4



Photo Point 6

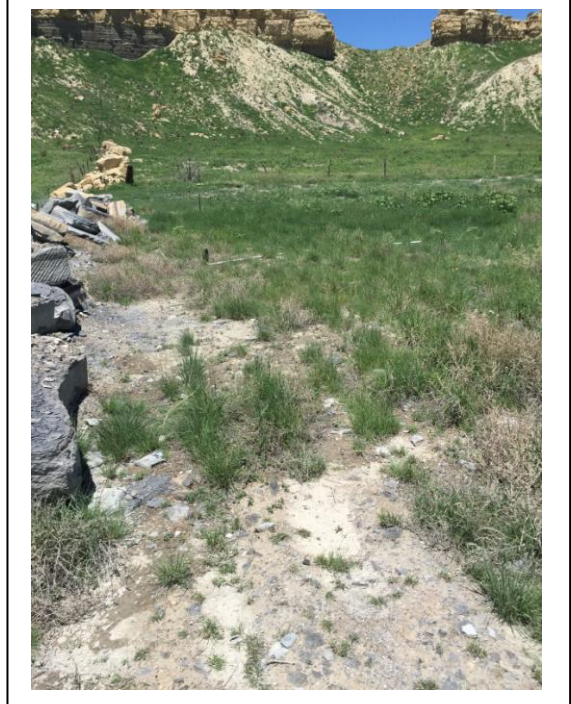
Description – this photo point is at barricade where park boundary meets city property near Pueblo West

- Photo 1 – North 10m from photopoint
- Photo 2 – North with skyline
- Photo 3 – East 10m from photopoint
- Photo 4 – East with skyline
- Photo 5 – aimed South (only one South photo) along bndry
- Photo 6 – West 10m from photopoint
- Photo 7 – West with skyline

1



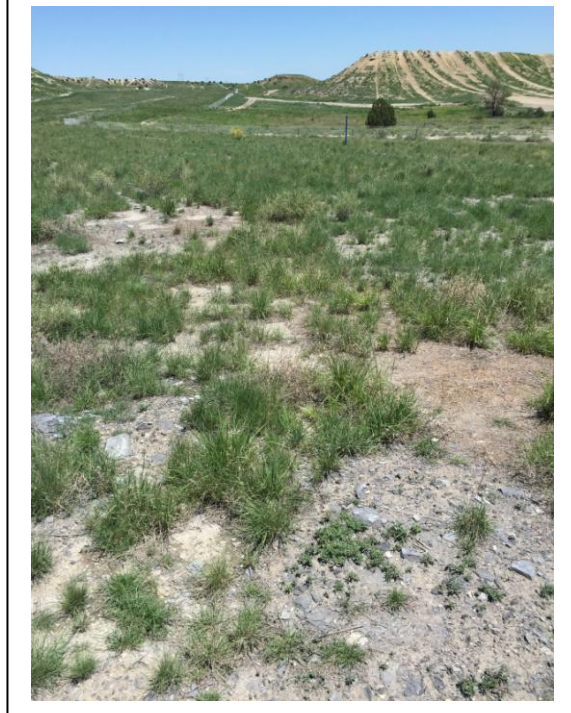
2



3



4



5



6



7



State Parks SME Acceptance Email

From: Thompson - DNR, Jeff [mailto:jeff.thompson@state.co.us]
Sent: Thursday, July 02, 2015 11:29 AM
To: Allison Mosser; Monique Mullis - DNR
Subject: Re: SDS South 1 revegetation evaluation

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Do not click on any links or attachments unless you have confirmed that it is from a trusted source by forwarding the email as an attachment to emailreview@csu.org.

Hello Allison and Monique,

I have had an opportunity to inspect the revegetation project on the SDS pipeline corridor. During this inspection I created a photo monitoring project to help with long term monitoring of the area. I have attached that document to this email.

We were fortunate to have a few years with above average moisture during this effort. This, coupled with diligent efforts from CS Utilities, has produced a pretty successful revegetation of the pipeline corridor. During my visit I noted some of the seeded species in the project area, along with some volunteer forb species that were not part of the reveg seed mix, which is a testament to the reuse of topsoil in the area. While there are some areas that are struggling with invasive plant species, overall the project looks good, with vegetation within the corridor usually in a similar condition to that in the same area outside the corridor.

I feel that we have reached the goals outlined in the scope of this project. I defer to Monique on moving forward with the removal of the irrigation and fencing in the area.

Please let me know if I can answer any questions for you.

Thanks,
Jeff

Jeff Thompson
Resource Stewardship Program Coordinator



Office: 303.291.7156 | Mobile: 303.242.1375
6060 Broadway, Denver, CO 80216
jeff.thompson@state.co.us | www.cpw.state.co.us

On Mon, Jun 15, 2015 at 10:42 AM, Allison Mosser <amosser@csu.org> wrote:
Good Morning,

I thought a common email to everyone would be a good follow up on all of the on-going communication that has transpired regarding the South 1 pipeline easement revegetation to ensure we are all on the same page.

My understanding from Monique is that Jeff is scheduled to conduct a site visit to the City of Pueblo property, the State Parks property north of the railroad, and the leased S1 easement property at Lake Pueblo State Park this Wednesday, June 17.

Also, in various calls and emails, it has been indicated that the City of Pueblo, the Bureau of Reclamation, and the CPW Management at the Park will all defer to Jeff's evaluation of completion regarding the SDS revegetation and rehabilitation of these properties. We have provided CNHP's and Dr. Keammerer's reports regarding coverage density and diversity, (both attached here), for which we seek a concurrence of the revegetation compliance criteria being met. We would like to continue with the S1 removal of the fencing and irrigation hardware within these easement areas, but are waiting the pending determination so that we still have the irrigation system in place if we have areas that need to be addressed.

Further, I was wondering when we might expect to get feedback from the survey and the official determination, as well as in what form that might be received? If we are able to get a verbal follow up prior to a written notice, we would like to initiate removal of the above mentioned hardware as soon as weather permits.

Please let me know if you have questions or comments regarding this email and the understanding of our reveg close-out I have indicated herein.

Kind regards,
Allison

Allison Mosser
Sr. Project Manager
Southern Delivery System
Colorado Springs Utilities

w: [719-668-8667](tel:719-668-8667)

c: [719-650-1652](tel:719-650-1652)

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Lake Pueblo State Park Manager Acceptance Email

From: Mullis - DNR, Monique [mailto:monique.mullis@state.co.us]
Sent: Monday, July 06, 2015 2:41 PM
To: Allison Mosser
Cc: Thompson - DNR, Jeff; Mark Pifher
Subject: Re: SDS South 1 revegetation evaluation

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emailreview@csu.org.**

Hi Allison,

I forwarded Jeff's findings to Steven Meier with Pueblo City Parks and Rec, but he is out of the office until July 9th. I can't speak for the City or BOR, but I am satisfied with the re-veg efforts on the CPW areas. I realize there are still efforts for noxious weed control, but you can remove the hardware on CPW land anytime.

Please let me know what other paperwork needs to be done to close-out this portion of SDS. YIPPEE!!

Thanks.

Monique Mullis
Park Manager
Lake Pueblo State Park

P 719.561.9320 x13 | F 719.564.9455
640 Pueblo Reservoir Road, Pueblo, CO 81005
monique.mullis@state.co.us | www.cpw.state.co.us

On Mon, Jul 6, 2015 at 8:53 AM, Allison Mosser <amosser@csu.org> wrote:

Hello Jeff,

Thank you for your follow up. We will refer to your email below regarding acceptance of the coverage areas. I would like to clarify that this includes the areas for the City of Pueblo easement as well as the Park area at the dam? The associated jurisdictions have deferred to you for acceptance of the vegetation success, and I will follow up with them as well.

Also, as I believe you are aware, we are required to monitor and mitigate for noxious weeds for three years post construction. These areas still have some time for coverage under this condition, so we will be out there again before we close our oversight of the easements.

I will wait to hear from Monique regarding removal of the hardware.

Many thanks,
Allison

Allison Mosser
Sr. Project Manager
Southern Delivery System
Colorado Springs Utilities

w: [719-668-8667](tel:719-668-8667)

c: [719-650-1652](tel:719-650-1652)

From: Thompson - DNR, Jeff [mailto:jeff.thompson@state.co.us]

Sent: Thursday, July 02, 2015 11:29 AM

To: Allison Mosser; Monique Mullis - DNR

Subject: Re: SDS South 1 revegetation evaluation

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Thanks,
Jeff

Jeff Thompson
Resource Stewardship Program Coordinator


Office: [303.291.7156](tel:303.291.7156) | Mobile: [303.242.1375](tel:303.242.1375)
6060 Broadway, Denver, CO 80216
jeff.thompson@state.co.us | www.cpw.state.co.us

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Also, in various calls and emails, it has been indicated that the City of Pueblo, the Bureau of Reclamation, and the CPW Management at the Park will all defer to Jeff's evaluation of completion regarding the SDS revegetation and rehabilitation of these properties. We have

provided CNHP's and Dr. Keammerer 's reports regarding coverage density and diversity, (both attached here), for which we seek a concurrence of the revegetation compliance criteria being met. We would like to continue with the S1 removal of the fencing and irrigation hardware within these easement areas, but are waiting the pending determination so that we still have the irrigation system in place if we have areas that need to be addressed.

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Kind regards,
Allison

Allison Mosser
Sr. Project Manager
Southern Delivery System
Colorado Springs Utilities

w: [719-668-8667](tel:719-668-8667)
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U.S. Bureau of Reclamation Acceptance Email

From: Thiel, Karl [mailto:kthiel@usbr.gov]
Sent: Wednesday, July 15, 2015 12:50 PM
To: Gayle Sturdivant; Allison Mosser
Cc: Tara Piper; Terence Stroh; Roy Vaughan
Subject: SDS South 1 Pipeline Re-Vegetation

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The work to date on the re-vegetation of the lands associated with Southern Delivery System South 1 Pipeline has been reviewed by Reclamation staff and found to be adequate. This matter will be closed.

City of Pueblo Acceptance Email

From: Steven Meier <smeier@pueblo.us>
Date: July 24, 2015 at 4:48:24 PM MDT
To: Alec Hart <alhart@csu.org>
Cc: Scott Hobson <shobson@pueblo.us>
Subject: RE: SDS Revegetation

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Alec,

Yes, I finally got out there and was able to inspect the vegetation on SDS line. I am satisfied with how the grasses and forbs have covered the project area. I did notice that there are some areas that have a significant stand of weeds, but when compared to the overall size of the project those weedy areas are minimal.

With that said, I accept the current stand of vegetation. Please let me know if you have any questions.

Steven Meier, Director
City of Pueblo
Parks & Recreation; and
Planning & Community Development
719-553-2259

-----Original Message-----

From: Alec Hart [<mailto:alhart@csu.org>]
Sent: Friday, July 24, 2015 10:39 AM
To: Steven Meier
Subject: SDS Revegetation

Hello Steven;

Were you able to get out this week to have a look at the revegetation on the City portion of S1? With BOR and State Parks evaluations complete, we're just waiting for your written concurrence before having our contractor remove fences and irrigation lines.

Thanks Steve, have a great weekend.

Alec

Sent from my iPhone

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TECHNICAL TAB 12 –

- **Noxious Weed Control Documentation Example (July 28, 2015)**

Western States Reclamation
3756 Imperial St. Frederick, CO 80516

Pesticide Application Record

Date: 7-28-2015 Project Name: SDS

Project Number: 4054 Project Location: Pueblo West, CO

Time Frame: Start: 9:00 AM End: 5:00 PM

Pesticide (s) used:

Manufacturer	Trade Name/EPA Number	L/G	Rate applied
<u>Dow Agro</u>	<u>Milestone/62719-519</u>	<u>L</u>	<u>7oz/Acre</u>
<u>Rotam</u>	<u>Plotter/83100-3-83979</u>	<u>G</u>	<u>3oz/Acre</u>
	<u>Generic Cinnamon Product</u>		

Carrier (usually water): Water 40 gal/Acre

Total Area Treated: 3.5 Acres

Target Pest(s): Hatogelom, Kochia, Thistle

Site, crop, commodity treated: Pipeline/Right of Way

Weather:

Wind Direction: E-W Wind Velocity: 1-5 mph Temperature: 80°

Applicator Printed Name: Joshua McCay Lic. Number: 31568

Applicator Signature: [Signature]



FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE,
EXPOSURE OF ACCIDENT CALL CHEMTREC, DAY OR
NIGHT, 1-800-424-9300

INVOICE NUMBER: H22251

INVOICE DATE: 7/28/2015

SHIP DATE: 7/28/2015

DUE DATE: 9/25/2015

DISCOUNT DATE: 9/10/2015

PAGE 1

AGFINITY HENDERSON AGRONOMY

PO BOX 98 12390 HIGHWAY 85

HENDERSON, CO 80640

303-659-3643

BILL TO: 0007690325

WESTERN STATES RECLAMATION

C/O DAVE CHENOWETH

3756 IMPERIAL ST

FREDERICK CO 80516-9445

SHIP TO: 0007690325

WESTERN STATES RECLAMATION

C/O DAVE CHENOWETH

3756 IMPERIAL ST

FREDERICK CO 80516-9445

LICENSE #: 24432 JUS KEITH

EXPIRATION DATE: 6/1/2018

SALESPERSON: ANM

ITEM#	LOC	DESCRIPTION	EPA#	QUANTITY	UOM	UNIT PRICE	TOTAL PRICE
C217368	409	MILESTONE 2.5 GL	62719-519	2.5000	GAL	387.22000	\$968.05
C760035	409	PLOTTER	83100-3-83979	8.0000	OUNC	7.42000	\$59.36

↓
Generic Common Product.

FED./ST. TAX #S:

DELIVERY #:

P.O. #: 48568

DELIVERED BY _____

RECEIVED BY _____

INVOICE AMOUNT \$1,027.41
PLUS SALES TAX \$48.80

INVOICE TOTAL \$1,076.21
LESS PREPAYMENTS \$0.00
LESS PAYMENTS \$0.00
LESS DISCOUNTS \$0.00

AMOUNT DUE \$1,076.21

IF CASH OR CHECK PAYMENT IS RECEIVED BY 9/10/2015

A DISCOUNT OF \$51.37 APPLIES. PAY \$1,024.84

FINANCE CHARGE OF 1 3/4% PER MONTH (ANNUAL RATE OF 21%) WILL BE ADDED TO UNPAID INVOICES ON THE 25TH DAY OF THE FOLLOWING MONTH

DELIVERY COPY

1
Socell Blvd
1st Pueblo, CO
SD

TEMPERATURE _____ AM _____ PM

EMPLOYEES	EMPLOYEE / CLASSIFICATION		HRS.	WORK PERFORMED			
	JD		13.25	Sprayed for Noxious			
	Hugo		13.25	weeds, especially Halogeton			
	JAime		13.25	Finished spraying on			
				of S2, Then moved			
			37.75	on to all of S4,			
				and part of S S3,			
				north of Antelope Rock			
MATERIAL	QTY.	MATERIAL RECEIVED	QTY.	MATERIAL USED			
	2.5 gal	Milestone	27.562	Milestone			
	802	Plotter	16.102	Plotter			
			231.5	P.M.S. Surfactant			
EQUIPMENT	ON PROJECT		HRS.	RENTED		RATE	HRS.
	555		4				
	2032		1				
	2022		4				
	55		9.25				
	54		9.25				
DAILY WORK	BILLABLE		WORK UNITS	BUDGET	HRS.	ACTUAL	HRS.
	555 Mob		1ea			Mob	12
	2032 Spray		3.5Ac				27.75
	2022						
	55						
	54						
CHANGES/ETC.	CHANGE ORDERS / ADDITIONAL WORK			VISITORS TO SITE / REMARKS			
				"Plotter" is the generic brand of "Cimmaron", with the same formulation: 1 Percent Active ingredient			

CHANGE ORDER NO. _____



Public Communications

TAB 1 – Pre-Construction Communications

Your Safety is Our Priority

The SDS construction team is committed to protecting the safety of the public and our workers. We strive to be a good neighbor, answer questions, and resolve concerns. As we work in your neighborhood, we ask for your patience and cooperation.

Our work involves bringing heavy construction equipment and materials into our work sites and material storage areas. We will erect fences, signs, and other safety measures around our secure areas to clearly identify our boundaries. We will need to perform portions of our work in the vicinity of homes, schools, churches, and other facilities. We understand that our activities may be disruptive. We are committed to working with you to minimize disruptions, keep you informed about our activities, and respond quickly to questions or concerns.

Please take these important steps to help protect the safety of your family:

- Talk with family members about the importance of staying away from the construction sites, storage areas, and equipment. This is particularly important for young children to understand.
- Make sure pets are secured and away from the work areas.
- Stay away from construction equipment, especially when it is operating. Equipment operators may not be able to see you when the equipment is moving.
- Take extra care when driving near a construction area or on main roads near construction areas. It is especially important to obey reduced speed limits as marked and to be alert for changing traffic patterns. Keep a safe distance when driving near construction vehicles.

- Be alert to changes in fencing, signs, and other safety measures as we make progress and shift our construction site.
- Notify us if you or your family have any special health or access needs that might be affected by our construction.

If you or your family sees something that requires our attention, please call our SDS Hotline.

Please Talk to Your Children

The large equipment, piles of soil, and deep trenches at the construction site may be attractive to children. But it is critically important that the public—especially children—stays away from our construction sites for their safety. Please talk to your children about avoiding our construction areas at all times.

“Working together to keep our construction areas safe will protect the public and our workers, and it will help move our project more swiftly through your neighborhood.”

Southern Delivery System

Water for Generations



Please Help Us Share Information

We are available to give presentations and provide information to schools, homeowner or neighborhood associations, civic clubs, or other groups. If you know of a group that would like information, please contact us through the SDS Hotline.

Southern Delivery System

Water for Generations

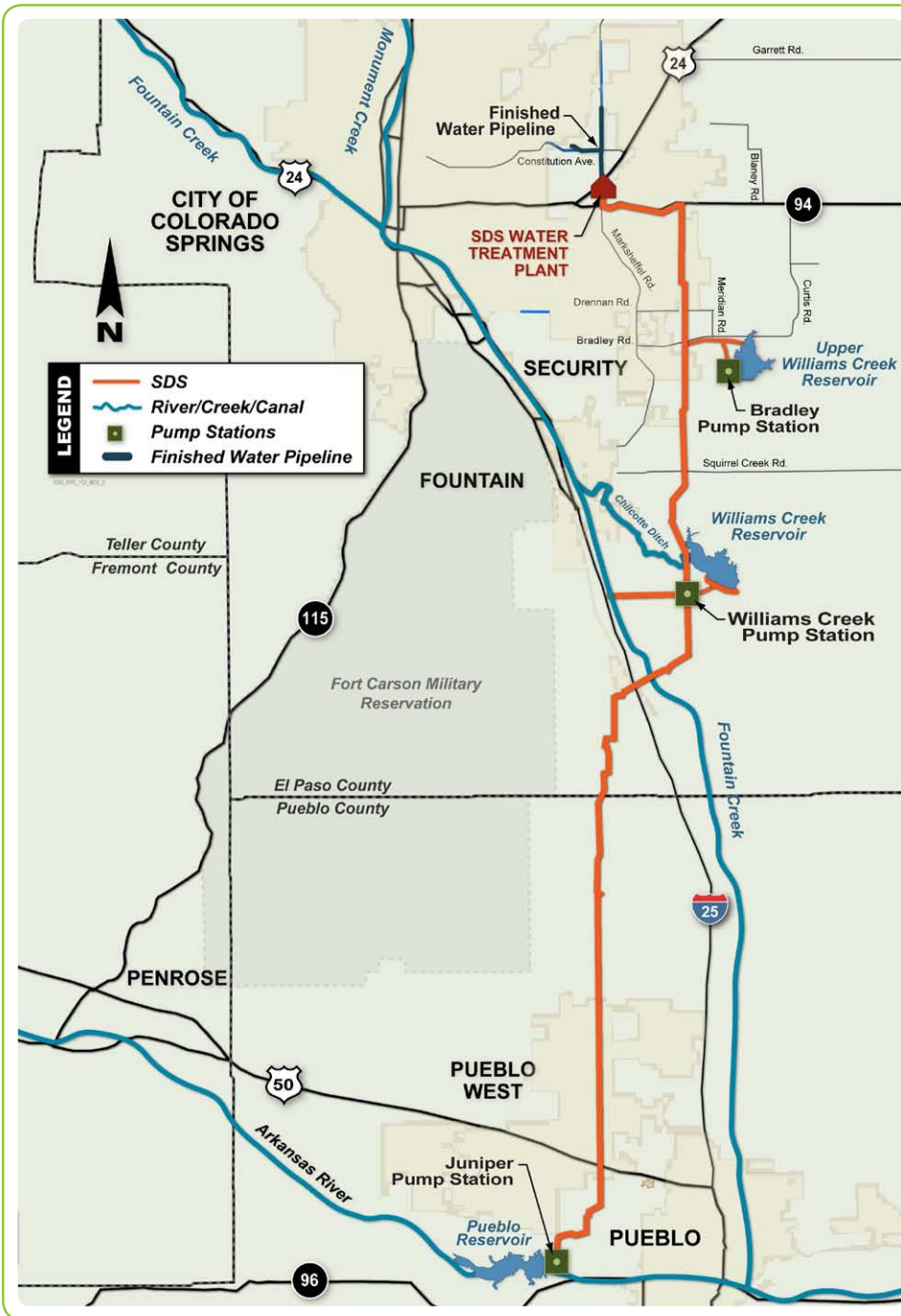
Water for Colorado Springs, Pueblo West, Fountain and Security



SDS Neighbor Resource Guide

What to Expect During Pipeline Construction

Construction on the Southern Delivery System (SDS) is under way. This information booklet provides an introduction to our project and detailed information about the stages of pipeline construction you can expect to see. Specific safety-related information to protect you, your family, and your neighbors also are included.



About Dust and Noise

Construction projects typically involve noise and dust. We will take steps to monitor these effects and minimize them. These steps may include watering construction sites, keeping construction vehicle speeds low and covering excavated soil to suppress dust. Most of our construction work will occur between 7 a.m. and 6 p.m. Monday through Friday.

"We are committed to working with you to minimize disruption and to be there when you need us."

Southern Delivery System Pipeline Construction

During construction, the SDS project partners and our contractors are committed to working with residents in Pueblo and El Paso counties to help protect your safety around our construction areas, keep you informed about our activities, and resolve concerns you may have as we complete this essential water project.

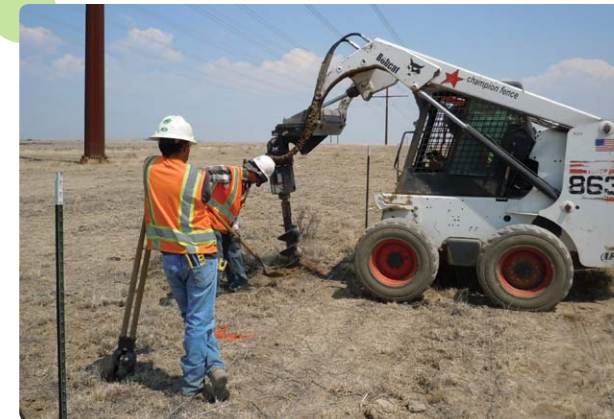
SDS is a regional project that will bring water from the Arkansas River to Colorado Springs, Fountain, Security, and Pueblo West. Construction of the SDS includes about 60 miles of raw and finished water pipelines, three pump stations, and a new water treatment plant to deliver water to residents and businesses by 2016.

Our construction activities will include digging a trench to bury the mostly 66-inch diameter steel pipeline. We understand that these activities may be disruptive. We are committed to working with you to minimize disruption and to be there when you need us. We look forward to completing the work in your neighborhood as soon as possible.

Your questions and concerns are important to us. Our construction facilitators, David Marciniak and Margaret Radford, are available to answer questions and work with you to resolve concerns.

What to Expect During Construction

There are three main phases of construction that you can expect to see while we are in your neighborhood.



Phase One

Construction Site Preparation

- 1) Survey and mark project work areas
- 2) Mark environmental areas
- 3) Remove and preserve topsoil

This pre-construction work includes the survey of the pipeline alignment and the temporary construction easement, the establishment of erosion control and perimeter fencing, and the removal and storage of topsoil. The SDS team is committed to the protection of the environment. Protection measures for wildlife and plants will begin during field preparation.



Phase Two

Pipe Installation

- 1) Carefully excavate trench
- 2) Lower pipe into trench
- 3) Backfill and compact trench with soil
- 4) Weld pipe from the inside

This is the main construction activity and includes excavation, installation, backfilling and welding of the pipe. The backfill will be compacted in layers with the stored topsoil replaced above the pipe.



Phase Three

Final Restoration

- 1) Restore work area to pre-construction grade
- 2) Revegetate affected areas
- 3) Monitor area after construction

Once the construction has been completed, the revegetation activities can begin, including grading, seeding, and watering. The erosion control measures will remain until the seed has been established. Activities will be coordinated closely with affected property owners.



Invitation to Pre-existing Condition Assessment of Easement

As part of our commitment to you to construct this project in a responsible way, we would like to invite you to an assessment of the pre-existing condition of the easement you have granted on your property and adjoining areas. This assessment is one of the ways we are inviting you to participate in the construction process and be responsive to your questions.

These assessments will be performed by professionals using video and photographic equipment. The purpose of these assessments is to document the pre-construction conditions of your property within the temporary construction easement, such as sprinkler heads, fences/gates and vegetation. If you wish, an Optional Property Walkthrough of areas outside the easement also can be conducted and could include a structure assessment if desired.

You will receive a copy of the video and photographs and a summary of the assessment findings for review and acceptance.

While we hope you can join us, we understand that your schedule can be busy. To accommodate your schedule, limited evening and weekend appointments are available. Please sign and complete the invitation form below and return it in the enclosed envelope by Dec. 2, 2011. You also may e-mail us at sdsinfo@csu.org or call **(855) SDS-4YOU (737-4968)**. If we do not hear from you, we will assume you do not wish to attend the assessment.

Pre-existing Condition Easement Assessment Participation Form			
Parcel #:			
Please check your option(s) below			
<input type="checkbox"/>	Yes , I would like to be present during the pre-existing condition easement assessment of my property.	By checking any of these boxes, the property owner (OWNER) grants the Southern Delivery System and its contractor a one-time right-of-entry onto the OWNER'S property for purposes of documenting the pre-existing condition of the property through visual observation, photographs, and video recording.	
<input type="checkbox"/>	Yes , I would like an OPTIONAL PROPERTY WALKTHROUGH of my property only conducted in my presence.		
<input type="checkbox"/>	No , I do not need to be present during the pre-existing condition easement assessment on my property. The Southern Delivery System and its contractor may conduct this activity on their own without my presence.		
Phone number (s)		Property owner name: Please print:	
E-mail (s)		Property owner signature:	
If you would like to be present during these assessment(s), please indicate two preferences for each of the following:		Requested date (or dates) of visit:	Requested time (or times) of visit:



FEB 28 2012

Attn: RUEBEN JR MARTINEZ
9855 E 112TH WAY
HENDERSON, CO 80640

Parcel Ref: 9520017083

Dear RUEBEN JR MARTINEZ:

Since work began in Pueblo West last fall, workers have made significant progress on the Southern Delivery System (SDS). Crews are now beginning pipeline installation. We remain committed to working with you to build this project in a responsible way, be mindful of our neighbors, and take care of the land on which we hold easements. An important part of construction will be the restoration phase, when we will restore grade and revegetate the land, restore fences, and complete other restoration activities.

Last fall we invited you to attend a video and photo assessment of the pre-existing condition of the easement on your property as a way to keep you informed about our activities and involve you in the process of restoration of the construction easement. Enclosed with this letter is a DVD containing photos and a video that serve as documentation of this assessment. Our contractors will refer to this documentation as they complete the restoration of the easement following construction.

Please review these documents and keep this copy for your records. The assessment disc itself plays on any DVD player and/or personal computer. If you are having difficulty playing this disc, please contact us and we'll be happy to assist you. We value your input, so please let us know if you have any questions or comments about the assessment documentation. **After 15 business days from the date on this letter, we will consider this documentation as acceptable to you and will provide a copy of these records to Pueblo County unless we hear from you.**

If you have any questions or comments about the assessment, please e-mail us at sdsinfo@csu.org or call our SDS Construction Hotline at **855-SDS-4YOU** (737-4968) to speak with David Marciniak or Margaret Radford.

We appreciate your cooperation as crews work to complete construction on your property and restore the easement area to previous conditions.

Sincerely,

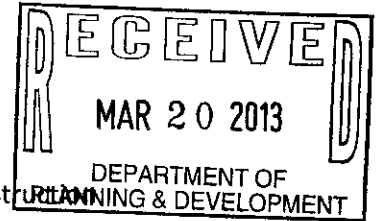
A handwritten signature in blue ink, appearing to read 'Keith Riley'.

Keith Riley
Colorado Springs Utilities
Land Manager



Public Communications

TAB 2 – Post-Construction Communications



Process for Obtaining Property Owner Acceptance of Grade After Construction

Southern Delivery System (SDS) processes for obtaining property owner acceptance of post-construction grade in Pueblo County have been refined and improved with each successive pipeline package.

South Pipeline 2

- SDS staff mailed a letter to each property owner in July 2012, stating that major construction was concluding, advising property owner what activities they could expect to see next, and indicating that we would like to meet with them to discuss next steps.
- In August 2012, the SDS staff mailed letters introducing the revegetation license agreement. These license agreements are the mechanism by which SDS offered to pay property owners for the access needed for ongoing watering and maintenance of revegetated areas in the former construction area. These license agreement letters sought individual meetings with property owners about revegetation.
- In these revegetation meetings, SDS staff and property owners discussed grading and other characteristics of the property. If requested, staff arranged to adjust the grading to meet property owner expectations.
- SDS staff explained that once the seeding and irrigation systems were in place, it would be difficult to adjust grading during revegetation. Following these meetings, property owners executed the revegetation license agreements, allowing revegetation activities to proceed.

South Pipeline 3

- SDS staff mailed a letter to each property owner in S3 in late July 2012, similar to the S2 letter, specifically requesting that property owners contact the SDS team about grading or any other concerns by August 9, 2012.
- We received no calls or contacts about grading, either before or after this letter, from property owners north of Antelope Road.
- The team then secured signed revegetation license agreements from property owners in much the same way as with the S2 package.

South Pipeline 1

- SDS staff mailed a letter to each property owner in S1 in early December 2012, asking property owners to contact SDS staff if they had any concerns regarding grading of their property by February 15, or in one case, February 21.
- In addition, the SDS staff invited each property owner to participate in a walkthrough of the property to review grading and other characteristics. Several of the residents have reviewed their property with us and signed a post-construction checklist.
- In a few cases, staff were unable to connect with property owners in person, so a letter was sent with a grading checklist that included the staff assessment that the property had been graded properly.
- One property owner requested photos of her property, and staff met that request. Two requests for grading adjustments were received, and that work has been completed.

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S2PL)	No	Yes	9520017078	2 KFN LTD	
South Pipeline (S2PL)	No	Yes	505010006	ABAKA REPUBLIC MARKETING INC	
South Pipeline (S2PL)	No	Yes	9520005016	ABAKA REPUBLIC MKTG INC	
South Pipeline (S2PL)	No	Yes	9520017077	ADAMS	JOHN W AND SANDRA J
South Pipeline (S2PL)	No	In process	508003011	ADKINS	JAY D
South Pipeline (S2PL)	No	Yes	9520005017	AGAG	ANTONIO R AND ELEANOR A
South Pipeline (S2PL)		Yes	9520005008	AKEO	ADAM AND GINA
South Pipeline (S2PL)	No	Yes	9532006019	ALLENBACK	RHONDA LEE
South Pipeline (S2PL)	No	Yes	9517004010	ANDERSON	ARLEN M
South Pipeline (S2PL)	No	Yes	9520004006	ARNOT	MICHAEL M AND CLARISSA ROSE
South Pipeline (S2PL)	No	Yes	9520017070	BLAND	DAVID D
South Pipeline (S2PL)	No	Yes	9532006037	BRATCHER	JOHN J AND LINDA E
South Pipeline (S2PL)	No	Yes	9520017018	BUNDESEN	THELMA T WANDAHL
		NA-2-year easement, will revegetate and offer agreement at end of easement			
South Pipeline (S2PL)	No		9529001003	BURKE	VIRGIL G JR AND PEGGY A
South Pipeline (S2PL)	No	Yes	9532006021	BURNS	LEILANI ANN RODRIGUEZ
South Pipeline (S2PL)	No	Yes	9532018002	CAMERON	JOHNNY V/STEPHANIE G
South Pipeline (S2PL)	No	Yes	9520004003	CARDOS	JUAN AND EMILIA
South Pipeline (S2PL)	No	Yes	9517005011	Carefree Corp.	WENDEL G Kent
South Pipeline (S2PL)	No	Yes	508013001	CHHORN/ING	DARAN S
South Pipeline (S2PL)	No	Yes	9517005012	CHMIEL	RONALD TR AND SUSAN OLIVIA TR
South Pipeline (S2PL)	No	Yes	9520005013	CHMIEL	RONALD TR AND SUSAN OLIVIA TR
South Pipeline (S2PL)	No	Yes	9520005003	CHMIEL	RONALD TR AND SUSAN OLIVIA TR
South Pipeline (S2PL)	No	Yes	9520004004	CIMINO/ESPINOZA	THELMA S/LISA K
South Pipeline (S2PL)	No	Yes	9520004007	CIMINO/ESPINOZA	THELMA S/LISA K
South Pipeline (S2PL)	No	NA	9529011047	CITY OF COLORADO SPRINGS	
South Pipeline (S2PL)	No	NA	9532026011	CITY OF COLORADO SPRINGS	
South Pipeline (S2PL)	No	NA	505010011	CITY OF COLORADO SPRINGS	
South Pipeline (S2PL)	No	NA	505005020	CITY OF COLORADO SPRINGS	

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S2PL)	No	NA	508006016	CITY OF COLORADO SPRINGS	
South Pipeline (S2PL)	No	NA	508010006	CITY OF COLORADO SPRINGS	
South Pipeline (S2PL)		Yes	505014011	COLE	WILLIAM WALLACE
South Pipeline (S2PL)	No	Yes	508003018	COLE	EDWIN DAVID AND LUCILLE C
South Pipeline (S2PL)	No	Yes	508003019	COLE	EDWIN DAVID AND LUCILLE CLAUDINE
South Pipeline (S2PL)	No	Yes	9520005009	DEARMAN	JULIE
South Pipeline (S2PL)	No	Waiver-Owner plans a horse corral	9532006040	DEES	THOMAS C
South Pipeline (S2PL)	No	Yes	9532006043	DILCHER	MATTHEW B and MACIE
South Pipeline (S2PL)	No	Yes	9520005006	FILLAS	ROSALIE B C/O JANNELLE MOLINA
South Pipeline (S2PL)	No	Yes	9520005007	FILLAS	ROSALIE B C/O JANNELLE MOLINA
		NA-2 year agreement, will revegetate and offer agreement at end of easement			
South Pipeline (S2PL)	No	Yes	9517004006	FRAZIER	EDWARD J
South Pipeline (S2PL)	No	Yes	9517004028	FUNK	BEN AND TAYLOR WANDA
South Pipeline (S2PL)	No	Yes	9520017082	FUNK	BEN
South Pipeline (S2PL)	No	Yes	9532006036	FURNEY	JAY W
South Pipeline (S2PL)	No	Yes	9520005004	GANSSE	GEORGE
South Pipeline (S2PL)	No	In process	9529011004	GIANNETTO	SALVATORE
South Pipeline (S2PL)	No	Yes	9532017015	GILLEN	FRANK J
		NA-2 year agreement, will revegetate and offer agreement at end of easement			
South Pipeline (S2PL)	No		508013010	GOOD	JOSEPH L
South Pipeline (S2PL)	No	In process	9517004016	GOWDA	USHA B
South Pipeline (S2PL)	No	Yes	508011031	GRACE	MARCUS J
South Pipeline (S2PL)	No	Yes	9529011019	Grunden	George
South Pipeline (S2PL)	No	Yes	9520005015	HALL	JACKIE N AND URSULA
South Pipeline (S2PL)	No	Yes	9517004027	HANEY	BRANSON A
South Pipeline (S2PL)	No	Yes	9532018009	HARVEY	KELLY
South Pipeline (S2PL)	No	Yes	9532006033	HEMBERGER	WILLIAM A
South Pipeline (S2PL)	No	Yes	9532006024	HERNASY	RICHARD P AND CAROLINE
South Pipeline (S2PL)	No	Yes	505015023	HILDRETH	CHRISTOPHER A AND SARAH B

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S2PL)	No	Yes	9532006031	HODGES	MICHAEL P AND GENEVIEVE R
South Pipeline (S2PL)	No	Yes	505005031	HUDDLESON	RENEE A
South Pipeline (S2PL)	No	Yes	9532006018	HUDSON	GERALD E
South Pipeline (S2PL)	No	Yes	9508001005	JACKSON	GREGORY L AND TONYA R
South Pipeline (S2PL)	No	Yes		JACKSON/BOND	
South Pipeline (S2PL)	No	Yes	9532006042	JACKSON	E NEAL/TWILA A
South Pipeline (S2PL)	No	Yes	9508003008	JOHNSON	CASEY
South Pipeline (S2PL)	No	In process	505014004	KAY	LAVETTA
South Pipeline (S2PL)		Yes	9520004011	KEEN	CHARLES J
South Pipeline (S2PL)	No	Yes	9532006035	KENNEY	NOAH
South Pipeline (S2PL)	No	Yes	9508001008	KOEHLER	KENNETH MARK
South Pipeline (S2PL)	No	Yes	9508001006	KOEHLER	KIM LORNE
South Pipeline (S2PL)	No	In process	9532017008	KRELOVICH	VICTOR A AND PAT
South Pipeline (S2PL)	No	Yes	9532006032	KRUPP	HERBERT W JR AND DEBRA L
South Pipeline (S2PL)	No	Yes		LEGACY HOMES OF	
South Pipeline (S2PL)	No	Yes	9508001007	PUEBLO INC	
South Pipeline (S2PL)	No	Yes	505015024	LEHMAN	CHARLES R AND DIANNE C
South Pipeline (S2PL)		Yes			BOBBY KEITH JR/DAUGHERTY
South Pipeline (S2PL)	No	Yes	9508003007	LUTTRELL	MELINDA
South Pipeline (S2PL)	No	Yes	9532006041	MANJI	ROSHANA H
South Pipeline (S2PL)	No	Yes	9520017083	MARTINEZ	RUEBEN JR
South Pipeline (S2PL)	Grading changes requested and have been completed and accepted	Yes			
South Pipeline (S2PL)	No	Yes	9520004010	MAXWELL	DWAIN B AND HELEN E
South Pipeline (S2PL)	No	Yes	9532006023	MC GRANAHAN	WILLIAM RICHARD
South Pipeline (S2PL)	No	Yes	9508001001	MIND YOUR OWN BUSINESS TRUST	
South Pipeline (S2PL)	No	Yes	9532006034	MOSHER	ANGELA S CALLOW
South Pipeline (S2PL)	No	Yes	9520004008	NAPIER - ZAUTCKE	CAROL
South Pipeline (S2PL)	No	In process	508010002	NGUYEN	NGUNG
South Pipeline (S2PL)	No	Yes	9529011006	NICHOLS	CHASE
South Pipeline (S2PL)	No	Yes		P A L CONSTRUCTION	
South Pipeline (S2PL)	No	Yes	9517004011	INC	Paul Langlois
South Pipeline (S2PL)	No	Yes	9517005009	PADILLA	RUBEN E PADILLA AND CYNTHIA A HUNGERFORD-PADILLA
South Pipeline (S2PL)	No	Yes	9532018003	POELMAN/RICOTTA	ADAM M/CARRIE N
South Pipeline (S2PL)	No	In process	9520004002	PRADO	ESTRELLA
South Pipeline (S2PL)	No	Yes	9508001004	PUEBLO BANK AND TRUST CO	
South Pipeline (S2PL)	No	Yes	9517005019	PUEBLO BANK AND TRUST CO	

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S2PL)	No	NA	9521099400	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	9529099237	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	9529099238	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	9532018001	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	508099254	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	508011005	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	508011006	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	NA	508099998	PUEBLO WEST METRO DISTRICT	
South Pipeline (S2PL)	No	Yes	9532017005	QUINTANA	THOMAS L/BEATRIZ M
		NA-2-year easement, will revegetate now and offer agreement at end of easement			
South Pipeline (S2PL)	No		9517004009	RAFAEL	ALEXY C
South Pipeline (S2PL)	No	Yes	9517004035	REAL CORP LLC	
South Pipeline (S2PL)	No	Yes	9520017069	REITER	DAVID PAUL AND DIANE MARIE
South Pipeline (S2PL)	No	Yes	9508001003	REPOLLO	GEORGE E
South Pipeline (S2PL)	No	Yes	9508001002	REPOLLO	GEORGE E
South Pipeline (S2PL)	No	Yes	505015010	ROMERO	BERNARD P SR AND REBECCA A
South Pipeline (S2PL)	No	Yes	9520004012	SALMAN	MO AND CAROLE
South Pipeline (S2PL)	No	Yes	505015025	SCHADEN	EVELYN T AND PAUL H
South Pipeline (S2PL)	No	Yes	9532006020	SCHROEDER	KURT AND ROBIN
South Pipeline (S2PL)	No	Yes	9529011005	SMITH	MARY ANN MICHELLE
South Pipeline (S2PL)	No	In process	508011003	SMUCZEROWICZ	ROGER J
South Pipeline (S2PL)	No	In process	508011004	SMUCZEROWICZ	ROGER J
South Pipeline (S2PL)	No	Yes	9532018011	Snyder	Heather
South Pipeline (S2PL)	No	Yes	9532006030	SPENCER	WILLIAM KAGUA/MARY KAEKAE WOOLSEY
South Pipeline (S2PL)	No	Yes	9529011002	STAACK	DENNIS E AND BONNIE S
South Pipeline (S2PL)	No	Yes	9520004005	STEWART	SEAN M AND MICHELLE A
South Pipeline (S2PL)	No	Yes	508011001	SWICK	BECKY A
South Pipeline (S2PL)	No	Yes	9532018007	TANO	DARREL G
South Pipeline (S2PL)	No	Yes	9532006039	THORNTON	CHARLES/PATRICIA JANNELL

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S2PL)	No	Yes	9532006038	THORNTON	CHARLES ANTHONY/PATRICIA JANNELL
South Pipeline (S2PL)	Grading changes requested and have been completed and accepted	Yes	9529011001	UNDERHILL	SMITH ADAM D/CANDY S
South Pipeline (S2PL)	Yes	Yes	508006029	VELASQUEZ	ELOVEIDA B
South Pipeline (S2PL)	Grading changes requested and have been completed and accepted	Yes	9520004009	WALSH	HERBERT S
South Pipeline (S2PL)	Grading changes requested and have been completed and accepted	Yes	9529011003	WILLIAMS	PAUL L AND PAMELA L
South Pipeline (S2PL)	No	Yes	9529010017	WILSON	STEVEN A
South Pipeline (S2PL)	No	Yes	505011015	ZAGGY	CAROLYN S
South Pipeline (S2PL)	No	Yes	9520005014	ZOPH	BETTY R
South Pipeline (S3PL)	Grading changes requested and have been completed and accepted	Yes	85000001020	DeChabert	Pierre & Saturnina
South Pipeline (S3PL)	No	Yes	850003013	Essig	Jason D. and Erica D.
South Pipeline (S3PL)	No	Yes	8500005011	Idolor	Gaspar P. & Lorna V.
South Pipeline (S3PL)	No	Yes	8500005012	Keshmiri	Hamid
South Pipeline (S3PL)	Property abandoned, owner missing, SDS will revegetate				
South Pipeline (S3PL)	Never reached, No forwarding.	8500005027	Kyle	David	
South Pipeline (S3PL)	No	Yes	8500006010	Manzanares & Madrid	Andy P. and Clyde G.
South Pipeline (S3PL)				Midway Ranches Property Owners Association	
South Pipeline (S3PL)	No	Yes	8500005019		
South Pipeline (S3PL)		NA-2-year easement, will revegetate now and offer agreement at end of easement			
South Pipeline (S3PL)	No	8500001002	Surniak	Cynthia	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	500000002	City of Pueblo	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	500000023	City of Pueblo	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	500000024	City of Pueblo	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	500000025	City of Pueblo	
South Pipeline (S1PL)	No	Yes	500000069	State of Colorado	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	508015001	Curtis & Betty Bell	

Work Package	Post-construction changes requested?	Revegetation License Agreement Signed	Parcel No.	Owner (Last)	Owner (First)
South Pipeline (S1PL)	No	Yes	517000001	Douglas, William & Vivienne & Holman, Andrew P. & Vera P.	
South Pipeline (S1PL)	No	Yes	517000004	Douglas, William & Vivienne & Holman, Andrew P. & Vera P.	
South Pipeline (S1PL)	No	In process	517000005	Robert M. Korb Trust	
South Pipeline (S1PL)	No	NA	517000007	Pueblo West Metro District	
South Pipeline (S1PL)	Grading changes requested and have been completed and accepted	Yes	517000009	City of Pueblo	
South Pipeline (S1PL)	No	In process	517003001	James L. Snyder	
South Pipeline (S1PL)	No	Yes	517003002	Mary Anne Weber	
South Pipeline (S1PL)	No	In process	517003003	Jason Robinson	
South Pipeline (S1PL)	No	Yes	517003004	Timothy R. & Joanne Nolen	
South Pipeline (S1PL)	No	Yes	517003005	Sherman T. & Ramona J. Guimont	
South Pipeline (S1PL)	No	Yes	517003006	Rene Gonzalez Escudero	
South Pipeline (S1PL)	No	Yes	517003007	Kenneth B. & Robbyne L. Cape	
South Pipeline (S1PL)	No	NA	517099386	Pueblo West Metro District	
South Pipeline (S1PL)	No	Yes	600000058	United State of America	
South Pipeline (S1PL)	No	Yes	625000004	United States of America	
South Pipeline (S1PL)	No	NA	625001001	Pueblo West Metro District	
South Pipeline (S1PL)	No	NA	625002001	Pueblo West Metro District	

For project updates and schedule information:
VISIT www.sdswater.org
E-MAIL sdsinfo@csu.org
CALL (855) SDS-4YOU or (855) 737-4968

Water for generations
SDS

PLEASE STAY AWAY FROM REVEGETATION AREA
We are committed to restoring plant life in the area affected by the construction activities. You can help by keeping people, pets, livestock, horses, and vehicles out of the revegetation area. With your cooperation, we can protect the young plants and help them to thrive.

SDS COMMUNITIES SERVED



WHAT TO EXPECT DURING REVEGETATION

RESTORING NATIVE PLANTS IN THE SDS CONSTRUCTION AREA

Construction of the Southern Delivery System (SDS) is entering a new phase. Major activities associated with pipeline installation are concluding in your area. Crews are now beginning work to restore native plants in the areas affected by construction. During these revegetation activities, the SDS team and contractors want to keep you informed and involved in the process.



THE FOLLOWING IS AN OVERVIEW OF GENERAL ACTIVITIES YOU CAN EXPECT TO SEE DURING REVEGETATION



STEP 1: LOOSEN SOIL

One of the first activities in revegetation is to loosen the top 6 to 12 inches of soil in the construction area. Typically, tractors pull discs to till the soil, which helps increase water penetration while aerating the soil to encourage root growth.



STEP 2: ASSESS FENCE AND ENVIRONMENTAL CONTROLS

Before seeding, the contractor will assess each property to see if changes to environmental controls are needed. Activities may include relocating, repairing, or installing earthen berms or knee-high black silt fences, which prevent silt and debris from washing off the site. The contractor also may remove or reconfigure temporary fences to apply seed and water to the area. Fencing is important to protect the young plants from being damaged by vehicle or foot traffic, livestock, or pets.



STEP 3: PREPARE SOIL

Native topsoil will be returned to the revegetation area to provide a nourishing environment for the seed. After the native topsoil is in place, the area will be graded, rolled or raked to a smooth and even surface.

Seedbeds will be prepared by rolling and/or leveling and raking the area. This will provide optimal conditions for applying seed, leaving a smooth, reasonably firm seedbed.



STEP 4: PLANT SEED

A native short-grass seed mixture will be planted, using either drill or broadcast methods. A drought-tolerant mixture was selected specially for the climate and soil type in the area. For more information on the seed mix for your area, contact your SDS representative.



STEP 5: APPLY MULCH AND ANCHORING

Mulch will be applied to the revegetation area to help maintain soil moisture and encourage seed germination. Depending on site conditions, mulch will be crimped into the soil and sprayed with a material that is used to keep it in place.



STEP 6: IRRIGATE

Contractor methods for irrigation will vary depending on the soil and availability of water at the restoration area. Some areas will be watered using temporary sprinkler systems. Other areas will be watered using water trucks. Timing and amount of watering also will vary, depending on rainfall, temperature, and other conditions.



STEP 7: PERFORM QUALITY CONTROL

Once the area is planted, the contractor will routinely inspect the seed area and monitor the site. The contractor will determine whether reseeding or repair work should be performed. Fences and environmental controls also will be inspected and repairs made as needed.

The contractor will mitigate noxious (invasive) weeds in the revegetation area. Herbicides will be applied at the manufacturers recommended rate to control noxious weeds, such as Salt Cedar, Canada Thistle, and Russian Knapweed. Spot treatment with products similar to Roundup™ may be used for other weeds. A backpack sprayer will typically be used for application; general area spraying is not allowed.



DATE, 2012

NAME

ADDRESS

CITY, STATE ZIP

Parcel Ref: XXXXXXXXXX

Dear XXXXXXX:

We greatly appreciate your cooperation during construction of the Southern Delivery System (SDS) water pipeline in your neighborhood. With the pipeline installation essentially completed in your area, we are beginning the process to revegetate — grow native grasses — in areas affected by our construction. As always, we want to keep you informed and involved in the process.

Our goal is to re-establish low-growing, native grasses on your property as soon as possible. To achieve the best results, it is likely that we need limited access to your property to prepare for planting, placing seed, irrigating the seed and controlling weeds. The temporary construction easement that Colorado Springs purchased from you will expire date. The permanent easement that Colorado Springs purchased from you for the SDS pipeline will continue to be in effect. To perform successful revegetation on your property past the temporary construction easement's expiration, we would like to enter into a license agreement with you.

The SDS team is committed to working with you to implement a revegetation approach that suits how you intend to use your property. Each property is unique. Some of our neighbors own horses that would eat any new vegetation. Others are planning to install recreational features such as a go-cart track. Many residents simply want SDS to revegetate the affected construction area with native grasses for them to enjoy for years to come.

In the coming weeks, we will ask you to choose whether to opt into the SDS revegetation program or to opt out of the program. The yearly revegetation license agreements are voluntary. Property owners may cancel at any time.

Here are the two options:

1. Opting into the SDS revegetation program

You will permit our contractors, currently Western States Reclamation, limited access to establish native grasses in the recently vacated construction area on your property. Please see "What to Expect During SDS Revegetation" brochure for more detailed information on the process.

- **Year One – \$300 paid to property owner for agreement:** Our goal is to re-establish low-growing, native grasses on your property as soon as possible during this first year. As the temporary easement expires, we would like to enter into a license agreement with you to allow our contractor to perform limited and infrequent revegetation activities on your property. Activities might include soil preparation; minor grading; fence installation, maintenance and removal; seeding and re-seeding; installation, use and maintenance of temporary irrigation systems; and weed control.
- **Year Two – \$200 paid to property owner for agreement:** If weather conditions and other factors inhibit the growth of sufficient vegetation, we will identify your property for a second year of limited access. To continue into a second year for revegetation, a new license agreement will be needed to allow for further activities on your property. Access would be more limited because much of the preparatory work would already be complete. Activities might include fence maintenance and removal; re-seeding; use and maintenance of temporary irrigation systems; and weed control.
- **Year Three – \$100 paid to property owner for agreement:** A third year is available for property owners who want added protection against weeds growing in the re-established vegetation. To continue into a third year, a new license agreement will be needed to allow for final revegetation activities. Activities might include temporary above ground irrigation system removal, completion of fence removal, and weed control.

2. Opting out of the SDS revegetation program

It is possible that you may not want any further SDS activity on your property once the temporary easement expires. In this case, you may opt out of SDS revegetation. By choosing this option, you will waive and release SDS and its contractors from any revegetation obligations on your property and assume full responsibility for maintenance after the expiration of the temporary easement. The opt-out plan does not include financial compensation.

Thank you again for your cooperation and patience. Our work is nearly done! I am available to discuss these options and answer any questions you might have.

Also, if you are interested in monitoring the progress of the project, you can sign up for project or construction updates at www.SDSwater.org.

Sincerely,

SDS REP NAME

PHONE





REVEGETATION LICENSE AGREEMENT
(YEAR ONE)
Pueblo County

APN: XXXXXXXXXX

Owner: NAME Tenant: XXX

Address: ADDRESS
CITY, STATE ZIP

Contact Info: XXXXXXXX

Property Address: XXXXXXXXXXXX

Owner ("Licensor") hereby authorizes the City of Colorado Springs, a home rule city and municipal corporation, on behalf of its enterprise, Colorado Springs Utilities ("Licensee"), its agents or contractors to enter upon said property for the purpose of Revegetation Activities within the lands described in Exhibits B and C attached hereto and incorporated herein by reference. These Revegetation Activities shall include, but not be limited to, the following: seeding, re-seeding, irrigation installation, irrigation maintenance, soil preparation, soil amending, minor grading, fence installation, fence maintenance, fence removal, and/or weed control.

Licensor hereby certifies that he/she is the owner of the property at the address indicated above.

As consideration for the rights granted by this License, the Licensor shall be compensated the sum of Three Hundred and no/100 Dollars (\$300.00), and other good and valuable consideration upon execution and acceptance of this License.

This License shall commence on DATE, 2012 and terminate one year thereafter. This License shall be non-exclusive and may be terminated by Licensor upon thirty (30) days written notice.

This License shall **not** be recorded at the Office of the Clerk and Recorder for the county in which the property is located.



Licensee, to the extent specifically authorized by Colorado Law, shall hold harmless and indemnify Licensor from all claims, suits and costs arising from the construction and operation of the Revegetation Activities directly caused by Licensee. The Licensor shall hold harmless and indemnify Licensee, its agents or contractors, from all claims, suits and costs arising from the Revegetation Activities caused by the direct actions of the Licensor.

This License shall be construed in accordance with the laws of the State of Colorado.

Notices shall be sent to the following addresses:

if to Licensor:

NAME
ADDRESS
CITY, STATE ZIP

if to Licensee:

Colorado Springs Utilities
c/o Deputy Program Director
P.O. Box 1103, Mail Code 930
Colorado Springs, CO 80947-0930

Dated this DATE, 2012

Owner/Licensor:

Colorado Springs Utilities/Licensee:

Memorandum of Agreement
For Revegetation
Southern Delivery System
Property Address: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

APN: XXXXXXX
Property Owner: NAME
Segment Work Package: S2

Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

-
1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
 2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
 3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
 4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
 5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
 6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

The parcel proposed to be revegetated contains XXXXXXX square feet on parcel XXXX and improvements as follows: ENTER NOTES RELEVANT TO PARCEL

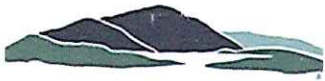
Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Colorado Springs Utilities	Owner
<div><div>Real Estate Specialist</div><div>Date</div></div>	<div><div>Owner</div><div>Date</div></div>
<div><div>APPROVED:</div><div></div></div>	<div><div>Owner</div><div>Date</div></div>
<div><div>SDS Land Team</div><div>Date</div></div>	<div><div>Owner</div><div>Date</div></div>
<div><div>City Attorney's Office</div><div>Date</div></div>	
<div><div>SDS Director/Deputy Director</div><div>Date</div></div>	

Revegetation Waiver

I hereby decline having my property revegetated following construction of the Southern Delivery System pipeline, waive any obligation that Colorado Springs Utilities has to do so, and understand that I will not be offered the opportunity to include my property in the revegetation activities in the future.

Owner _____ Date _____



Colorado Springs Utilities

It's how we're all connected

Memorandum of Agreement
For Revegetation
Southern Delivery System

APN: 9520004006
Property Owner: Michael and Clarissa Arnot
Segment Work Package S2

Property Address: 1163 North Kirkwood Drive, Pueblo West, CO 81007

Parcel Description: See Exhibit A for property owner's property. See Exhibits B and C for the areas of Revegetation Activities. Revegetation activities are intended to occur where Southern Delivery System construction disturbances have occurred on owner's property.

1. The undersigned owner agrees to allow revegetation activities (as defined on the attached scope of work) on his/her property for a one-year term renewable for two additional terms upon the mutual agreement of both parties. Payment shall be made for each separate term following the execution and delivery of the license agreement or a renewal of the license agreement.
2. It is understood by the owner that the revegetation access is for a public purpose and is voluntary and may be revoked upon thirty (30) days written notice. Revocation of access shall constitute a waiver of future revegetation work and a release of Colorado Springs Utilities (CSU) from performing and completing such work on the owner's property, excepting the removal of all or a portion of the irrigation system and fencing.
3. If the owner declines to execute a Revegetation License Agreement, owner understands that no future agreements will be offered or are available. By declining the Revegetation Offer, owner acknowledges that the Southern Delivery System shall not conduct its revegetation activities on the owner's property.
4. Payment for Year One shall be \$300.00. Payment for Year Two shall be \$200.00. Payment for Year Three shall be \$100.00. Each payment shall be made in a separate calendar year. Samples of the Agreements are attached for reference purposes.
5. The memorandum shall not be considered as binding upon the parties until such time as all of the hereinbelow signatures have been obtained.
6. This Agreement shall be construed in accordance with the laws of the State of Colorado.

Construction fence to remain during revegetation, then be removed.

The parcel proposed to be revegetated contains A temporary construction easement of 9,490 square feet and a permanent easement of 8,665 square feet.

Compensation shall be paid upon execution and acceptance of each Revegetation License Agreement.

Colorado Springs Utilities

Owner

Real Estate Specialist

Date

APPROVED:

SDS Land Team

Date

City Attorney's Office

Date

SDS Director/Deputy Director

Date

Owner

Date

Owner

Date

Revegetation Waiver

I hereby decline having my property revegetated following construction of the Southern Delivery System pipeline, waive any obligation that Colorado Springs Utilities has to do so, and understand that I will not be offered the opportunity to include my property in the revegetation activities in the future.

Owner _____ Date _____

SCOPE OF WORK

Note: The Scope of Work is based on requiring a full three years to establish a successful revegetation program

Revegetation Task	Year One	Year Two	Year Three
	\$300	\$200	\$100
Install Irrigation System	Yes	No	No
Maintain Irrigation System	Yes	Yes	No
Remove Irrigation System (above ground)	No	Possible	Yes
Prepare Soil	Yes	Possible	No
Install Seeding	Yes	No	No
Re-seed	Possible	Possible	No
Irrigate	Yes	Yes	No
Monitor Revegetation	Yes	Yes	No
Install Fencing	Yes	Possible	No
Maintain Fencing	Yes	Yes	Unlikely
Remove Fencing*	No	Yes	Possible
Control Noxious Weeds	Yes	Yes	Yes
Miscellaneous**	Possible	Possible	Possible

*Unless otherwise agreed to

**Unanticipated items which contribute to the success of the revegetation effort

PARCEL DESIGNATION:	9520004006	DATE:	December 7, 2009
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE, (Owner current as of the date of certification hereon)		

EXHIBIT A

LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

PARCEL DESIGNATION:	9520004006	DATE:	December 7, 2009
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE, (Owner current as of the date of certification hereon)		

EXHIBIT B
LEGAL DESCRIPTION

A permanent easement situated in LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County, more particularly described as follows:

The east 52.51 feet of the west 60.01 feet of said Lot 4.

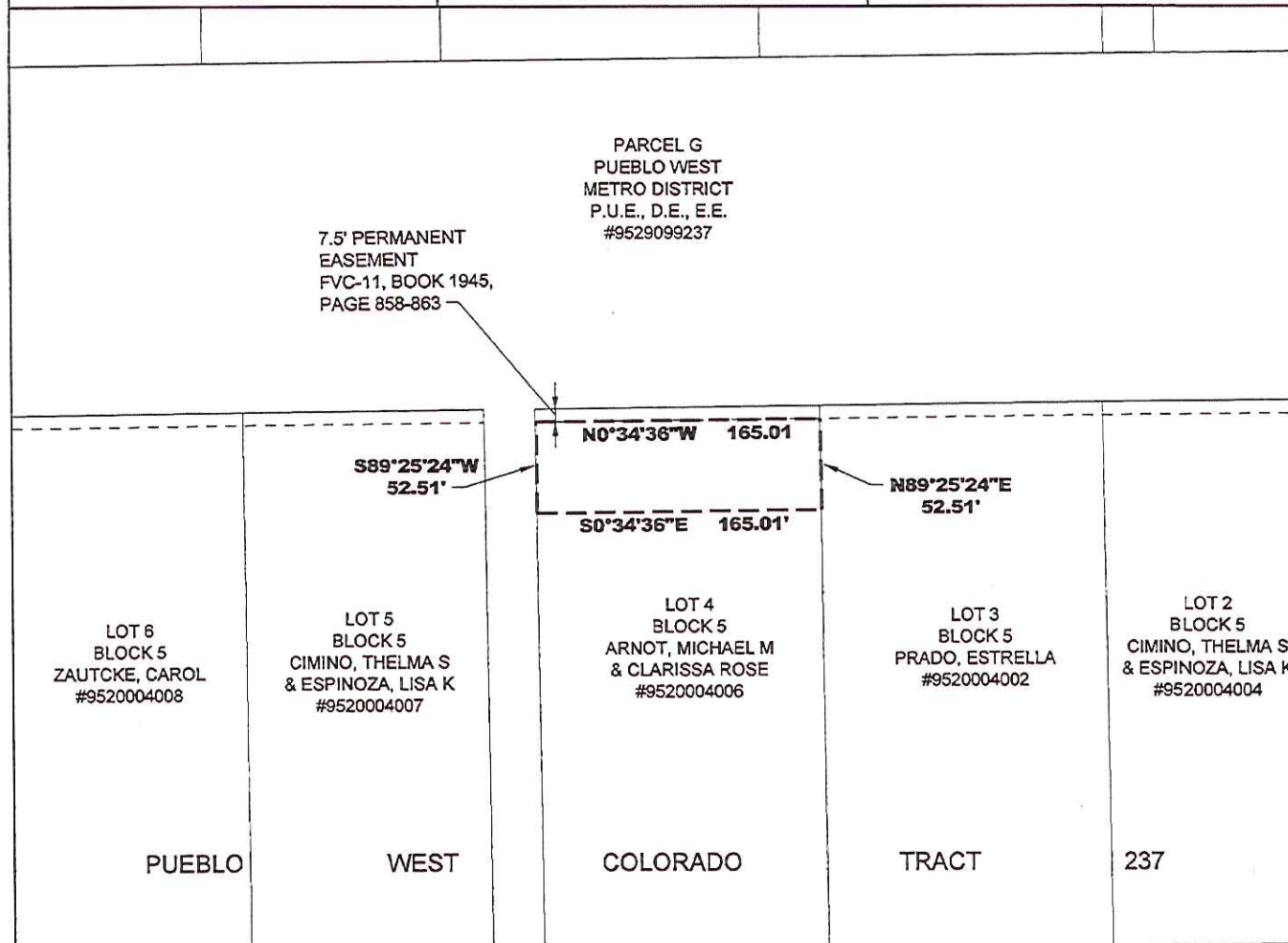
Said easement contains 8,665 square feet or 0.199 acres more or less.

EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

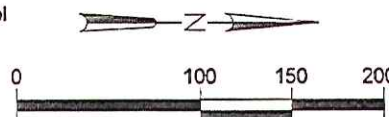
DATE: 8-DEC-2009	EXHIBIT C SKETCH PERMANENT EASEMENT PARCEL #9520004006 SECTION 20 T19S, R65W, 6TH P.M. PUEBLO COUNTY, COLORADO	CITY OF COLORADO SPRINGS
DRAWN BY: L STUDER		
CHECKED BY: B HANSON		
APPROVED BY: T SHAUGHNESSY		
DRAWING: 9520004006_EXC		



NORTH KIRKWOOD DRIVE

NOTES:

1. This sketch does not constitute a land survey plat by CRITIGEN, LLC., and is only intended to depict Exhibit B - Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.
2. Bearings are based on a line from NGS Station "Pueblo CBL 973" (PID JK1355), monumented by a 3" brass disk set in 1.5' diameter concrete pad to NGS Station "Clevenger" (PID JK1353), monumented by a stainless steel rod set in concrete, said line was assumed to bear North 13°33'20" West according to a survey control diagram prepared by Kirkham Michael Consulting Engineers deposited with the El Paso County Surveyor on August 10, 2004 at Survey Deposit Number 204900110.
3. P.U.E., D.E., E.E. = Public Utility Easement, Drainage Easement and Equestrian Easement. Per Subdivision Plat.



SCALE: 1" = 100'

SHEET 1 OF 1

PARCEL DESIGNATION:	9520004006	DATE:	March 17, 2010
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE (Owner current as of the date of certification hereon)		

EXHIBIT A

LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, Colorado, 80903

PARCEL DESIGNATION:	9520004006	DATE:	March 17, 2010
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE (Owner current as of the date of certification hereon)		

EXHIBIT B LEGAL DESCRIPTION

A temporary construction easement situated in LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County, more particularly described as follows:

The west 7.50 feet and the east 50.01 feet of the west 110.02 feet of said Lot 4.

Said easement contains 9,490 square feet or 0.218 acres more or less.

EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, Colorado, 80903

9520004006TE_EXB.doc

DATE: 18-MAR-2010

DRAWN BY: L STUDER

CHECKED BY: B HANSON

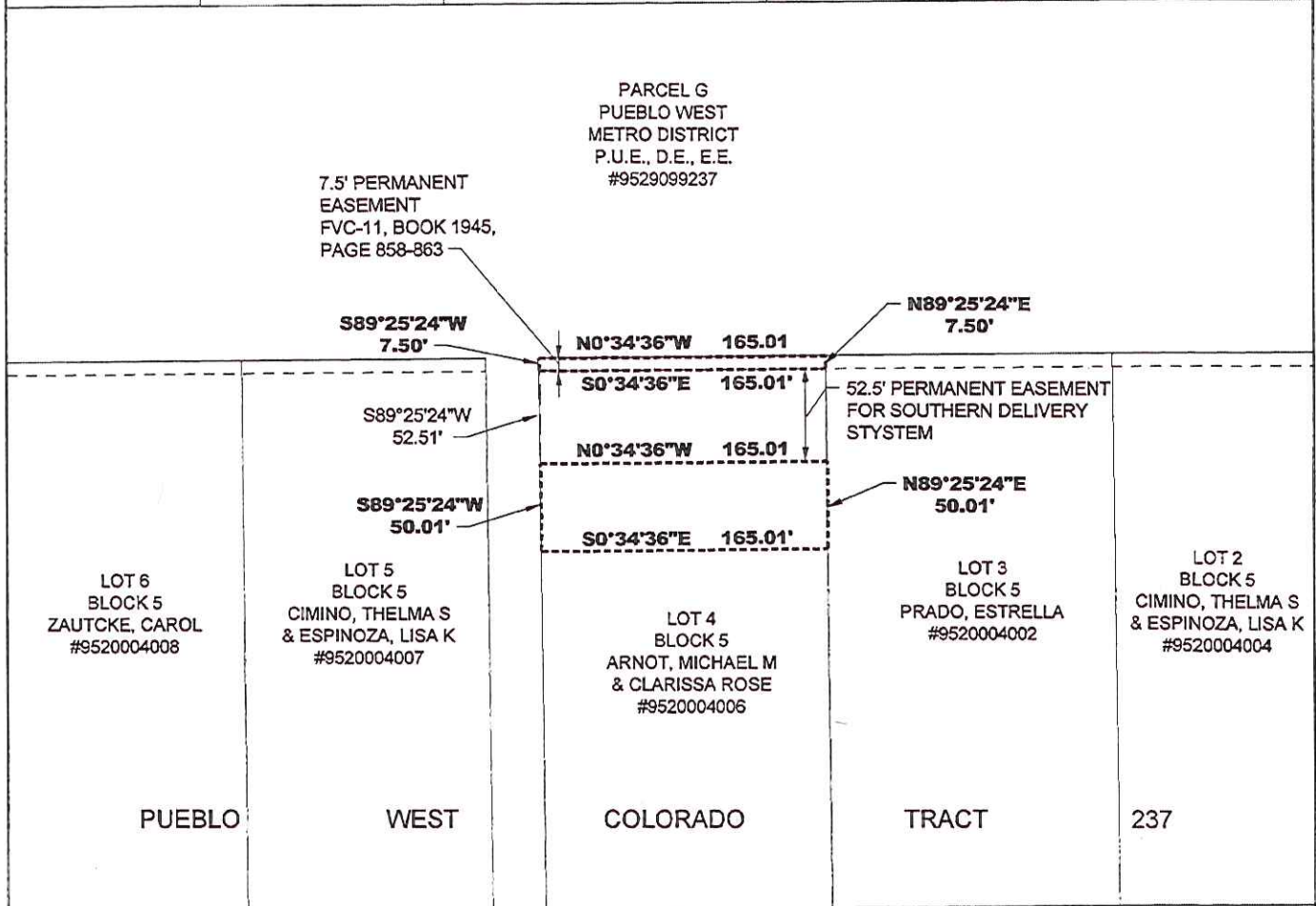
APPROVED BY: T SHAUGHNESSY

DRAWING: 9520004006TE_EXC

EXHIBIT C SKETCH

TEMPORARY CONSTRUCTION EASEMENT
PARCEL #9520004006
SECTION 20
T19S, R65W, 6TH P.M.
PUEBLO COUNTY, COLORADO

CITY OF
COLORADO SPRINGS



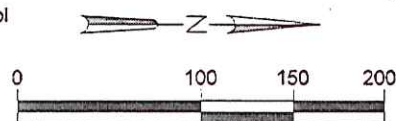
NORTH KIRKWOOD DRIVE

NOTES:

1. This sketch does not constitute a land survey plat by CRITIGEN, LLC., and is only intended to depict Exhibit B - Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.

2. Bearings are based on a line from NGS Station "Pueblo CBL 973" (PID JK1355), monumented by a 3" brass disk set in 1.5' diameter concrete pad to NGS Station "Clevenger" (PID JK1353), monumented by a stainless steel rod set in concrete, said line was assumed to bear North 13°33'20" West according to a survey control diagram prepared by Kirkham Michael Consulting Engineers deposited with the El Paso County Surveyor on August 10, 2004 at Survey Deposit Number 204900110.

3. P.U.E., D.E., E.E. = Public Utility Easement, Drainage Easement and Equestrian Easement. Per Subdivision Plat.



SCALE: 1" = 100'

SHEET 1 OF 1





Colorado Springs Utilities

It's how we're all connected

213286

8/28/12

REVEGETATION LICENSE AGREEMENT

(YEAR ONE)

Pueblo County

APN: 9520004006

Owner: Michael and Clarissa Arnot Tenant: _____

Address: 1163 N. Kirkwood Drive, Pueblo West, CO 81007

Contact Info: _____

Property Address: 1163 N. Kirkwood Drive

Owner ("Licensor") hereby authorizes the City of Colorado Springs, a home rule city and municipal corporation, on behalf of its enterprise, Colorado Springs Utilities ("Licensee"), its agents or contractors to enter upon said property for the purpose of Revegetation Activities within the lands described in Exhibits B and C attached hereto and incorporated herein by reference. These Revegetation Activities shall include, but not be limited to, the following: seeding, re-seeding, irrigation installation, irrigation maintenance, soil preparation, soil amending, minor grading, fence installation, fence maintenance, fence removal, and/or weed control.

Licensor hereby certifies that he/she is the owner of the property at the address indicated above.

As consideration for the rights granted by this License, the Licensor shall be compensated the sum of Three Hundred and no/100 Dollars (\$300.00), and other good and valuable consideration upon execution and acceptance of this License.

This License shall commence on **26th day of September, 2012** and terminate one year thereafter. This License shall be non-exclusive and may be terminated by Licensor upon thirty (30) days written notice.

This License shall **not** be recorded at the Office of the Clerk and Recorder for the county in which the property is located.

Licensee, to the extent specifically authorized by Colorado Law, shall hold harmless and indemnify Licensor from all claims, suits and costs arising from the construction and operation of the Revegetation Activities directly caused by Licensee. The Licensor shall hold harmless



Colorado Springs Utilities

It's how we're all connected

and indemnify Licensee, its agents or contractors, from all claims, suits and costs arising from the Revegetation Activities caused by the direct actions of the Licensor.

This License shall be construed in accordance with the laws of the State of Colorado.

Notices shall be sent to the following addresses:

if to Licensor:

Michael and Clarissa Arnot

1163 N. Kirkwood Drive

Pueblo West, CO 81007

if to Licensee:

Colorado Springs Utilities


c/o Deputy Program Director

P.O. Box 1103, Mail Code 930

Colorado Springs, CO 80947-0930

Dated this 28 day of July, 2012

Owner/Licensor:



Colorado Springs Utilities/Licensee:



APPROVED AS TO FORM:


CITY ATTORNEYS OFFICE
UTILITIES DIVISION

PARCEL DESIGNATION:	9520004006	DATE:	December 7, 2009
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE, (Owner current as of the date of certification hereon)		

EXHIBIT A

LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

PARCEL DESIGNATION:	9520004006	DATE:	December 7, 2009
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE, (Owner current as of the date of certification hereon)		

EXHIBIT B
LEGAL DESCRIPTION

A permanent easement situated in LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County, more particularly described as follows:

The east 52.51 feet of the west 60.01 feet of said Lot 4.

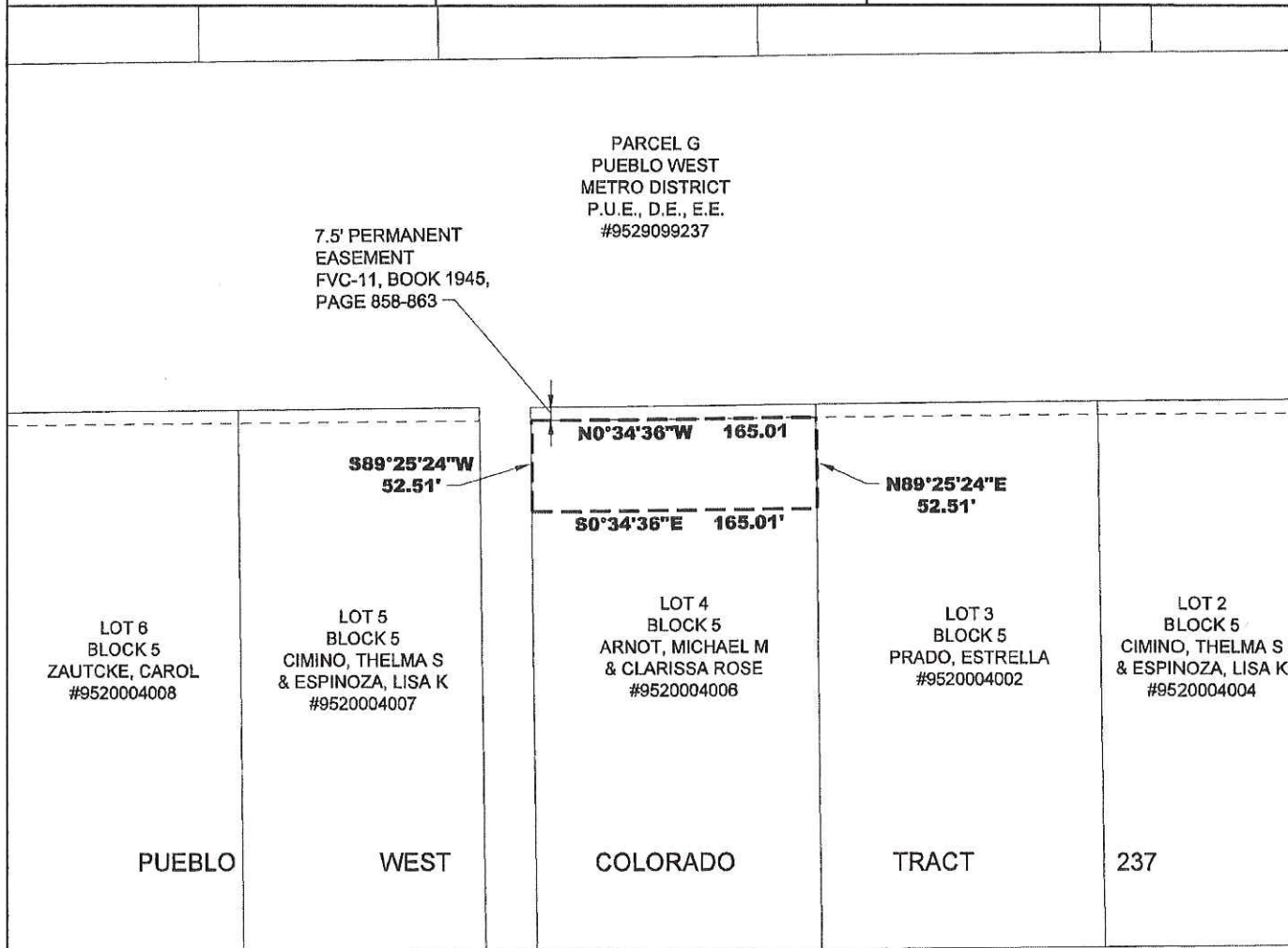
Said easement contains 8,665 square feet or 0.199 acres more or less.

EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Ave., Suite 700, Colorado Springs, Co, 80903

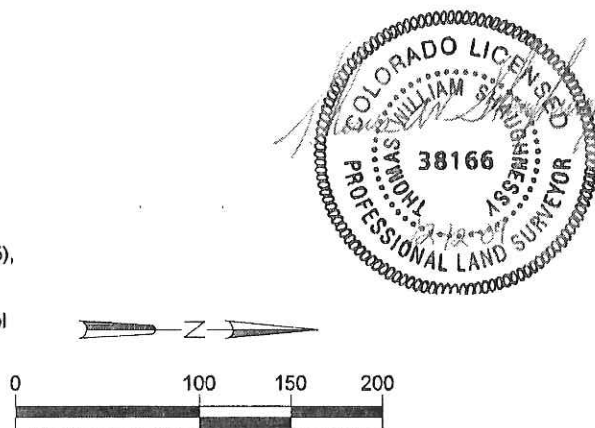
DATE: 8-DEC-2009	EXHIBIT C SKETCH PERMANENT EASEMENT PARCEL #9520004006 SECTION 20 T19S, R65W, 6TH P.M. PUEBLO COUNTY, COLORADO	CITY OF COLORADO SPRINGS
DRAWN BY: L STUDER		
CHECKED BY: B HANSON		
APPROVED BY: T SHAUGHNESSY		
DRAWING: 9520004006_EXC		



NORTH KIRKWOOD DRIVE

NOTES:

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3. P.U.E., D.E., E.E. = Public Utility Easement, Drainage Easement and Equestrian Easement. Per Subdivision Plat.



SCALE: 1" = 100'

SHEET 1 OF 1

PARCEL DESIGNATION:	9520004006	DATE:	March 17, 2010
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE (Owner current as of the date of certification hereon)		

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Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, Colorado, 80903

PARCEL DESIGNATION:	9520004006	DATE:	March 17, 2010
OWNER:	ARNOT, MICHAEL M. & CLARISSA ROSE (Owner current as of the date of certification hereon)		

EXHIBIT B
LEGAL DESCRIPTION

A temporary construction easement situated in LOT 4, BLOCK 5, TRACT NO. 237, PUEBLO WEST COLORADO, located in the Southeast Quarter of Section 20, Township 19 South, Range 65 West of the Sixth Principal Meridian, Pueblo County, Colorado, according to the plat thereof recorded in Book 1679 at Page 219 of the records of Pueblo County, more particularly described as follows:

The west 7.50 feet and the east 50.01 feet of the west 110.02 feet of said Lot 4.

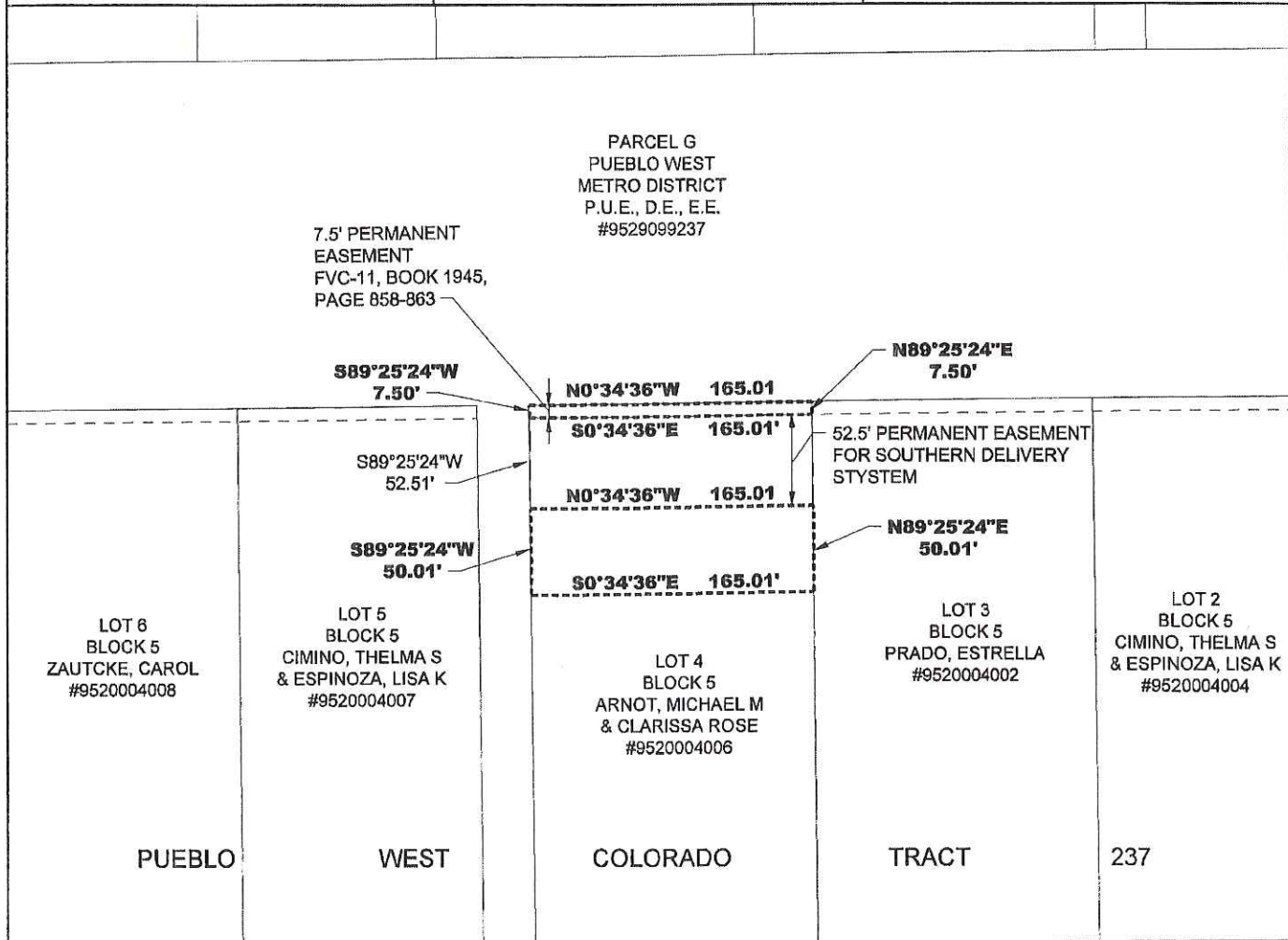
Said easement contains 9,490 square feet or 0.218 acres more or less.

EXHIBIT C SKETCH is attached hereto and is only intended to depict Exhibit B – Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.



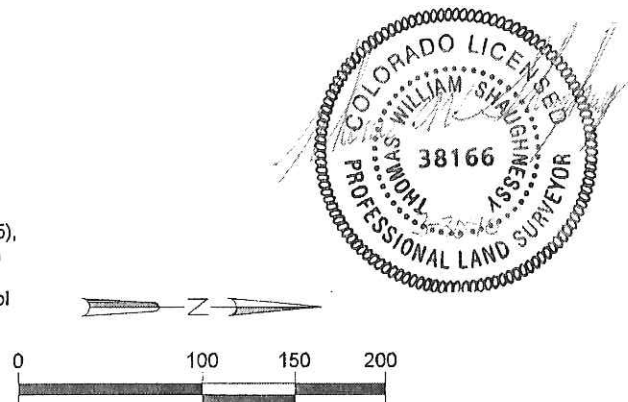
Prepared for and on behalf of Colorado Springs Utilities by: Thomas W. Shaughnessy, L.S. 38166, of CRITIGEN, LLC, 90 South Cascade Avenue, Suite 700, Colorado Springs, Colorado, 80903

DATE: 18-MAR-2010	EXHIBIT C SKETCH TEMPORARY CONSTRUCTION EASEMENT PARCEL #9520004006 SECTION 20 T19S, R65W, 6TH P.M. PUEBLO COUNTY, COLORADO	CITY OF COLORADO SPRINGS
DRAWN BY: L STUDER		
CHECKED BY: B HANSON		
APPROVED BY: T SHAUGHNESSY		
DRAWING: 9520004006TE_EXC		



NOTES:

1. This sketch does not constitute a land survey plat by CRITIGEN, LLC., and is only intended to depict Exhibit B - Legal Description. In the event that Exhibit B contains an ambiguity, Exhibit C may be used to solve said ambiguity.
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SHEET 1 OF 1



August 28, 2013

Michael & Clarissa Arnot
1163 North Kirkwood Drive
Pueblo West, CO 81007

Parcel Ref: 95200-04-006

Dear Mr. & Mrs. Arnot:

H!

We greatly appreciate your cooperation during construction of the Southern Delivery System (SDS) water pipeline in your neighborhood and the initial revegetation activities. Your assistance has enabled our contractors to continue efforts to return your property to a good condition. To build upon the initial revegetation efforts, we are asking you to extend property access for our contractors through a voluntary license agreement. This will involve a \$200 payment to you for granting the SDS Program and its contractors a second year of access for revegetation efforts in the former construction area on your property.

As you may recall, the revegetation license agreements are voluntary. Property owners may choose to opt in to the SDS revegetation program or to opt out of the program, or cancel at any time.

Here are the two options for the SDS revegetation program:

1. OPT IN

If you choose to continue participation in the SDS revegetation program, you would agree to permit our contractors, currently Western States Reclamation, limited access to continue establishing native grasses in the former construction area on your property. Payment to you under this Year Two agreement is \$200. Our need for access will be more limited during Year Two because grass seed already has been planted on your property. Activities during this period may include continued irrigation, fence maintenance and fence removal; re-seeding if needed; and weed control.

Remember that Year Three (\$100 paid to the property owner) may be available for property owners who want added protection against weeds growing in the re-established vegetation.

2. OPT OUT

We recognize that you may not want to have these activities continue on your property. If you prefer, you may opt out of SDS revegetation. By choosing this option, you would waive and release SDS and its contractors from any revegetation obligations on your property and assume full responsibility for maintenance after the expiration of the temporary easement. This opt-out plan does not include financial compensation.

(over)

SDS representatives are available to discuss these options and answer any questions you may have. For property owners that have homes or other property improvements, please call David Marciniak or Margaret Radford at **855-SDS-4YOU** (737-4968). Property owners who own vacant land, please call Clara Lucero at (719) 668-8685.

Thank you again for your cooperation and patience. If you are interested in monitoring the progress of the project, you can sign up for project or construction updates at www.SDSwater.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Margaret Radford", written in a cursive style.

Margaret Radford
Construction Facilitator



Colorado Springs Utilities
It's how we're all connected

**REVEGETATION LICENSE AGREEMENT
(YEAR TWO)
Pueblo County**

APN: 95200-04-006

Owner: Michael M. & Clarissa Rose Arnot Tenant: NA
Address: 1163 North Kirkwood Drive
Pueblo West, CO 81007

Contact Info: 505-553-8431

Property Address: 1163 North Kirkwood Drive, Pueblo West, CO 81007

Owner ("Licensor") hereby authorizes the City of Colorado Springs, a home rule city and municipal corporation, on behalf of its enterprise, Colorado Springs Utilities ("Licensee"), its agents or contractors to enter upon said property for the purpose of Revegetation Activities within the lands described in Exhibits B and C attached hereto and incorporated herein by reference. These Revegetation Activities shall include, but not be limited to, the following: seeding, re-seeding, irrigation installation, irrigation maintenance, soil preparation, soil amending, minor grading, fence installation, fence maintenance, fence removal, and/or weed control.

Licensor hereby certifies that he/she is the owner of the property at the address indicated above.

As consideration for the rights granted by this license, the licensor shall be compensated the sum of Two Hundred and no/100 Dollars (\$200.00), and other good and valuable consideration.

This License shall commence on 26th day of September, 2013 and terminate one year thereafter. This License shall be non-exclusive and may be terminated by Licensor upon thirty (30) days written notice.

This License shall **not** be recorded at the Office of the Clerk and Recorder for the county in which the property is located.

Licensee, to the extent specifically authorized by Colorado Law, shall hold harmless and indemnify Licensor from all claims, suits and costs arising from the construction and operation



Colorado Springs Utilities

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of the Revegetation Activities directly caused by Licensee. The Licensor shall hold harmless and indemnify Licensee, its agents or contractors, from all claims, suits and costs arising from the Revegetation Activities caused by the direct actions of the Licensor.

This License shall be construed in accordance with the laws of the State of Colorado.

Notices shall be sent to the following addresses:

if to Licensor:

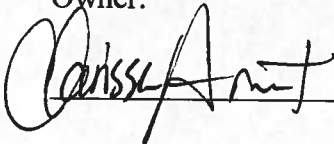
Michael M. & Clarissa Rose Arnot
1163 North Kirkwood Drive
Pueblo West, CO 81007

if to Licensee:

Colorado Springs Utilities
c/o Deputy Program Director
P.O. Box 1103, Mail Code 930
Colorado Springs, CO 80947-0930

Dated this 30th day of August, 2013

Owner:



Colorado Springs Utilities:





Approved as to Form:



City Attorney's Office – Utilities Division



Colorado Springs Utilities
It's how we're all connected

**REVEGETATION LICENSE AGREEMENT
(YEAR THREE)
Pueblo County**

APN: 95200-04-006

Owner: Michael M. & Clarissa R. Arnot
Address: 1163 North Kirkwood Drive
Pueblo West, CO 81007

Tenant: N/A

Contact Info: 505-553-8431

Property Address: 1163 North Kirkwood Drive, Pueblo West, CO 81007

Owner ("Licensor") hereby authorizes the City of Colorado Springs, a home rule city and municipal corporation, on behalf of its enterprise, Colorado Springs Utilities ("Licensee"), its agents or contractors to enter upon said property for the purpose of Revegetation Activities within the lands described in Exhibits B and C attached hereto and incorporated herein by reference. These Revegetation Activities shall include, but not be limited to, the following: irrigation lateral removal, fence removal, and/or noxious weed control.

Licensor hereby certifies that he/she is the owner of the property at the address indicated above.

As consideration for the rights granted by this license, the licensor shall be compensated the sum of One Hundred and no/100 Dollars (\$100.00), and other good and valuable consideration.

This License shall commence on the 26th day of September, 2014 and terminate one year thereafter. This License shall be non-exclusive and may be terminated by Licensor upon thirty (30) days written notice.

This License shall **not** be recorded at the Office of the Clerk and Recorder for the county in which the property is located.

Licensee, to the extent specifically authorized by Colorado Law, shall hold harmless and indemnify Licensor from all claims, suits and costs arising from the construction and operation of the Revegetation Activities directly caused by Licensee. The Licensor shall hold harmless



and indemnify Licensee, its agents or contractors, from all claims, suits and costs arising from the performance of the Revegetation Activities caused by the direct actions of the Licensor.

This License shall be construed in accordance with the laws of the State of Colorado.

Notices shall be sent to the following addresses:

if to Licensor:

Michael M. & Clarissa R. Arnot
1163 North Kirkwood Drive
Pueblo West, CO 81007

if to Licensee:

Colorado Springs Utilities
c/o Deputy Program Director
P.O. Box 1103, Mail Code 930
Colorado Springs, CO 80947-0930

Dated this ~~14th~~ 21st day of September, 2014

Owner:



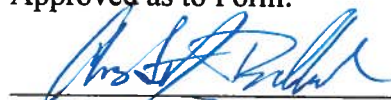
Colorado Springs Utilities:



Owner:



Approved as to Form:


City Attorney's Office – Utilities Division



Public Communications

TAB 3 – Revegetation-Phase Communications



Public Communications

2012 Revegetation-Phase Communications



SOUTHERN DELIVERY SYSTEM

P.O. Box 1103, MC 930 Colorado Springs, CO 80947

CONSTRUCTION NEWS

DINNER AT A GLANCE

Thursday, September 13
5 to 7 p.m.
Pueblo West Fire Station 3
729 E. Gold Ave.

Stop by for SDS info
and dinner.

PUEBLO WEST NEIGHBORS APPRECIATION DINNER

Join us for dinner and a Southern Delivery System construction update!
On Thursday, Sept. 13, SDS and the Pueblo West Metropolitan District will host an informal open house and dinner from 5 to 7 p.m. at the Pueblo West Fire Station 3 (729 E. Gold Ave.). To help us plan accordingly, please call 719-668-3591 to RSVP with the number of attendees in your party by Sept. 7.

This event is scheduled to discuss the conclusion of pipeline installation in the Pueblo West area and answer any questions residents may have about revegetation. Members of the SDS team, our contractor, and the PWMD will be on hand to answer your questions and visit with neighbors.



SOUTHERN DELIVERY SYSTEM

P.O. Box 1103, MC 930 Colorado Springs, CO 80947

Information and Construction Hotline: 855-SDS-4YOU or 855-737-4968

E-Mail: sdsinfo@csu.org

Website: www.sdswater.org



CONSTRUCTION NEWS

August 2012

PIPELINE CONSTRUCTION WINDING DOWN IN PUEBLO WEST

Thank you for your patience during construction of the Southern Delivery System (SDS) water pipeline. We are pleased to announce that major construction activities are coming to a close through most of Pueblo County and revegetation has begun. SDS is a regional water pipeline that will provide up to 18 million gallons of water per day to residents of Pueblo West, as well as water for Fountain, Security, and Colorado Springs.

More than 15 miles of the pipeline is now installed and buried from the Pueblo/El Paso County line at the north and heading south past East Spaulding Avenue.

- Garney Construction is winding down construction activities and beginning revegetation on its 7 miles of pipeline through Pueblo West.
- Layne Heavy Civil, Inc. (formerly Reynolds, Inc.), another pipeline contractor, has nearly completed construction of 8 miles of pipeline from northern Pueblo West through Midway Ranches; revegetation is under way.

SDS will provide
up to 18 million
gallons of water per
day to residents of
Pueblo West.

Garney Construction installed the first and last pieces of pipe in Pueblo West. The first piece of pipe was placed January 5, 2012. The last piece of pipe was placed six months later on July 6, 2012.



SOME OF THE FINAL ACTIVITIES IN PUEBLO WEST INCLUDE:

- Backfilling and grading of soil,
- Finishing above-ground pipe fixtures,
- Repairing roads, and
- Filling pipe with water for testing.

As these activities conclude, please let us know if you have questions regarding construction or revegetation.

For updates, visit our Construction Progress page at www.sdswater.org.



Revegetation operations under way in Pueblo West.

REVEGETATION HAS BEGUN

As construction crews move out of Pueblo West, revegetation activities are moving in. Western States Reclamation, Inc. is performing revegetation for the section of pipeline from the Pueblo/El Paso County line south to East Spaulding Avenue. Western States is an industry leader in revegetation and has worked on similar projects around the nation.

The SDS team is working closely with nearby neighbors to inform them about what they can expect during revegetation. Activities that neighbors can expect to see in the construction area include: loosening soil, assessing fencing and environmental controls, preparing soil, planting seed, applying mulch, irrigating, and performing quality control. After careful consideration, a special drought-tolerant mix of grass seed was selected for use throughout Pueblo West, which should help re-establish the easement area to its native condition.

For any questions about the upcoming activities, call the SDS hotline at 855-SDS-4YOU (855-737-4968), or visit the Construction Progress page at www.sdswater.org.

FACTS ABOUT REVEGETATION

- A native short-grass seed mix, including Blue Gramas and Wheatgrass, will be used.
- SDS and its contractor are responsible for preventing the growth and spread of noxious weeds for three years after revegetation begins. In areas where easements expire, revegetation beyond the initial seeding will be provided with property owners' consent.
- If initial seeding does not establish, areas will be reseeded for up to two years to establish native grasses.
- A temporary above-ground irrigation line will be used to help encourage seed germination.

LOCAL BUSINESSES SUPPORTING SDS

Did you know that more than 50 Pueblo County businesses are directly benefitting from work with SDS? John Volk, co-owner of WorkZone Traffic Control, Inc. is among one of the many local businesses that are proud to be partnering with SDS to support construction.

"In today's economy, I need new business opportunities to survive," Volk said. "SDS construction has kept my business profitable and my employees busy."

WorkZone has competitively secured contracts for traffic control and other services for much of the construction in Pueblo County. The company teamed with Garney Construction for work on the pipeline through Pueblo West, and is also benefitting from business with several other SDS contractors. Headquartered in Pueblo, WorkZone opened in March 2003 and employs 65 to 120 workers each year.

To learn more about other businesses supporting SDS construction, visit the Jobs/Business Opportunities page at www.sdswater.org.

YOUR SAFETY IS OUR PRIORITY

The SDS construction team is committed to protecting the safety of the public and our workers. We strive to be a good neighbor, answer questions, and resolve concerns. As we work in your area, we ask for your patience and cooperation.

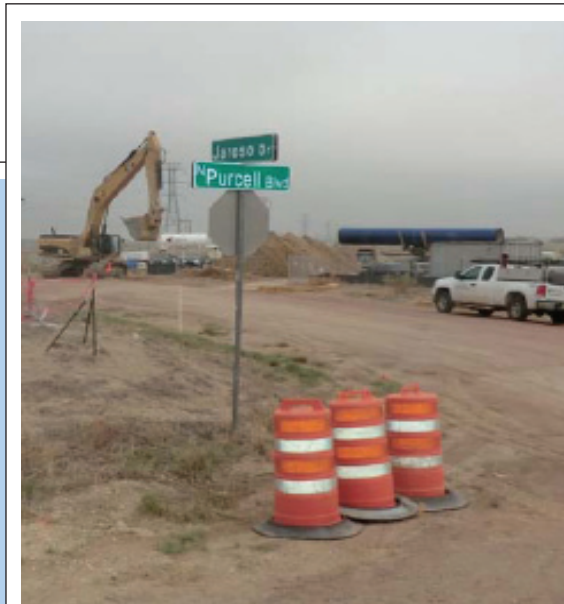
For your safety, be careful and watch for fencing, signs, and construction or revegetation activities that may include heavy equipment. Even though major construction is complete, we ask that you continue to stay away from the construction area until the safety fences and signs are removed.

TRAIL IMPROVEMENTS IN PUEBLO WEST

Residents may have noticed activity along the west side of the SDS construction area following the pipeline installation. Crews are improving Pueblo West's existing trail system along the utility corridor.

The trail is located on Pueblo West property that extends along the power lines, beginning on the north side of U.S. Highway 50 and continuing through Pueblo West. These improvements to the existing trail are another way SDS is partnering with local agencies to benefit the surrounding community.

For information on the trail improvements, call the Pueblo West Parks and Recreation Department at 719-547-7400.





TEMPORARY ROAD DETOURS

Dear neighbor:

Revegetation of the construction area for the Southern Delivery System pipeline is under way in your neighborhood.

Sandusky Drive Detour

On Wednesday, Aug. 8, our revegetation contractor will need to temporarily detour traffic on Sandusky Drive to allow workers to place an irrigation line under the road. This traffic diversion is necessary to protect the safety of residents and workers. The temporary detour, using Kirkwood Drive and North Thorpe Drive, is shown below. This detour is expected to last for one day.

Kirkwood Drive Detour

On Thursday, Aug. 9, traffic on Kirkwood Drive will need to be rerouted in much the same way, using Sandusky Drive and North Thorpe Drive as the alternate routes. This detour is expected to last for one day.

For your safety

We need your assistance to help protect the safety of your family, your neighbors and our workers. Detours will be clearly marked with signs, fencing and other means. Please help to ensure that you and everyone in your care follows the signage and stays away from the revegetation area. Keeping the work area safe will help our crews to complete their work in a timely manner.

For project updates
and schedule information

VISIT

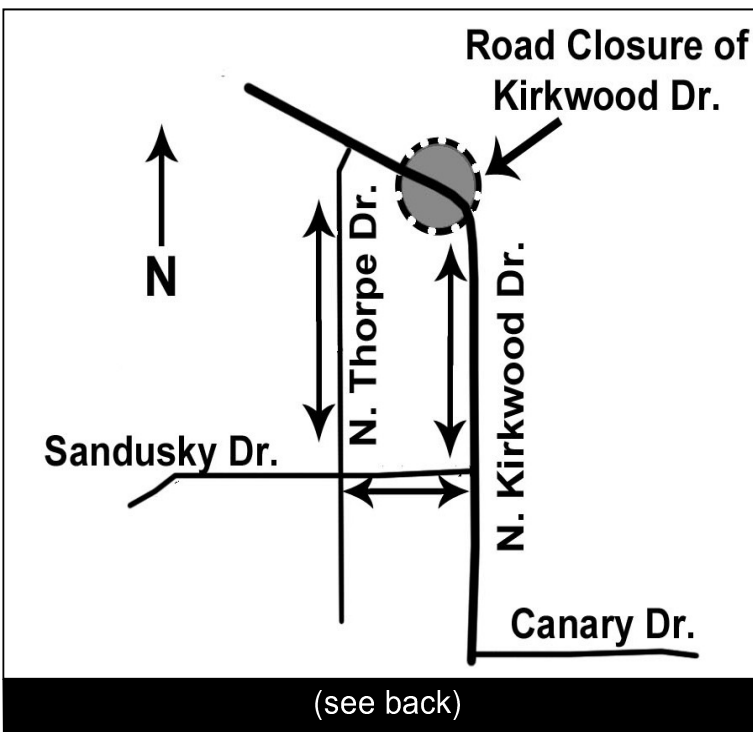
our Construction Progress page
www.sdswater.org

E-MAIL

sdsinfo@csu.org

CALL

our Construction Facilitators
at (855) SDS-4YOU



(see back)



Colorado Springs Utilities
It's how we're all connected





Public Communications

2013 Revegetation-Phase Communications



SDS CONSTRUCTION UPDATE

Spring is here, and it's time to continue native revegetation work on your property now that construction of the Southern Delivery System (SDS) water pipeline is complete. As always, we appreciate your patience and cooperation during our activities.

To facilitate the restoration process, our contractor, Western States Reclamation, will install a temporary irrigation system. You will likely see this activity occurring over the next several weeks. The first step will be installation of a below-ground irrigation water line, which will be abandoned in place when revegetation is complete.

Next, a drought-tolerant grass seed mix will be planted and mulched. Once seeding is complete, the contractor will install above-ground sprinkler "arms" or lateral arms, and sprinkler heads. Irrigation will begin when soil and air temperatures reach optimum levels for growth of the grasses.

We are committed to keeping you informed throughout the revegetation process. If you have any questions about this planned work, please contact Margaret Radford or David Marciniak at our toll-free hotline, (855) 737-4968. For ongoing SDS project information and updates, visit www.SDSwater.org.



Colorado Springs Utilities
121 S. Tejon St.
Colorado Springs, CO 80903



Curtis & Betty Bell

PO Box 801

Oakley, CA 94561



SDS CONSTRUCTION UPDATE

Spring is here, and it's time to continue native revegetation work on your property now that construction of the Southern Delivery System (SDS) water pipeline is complete. As always, we appreciate your patience and cooperation during our activities.

To facilitate the restoration process, our contractor, Western States Reclamation, will install a temporary irrigation system. You will likely see this activity occurring over the next several weeks. The first step will be installation of a below-ground irrigation water line, which will be abandoned in place when revegetation is complete.

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Colorado Springs Utilities
121 S. Tejon St.
Colorado Springs, CO 80903



Ross Osbold

1146 East Spaulding Avenue

Pueblo West, CO 81007

May 10, 2013

Curtis and Betty Bell
PO Box 801
Oakley, CA 94561

Parcel number: **508015001**

Dear Mr and Mrs. Bell:

Spring is here and the Southern Delivery System (SDS) and its contractor—Western States Reclamation—are increasing activities within the area disturbed by construction on your property to facilitate successful revegetation.

Although a drought-tolerant, native grass mix will be planted to help re-vegetate the former construction area, the area will still require water to promote successful plant growth. Despite current drought conditions, SDS has made the necessary arrangements to irrigate the restoration area during the critical germination and root development period. The SDS revegetation plan was developed with recommendations from independent experts with the Colorado Natural Heritage Program at Colorado State University.

We appreciate your assistance and patience during these activities, and we remain committed to partnering with you on this restoration. Here's what you can expect to see during this spring and summer:

Irrigation startup—The contractor has been monitoring the soil temperature in the former construction area to assess the best time to begin using the irrigation system installed in the permanent easement. It is important to water when the soil is at an optimal temperature for seed germination and the threat of frost has passed. ***Based on extended forecasts and recent inspections, we anticipate that as soon as next week we could begin watering in your area.***

Irrigation system setup—The former construction area is divided into zones for applying non-potable water (untreated water not suitable for drinking). Because the area we are watering is long and narrow, generally one zone will be turned on at a time. Each zone will usually activate sequentially, so as one zone shuts off, the zone next to it turns on.

Irrigation schedule—The amount of water applied and length of time each irrigation zone operates will fluctuate based on specific conditions within each zone. Among the factors that affect the water schedule are terrain, soil type, periods of dry or wet weather, and root growth for the seedlings. Here is a general progression of what you can expect to see.

- Initially, our revegetation team will turn the water on to fill the sprinkler system and adjust any sprinkler heads.
- Once the system is ready, watering will begin and is anticipated to progress through multiple cycles in each zone.
- Generally, initial irrigation is anticipated to occur daily. Irrigation will likely occur on a 24 hour schedule to balance the water needs of seedling development with conservation objectives. The amount, duration, and frequency of watering is expected to vary and decrease over time, optimizing conditions to germinate seed by helping water penetrate deep into the soil and provide the right amount of water for seedling growth.

Dos and don'ts while our work is under way—During the revegetation phase, please be aware that keeping traffic off the newly seeded area will help maximize its successful growth. This is especially true during these initial watering cycles when the delicate seedlings are just beginning to germinate. There is no need to mow or apply herbicides as Western States Reclamation will be maintaining the area. Please let us know if you are aware of malfunctioning sprinkler heads or other concerns by calling the information hotline.

Noxious weeds—Weeds that are generally not native to the area, such as certain types of thistles, will be mitigated. A backpack sprayer will typically be used for application of any herbicide that might be used to control these noxious weeds.

Again, thank you for your support for successful revegetation. Other than periodic irrigation, this restoration should be relatively unnoticeable.

We remain committed to continuing our efforts overseeing the restoration area to encourage successful revegetation. During this process, we want to coordinate in a way that is respectful of your property and privacy. We look forward to partnering with you to keep you informed and respond to your needs.

If you have any questions about our activities, please call the **SDS information hotline at 855-SDS-4YOU (855-737-4968)**.

Regards,
The SDS Construction Team



May 10, 2013

Ross Osvold
1146 E. Spalding Drive
Pueblo West, CO 81007

Parcel number: **508015001**

Dear Mr. Osvold:

Spring is here and the Southern Delivery System (SDS) and its contractor—Western States Reclamation—are increasing activities within the area disturbed by construction on your property to facilitate successful revegetation.

Although a drought-tolerant, native grass mix will be planted to help re-vegetate the former construction area, the area will still require water to promote successful plant growth. Despite current drought conditions, SDS has made the necessary arrangements to irrigate the restoration area during the critical germination and root development period. The SDS revegetation plan was developed with recommendations from independent experts with the Colorado Natural Heritage Program at Colorado State University.

We appreciate your assistance and patience during these activities, and we remain committed to partnering with you on this restoration. Here's what you can expect to see during this spring and summer:

Irrigation startup—The contractor has been monitoring the soil temperature in the former construction area to assess the best time to begin using the irrigation system installed in the permanent easement. It is important to water when the soil is at an optimal temperature for seed germination and the threat of frost has passed. ***Based on extended forecasts and recent inspections, we anticipate that as soon as next week we could begin watering in your area.***

Irrigation system setup—The former construction area is divided into zones for applying non-potable water (untreated water not suitable for drinking). Because the area we are watering is long and narrow, generally one zone will be turned on at a time. Each zone will usually activate sequentially, so as one zone shuts off, the zone next to it turns on.

Irrigation schedule—The amount of water applied and length of time each irrigation zone operates will fluctuate based on specific conditions within each zone. Among the factors that affect the water schedule are terrain, soil type, periods of dry or wet weather, and root growth for the seedlings. Here is a general progression of what you can expect to see.

- Initially, our revegetation team will turn the water on to fill the sprinkler system and adjust any sprinkler heads.
- Once the system is ready, watering will begin and is anticipated to progress through multiple cycles in each zone.
- Generally, initial irrigation is anticipated to occur daily. Irrigation will likely occur on a 24 hour schedule to balance the water needs of seedling development with conservation objectives. The amount, duration, and frequency of watering is expected to vary and decrease over time, optimizing conditions to germinate seed by helping water penetrate deep into the soil and provide the right amount of water for seedling growth.

Dos and don'ts while our work is under way—During the revegetation phase, please be aware that keeping traffic off the newly seeded area will help maximize its successful growth. This is especially true during these initial watering cycles when the delicate seedlings are just beginning to germinate. There is no need to mow or apply herbicides as Western States Reclamation will be maintaining the area. Please let us know if you are aware of malfunctioning sprinkler heads or other concerns by calling the information hotline.

Noxious weeds—Weeds that are generally not native to the area, such as certain types of thistles, will be mitigated. A backpack sprayer will typically be used for application of any herbicide that might be used to control these noxious weeds.

Again, thank you for your support for successful revegetation. Other than periodic irrigation, this restoration should be relatively unnoticeable.

We remain committed to continuing our efforts overseeing the restoration area to encourage successful revegetation. During this process, we want to coordinate in a way that is respectful of your property and privacy. We look forward to partnering with you to keep you informed and respond to your needs.

If you have any questions about our activities, please call the **SDS information hotline at 855-SDS-4YOU (855-737-4968)**.

Regards,
The SDS Construction Team



CONSTRUCTION NEWS

GOOD QUESTION!

We recently received this question from a caller, "When did SDS start pumping water from Pueblo Reservoir and is that why water levels are lower?" It's important to note that SDS will not start operating until 2016. The level of water at Pueblo Reservoir is related to current drought conditions, not SDS. Even when SDS is operating at full capacity in 2046, lake levels are only projected to be on average 3½ feet lower over the course of an entire year.

EYES ON REVEGETATION

The SDS team appreciates the interest that residents are showing in the revegetation activities. We periodically receive calls on the SDS Hotline (855-737-4968) when workers are present in the area. While you can expect to periodically see members of the SDS revegetation team during the upcoming months, you may also notice other agencies performing their activities in nearby utilities easements. Black Hills Energy, Fountain Valley Authority and other utility or service providers are still active in the area. If you have a question about activities you observe, please call our construction facilitators, David Marciniak or Margaret Radford. SDS is working with the other agencies to minimize disturbances to the ongoing restoration efforts.



PUEBLO COUNTY CONSTRUCTION PROGRESSING

Construction of the Southern Delivery System (SDS) in Pueblo County continues. Current activities include ongoing revegetation, construction of a section of pipeline within Lake Pueblo State Park, and the Juniper Pump Station near the dam.

Here is an update on completed and upcoming SDS construction activities within Pueblo County:

- More than 40 total miles of pipeline, including about 18 miles of pipeline within Pueblo County, have been installed.
- A connection to the North Outlet Works of Pueblo Dam was completed in late 2012 for the Bureau of Reclamation to operate.
- Work on the Juniper Pump Station within Lake Pueblo State Park is scheduled to begin this summer.
- Work on the section of pipe connecting the North Outlet Works to the new pump station is scheduled to begin this fall. The pipe will make it possible for partner communities to receive water by 2016.
- The Pueblo West Metropolitan District connection to the SDS pipeline is scheduled to begin this summer.

The only remaining pipeline in Pueblo County is a one-third mile segment at Lake Pueblo State Park.

SDS JOB FAIRS PLANNED

Job fairs will be held in Pueblo and Colorado Springs to highlight employment opportunities on the SDS water treatment plant and raw water pump stations. The events will be held:

- **July 24, 4-6 p.m.,**
Leon Young Service Center,
1521 Hancock Expressway,
Colorado Springs
- **July 30, 4-6 p.m.,**
El Pueblo History Museum,
301 N. Union Ave, Pueblo

For information, visit the Jobs/Business Opportunities page at www.SDSwater.org.



SDS pipeline installed in Pueblo County.

NATIVE PLANTS RESTORATION CONTINUES

The SDS program and its contractor, Western States Reclamation, are continuing ongoing efforts to revegetate areas disturbed by pipeline construction in Pueblo County.

A native grass seed mix has been planted and will receive irrigation, ongoing monitoring, and maintenance to promote successful plant growth. The seed mix was selected by experts from Colorado State University due to its drought tolerance. During critical germination periods, the seed requires regular watering to encourage growth.

Here is what you can expect to see in these areas during this summer’s growing season:

- The area will be irrigated by a temporary above-ground water line with several zones. Each zone’s operation fluctuates based on the specific terrain, soil type, periods of dry or wet weather, and root growth for the seedlings.
- Irrigation may occur during the day or night hours.
- The amount, duration, and frequency of watering will vary to optimize conditions during seed germination and root development.
- Inspectors will routinely assess the revegetation area to monitor the areas for growth and to perform maintenance.

While native plants are restored, please help keep traffic off the newly seeded area to maximize its successful growth. This is especially important during initial watering cycles when the delicate seedlings are germinating and sprouting.

For more information or to report malfunctioning sprinkler heads, please contact the SDS information hotline, toll free, at (855) 737-4968.



Spreading mulch after seeds are planted to retain soil moisture.



New grass sprouting in areas disturbed by construction.

FACTS ABOUT REVEGETATION

- A mix of native, drought-tolerant short grasses, including Blue Gramas and Wheatgrass, recommended by independent experts was planted.
- SDS and its contractor are responsible for preventing the growth and spread of specific noxious weeds for three years after revegetation begins.

ESTABLISHING NATIVE VEGETATION DURING DROUGHT

A drought is a challenging time to revegetate areas affected by construction. However, restoration experts indicate that through careful management it is possible to establish new plant growth.

To meet restoration commitments to residents and to Pueblo County, the SDS program has arranged for water supplies to irrigate the native grass seed mix planted. This water is from a non-potable, raw-water source (not for use inside a home, but suitable for irrigation purposes). The irrigation plan complies with local water use guidelines and will not affect drinking water supplies for Pueblo West and other communities.

SDS and its revegetation contractor are following best practices to conserve water during this critical germination and root development period. Some practices include:

- Placing weed-free mulch on the site to help the ground retain moisture.
- Adjusting sprinkler heads to make sure that water is being applied to where it’s needed most.
- Using a specially designed irrigation system with multiple zones to provide greater control of water, enabling more precise response to water needs.

After the seeds germinate and roots have begun to develop, less water can be applied to the native grass. Revegetation professionals are monitoring the progress and will carefully adjust the watering. Irrigation will be reduced as the plants are weaned from watering. Once established, the native seed mix is suited to withstand the local arid climate and will be naturally drought tolerant. The above ground irrigation lines will then be removed.

IMPROVED TRAIL OPENS

The Pueblo West Parks & Recreation Department has formally opened the crushed gravel trail that spans across Pueblo West Metropolitan District property, west of the recently completed SDS pipeline. The trail begins north of U.S. Highway 50 and continues north for about six miles along the utility corridor.

The multi-use trail provides a dedicated path for walkers, runners and bicyclists — now separate from a nearby utilities access road along the power lines. The enhancement also includes fencing on each side to keep visitors within the pathway and away from private properties and newly seeded areas adjacent to the trail.

To preserve this amenity for the enjoyment of all Pueblo West residents, as well as to respect neighbors in the area, please:

- Stay within the dedicated gravel pathway
- Stay off nearby areas where revegetation efforts are being conducted
- Walk dogs on a leash
- Clean up after pets
- Keep the area free of trash
- Use the trail only during daylight hours

For public safety, please keep unauthorized motor vehicles off of the trail and observe caution signs by watching for traffic at road crossings.

For information, call the Pueblo West Parks & Recreation Department at 719-547-7400.





Public Communications

2014 Revegetation-Phase Communications

PROJECT UPDATE

PUEBLO WEST CONTRACTOR HELPS BUILD FOUNDATION FOR SDS WATER STORAGE



Pueblo County, Colorado Businesses Help Build SDS

More than 100 businesses in Pueblo County are involved with construction of SDS. More than \$66 million has been spent with Pueblo County businesses, and approximately \$489 million has been spent with Colorado businesses.

One of the more visible components of construction at the SDS Water Treatment Plant is the 10-million-gallon raw water storage tank that sits at the highest point of the site.

The plant, located at Marksheffel Road north of Highway 94, is making steady progress, and work on the concrete dome tank has been highly visible this year. The tank has several components, and local contractors have literally laid the foundation for success. R.E. Monks of Colorado Springs, Araco Concrete of Fountain and Pate Construction of Pueblo West partnered on the project.

Pate Construction has been in business for 40 years and has developed a strong working relationship with several area contractors and utilities. The company spent several months at the plant performing grading, concrete, drain installation, and other work for the inlet and outlet of the tank.

“This project was good timing for us because the economy had crashed, and we were just starting to bounce back,” said Dave Pate, vice president of operations for Pate Construction. “SDS is such a large project. As a smaller contractor, I wasn’t sure what we would bid on. The tank work was just right. This has been a good project.”

REVEGETATION GROWING STRONG

Revegetation of areas disturbed during construction of the SDS pipeline is showing strong signs of successful growth across Pueblo County. SDS is now in the third year of revegetation.

Through a partnership with Colorado Natural Heritage Program (CNHP) at Colorado State University, well-recognized experts in establishing native vegetation have been working with SDS and its contractors to ensure the area is restored in an environmentally responsible, sustainable way.

The goal of SDS revegetation is to re-establish native vegetation in the areas disturbed by construction using a specially selected grass seed mix that is suited to Pueblo County’s arid conditions.

In August, CNHP conducted its latest round of plant surveys for SDS. This is part of the agency’s seasonal assessments that have been ongoing since revegetation began. The surveys indicate that the plants are thriving.



INFORMATION ABOUT THE GRASSES PLANTED

A diverse mix of drought-tolerant, native grasses was used to revegetate the SDS construction areas. The mixture contained both “cool season” and “warm season” grasses to encourage sustainable, year-round vegetative cover. Among the seeds were different varieties of ‘gramas’ identified in the area prior to construction. These grasses are easy to maintain and will fare well with naturally occurring precipitation. SDS slowly reduced irrigation this year to prepare plants for the drier conditions naturally encountered. Once established, these grasses require little or no supplemental irrigation.

ACTIVITIES WINDING DOWN



With the third year of the SDS revegetation program underway, those living around the revegetation areas will see activities reduced as the plants are well established.

Year three is more of a monitoring year, as the SDS team monitors and mitigates certain noxious weeds, and oversees the areas disturbed by SDS construction to ensure the native vegetation continues to thrive. Some of the activities may include:

- Little to no supplemental watering because the drought-tolerant grass seed mix is now established.
- Removal of temporary irrigation lines.
- Removal of any remaining temporary fence and posts.
- Continued monitoring and mitigation of certain noxious weeds as needed.
- Continued monitoring and site maintenance after storm events as needed.



FOUNTAIN CREEK IMPROVEMENTS PART OF SDS

Colorado Springs Utilities recently completed the Fountain Creek Improvement Project, restoring the creek banks to a more natural pattern, helping slow water flow through this stretch during storms and reducing erosion and sediment being carried downstream. The project is part of the Southern Delivery System (SDS) project near the city of Fountain.

Over the years, multiple factors have contributed to instability in the creek’s natural flow pattern, causing bank erosion and sedimentation – not only in this location but also throughout the watershed. By returning the creek to a more natural flow pattern, crews reshaped the way in which water entered a bend in the creek to help reduce the speed and the force of the water.

In addition to creek bank improvement, six new acres of wetlands were created to provide habitat for abundant area wildlife. A regional trail also is under construction adjacent to the project.

“This is just the beginning of good things that will come to Fountain Creek as a result of SDS,” said Merv Bennett, chair of the Colorado Springs Utilities Board.

SDS HOSTS PUEBLO BOYS AND GIRLS CLUB FOR CAREER DAY

The Southern Delivery System (SDS) team hosted about 30 young people (ages 9 to 13) from the Pueblo Boys and Girls Club in early November for an afternoon of educational, hands-on activities at the Juniper Pump Station construction site in Lake Pueblo State Park.

“It’s great that the SDS team took the time to introduce these kids to this line of work that is out there,” said Dave Pate of Pate Construction Co. Inc. of Pueblo West, who serves on the Pueblo Boys and Girls Club Board of Directors and accompanied the club on the field trip. “This really opened their eyes. A lot of these kids don’t know that there are these types of career opportunities right in their back yard.”

The visit provided a fun and interactive experience for the youth to learn more about careers in construction and engineering while also showing them how pipelines and pump stations deliver water. A variety of career professionals associated with the SDS project from Colorado Springs Utilities, Archer Western Construction, MWH, and Colorado Parks and Wildlife, led the groups of children as they sat inside construction equipment, constructed a model pipeline and water delivery system, learned about wildlife from a Park Ranger, practiced surveying and toured nearby construction work.



RUNOFF MANAGEMENT PROGRAM CONTINUES

Site restoration and maintenance are important components of the SDS program following construction. The team has an ongoing program to manage the restoration areas responsibly and to work with our contractors to minimize the risk of impacts from storm events.

Once established, the native grasses help slow erosion and better control runoff from storm events. This vegetation literally holds the soil in place. The SDS team will continue to routinely inspect the pipeline alignment to monitor and perform maintenance as needed. Additional stabilization measures may include small rock areas that slow flows, straw bundles and biodegradable erosion-control blankets on slopes.

After storms, the team inspects the restoration area to monitor temporary erosion control features to ensure they are working properly and make repairs as needed.

REVEGETATION FAST FACTS

- More than 336 acres of native seed were planted in Pueblo County.
- A native seed mix specially formulated for Pueblo County growing conditions.
- The native grasses that SDS replanted are drought-tolerant and require little to no watering once established.
- All seed used for revegetation meets the U.S. Department of Agriculture’s requirements as certified weed-free seed.
- Experts from CNHP conduct routine field surveys to track progress of revegetation in both Pueblo and El Paso counties.
- Plant progress assessments are regularly shared with agencies overseeing revegetation in Pueblo County.
- Several varieties of native wildflowers and yucca began thriving in revegetation areas within the first growing season.

SDS COMMUNITIES SERVED



For project updates and schedule information:
VISIT www.sdswater.org
E-MAIL sdsinfo@csu.org
CALL (855) SDS-4YOU or (855) 737-4968



MANAGING OVERGROWTH AND WEEDS

Although the SDS contractor planted a native grass mix in the restoration area, other naturally occurring plants also have grown. Some people consider these weeds, but not all weeds are bad. The SDS team manages certain noxious weeds and will continue to work with property owners to manage overgrowth during final restoration. The noxious weeds that are managed and mitigated include:

- Canada Thistle (*Cirsium arvense*)
- Field Bindweed (*Convolvulus arvensis*)
- Salt Cedar (various, including *Tamarix ramosissima*)
- Halogeton (*Halogeton glomeratus*)
- Russian Knapweed (*Centaurea repens*)
- Russian Olive Tree (*Elaeagnus angustifolia*)
- Scotch Thistle (*Onopordum acanthium*)

ABOUT TUMBLEWEEDS

The plant most commonly associated with the term tumbleweed is Russian Thistle, which was introduced as an exotic species during the 1800s and has been present in much of the western United States, including Pueblo County, ever since. While the seed mixes on the SDS alignment don’t contain Russian Thistle, naturally occurring seed was likely present in the topsoil we preserved and returned to the site. With irrigation and natural rainfall, Russian Thistle prospered, particularly in the 2013 growing season. But you may have noticed that the Russian Thistle didn’t do as well this year. When we “weaned” the grasses away from irrigation, the Russian Thistle didn’t get as much extra water to grow. The good thing about Russian Thistle is that they have acted as “nurse crops” for the young grasses, sheltering them from the hot sun and harsh wind. Now the grasses are well on their way to putting the Russian Thistle out of business.

Thank you for working with the Southern Delivery System (SDS) team during the revegetation process following SDS pipeline construction. The grasses planted are well established and should continue to thrive. To ensure success, we worked closely with the Colorado Natural Heritage Program (CNHP) at Colorado State University to select the right mix of drought-tolerant short prairie grasses for the soil and climate. We also tapped the expertise of Western States Reclamation, Inc. (WSRI), an industry leader in restoration of native plants of arid and semi-arid climates. These experts have guided the process to ensure the best possible outcome for establishing new plants.

All of the grasses planted are perennials, meaning that they regrow on their own annually from the same root stock and produce seeds. Our goal was to revegetate areas disturbed during construction in an environmentally responsible way that is sustainable for property owners. This care guide contains information on what was planted, how to care for the plants, and answers to questions property owners may have as you begin the process of maintaining the area.

SEEDS VS. RHIZOMES – WHY DOES IT MATTER?

The way plants reproduce matters because it may guide how you maintain the plants. With native grasses, it's best not to mow at all, if possible. But if your grass spreads primarily through production of seeds, definitely wait to mow until after the seed heads mature and leave clippings onsite. If your grasses spread primarily through underground stems with shoots and roots known as rhizomes, you also should avoid digging up the grass or disturbing the roots to maintain healthy plants.

NATIVE GRASSES PLANTED

Following are some of the native grasses planted as part of the SDS revegetation process:



SIDEOATS GRAMA

Flourishes in warm summer months and grows in bunches like many native grasses. This grass spreads through production of seeds and sending out underground stems with shoots and roots.



BLUE GRAMA

(Bouteloua gracilis)

Can grow in bunches or from sod and is considered one of the most drought-resistant grasses in North America. This grass spreads through production of seeds and sending out underground stems with shoots and roots.



SAND DROPSOED

(Sporobolus cryptandrus)

A warm season grass that grows in bunches and spreads through prolific production of seeds.



WESTERN WHEATGRASS

(Pascopyrum smithii)

Grass tends to grow in cooler months and spreads by production of seeds and by sending out underground stems with shoots and roots.

*Photo credits – Sideoats Grama, Blue Grama and Sand Dropseed: Granite Seed Company
Western Wheatgrass: Dr. Robin Buckallew, Central Community College, Lincoln, Neb.*



Native grasses and plants growing in Pueblo West as result of SDS revegetation efforts.

NEIGHBORHOOD'S LEAST WANTED WEEDS

(NOXIOUS WEEDS)

Seeds for unwanted plants exist naturally in the soil because they are spread by birds and animals and by the wind. Scientists classify some weeds as "noxious" because they may be non-native invaders of a plant community and damage or outcompete native or desirable species such as crops. The SDS team is committed to monitoring for and mitigating certain noxious weeds for the third growing season after construction. If you see noxious weeds described below or have questions, please contact us at the SDS Information Hotline, (855) 737-4968 for more information.



SALT CEDAR

(various, including *Tamarix ramosissima*)

- Was introduced as an ornamental and for erosion control but it has become the No. 1 threat to riparian ecosystem health in the southwestern United States.
- Secretes salt making the soil too salty for native plants.
- A single plant can use the same amount of water per day that a small family might use.



HALOGETON

(*Halogeton glomeratus*)

- Secretes mineral salts making it harder for other plants to grow.
- Ranges in height from 3 to 18 inches with stems branch at the base, spreading out at first then growing upward.
- Plants are green in the spring and early summer, then turn red or yellow by late summer.



FIELD BINDWEED

(*Convolvulus arvensis*)

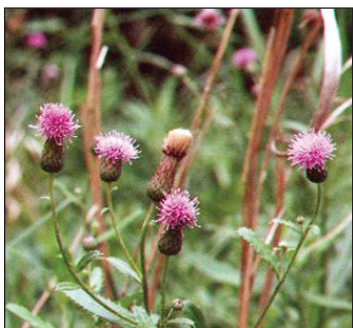
- One of the most serious weeds in agricultural fields.
- Intertwines and topples native species and competes with desirable species for sunlight, moisture and nutrients.
- Poses threats to restoration efforts by choking out native grasses.



RUSSIAN OLIVE TREE

(*Elaeagnus angustifolia*)

- Can out compete native vegetation for resources such as water.
- Produces a fruit that birds can eat but ecologists say native species are better for wildlife.



CANADA THISTLE

(*Cirsium arvense*)

- Considered a noxious weed throughout the United States – major agricultural pest.
- Crowds out and replaces native plants and reduces plant diversity.
- Difficult to control because its extensive root system allows it to continue growing even after attempt to control it.



SCOTCH THISTLE

(*Onopordum acanthium*)

- Ornamental plant that escaped to become a significant problem.
- Plant lives for two years and reproduces by seed only.
- Can outcompete native plants.
- Spines can irritate livestock and people.



RUSSIAN KNAPWEED

(*Centaurea repens*)

- A creeping perennial that reproduces from seed and vegetative root buds.
- Can crowd out desired species such as native grasses.
- Emerges in early spring, flowers through the summer into fall.
- Toxic to horses.

Photo credits

Salt Cedar, Field Bindweed, Canada Thistle, Scotch Thistle and Russian Knapweed: Steve Dewey, Utah State University

Halogeton: Bonnie Million, National Park Service

Russian Olive: Robert Vidéki, *Doronicum Kft.*



QUESTION: What was planted to revegetate the areas where SDS construction occurred?

A: A grass seed mix containing 8-10 native, drought-tolerant species was used to revegetate the area. The mixture contained grasses that thrive and reproduce in cool or warm temperatures to create a sustainable, year-round landscape. The grass seed mix likely represents greater diversity than was present prior to construction but is consistent with what university-based plant experts have found should be present in the area. These grasses were also selected for ease of maintenance and drought tolerance.

Q: Is SDS finished with revegetation on my property?

A: The commitment that the SDS team made to property owners was to establish grasses for two growing seasons in areas affected by construction and to monitor and mitigate certain noxious weeds during the third growing season. Fall 2014 is the end of the second year of plant growth and maintenance.

Q: Do I need to water?

A: The native species are expected to fare well with naturally occurring precipitation. If your community doesn't have watering restrictions in place, limited watering (1/2 to 1 inch/week) during the summer months will further growth/plant density.

Q: Can I fertilize the new grasses that were planted?

A: The native plants don't require any additional nutrients, and the addition of any commercial fertilizers typically encourages weed growth with little benefit to the desirable plants.

Q: Should I pull the weeds?

A: If you want to eliminate or reduce the occurrence of weeds, cutting or pulling the undesirable plants and

removing the cuttings will produce the best results. As a general rule, we do not encourage or recommend use of herbicides. If you see what you think might be noxious weeds (see related story) please call the SDS Information Hotline, (855) 737-4968 to report what you see.

Q: Should I mow the area?

A: The area on your property that was affected by SDS construction is yours to maintain as you wish. The native grasses now growing on your property are considered prairie short grasses, but they may grow taller than the height normally maintained for turf grass. One caution: These grasses, and all grasses, may not fare well if mowed below 4 inches tall, particularly in hot weather.

Q: Where can I go for more information?

- Colorado State University Extension, www.ext.colostate.edu/pubs/natres/03111.html
- Colorado Natural Heritage Program at Colorado State University, www.cnhp.colostate.edu
- For information on weeds, two informative sources are the Turkey Creek Conservation District, www.puebloweeds.org and the Center for Invasive Species and Ecosystem Health, www.invasive.org



Public Communications

2015 Revegetation-Phase Communications



Maintenance Work Begins in May

Dear neighbor:

We hope you are enjoying the spring weather. Please be aware that beginning in May, we will have crews in your area performing work related to revegetation that we want to coordinate with you. We have had difficulty reaching you by telephone, so we thought you might appreciate a note.

During this current growing season, our activities will be limited to final maintenance work, as well as monitoring for and mitigating certain noxious weeds as needed. The next step is to remove construction fencing and the temporary, above-ground irrigation system because the drought-tolerant grasses now planted on your property require no supplemental irrigation.

Thank you for working with us during revegetation. We have made great progress in your area. If you have any questions or would like to keep any fence or sprinklers, please call us at 855-SDS-4YOU (855-737-4968).

PS: Could you please call us and share a phone number or e-mail so we can coordinate with you in the future?

Thanks

The SDS Construction Team



For project updates and schedule information for work near your neighborhood:

VISIT
our Construction Progress page
www.sdswater.org

E-MAIL
sdsinfo@csu.org

CALL
our Construction Facilitators
at (855) SDS-4YOU



Public Communications

TAB 4 – Post-Revegetation Communications

Manji
1330 Highland Lake Dr
Lawrenceville, GA 30045

April 8, 2015

Dear Roshana Manji,

Spring is here, and we would like to provide you with an update about our revegetation progress and related upcoming activities.

The SDS team is grateful for your patience during installation of the SDS pipeline in 2011 and the ongoing revegetation efforts. As you know, our contractor installed a mix of drought-tolerant grasses in the former construction area on your property. After two growing seasons with irrigation, the grasses are now established. Experts at the Colorado Natural Heritage Program (part of Colorado State University) have made periodic visits to evaluate progress in the area and have provided positive reports on the revegetation progress.

During this current growing season, our activities will be limited to concluding final maintenance work, as well as monitoring for and mitigating certain noxious weeds as needed. The next step is to remove the temporary, above-ground irrigation system because the new grasses require no supplemental irrigation.

As we complete the restoration efforts, we also plan to remove any remaining temporary construction fencing in your area. If you wish to retain any of the fencing on your property, please notify us as soon as possible using the SDS Construction Hotline at 855-SDS-4YOU (855-737-4968) so that we may coordinate to meet your needs.

The removal of the irrigation system and fencing are expected to take place within the next few weeks. Please let us know if you have any concerns or questions about this process or the revegetation effort by **April 20th**.

Please note that the wire fencing alongside the Pueblo West walking trail west of your property belongs to the metropolitan district and is anticipated to remain in place.

Again, thank you for your patience and cooperation over the last few years, and let us know if you have any questions.

If you have any questions about our activities, please call the SDS information hotline at 855-SDS-4YOU (855-737-4968).

Regards,
The SDS Construction Team



7014 2870 0000 7718 5041

2 KFN LTD
1760 Oakmond Cir
New Braunfels, TX 78132

April 8, 2015

Dear Sir or Ms. 2 KFN LTD,

Spring is here, and we would like to provide you with an update about our revegetation progress and related upcoming activities.

The SDS team is grateful for your patience during installation of the SDS pipeline in 2011 and the ongoing revegetation efforts. As you know, our contractor installed a mix of drought-tolerant grasses in the former construction area on your property. After two growing seasons with irrigation, the grasses are now established. Experts at the Colorado Natural Heritage Program (part of Colorado State University) have made periodic visits to evaluate progress in the area and have provided positive reports on the revegetation progress.

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Please note that the wire fencing alongside the Pueblo West walking trail west of your property belongs to the metropolitan district and is anticipated to remain in place.

Again, thank you for your patience and cooperation over the last few years, and let us know if you have any questions.

If you have any questions about our activities, please call the SDS information hotline at 855-SDS-4YOU (855-737-4968).

Regards,
The SDS Construction Team

7014 2870 0000 7718 5041

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Property Owner Name
Address
City, State Zip

June 17, 2015

Dear (name),

Spring is here, and we would like to provide you with an update about our revegetation progress and related upcoming activities.

The SDS team is grateful for your patience during installation of the SDS pipeline in 2011 and the ongoing revegetation efforts. As you know, our contractor installed a mix of drought-tolerant grasses in the former construction area on your property. After two growing seasons with irrigation, the grasses are now established. Experts at the Colorado Natural Heritage Program (part of Colorado State University) have made periodic visits to evaluate progress in the area and have provided positive reports on the revegetation progress.

During this current growing season, our activities will be limited to concluding final maintenance work, as well as monitoring for and mitigating certain noxious weeds as needed. The next step is to remove the temporary, above-ground irrigation system because the new grasses require no supplemental irrigation.

As we complete the restoration efforts, we also plan to remove any remaining temporary construction fencing in your area. If you wish to retain any of the fencing on your property, please notify us as soon as possible using the SDS Construction Hotline at 855-SDS-4YOU (855-737-4968) so that we may coordinate to meet your needs.

The removal of the irrigation system and fencing are expected to take place within the next few weeks. Please let us know if you have any concerns or questions about this process or the revegetation effort by June 29.

Again, thank you for your patience and cooperation over the last few years, and let us know if you have any questions.

If you have any questions about our activities, please call the SDS information hotline at 855-SDS-4YOU (855-737-4968).

Regards,
The SDS Construction Team



2015 Land Owner Communication Follow-up Log

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	9520017078	2 KFN LTD		1760	OAKMOND CIR	NEW BRAUNFELS	TX	78132	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005016 and 505010006	ABAKA REPUBLIC MKTG INC		1447	E COLORADO ST, STE D	GLENDALE	CA	91205	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005016 and 505010006	ABAKA REPUBLIC MKTG INC		1447	E COLORADO ST, STE D	GLENDALE	CA	91205	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520017077	Adams	JOHN W AND SANDRA J	12101	PEARL ST	SOUTHGATE	MI	48195	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	508003011	Adkins	JAY D	1119	E PARAMOUNT DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005017	Agag	ANTONIO R AND ELEANOR A	1470	DILLINGHAM BLVD #107	HONOLULU	HI	96817-4819	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005008	Akeo	ADAM AND GINA	1070	E KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/28: Occupied property. Called property owner. Made arrangements for fence/sprinkler removal. Mr. Akeo offered comment about revegetation progress: "It looks real good out there."
S2	9532006019	Allenback	RHONDA LEE	2304	SOUTH DRIVE	PUEBLO	CO	81008	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004010	Anderson	ARLEN M	4037	ENSENADA ST	DENVER	CO	80249	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004006	Arnot	MICHAEL M AND CLARISSA ROSE	1163	N KIRKWOOD DR	PUEBLO WEST	CO	81007-1206	Letter sent certified mail 4/8.	4/24: Occupied property. Called Mrs. Arnot and made arrangement for fence/sprinkler removal. Her comment: "You guys did great on new grass. Thanks."
S2	9520017070	Bland	DAVID D	1587	S PITKIN CIR	AURORA	CO	80017	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006037	Bratcher	JOHN J AND LINDA E	595	N. Canvas Drive	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/15: Occupied property. Property owner called. Made arrangements for fence/sprinkler removal. Mr. Bratcher offered comment about revegetation progress. "You folks have done a wonderful job out there with revegetation and everything looks great!"
S2	9520017018	Bundeson	THELMA T WANDAHL		228TH SIGNAL COMPANY	APO	AE	9366	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9529001003	Burke	VIRGIL G JR AND PEGGY A	23387	COUNTY RD 2	CANON CITY	CO	81212	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006021	Burns	LEILANI ANN RODRIGUEZ	1126	NORWOOD AVE	COLORADO SPRINGS	CO	80905	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004003	Cardos	JUAN AND EMILIA		APARTADO 240 XATIVA 46800	VALENCIA	SPAIN		Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505005031	Casey	Donald	353	N. Escambia Drive	Pueblo West		81007	Letter sent certified mail 4/8. Returned as "unclaimed" May 12.	Occupied property. Irrigation already removed at Mr. Casey's request. Signed revegetation waiver 3/6 expressing satisfaction with revegetation and wants to bring in more horses. Also wants to lease Colorado Springs-owned parcel to the north for grazing/exercise of horses.
S2	9517005012	Chmiel	RONALD TR AND SUSAN OLIVIA TR	7816	Regency Park Street	Las Vegas	NV	89149-3772	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005003 and 9520005013	Chmiel Trust		501	West Colombine Avenue	Woodland Park	CO	80863	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004004 and 9520004007	Cimino/Espinoza	THELMA S/LISA K	3489	BRIGHT ANGEL	LONGMONT	CO	80504-9586	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505014011	Cole	WILLIAM WALLACE		PO BOX 7551	BRECKENRIDGE	CO	80424	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	508003018 and 508003019	Cole	EDWIN DAVID AND LUCILLE C	1128	E RANCH DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Occupied property. 4/24: left message. 4/27: Called and talked to Mrs. Cole and made arrangements for sprinkler/fence removal. No further response from property owner.
S2	9532006040	Dees	Thomas C	623	N Canvas Drive	Pueblo West	CO	81007		Property owner signed a revegetation waiver in 2011 to permit horse grazing.
S2	9532006043	Dilcher	MATTHEW B and MACIE	655	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	5/1: Called property owner. Made arrangements for sprinkler removal. Mrs. Dilcher noted that grass inside her chain link fence was eaten by the pet geese but outside the fence (permanent easement) the grass is growing well. She had no concerns and said thanks.
S2	9517004006	Frazier	EDWARD J		PO BOX 4707	PAHRUMP	NV	89041	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004028 and 9520017082	Funk	BEN AND TAYLOR WANDA	1325	North Farley Drive	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006036	Furney	JAY W	6033	STATE HWY 78	PUEBLO	CO	81005	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005004	Ganssle	GEORGE	519	BLAUVELT RD	PEARL RIVER	NY	10965-2847	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9529011004	Giannetto	SALVATORE	1073	N. Kirkwood Dr	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/28: Occupied property. Called property owner who expressed concerns about tumble weeds in the area and what maintenance SDS might have planned. Working with property owner to arrange further maintenance and remove sprinklers.
S2	9532017015	Gillen	FRANK J	1110	E JAROSO DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/24: Occupied property. Left message. 5/4: left doorhanger. No response to date.
S2	508013010	Good	JOSEPH L	566	E Tanager Dr	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004016	Gowda	USHA B	139	REGAL CT	MONROEVILLE	PA	15146-4735	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	508011031	Grace	MARCUS J	4521	West Ponds Circle	LITTLETON	CO	80123	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9529011019	Grunden	George	5341	Cole Circle	Arvada	CO	80002-1639	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005015	Hall	JACKIE N AND URSULA	1865	JUNTURA CT S	SALEM	OR	97302	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004027	Haney	BRANSON A	788	E ALAMEDA LN	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532018009	Harvey	KELLY	729	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/24: Called property owner and made arrangements for fence/sprinkler removal. Mr. Harvey offered comment about revegetation progress: "Looks like it did before you started. It's a prairie and everything looks great."
S2	9517005019	Helping Hands Home Services Inc.		988	S. Avenida Del Oro West	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006033	Hemberger	WILLIAM A	14673	SUMMER BLOSSOM LN	CHESTERFIELD	MO	63017-5670	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006024	Now Veterans Administration: (FKA Hernesy)	RICHARD P AND CAROLINE	73	MAXWELL FARM LANE	HENDESONVILLE	NC	28792	Letter sent certified mail 4/8.	4/21: Occupied property/tenant. Called property owner and made arrangements for fence/sprinkler removal. Mr. Hernesy offered comment about revegetation progress: "It's good to hear its going well, it's a miracle to get anything to grow out there."
S2	505015023	Hildreth	CHRISTOPHER A AND SARAH B	1102	E ORCHID DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/21: Occupied property. Left message 5/4: left doorhanger. No response to date.

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	9532006031	Hendricks (Was Hodges)	Travis and Clara Hendricks (FKA: MICHAEL P AND GENEVIEVE R)	539	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/24: Occupied property. Called Mr. Hodges, who said property has been sold (3 days on market). 5/5: Visited property and met new owner. Mrs. Hendricks expressed no concerns and expressed appreciation for revegetation and information.
S2	9532006018	Hudson	GERALD E		c/o Daniel Hudson, 2666 TITANIA RD	ENGLEWOOD	FL	34224	Letter sent certified mail 4/8.	4/21: Called property owner and made arrangements for fence/sprinkler removal. No issues or concerns expressed.
S2	508013001	Ing	Rany	5811	Count Fleet St.	LAS VEGAS	NV	89113	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9508001005	Jackson	GREGORY L AND TONYA R	1809	N BAT MASTERSON LN	PUEBLO WEST	CO	81007-1255	Letter sent certified mail 4/8.	4/24: Occupied property. Left message, also e-mailed. 5/4: left doorhanger. No response to date.
S2	9532006042	Jackson	E NEAL/TWILA A	643	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/24: Occupied property. No working phone number. 5/4: Left doorhanger. No response to date.
S2	9508003008	Johnson	CASEY	4173	S OURAY WAY	AURORA	CO	80013	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505014004	Kay	LAVETTA	1104	E RANCH DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	3/13:Occupied property. Emailed Ms. Kay about upcoming planned activities in the easement on her property. 3/20: Met with Ms. Kay to view revegetation progress. She requested removal of sprinklers and light maintenance and discussed giving compensation in lieu of replanting some specialty plants that didn't take in the fall. 4/3: performed activities on property. Removed sprinkler system, marked property corners and light cleanup. Provided check to compensate for plants on 4/17.
S2	9520004011	Keen	CHARLES J	1266	S THOREAU PL	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; Letter mailed 4/8. No word from property owner.
S2	9532006035	Kenney	NOAH	579	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/21: Called property owner and made arrangements for fence/sprinkler removal. Mr. Kenney offered comment about revegetation progress: "Everything is looking good out there, I'm really satisfied."
S2	9508001006	Koehler	Francine	239	DINISON Cres	KITCHENER	ON, Canada	N2E 2S6	Letter sent certified mail 4/8.	Vacant property; Letter mailed 4/8. No word from property owner.
S2	9508001008	Koehler	KENNETH MARK	2036	REIDSVILLE RD RR 1	AYR	ON, Canada	N0B 1E0	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532017008	Krelovich	VICTOR A AND PAT		PO BOX 1513	RIFLE	CO	81650	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006032	Krupp	HERBERT W JR AND DEBRA L	620	HAGERER ST	RACINE	WI	53402	Letter sent certified mail 4/8.	4/13: Occupied property. Mr. Krupp called and asked for photos of fencing -- he lives out of state. Sent photos. All that remains is T-posts and property owner was told we would remove.
S2	9517005011	Leboeuf	Rick	608	Debra Lane	Stewartsville	NJ	08886	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9508001007	LEGACY HOMES OF PUEBLO INC			PO BOX 7327	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505015024	Lehman	CHARLES R AND DIANNE C	27	GREENDALE CRES	KITCHENER	ON	N2A2RS	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9508003007	Luttrell	BOBBY KEITH JR/DAUGHERTY MELINDA	1703	N BEAR BULCH LN	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/28: Occupied property. Left message. 5/4: Left doorhanger. No response to date.
S2	9532006041	Manji	ROSHANA H	1330	HIGHLAND LAKE DR	LAWRENCEVILLE	GA	30045	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	9520017083	Martinez	RUEBEN JR	9855	E 112TH WAY	HENDERSON	CO	80640	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004010	Maxwell	DWAIN B AND HELEN E	1123	N KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/29: Occupied property. Called Mr. Maxwell to discuss plans for sprinkler removal, and requested early removal of the sprinklers on the lot south of his property so he could mow. 4/30: Removed sprinklers south of his property and contacted Mr. Maxwell to give update on him on activity and coordinate details for removal of system inside his fenced area. 5/7: Mr. Maxwell called asking for an update on removal and asking questions about his buried sprinkler pipe if he leaves it in place. Working with property owner to decommission the system in a way that meets his needs on the property. He commented that with the rain, the grass planted looks good and he is happy with his revegetation. 8/19: Removed buried temporary sprinkler line from fenced property and adjacent buried sprinkler line. Owner directed CSU to remove line. Reseeded area. Owner was satisfied with the activities.
S2	9532006023	McGranahan	WILLIAM RICHARD	3111	Diamond Knot Cir	Tampa	FL	33607	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005006	Molina	ROSALIE B	7602	EAST COLUMBIA PLACE	DENVER	CO	80231	Letter sent certified mail 4/8.	Vacant property; Letter mailed 4/8. No word from property owner.
S2	9520005007	Molina	FILLAS C/O JANNELLE MOLINA (Daughter of Rosalie)	7602	EAST COLUMBIA PLACE	DENVER	CO	80231	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006034	Mosher	ANGELA S CALLOW	320	W 50TH ST	LOVELAND	CO	80538	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004008	Napier-Zautcke	CAROL		PO BOX 206	CASCADE	CO	80809-0206	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	508010002	Nguyen	NGUNG	3528	DELANO COURT	PUEBLO	CO	81005	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9529011006	Nichols	CHASE	6578	S. Ackire St. Apt. 1638	LITTLETON	CO	80127	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517005009	Padilla	RUBEN E PADILLA AND CYNTHIA A HUNGERFORD-PADILLA	16473	DAWNLIGHT DR	FENTON	MI	48430	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532018002	Pagan-Garcia. FKA Cameron, mailed as Cameron	Melissa Nicole	695	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9508001004	Clem (formerly PANNUNZIO INC)	Matthew and Kindle	1797	Bat Masterson	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	5/4: Occupied property. Left doorhanger. New owner and new house. Mr. Clem called 5/13 and expressed satisfaction with revegetation.
S2	9520004002	Prado	ESTRELLA	14360	AZTEC ST	SYLMAR	CA	91342-5104	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532017005	Quintana	THOMAS L/BEATRIZ M	6123	High Noon Ave.	COLORADO SPRINGS	CO	80923	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004009	Rafael	ALEXY C	20426	S VERMONT AVE UNIT 74	TORRANCE	CA	90502	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9517004035	Real Corp LLC		1168	S MONTCLAIR DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520017069	Reiter	DAVID PAUL AND DIANE MARIE	10200	CASEY LN	PARKER	CO	80138	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9508001003 and 9508901002	Repollo	GEORGE E	66-834	WANINI ST	WAIALUA	HI	96791	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505015010	Romero	ELIJAH	1043	E MARENGO DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	9508001001	Roy	Lisa R.	4100	ALBION ST UNIT 771	DENVER	CO	80216-4439	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004012	Salman	MO AND CAROLE	1143	LAWRENCE DR	FT COLLINS	CO	80521	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	505015025	Schaden	EVELYN T AND PAUL H	254	CALLE DE LA PALOMA	FALLBROOK	CA	92028	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006020	Schroeder	KURT AND ROBIN	587	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/21: Occupied property. Left message 5/4: Left doorhanger. No response to date.
S2	9517004011	Smith	Robert and Heather	1067	Bronco Lane	Pueblo West	CO	81007	Letter sent certified mail 4/8.	4/23: Occupied property. Called property owner and arranged for fence/sprinkler removal. No concerns expressed.
S2	9529011005	Smith	MARY ANN MICHELLE	5930	Sutter Ave Apt. 106	Carmichael	CA	95608	Letter sent certified mail 4/8.	4/27: Occupied property. Called property owner (out of state but has tenant) and made arrangements for fence/sprinkler removal.
S2	508011003 and 508011004	SMUCZEROWICZ	ROGER J	18044	S HIGHLAND AVE	TINLEY PARK	IL	60477-4271	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532018011	Snyder	Heather	703	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/24: Called property owner and made arrangements for fence/sprinkler removal. Mrs. Snyder expressed satisfaction with amount of vegetation that has grown.
S2	9532006030	Spencer	WILLIAM KAGUA/MARY KAEKAE WOOLSEY	1586	KAMOHOALII ST	HONOLULU	HI	96819	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9529011002	Staack	DENNIS E AND BONNIE S	1714	OVERTON DR	CASTLE ROCK	CO	80109	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520004005	Stewart	SEAN M AND MICHELLE A	1191	N KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/29: Occupied property. Left message. 5/4: left doorhanger. No response to date.
S2	508011001	Swick	BECKY A	3832	DEVONSHIRE LN	PUEBLO	CO	81005	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532018007	Tano	DARREL G	46-039	HEEIA ST	KANEOHE	HI	96744	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9532006038 and 9532006039	Thornton	CHARLES ANTHONY/PATRICIA JANNELL	607	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/30: Occupied property. Property owner called and made arrangements for sprinkler/fence removal. Mr. Thornton commented that revegetation "Looks very nice, we walk the trail a lot and the grasses have filled in very well."
S2	9532018003	Tillman	MATTHEW	717	N CANVAS DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	5/1: Occupied property. Called property owner and made arrangements for sprinkler/fence removal. Mr. Tillman's comment: "Grass is coming along really well out there. We really appreciate it."
S2	9529011001	Underhill	SMITH ADAM D/CANDY S	1097	N KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8. Returned as "unclaimed" May 12.	Property owners are professional landscaper and signed modified revegetation waiver in 2012. Mr. Underhill commented, "You've done a pretty good job of establishing grass."
S2	508006029	Velasquez	ELOVEIDA B	1115	E IVANHOE DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/20: Occupied property. Property owner called to inquire about the revegetation. Working with property owner to perform maintenance on an area and thin the vegetation in an area where her grandkids and daycare visitors play. Also planning to help her find her property corners to help her prepare for installation of a fence. 8/19: • Performed maintenance on the property as a follow up from earlier request. Owner was happy with the results.

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S2	9520004009	Walsh	HERBERT S	1131	N KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/28: Called property owner to let him know we are planning activities nearby and see if he had any questions. He declined to participate in further revegetation on his property in a 9/12/13 email, indicating he would take care of further responsibilities on his property. 8/19: At the owners consent, applied remaining seed and topsoil from Maxwell property reseeding to temporary sprinkler removal area from the prior year on the Walsh property. Owner was thankful for the extra seed.
S2	9529011003	Williams	PAUL L AND PAMELA L	1081	N KIRKWOOD DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/15: Called Mrs. Williams to make arrangements for fence/sprinkler removal. She expressed satisfaction with revegetation and will accept payment for replacement shrubs that did not come back well after winter.
S2	9529010017	Wilson	STEVEN A	1090	E LINDA AVE	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	4/23: Call did not go through 5/4: left doorhanger. No response from property owner to date.
S2	505011015	Zaggy	CAROLYN S	10770	ROEDEL RD	FRANKENMUTH	MI	48734-9130	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	9520005014	Zoph	BETTY R	2107	GABRIEL AVE	ZION	IL	60099-2220	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S2	508015001	Bell	Curtis and Betty (Tenant is Ross Osvold)		PO Box 801	Oakley	CA	94561	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S1										
S1	517003007	Cape	Kenneth B. & Robbyne L.	2008	Wyoming Ave.	Pueblo	CO	81004	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S1	517003006	Gandara	Cynthia	407	S Birchwood Dr.	Pueblo West	CO	81007	Letter sent certified mail 4/8.	4/11: Occupied property. Property owner called, made arrangements for sprinkler/fence. Ms. Gandara commented, "It's progressed well, for awhile there it got pretty tall."
S1	517003001	Garcia	Ann	277	South Birchwood Drive	Pueblo West	CO	81007	Letter sent certified mail 4/8. Returned as "unclaimed" May 12.	4/21: Occupied property. Left message. 5/4: Left doorhanger. No response from property owner/resident to date.
S1	508013005	Good	JOSEPH L	566	TANAGER DR	PUEBLO WEST	CO	81007	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S1	517003005	Guimont	Sherman T. & Ramona J.	2864	S Winona Ct.	Denver	CO	80236	Letter sent certified mail 4/8.	Vacant property; No response from property owner to date.
S1	517000001 and 517000004	Holman	William and Vivienne, Andrew P. and Vera P.	13	Full Moon Ct.	Pueblo	CO	81001	Letter sent certified mail 4/8.	5/1: Vacant property. Called property owner and arranged for fence/sprinkler removal. He expressed satisfaction with SDS process and with revegetation progress.
S1	517003004	Nolen	Timothy R. & Joanne	355	S Birchwood Dr.	Pueblo West	CO		Letter sent certified mail 4/8.	4/24: Occupied property. Called property owner and arranged for fence/sprinkler. Mr. Nolen commented, "There's a lot more grass growing out there than there was when you all came with the pipeline. It looks just great!"
S1	517000005	Robert M. Korb Trust		3923	Augustana Ln.	Pueblo	CO	81001	Letter sent certified mail 4/8.	4.24: Reached attorney for property owner, who said land has been deeded to city of Pueblo. Nothing in Assessor's Record yet. Attorney had no concerns about property.
S1	517003003	Robinson	Jason	329	S Birchwood Dr.	Pueblo West	CO	81007	Letter sent certified mail 4/8. Returned as "unclaimed" May 12.	4/21: Called property and arranged for sprinkler/fence removal. Mr. Robinson commented, "Everything looks fine out there."

Work Package	Parcel No.	Last name	First name	Address	Street	City	State	Zip	Letter sent	Comment log
S1	517003002	Weber	Mary Anne	341789 Conc. 2	Bentinck NDR RR #2	Hanover	Ontario, Canada	N4N 3B9	Letter sent certified mail 4/8.	Vacant property; Letter mailed 4/8. No word from property owner.
S3	8500001002	Surniak	Cynthia	27252	Barbarosa St.	Bonita Springs, FLA		34135-4346	Letter sent 6/18	Vacant property. Letter mailed 6/18/2015. No response from property owner.
S3	8500001020	DeChabert	Saturnina & Pierre	6501	Young Hollow Road	Fountain	CO	80817	Letter sent 6/18	Week of Aug. 1: Called property owner to verify OK to remove irrigation but leave fence. "We are happy with the grass but it is more than we ever had so could we get it mowed one more time?" Pierre DeChabert
S3	8500003013	Essig	Jason and Erica	5450	Pronghorn Road	Fountain	CO	80817	Letter sent 6/19	Property possibly abandoned. Letter and e-mails went unanswered.
S3	8500005011	Idolor	Gaspar P. & Lorna V.	400	Blossom Field Road	Fountain	CO	80817	Letter sent 6/20	Vacant property. Letter mailed 6/18/2015. No response from property owner.
S3	8500005012	Keshmiri	Hamid	400	Sante Fe Drive	Pueblo	CO	81006	Letter sent 6/21	Vacant property. Letter mailed 6/18/2015. No response from property owner.
S3	8500005019	Acosta	Miguel Galaviz	3360	Springite Dr.	Colorado Springs	CO		Letter sent 6/22	Property owner waived in 2014 to encourage his horses to graze in area. Called property week of Aug. 1 to check in. "My horses love the grass and we appreciate it." Miguel Galaviz Acosta
S3	8500005027	Stevens	Thomas Stevens	5541	Pronghorn Road	Fountain	CO		Letter sent 6/23	Called property owner week of Aug. 1 to verify if OK to remove irrigation but leave fence. Property owner had requested permission to graze animals in late 2014; no waiver sought. "You all did a good job with the grass. Thank you." Thomas Stevens.
S3	8500006010	Manzanares and Madrid	Andy P. & Clyde G	132	Larch Dr.	Colorado Springs	CO	80911	Letter sent 6/24	Vacant property. Letter mailed 6/18/2015. No response from property owner.