TECHNICAL MEMORANDUM

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To: **Newmont Mining Company**
Cripple Creek & Victor Gold Mine

From: **NewFields MD&TS**

Project: Poverty Gulch Diversion Channel
Cripple Creek and Victor Gold Mine
Teller County, Colorado

Project No: **475.0106.016**

Subject: **Technical Specifications**

Date: April 25, 2017

1. APPROVED TECHINCAL SPECIFICATIONS

After reviewing the approved technical specifications from the Squaw Gulch VLF Project, NewFields is proposing the relevant section these specifications for the Poverty Gulch Diversion Channel Project. In particular, the following technical specifications apply:

- 01050 Construction Staking
- 01400 Earthwork Construction Quality Assurance (CQA) Plan
- 01400-2 Geosynthetic Construction Quality Assurance (CQA) Plan
- 02200 Earthworks
- 02271 Riprap
- 02777 Geotextile
- 03300 Cast-in-place Concrete

In order to include riprap and grouted riprap materials as called out on the drawings, the riprap technical specification has been modified to include:

- Gradations for the D_{50}=12” Riprap
- Gradation for the D_{50}=18” Riprap
- Installation and Material Specifications for grout.

The above mentioned technical specifications have been attached to this memorandum.

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS – Construction Staking		**SPECIFICATION NO.** **01050.DOCX**

REV	DATE	PAGES	APPROVALS			REMARKS
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1	04/07/2016	3	JNM	RMS		Issued for Client Review
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TABLE OF CONTENTS

SECTION 01050.0 CONSTRUCTION STAKING AND CONSTRUCTION DOCUMENTATION

1. PART 1: GENERAL

1.1. Summary

This Section defines the control staking services required by the **CONTRACTOR**. All staking and surveying will be the responsibility of the **CONTRACTOR** unless otherwise specifically defined in this section. All grade checking and transferring of lines and grades from **CC&V**'s stakes will be the **CONTRACTOR**'S responsibility.

1.2. Control Stakes

Control stakes which are reference points for all construction work will be conspicuously marked. It shall be the responsibility of the **CONTRACTOR** to inform his employees and his subcontractors of their importance and the necessity for their preservation. At least forty-eight (48) hours written advance request for removal of control stakes shall be given to **CC&V**. A total of ten (10) control stakes will be provided to the **CONTRACTOR** by **CC&V** for this work.

Control stakes shall be set one time only.

1.3. Flagging Code

A color code will be established by the **CONTRACTOR** during the course of the project indicating specific colors for the various kinds of stakes to be set.

1.4. Staking

A. **CC&V** will provide vertical and horizontal reference control stakes in the proximity of the work as discussed in Article 1.02 of this Section.

B. The **CONTRACTOR** shall be responsible for setting construction and grade stakes and for proper preservation of control points.

C. The **CONTRACTOR** will provide as-built coordinates and elevations for the Underdrains, Leak Detection system, Low Volume Solution Collection piping and High Volume Solution Collection piping or as requested by the **MANAGER**.

1.5. Construction Certification Documentation

A. The **CONTRACTOR** shall be responsible for accurately surveying the locations and elevations, and where applicable, the type, thickness, and geometry of any and all pipes and fittings, ditches, geosynthetic materials, breaks in fill or cut slopes, general grading,

change in fill or synthetic material type, and any other aspect of the work to facilitate construction and as required by the **MANAGER**.

B. Submittals By **CONTRACTOR** Upon Completion of Work:

Within seven (7) calendar days after completion of the WORK, **CONTRACTOR** shall furnish **MANAGER** with "Record Drawings" (also referred to as "As-Built Drawings") of the Work. The Record Drawing will be drawn at a scale of 1-inch equals 100 feet with 10 foot topographic contour interval, and on a 24-inch by 36-inch sheet. All surveying Record Drawings shall be signed and sealed by the Colorado licensed surveyor who directed the work. The required surveying shall be carried out on a 100-foot by 100-foot grid with additional survey points required to define valley leach facility topographic features (i.e., toe of slope, crest of slope, breaks in grade), unless otherwise directed by **MANAGER**. The Record Drawings shall include elevations and locations for the following:

- Underdrain plan view showing the limits of the valley leach facility. Underdrain Fill and underdrain alignment, with elevations every approximately 100 feet or on every break in grade
- Diversion channel plan and profile view along the diversion channel alignment
- Leak detection trench plan view showing the limits of the valley leach facility, leak detection trench alignment, and leak detection sumps, with elevations every approximately 100-feet
- Soil Liner Fill plan view showing the limits of the valley leach facility, with contours of the Soil Liner Fill and Bedding Fill surface on a 10-foot contour interval, including the regraded ore slopes and end berms
- Low Volume Solution Collection piping plan showing the limits of the composite liner, double liner and single liner, and piping alignment with elevations every approximately 100 feet
- Perimeter access roads
- Top of Upper geosynthetics in the Pregnant Solution Storage Area, including the Vertical Riser Sump and base plates
- High Volume Solution Collection piping plan showing the limits of the VLF, and piping alignment with elevation every approximately 100-feet

In addition, the Colorado licensed surveyor will provide a surveyor's certificate to be submitted in the Construction Certification Report.

C. Submittal

CONTRACTOR will submit completed as-built documentation within seven (7) calendar days upon completion of the work in the following manner:

1. Submit two (2) hard copies to the **MANAGER**.
2. Submit two (2) non-reproducible copies to the **MANAGER** in electronic form on compact disks (CD) or DVD's and in an AutoCAD compatible format.

D. The **CONTRACTOR** will be responsible for performing the following survey activities associated with the Construction Certification Report:

1. Provide northing, easting, and elevation for all Soil Liner Fill depth verifications.
2. Provide northing, easting, and elevation for geomembrane panel intersections and destructive samples.
3. Provide continuous northing, easting, and elevation reference for field testing and sampling location identification.
4. Provide depth verification for the Low Volume Solution Collection Fill on a 50-foot by 50-foot grid with additional points at all grade breaks.
5. Provide depth verification for Drain Cover Fill on a 50-foot by 50-foot grid with additional survey points at all breaks in grade.
6. Provide northing, easting and elevation reference for any underground working confirmatory drillhole and blasthole locations.

Northings, eastings, and elevations for Items 1, 2, 3 and 6 will be performed on a daily basis and results will be provided to the **MANAGER** in both electronic and hardcopy format within 24 hours of performing the survey.

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS – Earthworks Construction Quality Assurance (CQA) Plan		**SPECIFICATION NO.** **01400.DOCX**

REV	DATE	PAGES	APPROVALS			REMARKS
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TABLE OF CONTENTS

LIST OF TABLES

SECTION 01400.1 EARTHWORKS CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN

1. PART 1: INTRODUCTION

This plan addresses the construction quality assurance (CQA) procedures for the installation of the earthworks (soils) components of the valley leach facility at the Cresson Project, Teller County, Colorado. This program has been developed to assure that the construction of the soil components are in compliance with the project SPECIFICATIONS and to demonstrate that the regulatory requirements for the construction are achieved.

The objective of this plan is to assure that proper materials, construction techniques, and procedures are followed by the **CONTRACTOR** and that the intent of the design is met. This plan also provides the means for resolution of problems that may occur during construction.

This plan addresses quality assurance, not quality control. This CQA Plan is independent of the quality control (QC) programs conducted by **CONTRACTOR**. The intent of the CQA Plan is to provide independent third party verification and testing, to demonstrate that the **CONTRACTOR** has met its obligations in the supply and installation of earthwork (soils) materials according to the design, project SPECIFICATIONS, contractual, and regulatory requirements. Quality control is provided by **CONTRACTOR** and refers to those actions taken by the **CONTRACTOR** to ensure that materials and workmanship meet the requirements of the DRAWINGS and SPECIFICATIONS.

2. PART 2: DESCRIPTION OF PARTIES TO CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties to this CQA Plan including their responsibilities and qualifications.

2.1. CC&V

In this CQA Plan, **CC&V** refers specifically to Cripple Creek & Victor Gold Mining Company. **CC&V** owns and operates the valley leach facility.

2.2. Manager

In this CQA Plan, **MANAGER** refers to the individual appointed by the Cripple Creek & Victor Gold Mining Company. **MANAGER** is the official representative of **CC&V** and is responsible for all construction activities including oversight and direction during construction. **MANAGER** is also responsible for coordinating construction and CQA activities for the project.

MANAGER shall serve as communications coordinator for the project, initiating preconstruction and resolution meetings. As communications coordinator, **MANAGER** will serve as a liaison

between all parties involved in the project to ensure that ongoing communications are maintained. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all CQA issues.

Duties for this position include the following:

- review and approval of DRAWINGS and SPECIFICATIONS for all soil components of the valley leach facility;
- preconstruction coordination with the CQA Monitor to ensure that the CQA Monitor has performed similar reviews of the DRAWINGS and SPECIFICATIONS to ensure that the CQA Plan can be implemented;
- coordination of all construction activities associated with **CONTRACTOR**;
- scheduling and coordinating construction activities with required CQA testing and activities;
- overseeing the construction quality control operations performed by **CONTRACTOR**;
- approve specific corrective measures to be implemented during construction when deviations from the SPECIFICATIONS occur;
- ensure that required quality assurance testing has been performed in accordance with the CQA Plan and to the satisfaction of the CQA Monitor; and
- ensure that the CQA personnel are provided with all documentation required in the CQA Plan and project SPECIFICATIONS.

2.3. Design Engineer

In this CQA Plan the **DESIGN ENGINEER and Engineer of Record (EOR)** refers specifically to NewFields who has assumed the role of **DESIGN ENGINEER** after a thorough review of design documents to include, but not limited to, the DRAWINGS and SPECIFICATIONS. The **DESIGN ENGINEER** or the **CERTIFYING ENGINEER** identified in section 2.4 below, is responsible for approving all DRAWING and SPECIFICATION changes, modifications, or clarifications encountered during construction.

2.4. Certifying Engineer

In this plan, **CERTIFYING ENGINEER** refers specifically to NewFields. **CERTIFYING ENGINEER** is the individual or firm responsible for certifying the construction was performed in compliance with the DRAWINGS and SPECIFICATIONS. **MANAGER** and **CERTIFYING ENGINEER** shall be responsible for the resolution of all quality assurance issues.

2.5. Construction Quality Assurance Monitor

The CQA Monitor is the firm or individual responsible for performing the CQA tasks outlined in this CQA Plan. The CQA Monitor is the official CQA representative of **CC&V** and has the responsibility of overseeing the CQA aspects of the Work. In this CQA Plan the CQA Monitor is associated with the **CERTIFYING ENGINEER,** and refers specifically to (To Be Determined). The CQA Monitor has the authority to stop any aspect of the Work that is not in compliance with the CQA Plan. Work would then be resumed once corrective action has been approved by **MANAGER**. The specific responsibilities of the CQA Monitor include:

- review the DRAWINGS, SPECIFICATIONS, and related guidance documents;
- review all **CONTRACTOR** QC submittals and make appropriate recommendations;
- obtain preconstruction and construction samples and perform material evaluation testing as required;
- monitor foundation preparation activities as discussed in Section 6.02.01 and material placement as discussed in Section 6.02.02;
- assure that testing equipment used and tests performed are conducted according to SPECIFICATIONS and industry standards;
- document and report test results to **MANAGER**;
- report any deficiencies to **MANAGER** that are not corrected to the satisfaction of the CQA Monitor, including design or SPECIFICATION changes;
- prepare a Construction Certification Report describing the construction, any deviations from SPECIFICATIONS or DRAWINGS and details, details of all field and laboratory test data, tests results (both laboratory and field), professional certification that construction was completed in accordance with the DRAWINGS and SPECIFICATIONS. The Construction Certification Report will be signed and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado;
- monitor the ambient air temperature and fill temperature, as outlined in specification Section 2200; and
- maintain an on-site soils laboratory and perform regular calibration of equipment.

2.6. Earthworks Contractor

The Earthworks Contractor, also referred to as "**CONTRACTOR**", is responsible for proper processing, delivery and placement of all components as outlined in the SPECIFICATIONS.

3. PART 3: LINES OF COMMUNICATION

The CQA Monitor shall be capable of direct communication with **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** at all times. Deficiencies that can be easily remedied, such as

unsatisfactory test results, will be dealt with directly between the CQA Monitor, and **CONTRACTOR**. The CQA Monitor will also discuss any deficiencies with the **CERTIFYING ENGINEER**.

If there is a disagreement among the **DESIGN ENGINEER, CERTIFYING ENGINEER,** and/or **MANAGER** that cannot be resolved among themselves, **MANAGER** shall present the matter to **CC&V** with **MANAGER** related recommendations and **CC&V** shall decide the matter with such decision being final.

4. PART 4: DEFICIENCIES

When deficiencies (items that do not meet SPECIFICATIONS or DRAWINGS) are discovered, the CQA Monitor will immediately determine the nature and extent of the problem and notify the **CONTRACTOR**. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient area.

CONTRACTOR shall correct the deficiency to the satisfaction of the CQA Monitor. If **CONTRACTOR** is unable to correct the problem, the CQA Monitor will notify **MANAGER** and **CERTIFYING ENGINEER** which will assist in problem resolution. If the solution involves a design revision, the **DESIGN ENGINEER** shall also be contacted.

The CQA Monitor shall retest and the **MANAGER** and **CERTIFYING ENGINEER** shall approve the corrected deficiencies before any additional related work is performed by **CONTRACTOR**. All retests and related documentation shall be recorded by the CQA Monitor and included in the Construction Certification Report.

5. PART 5: MEETINGS

This section identifies and describes the meetings to be held during the course of the construction. Meetings shall be held in order to clearly define construction activities and goals in order to facilitate construction.

5.1. Preconstruction Meeting

MANAGER will hold a preconstruction meeting at the site prior to the start of construction. **MANAGER**, **DESIGN ENGINEER, CERTIFYING ENGINEER**, CQA Monitor, **CONTRACTOR**, and others designated by **MANAGER** shall attend this meeting. The purpose of this meeting will be to:

- review the construction DRAWINGS, CQA Plan, and SPECIFICATIONS;
- define the responsibilities of each party;
- define lines of communication and authority;

- review method of documentation, testing procedures, and reporting inspection data;
- establish testing protocols and procedures for correcting and documenting construction deficiencies;
- discuss any changes that may be needed to ensure that construction will be completed in compliance with the design; and
- This meeting will be documented by **MANAGER** and copies will be distributed to all parties.

5.2. Progress Meetings

MANAGER will hold a daily progress meeting, either before the start of work or at the completion of work. At a minimum, this meeting will be attended by the CQA Monitor and **CONTRACTOR**. The purpose of this meeting will be to:

- review all the previous day's accomplishments and activities;
- review scheduled work location and activities for the day;
- discuss any problems or potential construction problems; and,
- review test data.

5.3. Deficiency Meetings

Special meetings will be held, as needed, to discuss potential problems or deficiencies. At a minimum, these meetings will be attended by the CQA Monitor and **CONTRACTOR**. If the problem relates to a design issue, **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** should also be present. The meeting will be documented by the CQA Monitor.

6. PART 6: EARTHWORKS CONSTRUCTION QUALITY ASSURANCE

Construction of the valley leach facility or specified earthworks shall be in accordance with the DRAWINGS and SPECIFICATIONS. A CQA monitoring and testing program shall be implemented by **CC&V** to ensure construction compliance by the **CONTRACTOR**. The CQA testing program shall consist of construction testing of materials used in the valley leach facility construction. The types of materials are defined in the SPECIFICATIONS. During construction, the CQA Monitor shall sample and test these soil types to determine if they meet SPECIFICATIONS. The CQA Monitor shall obtain and test soil samples in accordance with American Society for Testing and Material standards ASTM D75 and ASTM D420. All tests shall be performed by the CQA Monitor on-site or in a geotechnical laboratory approved by the **CERTIFYING ENGINEER.**

6.1. Construction Testing

During construction, the CQA Monitor shall test all earthwork components to verify that the construction is in accordance with the SPECIFICATIONS. Testing shall be performed on all soil used in the construction to confirm the materials meet SPECIFICATIONS. The CQA Monitor shall conduct testing after final placement of the materials. The tests to be performed, and the testing frequency, for each material type are listed in Tables 1 and 2. The testing frequencies specified in Tables 1 and 2 shall be increased when the CQA Monitor determines that construction conditions (such as adverse weather, equipment breakdown, improperly ballasted compactor, excessive lift thickness, improper soil type, improper moisture conditioning and compaction) warrant additional tests. Additional tests will be approved by **MANAGER** and directed by the CQA Monitor.

6.2. Construction Monitoring

The CQA Monitor will monitor and test all earthwork quality assurance components of the construction to verify that the construction is in accordance with the SPECIFICATIONS. The CQA Monitor shall identify inadequate construction methodologies or materials that may adversely impact the performance of the facility being constructed and existing structures. The CQA Monitor will record visual observations throughout the construction process to ensure that the materials are placed to the minimum dimensions as shown on the DRAWINGS. Quality control testing will be performed by the **CONTRACTOR**.

6.2.1. Foundation Preparation

The CQA Monitor shall observe and document the foundation preparation including:

- stripping and excavation activities to ensure that **CONTRACTOR** places the material in the appropriate stockpile (Structural Fill, Select Structural Fill, Underdrain Fill, Leak Detection Fill, Low Volume Solution Collection Fill, Bedding Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material and Granular Filter Material), if stockpiling is necessary;
- stockpiling activities to verify location of stockpile, material type, and dressing;
- excavations for moisture seeps, unsuitable foundation soil, elevation, and proper drainage;
- subgrade preparation to confirm that the surface of the subgrade is free of soft, organic, and otherwise deleterious materials (such as debris, branches, vegetation, mud, ice, or frozen materials); and that soil and rock surfaces that contain joints or fractures are adequately filled in accordance with the SPECIFICATIONS; and
- construction of access roads, drainage control features and erosion control features to verify compliance with the DRAWINGS and SPECIFICATIONS.

6.2.2. Placement Of Materials

During placement of Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Cemented Rockfill, Underdrain Fill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material and Granular Filter Material, the CQA Monitor shall:

- verify the use of appropriate fills;
- monitor and document material placement, including soil type, particle size, loose lift thickness, moisture conditioning process, compaction equipment and methods used to attain compaction, including number of passes, uniformity of compaction coverage, compacted lift thickness, bonding of lifts and in-place moisture content and dry density is in compliance with the SPECIFICATIONS;
- monitor Soil Liner Fill surface preparation to verify that the surface has been proof-rolled, compacted, or hand worked so as to be in a condition suitable for geomembrane installation as discussed in Section 02200 of the SPECIFICATIONS;
- monitor Bedding Fill placement and surface preparation to verify that the surface is suitable for geomembrane installation as discussed in Section 02200 of the SPECIFICATIONS;
- monitor the placement of fill to ensure that **CONTRACTOR** exercises care in the vicinity of pipes and that the underlying geosynthetics are not damaged;
- monitor and document **CONTRACTOR** verification of in-place Soil Liner Fill, Bedding Fill, Low Volume Solution Collection Fill and Drain Cover Fill thickness;
- monitor equipment being used to place Low Volume Solution Collection Fill and Drain Cover Fill to verify that the **CONTRACTOR** places the material in accordance with the SPECIFICATIONS;
- monitor that Low Volume Solution Collection Fill and Drain Cover Fill is pushed uphill for areas in which the slope exceeds 4H:1V and that the dozer does not perform unacceptable pivot turns; and
- monitor the fill temperature as identified in Section 02200 of the SPECIFICATIONS.

7. PART 7: DOCUMENTATION

Documentation kept by the CQA Monitor shall consist of daily record-keeping, construction problem resolutions, design and SPECIFICATION changes, photographic records of construction, weekly progress reports, chain of custody forms for test sample tracking, and a Construction Certification Report.

7.1. Daily Record Keeping

Daily records kept by the CQA Monitor shall consist of field notes, observation and testing data sheets, summary of the daily meeting with **CONTRACTOR**, and reporting of construction problems and resolutions. The CQA Monitor shall submit this information on a regular basis to **MANAGER** for review.

7.2. Soils Observation and Testing Forms

The CQA Monitor will document soils observations on forms that generally include the following information:

- date, project name, location, and weather data, including high and low daily temperatures;
- a site plan showing work areas and test locations;
- descriptions of ongoing construction detailing work areas and equipment utilized by CONTRACTOR**;**
- summary of test results and samples obtained, with locations and elevations;
- resolutions of deficient test results;
- test equipment calibrations, if necessary;
- summary of meetings held; and
- signature or initials of the CQA Monitor.

7.3. Photo Documentation

The CQA Monitor shall photograph all phases of construction. Photographs shall be identified by location, time, date, and name of the CQA Monitor taking the photograph.

7.4. Design and Specification Changes

During construction, the need to address DESIGN and SPECIFICATION changes, modifications, or clarifications may arise. In such cases the CQA Monitor shall notify **MANAGER**, which shall notify the **DESIGN ENGINEER** and the **CERTIFYING ENGINEER**. DESIGN and SPECIFICATION changes shall only be made with written agreement from **MANAGER** and **DESIGN ENGINEER**.

7.5. Weekly Progress Reports

The CQA Monitor shall prepare weekly progress reports summarizing all construction and quality assurance activities. This report shall be submitted to **MANAGER** and shall include the following information:

- date, project name, and location;

- summary of construction related activities;
- summary of samples taken and test results;
- summary of deficiencies and/or defects and resolutions; and,

7.6. signature of the CQA Monitor. Construction Certification Report

At the completion of the project, the CQA Monitor shall submit to **MANAGER** a Construction Certification Report. This report shall certify that the work has been performed in compliance with the DRAWINGS and SPECIFICATIONS and will contain the following information:

- summary of all construction activities;
- photographic documentation;
- test data sheets;
- copies of weekly reports;
- CQA test results, including date, test locations and resolutions of deficient test results;
- copies of surveyors certificate;
- fill temperature monitoring results;
- staff schedule summary;
- a description of significant construction problems and the resolution of these problems;
- changes to the DRAWINGS or SPECIFICATIONS and the justification for these changes;
- record drawings, and

a statement certifying that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS, signed, and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.

TABLE 1: SOIL CONSTRUCTION TESTING FREQUENCY[1] VOLUME PER TEST

Test and ASTM Designation	Subgrade (cy)	Structural Fill (cy)	Select Structural Fill (cy)	Underdrain Fill (cy)
Compaction (ASTM D698)	50,000	50,000	50,000	--
Particle Size2 (ASTM C117, C136, D1140, D6913)	50,000	50,000	50,000	5,000
Atterberg Limit (ASTM D4318)	--	50,000	--	5,000
Moisture Content3 (ASTM D2216)	2,000	2,000	2,000	5,000
Nuclear Density/Moisture (ASTM D6938)	2,000	2,000	2,000	--

1. **Tests shall be performed at the specified frequency or one per material type, whichever is greater.**
2. **Use the USCS for description and identification (ASTM D2488).**
3. **In-place moisture content.**

TABLE 2: SOIL CONSTRUCTION TESTING FREQUENCY VOLUME PER TEST

Test and ASTM Designation	Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, and Pipe Bedding Fill (cy)	Soil Liner Fill (cy)	Drain Cover Fill (cy)
Compaction (ASTM D698)	--	4,000	--
Particle Size2 (ASTM C117, C136, D1140) D6913	10,000	4,000	20,000
Atterberg Limit (ASTM D4318)	10,000	4,000	20,000
Moisture Content3 (ASTM D2216)	10,000	500	20,000
Permeability4 (ASTM D5084)	--	4,000	--
Nuclear Density/Moisture (ASTM D6938)	--	500	--

1. **Tests shall be performed at the specified frequency or one per material type, whichever is greater.**
2. **Use the USCS for description and identification (ASTM D2488).**
3. **In-place Moisture Content.**
4. **Permeability testing will be performed during the processing of the Soil Liner Fill material, certifying the processed stockpile.**

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS – Geosynthetic Construction Quality Assurance (CQA) Plan		**SPECIFICATION NO.** **01400-2.DOCX**

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TABLE OF CONTENTS

SECTION 01400.2 GEOSYNTHETIC CONSTRUCTION QUALITY ASSURANCE (CQA) PLAN

1. PART 1: INTRODUCTION

This plan addresses the construction quality assurance (CQA) procedures for the installation of the geosynthetic components used for the construction of the valley leach facility at the Cresson Project, Teller County, Colorado. This program has been developed to assure that the construction of the geosynthetic components are in compliance with the project SPECIFICATIONS and to demonstrate that the regulatory requirements for the construction are achieved.

The objective of this plan is to assure that proper materials, construction techniques, and procedures are followed by the **CONTRACTOR** and that the intent of the design is met. This program also intends to identify problems that may occur during construction and provide the means for resolution of these problems.

This program addresses quality assurance, not quality control. This CQA Plan is independent of the quality control (QC) programs conducted by the **MANUFACTURERS**, **INSTALLERS**, and **CONTRACTORS**. The intent of the CQA Plan is to provide independent third party verification and testing, to demonstrate that the **INSTALLER** and **CONTRACTORS** have met their obligations in the supply and installation of geosynthetic materials according to the design, project SPECIFICATIONS, contractual and regulatory requirements. Quality control is provided by the **MANUFACTURERS**, **INSTALLERS**, and **CONTRACTORS** and refers to those actions taken by them to ensure that their materials and workmanship meet the requirements of the plans and project SPECIFICATIONS.

2. PART 2: DESCRIPTION OF PARTIES TO CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties to this CQA plan including their responsibilities and qualifications.

2.1. CC&V

In this CQA Plan **CC&V** refers specifically to Cripple Creek & Victor Gold Mining Company. **CC&V** owns and operates the valley leach facility.

2.2. Manager

In this CQA Plan the **MANAGER** refers specifically to the individual appointed by the Cripple Creek & Victor Gold Mining Company. The **MANAGER** is the official representative of **CC&V** responsible for all construction activities including oversight and direction during construction.

The **MANAGER** is also responsible for coordinating construction and CQA activities for the project.

The **MANAGER** shall serve as communications coordinator for the project initiating preconstruction and resolution meetings. As communications coordinator, the **MANAGER** shall serve as a liaison between all parties involved in the project to ensure that ongoing communications are maintained. The **MANAGER** and **CERTIFYING ENGINEER** shall also be responsible for the resolution of all CQA issues that arise during the installation of the geosynthetics.

Duties for this position include the following:

- review and approval of design DRAWINGS and project SPECIFICATIONS for all geosynthetic components of the valley leach facility;
- preconstruction coordination with the CQA Monitor to ensure that the CQA Monitor has performed similar reviews of the design DRAWINGS and project SPECIFICATIONS to ensure that the CQA Plan can be implemented;
- coordination of all construction activities associated with the various **CONTRACTOR(S)**;
- scheduling and coordinating construction activities with required CQA testing and activities;
- overseeing the construction quality control operations performed by the **CONTRACTOR(S)**;
- approve specific corrective measures to be implemented during construction when deviations from the SPECIFICATIONS occur;
- ensure that required quality control testing has been performed in accordance with the CQA Plan and to the satisfaction of the CQA Monitor; and
- ensure that the CQA personnel are provided with all documentation required in the CQA Plan and project SPECIFICATIONS.

2.3. Design Engineer

In this CQA Plan the **DESIGN ENGINEER and Engineer of Record (EOR)** refers specifically to NewFields who has assumed the role of **DESIGN ENGINEER** after a thorough review of design documents to include, but not limited to, the DRAWINGS and SPECIFICATIONS. The **DESIGN ENGINEER** or the **CERTIFYING ENGINEER** identified in section 2.4 below, is responsible for approving all DRAWING and SPECIFICATION changes, modifications, or clarifications encountered during construction.

2.4. Certifying Engineer

In this plan, **CERTIFYING ENGINEER** refers specifically to NewFields. **CERTIFYING ENGINEER** is the individual or firm responsible for certifying the construction was performed in compliance

with the DRAWINGS and SPECIFICATIONS. **MANAGER** and **CERTIFYING ENGINEER** will be responsible for the resolution of all quality assurance issues.

2.5. Construction Quality Assurance Monitor

The Construction Quality Assurance Monitor, also referred to as the "CQA Monitor", is the firm or individual responsible for performing the CQA tasks outlined in this plan. The CQA Monitor is the official CQA representative of **CC&V** and has the responsibility of overseeing the CQA aspects of the project. In this CQA Plan the CQA Monitor is associated with the **CERTIFYING ENGINEER** and refers specifically to (To Be Determined). The CQA Monitor has the authority to stop any aspect of the work that is not in compliance with the CQA Plan. Work would then be resumed once corrective action has been approved by the **MANAGER** and **CERTIFYING ENGINEER**. The specific responsibilities of the CQA Monitor include:

- review the design DRAWINGS, project SPECIFICATIONS, and related guidance documents;
- review all **CONTRACTOR** QC submittals and make appropriate recommendations;
- observe geosynthetic material delivery, unloading, and storage;
- obtain and test geosynthetic conformance samples during geosynthetics manufacture;
- observe prepared subgrade prior to geosynthetic deployment;
- monitor and document geosynthetic material placement, trial seam testing, non-destructive testing, seaming and repair operations, and destructive testing;
- identify seam samples for CQA destructive testing;
- assure that testing equipment used, and tests performed are conducted according to project SPECIFICATIONS and industry standards;
- perform or observe, document, and report test results to **MANAGER** as required;
- report any deficiencies to **MANAGER** that are not corrected to the satisfaction of the CQA Monitor, including design or project SPECIFICATION changes; and
- prepare a Construction Certification Report describing the construction, any deviations from SPECIFICATIONS or, DRAWINGS and details, details of all field and laboratory details, subgrade acceptance forms, test data, tests results (both laboratory and field), QC submittals, geomembrane panel layout as-built prepared by the CQA Monitor, professional certification that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS. The report will be signed and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.

2.6. Geosynthetics Manufacturer

The Geosynthetics Manufacturer, also referred to as the "**MANUFACTURER**", is responsible for production of the geosynthetic components outlined in this plan. Each **MANUFACTURER**

must verify prior to construction that the MANUFACTURER can produce material that meets the requirements outlined in project SPECIFICATIONS.

2.7. Geosynthetics Installation Contractor

The Geosynthetics Installation Contractor, also referred to as the "**CONTRACTOR**" or "**INSTALLER**", is responsible for installation of the geosynthetic components, as outlined in the project SPECIFICATIONS.

The **INSTALLER** must meet the requirements outlined in the project SPECIFICATIONS.

The **INSTALLER** will be responsible for storage, handling, deploying, temporary geomembrane anchoring, seaming, repairs and non-destructive testing, in accordance with the project plans, SPECIFICATIONS and the Installer's internal quality control program. It is the Installer's responsibility to see that all submittals are received as outlined in the project SPECIFICATIONS.

2.8. Earthworks Contractor

The Earthworks Contractor, also referred to as "**CONTRACTOR**" is responsible for proper delivery and placement of earthwork components as outlined in the project SPECIFICATIONS.

3. PART 3: LINES OF COMMUNICATION

The CQA Monitor shall be capable of direct communication with the **MANAGER**, **DESIGN ENGINEER**, **CERTIFYING ENGINEER** and **CONTRACTOR** at all times. Deficiencies that can be easily remedied, such as unsatisfactory test results, will be dealt with directly between the CQA Monitor, **INSTALLER** , and/or **CONTRACTORS**.

If there is a disagreement among the **DESIGN ENGINEER**, **CERTIFYING ENGINEER** and/or **MANAGER** that cannot be resolved among themselves, **MANAGER** shall present the matter to **CC&V** with **MANAGER** related recommendations and **CC&V** shall decide the matter with such decision being final.

4. PART 4: DEFICIENCIES

When deficiencies (items that do not meet project requirements) are discovered, the CQA Monitor shall immediately determine the nature and extent of the problem and notify the **INSTALLER** or **CONTRACTOR**. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient area.

The **INSTALLER** or **CONTRACTOR** shall correct the deficiency to the satisfaction of the CQA Monitor. If the **CONTRACTOR** is unable to correct the problem, the CQA Monitor will

notify the **MANAGER** and **CERTIFYING ENGINEER** who will assist in problem resolution. If the solution involves a design revision, the **DESIGN ENGINEER** shall also be contacted.

The corrected deficiency shall be retested and/or approved by the **MANAGER** and **CERTIFYING ENGINEER** before any additional related work is performed by the **INSTALLER** or **CONTRACTOR**. All retests and related documentation shall be recorded by the CQA Monitor and included in the final Construction Certification Report.

5. PART 5: MEETINGS

This section identifies and describes the meetings to be held during the course of the construction. Meetings shall be held in order to clearly define construction activities and goals in order to facilitate construction.

5.1. Preconstruction Meeting

The **MANAGER** will hold a preconstruction meeting at the site prior to the start of construction. The **DESIGN ENGINEER**, **MANAGER**, **CERTIFYING ENGINEER**, CQA Monitor, **INSTALLER**, **CONTRACTOR**, and others designated by the **MANAGER** shall attend this meeting. The purpose of this meeting will be to:

- review the construction DRAWINGS, CQA Plan, and project SPECIFICATIONS;
- define the responsibilities of each party;
- define lines of communication and authority;
- review method of documentation, testing procedures, and reporting inspection data;
- establish testing protocols and procedures for correcting and documenting construction deficiencies;
- discuss any changes that may be needed to ensure that construction will be completed in compliance with the design; and
- This meeting will be documented by the **MANAGER** or his designee and copies distributed to all parties.

5.2. Progress Meetings

The **MANAGER** will hold a daily progress meeting, either before the start of work or at the completion of work. At a minimum, this meeting will be attended by the CQA Monitor, **INSTALLER** and **CONTRACTOR**. The purpose of this meeting will be to:

- review all the previous day's accomplishments and activities;
- review scheduled work location and activities for the day; and,

- discuss any problems or potential construction problems.
- This meeting will be documented by the CQA Monitor.

5.3. Deficiency Meetings

Special meetings will be held, as needed, to discuss potential problems or deficiencies. At a minimum, these meetings will be attended by the CQA Monitor and **INSTALLER** or **CONTRACTOR**. If the problem relates to a design issue, the **MANAGER**, **DESIGN ENGINEER** and **CERTIFYING ENGINEER** should also be present. The meeting will be documented by the CQA Monitor.

6. PART 6: GEOSYNTHETICS CONSTRUCTION QUALITY ASSURANCE

Construction of the valley leach facility or specified geosynthetics must be in compliance with the design plans and SPECIFICATIONS. **CC&V** shall implement a CQA monitoring and testing program to ensure construction compliance by the **CONTRACTOR**. The quality assurance program shall consist of reviewing **CONTRACTOR** quality control submittals, material conformance testing, and construction monitoring and testing.

The types of geosynthetics used in the valley leach facility construction include polyethylene pipe, geomembrane and geotextile. These geosynthetics are defined in the project SPECIFICATIONS. Prior to and during construction, these geosynthetics shall be sampled and tested to determine if they meet project SPECIFICATIONS. All tests shall be performed in a geosynthetics laboratory approved by the **MANAGER** and **CERTIFYING ENGINEER**.

6.1. Review Quality Control Submittals

Prior to geosynthetic installation, the CQA Monitor shall review the **INSTALLER'S** quality control submittals to evaluate or confirm that these materials meet project requirements. The CQA Monitor shall review the QC submittals that are outlined in Section 2776 (Geomembrane) and Section 02777 (Geotextile) of the SPECIFICATIONS.

6.2. Geomembrane Conformance Testing

Prior to geosynthetic installation, the CQA Monitor shall obtain samples of the geomembrane for conformance testing to confirm that these materials meet project requirements. The conformance testing frequency shall be at a rate of 1 test per 150,000 square feet. Samples shall be taken across the entire width of the roll and shall not include the first 3 feet. The samples shall be 3 feet wide by the roll width. The CQA Monitor shall mark the machine direction, roll number on the sample, and date the sample was obtained and forward the

sample to a third party geosynthetic laboratory. As a minimum, the following conformance tests shall be conducted; with project requirements outlined in Section 02776, Article 2.01:

- Geomembrane: density (ASTM D1505)
  carbon black content (ASTM D1603) thickness (ASTM D5199/D5994)
  tensile strength (ASTM D6693)

All conformance tests shall be performed in compliance with the project SPECIFICATIONS. The CQA Monitor shall review the test results and shall report any nonconformance to the **MANAGER**, **CERTIFYING ENGINEER** and the Geosynthetics Installation **CONTRACTOR**.

6.3. Construction Monitoring And Testing

The CQA Monitor shall monitor and test all geosynthetic components of the construction to verify that the construction is in compliance with the project SPECIFICATIONS. The CQA Monitor shall identify inadequate construction methodologies or materials which may adversely impact the performance of the facility being constructed and existing structures. Visual observations throughout the construction process shall be made to ensure that the materials are placed to the lines and grades as shown on the DRAWINGS.

The CQA monitor shall review the following submittals by **INSTALLER** during the project:

- verification that a qualified land surveyor has verified all lines and grades; and
- subgrade surface acceptance certificates for each area to be covered by the lining system, signed by the **INSTALLER**.

The CQA Monitor shall:

- Inspect all geosynthetic materials delivered to site. The CQA Monitor shall document any damage and notify **MANAGER**;
- obtain geosynthetic packaging identification slips for verification and generation of an on-site materials inventory;
- observe subgrade conditions prior to geosynthetics installation and verify that any deficiencies, as defined in Section 02200 of the SPECIFICATIONS, are corrected;
- observe permanent anchoring of geosynthetics to verify that design and project SPECIFICATIONS are met; observe that required overlap distances are met;
- monitor and record ambient air temperatures;
- verify that no continuous horizontal seams are placed on slopes unless approved by
- **CERTIFYING ENGINEER**; and
- observe and document that all soil materials placed on top of the geosynthetics are done in such a manner as to ensure that the geosynthetics are not damaged.

6.3.1. Geomembrane

During geomembrane installation, the CQA Monitor shall observe and document deployment, trial seams, field seaming, non-destructive and destructive seam testing, and repairs to assure that the installation is in compliance with the SPECIFICATIONS.

Deployment - The CQA Monitor shall verify that only approved materials are used, each panel is given a unique panel number, no geomembrane is placed during unsuitable weather conditions as outlined in Section 02776, Article 1.05 of the SPECIFICATIONS, the geomembrane is not damaged during installation, and anchoring is performed in compliance with the SPECIFICATIONS and design DRAWINGS. The CQA Monitor shall record the deployment on the deployment log form.

Trial Seams - The CQA Monitor shall verify that seaming conditions are performed in compliance with SPECIFICATIONS, tests are performed at required intervals, specified test procedures are followed, and retests are performed in compliance with the SPECIFICATIONS. If the ambient air temperature measured by the CQA Monitor is above 35°F for the entire day, the **INSTALLER** shall perform trial seams at the beginning of each crew shift, and immediately following any work stoppage (i.e., for lunch, weather conditions, etc.) of for more than 30 minutes or at the discretion of the **CERTIFYING ENGINEER**, for each seaming apparatus used that day. If the ambient air temperature measured by the CQA Monitor is below 35°F for the entire day, the **INSTALLER** shall perform four (4) trial seams, at approximately the same time interval throughout the scheduled work day. Each Seamer shall make at least one trial seam each day. Seaming operation shall not commence until the CQA Monitor has determined that the seaming process is meeting the SPECIFICATION requirement and is acceptable. The CQA Monitor shall record the trial weld results on the trial seam log form.

Field Seaming - The CQA Monitor shall verify that only approved equipment and personnel perform welding, all welding is performed under suitable conditions as specified in the project SPECIFICATIONS, specified overlaps are achieved, seams are oriented in compliance to project requirements, and that grinding techniques and extrudate meet project requirements for extrusion welding. The CQA Monitor shall record all field seaming on field seaming log forms.

Non-Destructive Seam Continuity Testing - The CQA Monitor shall verify that all seams and repair are non-destructively tested in compliance with the project SPECIFICATIONS. If a seam cannot be tested, the seam shall be capped. The CQA Monitor shall observe capping operations. The CQA Monitor shall verify that test equipment and gauges are functioning properly and that test procedures are in compliance with the project SPECIFICATIONS. The CQA Monitor shall verify that all seams and repairs with failing test results are repaired and/or

re-tested until passing results are achieved. The CQA Monitor shall record all non-destructive test locations on the vacuum test and pressure test log forms.

Destructive Seam Testing - The **INSTALLER** shall obtain samples, at locations selected by the CQA Monitor, of the field seamed geomembrane approximately 24 inches along and 12 inches across the seam and centered over the seam as follows:

- a minimum of one sample per day;
- a minimum of one sample for each geomembrane seamer;
- a minimum of one sample every 500 feet of seaming; and
- seams that appear suspect to the CQA Monitor.

The CQA Monitor shall witness the testing of destructive seam samples by the **INSTALLER**. The **INSTALLER** shall mark all samples with their roll and seam number, date, machine number, welding technician identification, extruder and nozzle/wedge temperature, and ambient air temperature.

The **INSTALLER** shall test all destructive samples in compliance with the project SPECIFICATIONS.

The **INSTALLER** shall be responsible for patching all areas cut for test samples in accordance with the SPECIFICATIONS and **MANUFACTURER's** requirements and performing non-destructive testing (i.e., vacuum box) of the seams. The CQA Monitor shall record test locations on the geomembrane defect log forms. Additional testing information will be recorded on the geomembrane seam destructive sample log form. The CQA Monitor shall track failing tests as described in the SPECIFICATIONS.

Repairs - The CQA Monitor shall observe and document that all repair materials, techniques, and procedures used for repairs are approved in advance and meet the requirements of the project SPECIFICATIONS. The CQA Monitor shall verify that all defects and repairs are marked, recorded, repaired, tested, and wrinkles are addressed, prior to being covered by other materials; and that repairs are performed as specified, including proper patch size or dimension. The CQA Monitor shall record defects and repairs on the defect and repair log forms.

6.3.2. Geotextile

During geotextile installation, the CQA Monitor shall observe and document deployment, field seaming, and repairs to assure that the installation is in compliance with the SPECIFICATIONS.

Deployment - The CQA Monitor shall verify that the subgrade is free of deleterious materials prior to deployment, anchoring is achieved as specified, specified methods are used to minimize wrinkles and protect underlying layers during cutting of materials, and deployment procedures are performed in compliance with the project SPECIFICATIONS.

Seams - The CQA Monitor shall verify sufficient overlap and that the specified seam procedures were followed in compliance with the project SPECIFICATIONS

Repairs - The CQA Monitor shall verify that all repairs are performed in compliance with SPECIFICATIONS.

Protection – The CQA Monitor shall observe and document that all soil materials placed on top of the geosynthetics are done in such a manner as to ensure that the geosynthetics and underlying materials are not damaged.

6.4. Polyethylene Pipe and Fittings

During polyethylene pipe installation, the CQA Monitor shall observe and document that the installation is in compliance with the project SPECIFICATIONS. CQA monitoring of the polyethylene pipe and fittings will include the following:

Placement - Observation that the handling procedures used do not damage the pipe, backfill is placed in compliance with the requirements of the project SPECIFICATIONS so as not to damage the pipe, any foreign material is removed from the interior of the pipe and indentations on the pipe are within the MANUFACTURER's allowable limits.

Joints and Connections - Monitoring of the jointing and connection operations to verify that the **CONTRACTOR** follows the SPECIFICATIONS and the pipe **MANUFACTURER's** recommendations, verification that the pipes are clean when installed, that perforated sections of pipe are aligned properly prior to connection, pipe boot connections are made in the field using the specified rings and clamps, and plastic ties are used to connect the secondary perforated pipes to primary perforated pipes.

Nondestructive Testing - Observe any required testing of the pipe to verify compliance with the project SPECIFICATIONS.

7. PART 7: DOCUMENTATION

Documentation kept by the CQA Monitor shall consist of daily record-keeping, documentation of construction problem resolutions, documentation of design and SPECIFICATION changes, photographic records, weekly progress reports, chain of custody forms for test sample tracking, and a Construction Certification Report.

7.1. Daily Record Keeping

The CQA Monitor shall keep daily records consisting of field notes, observation and testing data sheets, summary of the daily meeting with the **INSTALLER** or **CONTRACTOR**, and reporting of construction problems and resolutions. This information shall be submitted on a regular basis to the **MANAGER** for review.

7.2. Geosynthetic Observation and Testing Forms

The CQA Monitor shall document geosynthetic observations and test results on forms which include the following information:

- date, project name, location, and weather data;
- identification of panel or seam numbers;
- description of ongoing construction, detailing deployment areas;
- numbering system identifying test or sample number;
- location and identification of repairs and date of repair;
- length and/or thickness measurements for geomembrane panels or seams;
- welding machine temperatures and settings; welding machine and technician identifications;
- location of tests and test results;
- identification of testing technicians and time of tests; and
- signature or initials of the CQA Monitor.

7.3. Photo Documentation

The CQA Monitor shall photograph all phases of construction.

7.4. Design And Specification Changes

During construction, the need to address design and SPECIFICATION changes, modifications, or clarifications may arise. In such cases the CQA Monitor shall notify the **MANAGER**, which will notify the **DESIGN ENGINEER** and **CERTIFYING ENGINEER**. Design and SPECIFICATION changes shall only be made with written agreement from the **MANAGER** and **DESIGN ENGINEER**.

7.5. Weekly Progress Reports

The CQA Monitor shall prepare weekly progress reports summarizing all construction and CQA activities. This report shall be submitted to the **MANAGER** and shall include the following information:

- date, project name, and location;
- summary of construction related activities;
- summary of geomembrane deployed (per day);
- summary of samples taken and test results;
- summary of geomembrane areas completed, and approved for Drain Cover Fill placement;
- summary of deficiencies and/or defects and resolutions; and
- signature of the CQA Monitor.

7.6. Construction Certification Report

At the completion of the project, the CQA Monitor shall submit to the **MANAGER** a Construction Certification Report. This report shall certify that the work has been performed in compliance with the design DRAWINGS and project SPECIFICATIONS and will contain the following information:

- summary of all construction activities;
- observation and test data sheets;
- photographic documentation;
- CQA staff scheduling;
- copies of weekly reports;
- **CONTRACTOR'S** subgrade acceptance forms;
- temperature monitoring results;
- geosynthetic quality control documents;
- geosynthetic quality assurance documents;
- geomembrane installation observations, such as for deployment, trial seams, defect repair, destruct testing and non-destructive testing;
- sampling, testing locations, and test results;
- changes to the design DRAWINGS or project SPECIFICATIONS and the justification for these changes;
- record DRAWINGS; and
- a certification statement that construction was completed in compliance with the DRAWINGS and SPECIFICATIONS, signed, and sealed by the **CERTIFYING ENGINEER** registered in the State of Colorado.

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS –EARTHWORKS		**SPECIFICATION NO.** **02200.DOCX**

REV	DATE	PAGES	APPROVALS			REMARKS
			AUTHOR	REVIEW	CLIENT	
1	04/07/2016	21	JNM	RMS		Issued for Client Review
2	06/15/2016	21	JNM	RMS		Issued for Construction

TABLE OF CONTENTS

SECTION 02200.0 EARTHWORKS

1. PART 1: GENERAL

1.1. Summary

This SPECIFICATION describes site preparation, excavation, stockpiling of soils for earthwork if necessary, and placement of Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Underdrain Fill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material, and Granular Filter Material for the valley leach facility.

1.2. Related Sections

Refer to the following Sections for related work:

- Section 01050.0 - Staking and Construction Certification Documentation
- Section 02776.0 - Geomembrane
- Section 02777.0 - Geotextile

1.3. Tolerances

A. Limits of excavation, Structural Fill, Select Structural Fill, Coarse Shaft Backfill, Underdrain Fill, Low Volume Solution Collection Fill, Bedding Fill, Leak Detection Fill, Soil Liner Fill, Drain Cover Fill, Fine Shaft Backfill, Pipe Bedding Material, and Granular Filter Material for the valley leach facility are defined by the lines and elevations shown on the DRAWINGS. All fill shall be placed to the minimum thicknesses shown on the DRAWINGS.

B. Finished grades shown on the DRAWINGS are given in feet, and shall slope uniformly between given spot and contour elevations, without sag or humps. All grades shall provide for natural runoff.

C. The Soil Liner Fill and Bedding Fill shall have a minimum thickness of 1.0 foot.

D. The Low Volume Solution Collection Fill will have a minimum thickness of 3.0 feet at all times, and the Drain Cover fill will have a minimum thickness of 2.0 feet at all times.

E. Clearance of pipes with respect to regulated boundaries will be checked by **MANAGER**. If clearances are inadequate, **CONTRACTOR** shall backfill trenches to compaction SPECIFICATIONS and relocate trenches at **CONTRACTOR**'s expense.

F. Correction of over-excavation and backfilling shall be to **CONTRACTOR**'s account.

1.4. Quality Assurance

A. All work shall be monitored and tested in compliance with the requirements of the CQA Plan.

B. **CONTRACTOR** shall be aware of all testing activities outlined in the CQA Plan, and shall account for these activities in the construction schedule.

C. All CQA soils testing (both field and laboratory testing) will be the responsibility of **CERTIFYING ENGINEER**, as identified in the Earthworks CQA plan. **CONTRACTOR** shall be responsible for cooperating with CQA Monitor during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist CQA Monitor in sampling, if requested, and shall also provide access to all areas requiring testing activities. Quality Control testing shall be the responsibility of the **CONTRACTOR**.

D. All excavation, backfill, and grading operations shall be carried out under the observation of MANAGER and CERTIFYING ENGINEER.

E. Any work found unsatisfactory or any work disturbed by subsequent operations before acceptance is granted shall be corrected by **CONTRACTOR**, at its sole cost.

2. PART 2: PRODUCTS

2.1. Materials

A. Fill materials will be soils, gravels, or rock fill approved by **MANAGER** and **CERTIFYING ENGINEER**. The materials shall be free of organic matter, debris, frozen material, and other deleterious materials, and shall be excavated, as required, as follows:

1. Structural Fill - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATION:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
24 – inch	100
No. 200	0 – 25
Plasticity Index: 30 maximum	

2. Select Structural Fill - well graded granular soil or sound, hard, durable, rockfill excavated on-site or supplied from off-site mine waste rock with a maximum particle size of 3 inches as approved by **MANAGER** and **CERTIFYING ENGINEER**.

3. Underdrain Fill - granular, material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATION.

U.S. Standard Sieve Size	Percent Passing by Dry Weight
12-inch	100
No. 200	0 – 6
Point load tensile strength:	> 300 psi
Plasticity Index: 0	

4. Leak Detection Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATION:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
1-inch	100
⅜-inch	40 – 70
No. 4	5 – 50
No. 40	0 – 20
No. 200	0 – 10
Plasticity Index: 0	

5. Low Volume Solution Collection Fill and Bedding Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATION:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
1-inch	100
⅜-inch	40 – 70
No. 4	5 – 55
No. 200	0 – 10
Plasticity Index: 0	

6. Soil Liner Fill - processed materials as approved by **MANAGER** and **CERTIFYING ENGINEER**, conforming to the following SPECIFICATION:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
2-inch	100
No. 200	15 – 65
Point load tensile strength:	> 300 psi
Plasticity Index: 10 Minimum Hydraulic Conductivity 1×10-6 cm/s maximum	

7. Drain Cover Fill - material approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
1½-inch	100
¾-inch	70 – 100
No. 4	5 – 50
No. 200	0 – 8
Plasticity Index: 0	

8. Select Drain Cover Fill – material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
1½-inch	100
¾-inch	70 – 100
No. 4	5 – 50
No. 200	0 – 8
Plasticity Index: 0	

9. Coarse Shaft Backfill - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
12-inch	100
No. 200	0 – 15
Plasticity Index: 0	

10. Fine Shaft Backfill - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
2-inch	100
¾-inch	70 – 100
No. 40	20 – 50
No. 200	2 – 15
Plasticity Index: 15 maximum	

11. Pipe Bedding Material - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
2-inch	100
No. 4	30 – 100
No. 200	5 – 20
Plasticity Index: 15 maximum	

12. Granular Filter Material - material as approved by **MANAGER** and **CERTIFYING ENGINEER** conforming to the following SPECIFICATIONS:

U.S. Standard Sieve Size	Percent Passing by Dry Weight
3-inch	100
2-inch	75 – 100
No. 200	0 – 15
Plasticity Index: 15 maximum	

Acceptance of non-conforming materials: In cases where non-conformance to these material specifications occur the Design Engineer in tandem with the Manager can approve the material for use, if in their opinion, the specification deviation does not diminish functionality of a given design element and/or compromise the design intent. If non-conforming materials are accepted by the Design Engineer and Manager for use during construction, the DRMS will be contacted to alert them to the acceptance and rationale behind acceptance of non-conforming materials.

3. PART 3: EXECUTION

3.1. Clearing and Grubbing

A. Clearing and grubbing shall be done within the footprint of the limits of the construction area, as delineated on the DRAWINGS. Clearing shall extend a maximum of 15 feet and a minimum of 10 feet outside of the construction limits or as directed by **MANAGER**. Areas for clearing shall be released to **CONTRACTOR** by **MANAGER**. No pioneering of roads across undisturbed areas shall be allowed without prior approval of **MANAGER**

B. No clearing shall be performed until written permission is given by **MANAGER** and until the **CONTRACTOR** has provided construction staking for the proposed work. Clearing shall consist of cutting brush to the ground level, removing such material, along with wood, rubbish, tree stumps, and any other vegetation with roots in excess of 1-inch diameter, and other deleterious materials, and disposing of all such material in the accepted manner described below.

C. In areas designated to be stripped of unsuitable or objectionable material, said materials shall be stripped to the full depth of organic or other unsuitable material as determined by **MANAGER** and **CERTIFYING ENGINEER**, whichever is greater.

D. Stripped and grubbed vegetation shall be removed and disposed in stockpiles or other approved methods in an area designated by **MANAGER**.

3.2. Topsoil Removal

Topsoil is defined as an acceptable growth medium as approved by **MANAGER** and **CERTIFYING ENGINEER** that has no chemical or physical characteristics, which will exclude its use as such.

A. Stripping of the topsoil shall be done within the entire area of the stripping limits.

B. **CONTRACTOR** shall excavate and remove topsoil in a manner that will minimize contamination with other soil horizons, and will take such measures as are necessary to ensure that the removal of topsoil does not result in erosion or excessive sedimentation.

C. **CONTRACTOR** shall stockpile topsoil at locations designated by **MANAGER**. Stored topsoil shall not be disturbed by mining, leaching operations, or construction activities, and shall be protected from wind and water erosion, compaction, and contamination.

D. **CONTRACTOR** shall grade topsoil stockpiles to prevent erosion and ponding of precipitation in the stockpile areas. The maximum topsoil stockpile height will be approved by **MANAGER**. The **CONTRACTOR** shall protect stockpiled topsoil by an effective cover of non-noxious, quick- growing, annual, and perennial plants, approved by **MANAGER**, which shall be seeded or planted during the first appropriate growing season after removal.

3.3. Waste Removal

Waste material is defined as material too wet, too dry, frozen or containing ice or snow, containing organic or other deleterious matter, having poor characteristics of grading or compaction, having other characteristics that may result in undesirable settlement or other movement of the fill, or within the fill, or otherwise not meeting the requirements of the SPECIFICATIONS, provided that this definition permits drying, water, and any other processing or reprocessing to make the material stable and suitable prior to incorporating it into the fill as permitted in the SPECIFICATIONS or by the **MANAGER** and **CERTIFYING ENGINEER**.

A. **CONTRACTOR** shall excavate and remove waste in a manner that will minimize contamination with other soil horizons.

B. **CONTRACTOR** shall stockpile removed waste at locations designated by **MANAGER**

3.4. Excavation

A. **CONTRACTOR** shall perform excavation to the lines and grades shown on the DRAWINGS or as directed by **MANAGER**. No excavation shall begin until the **CONTRACTOR** has provided construction staking for the proposed work.

B. **CONTRACTOR** shall prevent the disturbance of surrounding areas during excavation. Where selective excavations are required to obtain materials for Structural Fill and Select Structural Fill, the material removed from the excavations shall be taken directly to the fill areas or, if required, stockpiled by material types. The stockpiles shall be approved by **MANAGER**.

C. **CONTRACTOR** shall grade all excavations to ensure grades are maintained to provide adequate drainage at all times. Work shall be suspended by **CONTRACTOR** when, in the opinion of **MANAGER** and **CERTIFYING ENGINEER**, the site is overly wet, muddy, or otherwise unsuitable for proper maintenance, until directed otherwise by **MANAGER**, at no cost to **CC&V**.

D. In excavations where Structural Fill or Select Structural Fill is to be placed on slopes steeper than 3H:1V, horizontal benches shall be excavated into the slope to allow fill to be placed in horizontal lifts. The **CONTRACTOR** shall continuously bench and key embankment material into the existing material a minimum of 2 feet.

E. The **CONTRACTOR** will be responsible for the safety of temporary construction slopes. **CONTRACTOR** shall inspect all temporary and permanent open-cut excavations on a regular basis for signs of instability. Should signs of instability be noted, **CONTRACTOR** shall immediately undertake remedial measures and shall notify **MANAGER** immediately. Permanent cut slopes shall be left in smooth, safe, and stable condition at the end of the workday.

F. **CONTRACTOR** shall final grade excavations within the valley leach facility to establish positive drainage to the Pregnant Solution Storage Area. In no case will depressions or bowls be permitted in the valley leach facility area.

G. **CONTRACTOR** shall conduct all excavation and shoring operations in compliance with applicable MSHA, Colorado State and Federal government laws and regulations.

3.5. Subgrade

A. The **MANAGER** and **CERTIFYING ENGINEER** will inspect and approve the exposed subgrade prior to any fill or Soil Liner being placed. CQA Monitor will confirm that the surface of the subgrade is smooth and free of debris, grade stakes, angular rocks, roots, branches, vegetation, mud, ice, or frozen material. If the subgrade is determined to be frozen, using the criteria identified in Item 3.06.10 of Section 2200, the **CONTRACTOR** may either remove and replace the frozen subgrade or wait until subsequent temperature monitoring indicates the fill is unfrozen, at no cost to **CC&V**. The subgrade shall have no sudden sharp or abrupt changes in grade.

B. **CONTRACTOR** is responsible for maintaining subgrades in a condition satisfactory to **CERTIFYING ENGINEER**. **CONTRACTOR** shall protect prepared subgrades, including previously approved subgrade, from weather, construction equipment, or other factors as outlined in Part 3.06 of the SPECIFICATIONS. Subgrade surfaces, including previously approved subgrade, that become softened or otherwise unsuitable for placement of fill, shall be repaired to **CERTIFYING ENGINEER's** and **MANAGER's** satisfaction, at no cost to **CC&V**.

C. Prior to placement of fill materials, **CONTRACTOR** shall scarify all in-situ materials to a depth of 6-inches, moisture condition, and recompact the subgrade. Compactive effort shall be adequate to obtain a minimum of 95 percent of maximum dry density as determined by the standard Proctor test (ASTM D698) for the particular fill material. Moisture conditioning shall be adequate to achieve a uniform moisture and density. In rock areas, the **CONTRACTOR** shall prepare the subgrade by removing loose rock fragments until competent foundation material is encountered as approved by **CERTIFYING ENGINEER**.

D. If the underlying material is unsuitable to permit proper compaction of the subgrade, **CONTRACTOR** shall loosen, aerate (or excavate and remove), and recompact the subgrade until the top layer can be compacted as required. The recompacted surface

shall then be scarified, as needed, to provide a good bond between the foundation and fill materials.

3.6. Fill Placement

A. The following general guidelines shall be followed except as noted elsewhere in this Section.

1. No fill materials shall be placed until the foundation and subgrade preparations have been completed as specified herein, in Article 3.05 of this Section. The procedures for fill placement shall be approved by **MANAGER** and **CERTIFYING ENGINEER** prior to start of fill placement.

2. No brush, roots, sod, frozen material, or other deleterious or unsuitable materials shall be incorporated in the fills. The suitability of all materials intended for use in the fill shall be subject to approval by **MANAGER** and **CERTIFYING ENGINEER**. Fill placement shall be temporarily stopped by **CONTRACTOR** due to weather conditions, if materials and installation do not meet the SPECIFICATIONS, at no cost to **CC&V**. Fill shall not be placed upon frozen material, such as snow or ice.

3. If the surface of the prepared foundation or the surface of any layer of the fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moisture-conditioned and/or worked with harrow, scarifier teeth, disc, or other suitable equipment to provide a satisfactory bonding surface before fill material is placed thereon. If the surface of the prepared foundation or the rolled surface of any layer is excessively wet for fill materials to be placed thereon, it shall be removed and allowed to dry or worked with a harrow, scarifier teeth, disc, or other suitable equipment to reduce the moisture content to an acceptable level or meet project specifications as determined by **MANAGER** and **CERTIFYING ENGINEER**. It shall then be compacted before the next layer of fill material is placed. Determination of such dry or wet conditions shall be made by **CERTIFYING ENGINEER**.

4. The distribution of materials shall be such that the fill is free from voids, lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. The material of a fill shall be as described in Article 2.01 of this Section.

5. Unless otherwise approved by **MANAGER** and **CERTIFYING ENGINEER**, the entire fill surface shall be at or near the same elevation at all times during construction. At all times during construction, the surface of the fill shall be graded and maintained by the **CONTRACTOR** to prevent ponding of water and to allow for storm water drainage.

6. Except as otherwise specified or approved by **MANAGER** and **CERTIFYING ENGINEER**, the **CONTRACTOR** shall dump and spread fill in such a manner so that

no excessive gaps are left between successively dumped loads of materials. The fill shall be leveled prior to compaction by means of a dozer or grader, or other suitable approved equipment, to obtain a surface free from depressions.

7. Except in areas approved by **MANAGER** and **CERTIFYING ENGINEER** where space is limited or otherwise specified, **CONTRACTOR** shall place fill by routing the hauling and spreading units approximately parallel to the axis of the fill. As far as practical, hauling units shall be so routed that they do not follow in the same paths, but split their tracks evenly across the surface of the fill to enhance compaction.

8. **CONTRACTOR** shall apply water required for moisture conditioning on the fill or in the borrow areas.

   CONTRACTOR shall maintain fill materials within the moisture content range required to permit proper compaction to the specified density with the equipment being used. The moisture content of the fill materials, prior to and during compaction, shall be uniform throughout each layer of the material.

   Prior to mixing of wet and dry material on the fill to obtain the proper moisture content, approval shall be obtained from **CERTIFYING ENGINEER**. Mixed material shall have a uniform distribution of the moisture content prior to placement on the subsequent lift.

   When materials spread on the fill are too dry for proper compaction, **CONTRACTOR** shall spray water on each layer of the fill and shall work the moisture into the fill by harrowing or other approved means, until a uniform distribution of moisture is obtained. Material that is too wet for proper compaction, as determined by **CERTIFYING ENGINEER**, shall be removed from the fill and/or spread out and permitted to dry, assisted by disking and harrowing or mixing in dry material when permitted by **CERTIFYING ENGINEER**, if necessary, until the moisture content is reduced to an amount suitable for obtaining the specified degree of compaction, at no cost to **CC&V.**

9. After each layer of fill material has been placed, spread, and moisture-conditioned, the layer shall be compacted by passing compaction equipment over the entire surface of the layer a sufficient number of times to obtain the required density, as specified herein. Compaction shall be accomplished with equipment and by methods approved by **CERTIFYING ENGINEER**. If such equipment or methods are found unsatisfactory for the intended use, **CONTRACTOR** shall replace the unsatisfactory equipment with other types or adjust methods until proper compaction is achieved. Prior to placement of a subsequent lift, the previous lift shall be thoroughly scarified to a nominal depth of 2-inches to provide good bonding between lifts. Scarification shall be accomplished by disking, raking with a grader, or an alternative method approved by **CERTIFYING ENGINEER**.

10. The CQA Monitor will measure the ambient air temperature on an hourly basis. If the ambient air temperature is less than thirty-two degrees Fahrenheit for more than one hour over the preceding twenty-four (24) hours, the CQA Monitor will measure the temperature of the fill to determine if the fill is frozen. "Frozen" is defined as a mean temperature of thirty-two degrees Fahrenheit (32°F) or less. The CQA Monitor will measure the temperature at a depth of three (3) inches and six (6) inches, recording the lower of the two. Six (6) measurements will be taken per acre, and if the average is below thirty-two degrees Fahrenheit (32°F), the fill will be considered frozen. If the fill is determined to be frozen the CONTRACTOR may either remove and replace the frozen fill or wait until subsequent temperature monitoring indicates the fill is unfrozen at no cost to CC&V.

11. Overburden slopes shall be compacted using a method specification and graded to meet the grades and dimensions shown on the DRAWINGS. The Bedding Fill subgrade surface will be prepared as identified in Section 2200 of the SPECIFICATIONS.

B. Structural Fill

1. Areas to receive Structural Fill will include, but are not limited to, slope reductions, and miscellaneous site grading.

2. **CONTRACTOR** shall condition Structural Fill to a moisture content that allows compaction to the required density and that results in a firm, unyielding surface capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.

3. **CONTRACTOR** shall place Structural Fill materials with less than 30 percent rock materials above 3/4-inch size in maximum 12-inch loose lifts, and compact to 95 percent of maximum dry density (ASTM D698).

4. **CONTRACTOR** shall condition, place and compact Structural Fill containing more than 30 percent rock materials above 3/4-inch size(rock fill) by a method compaction technique. The compaction equipment shall consist of a minimum 10-ton (static drum weight) vibratory smooth-drum compactor. The number of passes and loose lift thickness shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method SPECIFICATIONS may be changed at any time, at the discretion of **CERTIFYING ENGINEER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.

5. Maximum rock size for rock fill shall be two-thirds of the compacted lift thickness, unless otherwise approved by **MANAGER**, **DESIGN ENGINEER,** and **CERTIFYING ENGINEER**. **CONTRACTOR** shall remove oversize materials from fills at no additional cost to **CC&V**.

C. Select Structural Fill

1. Select Structural Fill shall be placed for miscellaneous site grading as required by the MANAGER and CERTIFYING ENGINEER.
2. **CONTRACTOR** shall condition Select Structural Fill to a moisture content that allows compaction to the required density and that results in a firm, unyielding surface capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.
3. **CONTRACTOR** shall place Select Structural Fill materials with less than 30 percent rock materials above 3/4-inch size in maximum 12-inch loose lifts, and compacted to 95 percent of maximum dry density (ASTM D698).
4. **CONTRACTOR** shall condition and place Select Structural Fill containing more than 30 percent rock materials above 3/4-inch size (rock fill) in maximum 12-inch loose lifts and compact by a method compaction technique. The compaction equipment shall consist of a minimum ten 10-ton (static drum weight) vibratory smooth-drum compactor. The number of passes shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method SPECIFICATIONS may be changed at any time, at the discretion of **CERTIFYING ENGINEER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.

D. Underdrain Fill

1. Underdrain Fill shall be placed in the Underdrains as shown in the DRAWINGS.
2. **CONTRACTOR** shall condition Underdrain Fill that results in a firm, unyielding surface capable of allowing the movement of vehicles and equipment over the surface without causing rutting or other deleterious effects.
3. **CONTRACTOR** shall condition, place and compact Underdrain Fill by a method compaction technique. The compaction equipment shall consist of a minimum 10-ton (static drum weight) vibratory smooth-drum compactor. The number of passes and loose lift thickness shall be subject to **CERTIFYING ENGINEER's** approval, at no additional cost to **CC&V**. The method SPECIFICATIONS may be changed at any time, at the discretion of **MANAGER**, based upon changes in material characteristics, field conditions, and/or compaction equipment.
4. Provisions shall be made by **CONTRACTOR** for removal of oversize materials from fills, at no additional cost to **CC&V**.
5. The **MANAGER** will minimize the amount of traffic over the Underdrain Fill.

E. Leak Detection Fill

1. Leak Detection Fill shall be placed in the Leak Detection Trenches as shown on the DRAWINGS.

2. **CONTRACTOR** shall condition Leak Detection Fill to allow a surface that does not cause rutting or other deleterious effects.

F. Low Volume Solution Collection Fill

1. Low Volume Solution Collection Fill shall be placed over the geomembrane in the locations shown on the DRAWINGS.
2. **CONTRACTOR** shall condition Low Volume Solution Collection Fill to allow a surface that does not cause rutting or other deleterious effects.
3. **CONTRACTOR** shall place Low Volume Solution Collection Fill around the Low Volume Solution Collection Vertical Riser Pipes in maximum 12-inch loose lifts and compact using a hand operated vibratory plate compactor to the satisfaction of the **MANAGER** and **CERTIFYING ENGINEER**. Low Volume Solution Collection Fill shall be worked under the Low Volume Solution Collection Rise pipe haunches by hand to provide uniform support of the pipe.
4. Prior to placing the Low Volume Solution Collection Fill, **CONTRACTOR** shall verify by visual inspection that the underlying geosynthetics are free of holes, tears, wrinkles, or foreign objects. **MANAGER** and **CERTIFYING ENGINEER** will inspect the geosynthetic for wrinkles prior to placement of Low Volume Solution Collection Fill. As instructed by **MANAGER**, **CONTRACTOR** shall "work out" wrinkles to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER** prior to placement of the Low Volume Solution Collection Fill. In all cases, wrinkles shall not be of a size that they could fold back on themselves. Wrinkles greater than one foot shall be removed and repaired by the **INSTALLER**.
5. **CONTRACTOR** shall place Low Volume Solution Collection Fill in a single 36-inch loose lift. The tracked equipment shall operate only over previously placed Low Volume Solution Collection Fill. **CONTRACTOR** shall not operate equipment directly on geosynthetics. Only a dozer with a ground pressure not exceeding 14.7 psi can be used to place Low Volume Solution Collection Fill. Equipment used for placement will not be allowed to pivot on one track (i.e., no abrupt or sharp turns). There shall be no downhill placement on slopes steeper than 4H:1V. Material can be placed along contours if buttressed from below.
6. Rubber tired construction equipment shall not be allowed to travel over the geomembrane or on top of Solution Collection piping unless a thickness of at least 45 inches of Low Volume Solution Collection Fill has been placed over the geomembrane and on top of Solution Collection piping. The **CONTRACTOR** will be required to demonstrate to the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER** that the equipment and procedures used are not detrimental to the geomembrane and piping, at no cost to **CC&V**. Off road haul truck traffic shall require a minimum of 60 inches for Cat 773 (or equivalent) of Low Volume Solution Collection Fill placed over the geomembrane and solution collection piping, and a

minimum of 120 inches for CAT 777 (or equivalent) of Low Volume Solution Collection Fill placed over the geomembrane and solution collection piping.

7. When placing Low Volume Solution Collection Fill the maximum acceptable drop height is 3 feet.
8. **CONTRACTOR** shall operate equipment in a manner that is protective of underlying geosynthetics. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Low Volume Solution Collection Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776.0 and 02777.0 of these SPECIFICATIONS, and recover, at no cost to **CC&V**.
9. **CONTRACTOR** shall place Low Volume Solution Collection Fill at a rate such that no single area of 350,000 square feet of geomembrane liner is exposed to ultraviolet light for more than 180 days.
10. **CONTRACTOR** shall provide close continuous monitoring at the point of placement during the placement of the Low Volume Solution Collection Fill over geosynthetics.
11. **CONTRACTOR** shall verify the final thickness of Low Volume Solution Collection Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record verification location, elevation, and thickness. CQA Monitor shall witness all verification measurements. **CONTRACTOR** will submit a method of verifying Low Volume Solution Collection Fill depth to **MANAGER** for approval. Grade markers shall be placed on a 50- by-50-foot grid with additional points required for breaks in grade. **CONTRACTOR** shall remove all grade markers under supervision of CQA Monitor after verification measurements have been approved by **MANAGER** and **CERTIFYING ENGINEER** and will backfill holes with Low Volume Solution Collection Fill. Areas with deficient thickness shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Low Volume Solution Collection Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776.0 and 02777.0 of these SPECIFICATIONS and recover, at no cost to **CC&V**.
12. **CONTRACTOR** will provide adequate illumination as approved by **MANAGER**, if Low Volume Solution Collection Fill placement is carried out at night. A minimum of 2-foot candles measured at the synthetic liner, shall be used when Low Volume Solution Collection Fill placement is carried out at night.

G. Soil Liner Fill

1. Soil Liner Fill shall be placed within the limits of the valley leach facility as shown on the DRAWINGS and shall begin only after completion of all, or **MANAGER** and

CERTIFYING ENGINEER approved portion of, excavation and Structural Fill placement in the valley leach facility.

2. **CONTRACTOR** shall process, place and compact the Soil Liner Fill to achieve a coefficient of permeability of less than $1x10^{-6}$ cm/sec, measured according to ASTM Method D5084, Method D. Any Soil Liner Fill not meeting the permeability specification shall be removed and replaced with material meeting the permeability specification, at no additional cost to **CC&V**.
3. **CONTRACTOR** shall place and compact the Soil Liner Fill in loose lifts such that the compacted lift thickness is a minimum of 12-inches.
4. **CONTRACTOR** shall compact the Soil Liner Fill to at least 95 percent of the maximum dry density as determined by the Standard Proctor density test (ASTM D698). The moisture content shall be within +3% to -2% of the optimum moisture content. Both moisture and density shall be uniform throughout the lift. If the Soil Liner Fill cannot be conditioned to meet the placement specifications, the material shall be removed and replaced with new Soil Liner Fill at the **CONTRACTOR's** expense. The **CONTRACTOR** shall reduce the clod size of the soil liner fill to a size that is acceptable to the **CERTIFYING ENGINEER**, the method by which will be approved by **CERTIFYING ENGINEER** and **MANAGER** prior to implementation.
5. The moisture content of the Soil Liner Fill shall be uniform throughout prior to and during compaction of the material. **CONTRACTOR** shall be responsible for meeting moisture content and compaction SPECIFICATIONS. If the Soil Liner Fill cannot be conditioned to meet the placement SPECIFICATIONS, the material shall be removed and replaced with new Soil Liner Fill at no additional cost to **CC&V**. **MANAGER** may require **CONTRACTOR** to moisture condition Soil Liner Fill at stockpile at least 24 hours prior to the Soil Liner Fill being placed.
6. **CONTRACTOR** shall place Soil Liner Fill to form a continuous monolithic material. If a lift of compacted Soil Liner Fill dries out during placement operations, **CONTRACTOR** shall scarify, moisture condition the dry soil and recompact the lift. If a lift of compacted Soil Liner Fill becomes overly wet due to precipitation or over watering, **CONTRACTOR** shall allow the wet soil to dry to the specified moisture content range before recompaction of fill and placement of geosynthetic materials.
7. **CONTRACTOR** shall assist CQA Monitor in obtaining soil samples for CQA testing. Soil Liner Fill sampling shall be scheduled by CQA Monitor with **CONTRACTOR** to facilitate CQA field testing.
8. **CONTRACTOR** shall maintain Soil Liner Fill stockpile areas in a free-draining condition. The **CONTRACTOR** will maintain Soil Liner Fill stockpiles and Soil Liner Fill placed within the limits of the valley leach facility to prevent the drying out of the surface.

9. **CONTRACTOR** shall compact corners and other areas inaccessible to driven compaction equipment using hand-operated 500-pound vibratory plate or vibratory smooth-drum compaction equipment approved by **MANAGER** and **CERTIFYING ENGINEER**.
10. **CONTRACTOR** shall trim the surface of the Soil Liner Fill to the design grades shown on the DRAWINGS.
11. **CONTRACTOR** shall roll the surface of the Soil Liner Fill with a smooth drum roller to remove ridges and surface irregularities greater than 0.5 inches in height. **CERTIFYING ENGINEER** shall determine if surface preparation is sufficient to place geomembrane. On areas with slopes steeper than 3H:1V, **CONTRACTOR** shall adopt methods as necessary to obtain the same final surface preparations that would be obtained by the passage of a smooth-drum roller on flat or level ground. Pushing of compaction equipment by tracked equipment shall not be performed. Wheel ruts on the surface of the Soil Liner Fill from grading equipment shall be repaired by **CONTRACTOR** prior to placement of the geomembrane by rolling the surface as approved by CQA Monitor.
12. **CONTRACTOR** will remove angular protruding rocks greater than 3/4 inches in diameter from the compacted Soil Liner Fill surface. Indentations left in the Soil Liner Fill Surface after removal of the rocks shall be filled with Soil Liner Fill or other suitable fill approved by CQA Monitor, and compacted to achieve final grade. Areas of the Soil Liner Fill surface with concentrated gravelly areas will have suitable fill approved by CQA Monitor placed on top and compacted to achieve final grade. A maximum thickness of 0.5 inches of suitable fill will be placed on the Soil Liner Fill.
13. **MANAGER** and **CERTIFYING ENGINEER** will identify any areas of significant desiccation, crusting, or erosion of a lift surface. Soil Liner Fill surfaces found to have desiccation cracks greater than 0.25-inches in width or depth, or which exhibit swelling, heaving or other similar conditions shall be replaced or reworked by **CONTRACTOR** to remove such defects. Desiccation cracks on the Soil Liner Fill surface less than 0.25-inches in width or depth shall be compacted with a smooth drum roller. **CONTRACTOR** shall take whatever steps necessary to prepare Soil Liner Fill surface to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER**, at no additional cost to **CC&V**.
14. **CONTRACTOR** shall maintain the Soil Liner Fill surface in a condition suitable for geomembrane installation as specified in these SPECIFICATIONS and in the CQA Plan until the surface is covered. **CONTRACTOR** shall repair all weather related damage to Soil Liner Fill surfaces or other portions of the Work that have or have not been covered by geomembrane, at no additional cost to **CC&V** If any moisture is allowed to collect under the geomembrane prior to or after final seaming and softens the Soil Liner Fill, the geomembrane shall be removed and **CONTRACTOR**

shall recondition and recompact the Soil Liner Fill to meet all placement and trimming SPECIFICATIONS, at no additional cost to **CC&V**.

15. **CONTRACTOR** shall remove all hubs and survey stakes in the Soil Liner Fill and backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved moisture-conditioned Soil Liner Fill or bentonite. Compact with a Proctor hammer or other suitable device that will achieve a kneading type of compaction and will achieve the required density.
16. **CONTRACTOR** shall verify the final thickness of Soil Liner Fill to determine compliance with this SPECIFICATION. Thickness verification shall be performed at a minimum frequency of two measurements per acre using a soil-coring device, unless directed otherwise by **MANAGER**. **CONTRACTOR** shall record as part of the as-built documentation the location, elevation, and thickness of each Soil Liner Fill verification test. CQA Monitor will witness all verification measurements. **CONTRACTOR** shall backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved moisture- conditioned Soil Liner Fill compacted with a Proctor hammer or other suitable device that will achieve a kneading type of compaction and will achieve the required density, or bentonite. Areas with deficiencies shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained at no additional cost to **CC&V**.
17. If tests indicate the Work does not meet the requirements of the SPECIFICATIONS, **MANAGER** and **CERTIFYING ENGINEER** will establish the extent of the nonconforming area. The nonconforming area shall be reworked by **CONTRACTOR** until acceptable test results are obtained at no additional cost to **CC&V**
18. Prior to any geosynthetics being placed on Soil Liner Fill, the area will be tested by CQA Monitor. No geosynthetics will be allowed to be placed on frozen material, as defined in Section 3.06, without the area in question being retested by the CQA Monitor.

H. Drain Cover Fill

1. Drain Cover Fill shall be placed over the geomembrane in the locations shown on the DRAWINGS.
2. Prior to placing the Drain Cover Fill, **CONTRACTOR** shall verify by visual inspection that the underlying geosynthetics are free of holes, tears, wrinkles, or foreign objects. **MANAGER** and **CERTIFYING ENGINEER** will inspect the geosynthetic for wrinkles prior to placement of Drain Cover Fill. As instructed by **MANAGER**, **CONTRACTOR** shall "work out" wrinkles to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER** prior to placement of the Drain Cover Fill. In all cases, wrinkles shall not be of a size that they could fold back on themselves. Wrinkles greater than one foot shall be removed and repaired by the **INSTALLER**.

3. **CONTRACTOR** shall place Drain Cover Fill in a single 24-inch loose lift. The tracked equipment shall operate only over previously placed Drain Cover Fill. **CONTRACTOR** shall not operate equipment directly on geosynthetics. Only a dozer with a ground pressure not exceeding 8.7 psi can be used to place Drain Cover Fill. A CAT 12G motor grader, or equivalent approved by **CERTIFYING ENGINEER,** can be used for Drain Cover Fill final grading. Equipment used for placement will not be allowed to pivot on one track (i.e. no abrupt or sharp turns). There shall be no downhill placement on slopes steeper than 4H:1V. Material can be placed along contours if buttressed from below. Motor graders shall not be allowed to make abrupt turns, brake suddenly, or dig blade in which results in the tires spinning on the Drain Cover Fill surface.
4. Highway compatible Rubber tired construction equipment shall not be allowed to travel over the geomembrane or on top of Solution Collection piping unless a thickness of at least 45 inches of Drain Cover Fill has been placed over the geomembrane and on top of Solution Collection piping. The **CONTRACTOR** will be required to demonstrate to the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER** that the equipment and procedures used are not detrimental to the geomembrane and piping, at no cost to **CC&V**. Off road haul truck traffic shall require a minimum of 60 inches for Cat 773 (or equivalent) of Drain Cover Fill placed over the geomembrane and solution collection piping, and a minimum of 120 inches for CAT 777 (or equivalent) of Drain Cover Fill placed over the geomembrane and solution collection piping.
5. When placing Drain Cover Fill the maximum acceptable drop height is 3 feet.
6. **CONTRACTOR** shall operate equipment in a manner that is protective of underlying geosynthetics. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Drain Cover Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776.0 and 02777.0 of these SPECIFICATIONS, and recover, at no cost to **CC&V**.
7. **CONTRACTOR** shall place Drain Cover Fill at a rate such that the geomembrane liner is not exposed to ultraviolet light for more than 180 days.
8. **CONTRACTOR** shall provide close continuous monitoring at the point of placement during the placement of the Drain Cover Fill over geosynthetics.
9. **CONTRACTOR** shall verify the final thickness of Drain Cover Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record verification location, elevation, and thickness. CQA Monitor shall witness all verification measurements. **CONTRACTOR** will submit a method of verifying Drain Cover Fill depth to **MANAGER** for approval. Grade markers shall be placed on a 50-by-50-foot grid with additional points required for breaks in grade. **CONTRACTOR** shall remove

all grade markers under supervision of CQA Monitor after verification measurements have been approved by **MANAGER** and **CERTIFYING ENGINEER** and will backfill holes with Drain Cover Fill. Areas with deficient thickness shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained. If **MANAGER** or **CERTIFYING ENGINEER** suspects the occurrence of any damage to the underlying geosynthetics, **MANAGER** will instruct **CONTRACTOR** to remove Drain Cover Fill to expose the geosynthetics. **CONTRACTOR** shall uncover, repair any observed damage of the underlying geosynthetics, in accordance with the repair requirements of Sections 02776.0 and 02777.0 of these SPECIFICATIONS and recover, at no cost to **CC&V**.

10. **CONTRACTOR** will provide adequate illumination as approved by **MANAGER**, if Drain Cover Fill placement is carried out at night. A minimum of 2-foot candles measured at the synthetic liner shall be used when Drain Cover Fill placement is carried out at night

I. Pipe Bedding Material

1. Pipe bedding material shall be placed around the CSP as shown on the drawings.
2. For piping external to the valley leach facility, **CONTRACTOR** shall compact the Pipe Bedding Material requiring compaction to at least 95 percent of the maximum dry density as determined by the Standard Proctor density test (ASTM D698), and a moisture content 3 percent below and 3 percent over the optimum moisture content.
3. **CONTRACTOR** shall place Pipe Bedding Material in maximum 12-inch loose lifts. Pipe Bedding Material will be worked under pipe haunches by hand to provide uniform support of the CSP.
4. Native material used for backfilling CSP excavation shall be placed in 12-inch to 18-inch loose lifts, and compacted by wheel rolling with light, rubber tired or other light compaction equipment, as approved by **CERTIFYING ENGINEER.**

J. Granular Filter Material

1. Granular Filter Material shall be placed beneath the Riprap as shown on the drawings.

K. Bedding Fill

1. Bedding Fill shall be placed within the limits of the valley leach facility as shown on the DRAWINGS.
2. **CONTRACTOR** shall place and compact the Bedding Fill in loose lifts such that the compacted lift thickness is a minimum of 12-inches. **CONTRACTOR** shall condition the Bedding Fill to allow a surface that does not cause rutting or other deleterious effects. The moisture content and density shall be uniform throughout the lift. If a

lift of compacted Bedding Fill dries out during placement operations, **CONTRACTOR** shall scarify, moisture condition the dry soil and recompact the lift. If a lift of compacted Bedding Fill becomes overly wet due to precipitation or over watering, **CONTRACTOR** shall allow the wet soil to dry to the specified moisture content range before recompaction of fill and placement of geosynthetic materials.

3. **CONTRACTOR** shall assist CQA Monitor in obtaining soil samples for CQA testing. Bedding Fill sampling shall be scheduled by CQA Monitor with **CONTRACTOR** to facilitate CQA field testing.
4. **CONTRACTOR** shall trim the surface of the Bedding Fill to the design grades shown on the DRAWINGS.
5. **CONTRACTOR** shall roll the surface of the Bedding Fill with a smooth drum roller to remove ridges and surface irregularities greater than 0.5 inches in height. **CERTIFYING ENGINEER** shall determine if surface preparation is sufficient to place geomembrane. On areas with slopes steeper than 3H:1V, **CONTRACTOR** shall adopt methods as necessary to obtain the same final surface preparations that would be obtained by the passage of a smooth-drum roller on flat or level ground. Pushing of compaction equipment by tracked equipment shall not be performed. Wheel ruts on the surface of the Bedding Fill from grading equipment shall be repaired by **CONTRACTOR** prior to placement of the geomembrane by rolling the surface as approved by CQA Monitor. **CONTRACTOR** shall take whatever steps necessary to prepare Soil Liner Fill surface to the satisfaction of **MANAGER** and **CERTIFYING ENGINEER**, at no additional cost to **CC&V**.
6. **CONTRACTOR** shall maintain the Bedding Fill surface in a condition suitable for geomembrane installation as specified in these SPECIFICATIONS and in the CQA Plan until the surface is covered. **CONTRACTOR** shall repair all weather related damage to Bedding Fill surfaces or other portions of the Work that have or have not been covered by geomembrane, at no additional cost to **CC&V**.

   If any moisture is allowed to collect under the geomembrane prior to or after final seaming and softens the Bedding Fill, the geomembrane shall be removed and **CONTRACTOR** shall recondition and recompact the Soil Liner Fill to meet all placement and trimming SPECIFICATIONS, at no additional cost to **CC&V**.
7. **CONTRACTOR** shall remove all hubs and survey stakes in the Bedding Fill and backfill all holes with **MANAGER** and **CERTIFYING ENGINEER** approved material.
8. **CONTRACTOR** shall verify the final thickness of Bedding Fill to determine compliance with this SPECIFICATION. **CONTRACTOR** shall record as part of the as-built documentation the location, elevation, and thickness of each Bedding Fill verification test. CQA Monitor will witness all verification measurements. Areas with deficiencies shall be reworked by **CONTRACTOR**, until acceptable measurements are obtained at no additional cost to **CC&V**. If tests indicate the

Work does not meet the requirements of the SPECIFICATIONS, **MANAGER** and **CERTIFYING ENGINEER** will establish the extent of the nonconforming area. The nonconforming area shall be reworked by **CONTRACTOR** until acceptable test results are obtained at no additional cost to **CC&V**

9. Prior to any geosynthetics being placed on Bedding Fill, the area will be tested by CQA Monitor. No geosynthetics will be allowed to be placed on frozen material, as defined in Section 3.06, without the area in question being retested by the CQA Monitor.

3.7. Equipment

CONTRACTOR may use any type of earthmoving or excavating equipment unless otherwise noted in the SPECIFICATIONS, provided the equipment is in a satisfactory condition, complies with applicable rules and regulations, is of such capacity that the construction schedule can be maintained as planned by **CONTRACTOR**, and is approved by **MANAGER.**

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.016
PROJECT: Poverty Gulch Diversion Channel		
TITLE: TECHNICAL SPECIFICATIONS –RIPRAP		**SPECIFICATION NO.** **02271.DOCX**

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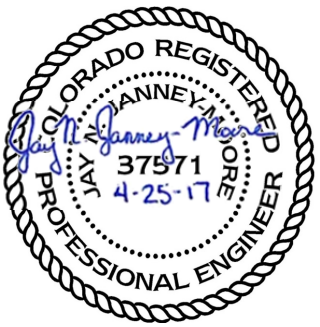
			AUTHOR	REVIEW	CLIENT	
0	04/25/2017	5	JNM	KCW		Issued for Construction

TABLE OF CONTENTS



SECTION 02271.0 RIPRAP

1. PART 1: GENERAL

1.1. Description

All work shall be carried out in compliance with these SPECIFICATIONS and in conformance with the lines, grades, and dimensions as shown on the DRAWINGS.

1.2. Related Sections

Refer to the following Sections for related work:

- Section 02200.0 Earthworks
- Section 03300.0 Cast-in-place Concrete

2. PART 2: SPECIFICATIONS AND INSTALLATION

2.1. Material Specifications

2.1.1. Riprap

A. Rip rap shall consist of hard, dense, and durable stone, angular in shape, and resistant to weathering. Rounded stone or boulders will not be accepted as riprap material. The stone shall have a specific gravity of at least 2.5. Each piece shall have its greatest dimension not greater than three times its least dimension. If approved by **CERTIFYING ENGINEER**, removed concrete may be used for riprap provided it meets the other requirements of this section.

B. Material used for riprap will be approved by **CERTIFYING ENGINEER** if, by visual inspection, the rock is determined to be sound and durable. **MANAGER** and **CERTIFYING ENGINEER** may require **CONTRACTOR** to furnish laboratory results to verify that the material meets SPECIFICATIONS. At the request of **MANAGER, CONTRACTOR** shall furnish laboratory test results indicating that the material meets the requirements for strength as indicated in the following table.

Test Description	Test Method	Specification Requirement
Point Load Tensile Strength	ISRM RTH 325-89/ASTM D5731	300 psi (min)

C. Rip rap shall conform to the gradation requirements given in the following table:

Stone Sized d^1 $(in)_{50}$	Percent of Material Smaller thanTypical Stone[2]	Typical Stone Dimensions[3] (in)
6	70 – 100	12
	50 – 70	9
	35 – 50	6
	2 – 10	2

Stone Sized d^1 $(in)_{50}$	Percent of Material Smaller thanTypical Stone[2]	Typical Stone Dimensions[3] (in)
12	70 – 100	21
	50 – 70	18
	35 – 50	12
	2 – 10	4

Stone Size $d^1(in)_{50}$	Percent of Material Smaller than Typical Stone[2]	Typical Stone Dimensions[3] (in)
15	70 – 100	26
	50 – 70	21
	35 – 50	15
	2 – 10	5

Stone Size $d^1(in)_{50}$	Percent of Material Smaller than Typical Stone[2]	Typical Stone Dimensions[3] (in)
18	70 – 100	30
	50 – 70	24
	35 – 50	18
	2 – 10	6

Notes:

1. d_{50} = average stone size
2. based on typical rock weight
3. equivalent spherical diameter
4. based on a specific gravity of 2.5

D. Nominal stone size and total thickness of the riprap shall be as shown on the DRAWINGS.

2.1.2. Grout

Concrete for the grout shall be approved batch meeting the following requirements:

- All grout shall have a minimum 28-day compressive strength of 3,000 psi
- Once cubic yard of grout shall contain a minimum of six (6) sacks of Type II Portland Cement.
- Aggregate for the grout shall consist of 70% natural sand (fines) and 30% 3/8-inch rock (coarse).
- Slump shall be four to six (4-6) inches.
- Air entrain shall be 5.5%-7.5%.
- Grout shall contain one and one –half (1½) pounds of Fiber mesh, or approved equivalent, per cubic yard of grout.

2.2. Installation

2.2.1. Riprap

Stones with typical stone dimensions that are equal to d_{50} and larger shall be placed at the top surface with faces and shapes matched to minimize voids and form as smooth a surface as practical. Dumping and backhoe placement alone is not sufficient to ensure a properly interlocked system. The material may be machine- placed to form a substantial bond as approved by **MANAGER** and **CERTIFYING ENGINEER**.

2.2.2. Grout

- Riprap shall be grouted in place at the locations shown on the DRAWINGS.
- The batching and mixing equipment for cement grout shall provide sufficient capacity to prevent cold joints. Materials shall be stockpiled and batched by methods that will prevent segregation or contamination of aggregates and ensure accurate proportioning of the ingredients of the mixture. No mixing water in excess of the amount required by the job mix shall be added to the grout mixture during mixing, hauling, or after arrival at the delivery point.
- All equipment needed to place, protect, and cure the grout shall be at the placement site and in good operating condition. The entire preparation shall be accepted by the **MANAGER** and **CERTIFYING ENGINEER** prior to placing the grout.
- Grout placement will not be permitted when weather conditions prevent proper placement, except upon approval. Grout shall be in place within 15 minutes after discharge from the

mixer. Grout shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation.

- No grout placement shall be made when the ambient temperature is below 35 °F, nor if the ambient temperature is below 40 °F and falling. Suitable covering and other means, as approved, shall be provided for maintaining the grout at a temperature of at least 50 °F for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. When freezing conditions prevail, rip rap to be grouted shall be covered and heated to a range of 40 °F to 60 °F for at least 24 hours prior to placing the grout. Salt, chemicals, or other foreign materials shall not be mixed with the grout to prevent freezing. Any grout damaged by freezing shall be removed and replaced at the expense of the **CONTRACTOR**.
- When the grout is mixed or transported by a truck mixer, the grout shall be delivered to the site of the work and discharge shall be completed within one and one-half hours after introduction of the cement to the aggregate and water. When the air temperature is 85 °F or greater or under conditions contributing to quick stiffening of the grout, the time between the introduction of the cement and discharge of the grout shall not exceed 45 minutes. The **MANAGER** may allow a longer time, provided the setting time of the grout is increased a corresponding amount by the addition of an approved set-retarding admixture.
- Grout shall be deposited as close as possible to its final position by methods that will prevent segregation of the aggregates or loss of mortar.
- The rock shall be flushed with water to remove the fines from the rock prior to placing the grout. The rock shall be kept moist just ahead of the actual placing, but the grout shall not be placed in standing or flowing water.
- The grout shall be delivered to the place of final deposit and discharged directly on the surface of the riprap, using a splash plate of metal or wood to prevent displacement of the rock directly under the discharge. The flow of grout shall be directed with brooms, spades, or baffles to prevent it from flowing excessively along the same path and to assure that all intermittent spaces are filled.
- Sufficient barring shall be done to loosen tight pockets of riprap and otherwise aid the penetration of grout so that all voids are filled and the grout fully penetrates the riprap.
- The grout shall be placed so that the top 4 inches of the riprap is left exposed in all locations unless otherwise directed by the **CERTIFYING ENGINEER**.
- Grout placed on inverts or other nearly level areas may be placed in one course. On slopes, the grout shall be placed in two courses in successive lateral strips approximately 10 feet in width starting at the toe of the slope and progressing to the top.
- All brooming on slopes shall be uphill and after the grout has stiffened, the entire surface shall be rebroomed to eliminate runs, to fill voids caused by sloughing, and to remove grout from the top surface and pockets or depressions of the upper stones.

- Beginning immediately after placement and continuing for at least 7 days, all grout shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water.
- After completion of any 10-foot strip, no workman or load will be permitted on the surface for a period of at least 24-hours, and longer if directed by the **CERTIFYING ENGINEER**.

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS –GEOTEXTILE		**SPECIFICATION NO.** **02777.DOCX**

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TABLE OF CONTENTS

SECTION 02711.0 GEOTEXTILE

1. PART 1: GENERAL

1.1. Summary

This SPECIFICATION describes requirements for the manufacture, supply, and installation of the geotextile in the Underdrains, and Leak Detection System, as shown on the DRAWINGS; and construction quality control monitoring. All procedures, operations, and methods shall be in strict compliance with the SPECIFICATIONS, the Construction Quality Assurance Plan, and the DRAWINGS.

1.2. Submittals

A. Submittals with Bid Documents

CONTRACTOR shall provide the following information relating to the geotextile MANUFACTURER with its proposal.

1. Information from MANUFACTURER including company name, address, telephone number, the names of the company president and quality control manager, and narrative of the company history.
2. Description of MANUFACTURER's manufacturing capabilities:
   a. Information on plant size, equipment, personnel, number of shifts per day, and capacity per shift.
   b. A list of standard material properties and test methods employed to arrive at the values for each. As a minimum, the list shall include properties given in Part 2 of this Section.
3. The Quality Control Manual followed during the manufacturing process including those for the polymer material and for detecting foreign objects in the finished goods, and a description of the quality control laboratory facilities, including the name and telephone number of the quality control manager. Upon review of the Quality Control Manual, the **MANAGER** and **CERTIFYING ENGINEER** may request additional testing during the manufacturing process at no additional cost to **CC&V**.

B. **CONTRACTOR** shall provide the following information after contract award but within ten (10) days prior to material arrival on-site and prior to commencement of the work:

1. The geotextile MANUFACTURER shall provide written certification that the geotextile to be used meets the requirements of the Squaw Gulch VLF Project and has been continuously inspected for the presence of needles and geotextile was found to be needle free.

2. A copy of the MANUFACTURER's geotextile QC test results of properties outlined in Part 2 of this Section. The **MANAGER** reserves the right to refuse use of any geotextile supplied without the proper QC documentation.
3. A detailed list of performance criteria for the geosynthetic material being produced for this project. (Note: Performance criteria are sometimes referred to as "minimum property values." Refer to Part 2 of this Section for geotextile properties and test methods.)

1.3. Quality Assurance

A. All Work shall be constructed, monitored, and tested in compliance with requirements in the Construction Quality Assurance Plan (Section 01400.2). **CONTRACTOR** and MANUFACTURER shall participate and comply with all items in these SPECIFICATIONS and requirements of the CQA plan.

B. **CONTRACTOR** shall ensure that geotextile MANUFACTURER has an internal product quality control program that meets Contract requirements.

C. **CONTRACTOR** shall be aware of all activities outlined in the Construction Quality Assurance Plan, and the **CONTRACTOR** shall account for these activities in the construction schedule.

D. **CONTRACTOR** shall assure that the geotextile is delivered to the site at least 14 calendar days prior to installation to allow sufficient time for conformance testing, if necessary.

E. Geotextile rolls that do not meet the requirements of this SPECIFICATION will be rejected. **CONTRACTOR** will be required to replace the rejected material with new material that complies with the SPECIFICATIONS, at no additional cost to **CC&V**.

F. In order to prevent weather-damaged geotextile from being placed, the following Quality Assurance procedures shall be followed:

1. **CONTRACTOR** shall perform its Work and utilize sufficient ballast as necessary to prevent wind uplift of the geotextile panels.
2. If weather damage should occur, **CERTIFYING ENGINEER** shall determine if the geotextile shall be repaired or replaced. Weather damage to the geotextile will include tears and dirty fabric, as determined by the **CERTIFYING ENGINEER**.
3. Repair or replacement of the weather-damaged geotextile shall be completed by **CONTRACTOR** at no additional cost to **CC&V**.
4. As determined by **MANAGER** and **CERTIFYING ENGINEER**, the geotextile panel may be rejected at no cost to **CC&V**.

1.4. Delivery, Storage, And Handling

A. Packing and Shipping

1. Geotextile shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers, with straps for unloading.
2. Geotextile rolls shall be marked or tagged with the following information.
    a. MANUFACTURER's name
    b. Product information
    c. Roll number
    d. Batch of lot number
    e. Roll dimensions
3. **CONTRACTOR** shall ensure that geotextile rolls are properly loaded and secured to prevent damage during transit.
4. **CONTRACTOR** shall protect geotextile from excessive heat, cold, puncture, cutting, or other damaging or deleterious conditions.
5. **CONTRACTOR** shall ensure personnel responsible for loading, transport, and unloading of are familiar with handling and transport constraints imposed by MANUFACTURER.

B. Acceptance at Site

1. CQA Monitor shall perform inventory and surface inspection for defects and damage of all geotextile rolls upon delivery.
2. **CONTRACTOR** shall unroll and inspect any geotextile roll that may be damaged below surface.
3. **CONTRACTOR** shall repair damage resulting from handling and transport of geotextile at no cost to **CC&V**. If irreparable, in the opinion of **CERTIFYING ENGINEER**, damaged materials shall be replaced at no cost to **CC&V**.

C. Storage and Protection

1. **MANAGER** will provide on-site storage area for geotextile rolls from time of delivery until installation.
2. The storage of the materials is the responsibility of **CONTRACTOR** from the time the materials are manufactured until the time the completed installation is accepted. **CONTRACTOR** is responsible for preparing the storage location and for the protection of the material from the elements (e.g. ultraviolet light, moisture, temperature, etc.).
3. After **CONTRACTOR** has removed material from storage area, protect geotextile from puncture, dirt, groundwater, moisture, mud, mechanical abrasion, excessive heat, ultraviolet light exposure, and other sources of damage.
4. Geotextile shall be supplied in rolls wrapped in relatively impermeable and opaque protective covers, with straps for unloading.

5. **CONTRACTOR** shall preserve integrity and readability of the geotextile roll labels, and store such that **MANAGER** and **CERTIFYING ENGINEER** have access to the package slips or roll labels for each roll to verify roll acceptance.

2. PART 2: PRODUCTS

2.1. Materials

A. Twelve-ounce Non-Woven Needle Punched Geotextile:

1. Geotextile shall be comprised of polyester or polypropylene fibers. Rolls shall be free of holes, contamination, and foreign matter.
2. The geotextile supplied for the project shall meet or exceed the minimum (unless noted otherwise) roll values shown in the table below:

MINIMUM AVERAGE ROLL VALUES FOR GEOTEXTILE MATERIAL		
Property	**ASTM Test Method**	**Value**
Weight (oz./sq. yd.)	D 5261	11.9
Puncture (lbs.)	D4833	130
Apparent Opening Size	D4751	No. 80 to 140 Sieve

3. PART 3: EXECUTION

3.1. Installation

A. Geotextile Deployment

CONTRACTOR shall handle geotextile in a manner to ensure that geotextile is not damaged, and shall comply with the following:

1. No equipment or tools shall damage the geotextile by handling, trafficking, or other means.
2. No personnel working on the geotextile shall smoke, wear damaging shoes, or engage in other activities that could damage the geotextile.
3. Cross seams between two (2) panels of geotextile shall be staggered by a minimum distance of five (5) feet on slopes greater than ten percent (10%).
4. In the presence of wind, all geotextiles shall be weighted with sandbags or the equivalent. Such sandbags shall be installed during deployment and shall remain until replaced with cover material.

5. Geotextile panels shall be deployed in such a manner as to preclude wrinkles and folds. Any wrinkle or fold that may manifest itself into other geosynthetic layers shall be removed.
6. Geotextile within the lined area shall be cut with a cutter approved by **CERTIFYING ENGINEER**, such as scissors.
7. Take necessary precautions to prevent damage to the underlying subgrade during placement of the geotextile.
8. During placement of geotextiles, care shall be taken not to entrap, in or beneath the geotextile, stones, excessive dust, or moisture that could damage the underlying or overlying geomembrane, cause clogging of drains or filters, or hamper subsequent seaming.
9. Following the installation of all geotextile, an examination of the entire surface shall be conducted to detect potentially harmful foreign objects. Any such foreign objects found shall be removed or the panel shall be replaced by the **CONTRACTOR**, at no cost to CC&V**.**
10. Geotextile panels shall not be deployed over frozen ground, unless approved by CERTIFYING ENGINEER.

B. Seaming Procedures

1. On slopes steeper than ten (10) percent, and in all cases in which soil or granular materials are to be placed over the geotextile, all seams shall be continuously sewn. In all other applications, sewing is the preferred seaming method.
2. Seams to be sewn shall be overlapped a minimum of six (6) inches and shall be sewn with a locking stitch. Seams to be thermally bonded shall be overlapped a minimum of twelve

(12) inches.

3. The thread used in sewing shall be of polymeric material having chemical resistance, and if the geotextile is to be exposed for more than thirty (30) days, ultraviolet resistance equal to or exceeding that of the geotextile.
4. **CONTRACTOR** shall take measures to prevent soil, granular materials, or foreign materials from entering or becoming trapped beneath the geotextile both during and following installation.

C. Defects and Repairs

Repair holes or tears in geotextile as follows:

1. Remove any soil or other material that may have penetrated the torn geotextile.
2. Should any tear exceed 10 percent of the width of the roll, that section of the roll shall be removed from the slope and replaced.

3. On slopes steeper than 10:1 (horizontal:vertical), sew into place, in accordance with Article 3.01(B) of this Section, a patch made from same geotextile. Use continuous sewing.
4. On slopes shallower than 10:1 (horizontal:vertical), sew geotextile patch into place using continuous (preferred) or spot seam in place a patch made from same geotextile, with a minimum 24-inch overlap in all directions.

NewFields	CLIENT Newmont - Cripple Creek & Victor Gold Mine	PROJECT NO 475.0106.006
PROJECT: Squaw Gulch VLF		
TITLE: TECHNICAL SPECIFICATIONS –CAST-IN-PLACE CONCRETE		**SPECIFICATION NO.** **03300.DOCX**

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TABLE OF CONTENTS

SECTION 03300.0 CAST-IN-PLACE CONCRETE

1. PART 1: GENERAL

1.1. Related Sections

Refer to the following Sections for related work:

- Section 02200.0 - Earthworks
- Section 03220.0 - Reinforcing Steel

1.2. Submittals

A. CONTRACTOR shall provide product data to allow evaluation by MANAGER and CERTIFYING ENGINEER.

B. **CONTRACTOR**'s mix design for each tentative mix for concrete shall contain the following information:

1. Slump on which design is based.
2. Total gallons of water per cubic yard.
3. Brand, type, composition, and quantity of cement.
4. Specific gravity and gradation of each aggregate.
5. Ratio of fine to total aggregates.
6. Weight (surface dry) of each aggregate per cubic yard.
7. Brand, type, ASTM designation, active chemical ingredients, and quantity of each admixture.
8. Time of initial set.

1.3. Tolerances

Concrete shall be placed to the lines and dimensions shown on the DRAWINGS.

1.4. Quality Assurance

A. All concrete testing (both field and laboratory testing) will be the responsibility of **CONTRACTOR**. **CONTRACTOR** shall be responsible for cooperating with CQA Monitor during all testing activities. **CONTRACTOR** shall provide equipment and labor to assist CQA Monitor in sampling, if requested, and shall also provide access to all areas requiring testing activities.

B. Any Work found unsatisfactory or any Work disturbed by subsequent operations beforeacceptance is granted shall be corrected by **CONTRACTOR**.

C. Flowable fill shall be manufactured by a ready-mix concrete producer with a minimum of 1 year experience in the production of similar products.

2. PART 2: PRODUCTS

2.1. Materials

A. Portland Cement, ASTM C 150, Type II.

B. Coarse Aggregate, ASTM C 33, except that clay and shale particles shall not exceed 1 percent of total aggregate.

C. Fine Aggregate, ASTM C 33, washed natural sand.

D. Flowable Fill containing, at a minimum, cementitious materials and water. The mixture may also contain fine aggregate or filler, and/or chemical admixtures in any proportions such that the final product meets the strength, flow consistency and shrinkage requirements included in this specification, as approved by the **CERTIFYING ENGINEER**.

1. Portland Cement: ASTM C150, Type II.
2. Mixing Water
3. Air-Entraining Admixture: ASTM C260.
4. Chemical Admixtures: ASTM C494.
5. Aggregate: ASTM C33.

2.2. Mixes

A. Mix Designs:

Concrete mix design shall be designed by an independent testing laboratory.

B. Cast-In-Place Concrete:

1. Cast-in-place concrete with reinforcing steel shall have a minimum 28-day compressivestrength of 4,000 psi.
2. Maximum Aggregate size of 1-inch.
3. Placement slump between 2-inches and 5-inches.
4. Air entrainment of 5% to 8%.

C. Flowable Fill:

1. Minimum compressive strength of 300 psi, ASTM C 39, at 28 days after placement.
2. Minimal subsidence and bleed water shrinkage. Evaporation of bleed water shall not result in shrinkage of more than 1/8 inch per ft. of flowable fill depth (for mixes containing high fly ash content).
3. Unit weight of (115 – 145 lb/feet^3) measured at the point of placement. In the absence of strength data the cementitious content shall be a maximum 150 lbs/cy.

2.3. Curing Compounds

Concrete curing compound shall be a clear compound complying with ASTM C 309, Type 1-D, Class A andB, such as "RES-X" by Burke, or an equivalent approved by **CERTIFYING ENGINEER**.

3. PART 3: EXECUTION

3.1. Structural Concrete

Place structural concrete as shown on DRAWINGS.

3.2. Installation

A. Ready-Mix Concrete shall be batched, transported, and placed in accordance with ASTM C94. Each batch delivered to the Site shall be accompanied by a certified weight master's delivery ticket.

B. All mixed concrete delivered to the Site shall be placed within 90 minutes from the time of introduction of cement and water into the mix.

C. No water shall be added after leaving the batch plant without the approval of **CERTIFYING ENGINEER**.

D. Placement of concrete, once started, shall be performed as a continuous operation until the scheduled placement is completed.

E. Cold joints shall be approved by **CERTIFYING ENGINEER**.

F. Concrete shall be thoroughly compacted by vibrating with suitable tools during placement, aroundembedded fixtures, and into the corners of forms.

G. Vibrators shall be operated at each point of placement and a standby vibrator in good working condition shall be kept at the placement site until all concrete is placed. Vibrators shall be used that will maintain at least 9,000 cycles per minute when immersed in the concrete.

H. Vibrations shall be used only to minimize honeycomb and accomplish compaction of the concrete, and shall not be used to move concrete from one location to another. Concrete shall not be moved in the forms more than 5 feet.

I. The surface of hardened concrete on which fresh concrete is to be placed shall be rough, clean, sound, and damp. The hardened surface shall be cleaned of all laitance, foreign substances, curing compound, washed with clean water, and wetted thoroughly preceding placement of fresh concrete.

J. Secure tanks, pipes and other members to be encased in flowable fill. Insure that there are no exposed metallic pipes, conduits, or other items that will be in contact with the flowable fill after placement. If so, replace with non-metallic materials or apply manufacturers recommended coating to protect metallic objects before placing the

flowable fill. Replacement or protection of metallic objects is subject to the approval of the **CERTIFYING ENGINEER.**

3.3. Cleaning

All form materials and debris resulting from construction shall be disposed of as directed by **MANAGER**.

3.4. Curing

A. General:
   1. Concrete shall be protected from loss of moisture for at least seven (7) days after placement.
   2. Curing may be accomplished with water or a curing compound.
   3. Water or curing compound shall be applied to formed surfaces within one (1) hour of form stripping.

B. Water Curing:
   1. Water saturation of unformed surfaces shall begin as quickly as possible after initial set of the concrete.
   2. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff.
   3. Concrete surfaces shall not be permitted to become dry during the curing period.

C. Curing Compound:
   1. Curing compound shall be spray-applied at the MANUFACTURER's recommended coverage rate.
   2. Unformed surfaces shall be covered within 30 minutes after final finishing.
   3. Curing compound shall be protected against abrasion during the curing period.

3.5. Schedules

CONTRACTOR shall notify **MANAGER** at least forty-eight (48) hours before each concrete placement.

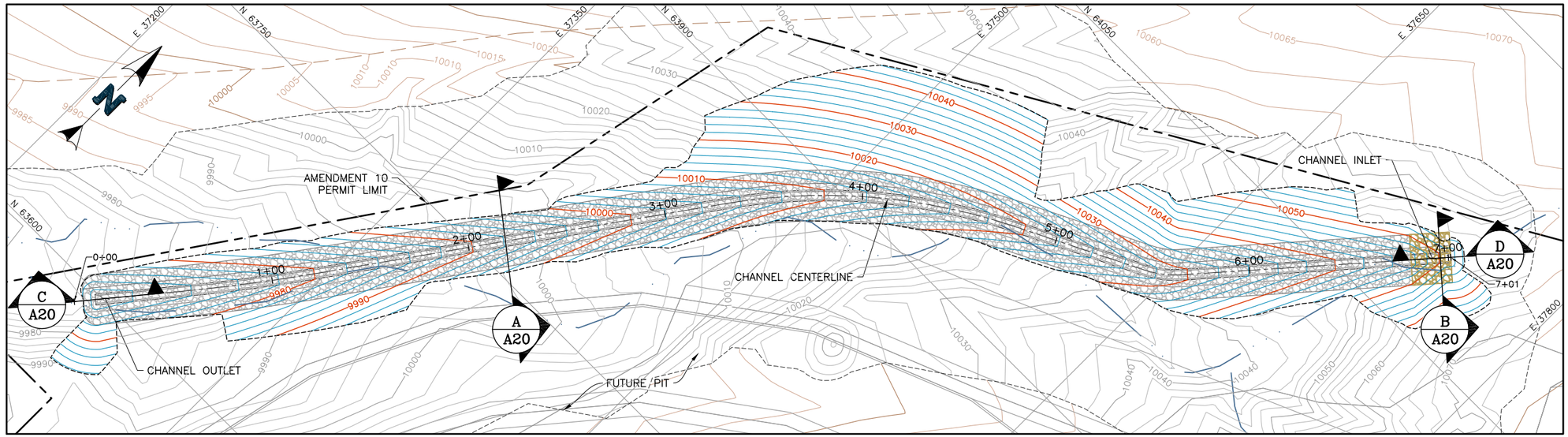
3.6. Field Quality Control

A. Concrete testing will be performed by **CONTRACTOR**.

B. Four standard 4-inch diameter by 8-inch long test cylinders shall be prepared for every 50 yards of concrete placed or for each placement, whichever is greater, at the discretion of the **MANAGER, DESIGN ENGINEER** and **CERTIFYING ENGINEER**.

C. Standard compression tests shall be performed to determine the compressive strength: one at seven (7) days, one at fourteen (14) days, and one at twenty-eight (28) days. The fourth cylinder shall be kept in reserve for additional testing, if necessary.

D. Slump testing shall be performed at the time the cylinders are prepared.



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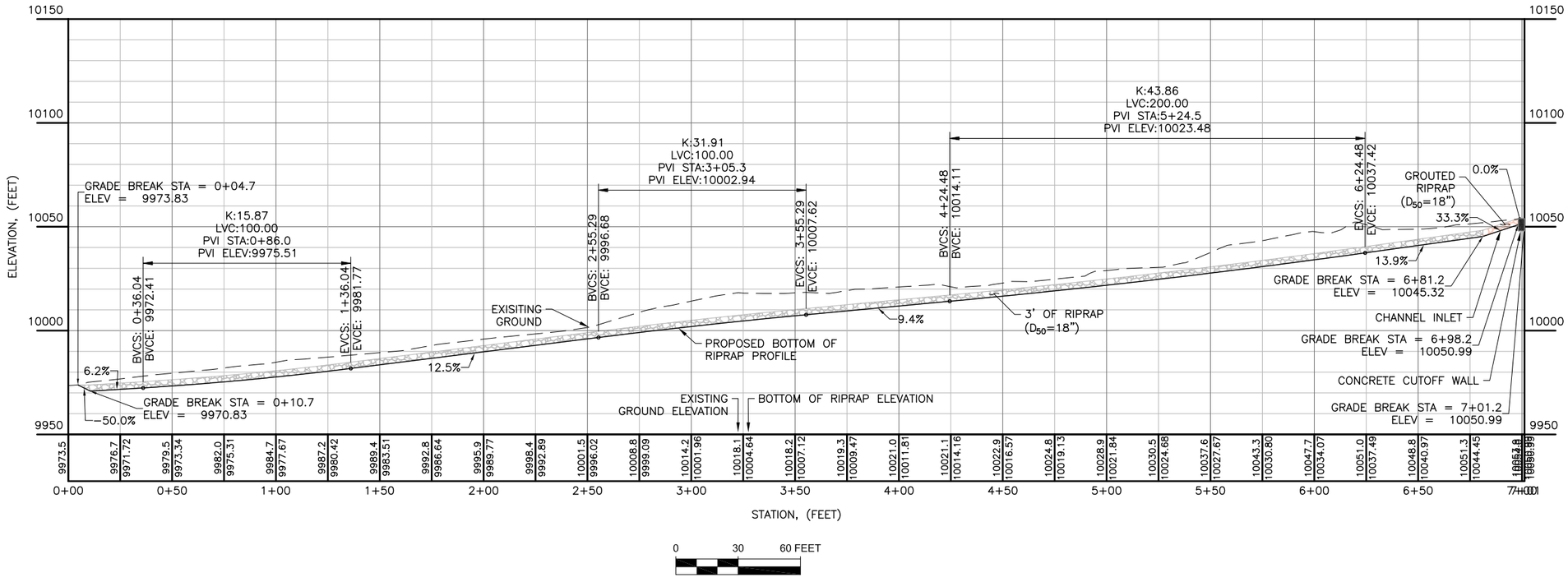

0 30 60 FEET

LEGEND:

- EXISTING GROUND CONTOURS (GROUND SURVEY)
- EXISTING GROUND CONTOURS (2016 FLYOVER)
- PROPOSED GROUND CONTOURS
- EXISTING ROADS/TRAILS (2016 FLYOVER)
- EXISTING DRAINAGE (2016 FLYOVER)
- PERMIT LIMIT
- RIPRAP (D_{50}=18")
- GROUTED RIPRAP (D_{50}=18")

NOTES:

1. PROPOSED GRADING CONTOURS REPRESENTS THE BOTTOM OF THE CHANNEL EXCAVATION.
2. SEE DRAWING A20 FOR ALIGNMENT SETTING OUT DATA.
3. CHANNEL ALIGNMENT AND CHANNEL FLOWLINE PROFILE MAY BE ALTERED IF THE EXISTING CONDITIONS WARRANT A CHANGE WITH THE APPROVAL OF THE ENGINEER OR OWNER.
4. IF THE CHANNEL EXCAVATION IS IN BEDROCK, THE RIPRAP MAY BE OMITTED WITH THE APPROVAL OF THE ENGINEER OR OWNER.
5. WITH APPROVAL FROM THE OWNER, THE D_{50}=18" RIPRAP MAY MAY BE SUBSTITUTED WITH D_{50}=12" GROUTED RIPRAP.

COLORADO REGISTERED PROFESSIONAL ENGINEER
JAYNE JANNEY-MOORE
37571
4-25-17

Reference:

NEWMONT PROVIDED THE 2016 FLYOVER DATA TO NEWFIELDS ON JAN. 19, 2017 IN A FILE CALLED "MM166157_2016-CRIPPLECREEK-TOPO-FINAL.DWG"

NEWMONT PROVIDED THE GROUND SURVEY DATA TO NEWFIELDS ON MAR. 13, 2017 IN A FILE CALLED "POVERTY GULCH GLOBE HILL DIVERSION CHANNEL BASE TOPO 3-09-17.DWG"

REV	DATE	DESCRIPTION	TECH	ENG
0	04/25/17	ISSUED FOR CONSRUCTION	JNM	JNM

APPROVED BY: TT
CHECKED BY: JNM
DESIGNED BY: JNM
DRAWN BY: JNM

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NewFields

CLIENT: NEWMONT MINING COMPANY

PROJECT: POVERTY GULCH DIVERSION CHANNEL

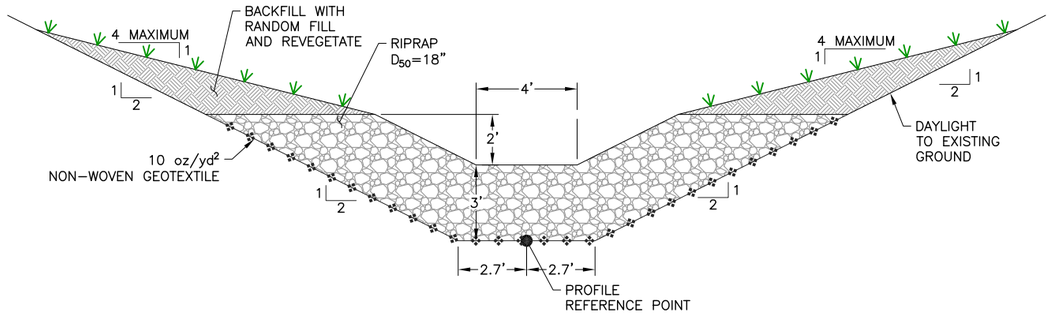
TITLE: CHANNEL PLAN AND PROFILE

FILENAME: 106.012.01P

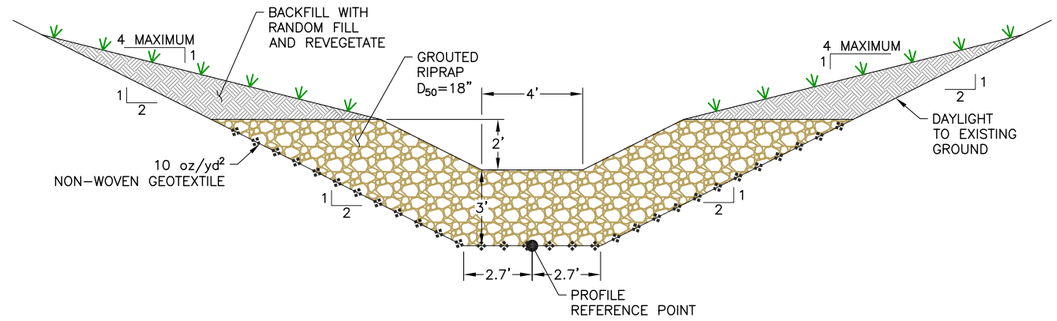
DRAWING NO.: A10

REVISION: 0

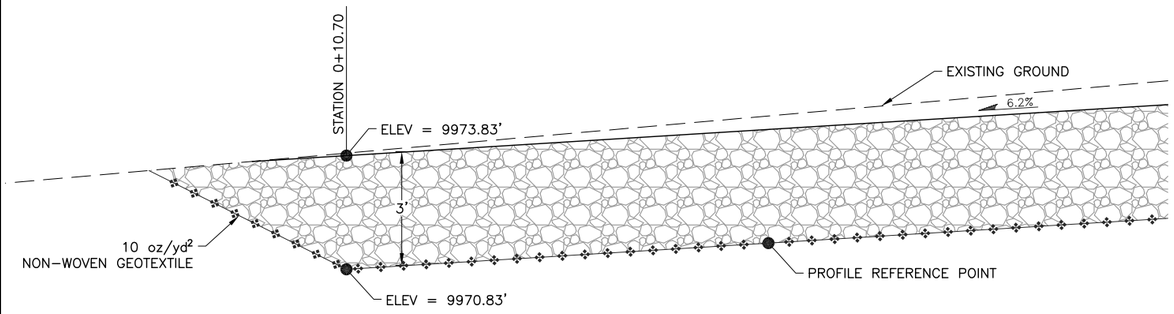
P:\Projects\0106.012 Poverty Gulch Diversion Channel\A-CAD\DWGS\106.012.01P.dwg-4/20/2017 11:24 AM



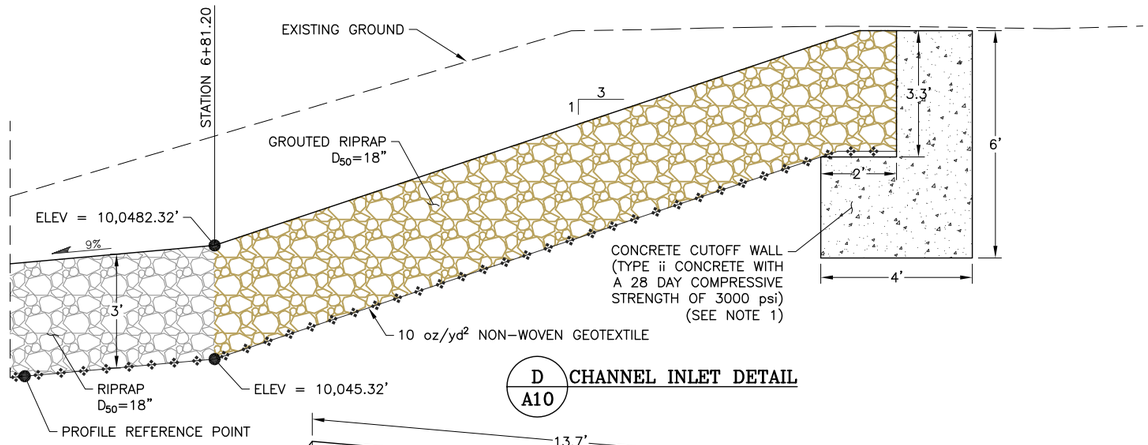
A / A10 TYPICAL CHANNEL SECTION



B / A10 TYPICAL GROUTED CHANNEL SECTION



C / A10 CHANNEL OUTLET DETAIL



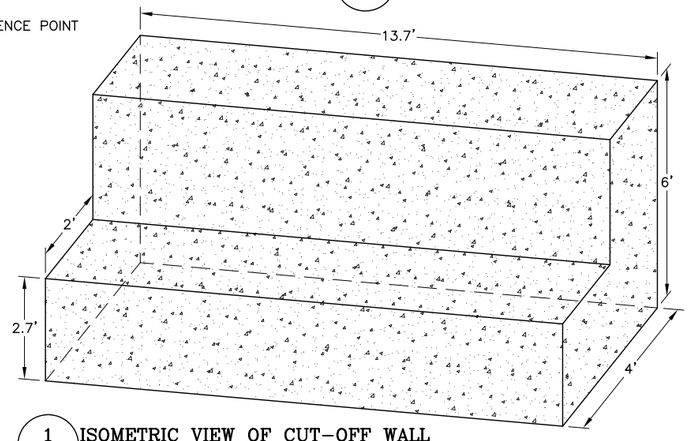
D / A10 CHANNEL INLET DETAIL

POVERTY GULCH DIVERSION CHANNEL						
	STATION	NORTHING	EASTING	DELTA (D-M-S)	LENGTH (FT)	RADIUS (FT)
PI	0+00.00	63,588.96	37,270.45			
PC	0+52.83	63,629.73	37,304.04	004-09-58	72.71	1000.00
PT	1+25.54	63,687.48	37,348.20			
PC	3+30.10	63,854.38	37,466.47	028-12-22	147.69	300.00
PT	4+77.79	63,949.48	37,577.52			
PC	5+46.39	63,980.06	37,638.92	022-13-32	19.40	50.00
PT	5+65.78	63,991.81	37,654.20			
PI	7+01.21	64,093.55	37,743.58			

APPROXIMATE CONSTRUCTION QUANTTIES		
ITEM	QUANTITIES	UNITS
CLEAR AND GRUB	35,342	ft^2
EXCAVATION TO WASTE	6,405	yd^3
10 OZ/YD2 NON-WOVEN GEOTEXTILE	19,400	ft^2
D_{50} = 18" RIPRAP	1,530	yd^3
D_{50}=18" GROUTED RIPRAP	39	yd^3
TYPE iia CONCRETE	9	yd^3

NOTES:

1. IF CHANNEL INLET IS BEDROCK, THEN CONCRETE CUT-OFF WALL MAY BE OMITTED FROM CONSTRUCTION WITH THE APPROVAL OF THE ENGINEER OR THE OWNER.
2. CHANNEL ALIGNMENT AND CHANNEL FLOWLINE PROFILE MAY BE ALTERED IF THE EXISTING CONDITIONS WARRANT A CHANGE WITH THE APPROVAL OF THE ENGINEER OR OWNER.
3. IF THE CHANNEL EXCAVATION IS IN BEDROCK, THE RIPRAP MAY BE OMITTED WITH THE APPROVAL OF THE ENGINEER OR OWNER.
4. THE GEOTEXTILE SHALL BE SHINGLED PROPERLY AND INSTALLED PER THE MANUFACTURES RECOMMENDATIONS.
5. WITH APPROVAL FROM THE OWNER, THE D_{50}=18" RIPRAP MAY MAY BE SUBSTITUTED WITH D_{50}=12" GROUTED RIPRAP.
6. FOR THE PURPOSE OF ESTIMATING, THE QUANTITY OF D_{50}=12" GROUTED RIPRAP IS 1,075 yd^3.



1 / A12 ISOMETRIC VIEW OF CUT-OFF WALL

REV	DATE	DESCRIPTION	TECH	ENG
0	04/25/17	ISSUED FOR CONSTRUCTION	JNM	JNM

APPROVED BY: TT
CHECKED BY: JNM
DESIGNED BY: JNM
DRAWN BY: JNM

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NewFields

CLIENT: NEWMONT MINING COMPANY

PROJECT: POVERTY GULCH DIVERSION CHANNEL

TITLE: SECTIONS AND DETAILS

FILENAME: 106.012.02D

DRAWING NO.: A20

REVISION: 0

P:\Projects\0106.012 Poverty Gulch Diversion Channel\A-CAD\DWGS\106.012.02D.dwg-4/25/2017 7:43 AM

STATE OF COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

RE: (EXTERNAL) M-1980-244 Globe Hill Diversion Construction inspection

1 message

Clara Steward <Clara.Steward@newmont.com> Mon, Sep 25, 2017 at 11:56 AM
To: "Cazier - DNR, Tim" <tim.cazier@state.co.us>
Cc: Meg Burt <Margaret.Burt@newmont.com>, "Erickson - DNR, Wally" <wally.erickson@state.co.us>, Amy Eschberger - DNR <amy.eschberger@state.co.us>, Elliott Russell - DNR <elliott.russell@state.co.us>, Jeff Gaul <Jeffrey.Gaul@newmont.com>, Justin Bills <Justin.Bills@newmont.com>

Please see attachments.

Clara Steward (Trippel)

Senior Environmental Coordinator

Sustainability & External Relations Department

Cripple Creek & Victor Gold Mine

T 719-689-4313 x18313

C 719-306-4838

From: Clara Steward
Sent: Monday, September 25, 2017 11:49 AM
To: 'Cazier - DNR, Tim'
Cc: Meg Burt; Erickson - DNR, Wally; Amy Eschberger - DNR; Elliott Russell - DNR; Jeff Gaul; Justin Bills
Subject: RE: (EXTERNAL) M-1980-244 Globe Hill Diversion Construction inspection

Tim,

Attached are the updated Technical Specifications and Design Drawings. The updates were made per your comments in the letter from DRMS dated January 10th, 2017 approving TR86.

As I stated on the phone last week, the current plan is to complete the placement of the grout during the week of October 2nd (specifically on the 4th), however, our Environmental Team is tied up all week for an ISO 14001 audit. I also stated I would get you in touch with site personnel in charge of the project, Jeff Gaul (cc'd), who could coordinate with you and tour you around if you decided to come out that week. It is apparent from the content of your email that there is some confusion regarding my original question as to whether you are still going to attend the monthly September CC&V inspection scheduled for September 27th **as well as** the inspection of the stormwater construction.

I'm sure you understand that we don't want to impede progress on the stormwater diversion channel construction as we realize we will need to accommodate for weather and contractor delays and still complete the construction within the timeframe specified in TR86. While I understand your concern is placement of the grout, please be aware this task will be completed in sections working

uphill so may not all be completed in one day. Jeff Gaul will keep you updated on the schedule, but please realize due to weather and contractor delays it is hard for us to control this aspect and, thus, the day(s) of construction is subject to change.

Furthermore, it is important to note that this is the first time the Division has mentioned their interpretation that this diversion channel is an EPF. The conversation around the permitting and construction of this facility has been ongoing for almost a year and the facility was approved in Jan 2017. Over this time, it was never discussed or mentioned that this was an EPF. The Division did not permit this as a designated EPF (see language in TR86) nor are diversion channels in general designated as EPFs in the Cresson Permit. Additionally, the diversion channel is being constructed so that the natural flow of poverty gulch is not disrupted and for pit stability (safety) concerns, neither of which fit Rule 1.1(15)'s definition of an EPF to "protect" the environment from "designated chemicals, uranium, uranium by-products or other radionuclides, acid mine drainage, or toxic or acid-forming materials that will be exposed or disturbed as a result of mining or reclamation operations." If the surface flow from poverty gulch were to flow into the future Globe Hill pit (which would be very rare), the water would stay contained in the pit and would not differ from general stormwater concerns that arise from precip events over the pit area.

Finally, we were under the impression that the reason you originally required a Certification Report including a Record of Construction was so that the contractor will construct the channel per the agreed upon designs and specifications. I do not understand the need for DRMS oversight on this project as the designs have been approved and we are preparing a Certification Report to provide evidence to DRMS that the designs were followed and properly implemented. The level of importance DRMS is placing on observing this construction project seems overblown and unnecessary. CC&V does not recall the Division placing this much priority on the construction of VLF2, which is, in fact, an EPF.

Please let me know if you are coming on for the planned monthly inspection Wednesday, and if so what your itinerary is.

Thanks,

Clara

Clara Steward (Trippel)

Senior Environmental Coordinator

Sustainability & External Relations Department

Cripple Creek & Victor Gold Mine

T 719-689-4313 x18313

C 719-306-4838

From: Cazier - DNR, Tim [mailto:tim.cazier@state.co.us]
Sent: Wednesday, September 20, 2017 5:32 PM
To: Clara Steward
Cc: Meg Burt; Erickson - DNR, Wally; Amy Eschberger - DNR; Elliott Russell - DNR
Subject: (EXTERNAL) M-1980-244 Globe Hill Diversion Construction inspection

Clara,

Sorry I didn't get back to you by phone, we just finalized our position about 4:50 pm and I'm in the field on Thursday, while you're all out on Friday. Thus, I'm falling back on email. I have also been reviewing TR-86 and cannot find in Newfield's drawings A10 and A20 (dated 12/15/2016) any reference to grouted riprap. I seem to recall discussions on the concept, but I can't find anything in my files that addresses the grout placement. Please help me clear that up, so we can proceed.

With that in mind, the Globe Hill Diversion is considered an environmental protection facility (EPF) as it is designed to separate unimpacted water/runoff from becoming potentially impacted in the Globe Hill Pit and to increase the stability of the Globe Hill Pit highwall in the vicinity of Poverty Gulch. As such both Rules 6.4.21 and 7.4 apply and give the Division authority to inspect critical aspects of the construction of the diversion channel. Proper construction techniques for grouting the riprap is potentially the most critical task in this EPF. I need to be there after the riprap is placed and is ready to receive the grout. I am leaving the next few weeks open for your schedule so I can be on site at this critical time. However, CC&V needs to make personnel available so I can inspect this critical part of the construction in keeping with Rule 7.4.2(1). If CC&V can't make someone available for me to observe the grout placement at this time, the construction schedule will need to be delayed until CC&V personnel can make themselves available to accompany me. If the Division does not observe this portion of the construction, we have the authority to require CC&V rip out the constructed portion and reconstruct it under our observation. So please help me help you get to where we all need to be on this issue.

Finally, a reminder of my request in the first paragraph to lead me to where the Division approved the use of grouted riprap for this project.

Thanks. If you have questions, please leave me a voice message on my cell (303-328-5229) or reply to this email.

Tim Cazier, P.E.

Environmental Protection Specialist

P 303.866.3567 x8169 | F 303.832.8106 | C 303.328.5229

1313 Sherman St., Room 215, Denver, CO 80203

tim.cazier@state.co.us | www.mining.state.co.us

3 attachments

Technical Specifications.pdf
1346K

A10.pdf
694K

A20.pdf

444K