



April 13, 2015

Mr. Alex Fischer, P.G.
Environmental Supervisor – Western Colorado
1120 Lincoln Street, Suite 801
Denver, Colorado 80203

**RE: Comments following review of Form 28 Centralized E&P Waste Management Facility Permit
Facility ID #436570, Pond 13 East and West
Pit Facility ID #414403 and 414404, Location ID 335849**

Dear Mr. Fischer,

OXY USA WTP LP (Oxy) has received and reviewed your comments regarding the above-referenced permit application. Oxy is providing responses to the comments provided by the COGCC in the letter dated November 26, 2014:

6) Form 28, question 6.

COGCC Comment – The Site Plan does not show existing grading in the existing pits or around the site. Please Clarify.

OXY Response – Including as an Attachment, please find the Updated Site Plan to include the existing grading in the existing pits and around the site.

10) Form 28, Question 10.

COGCC Comment – A sundry Form 4 shall be provided detailing a Rule 502 variance request to Rule 908.b.(5).D. The variance request shall detail the specifics of why this Rule cannot be met in addition to documentation of approval from the local fire authority indicating adequate access is provided to the Centralized E&P Waste Facility without installing the required fire lane.

Oxy Response – Oxy submitted a Sundry Form 4 detailing a Rule 502 variance request to Rule 908.b.(5).D, reference documents #400792328. Oxy has also included this sundry notice and supporting documentation as an Attachment to this submittal document.

11) Form 28, Question 11.

COGCC Comment – see response to item 10 above.

Oxy Response – Included as an Attachment, please find the submitted Sundry notice detailing the COGCC Rule 502 variance request to COGCC Rule 908.b.(5).D. along with a letter from Chief Marx with the DeBeque Fire Protection District outlining adequate access around Pond 13E/W as constructed.

12) Form 28, Question 12.

COGCC Comment – No design details were provided in this submittal. Please clarify.

Oxy Response - Including as an Attachment, please find the Drainage Report for the site and adjacent property prepared by D.R. Griffin and Associates. The Drainage Report includes surface water diversion structure design details to accommodate a 100-year, 24-hour storm event.

14) Form 28, Question 14.

COGCC Comment – This Facility is constructed and operational, please submit Civil Construction Documents, of the entire site, showing “As-Constructed” (plan view and cross-sections, of the pits), signed and stamped by a Colorado Licensed Professional Engineer (P.E.).

As-constructed details of the pit including liner(s), Geo-Net Conduction liner, leak detection and sump, and geo-synthetic clay liner shall be provided for review. These shall be signed and stamped by a Colorado P.E.

Oxy Response – Oxy has submitted and received COGCC approval for two Form 27 Site Investigation and Remediation Workplans for the Pond 13 East and Pond 13 West Facilities, reference Remediation numbers 8926 and 8927. These two facilities will be closed under the provided Form 27’s and will be reconstructed with the plans provided in the submitted Form 28 and updated information as included as Attachments to this document. Including in Attachment 1 is the Updated Site Plan to include the existing grading of the existing pits and around the site. Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

15) Form 28, Question 15.

COGCC Comment – The Operating Plan references a Figure 3 as being the proposed water sampling locations, yet Figure 3, in the Figures tab is the Sensitive Wildlife Habitat Map, please clarify.

Oxy Response – This was an error, the Proposed Water Sampling Locations Map should have been included in the Figures tab as Figure #9. Oxy has included the Proposed Water Sampling Locations Map as an Attachment to this submittal document.

16) For 28, Question 16.

COGCC Comment – Please clarify and provide ground water monitoring results and the location(s) of where the ground water monitoring occurred.

Oxy Response – As part of the Form 28 submittal, Oxy provided the Figure #9 Proposed Groundwater Monitoring Well locations for review. These three monitoring locations were based on topography and historic knowledge of available water in the area. After discussion and review of the monitoring well locations, Oxy would like to change these three proposed groundwater monitoring locations to surface water monitoring locations. Down-gradient surface water samples will provide the following:

- Installation of groundwater wells within the immediate vicinity of the creeks will not characterize potential impacts any different than down-gradient surface water monitoring will achieve;
- Down-gradient surface water is available in the immediate area of the proposed locations provided by seeps and springs; and
- Installation of groundwater wells could provide connectivity to groundwater for potential impacts during well installation.

Oxy proposes to monitor the surface water locations quarterly throughout the life of the Facility and all samples will be analyzed for: total petroleum hydrocarbons (diesel and gas range organics), benzene, toluene, ethyl-benzene, xylenes, pH, specific conductance, total alkalinity, total dissolved solids, bromide, chloride, fluoride, nitrate, nitrite, sulfate, calcium, iron, magnesium, manganese, potassium, selenium, and sodium.

17) Form 28, Question 16.

COGCC Comment – A Financial Assurance Cost Estimate of \$443,000.00 was provided with the submittal. Prior to approval, financial assurance shall be provided. Oxy can provide the estimated \$443,000.00 financial assurance, however, the COGCC is having a third party review the closure of the facility and prepare an independent closure cost estimate. Based on the third party review, the financial assurance may be less than the estimated \$443,000.00 or more than the estimated \$443,000.00.

Oxy Response – Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process.

18) Form 28, Question 18.

COGCC Comment – The COGCC is having a third party review the closure of the facility and prepare an independent closure cost estimate. Based on the third party review, the financial assurance may be less than the estimated \$443,000.00 or more than the estimated \$443,000.00.

Oxy Response – Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process.

19) Form 28, Question 19.

COGCC Comment – Could not find documentation, please submit a copy of the recorded Garfield County Limited Impact Review.

Oxy Response – Oxy is currently in the process of completing the Garfield County Resolution Conditions. Once the Resolution COAs have been completed, Oxy will provide a copy of the Land Use Change Permit (LUCP) for COGCC record under a separate cover. Copies of the Garfield County LUCP Resolution and Garfield County Extension Request Resolution are included in Attachment 1.

20) Form 28, Question 20.

COGCC Comment – Could not find documentation, please submit a copy of the recorded Garfield County Limited Impact Review.

Oxy Response – Oxy is currently in the process of completing the Garfield County Resolution Conditions. Once the Resolution COAs have been completed, Oxy will provide a copy of the Land Use Change Permit (LUCP) for COGCC record under a separate cover. Copies of the Garfield County LUCP Resolution and Garfield County Extension Request Resolution are included in Attachment 1.

Pond 13 East and West

1) 908.a: Applicability

COGCC Comment – Please provide the historic timeline of use of the Pit Facility including: construction date, etc.

Oxy Response – Oxy has submitted and received COGCC approval for two Form 27 Site Investigation and Remediation Workplans for the Pond 13 East and Pond 13 West Facilities, reference Remediation numbers 8926 and 8927. These two facilities will be closed under the provided Form 27's and will be reconstructed with the plans provided in the submitted Form 28 and updated information within Attachment 1 of this letter. Included as an Attachment, please find the Updated Site Plan to include the existing grading of the existing pits and around the site. Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

Once construction of the new Facility is complete, Oxy will provide as-constructed figures signed by a Colorado P.E. to detail the as-built construction of the Facility.

3) 908.b.(4) Figures, Maps, Precipitation and Evaporation Rates:

COGCC Comment – It is stated that “At the time of construction, Ponds 13 East and 13 West complied with all conditions of approval associated with wildlife best management practices required by the Director of the COGCC.” Does the Facility currently comply with all conditions of approval associated with wildlife best management practices required by the Director of the COGCC?

Oxy Response – Oxy currently complies with all wildlife best management practices as required by the Director of the COGCC.

4) 908.b.(5).A: Site Plan:

COGCC Comment – The Site Plan included with the submittal is showing existing contours at 10' intervals, with no grading contours shown across the site. A typical Site Plan should show grading contours across the site at no greater than 2' intervals, 1' would be preferred.

Oxy Response – Including in Attachment 1 is the Updated Site Plan to include 1' grading contours throughout the site.

5) 908.b.(5).B: Scaled Drawings:

COGCC Comment – Since this is an existing Site, please submit Civil Construction Documents, of the entire site, showing “As-constructed” (plan view and cross-sections, of the pits) signed and stamped by a Colorado Licensed P.E..

Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

Oxy Response – Oxy is in the process of preparing construction details of the reconstruction of the Facility to be stamped and signed by a Colorado licensed P.E.. Proposed netting details will be included in the construction details. Once these details are available, Oxy will provide them to the COGCC under separate cover.

6) 908.b.(5)C.: Access Control Measures:

COGCC Comment – Please provide a map depicting the location of the locked gate in relation to the pit complex.

Oxy Response – Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

7) 908.b.(5).D: Fire Access:

COGCC Comment – Rule 908.b.(5).D. Centralized facilities shall have a fire lane of at least ten (10) feet in width around the active treatment areas and within the perimeter fence. In addition, a buffer zone of at least ten (10) feet shall be maintained within the perimeter fire lane.

A Sundry Form 4 shall be provided detailing a Rule 502 variance request to Rule 908.b.(5).D. The variance request shall detail the specifics of why this Rule cannot be met in addition to documentation of approval from the local fire authority indicating adequate access is provided to the Centralized E&P Facility without installing the required fire lane.

Oxy Response – Oxy submitted a Sundry Form 4 detailing a Rule 502 variance request to Rule 908.b.(5).D, reference documents #400792328. Oxy has also included this sundry notice and supporting documentation as an Attachment to this submittal document.

8) 908.b.(5).E: Surface Water Diversion Structures:

COGCC Comment – The submittal indicates that OXY in the process of gathering survey data to prepare a Drainage Report as required by Garfield County Limited Impact Review process. Please provide this document for inclusion to the Form 28 Permit Application.

Oxy Response – Including as Attachments, please find the Updated Site Plan and Drainage Report for the Facility.

10) 908.b.(7): Facility Design and Engineering:

COGCC Comment – Provide specific pipeline integrity testing procedure, in accordance with COGCC 1100 Series Rules. Include frequency for the contributing well pads. Include a site vicinity map depicting the pipeline locations and routes.

This Facility is constructed and is stated to be upgraded. Please submit planned Civil Construction Documents, including all proposed pit construction details showing plan view and cross-sections, signed and stamped by a Colorado Licensed P.E..

Oxy Response – Please find included as an Attachment, Oxy’s pipeline integrity testing procedures and pipeline locations and routes maps.

Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

12) 908.b.(7).B.: Hydrologic Data:

COGCC Comment – The Geo-Hydrologic Report (OA Project No. 013-0655) stated that “shallow groundwater is not expected to occur in close proximity to the site...”. Please provide ground water monitoring results and the location(s) of where the ground water monitoring occurred.

Oxy Response – As part of the Form 28 submittal, Oxy provided the Figure #9 Proposed Groundwater Monitoring Well locations for review. These three monitoring locations were based on topography and historic knowledge of available water in the area. After discussion and review of the monitoring well locations, Oxy would like to change these three proposed groundwater monitoring locations to surface water monitoring locations. Down-gradient surface water samples will provide the following:

- Installation of groundwater wells within the immediate vicinity of the creeks will not characterize potential impacts any different than surface water monitoring will achieve;
- Surface water is available in the immediate area of the proposed locations provided by seeps and springs; and
- Installation of groundwater wells could provide connectivity to groundwater for potential impacts during well installation.

Oxy proposes to monitor the surface water locations quarterly throughout the life of the Facility and all samples will be analyzed for: total petroleum hydrocarbons (diesel and gas range organics), benzene, toluene, ethyl-benzene, xylenes, pH, specific conductance, total alkalinity, total dissolved solids, bromide, chloride, fluoride, nitrate, nitrite, sulfate, calcium, iron, magnesium, manganese, potassium, selenium, and sodium.

13) 908.b.(7).C: Engineering Data:

COGCC Comment – The original pit permits for Facility IDs 414403 and 414404 were constructed with a single 60 mil liner and geo-composite base layer. Please refer to the previous comments regarding as-constructed details and documents.

Oxy Response – Oxy has submitted and received approval of two Form 27 Site Investigation and Remediation Workplans for the Pond 13 East and Pond 13 West Facilities, reference Remediation numbers 8926 and 8927. These two facilities will be closed under the provided Form 27's and will be reconstructed with the plans provided in the submitted Form 28 and updated information included as attachments to this document. Including as an Attachment, please find the Updated Site Plan to include the existing grading in the existing pits and around the site. Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

14) 908.b.(8): Operating Plan:

COGCC Comment – Submit a copy of Oxy's Flowline Testing procedures for the pipelines associated with this Facility. Submit a map of Oxy's existing and proposed pipelines associated with this facility and update in the annual report.

Provide details of how Oxy remotely monitors the fluid level of the pits.

Oxy Response – Please find included as an Attachment, Oxy's pipeline integrity testing procedures and pipeline locations and routes maps.

Oxy remotely monitors fluid levels using a pressure transducer. These levels are transmitted through a fluid level monitoring and reporting system called Iconics which generates a report saved to Oxy's Grand Junction server. Fluid level reports are then provided to the field and office personnel twice a day via email. When the fluid level of a pond is nearing capacity, but not to free-board levels, a phone call, email, and text message is sent to field personnel alerting that there is an issue at the Facility. Once the alarm notification is sent to the field, personnel respond to the Facility and assess any problems that may be occurring at the Facility.

16) 908.b.(9).B.: Site Specific Monitoring Wells:

COGCC Comment – The proposed up-gradient monitoring well is located in the drainage of Little Creek, westerly down-gradient proposed monitoring well is located in the drainage of Cascade Canyon and the easterly proposed monitoring well is in a drainage that flows into Cascade Canyon. Please provide the rational for proposing the monitoring well locations within these drainages and not within the area of the Facility. Please provide the proposed construction detail of the monitoring wells.

Oxy Response – As part of the Form 28 submittal, Oxy provided the Figure #9 Proposed Groundwater Monitoring Well locations for review. These three monitoring locations were based on topography and historic knowledge of available water in the area. After discussion and review of the monitoring well locations, Oxy would like to change these three proposed groundwater monitoring locations to surface water monitoring locations. Down-gradient surface water samples will provide the following:

- Installation of groundwater wells within the immediate vicinity of the creeks will not characterize potential impacts any different than down-gradient surface water monitoring will achieve;
- Down-gradient surface water is available in the immediate area of the proposed locations provided by seeps and springs; and
- Installation of groundwater wells could provide connectivity to groundwater for potential impacts during well installation.

Oxy proposes to monitor the surface water locations quarterly throughout the life of the Facility and all samples will be analyzed for: total petroleum hydrocarbons (diesel and gas range organics), benzene, toluene, ethyl-benzene, xylenes, pH, specific conductance, total alkalinity, total dissolved solids, bromide, chloride, fluoride, nitrate, nitrite, sulfate, calcium, iron, magnesium, manganese, potassium, selenium, and sodium.

17) 908.b.(10): Surface Water Monitoring:

COGCC Comment: Baseline and periodic surface water monitoring shall be conducted. A location in Cascade Canyon shall be identified up-gradient of the Facility as well as down-gradient, in addition locations shall be identified in the easterly drainage both up and down gradient. Water quality analysis shall include BTEX, TPH-DRO, TPH-GRO, TDS, chloride, sulfate, total suspended solids, and pH.

Oxy Response – As part of the Form 28 submittal, Oxy provided the Figure #9 Proposed Groundwater Monitoring Well locations for review. These three monitoring locations were based on topography and historic knowledge of available water in the area. After discussion and review of the monitoring well locations, Oxy would like to change these three proposed groundwater monitoring locations to surface water monitoring locations.

Based on topography in the area of the Facility, the three proposed surface water monitoring locations would be classified as down-gradient points. Since the Facility is located on the top of a ridge, surface water sampling up-gradient of the Facility is not possible. Therefore, Oxy proposes to complete surface water monitoring in the three drainages which naturally drain away from the Facility to ensure adequate monitoring of any potential impacts would be captured.

Oxy proposes to monitor the surface water locations quarterly throughout the life of the Facility and all samples will be analyzed for: total petroleum hydrocarbons (diesel and gas range organics), benzene, toluene, ethyl-benzene, xylenes, pH, specific conductance, total alkalinity, total dissolved solids, bromide, chloride, fluoride, nitrate, nitrite, sulfate, calcium, iron, magnesium, manganese, potassium, selenium, and sodium.

18) 908.b.(11): Contingency Plan

COGCC Comment – The contingency plan shall be updated when contact information changes.

Oxy Response – Oxy will review and update the contact information within their Emergency Response Plan on a semi-annual basis to ensure accurate information is available in the event of an emergency. Oxy will provide any completed updates to contact information for that calendar year within the Centralized E&P Facility annual report submitted to the COGCC.

19) 908.c: Permit Approval:

COGCC Comment – Provide financial assurance and approval notices, permits, or similar types of notifications for the facility from local governments or other agencies.

Oxy Response – Oxy is currently in the process of permitting the Facility through the Garfield County Building and Planning Department. Once the application is approved, Oxy will provide the approved permit to the COGCC. Any future notices, permits, or similar types of notifications from local governments or other agencies will be provided to the COGCC.

Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process. Any additional financial assurance required by local governments will be provided to the COGCC.

20) 908.d: Financial Assurance:

COGCC Comment – see previous comments.

Oxy Response – Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process. Any additional financial assurance required by local governments will be provided to the COGCC.

22) 908.f: Annual Permit Review

COGCC Comment – Include the “Contributing Well’s” API numbers have in the Annual Permit Review.

Oxy Response – Once the Form 28 is approved, Oxy will provide a Form 26 Source of Produced Water report for inclusion into the permit package. Oxy will additionally review this list annually and provide any updated information on included wells within the Centralized E&P Facility annual report submitted to the COGCC.

23) 908.g.: Closure:

COGCC Comment – Please see response to 908.d.

Oxy Response – Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process. Any additional financial assurance required by local governments will be provided to the COGCC.

24) 908.h: Local Permitting:

COGCC Comment – Please provide a copy of the approved Garfield County Limited Impact review in addition to any other notices, permits, or similar types of notifications for the facility from local governments or other agencies.

Oxy Response – Oxy is currently in the process of permitting the Facility through the Garfield County Building and Planning Department. Once the application is approved, Oxy will provide the approved permit to the COGCC. Any future notices, permits, or similar types of notifications from local governments or other agencies will be provided to the COGCC.

Figure Review

Pond 13 E/W Stormwater Site Map:

COGCC Comment – What do the letter notifications in the yellow squares represent?
What does ECB mean in the Legend?
Are there steel containments around each of the pits as illustrated in the drawing?

Oxy Response – The letter notifications in the yellow boxes denote stormwater best management practice features which correlates to Oxy's Stormwater Management Plan. ECB located in the Legend stands for Erosion Control Blanket. No, steel containments are not built around each facility. The black lines on the were placed there to indicate the approximate location of the fence around both Pond 13 East and 13 West.

Site Plan:

COGCC Comment – There is a proposed storage area of 1.12 +/- acres south of the pits. What is the purpose of this storage area and how does it relate to the Ponds 13 E and 13 W CE&P Facility.

Oxy Response – This Site Plan was used for permitting through both the COGCC and Garfield County. The Garfield County Building and Planning Department requires the permitting of storage areas and so this was included in the site plan as an ancillary use to the Limited Use Permit application. Included as an Attachment, please find an updated site plan to outline the site boundary for the Pond 13 Centralized E&P Facility.

Figure 7 Process Flow Diagram:

COGCC Comment – Please clarify the process flow from one pit to the other pit.

Oxy Response – Pond 13E and Pond 13W are connected by a common suction line. By connecting a diesel pump or floating pump into the facility suction pipeline, produced water can be transferred from Pond 13E into Pond 13W. Produced water is not currently configured to allow produced water to transfer from Pond 13W into Pond 13E.

Figure 8 – Liner Configuration Diagram

COGCC Comment – As-constructed details of the pit including liner(s), Geo-Net Conduction liner, leak detection and sump, and geo-synthetic clay liner shall be provided for review.

Oxy Response – Included as an attachment is construction drawings for the upgrade of Pond 13 to include the liner configuration, plan view and cross sections of the pit, and netting fencing details.

Figure 9 – Ponds 13E/W Proposed Monitoring Location Map

COGCC Comment – See previous comment to 908.b.(9).B.: Site Specific Monitoring Wells.

Oxy Response – As part of the Form 28 submittal, Oxy provided the Figure #9 Proposed Groundwater Monitoring Well locations for review. These three monitoring locations were based on topography and historic knowledge of available water in the area. After discussion and review of the monitoring well locations, Oxy would like to change these three proposed groundwater monitoring locations to surface water monitoring locations. Down-gradient surface water samples will provide the following:

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- Down-gradient surface water is available in the immediate area of the proposed locations provided by seeps and springs; and
- Installation of groundwater wells could provide connectivity to groundwater for potential impacts during well installation.

Oxy proposes to monitor the down-gradient surface water locations quarterly throughout the life of the Facility and all samples will be analyzed for: total petroleum hydrocarbons (diesel and gas range organics), benzene, toluene, ethyl-benzene, xylenes, pH, specific conductance, total alkalinity, total dissolved solids, bromide, chloride, fluoride, nitrate, nitrite, sulfate, calcium, iron, magnesium, manganese, potassium, selenium, and sodium.

Attachment Review

Attachment C:

COGCC Comment – Submit a copy of Oxy's Flowline testing procedures for the pipelines associated with this Facility. Submit a map of Oxy's existing and proposed pipelines associated with this facility and update in the annual report. Provide details how OXY remotely monitors the fluid levels of the pits.

Oxy Response – Please find included as an Attachment, Oxy's pipeline integrity testing procedures and pipeline locations and routes maps.

Oxy remotely monitors fluid levels using a pressure transducer set in the pond with high-level fluid alarms. These high-level alarms are transmitted through a fluid level monitoring and reporting system called Iconics which generates a report saved to Oxy's Grand Junction server. Fluid level reports are then provided to the field and office personnel twice a day via email. When the fluid level of a pond is nearing capacity, but not to free-board levels, emails and notifications via text message are sent to field personnel alerting that there is an issue at the Facility. Low (1 foot below freeboard), medium (at freeboard), and high (1 foot above freeboard) level alarms are established for each Facility associated with the freeboard level of the pond. Once the alarm notification is sent to the field personnel, it is their responsibility to respond to the Facility and assess any problems that may be occurring at the Facility.

Attachment E:

COGCC Comment – A Financial Assurance Cost Estimate of \$443,000.00 was provided with the submittal. Prior to approval, financial assurance shall be provided. Oxy can provide the estimated \$443,000.00 financial assurance, however, the COGCC is having a third party review the closure of the facility and prepare an independent closure cost estimate. Based on the third party review, the financial assurance may be less than the estimated \$443,000.00 or more than the estimated \$443,000.00.

Oxy Response – Oxy will provide financial assurance to the COGCC for the specified amount provided by the COGCC third party reviewer. This financial assurance will be provided during the Form 28 approval finalization process.

Please contact me if you have any questions, comments, concerns, or if you require additional information. I can be reached at 970.263.3637 or at blair_rollins@oxy.com.

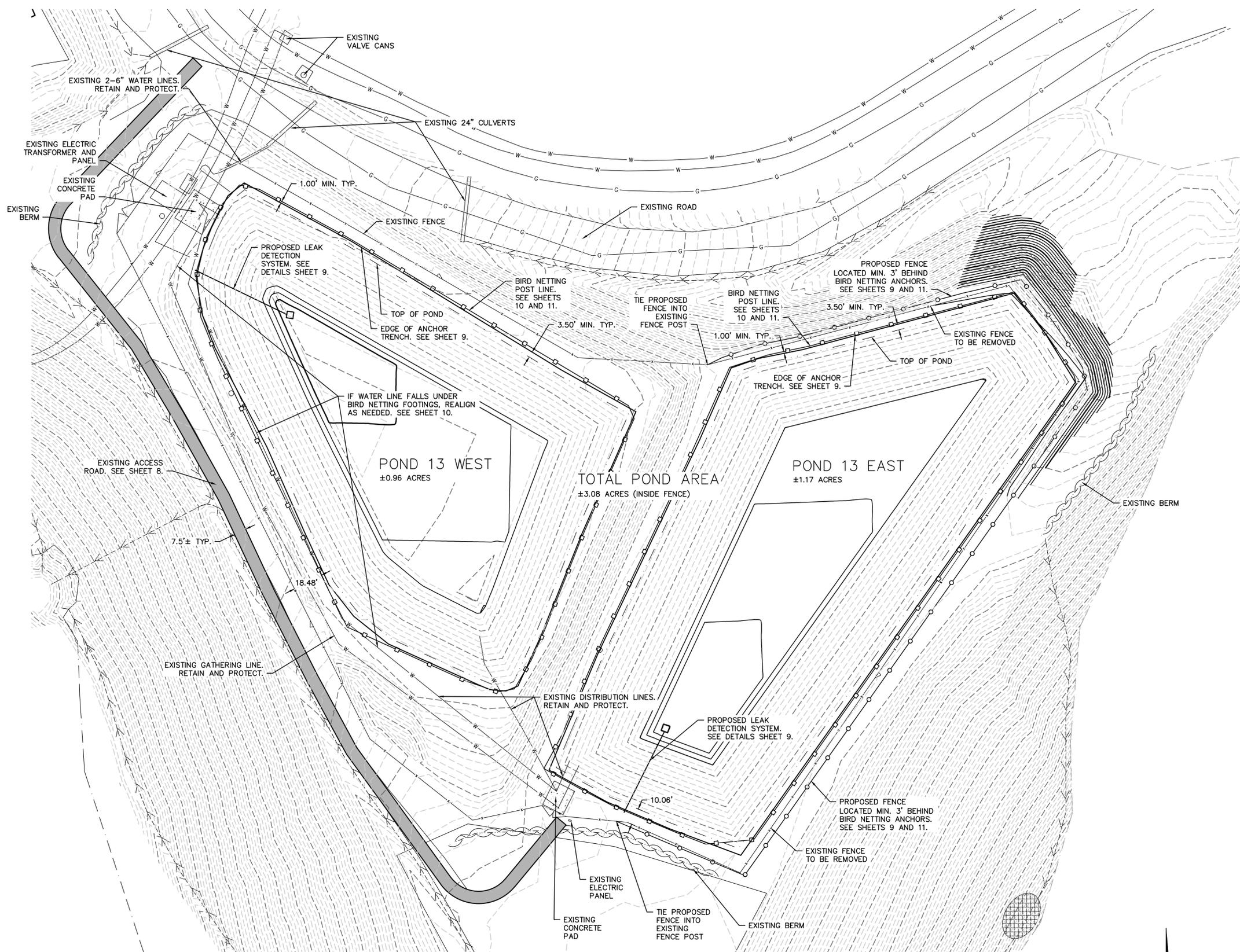
Sincerely;

A handwritten signature in blue ink, appearing to read "Blair K. Rollins".

Blair K. Rollins
HES Specialist
Oxy USA WTP LP (Mid-Continent)

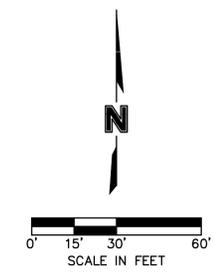
Attachments: Pond 13 E/W Construction Documents
Updated Pond 13 East and 13 West Site Plan
Sundry Form 4 (502 Variance Request) Documents #400792328
Pond 13 East and 13 West Drainage Report
Figure 9 – Proposed Monitoring Locations Map
Pipeline Integrity Testing Procedure and Figures
Garfield County Resolution #2013-77

DWG: F:\Projects\015-0689\40-Design\AutoCAD\Final Plans\Sheets\LDWP\C_SIT1_50689.dwg USER: alheritier
 DATE: Apr 13, 2015 1:20pm XREFS: C:\XCONT_50689 C:\XBASE_50689



- NOTES**
1. SITE FEATURES AND TOPOGRAPHY WAS PROVIDED BY D.R. GRIFFIN AND ASSOCIATES, INC. 1414 ELK STREET, SUITE 202, ROCK SPRINGS, WY 82901, (307) 362-5028.
 2. ALL CONTOUR INFORMATION USED FOR DESIGN SHALL BE FIELD VERIFIED.
 3. POND VOLUMES SHOWN ON PLANS SHALL BE FIELD VERIFIED.
 4. REFER TO SHEETS 9 TO 12 FOR SITE DETAILS.

- LEGEND**
- TOP OF EXISTING POND
 - EDGE OF EXISTING ROAD
 - - - EXISTING FENCE
 - W- EXISTING WATER LINE
 - G- EXISTING GAS LINE
 - - - EXISTING SWALE FLOW LINE
 - ~ ~ ~ EXISTING BERM
 - - - EXISTING MAJOR CONTOUR
 - - - EXISTING MINOR CONTOUR
 - PROPOSED FENCE
 - BIRD NETTING POST LINE
 - - - PROPOSED MAJOR CONTOUR
 - - - PROPOSED MAJOR CONTOUR
 - EXISTING SOLAR PANEL



MOLSSON ASSOCIATES ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL OR VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS HOWEVER THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.

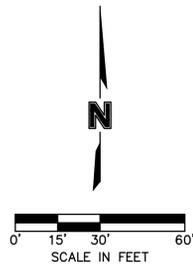
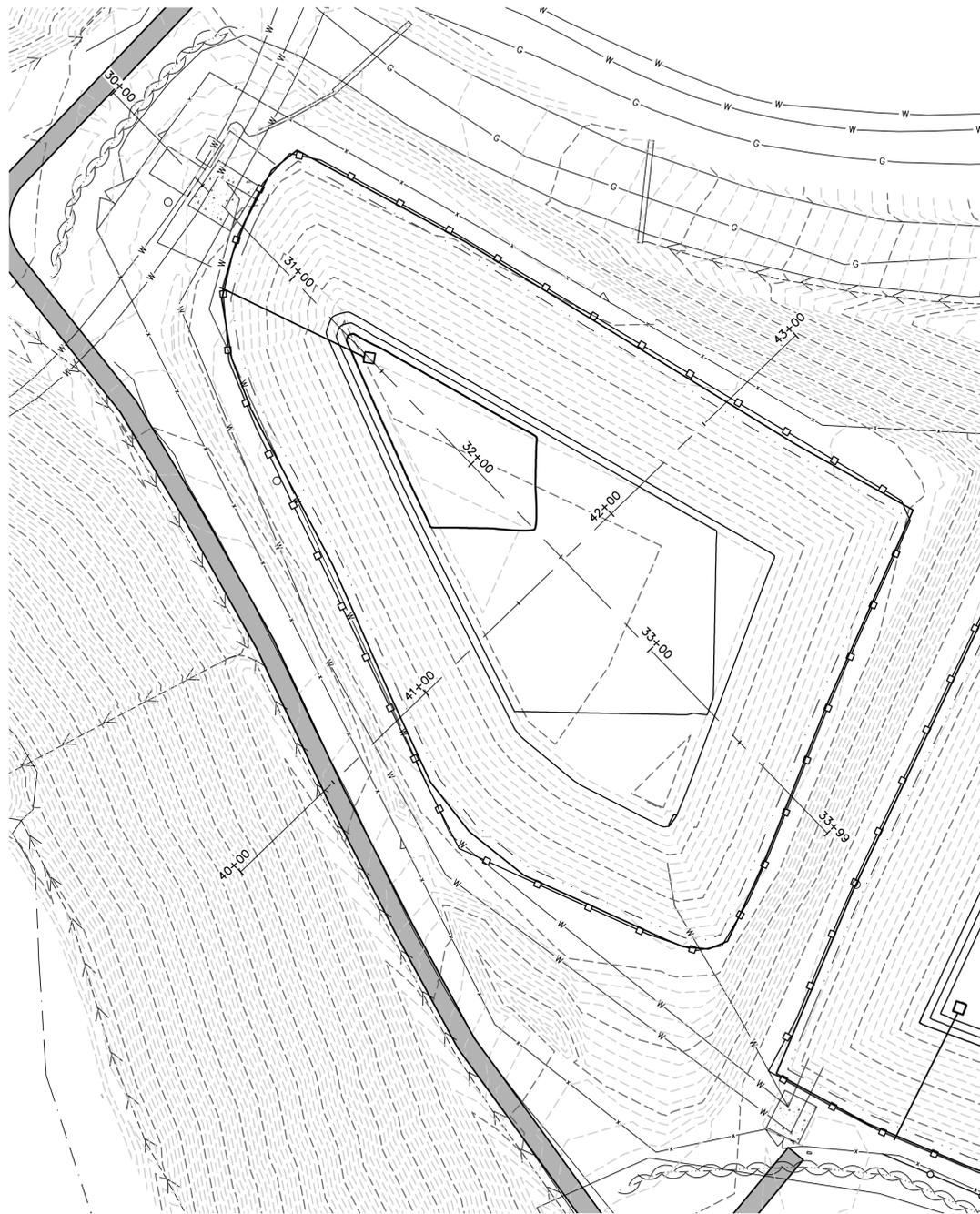
811
 Know what's below.
 Call before you dig.
 CALL 811 SEVENTY-TWO HOURS PRIOR TO DIGGING, GRADING OR EXCAVATING FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

REV. NO.	DATE	REVISIONS DESCRIPTION

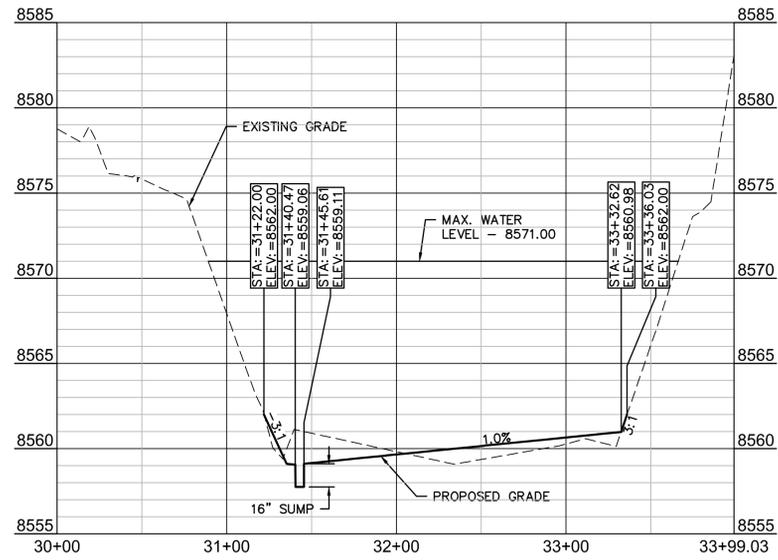
OXY POND 13
 CONSTRUCTION DOCUMENTS
 SITE PLAN
 GARFIELD COUNTY, COLORADO
 2015

drawn by: ABL
 checked by: WEP
 approved by: WEP
 QA/QC by: WEP
 project no.: 015-0689
 drawing no.: C_SIT1_50689.dwg
 date: 04/13/2015

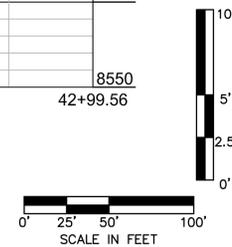
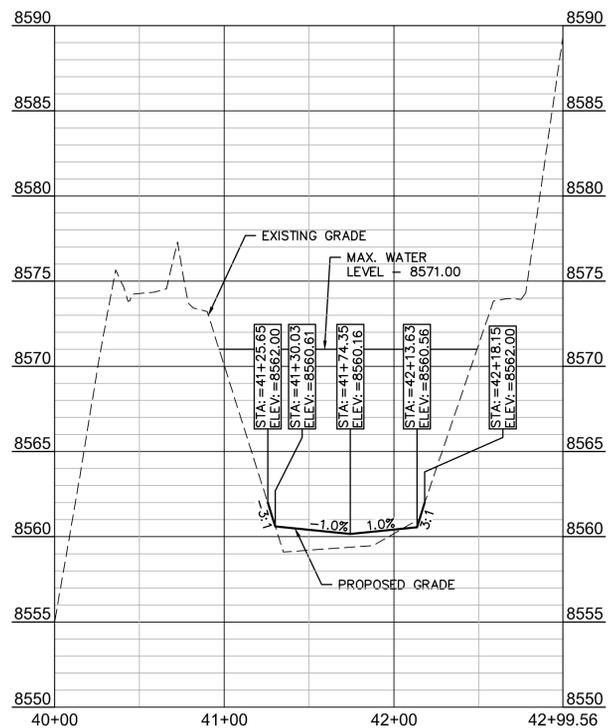
SHEET 3



POND 13 WEST - WEST TO EAST SECTION



POND 13 WEST - NORTH TO SOUTH SECTION



NOTES

- SITE FEATURES AND TOPOGRAPHY WAS PROVIDED BY D.R. GRIFFIN AND ASSOCIATES, INC. 1414 ELK STREET, SUITE 202, ROCK SPRINGS, WY 82901, (307) 362-5028.
- ALL CONTOUR INFORMATION USED FOR DESIGN SHALL BE FIELD VERIFIED.
- POND VOLUMES SHOWN ON PLANS SHALL BE FIELD VERIFIED.
- REFER TO SHEETS 9 TO 12 FOR SITE DETAILS.

LEGEND

- TOP OF EXISTING POND
- EDGE OF EXISTING ROAD
- EXISTING FENCE
- EXISTING WATER LINE
- EXISTING GAS LINE
- EXISTING SWALE FLOW LINE
- EXISTING BERM
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED FENCE
- BIRD NETTING POST LINE
- PROPOSED MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- EXISTING SOLAR PANEL



MOLSSON ASSOCIATES ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL OR VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS HOWEVER THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.



Know what's below. Call before you dig.
 CALL 811 SEVENTY-TWO HOURS PRIOR TO DIGGING, GRADING OR EXCAVATING FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

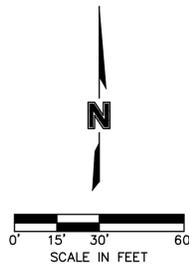
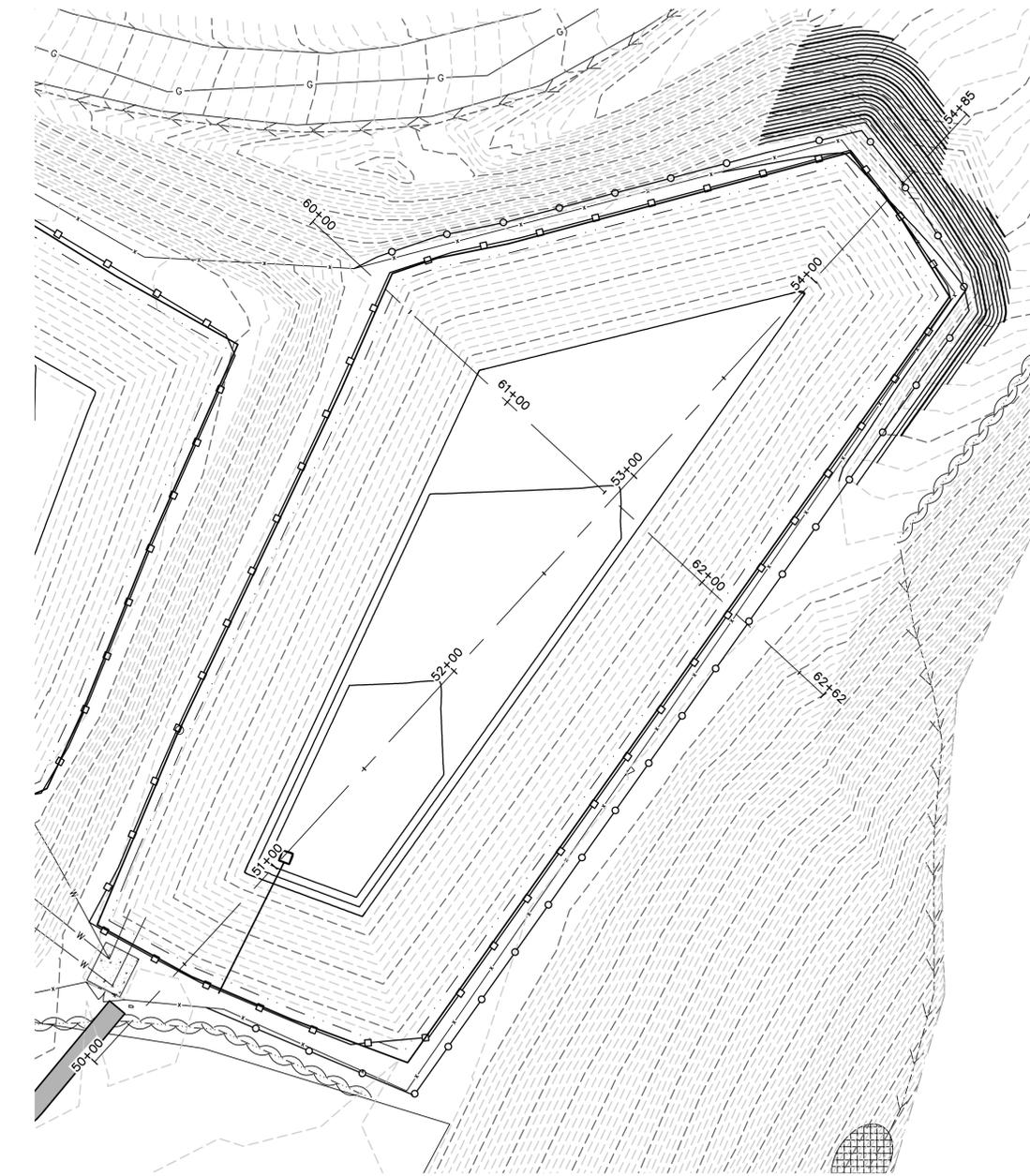
REV. NO.	DATE	REVISIONS DESCRIPTION

2015

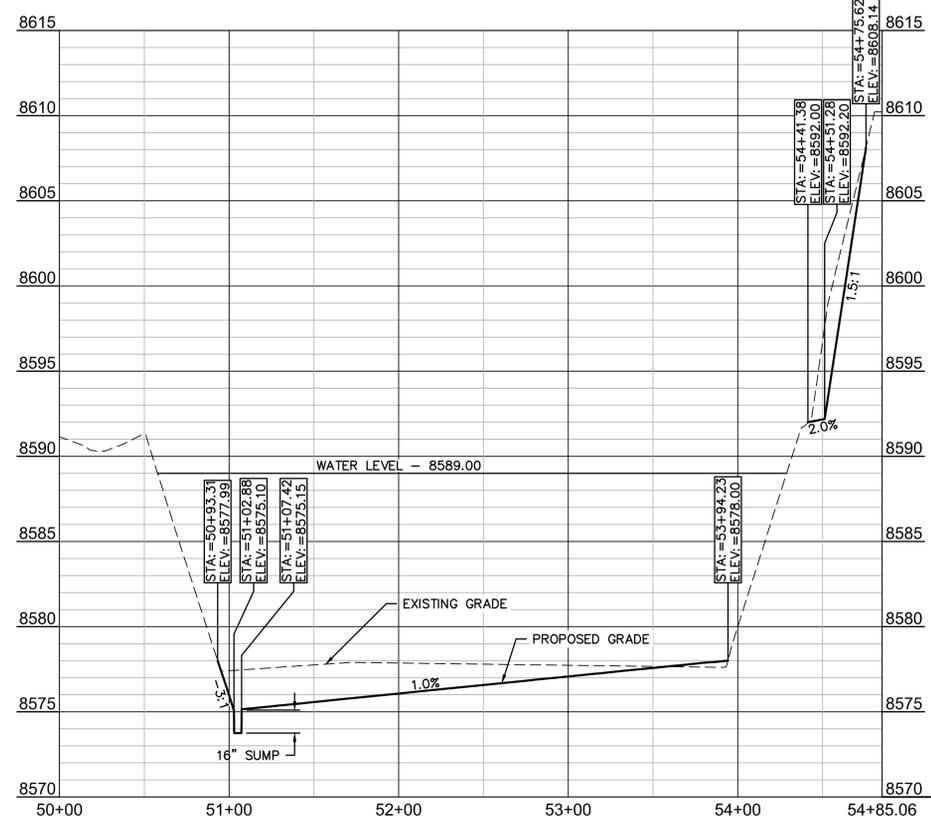
OXY POND 13
 CONSTRUCTION DOCUMENTS
 POND CROSS SECTIONS
 POND 13 WEST
 GARFIELD COUNTY, COLORADO

drawn by: ABL
 checked by: WEP
 approved by: WEP
 QA/QC by: WEP
 project no.: 015-0689
 drawing no.: C_SEC1_50689.dwg
 date: 04/13/2015

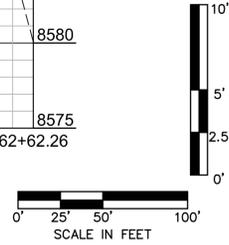
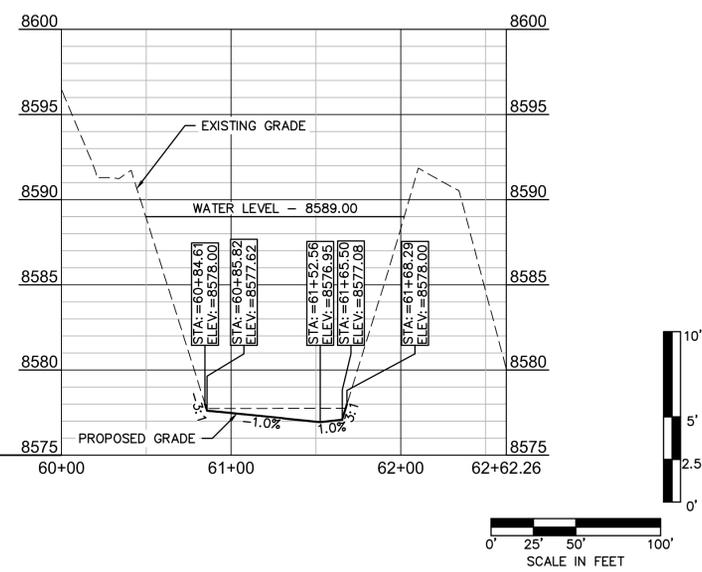
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 DATE: Apr 13, 2015 1:22pm XREFS: C_XCONT_50689 C_XBASE_50689 C_XBASE_50689



POND 13 EAST - NORTH TO SOUTH SECTION



POND 13 EAST - WEST TO EAST SECTION



NOTES

1. SITE FEATURES AND TOPOGRAPHY WAS PROVIDED BY D.R. GRIFFIN AND ASSOCIATES, INC. 1414 ELK STREET, SUITE 202, ROCK SPRINGS, WY 82901, (307) 362-5028.
2. ALL CONTOUR INFORMATION USED FOR DESIGN SHALL BE FIELD VERIFIED.
3. POND VOLUMES SHOWN ON PLANS SHALL BE FIELD VERIFIED.
4. REFER TO SHEETS 9 TO 12 FOR SITE DETAILS.

LEGEND

- TOP OF EXISTING POND
- EDGE OF EXISTING ROAD
- EXISTING FENCE
- W --- EXISTING WATER LINE
- G --- EXISTING GAS LINE
- EXISTING SWALE FLOW LINE
- EXISTING BERM
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED FENCE
- BIRD NETTING POST LINE
- PROPOSED MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- EXISTING SOLAR PANEL



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REV. NO.	DATE	REVISIONS DESCRIPTION

OXY POND 13
 CONSTRUCTION DOCUMENTS
 POND CROSS SECTIONS
 POND 13 EAST
 GARFIELD COUNTY, COLORADO

drawn by: ABL
 checked by: WEP
 approved by: WEP
 QA/QC by: WEP
 project no.: 015-0689
 drawing no.: C_SEC2_50689.dwg
 date: 04/13/2015



MOLSSON ASSOCIATES ASSUMES NO RESPONSIBILITY FOR EXISTING UTILITY LOCATIONS (HORIZONTAL OR VERTICAL). THE EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. IT IS HOWEVER THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES.



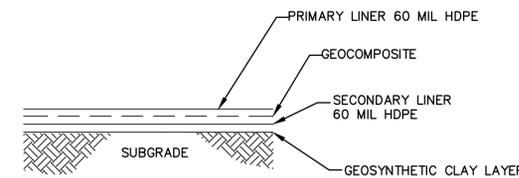
Know what's below. Call before you dig.
CALL 811 SEVENTY-TWO HOURS PRIOR TO DIGGING, GRADING OR EXCAVATING FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

REV. NO.	DATE	REVISIONS DESCRIPTION

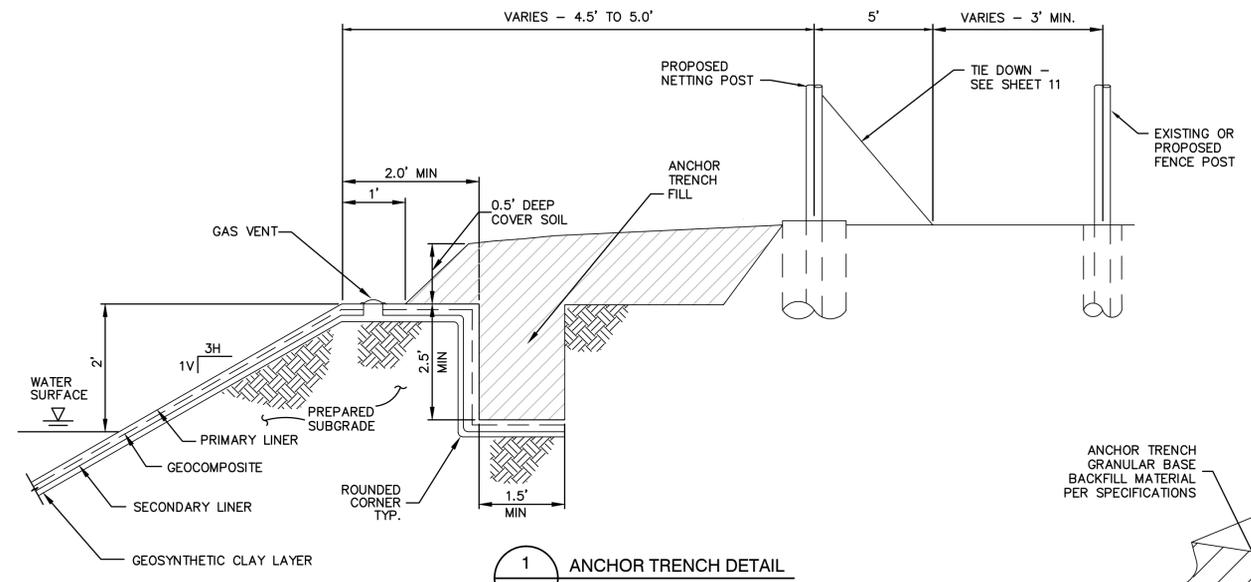
2015

**OXY POND 13
CONSTRUCTION DOCUMENTS
SITE PLAN DETAILS
ANCHOR TRENCH AND LINERS
GARFIELD COUNTY, COLORADO**

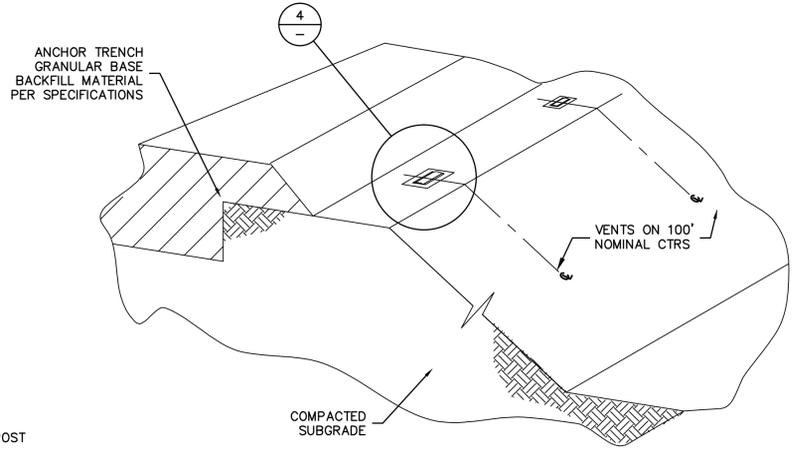
drawn by:	ABL
checked by:	WEP
approved by:	WEP
QA/QC by:	WEP
project no.:	015-0689
drawing no.:	C_DTL2_50689.dwg
date:	04/13/2015



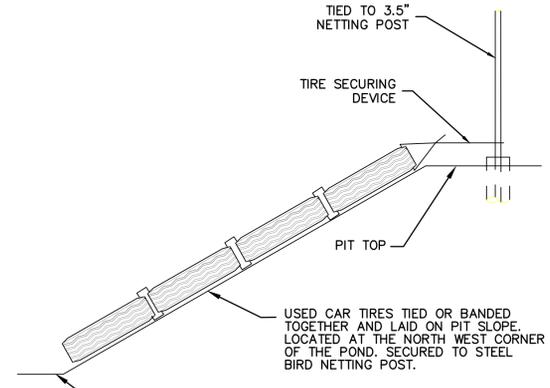
2 TYPICAL POND LINING SYSTEM DETAIL
N.T.S.



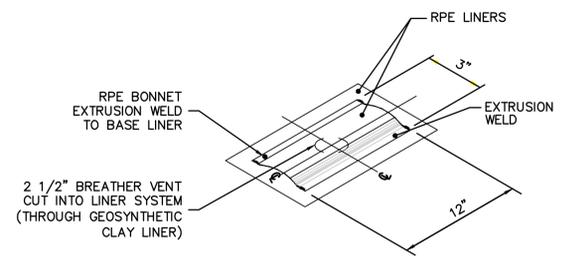
1 ANCHOR TRENCH DETAIL
N.T.S.



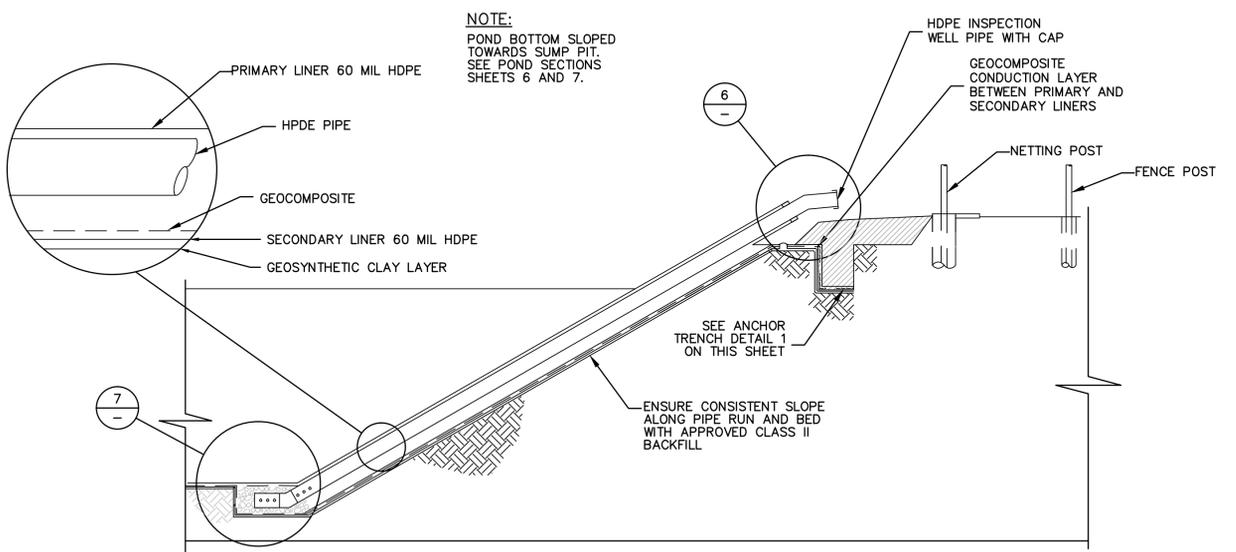
3 AIR/GAS VENT LOCATION DETAIL
N.T.S.



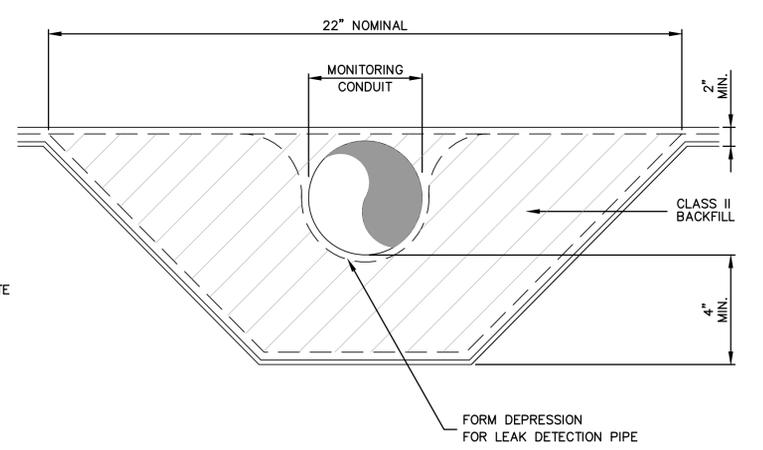
8 TIRE LADDER
N.T.S. (TYPICAL)



4 AIR/GAS VENT DETAIL
N.T.S.

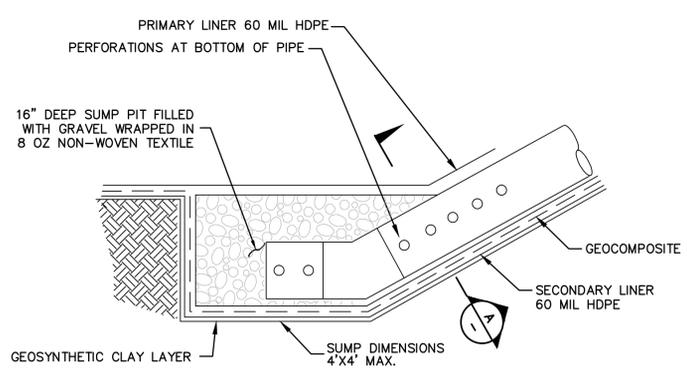


5 LEAK DETECTION WELL DETAIL WITH PIPE RESTING ON SLOPE GRADE
N.T.S.

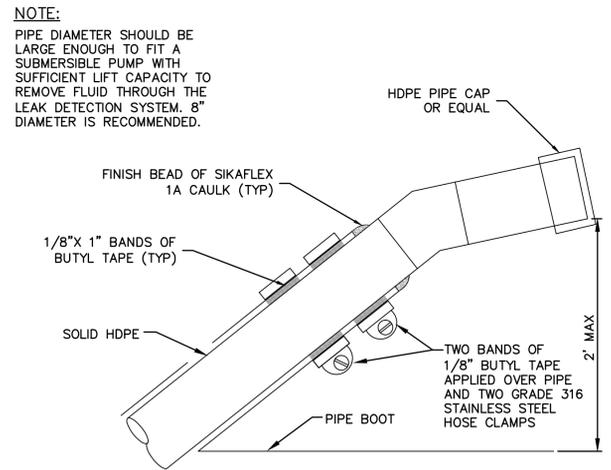


A SECTION
N.T.S.

- GENERAL NOTES:**
- CONTACT THE ENGINEER IF FIELD CONDITIONS ARE DIFFERENT THAN THOSE ASSUMED IN THE DESIGN AND DESIGNED ANCHOR TRENCH DIMENSIONS AND/OR COVER SOIL DEPTH CANNOT BE ACHIEVED.
 - THE GEOSYNTHETIC DRAINAGE LAYER WILL CONSIST OF GSE HYPERNET GEONET OR ENGINEER'S APPROVED EQUIVALENT.
 - THE PRIMARY AND SECONDARY LINER WILL CONSIST OF A GSE HD 60 MIL HDPE TEXTURED GEOMEMBRANE OR ENGINEER'S APPROVED EQUIVALENT.
 - SINCE SITE-SPECIFIC DATA WAS NOT AVAILABLE, THE VALUE FOR THE FRICTION ANGLES BETWEEN GEOMEMBRANES AND SOIL/GEOMEMBRANE HAS BEEN ESTIMATED FROM LITERATURE GUIDANCE FROM WASTE CONTAINMENT SYSTEMS, WASTE STABILIZATION, AND LANDFILLS, SHARMA/LEWIS 1994 AND A STUDY DONE BY MARTIN ET. AL. [MARTIN, J.P., KOERNER R.M., AND WHITEY, J.E., "EXPERIMENTAL FRICTION EVALUATION OF SOILS," PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON GEOMEMBRANES, IFAL, 1984, PP. 191-196]. CONSERVATIVE VALUES FROM THE RANGES PROVIDED IN THE AFOREMENTIONED LITERATURE WAS USED IN DETERMINING ANCHOR TRENCH DIMENSIONS AND RUN OUT LENGTHS.



7 SUMP PIT FILLED WITH GRAVEL
N.T.S.

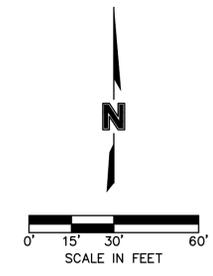
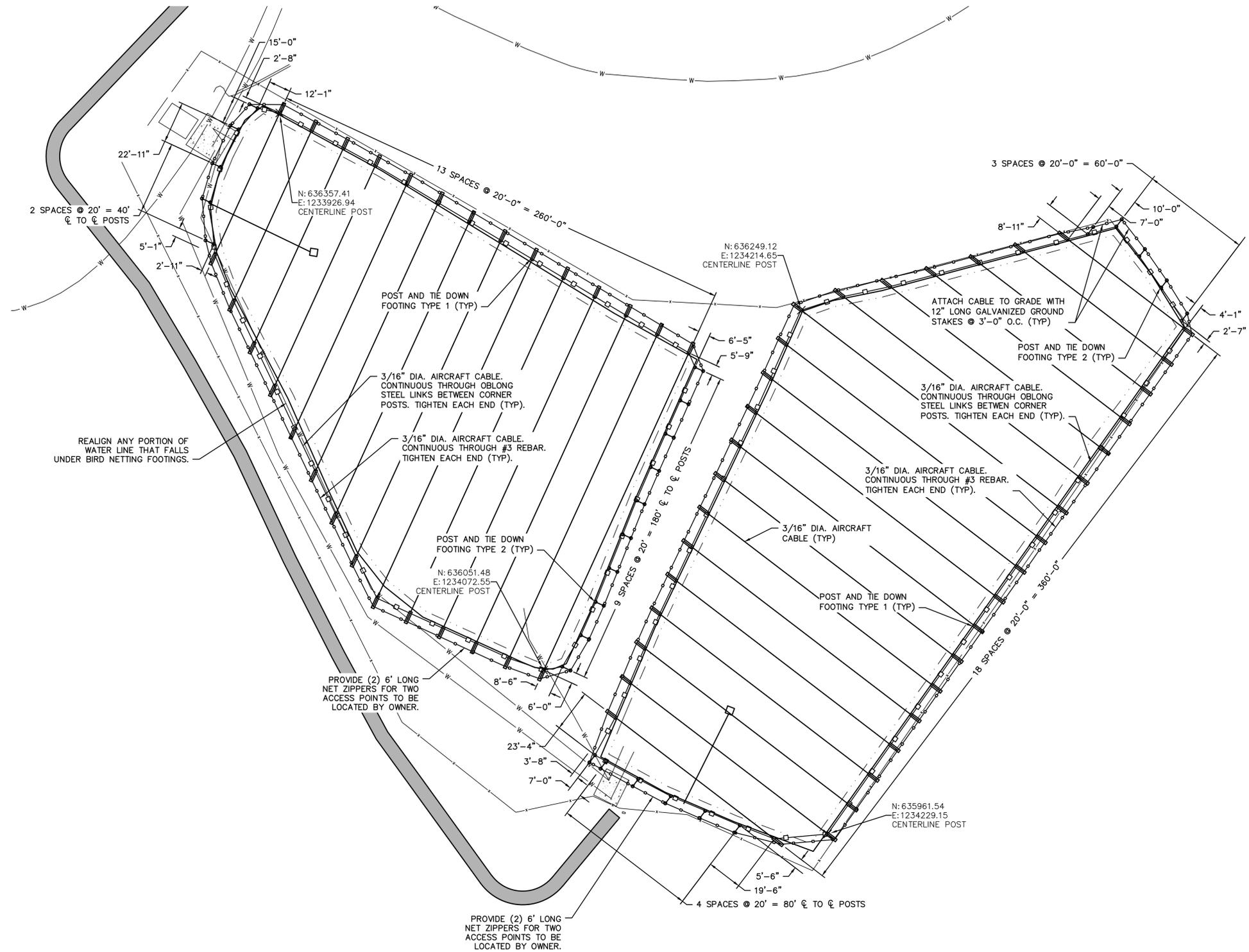


6 PIPE BOOT SEALING DETAIL
N.T.S.

NOTE:
POND BOTTOM SLOPED TOWARDS SUMP PIT. SEE POND SECTIONS SHEETS 6 AND 7.

NOTE:
PIPE DIAMETER SHOULD BE LARGE ENOUGH TO FIT A SUBMERSIBLE PUMP WITH SUFFICIENT LIFT CAPACITY TO REMOVE FLUID THROUGH THE LEAK DETECTION SYSTEM. 8" DIAMETER IS RECOMMENDED.

DWG: F:\Projects\015-0689\40-Design\AutoCAD\Final Plans\Sheets\LDWP\C_DTL4_50689.dwg USER: alheritier
 DATE: Apr 13, 2015 1:22pm XREFS: C:\XCONT\50689 C:\XBASE_50689 C:\XBASE_50689



- NOTES**
- BIRD NETTING TO BE 2" SQUARE MESH BIRD NET MANUFACTURED BY NIXALITE OF AMERICA, INC., OR APPROVED EQUAL.
 - NETTING SHALL BE ORDERED IN LARGEST LENGTHS POSSIBLE TO MINIMIZE END OF ROLL AND SIDE SEAMS.
 - INSTALL NETTING TO TENSIONED CABLE SYSTEM PER MANUFACTURER'S RECOMMENDATIONS.
 - CONCRETE SHALL BE CLASS A2.
 - FINISHED INSTALLATIONS OF BIRD NETTING TO BE TAUT, FREE OF WRINKLES, GAPS, AND OPENINGS.
 - PROVIDE TWO ZIPPER ACCESS POINTS TO BE LOCATED BY OWNER.
 - ALL DIMENSIONS ARE POST @ TO POST @.

MOLSSON ASSOCIATES
 760 Highway D, Suite 102
 Grand Junction, CO 81506
 TEL: 970.263.7800 www.molssonassociates.com



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811
 Know what's below.
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REV. NO.	DATE	REVISIONS DESCRIPTION

OXY POND 13
 CONSTRUCTION DOCUMENTS
 SITE PLAN DETAILS
 BIRD NETTING LAYOUT
 GARFIELD COUNTY, COLORADO
 2015

drawn by: ABL
 checked by: WEP
 approved by: WEP
 QA/QC by: WEP
 project no.: 015-0689
 drawing no.: C_DTL4_50689.dwg
 date: 04/13/2015

LOT 14

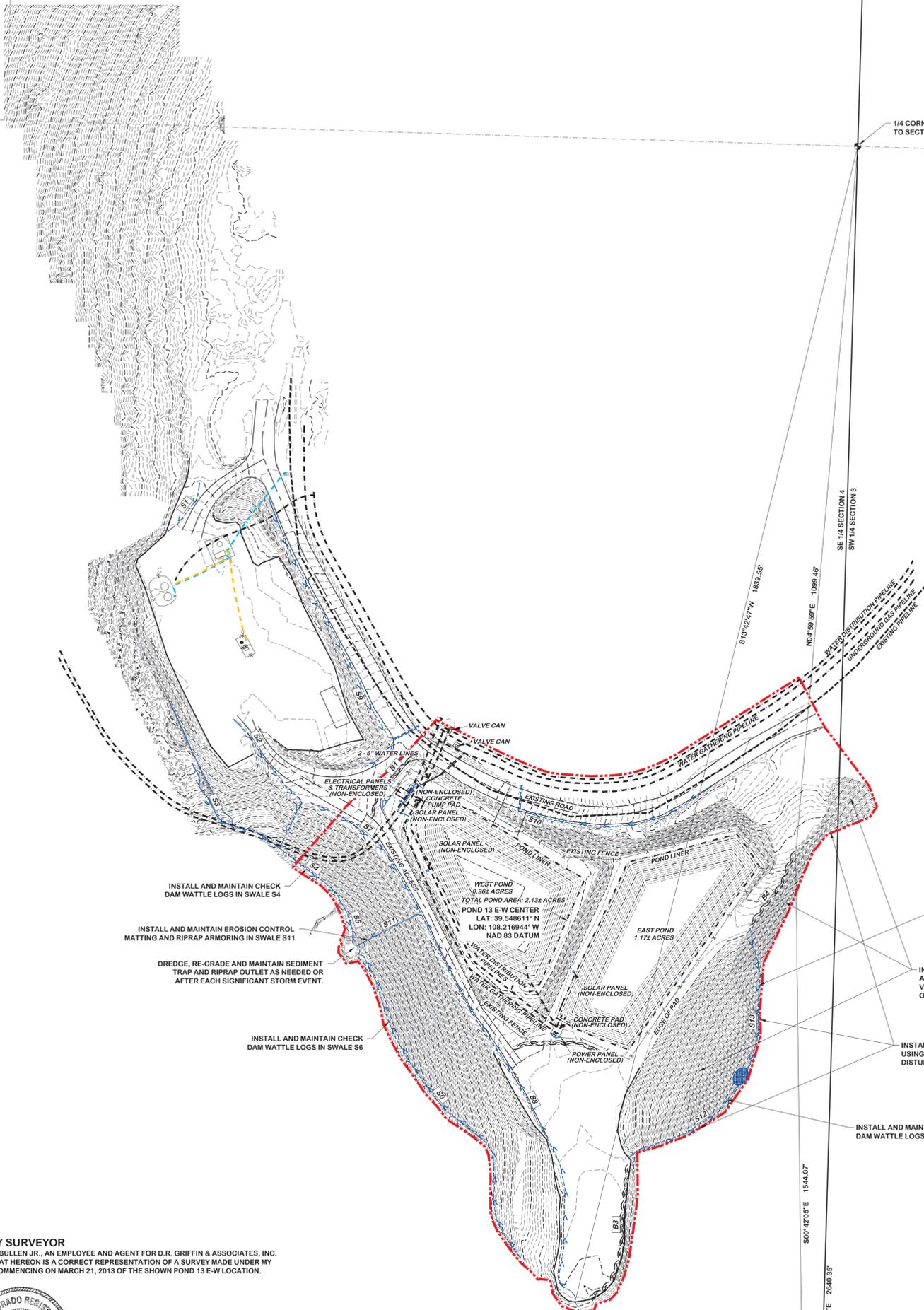
LOT 13

LOT 16



SE 1/4 SECTION 4, TOWNSHIP 6 SOUTH,
RANGE 97 WEST, 6TH PRINCIPAL MERIDIAN,
GARFIELD COUNTY, COLORADO

1/4 CORNER COMMON
TO SECTIONS 3 AND 4



STAMP BY SURVEYOR
I, RICHARD A. BULLEN JR., AN EMPLOYEE AND AGENT FOR D.R. GRIFFIN & ASSOCIATES, INC.
STATE THE PLAT HEREON IS A CORRECT REPRESENTATION OF A SURVEY MADE UNDER MY
AUTHORITY COMMENCING ON MARCH 21, 2015 OF THE SHOWN POND 13 E-W LOCATION.



COLORADO PLS No. 28647

NOTES:

1. COGCC PROJECT BOUNDARY AS SHOWN WITH POND 13 E-W AREA INCLUDED IS ±10.24 ACRES.
2. POND 13 EAST IS APPROXIMATELY 335' x 163' AND ENCOMPASSES ±1.17 ACRES.
3. POND 13 WEST IS APPROXIMATELY 273' x 176' AND ENCOMPASSES ±0.96 ACRES.
4. PROJECT SITE IS ZONED AS RESOURCE LANDS AS INDICATED BY THE GARFIELD COUNTY ZONE DISTRICT MAP.
5. THERE ARE NO FLOOD HAZARD ZONES DESIGNATED BY FEMA FOR THE AREA. THE SITE IS CLASSIFIED AS ZONE D.
6. POND 13 E-W AREA IS LOCATED ON A HISTORICAL RIDGE AND PARTIAL STEEP SLOPE AREA. CUT AND FILL SLOPES AROUND THE PAD ARE TYPICALLY STEEP SLOPE AREAS. SEE SHEET A-3 FOR SURVEYED SLOPE PERCENTAGES.
7. STOCKPILED SNOW WILL BE DIRECTED TOWARD BMPs WHEN PRACTICAL TO ALLOW TREATMENT. PLOWED SNOW WILL LIKELY BE PLACED AROUND THE OUTER BOUNDARY OF THE PADS SO SWALES WILL COLLECT THE SNOW MELT AND ROUTE IT TO THE APPROPRIATE BMPs.
8. ENTIRE AREA OF MAP SHOWN ON THIS SHEET IS ON OXY USA WTP LP PROPERTY.
9. AS-BUILT POND DATA PROVIDED BY OTHERS.

LEGEND

- COGCC PROJECT BOUNDARY
- - - CONTOURS (1 FOOT INTERVAL)
- - - FENCE
- 1 DESIGN POINT
- S1 DRAINAGE SWALE
- B1 DRAINAGE BERM
- - - EXISTING/PROPOSED DRAINAGE SWALE
- - - EXISTING/PROPOSED DRAINAGE BERM

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK	APPR
A	6/25/14	DRAINAGE PLAN	CSW	LGB	
B	11/03/2014	REVISED PER CLIENT COMMENTS	TKM	MCL	
C	12/08/2014	REVISED PER POND AS-BUILT DATA	CSW	MCL	
D	03/27/2015	REVISED PER CLIENT COMMENTS	TKM	MCL	

DG RIFFIN & ASSOCIATES, INC.

1414 ELK ST., SUITE 202
ROCK SPRINGS, WY 82901
(307) 362-5028



POND 13 E-W

SITE PLAN

SCALE: 1" = 100'

A-2

REV D

JOB No.: 19810
GARFIELD COUNTY, COLORADO

SHEET 2 OF 6

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109



DE	ET	OE	ES
Document Number: 400792328			
Date Received: 04/13/2015			

SUNDRY NOTICE

Submit a signed original. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full in Comments or provide as an attachment. Identify Well by API Number; identify Oil and Gas Location by Location ID Number; identify other Facility by Facility ID Number.

OGCC Operator Number: 66571 Contact Name Blair Rollins
 Name of Operator: OXY USA WTP LP Phone: (970) 263-3637
 Address: P O BOX 27757 #110 Fax: (970) 263-3694
 City: HOUSTON State: TX Zip: 77227-7757 Email: blair_rollins@oxy.com

Complete the Attachment
Checklist

OP OGCC

API Number : 05- 045 00 OGCC Facility ID Number: 436570
 Well/Facility Name: Pond 13 E/W Well/Facility Number: _____
 Location QtrQtr: NESE Section: 4 Township: 6S Range: 97W Meridian: 6
 County: GARFIELD Field Name: GRAND VALLEY
 Federal, Indian or State Lease Number: _____

Survey Plat		
Directional Survey		
Srvc Eqpmt Diagram		
Technical Info Page		
Other		

CHANGE OF LOCATION OR AS BUILT GPS REPORT

- Change of Location * As-Built GPS Location Report As-Built GPS Location Report with Survey

* Well location change requires new plat. A substantive surface location change may require new Form 2A.

SURFACE LOCATION GPS DATA Data must be provided for Change of Surface Location and As Built Reports.

Latitude _____ PDOP Reading _____ Date of Measurement _____
 Longitude _____ GPS Instrument Operator's Name _____

LOCATION CHANGE (all measurements in Feet)

Well will be: _____ (Vertical, Directional, Horizontal)

Change of **Surface** Footage **From** Exterior Section Lines:

FNL/FSL		FEL/FWL	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Change of **Surface** Footage **To** Exterior Section Lines:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Current **Surface** Location **From** QtrQtr Sec

Twp Range Meridian

New **Surface** Location **To** QtrQtr Sec

Twp Range Meridian

Change of **Top of Productive Zone** Footage **From** Exterior Section Lines:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Change of **Top of Productive Zone** Footage **To** Exterior Section Lines:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

**

Current **Top of Productive Zone** Location **From** Sec

Twp Range

New **Top of Productive Zone** Location **To** Sec

Twp Range

Change of **Bottomhole** Footage **From** Exterior Section Lines:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

Change of **Bottomhole** Footage **To** Exterior Section Lines:

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------

**

Current **Bottomhole** Location Sec Twp

Range ** attach deviated drilling plan

New **Bottomhole** Location Sec Twp

Range

Is location in High Density Area? _____

Distance, in feet, to nearest building _____, public road: _____, above ground utility: _____, railroad: _____,
 property line: _____, lease line: _____, well in same formation: _____

Ground Elevation _____ feet Surface owner consultation date _____

OTHER CHANGES

REMOVE FROM SURFACE BOND Signed surface use agreement is a required attachment

CHANGE OF WELL, FACILITY OR OIL & GAS LOCATION NAME OR NUMBER

From: Name POND 13 E/W Number _____ Effective Date: _____

To: Name _____ Number _____

ABANDON PERMIT: Permit can only be abandoned if the permitted operation has NOT been conducted. Field inspection will be conducted to verify site status.

WELL: Abandon Application for Permit-to-Drill (Form2) – Well API Number _____ has not been drilled.

PIT: Abandon Earthen Pit Permit (Form 15) – COGCC Pit Facility ID Number _____ has not been constructed (Permitted and constructed pit requires closure per Rule 905)

CENTRALIZED E&P WASTE MANAGEMENT FACILITY: Abandon Centralized E&P Waste Management Facility Permit (Form 28) – Facility ID Number _____ has not been constructed (Constructed facility requires closure per Rule 908)

OIL & GAS LOCATION ID Number: _____

Abandon Oil & Gas Location Assessment (Form 2A) – Location has not been constructed and site will not be used in the future.

Keep Oil & Gas Location Assessment (Form 2A) active until expiration date. This site will be used in the future.

Surface disturbance from Oil and Gas Operations must be reclaimed per Rule 1003 and Rule 1004.

REQUEST FOR CONFIDENTIAL STATUS

DIGITAL WELL LOG UPLOAD

DOCUMENTS SUBMITTED Purpose of Submission: _____

RECLAMATION

INTERIM RECLAMATION

Interim Reclamation will commence approximately _____

Per Rule 1003.e.(3) operator shall submit Sundry Notice reporting interim reclamation is complete and site is ready for inspection when vegetation reaches 80% coverage.

Interim reclamation complete, site ready for inspection.

Per Rule 1003.e(3) describe interim reclamation procedure in Comments below or provide as an attachment and attach required location photographs.

Field inspection will be conducted to document Rule 1003.e. compliance

FINAL RECLAMATION

Final Reclamation will commence approximately _____

Per Rule 1004.c.(4) operator shall submit Sundry Notice reporting final reclamation is complete and site is ready for inspection when vegetation reaches 80% coverage.

Final reclamation complete, site ready for inspection. Per Rule 1004.c(4) describe final reclamation procedure in Comments below or provide as an attachment.

Field inspection will be conducted to document Rule 1004.c. compliance

Comments:

ENGINEERING AND ENVIRONMENTAL WORK

NOTICE OF CONTINUED TEMPORARILY ABANDONED STATUS

Indicate why the well is temporarily abandoned and describe future plans for utilization in the COMMENTS box below or provide as an attachment, as required by Rule 319.b.(3).

Date well temporarily abandoned _____ Has Production Equipment been removed from site? _____

Mechanical Integrity Test (MIT) required if shut in longer than 2 years. Date of last MIT _____

SPUD DATE: _____

TECHNICAL ENGINEERING AND ENVIRONMENTAL WORK

Details of work must be described in full in the COMMENTS below or provided as an attachment.

NOTICE OF INTENT Approximate Start Date _____

REPORT OF WORK DONE Date Work Completed 04/13/2015

<input type="checkbox"/> Intent to Recomplete (Form 2 also required)	<input type="checkbox"/> Request to Vent or Flare	<input type="checkbox"/> E&P Waste Mangement Plan
<input type="checkbox"/> Change Drilling Plan	<input type="checkbox"/> Repair Well	<input type="checkbox"/> Beneficial Reuse of E&P Waste
<input type="checkbox"/> Gross Interval Change	<input checked="" type="checkbox"/> Rule 502 variance requested. Must provide detailed info regarding request.	
<input type="checkbox"/> Other _____	<input type="checkbox"/> Status Update/Change of Remediation Plans for Spills and Releases	

COMMENTS:

Oxy is providing this Sundry Notice for Alex Fischer in the Denver Office. Please reference Attachment A.

H2S REPORTING

Data Fields in this section are intended to document Sample and Location Data associated with the collection of a Gas Sample that is submitted for Laboratory Analysis.

Gas Analysis Report must be attached.

H2S Concentration: _____ in ppm (parts per million) Date of Measurement or Sample Collection _____

Description of Sample Point:

Absolute Open Flow Potential _____ in CFPD (cubic feet per day)

Description of Release Potential and Duration (If flow is not open to the atmosphere, identify the duration in which the container or pipeline would likely be opened for servicing operations.):

Distance to nearest occupied residence, school, church, park, school bus stop, place of business, or other areas where the public could reasonably be expected to frequent: _____

Distance to nearest Federal, State, County, or municipal road or highway owned and principally maintained for public use: _____

COMMENTS:

Best Management Practices

No BMP/COA Type

Description

--	--

Operator Comments:

Please reference Attachment A.

I hereby certify all statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: _____ Print Name: Blair Rollins

Title: HES Specialist Email: blair_rollins@oxy.com Date: 4/13/2015

Based on the information provided herein, this Sundry Notice (Form 4) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved: _____ Date: _____

CONDITIONS OF APPROVAL, IF ANY:

General Comments

User Group

Comment

Comment Date

--	--	--

Total: 0 comment(s)

Attachment Check List

Att Doc Num

Name

400792328	FORM 4 SUBMITTED
400823930	VARIANCE REQUEST

Total Attach: 2 Files



Attachment A – Pond 13E/W Variance Request Sundry Notice (Facility ID #436570)

OXY USA WTP LP (Oxy) is providing this Sundry Notice to request a variance from the requirements in COGCC Rule 908.b.(5).D. for Oxy's Pond 13E/W produced water storage facility (Facility).

COGCC Rule 908.b.(5).D. indicates *“Centralized facilities shall have a fire lane of at least ten (10) feet in width around active treatment areas within the perimeter fence. In addition, a buffer zone of at least ten (10) feet shall be maintained within the perimeter fire lane.”*

The Facility was previously constructed on a pad site and Oxy is currently in the process of permitting it as a Centralized E&P Waste Management Facility. Oxy has submitted a Form 28 application to convert the Facility during construction upgrades scheduled for summer 2015 at the Facility. The Facility was originally constructed on a pad to maximize storage capacity while allowing room for access to two sides of the Facility. This existing situation makes compliance with COGCC Rule 908.b.(5).D. extremely difficult.

Oxy has familiarized the DeBeque Fire Protection District (DFPD), the local fire protection agency, with the location, terrain, and any access issues that may be associated with the Facility. Please reference the attached letter from DFPD. The District does not have any issues with the variance request. DFPD has the proper equipment to respond to an emergency at the Facility.

The District is familiar with the location, terrain, and conditions and is confident that the Facility location is easily accessible using any of the departments brush units, or other four-wheel or all-wheel drive equipment vehicles. The fire departments vehicles are similar to Oxy's fleet vehicles and will provide sufficient means for access to the site.

Chemicals are not stored at this Facility and fire is unlikely due to the lack of flammable materials. However, a fire is the most likely emergency scenario. In any event when DFPD vehicles could not directly access the facility, the Department has sufficient hoses to travel the short distance to the Facility. While the water storage facility does not have the full ten (10) feet of emergency access zone and ten (10) feet of buffer zone, all areas of the facility are accessible using hoses.

Oxy has also submitted a copy of our Emergency Response Plan with the Form 28 application, detailing how emergencies are managed by Oxy.

Oxy respectfully submits this information in order to provide the COGCC with information required to grant a COGCC Rule 502 variance request to COGCC Rule 908.b.(5).D.

April 1, 2014

Chris Clark – Operations Manager
OXY USA WTP LP
760 Horizon Drive, Suite 101
Grand Junction, CO 81506

Subject: Emergency Access – Oxy's Pond 13 E/W Facility

Dear Mr. Clark,

This letter is to address Oxy's Pond 13 E/W facility and its potential access restrictions. The DeBeque Fire Protection District has been familiarized with the location, terrain, and any access issues that may be associated with Pond 13 E/W and is confident that the property provides adequate space for any of the departments brush units, or other four-wheel or all-wheel drive equipment vehicles. The fire departments vehicles are similar to Oxy's fleet Vehicles and will provide sufficient means for access to the site. In any event where the DFPD vehicles could not directly access the Facility, the District has sufficient hoses to access a fire within the Facility. The DFPD does not see any issue with the amount of space available at this location, and therefore does not see any issue with the variance request that this letter pertains to. Please feel free to contact me if you have any questions, comments, or concerns regarding this letter.

Sincerely,



Nick Marx

Fire Chief
DeBeque Fire Protection District

Drainage Report

Pond 13 E-W **Garfield County, Colorado**

Prepared for:
OXY USA Inc.
760 Horizon Drive, Suite 101
Grand Junction, CO 81506
Office Phone: 970-263-3634

Prepared by:
D.R. Griffin & Associates, Inc.
1414 Elk Street, Suite 202
Rock Springs, WY 82901
Office Phone: 307-362-5028

March 23, 2015

D.R. Griffin & Associates, Inc.
Job #: 19810

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SIGNATURE BLOCKS

ENGINEER'S STATEMENT

MICHAEL C. LOCK STATES THAT I AM BY OCCUPATION A PROFESSIONAL ENGINEER (MINING) EMPLOYED BY OXY USA INC. TO PREPARE A DRAINAGE REPORT FOR POND 13 E-W LOCATION IN ACCORDANCE WITH THE COLORADO OIL AND GAS COMMISSION (COGCC) REGULATIONS, GARFIELD COUNTY REGULATIONS AND THAT THE WORK WAS DONE UNDER MY AUTHORITY AND SUPERVISION COMMENCING MARCH 21, 2013. I ALSO STATE THAT THE DESIGN IS COMPLIANT WITH THE NORMAL AND CUSTOMARY INDUSTRY STANDARD OF PRACTICE FOR THIS TYPE AND NATURE OF WORK.



MICHAEL C. LOCK, COLORADO
PROFESSIONAL ENGINEER NO. 37933

OWNER'S STATEMENT

OXY USA INC. HAS REVIEWED THE DRAINAGE REPORT FOR POND 13 E-W AND ACCEPTS THE RESPONSIBILITY FOR IMPLEMENTING AND MAINTAINING REQUIRED DRAINAGE MITIGATION PROCEDURES.

GARY GROVE, OXY USA INC.

1) INTRODUCTION

a) Background

Pond 13 E-W stores produced and flowback water from Oxy USA, Inc. owned or operated natural gas wells in the Cascade Creek field. The ponds may also be used to store produced water from other Piceance operators to support well stimulation by hydraulic fracturing. Water is introduced to the pond from either pipeline or water trucks. The location is also being designed to comply with Garfield County Code 4-203.D., 4-203.E., 7-204 and the COGCC regulation that states,

“Surface water diversion structures, including, but not limited to berms and ditches, shall be constructed to accommodate a one hundred (100) year, twenty-four (24) hour event. The facility shall be designed and constructed with a run-on control system to prevent flow onto the facility during peak discharge and a run-off control system to contain the water volume from a twenty-five (25) year, twenty-four (24) hour storm”

This report analyzes stormwater flows on and around the existing pad areas and change in stormwater runoff quantity resulting from the existing location during expected flows for design storm events.

b) Project Location

The Pond 13 E-W Facility is located in the SE $\frac{1}{4}$ of Section 4, Township 6 South, Range 97 West, 6th Principal Meridian, Garfield County, Colorado. The ponds are located on top of a ridge which is advantageous for controlling stormwater. Driving directions to the Pond 13 E-W Facility are described as follows:

From De Beque, Colorado, head northwesterly on 45 Rd for 3.2 miles. Continue northerly onto County Road 204 into Garfield County for 2.1 miles. Turn right onto the field access road and continue northerly then easterly, up the switchbacks, then northerly again for 11.1 miles. Turn left at the Y and continue on the main access road for 6.6 miles. Turn left at the T and continue on the main access road for 1.4 miles. Turn left across the cattle guard and continue on the main access road for 1.5 miles. Turn right at the Y and continue along the ridge for 0.6 miles. Turn right at the Y and continue 2.1 miles staying on the main access road to enter the Pond 13 E-W Facility.

Center of Pond 13 E-W coordinates are approximated in NAD 83 Datum as:

Latitude: 39.548611° N

Longitude: 108.216944° W

c) Property Description

The Pond 13 E-W Facility is located on a large Oxy USA property with no nearby property boundaries. The Pond 13 E-W Facility is generally bounded on the southeast by the top of an existing 2:1 (H:V) slope, bounded on the southwest by the top of an existing 2:1 slope, bounded on the northwest by the Cascade Creek 640-44 well pad and bounded on the north by an existing field access road.

Two storage areas for equipment and surplus materials are proposed near the ponds. The existing Cascade Creek 604-44 well pad which lies just Northwest of the Pond 13 E-W Facility is a proposed storage area. The other proposed storage area is the Southern portion of the Pond 13 E-W pad which is comprised of a “finger” that juts out to the South along a ridge.

The surface of the Pond 13 E-W Facility and Cascade Creek 604-44 well pad are mostly bare dirt with a small amount of gravel intermixed. Side slopes within the Stormwater Analysis Area have been reclaimed and are either mostly bare or lightly covered with grasses and other vegetation.

The existing Pond 13 E-W area is zoned as Resource Lands as indicated by the Garfield County Zone District Map.

d) Previous Investigations

To our understanding, no previous investigations of the Pond 13 E-W Facility drainage have been conducted or approved regarding this location.

2) DRAINAGE SYSTEM DESCRIPTION

a) Basin Descriptions

See Sheet A-3 of Appendix A for a map of the delineated watersheds.

W1 is the 0.56 acre basin north of the Cascade Creek 604-44 well pad. Stormwater accumulating on W1 is collected in swale S1 and directed in a road ditch to the Southwest where it is discharged down the slope to the West.

W2 is the 1.28 acre basin making up the northern portion of the Cascade Creek 604-44 well pad. Stormwater accumulating on W2 is either collected on the well pad in small puddles or directed by sheet flow to the northwest edge of the pad where it is released by sheet flow or small rills off the edge of the pad, down the slope to the northwest.

W3 is the 0.97 acre basin making up the southern portion of the Cascade Creek 604-44 well pad. Stormwater falling on W3 is directed by sheet flow or small rills to swale S2 and transported to the Southeast at design point 2 where it is released down the slope in swale S2.

W4 is the 0.65 acre sloping area southwest of the Cascade Creek 604-44 well pad and part of the Pond 13 E-W Facility. Water flows onto W4 through swale S2. Stormwater collecting on W4 is collected in swales S3 and S4 and transported to design point 3 where it is released down the slope to the southwest.

W5 is the 1.56 acre sloping area southwest of the Pond 13 E-W Facility. Water flows onto W5 through swale S11 and is directed to the sediment trap at the bottom of the slope. Stormwater that falls on W5 is collected in swales S5 and S6 and directed to the sediment trap at design point 4 before it is released down the slope to the Southwest.

W6 is the 1.06 acre area at the southwest edge of the Pond 13 E-W Facility. Water accumulating on W6 is collected in swales S7 and S8 where it is directed to design point

5 and released to swale S11 which routes the water to the sediment trap at the bottom of the slope, before being released by sheet flow or small rills down the slope to the southwest.

W7 is the 0.57 acre area which drains through sheet flow and small rills to swale S9 and directed to a proposed 24" culvert.

W8 is the 2.04 acre area which drains to Pond 13 West. Water collecting on W8 is directed through sheet flow and small rills to Pond 13 West. Interior slopes of Pond 13 West are at a maximum 3:1 (H:V). The area of Pond 13 West is excluded from the basin for calculation purposes.

W9 is the 1.53 acre area which drains to Pond 13 East. Water that falls on W9 is directed to the pond by sheet flow or small rills. Interior slopes of Pond 13 East are at a maximum 3:1 (H:V). This is excluded from the basin for calculation purposes.

W10 is the 0.12 acre area which drains through sheet flow and small rills to swale S10 and directed to a proposed 24" culvert.

W11 is the 1.84 acre area along the southeast edge of Pond 13 E-W Facility. Water accumulating on W11 is directed by sheet flow to swales S12 and S13 and collects in a proposed sediment trap at design point 8, before being released by sheet flow or small rills down the slope to the south east.

WH is the historic location of the Stormwater Analysis Area which includes all the previously identified basins and covers 12.18 acres. This location was located on the top of a ridge and stormwater that fell within this boundary exited in nearly every direction by way of sheet flows and small rills.

b) Existing Drainage Conditions

The existing conditions of the Pond 13 E-W and Cascade Creek 604-44 locations consist of relatively level pad areas with projecting 2:1 slopes extending from the southwest and southeast pad edges down to catch with native contours. The slopes have been revegetated, and some vegetation is beginning to stabilize the slopes. Soil conditions on the pads are mainly graded and leveled travel surfaces. All basins in the Stormwater Analysis Area have a hydrologic soil group C designation which has "moderately high runoff potential when thoroughly wet" as defined by the Natural Resources Conservation Service (NRCS). See the hydrologic soil group map produced by the NRCS in Appendix B.

Our findings show the existing Pond 13 E-W Facility reduces the runoff amount across the WH boundary as a result of the ponds being constructed. Since stormwater which falls on W8 and W9 drain to the ponds and is not allowed to discharge, runoff is reduced. Calculations show the total peak flow across the boundary of the Stormwater Analysis Area during a 100 year, 24 hour storm has been reduced compared to historical flows from 26.87 cfs to 24.77 cfs. As a result, no retention facilities are required.

The Stormwater Analysis Area is located so that no water flows onto the location from any direction. The north edges of the pads are bounded by a field access road which

runs just north of the Pond 13 E-W Facility and Cascade Creek 604-44 well pad and directs water to the North and away from the pads.

Stormwater which falls within the Stormwater Analysis Area is either retained within the ponds or discharged off the southeast and southwest edges of the pads by sheet flow or collected in drainage ditches and released.

c) Offsite Drainage

The Pond 13 E-W Facility and associated Cascade Creek 604-44 well pad were located on a ridge to minimize the Stormwater Analysis Area to the disturbance area of the facility.

d) Proposed Drainage System Description

See Sheet A-3 of Appendix A for the proposed dimensions of each swale. The V shape swales are to be graded with 3:1 slopes at a total depth as shown. Extra soil due to swale grading shall be stockpiled on the downhill side of the swale and compacted to form a small berm. Swales shall not have a minimum slope less than 0.75%. Design swale depths meet or exceed required dimensions as calculated, see Appendix C.

Where water flow velocity through a swale exceeds 5 feet per second during a 100 year, 24 hour event, additional mitigation measures will be needed. Swales meeting this criterion are S2, S4, S6, S11, S12, and S13. To control flow velocities and prevent erosion through swales S4, S6, S12, and S13, permanent wattle logs will be placed to form small check dams which provide energy dissipation along their length. Swales S2 and S11 will require erosion control matting under riprap armoring along the length of channel exceeding 40% slope to provide energy dissipation.

The existing sediment trap at design point 4 will also be utilized to dissipate energy and remove excess sediment before water is released to undisturbed ground. The sediment trap should be constructed as directed by the Urban Storm Drainage Criteria Manual available from the Urban Drainage and Flood Control District with appropriate compaction and riprap outlet.

A sediment trap is proposed at design point 8 to dissipate energy and remove excess sediment before water is released to undisturbed ground. The sediment trap should be constructed as directed by the Urban Storm Drainage Criteria Manual available from the Urban Drainage and Flood Control District with appropriate compaction and riprap outlet.

In addition to other upgrades, slope stabilization and erosion mitigation will be incorporated on the fill slope just Southeast of Pond 13 East. Erosion control blankets shall be installed according to the Urban Storm Drainage Criteria Manual and the area reseeded and mulched as needed until sufficient vegetation is reestablished to prevent erosion. Wattle logs shall be installed along the bottom of the slope at the edge of disturbance Southeast of Pond 13 East and other places along the disturbance perimeter where rills or erosion occur. The purpose is to eliminate concentration of stormwater before it is released to undisturbed ground. Perimeter wattle logs shall be installed using the "J-hook" methods and as described in the Urban Storm Drainage

Criteria Manual where possible. Where small rills have already developed, wattle logs shall be installed at regular intervals in check dam fashion along the entire length of the rill until the erosion is controlled. Installation of sediment control logs shall be as suggested by the Urban Storm Drainage Criteria Manual.

e) Drainage Facility Maintenance

Owner will be required to perform regular maintenance of swales, wattle logs, erosion control mats and sediment trap. Swales should be graded or cleaned out every one to three years or as needed after all significant storm events. Wattle logs should be maintained as needed to retain erosion mitigation properties. Erosion control mats should be maintained and the area reseeded and mulched until the slope is sufficiently stabilized by vegetation. The sediment trap should be dredged and re-graded as needed to maintain depth, dimensions and side slopes.

3) DRAINAGE ANALYSIS AND DESIGN CRITERIA

a) Regulations

Production of this drainage report follows normal and customary engineering practices for this type and nature of work. Regulations from the Garfield County Land Use and Development Code 7-204 were applied as minimum standards.

b) Development Criteria

No known drainage constraints have been previously placed on the Pond 13 E-W site due to drainage studies, floodplain studies or a master drainage plan. Drainage systems were designed to reduce flow from the Pond 13 E-W site compared to historical flows and mitigate runoff effects onto downstream lands.

c) Hydrologic Criteria

Hydrologic calculations performed on the Stormwater Analysis Area were according to normal and customary engineering practices. The rational method was utilized in development of hydrologic design storms and runoff. See Appendix B for all hydrologic calculations.

d) Hydraulic Criteria

Hydraulic calculations performed during drainage design of the Stormwater Analysis Area drainage systems were according to normal and customary engineering practices. Hydraulic flow through each swale was estimated using Manning's Equation. See Appendix C for hydraulic calculations.

4) CONCLUSIONS

a) Compliance

This report has been prepared in accordance with normal and customary engineering practices for this type and nature of work.

b) Design Effectiveness

With proper application of the proposed drainage mitigation design presented in this report, runoff effects onto areas downstream of the Stormwater Analysis Area will be alleviated.

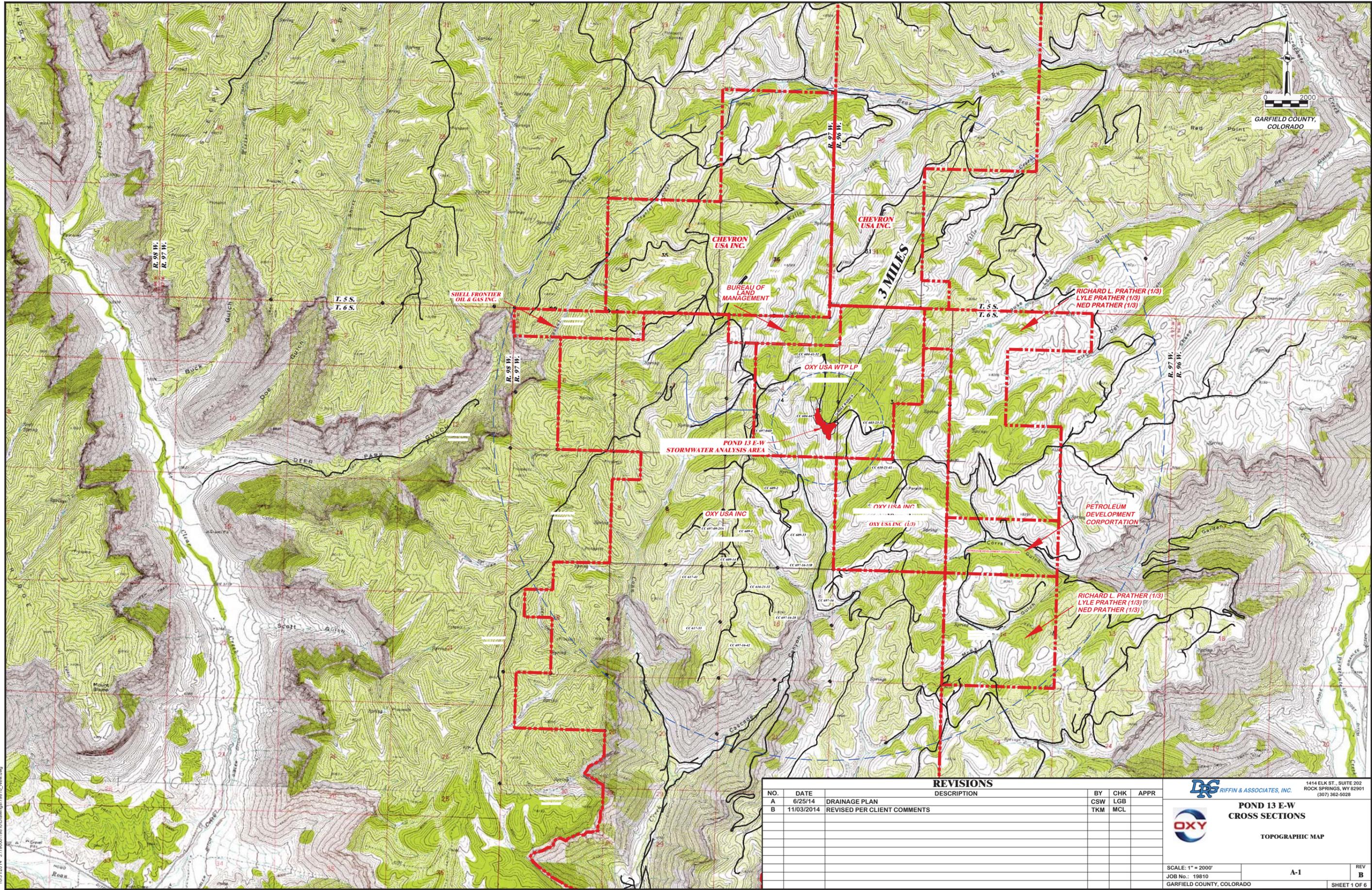
c) Areas in Flood Hazard Zones

There are no flood hazard zones designated by FEMA for the Stormwater Analysis Area. The Stormwater Analysis Area is classified as Zone D.

5) REFERENCES

- 1.) Stormwater Management Manual Grand Junction Municipal Code Title 26, December 4, 2013
- 2.) Urban Storm Drainage Criteria Manual Volume 3, Stormwater Best management Practices, November 2010
- 3.) Hydrology National Engineering Handbook Hydrologic Soil Groups United States Department of Agriculture Natural Resources Conservation Service Part 630 Chapter 7, May 2007
- 4.) Zone District Map, Garfield County, CO, December 16, 2013
- 5.) FEMA Flood Insurance Rate Map, Garfield County Colorado, Map Number 080205IND0A, August 2, 2006

APPENDIX A: MAPS AND EXHIBITS



REVISIONS				BY	CHK	APPR
NO.	DATE	DESCRIPTION				
A	6/25/14	DRAINAGE PLAN	CSW	LGB		
B	11/03/2014	REVISED PER CLIENT COMMENTS	TKM	MCL		

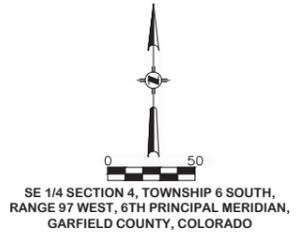
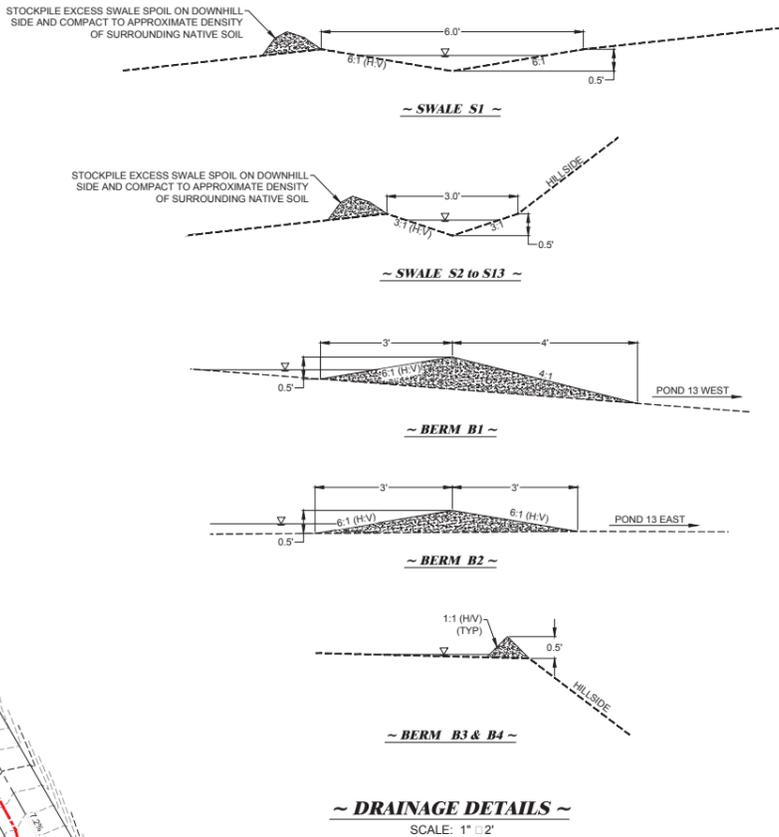
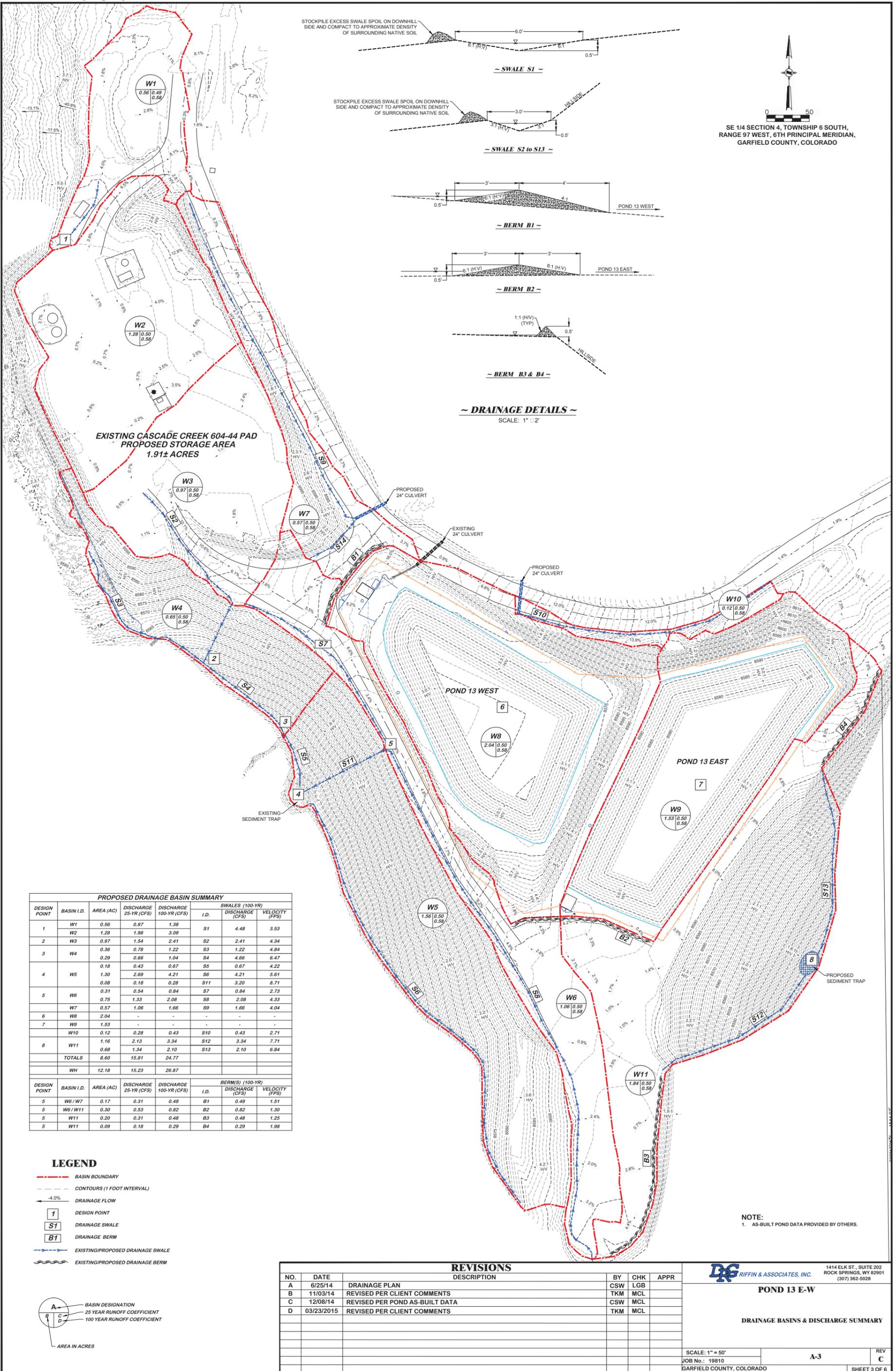

 1414 ELK ST., SUITE 202
 ROCK SPRINGS, WY 82901
 (307) 362-5028


**POND 13 E-W
 CROSS SECTIONS**
 TOPOGRAPHIC MAP

SCALE: 1" = 2000'
 JOB No.: 19810
 GARFIELD COUNTY, COLORADO

A-1
 REV B
 SHEET 1 OF 6

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EXISTING CASCADE CREEK 604-44 PAD
PROPOSED STORAGE AREA
1.91± ACRES

PROPOSED DRAINAGE BASIN SUMMARY							
DESIGN POINT	BASIN I.D.	AREA (AC)	DISCHARGE 25-YR (CFS)	DISCHARGE 100-YR (CFS)	SWALES (100-YR)		
					I.D.	DISCHARGE (CFS)	VELOCITY (FPS)
1	W1	0.56	0.87	1.38	S1	4.48	3.53
	W2	1.28	1.98	3.09			
2	W3	0.97	1.54	2.41	S2	2.41	4.34
	W4	0.36	0.78	1.22	S3	1.22	4.84
3	W4	0.29	0.66	1.04	S4	0.66	6.47
		0.18	0.43	0.67	S5	0.67	4.22
	W5	1.30	2.69	4.21	S6	4.21	5.61
		0.08	0.18	0.28	S11	0.28	8.71
4	W6	0.31	0.54	0.84	S7	0.84	2.73
	W7	0.75	1.33	2.08	S8	2.08	4.33
	W7	0.57	1.06	1.66	S9	1.66	4.04
6	W8	2.04	-	-			
	W9	1.53	-	-			
7	W10	0.12	0.28	0.43	S10	0.43	2.71
	W11	1.16	2.13	3.34	S12	3.34	7.71
8	W11	0.68	1.34	2.10	S13	2.10	6.84
	TOTALS	8.60	15.81	24.77			
	WH	12.18	15.23	26.87			

DESIGN POINT	BASIN I.D.	AREA (AC)	DISCHARGE 25-YR (CFS)	DISCHARGE 100-YR (CFS)	BERM(S) (100-YR)		
					I.D.	DISCHARGE (CFS)	VELOCITY (FPS)
5	W6 / W7	0.17	0.31	0.49	B1	0.49	1.51
5	W6 / W11	0.30	0.53	0.82	B2	0.82	1.30
5	W11	0.20	0.31	0.48	B3	0.48	1.25
5	W11	0.09	0.18	0.29	B4	0.29	1.98

- LEGEND**
- BASIN BOUNDARY
 - CONTOURS (1 FOOT INTERVAL)
 - DRAINAGE FLOW
 - 1 DESIGN POINT
 - S1 DRAINAGE SWALE
 - B1 DRAINAGE BERM
 - EXISTING/PROPOSED DRAINAGE SWALE
 - EXISTING/PROPOSED DRAINAGE BERM



NOTE:
1. AS-BUILT POND DATA PROVIDED BY OTHERS.

REVISIONS					
NO.	DATE	DESCRIPTION	BY	CHK	APPR
A	6/25/14	DRAINAGE PLAN	CSW	LGB	
B	11/03/14	REVISED PER CLIENT COMMENTS	TKM	MCL	
C	12/08/14	REVISED PER POND AS-BUILT DATA	CSW	MCL	
D	03/23/2015	REVISED PER CLIENT COMMENTS	TKM	MCL	

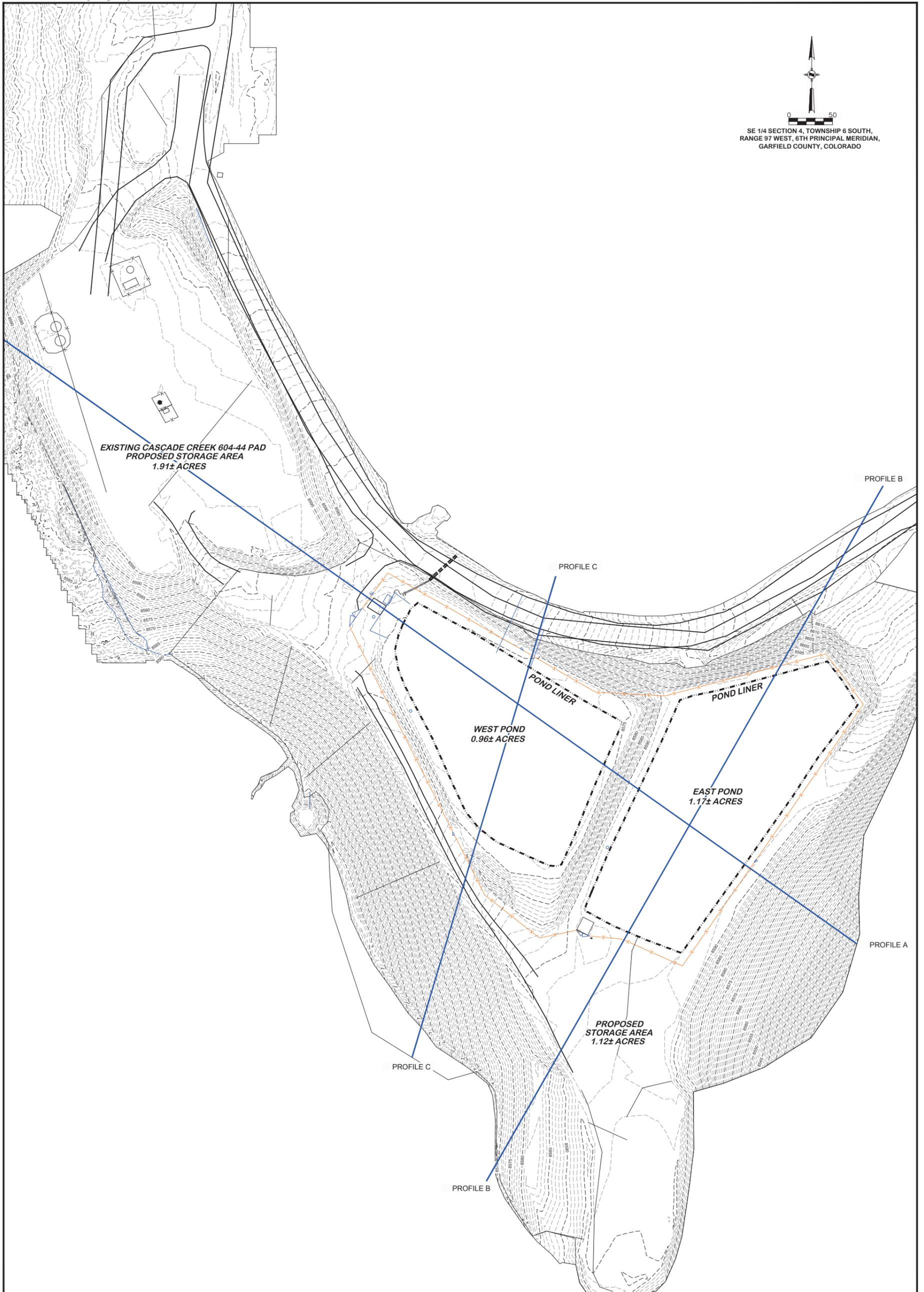
DRG RIFFIN & ASSOCIATES, INC. 1414 ELK ST., SUITE 202
ROCK SPRINGS, WY 82901
(307) 362-5028

POND 13 E-W

DRAINAGE BASINS & DISCHARGE SUMMARY



SE 14 SECTION 4, TOWNSHIP 6 SOUTH,
RANGE 97 WEST, 6TH PRINCIPAL MERIDIAN,
GARFIELD COUNTY, COLORADO



EXISTING CASCADE CREEK 604-44 PAD
PROPOSED STORAGE AREA
1.91± ACRES

WEST POND
0.96± ACRES

EAST POND
1.17± ACRES

PROPOSED
STORAGE AREA
1.12± ACRES

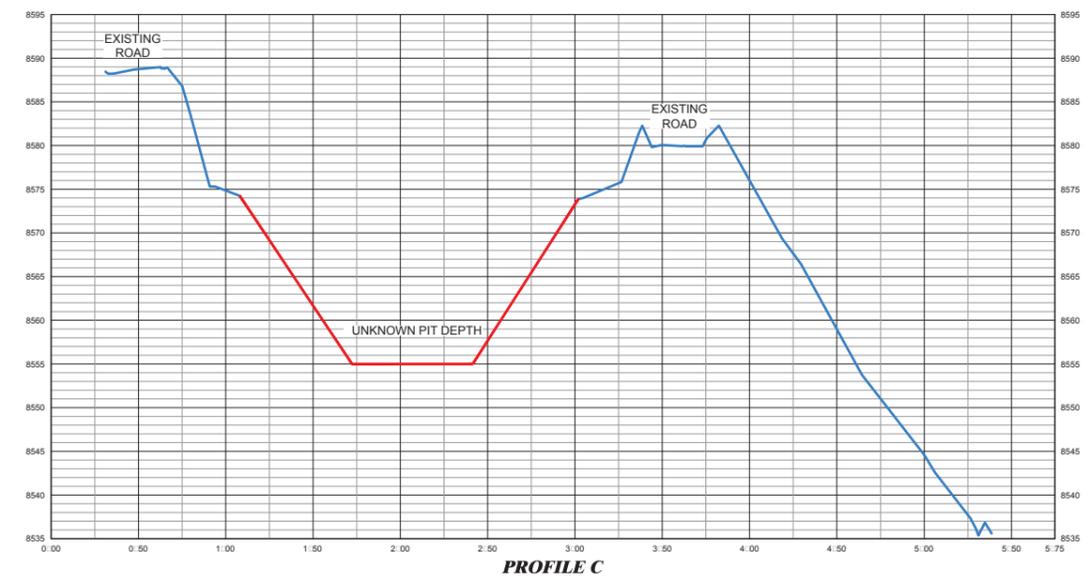
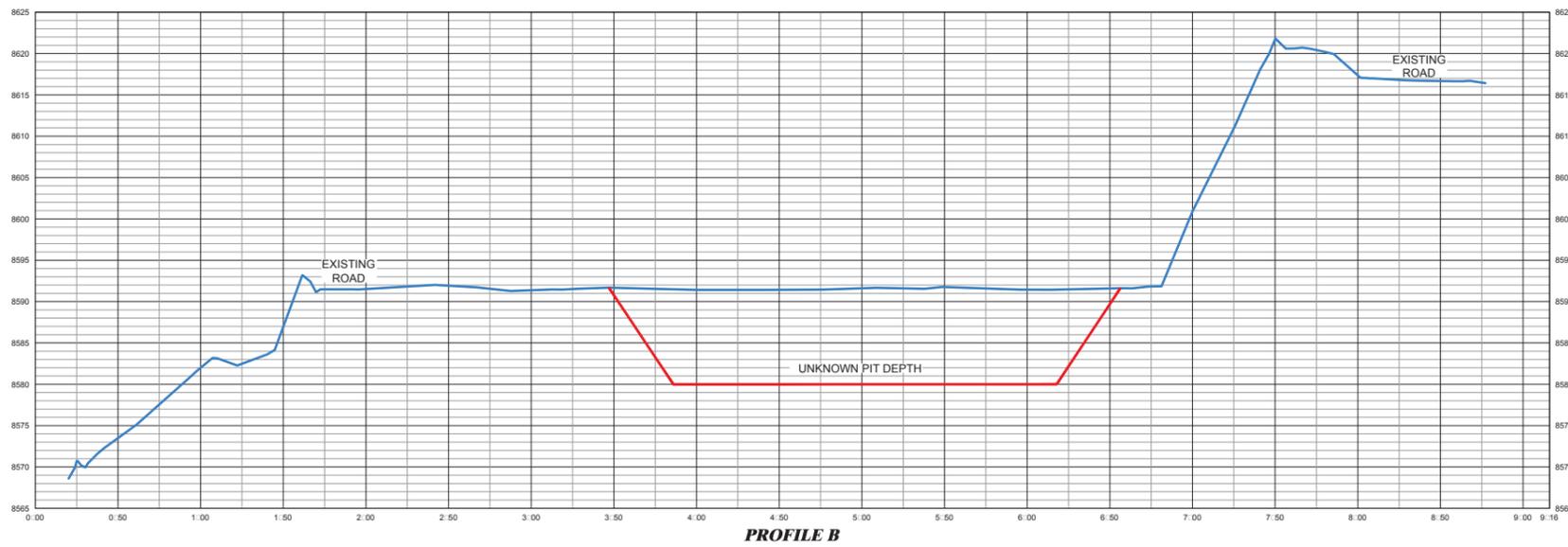
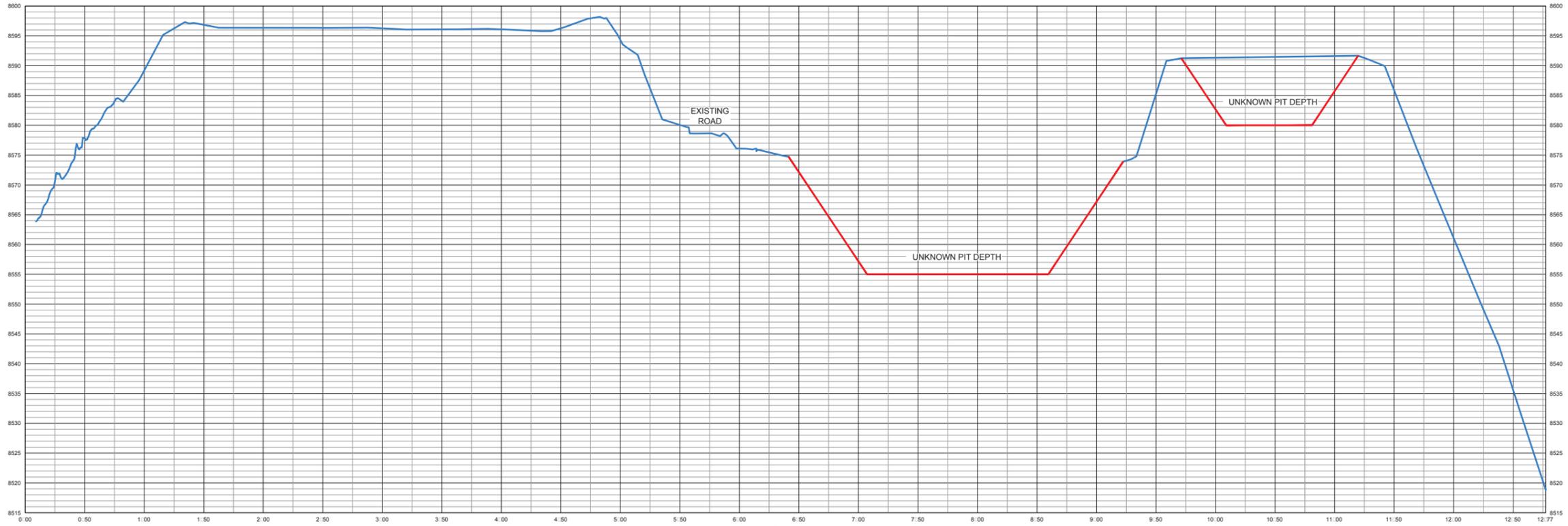
LEGEND

- PROFILE LINE
- - - - - CONTOURS (1 FOOT INTERVAL)
- FENCING
- · - · - PIT LINERS
- ROAD EDGES

REVISIONS					
NO.	DATE	DESCRIPTION	BY	CHK	APPR
B	11/03/2014	REVISED PER CLIENT COMMENTS	TKM	MCL	

DR RIFFIN & ASSOCIATES, INC. 1414 ELK ST., SUITE 202
ROCK SPRINGS, WY 82901
(307) 362-5028

**POND 13 E-W
CROSS SECTIONS**
DETAIL PIT PLAN



REVISIONS					
NO.	DATE	DESCRIPTION	BY	CHK	APPR
B	11/03/2014	REVISED PER CLIENT COMMENTS	TKM	MCL	

LRS RIFFIN & ASSOCIATES, INC. 1414 ELK ST., SUITE 202
 ROCK SPRINGS, WY 82901
 (307) 362-5028

**POND 13 E-W
 CROSS SECTIONS**

PROFILE VIEWS

SCALE: 1" = 50'
 JOB No.: 19810
 GARFIELD COUNTY, COLORADO

A-5

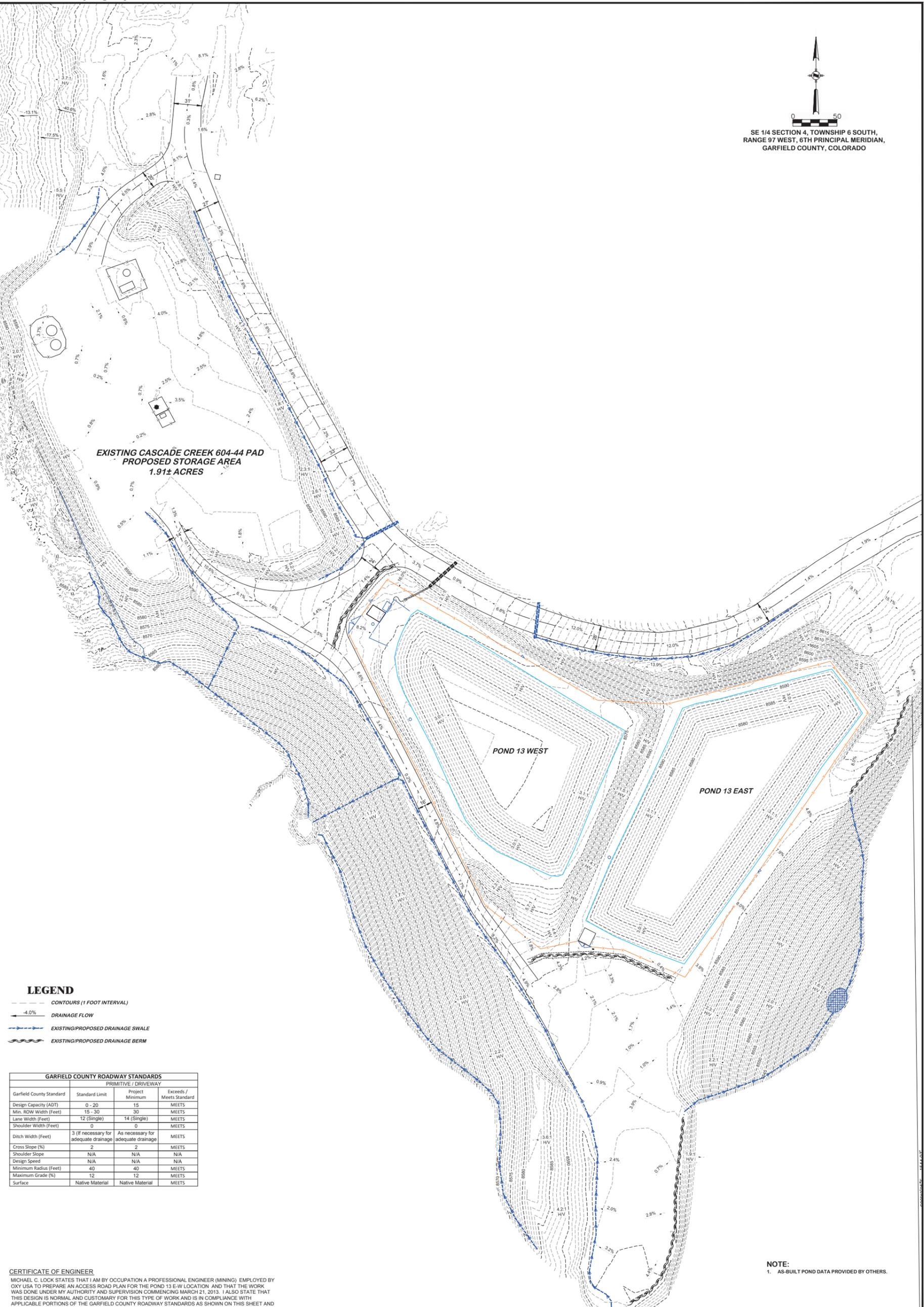
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SHEET 5 OF 6

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SE 1/4 SECTION 4, TOWNSHIP 6 SOUTH,
RANGE 97 WEST, 6TH PRINCIPAL MERIDIAN,
GARFIELD COUNTY, COLORADO



LEGEND

- CONTOURS (1 FOOT INTERVAL)
- -4.0% DRAINAGE FLOW
- EXISTING/PROPOSED DRAINAGE SWALE
- EXISTING/PROPOSED DRAINAGE BERM

GARFIELD COUNTY ROADWAY STANDARDS			
	PRIMITIVE / DRIVEWAY		
Garfield County Standard	Standard Limit	Project Minimum	Exceeds / Meets Standard
Design Capacity (ADT)	0 - 20	15	MEETS
Min. ROW Width (Feet)	15 - 30	30	MEETS
Lane Width (Feet)	12 (Single)	14 (Single)	MEETS
Shoulder Width (Feet)	0	0	MEETS
Ditch Width (Feet)	3 (if necessary for adequate drainage)	As necessary for adequate drainage	MEETS
Cross Slope (%)	2	2	MEETS
Shoulder Slope	N/A	N/A	N/A
Design Speed	N/A	N/A	N/A
Minimum Radius (Feet)	40	40	MEETS
Maximum Grade (%)	12	12	MEETS
Surface	Native Material	Native Material	MEETS

CERTIFICATE OF ENGINEER
MICHAEL C. LOCK STATES THAT I AM BY OCCUPATION A PROFESSIONAL ENGINEER (MINING) EMPLOYED BY OXY USA TO PREPARE AN ACCESS ROAD PLAN FOR THE POND 13 E-W LOCATION AND THAT THE WORK WAS DONE UNDER MY AUTHORITY AND SUPERVISION COMMENCING MARCH 21, 2013. I ALSO STATE THAT THIS DESIGN IS NORMAL AND CUSTOMARY FOR THIS TYPE OF WORK AND IS IN COMPLIANCE WITH APPLICABLE PORTIONS OF THE GARFIELD COUNTY ROADWAY STANDARDS AS SHOWN ON THIS SHEET AND AS DISCUSSED IN THE NOTES.



MICHAEL C. LOCK
COLORADO PE NO. 37933

NOTE:
1. AS-BUILT POND DATA PROVIDED BY OTHERS.

REVISIONS					
NO.	DATE	DESCRIPTION	BY	CHK	APPR
A	03/23/2015	ISSUED FOR CLIENT REVIEW	TKM	MCL	

 1414 ELK ST., SUITE 202
ROCK SPRINGS, WY 82901
(307) 362-5028



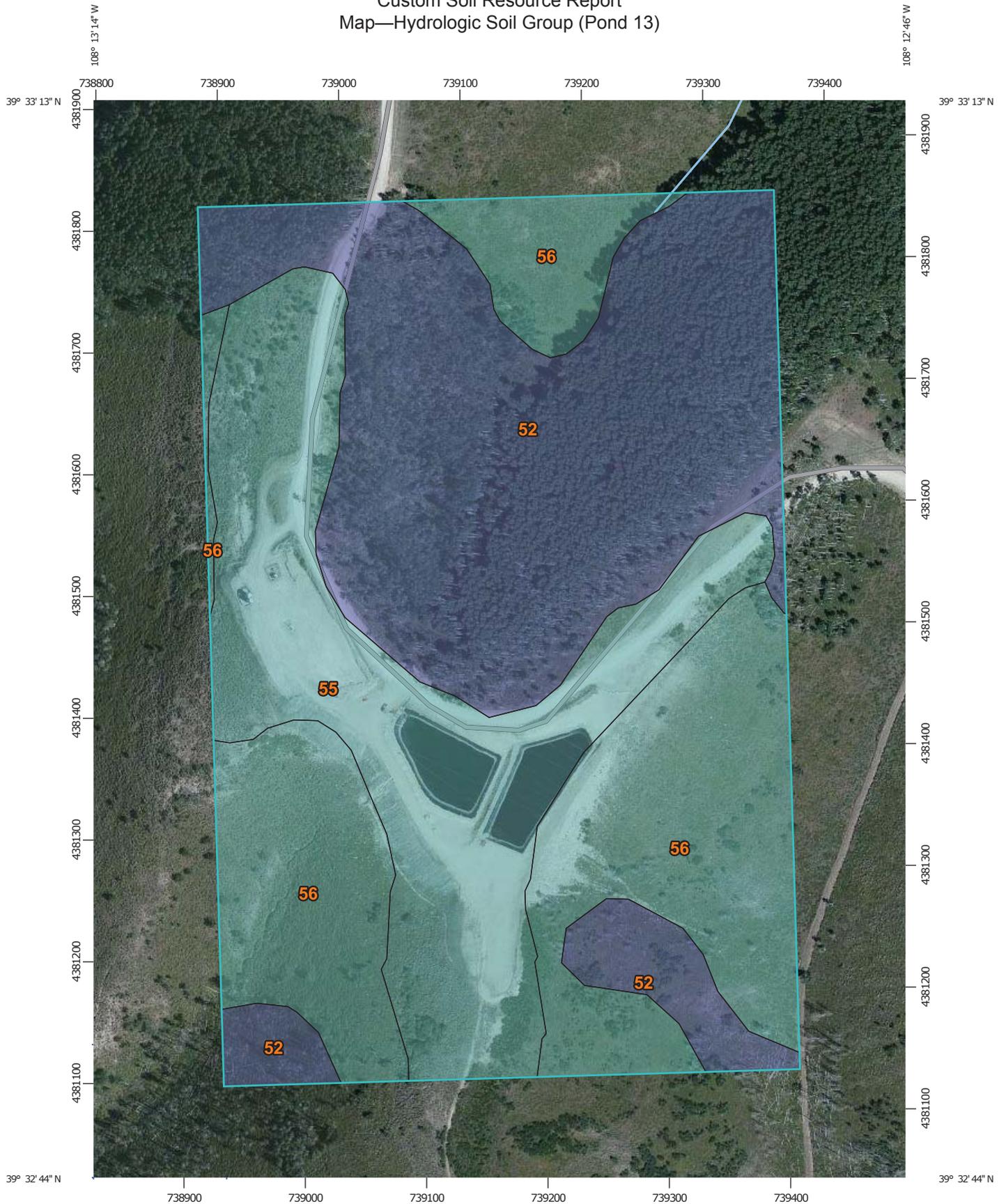
POND 13 E-W
ACCESS ROAD PLAN

SCALE: 1" = 50'
 JOB No.: 19810
 GARFIELD COUNTY, COLORADO

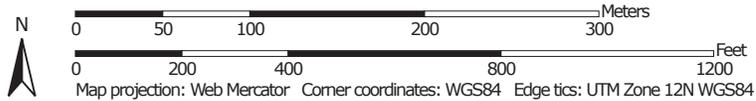
19810-ACCESS ROAD
 REV **A**
 SHEET 1 OF 1

APPENDIX B: HYDROLOGIC CALCULATIONS

Custom Soil Resource Report Map—Hydrologic Soil Group (Pond 13)



Map Scale: 1:4,310 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

- Area of Interest (AOI)**
 -  Area of Interest (AOI)
- Soils**
 - Soil Rating Polygons**
 -  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
 - Soil Rating Lines**
 -  A
 -  A/D
 -  B
 -  B/D
 -  C
 -  C/D
 -  D
 -  Not rated or not available
 - Soil Rating Points**
 -  A
 -  A/D
 -  B
 -  B/D
- Water Features**
 -  Streams and Canals
- Transportation**
 -  Rails
 -  Interstate Highways
 -  US Routes
 -  Major Roads
 -  Local Roads
- Background**
 -  Aerial Photography
- Other**
 -  C
 -  C/D
 -  D
 -  Not rated or not available

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties
 Survey Area Data: Version 6, Dec 23, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 22, 2010—Sep 2, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Pond 13)

Hydrologic Soil Group— Summary by Map Unit — Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties (CO682)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
52	Northwater-Adel complex, 5 to 50 percent slopes	B	34.8	40.9%
55	Parachute-Irigul complex, 5 to 30 percent slopes	C	23.4	27.4%
56	Parachute-Irigul-Rhone association, 25 to 50 percent slopes	C	27.0	31.7%
Totals for Area of Interest			85.1	100.0%

Rating Options—Hydrologic Soil Group (Pond 13)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be

Design Storms

1 HOUR DURATION DESIGN RAINFALL OBTAINED FROM NOAA ATLAS 14, VOLUME 8, VERSION 2

RECURRENCE INTERVAL (YEARS)		DEPTH (INCHES)
2 YEAR		0.61
5 YEAR		0.83
10 YEAR		1.01
25 YEAR		1.29
50 YEAR		1.51
100 YEAR		1.74

24 HOUR DURATION DESIGN RAINFALL OBTAINED FROM NOAA ATLAS 14, VOLUME 8, VERSION 2

RECURRENCE INTERVAL (YEARS)		DEPTH (INCHES)
2 YEAR		1.32
5 YEAR		1.59
10 YEAR		1.83
25 YEAR		2.19
50 YEAR		2.48
100 YEAR		2.80

Composite Runoff Coefficients "C"								
Swale(s)	Basin I.D.	Soil Group C&D (%)	Undeveloped (%)	Gravel Road (%)	Impervious (%)	Runoff Coefficients		
						Soil Type C&D		
						5 YR	25 YR	100 YR
S1	W1	100.0%	10.0%	90.0%	37.0%	0.34	0.49	0.58
	W2	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S2	W3	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S3	W4	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S4		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S5	W5	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S6		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S11		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S7	W6	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S8		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S9	W7	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S14		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
P13W	W8	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
P13E	W9	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S10	W10	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S12	W11	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
S13		100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
	WH	100.0%	100.0%	0.0%	2.0%	0.17	0.39	0.51
Berm(s)	Basin I.D.	Soil Group C&D (%)	Undeveloped (%)	Gravel Road (%)	Impervious (%)	Runoff Coefficients		
B1	W6 / W7	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
B2	W6 / W11	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
B3	W11	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58
B4	W11	100.0%	0.0%	100.0%	40.0%	0.35	0.50	0.58

Time of Concentration

Sub-Basin Data				Init. Overland Time (Ti)			Travel Time (Tt)						Total	Tc Check (Urbanized Basins)	
Swale(s)	Basin	C5	Area (AC)	Lo (ft)	Slope %	Ti (Min.)	Land Type	Cv	Length	Slope %	Vel. (FPS)	Tt (Min)	Ti+Tt (Min)	Lgth. (Ft)	Tc
S1	W1	0.34	0.56	200	4	12.19	BARE	10	92	5	2.24	0.69	12.87	292	11.62
	W2	0.35	1.28	260	4	13.71	BARE	10	-	-	-	-	13.71	260	11.44
S2	W3	0.35	0.97	185	4	11.57	BARE	10	246	9	3.00	1.37	12.93	431	12.39
S3	W4	0.35	0.36	100	22	4.82	BARE	10	204	19	4.36	0.78	5.60	304	11.69
S4		0.35	0.29	95	46	3.67	BARE	10	130	17	4.12	0.53	4.20	225	11.25
S5	W5	0.35	0.18	100	53	3.59	BARE	10	63	22	4.69	0.22	3.82	163	10.91
S6		0.35	1.30	100	50	3.66	BARE	10	551	12	3.41	2.69	6.36	651	13.62
S11		0.35	0.08	100	57	3.51	BARE	10	103	50	7.07	0.24	3.75	203	11.13
S7	W6	0.35	0.31	150	6	9.10	BARE	10	255	6	2.45	1.74	10.83	405	12.25
S8		0.35	0.75	100	10	6.27	BARE	10	675	10	3.16	3.56	9.82	775	14.31
S9	W7	0.35	0.45	100	10	6.27	BARE	10	486	10	3.16	2.56	8.83	586	13.26
S14		0.35	0.12	60	10	4.85	BARE	10	73	3	1.73	0.70	5.56	133	10.74
P13W	W8	0.35	2.04	50	50	2.59	BARE	10	0	-	-	-	2.59	50	10.28
P13E	W9	0.35	1.53	75	30	3.76	BARE	10	0	-	-	-	3.76	75	10.42
S10	W10	0.35	0.12	24	15	2.68	BARE	10	314	9	3.00	1.74	4.43	338	11.88
S12	W11	0.35	1.16	100	4	8.50	BARE	10	208	36	6.00	0.58	9.08	308	11.71
S13		0.35	0.68	100	8	6.75	BARE	10	224	33	5.79	0.65	7.40	324	11.80
	WH	0.17	12.18	300	18	11.06	PASTURE	7	300	20	3.13	1.60	12.66	600	13.33

Berm(s)	Basin	C5	Area (AC)	Lo (ft)	Slope %	Ti (Min.)	Land Type	Cv	Length	Slope %	Vel. (FPS)	Tt (Min)	Ti+Tt (Min)	Lgth. (Ft)	Tc
B1	W6 / W7	0.35	0.17	86	3	8.68	BARE	10	0	3	1.73	0.00	8.68	86	10.48
B2	W6 / W11	0.35	0.30	128	3	10.59	BARE	10	0	3	1.73	0.00	10.59	128	10.71
B3	W11	0.35	0.20	209	3	13.53	BARE	10	0	3	1.73	0.00	13.53	209	11.16
B4	W11	0.35	0.09	128	8	7.64	BARE	10	0	3	1.73	0.00	7.64	128	10.71

Formulas:

$$Ti = 1.8(1.1 - C_5)Lo^{0.5} / (S^{1/3})$$

$$V = Cv * (S/100)^{0.5}$$

$$Tc = (L/180) + 10$$

Notes:

- 1.) C_5 = 5 year runoff coefficient
- 2.) Lo = Length of overland flow, 300' maximum.
- 3.) Overland Time and Travel Time Slope % derived from survey data.

Rational Method Procedure
Design Storm: 25-Year Developed

Direct Runoff										
Design Point	Swale(s)	Basin	Area (AC)	Imperv.	Coeff. (C)	Tc (Min.)	C*A	P ₁	I (in/hr.)	Q (cfs)
1	S1	W1	0.56	0.37	0.49	12.87	0.27	1.29	3.18	0.87
		W2	1.28	0.40	0.50	13.71	0.64	1.29	3.10	1.98
2	S2	W3	0.97	0.40	0.50	12.93	0.48	1.29	3.18	1.54
3	S3	W4	0.36	0.40	0.50	5.60	0.18	1.29	4.30	0.78
	S4		0.29	0.40	0.50	4.20	0.14	1.29	4.63	0.66
4	S5	W5	0.18	0.40	0.50	3.82	0.09	1.29	4.73	0.43
	S6		1.30	0.40	0.50	6.36	0.65	1.29	4.14	2.69
	S11		0.08	0.40	0.50	3.75	0.04	1.29	4.75	0.18
5	S7	W6	0.31	0.40	0.50	10.83	0.16	1.29	3.43	0.54
	S8		0.75	0.40	0.50	9.82	0.37	1.29	3.56	1.33
	S9	W7	0.45	0.40	0.50	8.83	0.23	1.29	3.71	0.84
	S14		0.12	0.40	0.50	5.56	0.06	1.29	4.31	0.26
6	P13W	W8	2.04	0.40	0.50	2.59	1.02	1.29	5.09	5.20
7	P13E	W9	1.53	0.40	0.50	3.76	0.76	1.29	4.75	3.63
	S10	W10	0.12	0.40	0.50	4.43	0.06	1.29	4.58	0.28
8	S12	W11	1.16	0.40	0.50	9.08	0.58	1.29	3.67	2.13
	S13		0.68	0.40	0.50	7.40	0.34	1.29	3.95	1.34
		TOTAL	8.48							15.59
		WH	12.18	0.02	0.39	12.66	4.75	1.29	3.21	15.23

Design Point	Berm(s)	Basin	Area (AC)	Imperv.	Coeff. (C)	Tc (Min.)	C*A	P ₁	I (in/hr.)	Q (cfs)
	B1	W6 / W7	0.17	0.40	0.50	8.68	0.08	1.29	3.73	0.31
	B2	W6 / W11	0.30	0.40	0.50	10.59	0.15	1.29	3.46	0.53
	B3	W11	0.20	0.40	0.50	13.53	0.10	1.29	3.11	0.31
	B4	W11	0.09	0.40	0.50	7.64	0.05	1.29	3.91	0.18

Formulas:

$$I = 28.9 * P_1 / (10 + T_c)^{0.786}$$

$$Q = CIA$$

Notes:

P₁ = Point rainfall for one-hour duration. See Design Storms.

Rational Method Procedure
Design Storm: 100-Year Developed

Direct Runoff											Ditch			Travel Time	
Design Point	Swale(s)	Basin	Area (AC)	Imperv. (dec)	Coeff. (C)	Tc (Min.)	C*A	P1	I (in/hr.)	Q (cfs)	Slope %	Flow (cfs)	Length (Ft)	Velocity (fps)	Travel Time (Min)
1	S1	W1	0.56	0.37	0.58	12.87	0.32	1.74	4.30	1.38	5	4.48	92	3.53	0.43
		W2	1.28	0.40	0.58	13.71	0.74	1.74	4.18	3.09					
2	S2	W3	0.97	0.40	0.58	12.93	0.56	1.74	4.29	2.41	9	2.41	246	4.34	0.94
3	S3	W4	0.36	0.40	0.58	5.60	0.21	1.74	5.80	1.22	19	1.22	204	4.84	1.15
	S4		0.29	0.40	0.58	4.20	0.17	1.74	6.25	1.04	17	4.66	130	6.47	0.33
4	S5	W5	0.18	0.40	0.58	3.82	0.10	1.74	6.38	0.67	22	0.67	63	4.22	2.42
	S6		1.30	0.40	0.58	6.36	0.75	1.74	5.59	4.21	12	4.21	551	5.61	1.64
	S11		0.08	0.40	0.58	3.75	0.04	1.74	6.41	0.28	50	3.20	103	8.71	0.69
5	S7	W6	0.31	0.40	0.58	10.83	0.18	1.74	4.62	0.84	6	0.84	255	2.73	1.56
	S8		0.75	0.40	0.58	9.82	0.43	1.74	4.81	2.08	10	2.08	675	4.33	4.47
	S9	W7	0.45	0.40	0.58	8.83	0.26	1.74	5.01	1.32	10	1.32	486	3.81	2.13
	S14		0.12	0.40	0.58	5.56	0.07	1.74	5.82	0.40	3	0.40	73	1.74	0.70
6	P13W	W8	2.04	0.40	0.58	2.59	1.19	1.74	6.87	8.14	-	-	0	-	-
7	P13E	W9	1.53	0.40	0.58	3.76	0.89	1.74	6.40	5.68	-	-	0	-	-
	S10	W10	0.12	0.40	0.58	4.43	0.07	1.74	6.17	0.43	9	0.43	314	2.71	1.93
8	S12	W11	1.16	0.40	0.58	9.08	0.67	1.74	4.95	3.34	36	3.34	208	7.71	0.45
	S13		0.68	0.40	0.58	7.40	0.40	1.74	5.33	2.10	33	2.10	224	6.84	0.55
		TOTAL	8.48							24.42					
		WH	12.18	0.02	0.51	12.66	6.21	1.74	4.33	26.87					

Design Point	Berm	Basin	Area (AC)	Imperv. (dec)	Coeff. (C)	Tc (Min.)	C*A	P1	I (in/hr.)	Q (cfs)	Slope %	Flow (cfs)	Length (Ft)	Velocity (fps)	Travel Time (Min)
5	B1	W6 / W7	0.17	0.40	0.58	8.68	0.10	1.74	5.04	0.49	3	0.49	0	4.34	0.00
5	B2	W6 / W11	0.30	0.40	0.58	10.59	0.18	1.74	4.67	0.82	3	0.82	0	5.34	0.00
8	B3	W11	0.20	0.40	0.58	13.53	0.12	1.74	4.20	0.48	3	0.48	0	6.34	0.00
8	B4	W11	0.09	0.40	0.58	7.64	0.05	1.74	5.27	0.29	0	0.29	0	7.34	0.00

Formulas:

$$I=28.9*P_1/(10+Tc)^{0.786}$$

$$Q=CIA$$

Notes:

P₁ = Point rainfall for one-hour duration. See Design Storms.

APPENDIX C: HYDRAULIC CALCULATIONS

Channel Report

S1-100 Yr

Triangular

Side Slopes (z:1) = 6.00, 6.00
Total Depth (ft) = 0.50

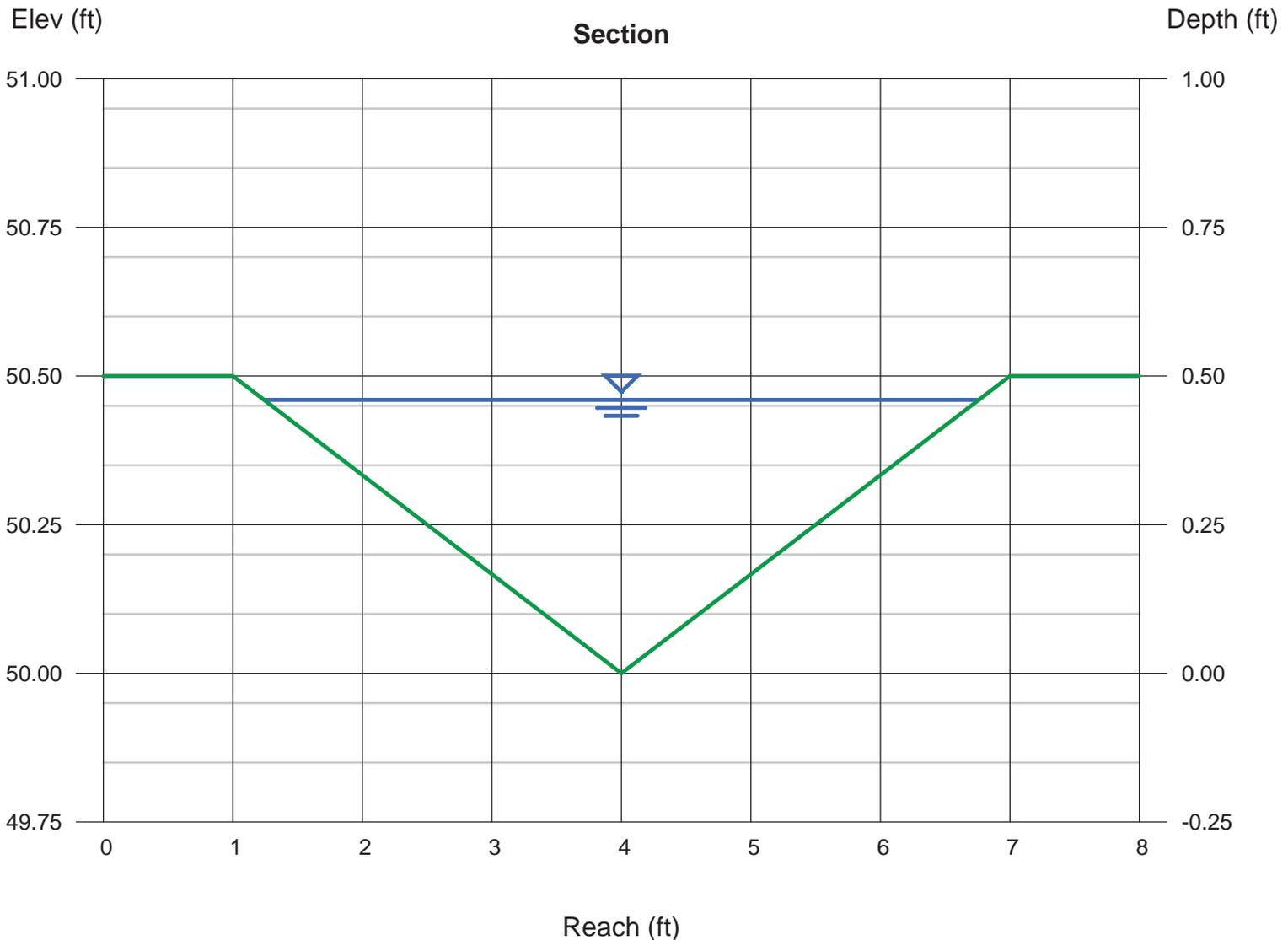
Invert Elev (ft) = 50.00
Slope (%) = 5.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 4.48

Highlighted

Depth (ft) = 0.46
Q (cfs) = 4.480
Area (sqft) = 1.27
Velocity (ft/s) = 3.53
Wetted Perim (ft) = 5.60
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 5.52
EGL (ft) = 0.65



Channel Report

S2-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00

Total Depth (ft) = 0.50

Invert Elev (ft) = 50.00

Slope (%) = 9.00

N-Value = 0.035

Calculations

Compute by: Known Q

Known Q (cfs) = 2.41

Highlighted

Depth (ft) = 0.43

Q (cfs) = 2.410

Area (sqft) = 0.55

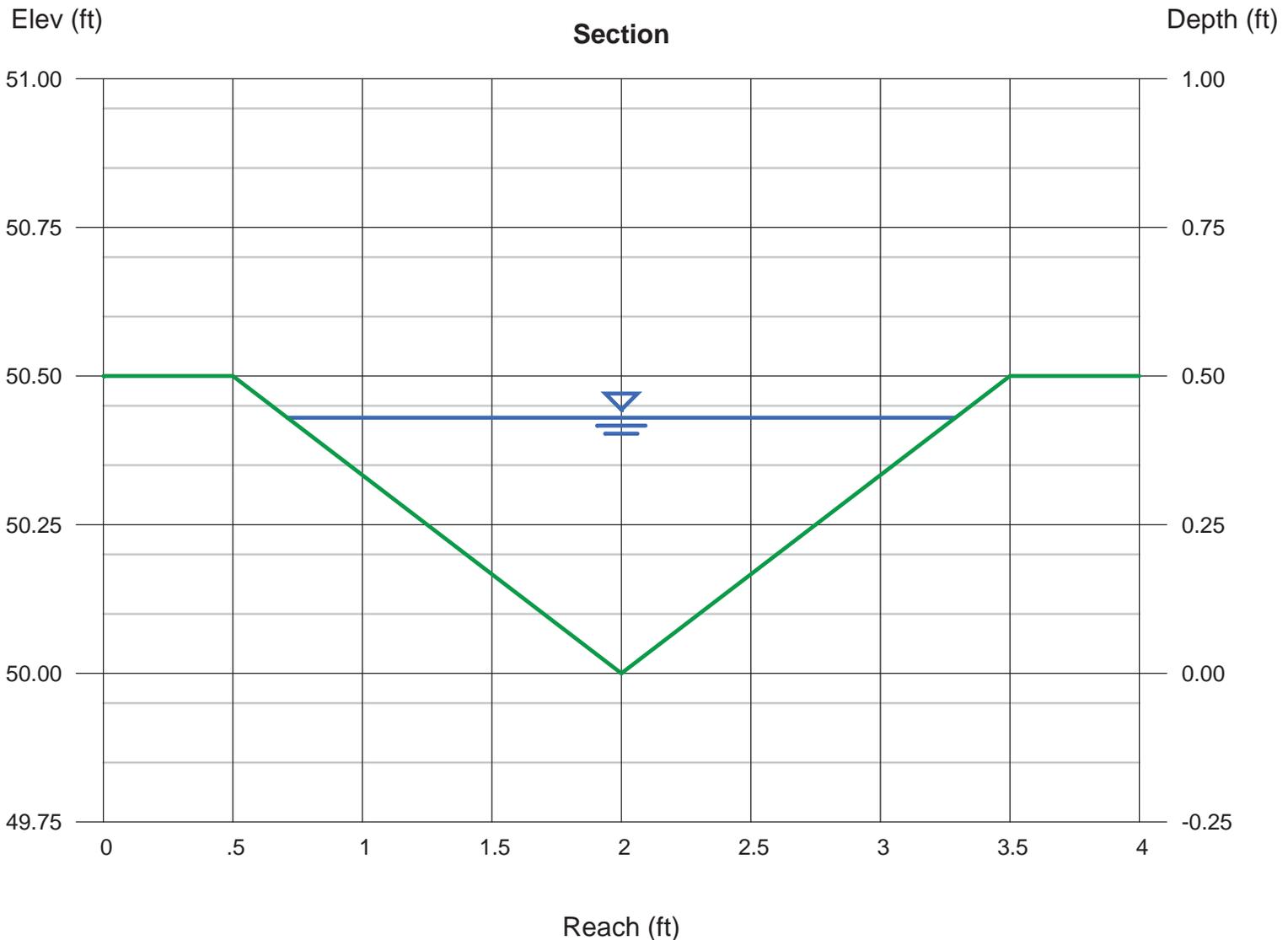
Velocity (ft/s) = 4.34

Wetted Perim (ft) = 2.72

Crit Depth, Yc (ft) = 0.50

Top Width (ft) = 2.58

EGL (ft) = 0.72



Channel Report

S3 - 100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

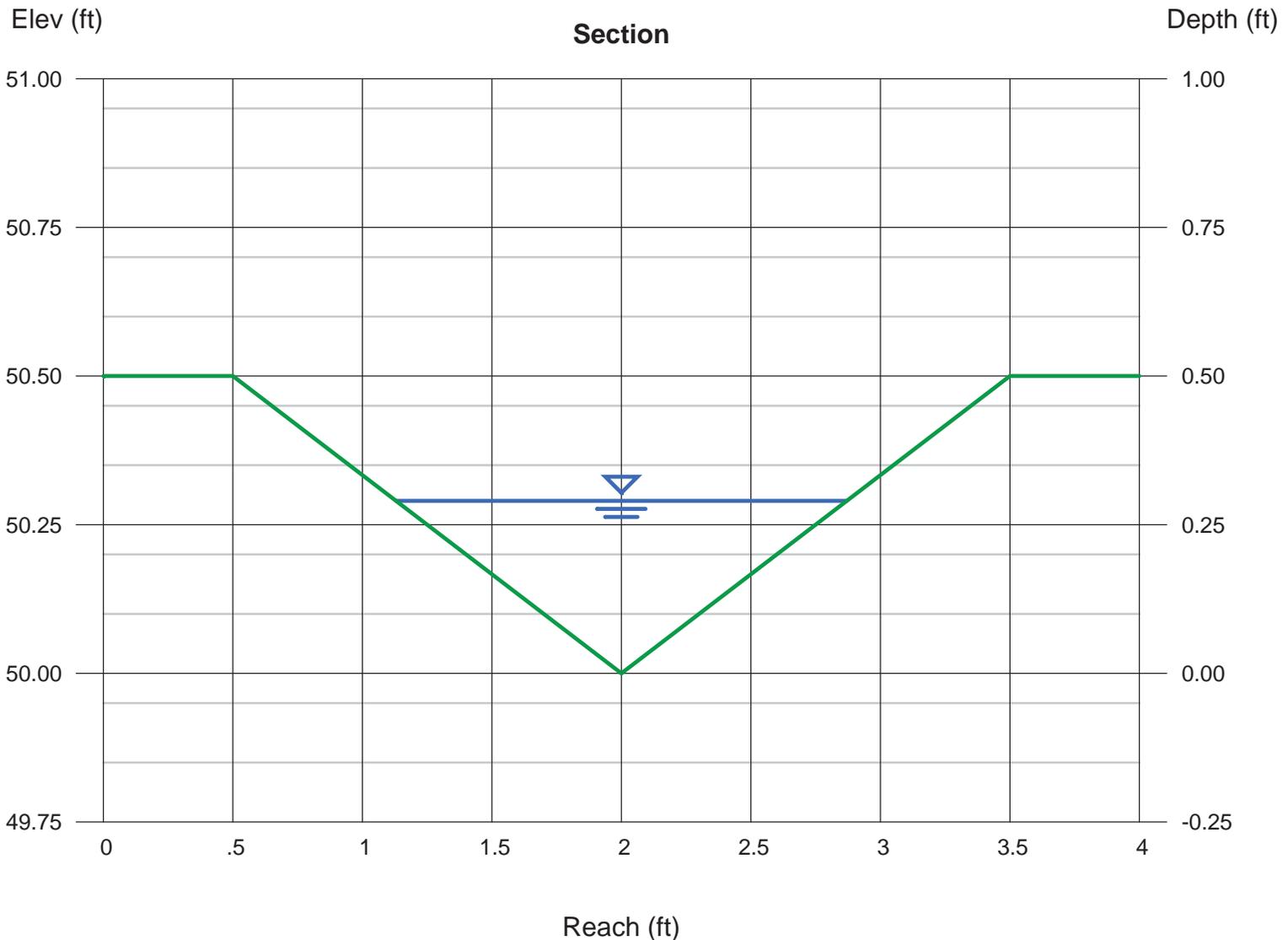
Invert Elev (ft) = 50.00
Slope (%) = 19.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 1.22

Highlighted

Depth (ft) = 0.29
Q (cfs) = 1.220
Area (sqft) = 0.25
Velocity (ft/s) = 4.84
Wetted Perim (ft) = 1.83
Crit Depth, Yc (ft) = 0.41
Top Width (ft) = 1.74
EGL (ft) = 0.65



Channel Report

S4 - 100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

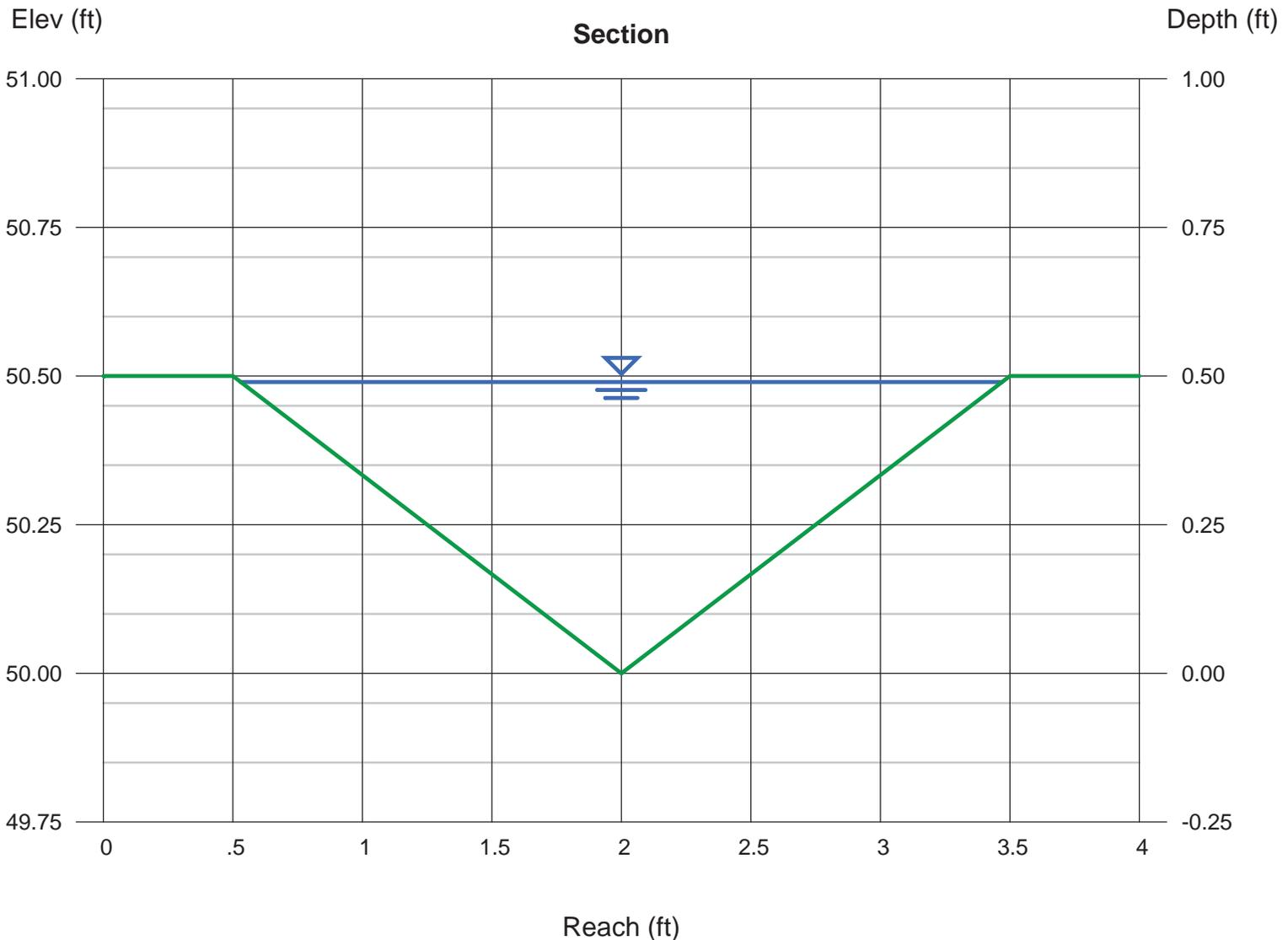
Invert Elev (ft) = 50.00
Slope (%) = 17.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 4.66

Highlighted

Depth (ft) = 0.49
Q (cfs) = 4.660
Area (sqft) = 0.72
Velocity (ft/s) = 6.47
Wetted Perim (ft) = 3.10
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 2.94
EGL (ft) = 1.14



Channel Report

S5 - 100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

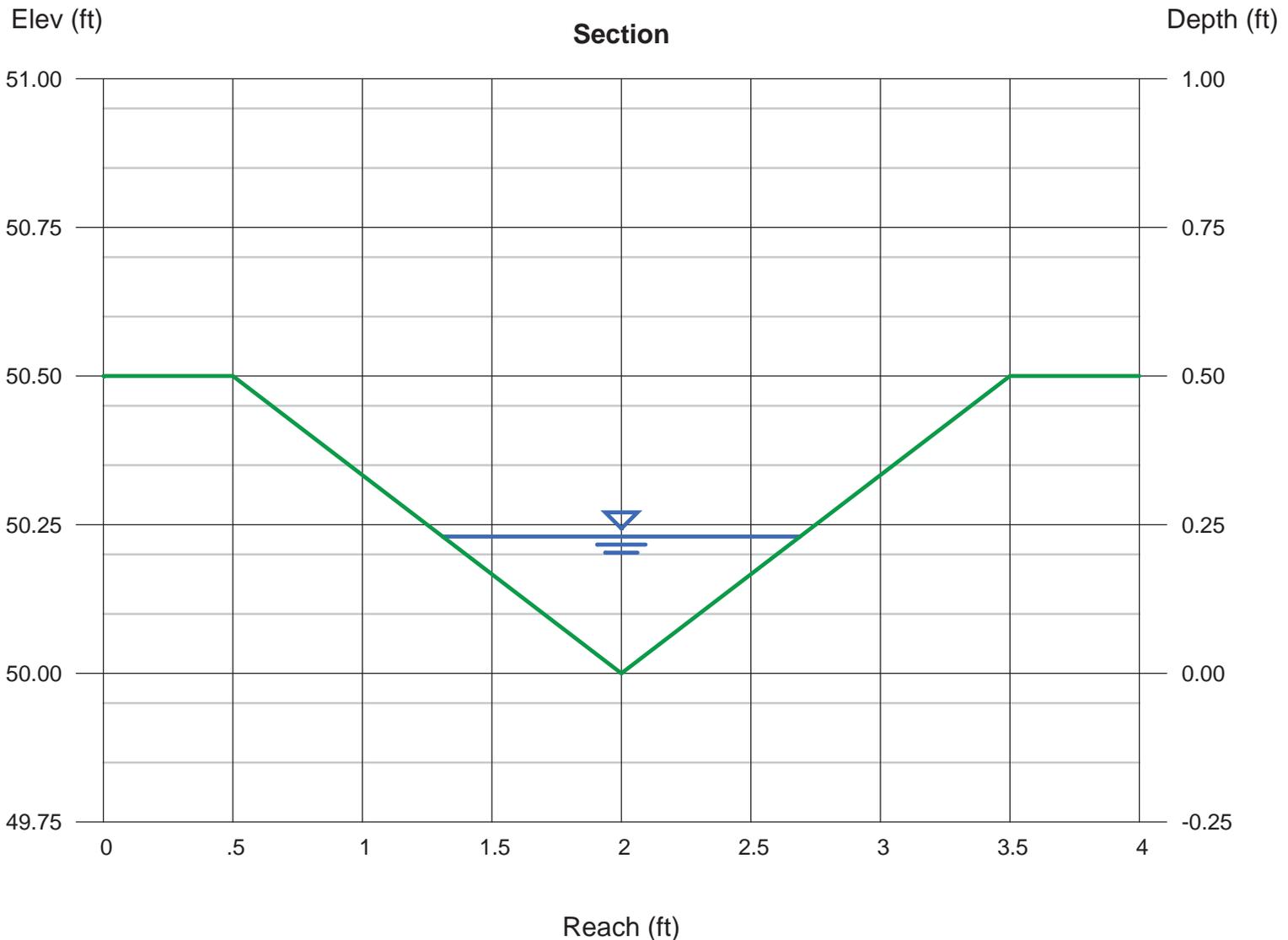
Invert Elev (ft) = 50.00
Slope (%) = 22.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.67

Highlighted

Depth (ft) = 0.23
Q (cfs) = 0.670
Area (sqft) = 0.16
Velocity (ft/s) = 4.22
Wetted Perim (ft) = 1.45
Crit Depth, Yc (ft) = 0.32
Top Width (ft) = 1.38
EGL (ft) = 0.51



Channel Report

S6-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

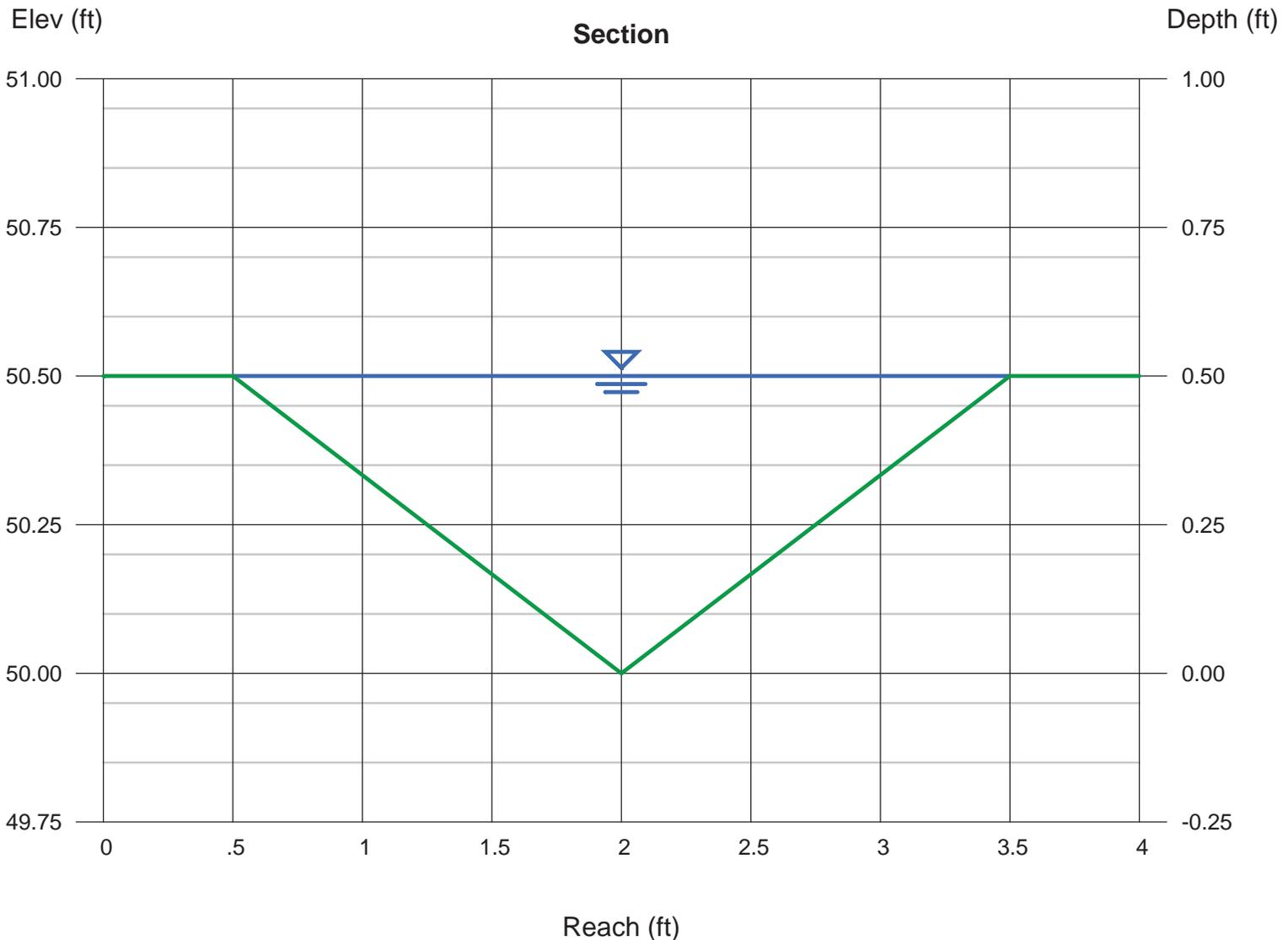
Invert Elev (ft) = 50.00
Slope (%) = 12.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 4.21

Highlighted

Depth (ft) = 0.50
Q (cfs) = 4.210
Area (sqft) = 0.75
Velocity (ft/s) = 5.61
Wetted Perim (ft) = 3.16
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 3.00
EGL (ft) = 0.99



Channel Report

S7-100YR

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 1.00

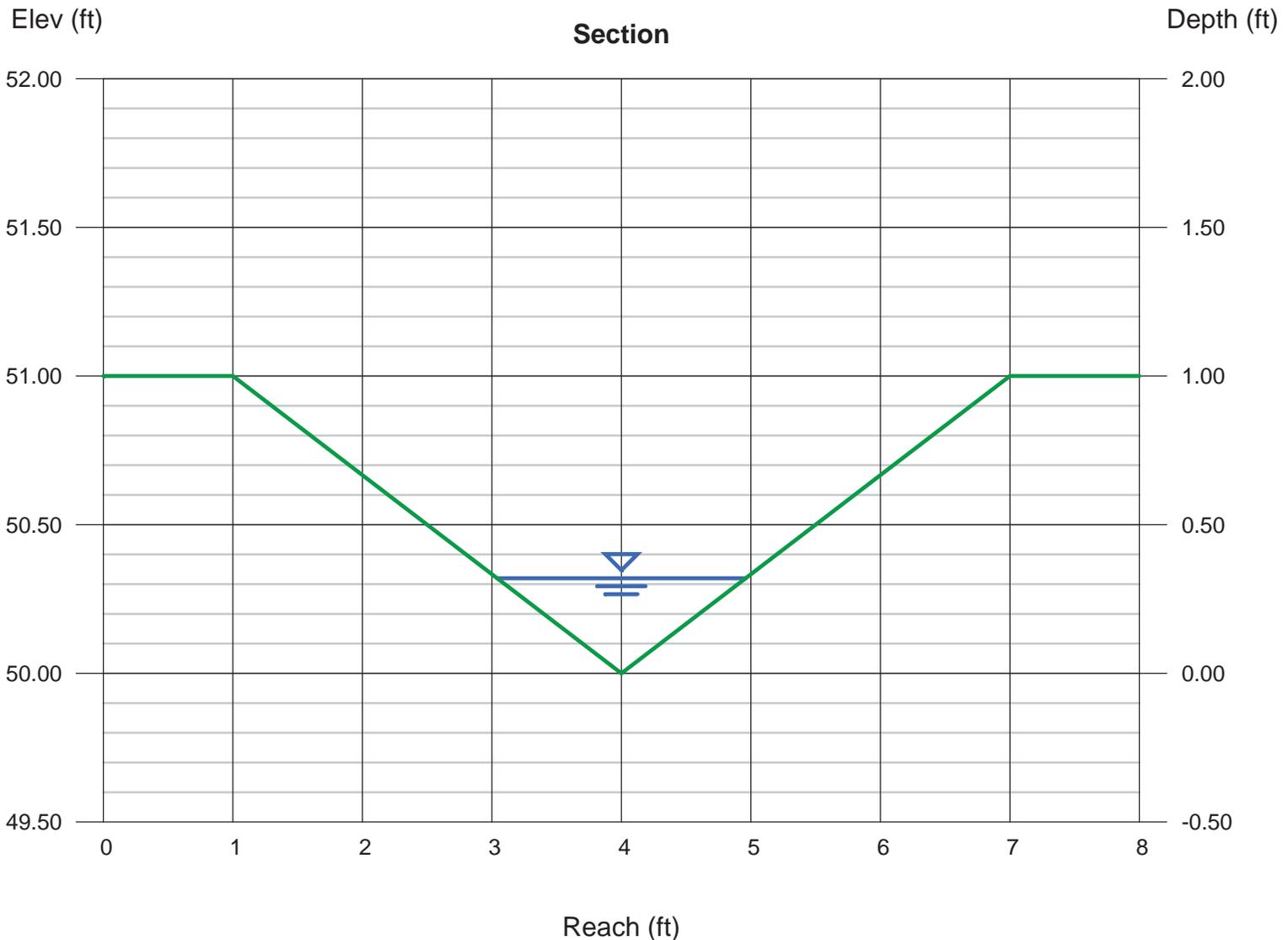
Invert Elev (ft) = 50.00
Slope (%) = 6.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.84

Highlighted

Depth (ft) = 0.32
Q (cfs) = 0.840
Area (sqft) = 0.31
Velocity (ft/s) = 2.73
Wetted Perim (ft) = 2.02
Crit Depth, Yc (ft) = 0.35
Top Width (ft) = 1.92
EGL (ft) = 0.44



Channel Report

S8-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

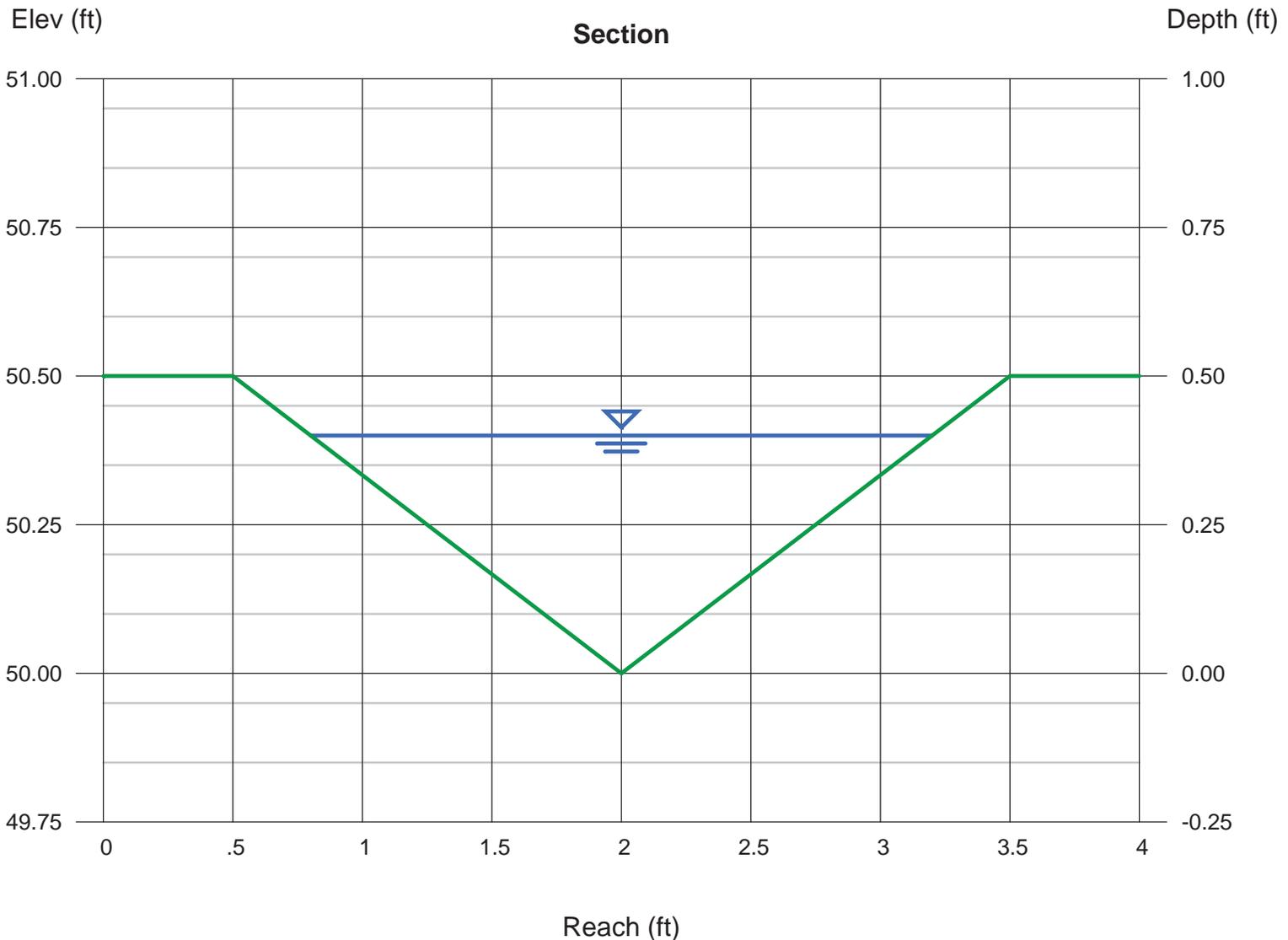
Invert Elev (ft) = 50.00
Slope (%) = 10.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 2.08

Highlighted

Depth (ft) = 0.40
Q (cfs) = 2.080
Area (sqft) = 0.48
Velocity (ft/s) = 4.33
Wetted Perim (ft) = 2.53
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 2.40
EGL (ft) = 0.69



Channel Report

S9-100YR

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

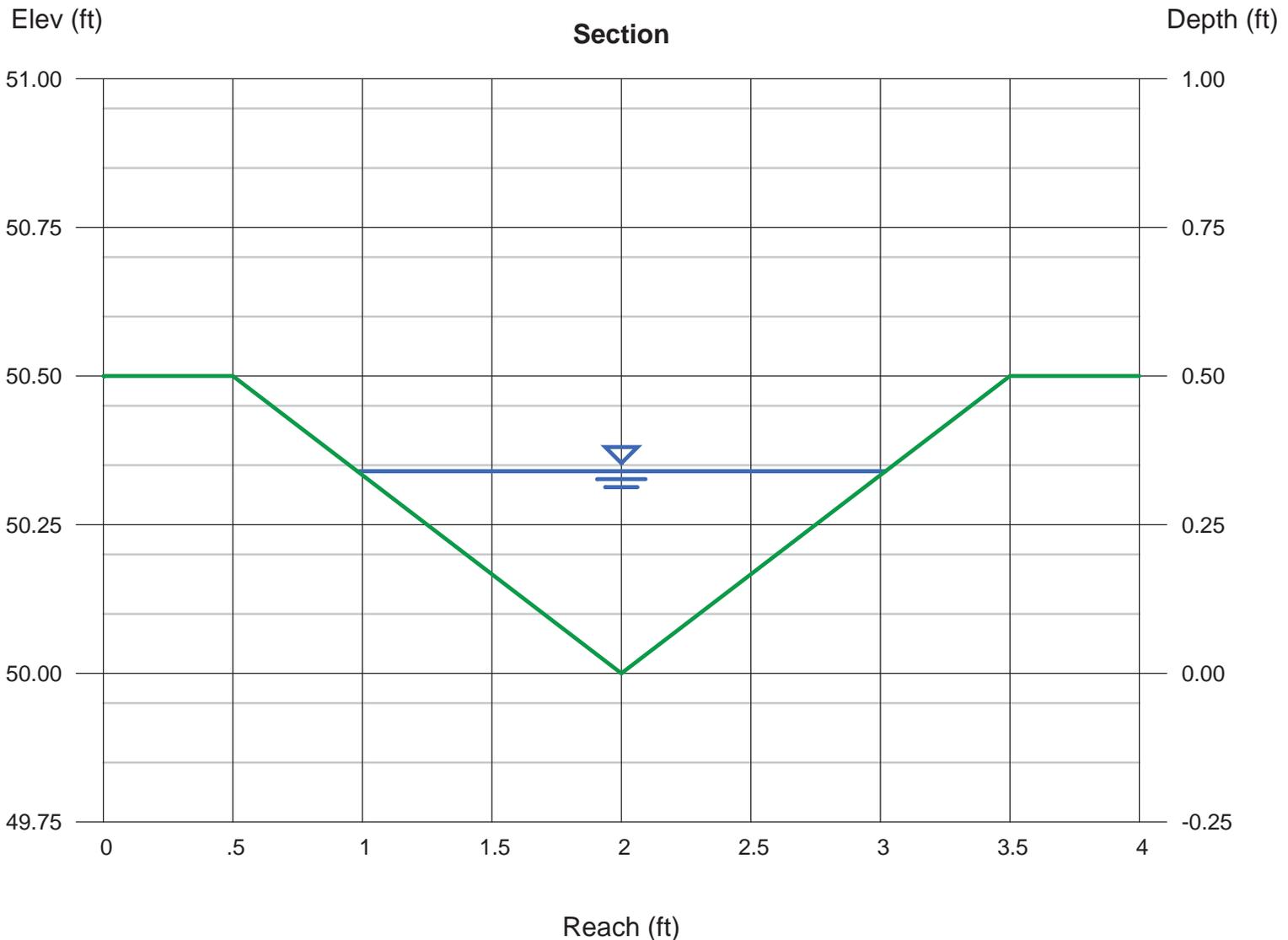
Invert Elev (ft) = 50.00
Slope (%) = 10.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 1.32

Highlighted

Depth (ft) = 0.34
Q (cfs) = 1.320
Area (sqft) = 0.35
Velocity (ft/s) = 3.81
Wetted Perim (ft) = 2.15
Crit Depth, Yc (ft) = 0.42
Top Width (ft) = 2.04
EGL (ft) = 0.57



Channel Report

S10-100YR

Triangular

Side Slopes (z:1) = 3.00, 3.00

Total Depth (ft) = 1.00

Invert Elev (ft) = 50.00

Slope (%) = 9.00

N-Value = 0.035

Calculations

Compute by: Known Q

Known Q (cfs) = 0.43

Highlighted

Depth (ft) = 0.23

Q (cfs) = 0.430

Area (sqft) = 0.16

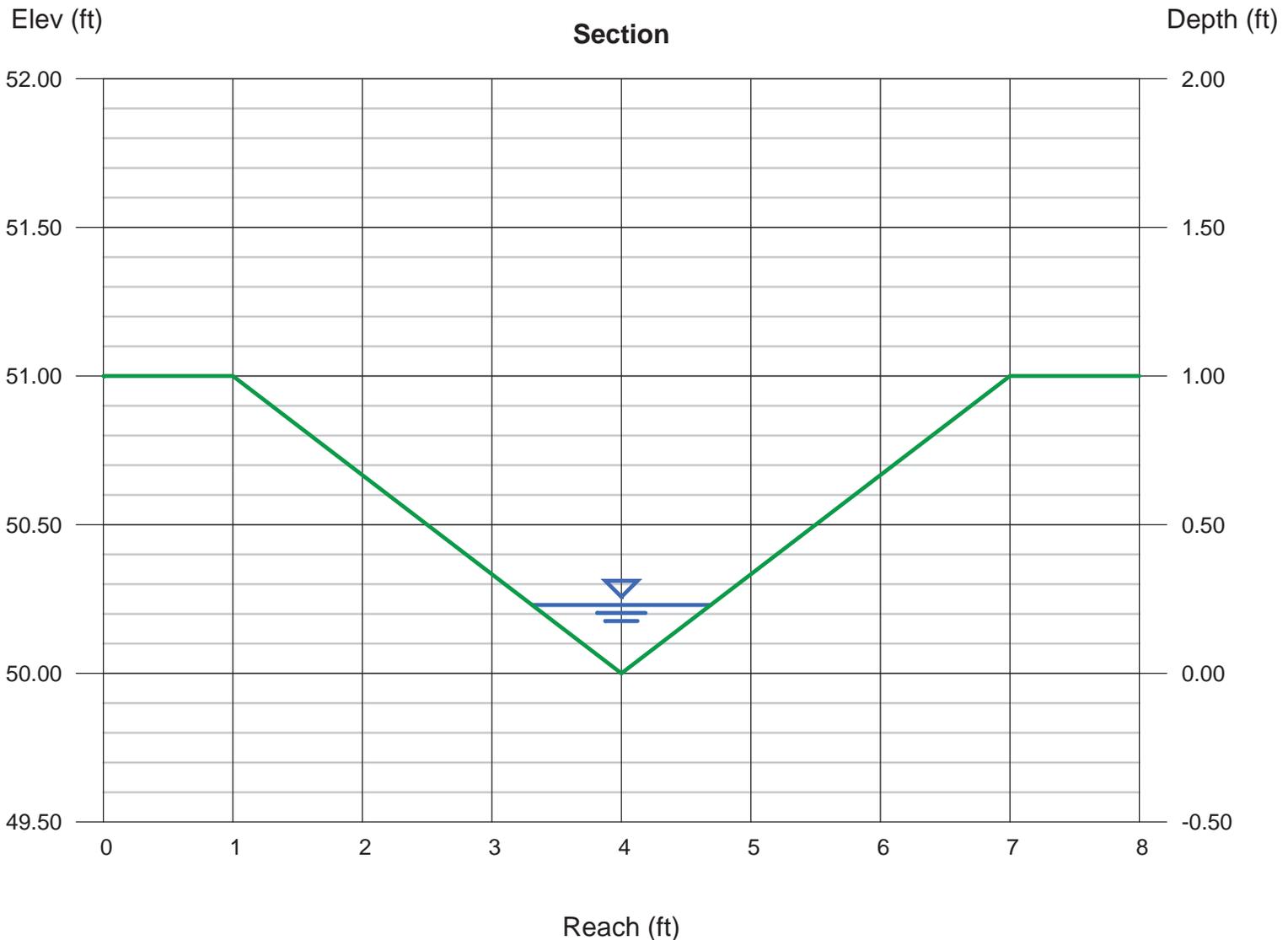
Velocity (ft/s) = 2.71

Wetted Perim (ft) = 1.45

Crit Depth, Yc (ft) = 0.27

Top Width (ft) = 1.38

EGL (ft) = 0.34



Channel Report

S11-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

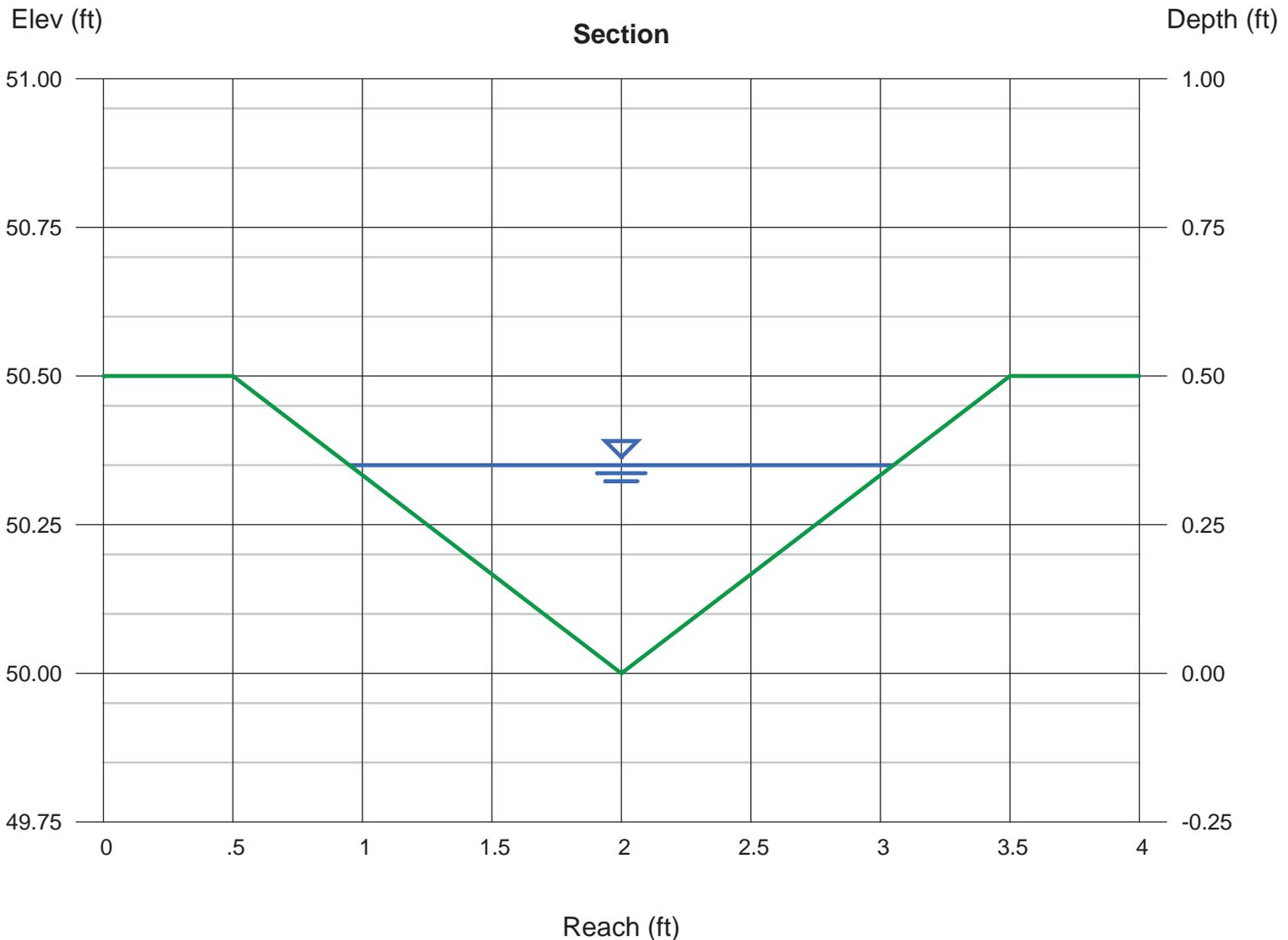
Invert Elev (ft) = 50.00
Slope (%) = 50.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 3.20

Highlighted

Depth (ft) = 0.35
Q (cfs) = 3.200
Area (sqft) = 0.37
Velocity (ft/s) = 8.71
Wetted Perim (ft) = 2.21
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 2.10
EGL (ft) = 1.53



Channel Report

S12-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

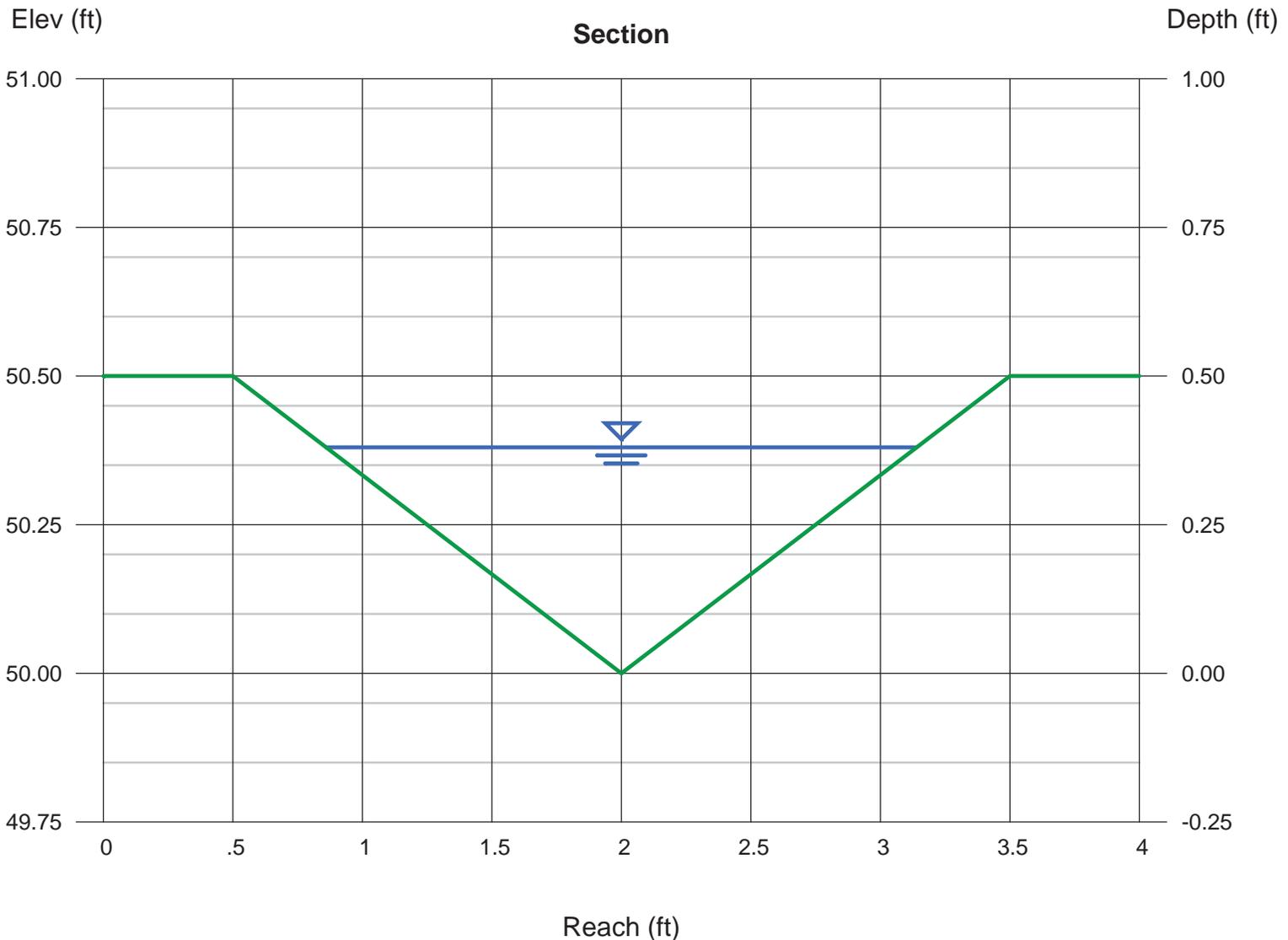
Invert Elev (ft) = 50.00
Slope (%) = 36.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 3.34

Highlighted

Depth (ft) = 0.38
Q (cfs) = 3.340
Area (sqft) = 0.43
Velocity (ft/s) = 7.71
Wetted Perim (ft) = 2.40
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 2.28
EGL (ft) = 1.30



Channel Report

S13-100 Yr

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

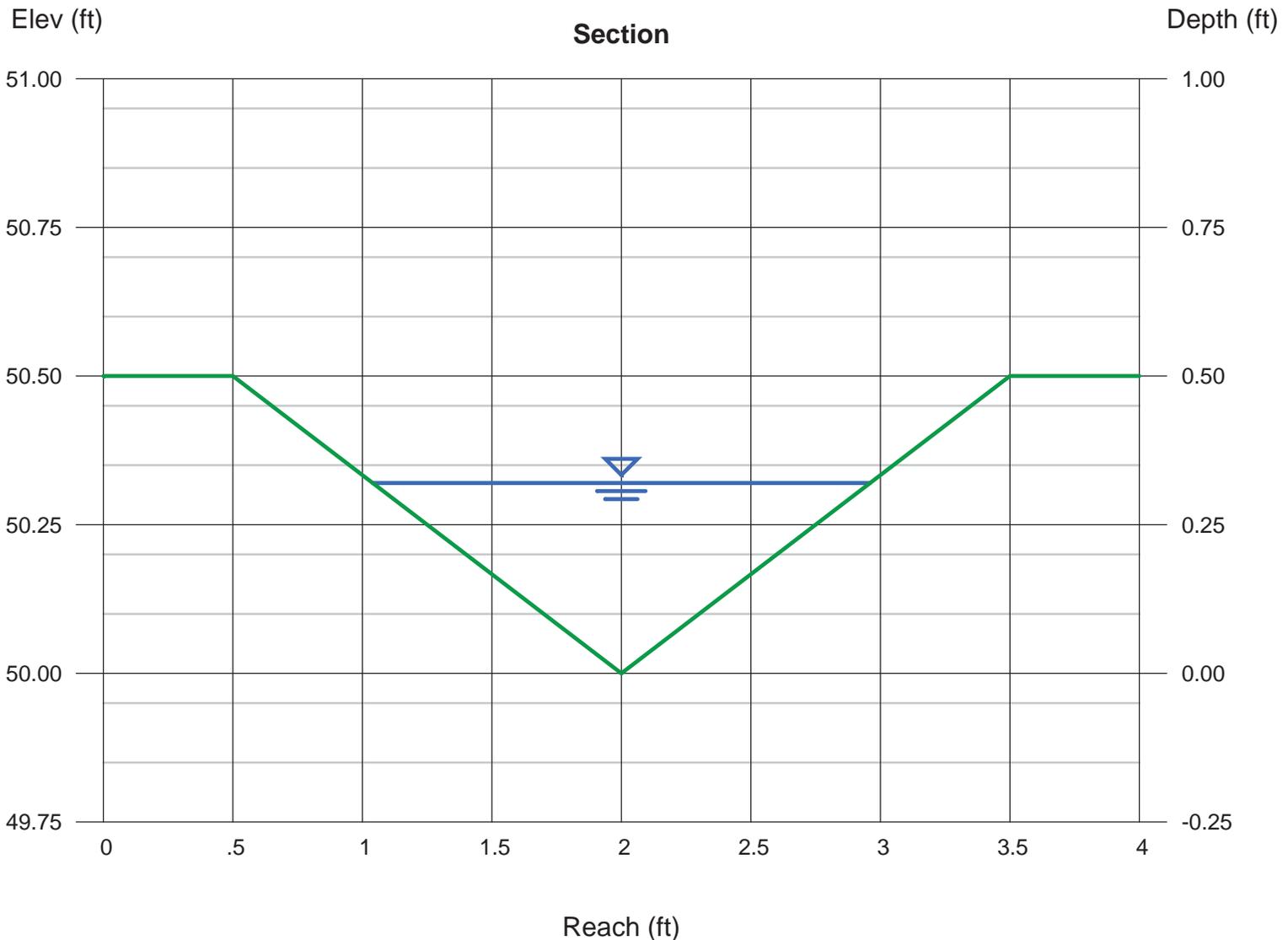
Invert Elev (ft) = 50.00
Slope (%) = 33.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 2.10

Highlighted

Depth (ft) = 0.32
Q (cfs) = 2.100
Area (sqft) = 0.31
Velocity (ft/s) = 6.84
Wetted Perim (ft) = 2.02
Crit Depth, Yc (ft) = 0.50
Top Width (ft) = 1.92
EGL (ft) = 1.05



Channel Report

S14-100YR

Triangular

Side Slopes (z:1) = 3.00, 3.00
Total Depth (ft) = 0.50

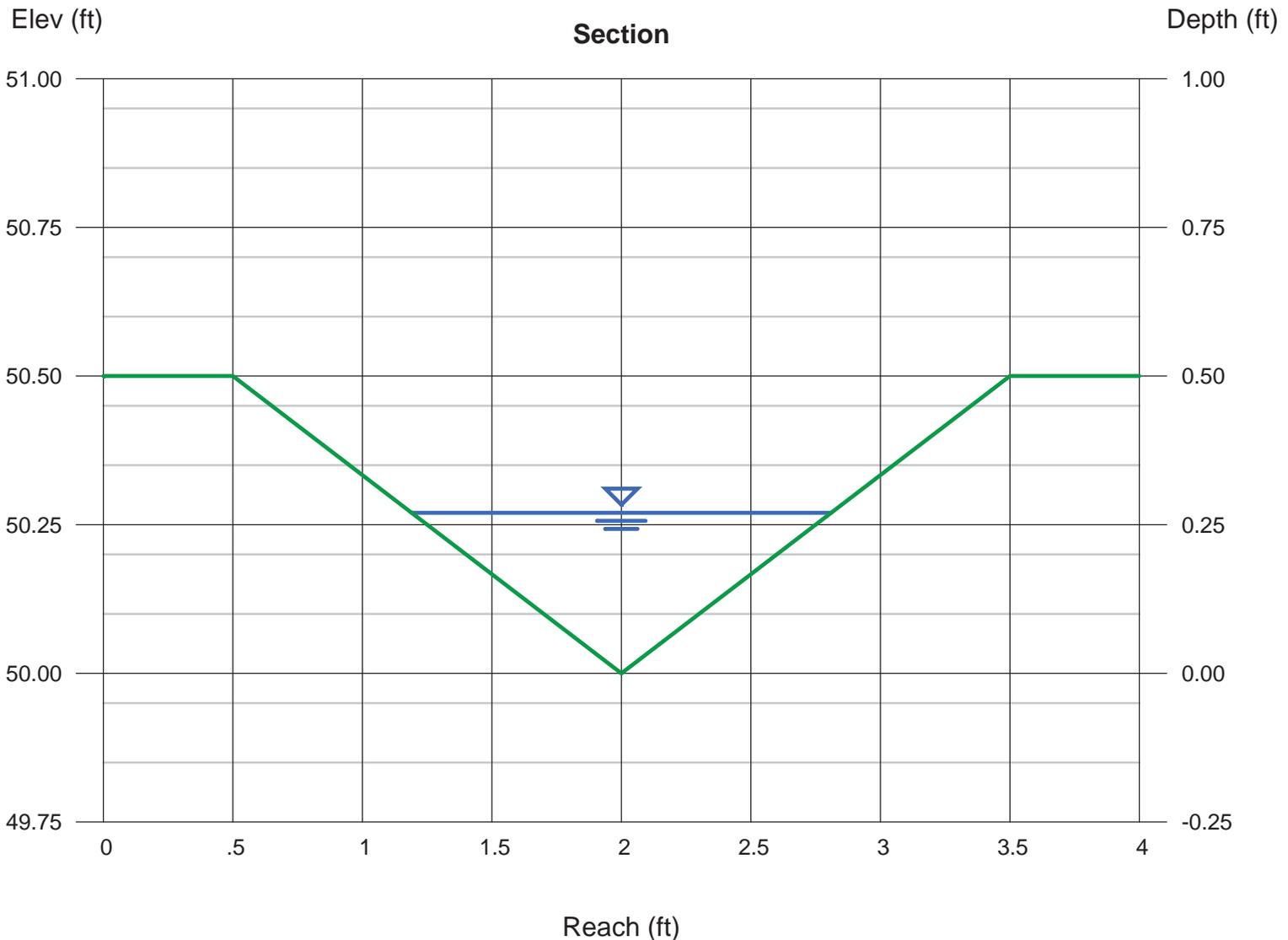
Invert Elev (ft) = 50.00
Slope (%) = 3.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.38

Highlighted

Depth (ft) = 0.27
Q (cfs) = 0.380
Area (sqft) = 0.22
Velocity (ft/s) = 1.74
Wetted Perim (ft) = 1.71
Crit Depth, Yc (ft) = 0.26
Top Width (ft) = 1.62
EGL (ft) = 0.32



Channel Report

B1-100YR

Triangular

Side Slopes (z:1) = 15.00, 3.00
Total Depth (ft) = 0.50

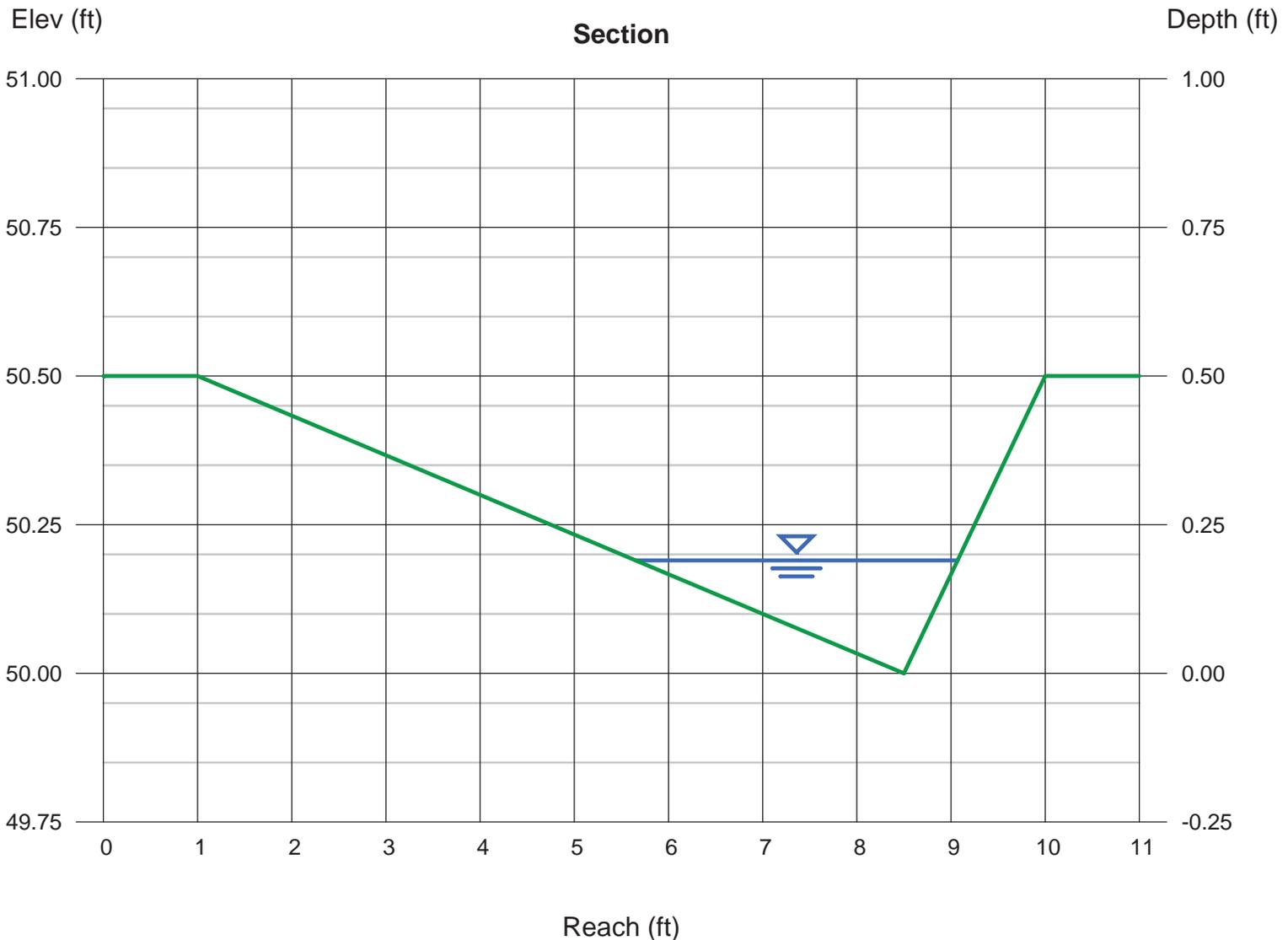
Invert Elev (ft) = 50.00
Slope (%) = 3.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.49

Highlighted

Depth (ft) = 0.19
Q (cfs) = 0.490
Area (sqft) = 0.32
Velocity (ft/s) = 1.51
Wetted Perim (ft) = 3.46
Crit Depth, Yc (ft) = 0.18
Top Width (ft) = 3.42
EGL (ft) = 0.23



Channel Report

B2-100YR

Triangular

Side Slopes (z:1) = 33.00, 6.00
Total Depth (ft) = 0.50

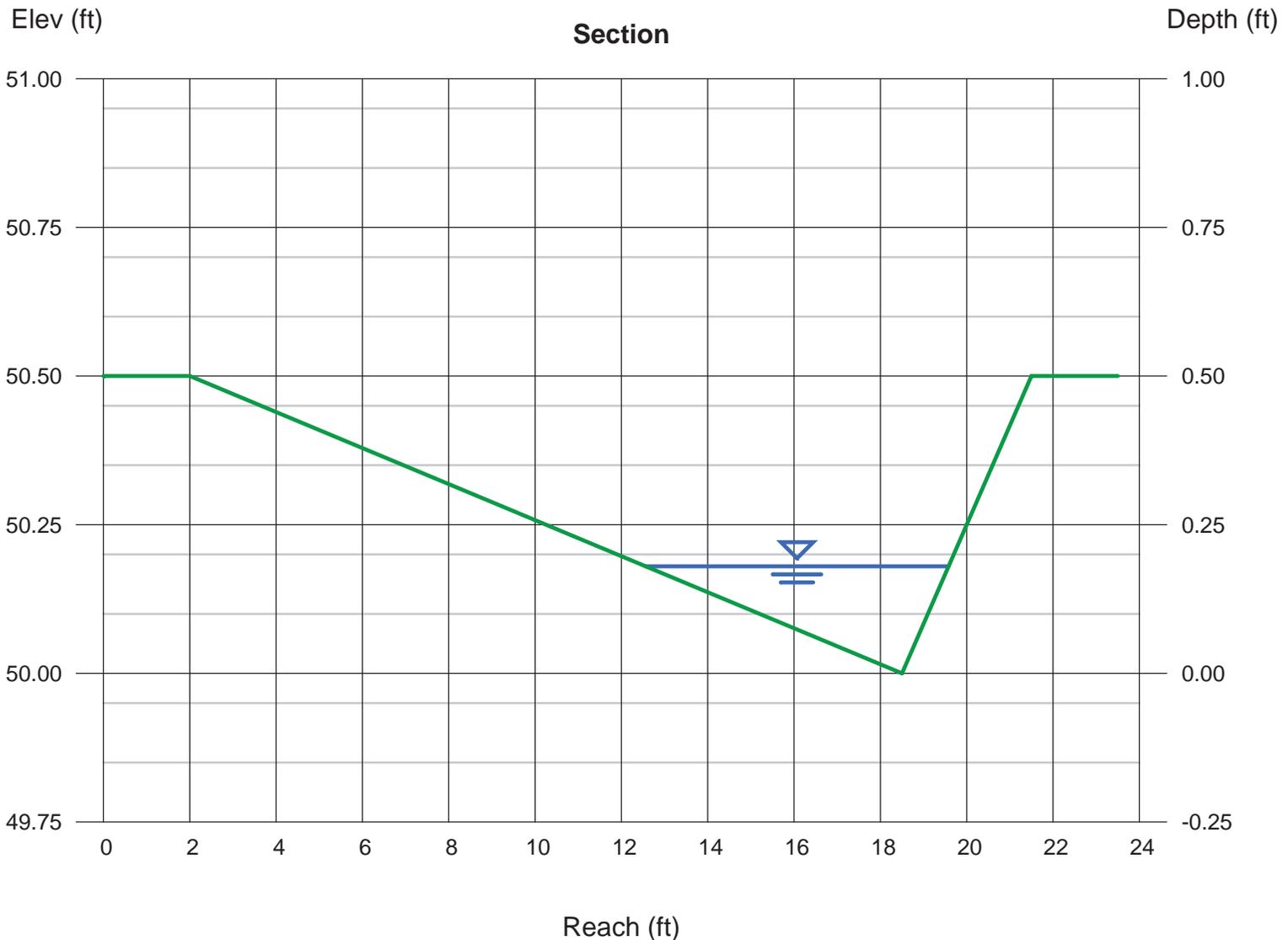
Invert Elev (ft) = 50.00
Slope (%) = 3.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.82

Highlighted

Depth (ft) = 0.18
Q (cfs) = 0.820
Area (sqft) = 0.63
Velocity (ft/s) = 1.30
Wetted Perim (ft) = 7.04
Crit Depth, Yc (ft) = 0.17
Top Width (ft) = 7.02
EGL (ft) = 0.21



Channel Report

B3-100YR

Triangular

Side Slopes (z:1) = 33.00, 1.00
Total Depth (ft) = 0.50

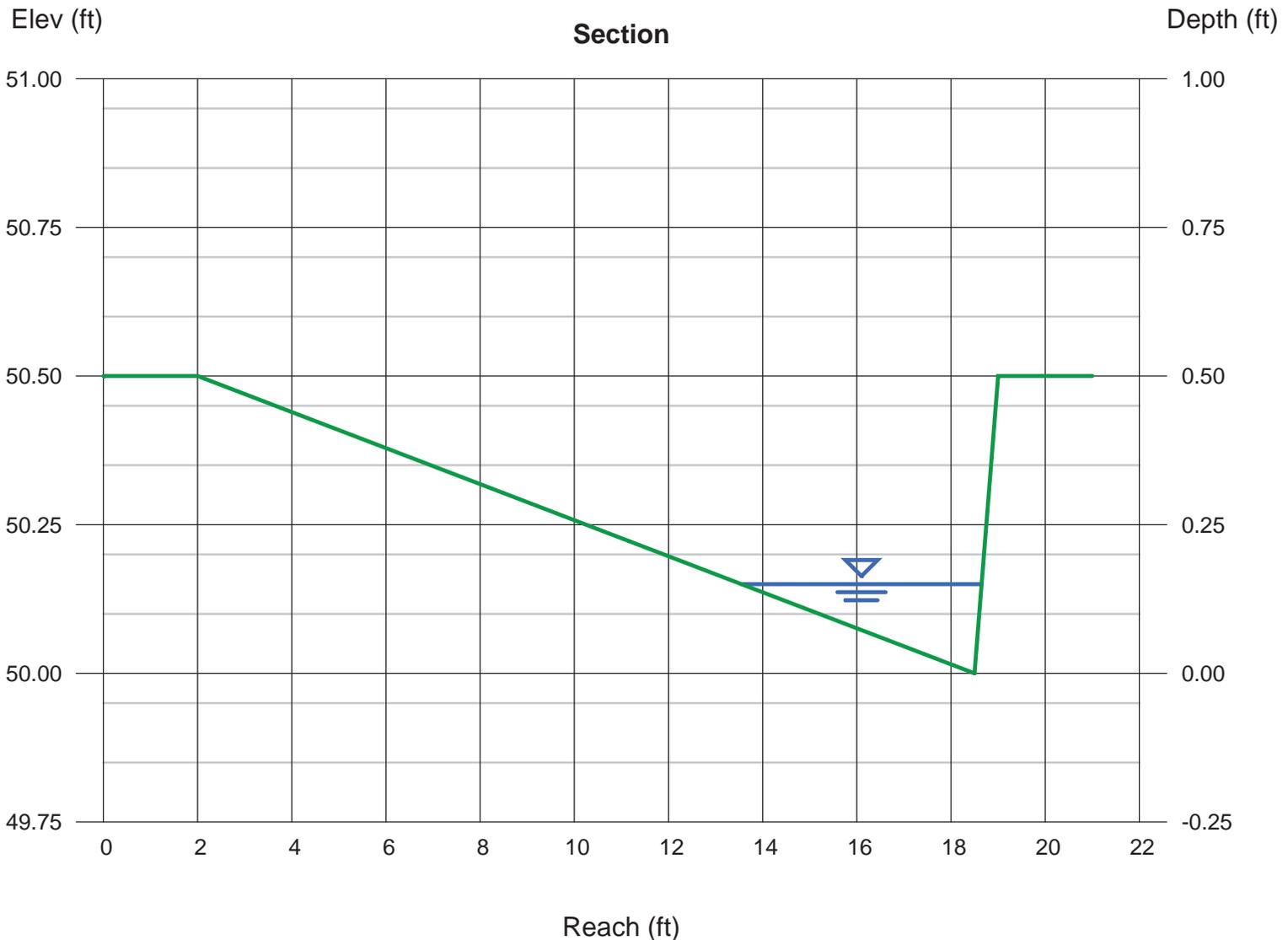
Invert Elev (ft) = 50.00
Slope (%) = 3.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.48

Highlighted

Depth (ft) = 0.15
Q (cfs) = 0.480
Area (sqft) = 0.38
Velocity (ft/s) = 1.25
Wetted Perim (ft) = 5.16
Crit Depth, Yc (ft) = 0.14
Top Width (ft) = 5.10
EGL (ft) = 0.17



Channel Report

B4-100YR

Triangular

Side Slopes (z:1) = 12.00, 1.00
Total Depth (ft) = 0.50

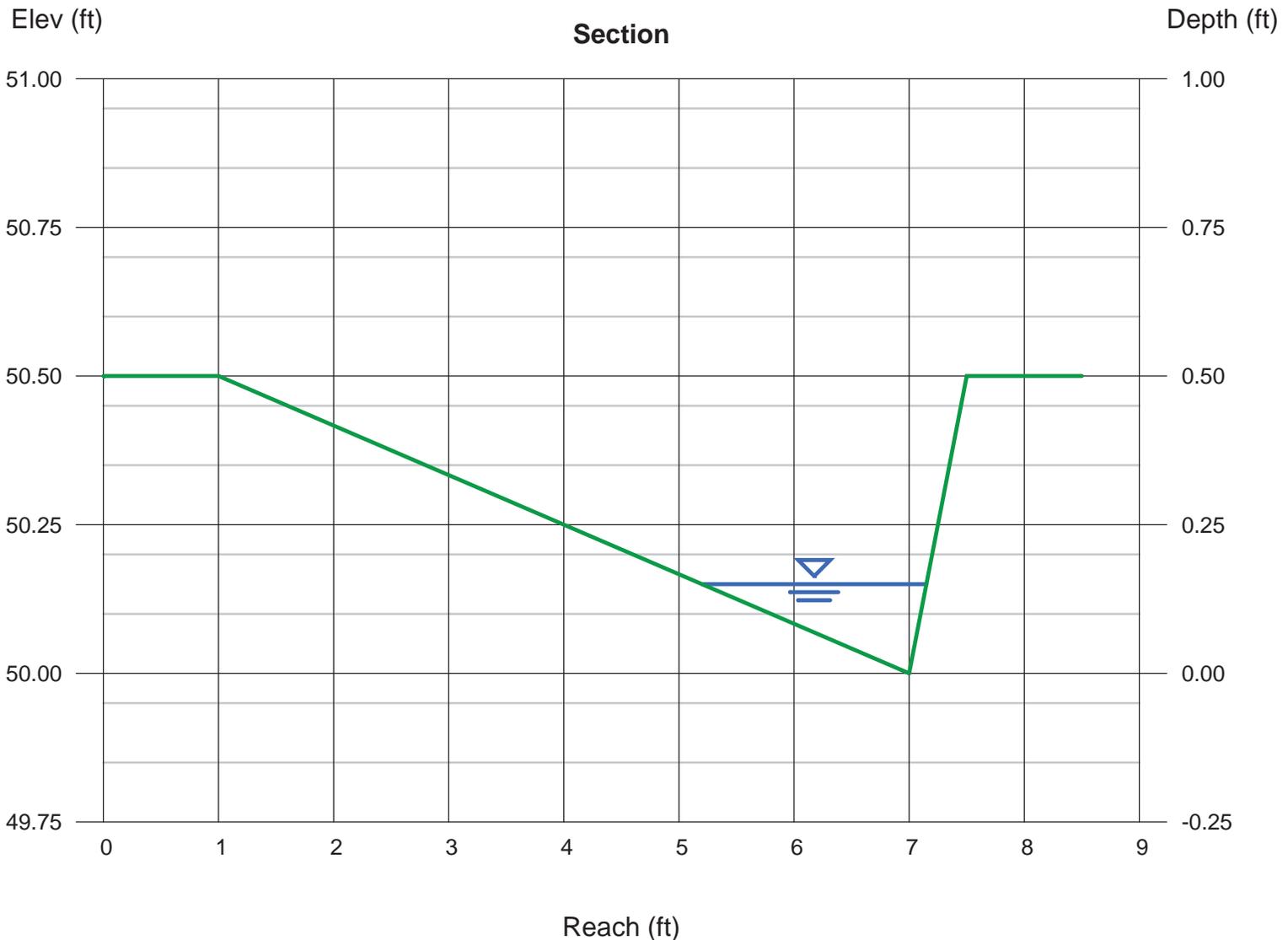
Invert Elev (ft) = 50.00
Slope (%) = 8.00
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 0.29

Highlighted

Depth (ft) = 0.15
Q (cfs) = 0.290
Area (sqft) = 0.15
Velocity (ft/s) = 1.98
Wetted Perim (ft) = 2.02
Crit Depth, Yc (ft) = 0.17
Top Width (ft) = 1.95
EGL (ft) = 0.21



Culvert Report

24 IN CULVERT - S9 & S14

Invert Elev Dn (ft)	=	79.00
Pipe Length (ft)	=	40.00
Slope (%)	=	5.00
Invert Elev Up (ft)	=	81.00
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Corrugate Metal Pipe
Culvert Entrance	=	Mitered to slope (C)
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

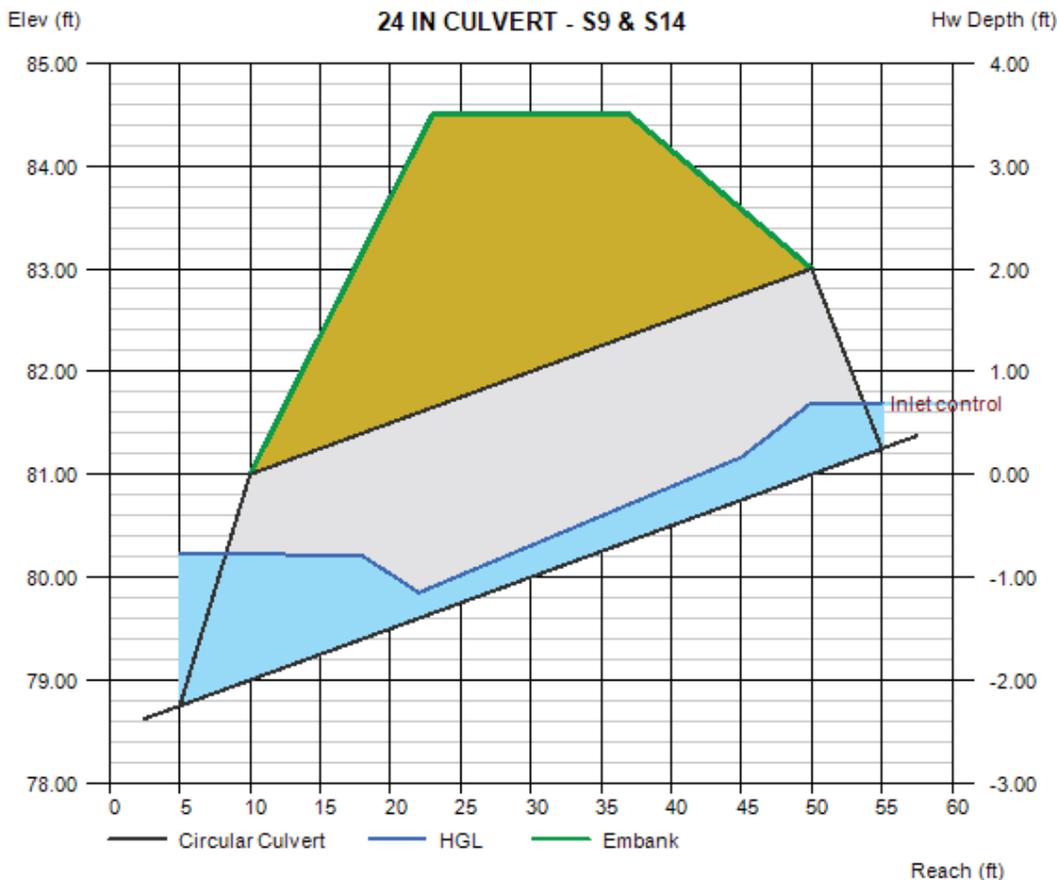
Top Elevation (ft)	=	84.50
Top Width (ft)	=	14.00
Crest Width (ft)	=	0.00

Calculations

Qmin (cfs)	=	1.72
Qmax (cfs)	=	1.72
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtot (cfs)	=	1.72
Qpipe (cfs)	=	1.72
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.85
Veloc Up (ft/s)	=	3.21
HGL Dn (ft)	=	80.23
HGL Up (ft)	=	81.45
Hw Elev (ft)	=	81.70
Hw/D (ft)	=	0.35
Flow Regime	=	Inlet Control



Culvert Report

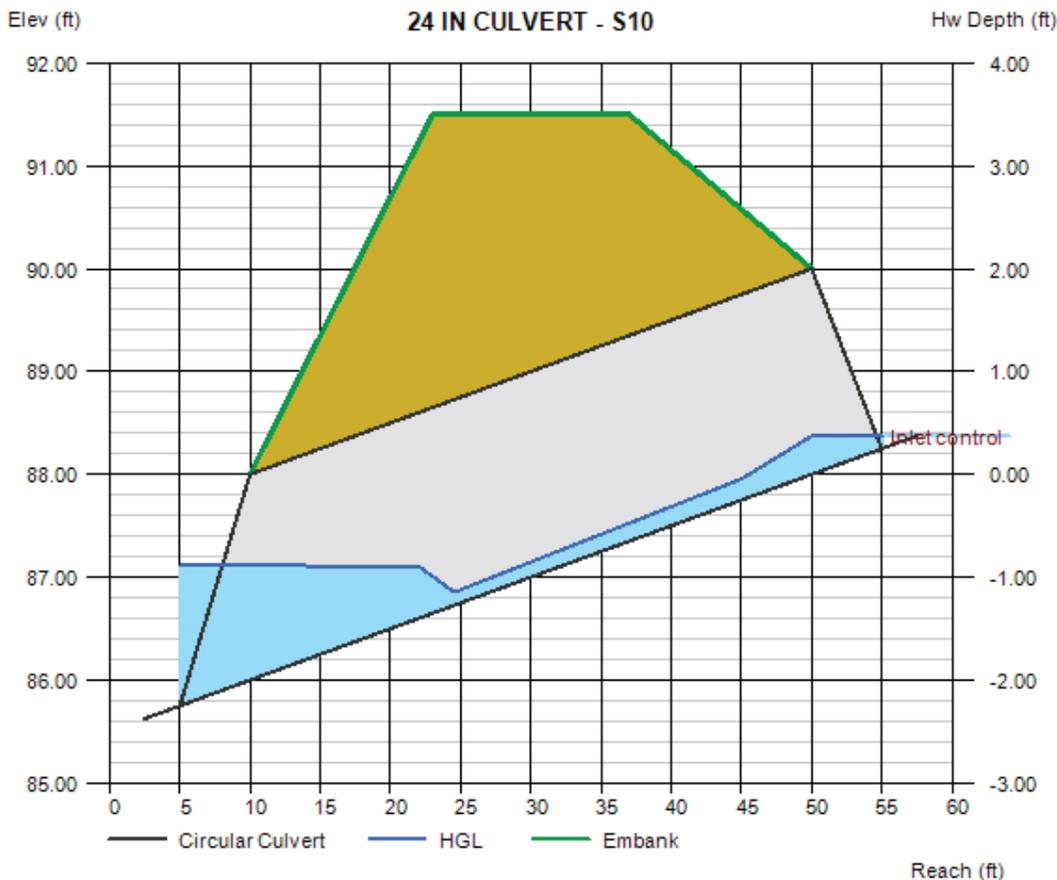
24 IN CULVERT - S10

Invert Elev Dn (ft)	= 86.00
Pipe Length (ft)	= 40.00
Slope (%)	= 5.00
Invert Elev Up (ft)	= 88.00
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Mitered to slope (C)
Coeff. K,M,c,Y,k	= 0.021, 1.33, 0.0463, 0.75, 0.7

Embankment	
Top Elevation (ft)	= 91.50
Top Width (ft)	= 14.00
Crest Width (ft)	= 0.00

Calculations	
Qmin (cfs)	= 0.43
Qmax (cfs)	= 0.43
Tailwater Elev (ft)	= (dc+D)/2

Highlighted	
Qtotal (cfs)	= 0.43
Qpipe (cfs)	= 0.43
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 0.24
Veloc Up (ft/s)	= 2.22
HGL Dn (ft)	= 87.11
HGL Up (ft)	= 88.22
Hw Elev (ft)	= 88.37
Hw/D (ft)	= 0.19
Flow Regime	= Inlet Control





Overview

The COGCC has set forth rules requiring pressure testing of flowlines to address Environmental Risk associated with Oil and Gas Operations where piping system failures were identified as a frequent cause of subsurface releases. This procedure shall cover produced water gathering systems and produced water distribution systems.

COGCC Rule 1101.e.(1) states that before operating a segment of flowline it shall be tested to maximum anticipated operating pressure. In conducting tests, each operator shall ensure that reasonable precautions are taken to protect its employees and the general public. The testing may be conducted using well head pressure sources and well bore fluids, including natural gas. Such pressure tests shall be repeated each calendar year to maximum anticipated operating pressure, and operators shall maintain records of such testing for Commission inspection for at least three (3) years.

Produced Water Gathering Systems – From the first above ground isolation valve to the next above ground isolation valve found along the water gathering system route.

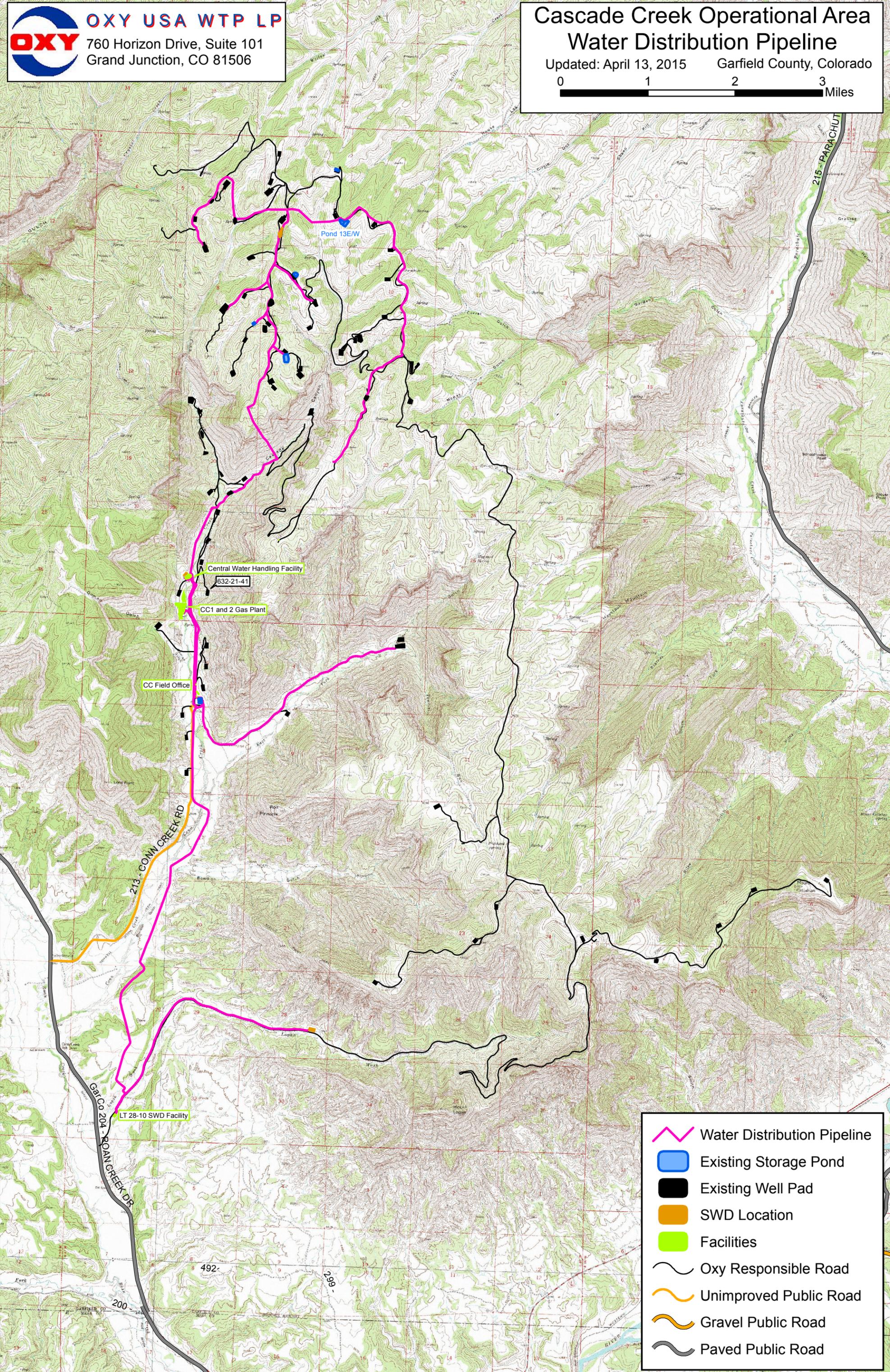
Produced Water Distribution Systems – From the first above ground isolation valve to the next above ground isolation valve found along the water distribution system route.

Procedure

- The pressure indicator (PI) shall be located within the isolation limits of the line to be tested and be in good working condition. The PI should be validated at a zero pressure reading prior to introducing the test fluid. The isolation valves shall be in good working condition as to prevent any leakage past the valve.
- Once visually verified, the isolation valve at the separator shall be closed and again a zero pressure reading of the PI verified.
- At the isolation valve, open the valve and introduce fluid into the system. Once the pressure is at the maximum operating pressure produced and has stabilized, then isolate the valve.
- Validate the start time and hold for 30 minutes, verifying there is no loss in operating pressure.
- Document the test and submit to your supervisor

Cascade Creek Operational Area Water Distribution Pipeline

Updated: April 13, 2015 Garfield County, Colorado



-  Water Distribution Pipeline
-  Existing Storage Pond
-  Existing Well Pad
-  SWD Location
-  Facilities
-  Oxy Responsible Road
-  Unimproved Public Road
-  Gravel Public Road
-  Paved Public Road

Pond 13E/W

Central Water Handling Facility
 632-21-41

CC1 and 2 Gas Plant

CC Field Office

213 - CONW CREEK RD

LT 28-10 SWD Facility

GarCo 204 - BOAN CREEK DR

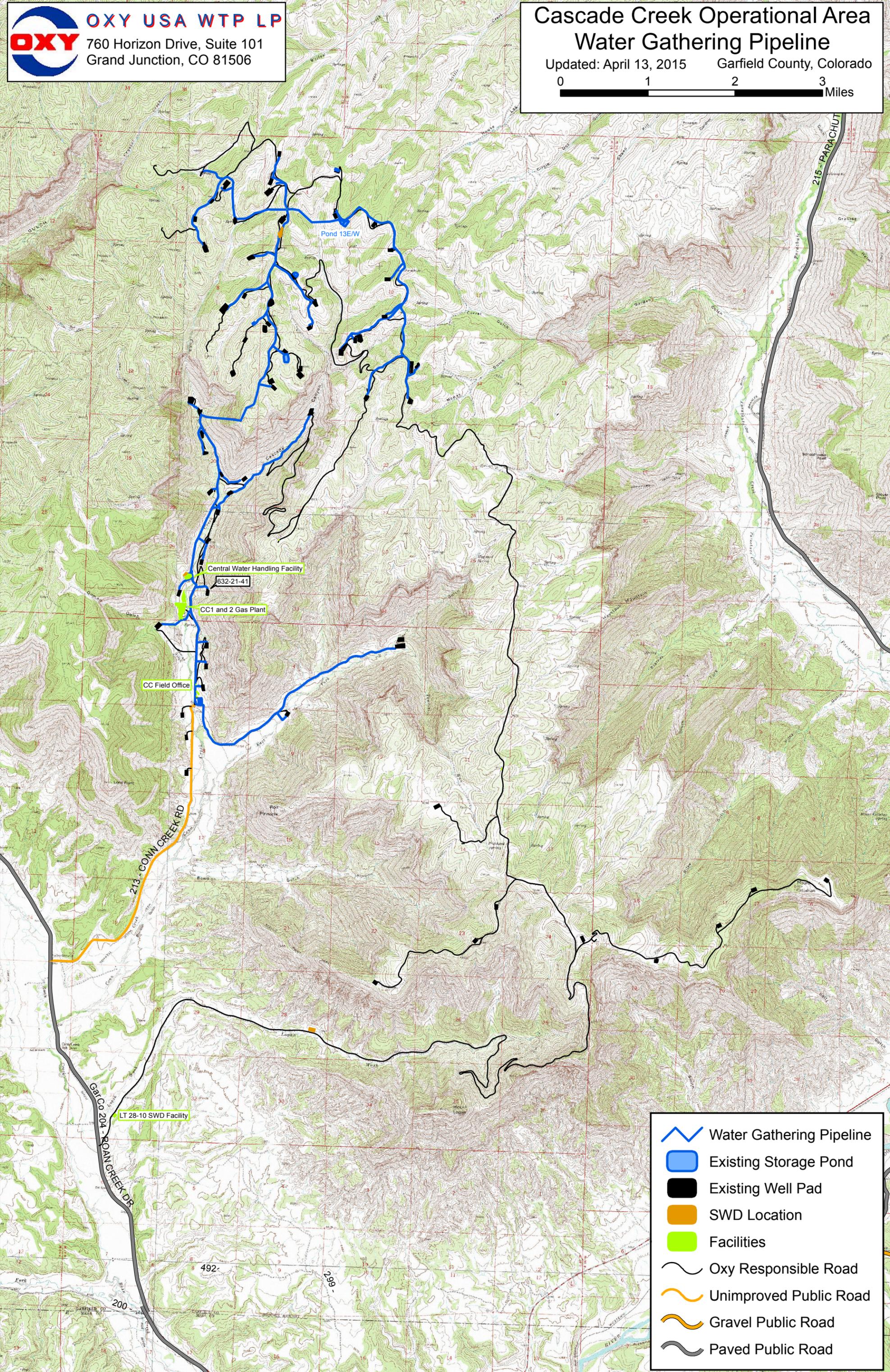
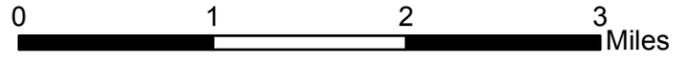
492-

299-

215 - PARACHUTE

Cascade Creek Operational Area Water Gathering Pipeline

Updated: April 13, 2015 Garfield County, Colorado



	Water Gathering Pipeline
	Existing Storage Pond
	Existing Well Pad
	SWD Location
	Facilities
	Oxy Responsible Road
	Unimproved Public Road
	Gravel Public Road
	Paved Public Road

Pond 13E/W

Central Water Handling Facility
 632-21-41

CC1 and 2 Gas Plant

CC Field Office

213 - CONW CREEK RD

215 - PARACHUTE

GarCo 204 - BOAN CREEK DR

LT 28-10 SWD Facility

492-

299-

STATE OF COLORADO)
)ss
County of Garfield)

At a regular meeting of the Board of County Commissioners for Garfield County, Colorado, held in the Commissioners' Meeting Room, Garfield County Administration Building in Glenwood Springs on Monday, the 20th day of January A.D. 2014, there were present:

John Martin, Commissioner Chairman
Mike Samson, Commissioner
Tom Jankovsky, Commissioner
Frank Hutfless, County Attorney
Jean Alberico (absent), Clerk of the Board
Andrew Gorgey (absent), County Manager

when the following proceedings, among others were had and done, to-wit:

RESOLUTION NO. 2014-07

A RESOLUTION OF APPROVAL FOR A LAND USE CHANGE PERMIT FOR TWO WATER IMPOUNDMENTS KNOWN AS 13E AND 13W, AND STORAGE OF MATERIAL, EQUIPMENT AND SUPPLIES ON A SITE OWNED BY OXY USA WTP, LP. THE 640-ACRE SITE IS LOCATED IN SESE ¼ SECTION 4, TOWNSHIP 6 SOUTH, RANGE 97 WEST OF THE 6TH P.M., GARFIELD COUNTY

PARCEL NO# 2169-044-00-003

Recitals

A. The Board of County Commissioners of Garfield County, Colorado, (Board) received a request for a Land Use Change Permit for two existing Water Impoundments, and two proposed Storage areas for material, equipment and supplies. This approval allows operation of the facility to store a maximum of 121,480 BBLs of produced water in the two water impoundments and storage area not to exceed 3.03-acres within the 21.47-acre project area as shown in the site plan attached as Exhibit A.

B. This facility is located within a 640-acre parcel of land owned by OXY USA WTP, LP as described in a General Warranty Deed at Reception Number 713681 in the records of the Garfield County Clerk and Recorder.

C. The subject property is located within unincorporated Garfield County in the Resource Lands (Plateau) zone district, north of the Town of DeBeque.

D. Water Impoundment and Storage may be permitted in the Resource Lands (Plateau) zone district with Limited Impact review.

E. The Board is authorized to approve, deny or approve with conditions a Limited Impact application resulting in issuance of a Land Use Change Permit pursuant to the 2013 Land Use and Development Code.

F. The Board of County Commissioners opened a public hearing on the 16th day of December, 2013 for consideration of whether the proposed Land Use Change Permit should be granted or denied, during which hearing the public and interested persons were given the opportunity to express their opinions regarding the request.

G. The Board of County Commissioners continued the public hearing to the 20th day of January, 2014 to obtain and review additional information related to the request.

H. The Board of County Commissioners continued the public hearing on the 20th day of January, 2014 at which time additional information was considered to determine if the Land Use Change Permit should be granted or denied, during which hearing the public and interested persons were given the opportunity to express their opinions regarding the request.

I. The Board of County Commissioners closed the public hearing on the 20th of January, 2014 to make a final decision.

J. The Board on the basis of substantial competent evidence produced at the aforementioned hearings, has made the following determinations of fact:

1. That proper public notice was provided as required for the hearing before the Board of County Commissioners.
2. That the hearing before the Board of County Commissioners was extensive and complete, that all pertinent facts, matters and issues were submitted and that all interested parties were heard at that meeting.
3. That for the above stated and other reasons, and upon compliance with conditions of approval, the Land Use Change Permit for two (2) Water Impoundments, 13E and 13W, and Storage of Equipment, Material and Supplies, is in the best interest of the health, safety, convenience, order, prosperity and welfare of the citizens of Garfield County.
4. That, upon compliance with conditions of approval, the application is in general conformance with the Comprehensive Plan 2030, as amended.
5. That, upon compliance with conditions of approval, the application is in conformance with the 2013 Land Use and Development Code.

RESOLUTION

NOW THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Garfield County, Colorado, that:

- A. The forgoing Recitals are incorporated by this reference as part of the resolution.
- B. The Land Use Change Permit for a for two (2) Water Impoundments, 13E and 13W, and Storage of Equipment, Material and Supplies is hereby approved subject to compliance with the following conditions:
 - 1. That all representations made by the Applicant in the application and public hearing shall be conditions of approval, unless specifically altered by the Board of County Commissioners.
 - 2. That the facility shall operate in compliance with all applicable Federal, State, and local regulations governing the operation of this type of facility.
 - 3. The land use change permit is for two water impoundments, 13E and 13W, not to exceed 3.3-acres in size and storage capacity not to exceed 121,480 Barrels of produced water. In addition, the 21.47-acre project area is approved for two storage facilities as indicated on the approved site plan for a total area of 3.03-acres. No hazardous material or fuel storage is permitted within the facility.

Prior to Issuance of the LUCP

- 4. Prior to issuance of the Land Use Change Permit, the Applicant shall provide a supplement to the Traffic Analysis utilizing the 2011 Road & Bridge Traffic Counts and updating the report as appropriate to include traffic generated by the storage areas. The supplement shall include a finding consistent with the current study that no additional traffic improvements are recommended or provide specific recommendations that the Applicant shall be required to comply with subject to review by Garfield County.
- 5. Prior to issuance of the Land Use Change Permit, the Applicant shall provide written confirmation that all pipelines serving the facility have been properly permitted or are exempt from permitting requirements.
- 6. Prior to issuance of the Land Use Change Permit, the Applicant shall provide copies of the well permits related to the three monitoring wells for the site.
- 7. Prior to issuance of the Land Use Change Permit, the Applicant shall provide a statement by a qualified professional or representative of the Applicant confirming the adequacy of the access road to serve the site. A waiver from Article 7, Roadway Standards is approved pursuant to the approval criteria contained in Section 4-118 of the Land Use and Development Code, subject to compliance with the above requirement.

8. Prior to issuance of the Land Use Change Permit, the Applicant shall obtain the proper building permits for structures on the site, including existing/proposed fencing that shall consist of a minimum of a 7-foot chain-link fence capable of preventing elk and deer from entering the pit; concurrently it should have a small mesh type of fencing along the bottom of the fence (buried on-foot below grade level and extending a minimum of two-feet above grade capable of preventing small animals from entering between the gaps (gaps should be no larger than three-inches).
9. Prior to issuance of the Land Use Change Permit, the Applicant shall provide specifications and details for the proposed liners and leak detection systems of the ponds subject to review by Garfield County.
10. Prior to issuance of the Land Use Change Permit, the Applicant shall provide a Drainage and Erosion Control Plan that includes analyzes the 21.47-acre project area including sufficient detail to determine how site runoff is directed on the site and includes additional BMPs in areas of concentrated flow. This plan shall be reviewed for sufficiency by Garfield County.
11. Prior to issuance of the Land Use Change Permit, the Applicant shall provide a signed and stamped Drainage Report prepared by an engineer that satisfies the requirements of Section 7-204 of the 2013 Land Use and Development Code and includes documentation on the source of the runoff calculation intensities as well plans indicating how water will drain around the impoundments and storage areas (including grading plans). The Applicant shall provide information related to how the levels in the ponds will be monitored and management concerning items such as active water level, precipitation, freeboard, overflow level, etc. This information, once submitted shall be reviewed by Garfield County for compliance with code standards and BMP's.
12. Prior to issuance of the Land Use Change Permit the Applicant shall provide information regarding total amount of site disturbance related to proposed improvements and provide a revegetation security based upon \$2,500.00 per acre of revegetated area if the amount of disturbance is greater than one-half (1/2) acre.
13. Prior to issuance of the Land Use Change Permit the Applicant shall provide a Soil Plan that provides for soil cover if any topsoil stockpiles will site exposed for a period of ninety days or longer.

Wildlife Conditions

14. The Applicant shall comply with the following Colorado Parks and Wildlife recommendations regarding protection of wildlife:
 - A. Night Lighting should be of the full-cutoff type and/or timed or otherwise minimized to reduce disruption to wildlife.

- B. The Applicant shall install bear-proof trash containers at this facility and workers shall be advised that feeding bears is a prohibited activity.
- C. The wastewater pit(s) should be adequately protected to ensure that waterfowl and other birds are prevented – excluded – from entering or coming in contact with water in the pit(s). Adequate protection may include netting (preferred by CPW and USFWS), RADAR triggering noise deterrents, floating cover, or other device that is a demonstrably proven method of avian deterrent. Unacceptable methods including flagging, floating 4 inch hollow plastic balls, decoy predators, or other sight deterrents, reflectors, strobe lights, or zon guns (sonic blast). See the USFW web page for additional guidance at <http://www.fws.gov/mountain-prairie/contaminants/contaminants1c.html>.
- D. Construction activities (on a daily basis, continuous, intermittent loud noise) such as heavy equipment operations (backhoes, bulldozers, generator, and heavy trucks) and or intensive human activities should occur outside of the time period from March 1 to June 30 to minimize impacts to greater sage-grouse production areas. Construction activities include earth moving and or pit liner removal or installation.
- E. CPW shall be notified immediately if any birds and/or wildlife are found dead or trapped within or around the pit, netting, or fences.
- F. Following the completion of construction activities, newly exposed soils should be revegetated as soon as possible to prevent erosion and to reduce the likelihood of non-native plants becoming established in the area. Seed mix used for revegetation should be certified as weed-free and consist of native seeds from plants that are common to the area.
- G. To reduce the likelihood of truck – wildlife collisions, proper speed limits (<25 mph) should be posted and enforced on all service roads.

Other

- 15. Any future air quality permits for this facility shall be provided to the County upon issuance by CDPHE.
- 16. The applicant shall conduct on-site weed inventory in the spring or early summer of 2014 and provide the information to the County Vegetation Manager by June 30, 2014.

Dated this 3rd day of February, A.D. 2014.

