COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

April 23, 2020

Ms. Melissa Harmon
Cripple Creek & Victor Gold Mining Company
P.O. Box 191
Victor, CO 80860

Re: Project, Permit No. M-1980-244;
Stormwater Preliminary Adequacy Review, Amendment Application (AM-13)

Dear Ms. Harmon:

The Division of Reclamation, Mining and Safety (Division) has completed its preliminary adequacy review (PAR) of your Cresson Project 112d-3 Reclamation Permit Amendment Application (AM-13), Volume III, Appendix 3 "Stormwater Management Plan (SWMP) and Valley Leach Facility (VLF)/Overburden Storage Area (OSA) Closure Stormwater Analysis Report". The Division sent a Preliminary Adequacy Review (PAR) Letter for the all sections of the AM-13 Application (except this stormwater section) on April 3, 2020. The **decision date for the application** has been set to **May 31, 2020**.

Please be advised that if you are unable to satisfactorily address any concerns identified in this review before the decision date, **it will be your responsibility to request an extension of the review period**. If there are outstanding issues that have not been adequately addressed prior to the end of the review period, and no extension has been requested, the Division will deny this application.

The review consisted of comparing the application content with specific requirements of the Hard Rock Act, 34-32-101 et seq., C.R.S. (the Act) and the Minerals Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard rock, Metal and Designated Mining Operations (Rules). As stated in the April 3, 2020 PAR The Division is formally requesting the Applicant provide a cover letter responding to each adequacy item as well as providing appropriate replacement pages/sections/exhibits/etc. for each response. The following adequacy questions are identified by letter (to distinguish comment numbers from the April 3, 2020 PAR).

GENERAL COMMENTS

A. Comment No. 88. In the April 3rd PAR, Comment No. 88 indicated additional comments related to the Appendix 3 stormwater would be provided at a later date and the Division had been unable to locate previously submitted documents referenced in Appendix 3. The Division has since located the referenced document with assistance from CC&V personnel (thank you). The following comments fulfil the Division's commitment in Comment No. 88 of the PAR. No response required.

B. VLF/OSA Closure Stormwater Analysis. As alluded to in Comment A above, the Closure Stormwater Analysis references Knight Piesold documents from 2018. These documents were submitted as TR-96 and adequacy review responses to the same. TR-96 focused primarily on EMP sediment ponds and not on stormwater channels designed to convey runoff from disturbed and reclaimed areas. The VLF/OSA Closure Stormwater Analysis appears to use the same hydrologic assumptions and build on TR-96 to include the necessary stormwater channels. The EMP sediment ponds are not shown in Figures 1 through 7. There are also several "terminations" of stormwater channels to what is implied as an existing or future channel (e.g., Haul Road). At closure, the Division expects stormwater to be conveyed in a controlled manner from and through all disturbed areas to the point it reaches a suitable natural drainage or to a non-discharging feature, such as a pit. Please address the following:

   a. If these EMPs are to be removed prior to the establishment of vegetation, how is sediment discharge to be prevented/controlled while vegetation is being established?

   b. Where are, or when can the Division see completed designs for non-natural receiving channels (such as haul roads) referenced on Figures 2 through 7?

C. Channel Designs. Based on the concerns outlined in Comment Q below, it may be appropriate to remove the current stormwater designs from consideration in Amendment 13 in order avoid additional response and review time and possibly delaying the time needed to get these designs in approvable form. It may also be appropriate to have some meetings to discuss the concerns in Comment Q. If CC&V is willing to commit in writing to addressing the concerns in Comment Q via a technical revision review process within one year of a Division approval of AM-13, the Division would be willing to accept that approach.

Stormwater Management Plan

D. Table of Contents. The SWMP includes a Table of Contents complete with page numbers for each subsection. No page numbers are present on any page of the SWMP. Please resubmit the SWMP with page numbers on each page (with the exception of the Appendix 3 cover page).

E. Individual Discharge Permits. Section 2.0 states CC&V holds three individual discharge permits: Carlton Tunnel, Fourmile Creek Springs, and Arequa Gulch. Please either provide a map showing locations of each discharge point or include a reference to a map in the application showing locations.

F. Administrator Contacts. Section 4.1, Table 1 leaves the "[Mine Manager]" open. If this position has been filled, please provide an update with the requested page-numbered SWMP.

G. High Grade Mill. The fourth bullet under Section 4.3.1 states the "HGM liner is tied to the VLF liner system, providing full containment of the outdoor HGM area. Chemical releases to stormwater or the environment are, therefore, unlikely to occur." Given the HGM liner allows up to nearly six feet of ponding on the double composite-liner and has no leak detection system, how can CC&V demonstrate whether or not there is release to the environment (i.e., groundwater)?

VLF/OSA Closure Stormwater Analysis

H. Design Storm. Section 3 states the 500-year, 24-hour design storm is now being used for the design of stormwater diversion/control channels. Previous efforts have used the 100-year, 24-hour design storm for channel sizing purposes. Several of the higher capacity channels discharge to previously designed channels that will not have the capacity to convey the full design flow and may lead to channel failures in these transition locations. An additional concern is the higher design capacity means the flow velocity in the larger channels will likely be much slower for the runoff from more common frequent storms, thereby increasing sediment deposition. The expected increase in sediment deposition may reduce the design conveyance capacity. Please respond to the following:

   a. Does CC&V intend to upgrade diversion channels not addressed in AM-13 to convey the runoff from the 500-year, 24-hour design storm?

   b. Have these higher capacity channels been evaluated for flow velocity for smaller storms such as the 2- or 5-year, 24-hour design storm such that the expected velocity is sufficient to transport sediment?

I. Stormwater Routing Plan. The last sentence on p. 4 states an overall plan for surface water routing is on Figure 1. There are no routing indications of any kind on Figure 1. Please correct the reference or add routing indicators on Figure 1.

J. Figure 2. Section 2.1 of the text indicates the ECOSA top will be graded at 1.5% towards the southwest to limit runoff to Grassy Valley. No such indication is shown on Figure 2. Two proposed diversion channels merge on the south end of the ECOSA and Altman backfill area, with a note indicating a "Discharge to Haul Road". Please address the following:

   a. Watershed delineation labels need to be added to the legend,

   b. Add a note or grading direction indicator on the crest of the ECOSA showing a 1.5% slope to the southwest

   c. The 1.5% grade to drain on the crest of the ECOSA appears to significantly expand the contributing area to the "Haul Road" channel. Has the increased peak flow been

checked with respect to the design capacity and stability of the "Haul Road" channel?

d. Where can the design for the channel in the Haul Road be found?

There are several apparent errors on Figure 2 related to the subbasin delineation and the grading plan. Several subbasin boundaries are skewed from the expected orientation perpendicular to contour lines. Furthermore, the second and third bullets in Paragraph 2 (p. 1) state benches are to exist every 150 vertical feet and Section A on Figure 8 is called out on Figure 2, implying bench channels are planned for each bench. These planned bench channels contradict the watershed boundaries delineated on Figure 2. Please reference the enclosed Figure 2 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. Bench Channels should be corrected to be no more than 150 feet apart (vertically),

c. Watershed delineations are inconsistent with the grading plan,

d. Consider grading the crest towards the remnant haul road and using the haul road to convey runoff away from Grassy Valley, rather than grading the crest to southwest where it would erode the steep slope in the Southwest watershed.

e. ECOSA Channel 1A (on Figure 2) and the WHEX Channel on Figure 3 appear to have an upstream beginning in very close to the same place. How is runoff from the north end of watershed Northeast1 and all of watershed North1 directed to ECOSA Channel 1A and not the WHEX Channel?

K. Figure 3. Please reference the enclosed Figure 3 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. Bench Channels should be corrected to be no more than 150 feet apart (vertically) and shown in grading plan,

c. Steep channels on the west side of the WHEX backfill not addressed specifically in TR-96, and

d. Grading difference with respect to a remnant haul road on the south end of the WHEX backfill

L. Figure 4. Please reference the enclosed Figure 4 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. Bench Channels should be corrected to be no more than 150 feet apart (vertically) and shown in grading plan,

c. Watershed delineations are inconsistent with the grading plan,

d. The steep contact channel on the north side of the contact between VLF 2 and the SGOSA does not appear to be designed, and

e. The discharge to the existing drainage way on the west appears to be into swale rather than an incised drainage. This will likely lead to significant head cutting. How will head cutting be avoided?

M. Figure 5. Please reference the enclosed Figure 5 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. Watershed delineations appear to be inconsistent with the grading plan,

c. There is no design detail/section for the haul road channel (VLF2 channel 5),

d. Bench channel flow directions need to be shown.

e. The ultimate discharge location appears to be down the steep face of the VLF2/SGVLF toe berm on the SW side of Hwy 67. There is no defined or established drainage here. Some means of controlling discharge to the existing Squaw Gulch drainage needs to be presented that will not result in excessive scour.

N. Figure 6. Please reference the enclosed Figure 6 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. Watershed delineations are inconsistent with the grading plan,

c. How is runoff conveyed from the termination of the VLF1 Channels 5 and 6 to the Cresson Pit?

O. Figure 7. Please reference the enclosed Figure 7 Markup and address the following:

a. Watershed delineation labels need to be added to the legend,

b. There are two poorly defined drainages that may have considerable runoff directed to them. These should be evaluated in the field to determine if they have the capacity to accept flows rerouted to them that will not result in excessive scour.

P. Figure 8. Please reference the enclosed Figure 8 Markup and address the following:

a. There is a discrepancy between sections A and C as to whether the wider benches are 24 or 25 feet. Please correct as appropriate,

b. This flat area between the upslope toe and the more centered bench channel will erode due to the runoff energy and generate sediment to reduce the channel capacity. Move the channel adjacent to the uphill slope to avoid this,

c. Section A cites a "Rock Check Dam". There are no details as to how a rock check dam would be integrated into the bench channel. This type of BMP would be expected to cause backwater conditions and likely lead to water levels exceeding the freeboard (also not specified) and resulting to overtopping, breakout erosion and channel failure. Please provide clarification and appropriate details.

Drawings

Q. Drawings. Our review of the 50 drawings in Appendix C raised the following concerns:

a. Channel Hatch Patterns. Given the scale of the B-size drawings, it is difficult to discern on most plan views of the Plan & Profile drawings what the proposed lining is. It is common practice to call out the appropriate channel design section (Drawings 520 and 521) in the profile portion of a Plan & Profile to clarify what type of channel lining is proposed for each segment. Please add this to the drawings.

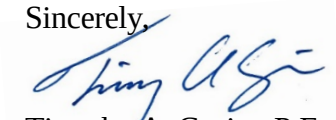
b. Channel Alignment/Positioning. Several of the plan views of channels proposed for haul road remnants or wide benches position the proposed channel closer to the outside/downslope side of the haul road (e.g., Drawings 221, 310, 315, 342, 343, 344, and 421). This flat area between the upslope toe and the offset channel will erode due to the runoff energy and generate sediment, reducing the channel capacity. Move the channel adjacent to the uphill slope to avoid this.

c. Channel Appropriateness and Feasibility. The post-mine land use is rangeland. There are several thousand feet of concrete and grouted riprap channel proposed. Given the steep nature and potential for ice forming in these channels, the Division questions whether the ubiquitous use of concrete and grouted riprap is appropriate for either domestic or wildlife. The Division's and Urban Drainage and Flood Control's (UDFCD) experience has shown grouted riprap in cold climates results in broken/rubblized grout due to the freeze-thaw cycle effect on grout. UDFCD now recommends a grouted boulder technique, which differs significantly from grouted riprap. There are no details to show grouted riprap, so it is unclear what is intended. There are also significant lengths of grass-lined channels proposed. The Division has walked several thousand feet of existing diversion channels on site and has only seen a few hundred feet where sufficient grass has grown to stabilize the soil in the bottom of a channel. For this reason the Division questions the appropriateness of grass-lined and turf-reinforced mat (TRM) as an effective means of conveying and controlling runoff.

d. Drawing 240. The north arrow is rotated 90 degrees. Please correct the error.

If you have any questions or need further information, please contact me at (303)866-3567 x8169.

Sincerely,

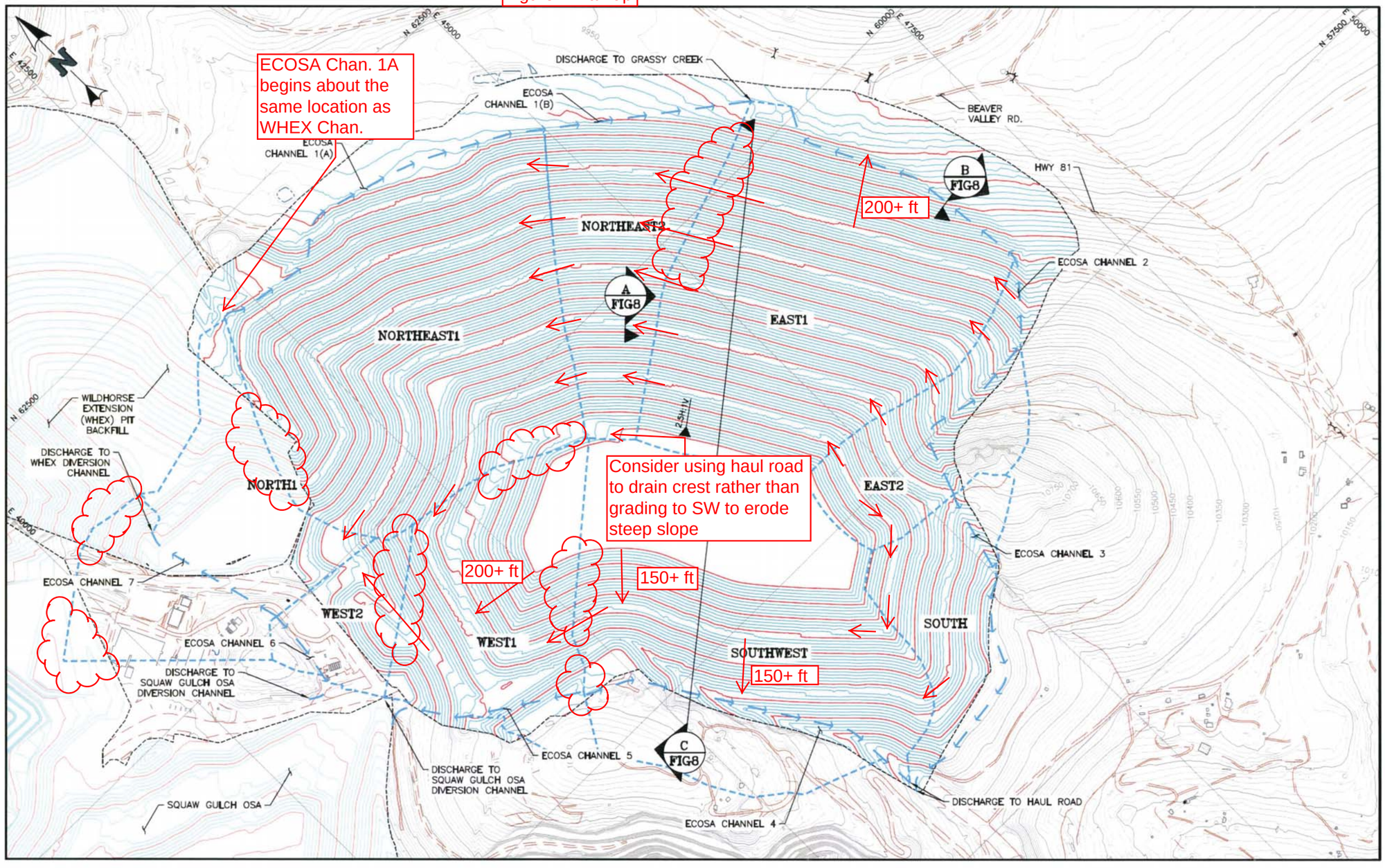


Timothy A. Cazier, P.E.
Environmental Protection Specialist

Attachments: Markups of Figures 2 - 8

ec: Michael Cunningham, DRMS
Elliott Russell, DRMS
Patick Lennberg, DRMS
Brock Bowles, DRMS
DRMS file
Justin Raglin, CC&V
Justin Bills, CC&V
Katie Blake, CC&V
Wendy Conley, CC&V

Figure 2 Markup



Markup Legend

Subbasin delineation not perpendicular to contours

→ Figure 8, Section A channel contradicting overall subbasin delineation

200+ ft Distance between benches > 150 ft (vertical)

NewFields	CLIENT CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY	
PROJECT	VLF/OSA CLOSURE STUDY	
TITLE EAST CRESSON OSA CLOSURE PLAN	FILENAME 106.025.002F	
	FIGURE NO. 2	REVISION 0

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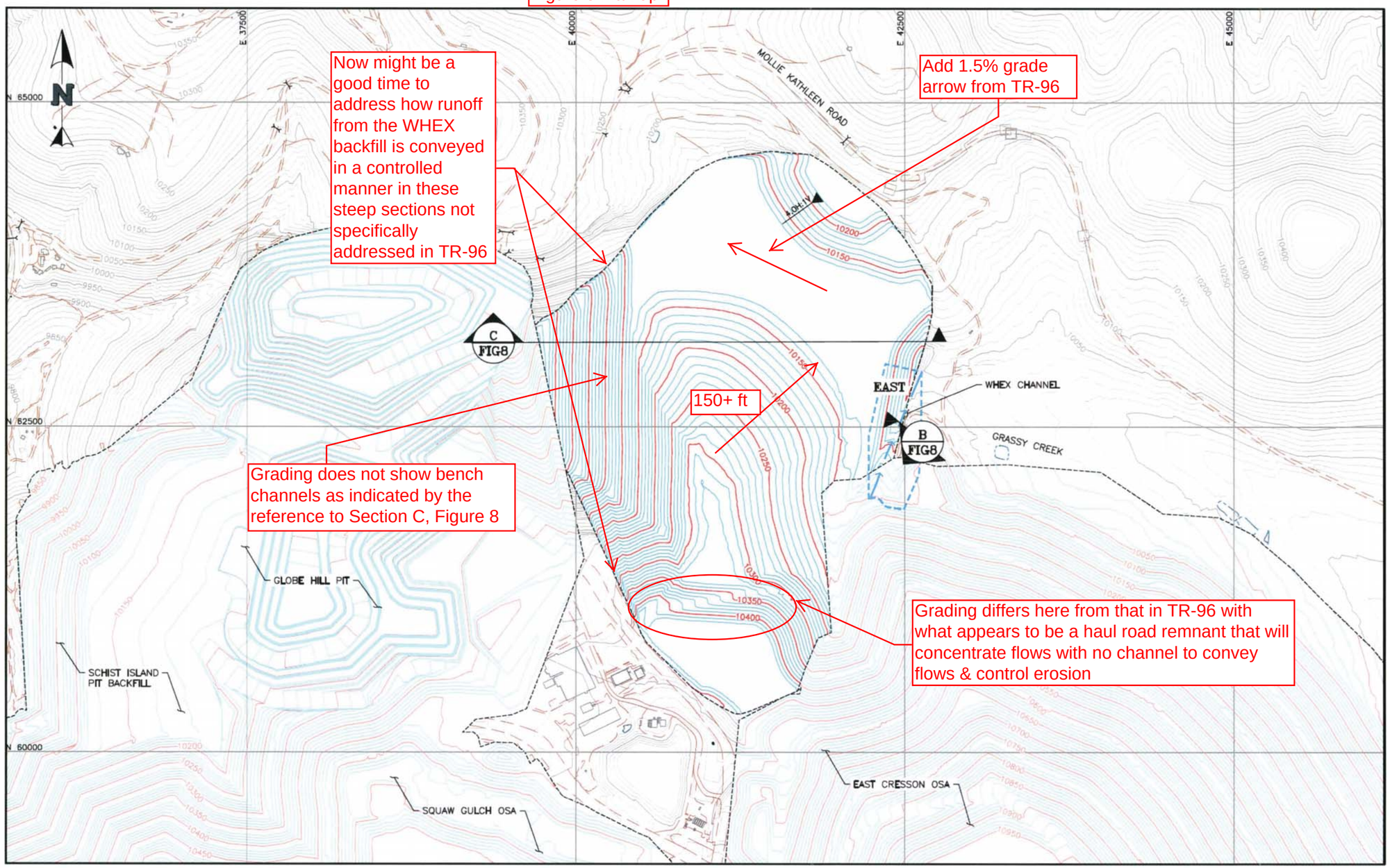
Figure 3 Markup

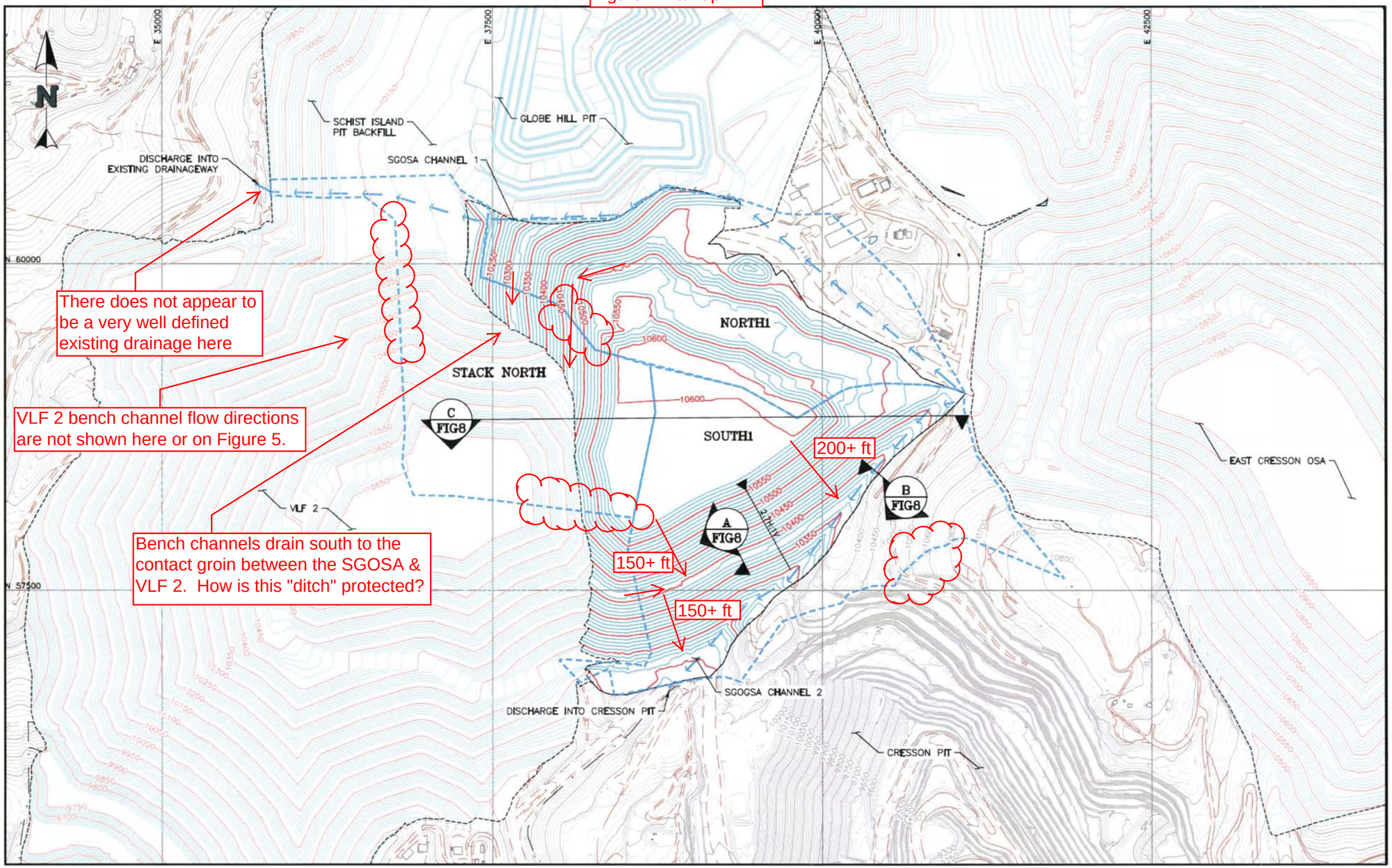


Reference legend on Figure 2 Markup

P:\Projects\0106.035 ... re Stormwater\A-CAD\FIGS\106.025.003F.dwg-11/1/2019 11:37 AM

NewFields	CLIENT: CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY
PROJECT: VLF/OSA CLOSURE STUDY	
TITLE: WHEX PIT BACKFILL CLOSURE PLAN	FILENAME: 106.025.003F; FIGURE NO.: 3; REVISION: 0

Figure 4 Markup



LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED CLOSURE CONTOURS
- SECONDARY CLOSURE CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING POWERPOLE
- EXISTING POWER LINE
- EXISTING CULVERT
- EXISTING DIVERSION CHANNEL
- PROPOSED DIVERSION CHANNEL
- WATERSHED BOUNDARY

NOTES:

1. PROPOSED CONTOURS REPRESENT TOP OF OVERBURDEN MATERIAL

Reference legend on Figure 2 Markup

NewFields

CLIENT: CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

PROJECT: VLF/OSA CLOSURE STUDY

TITLE: SQUAW GULCH OSA CLOSURE PLAN

FILENAME: 106.025.004F

FIGURE NO.: 4

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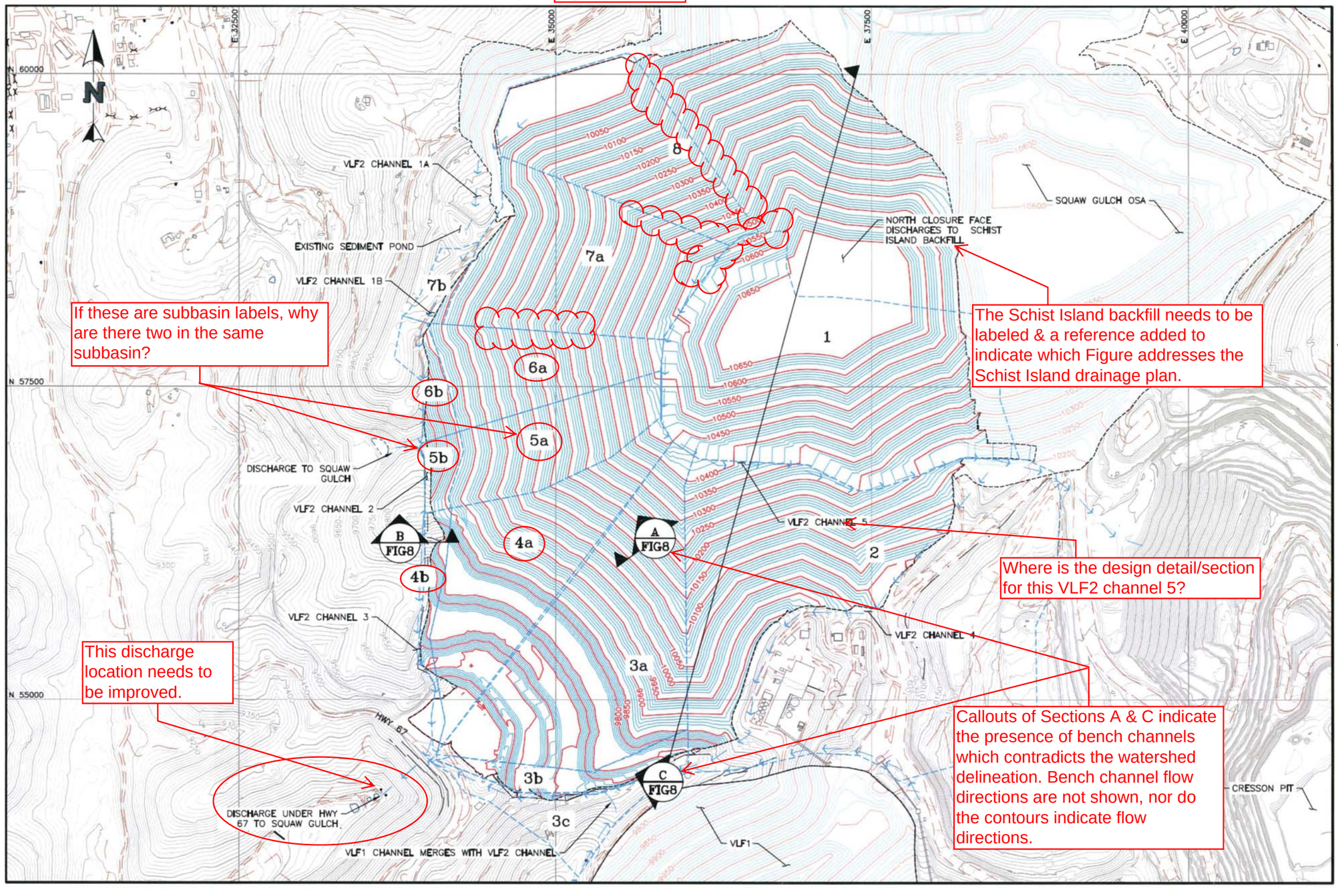
Figure 5 Markup



If these are subbasin labels, why are there two in the same subbasin?

The Schist Island backfill needs to be labeled & a reference added to indicate which Figure addresses the Schist Island drainage plan.

Where is the design detail/section for this VLF2 channel 5?

This discharge location needs to be improved.

Callouts of Sections A & C indicate the presence of bench channels which contradicts the watershed delineation. Bench channel flow directions are not shown, nor do the contours indicate flow directions.

LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED CLOSURE CONTOURS
- SECONDARY CLOSURE CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING POWERPOLE
- E_x EXISTING POWER LINE
- EXISTING CULVERT
- PROPOSED DIVERSION CHANNEL
- WATERSHED BOUNDARY

NOTES:

1. PROPOSED CONTOURS ARE TOP OF ORE STACKING SURFACE.

Reference legend on Figure 2 Markup

0 400 800 FEET

NewFields

CLIENT: CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

PROJECT: VLF/OSA CLOSURE STUDY

TITLE: VLF2 CLOSURE PLAN

FILENAME: 106.025.005F

FIGURE NO.: 5

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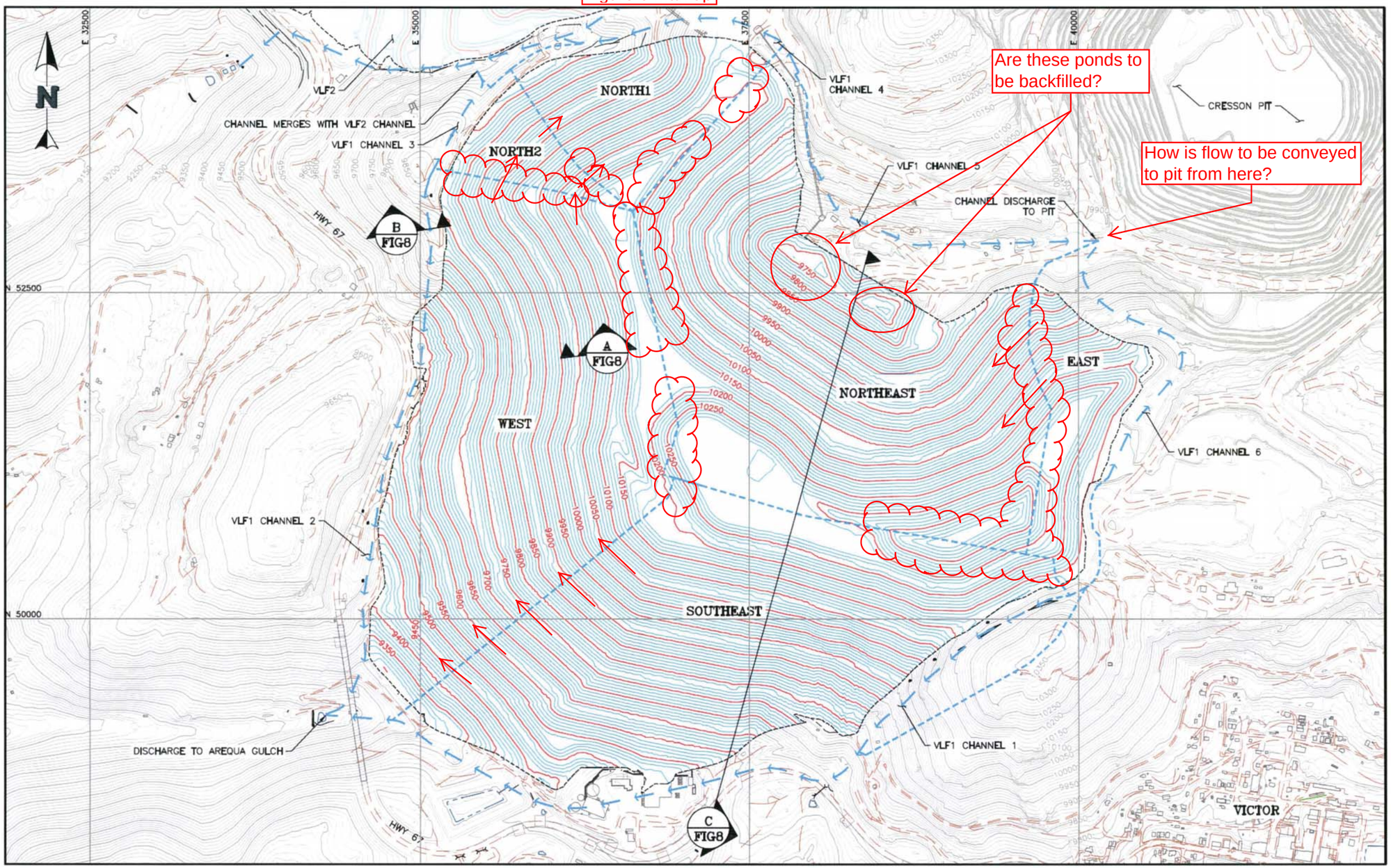
Figure 6 Markup



LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED CLOSURE CONTOURS
- CLOSURE CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING POWERPOLE
- E_x EXISTING POWER LINE
- EXISTING CULVERT
- EXISTING DIVERSION CHANNEL
- PROPOSED DIVERSION CHANNEL
- WATERSHED BOUNDARY

NOTES:

1. PROPOSED CONTOURS REPRESENT TOP OF OVERBURDEN MATERIAL.

Reference legend on Figure 2 Markup

P:\Projects\0106.035 ...\e Stormwater\A-CAD\FIGS\106.025.006F.dwg-11/1/2019 11:42 AM

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CLIENT CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

PROJECT VLF/OSA CLOSURE STUDY

TITLE VLF1 CLOSURE PLAN

FILENAME 106.025.006F

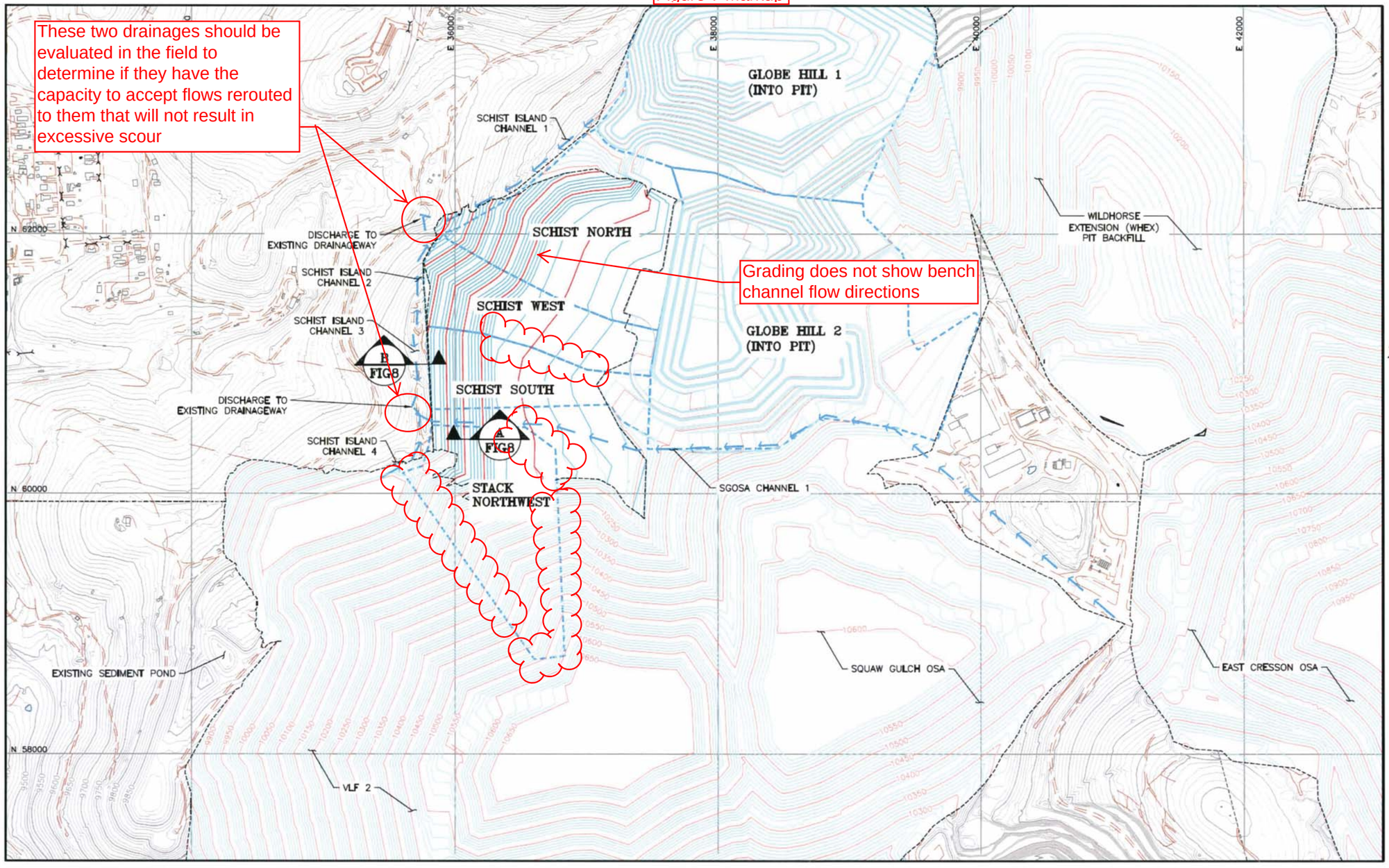
FIGURE NO. 6

REVISION 0

Figure 7 Markup

These two drainages should be evaluated in the field to determine if they have the capacity to accept flows rerouted to them that will not result in excessive scour

Grading does not show bench channel flow directions



LEGEND:

- EXISTING GROUND CONTOURS
- PROPOSED CLOSURE CONTOURS
- SECONDARY CLOSURE CONTOURS
- EXISTING ROADS/TRAILS
- EXISTING POWERPOLE
- E_x EXISTING POWER LINE
- EXISTING CULVERT
- PROPOSED DIVERSION CHANNEL
- WATERSHED BOUNDARY

NOTES:

1. PROPOSED CONTOURS ARE TOP OF ORE STACKING SURFACE.

0 400 800 FEET

Reference legend on Figure 2 Markup

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CLIENT CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

PROJECT VLF/OSA CLOSURE STUDY

TITLE SCHIST ISLAND PIT BACKFILL CLOSURE PLAN

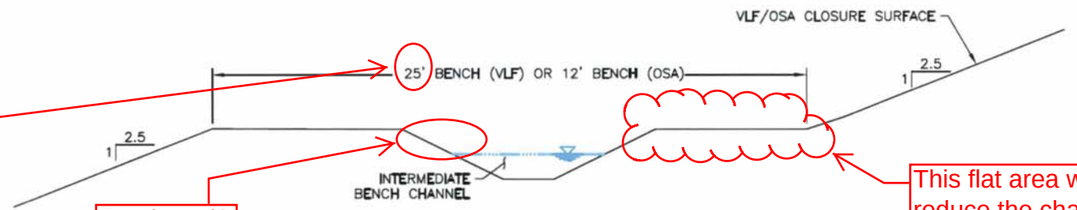
FILENAME 106.025.010F

FIGURE NO. 7

REVISION 0

Figure 8 Markup

Is it 24 ft or 25 ft?

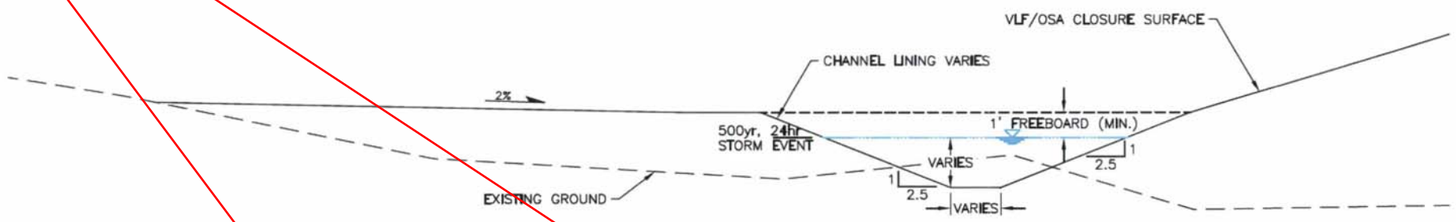


Freeboard?

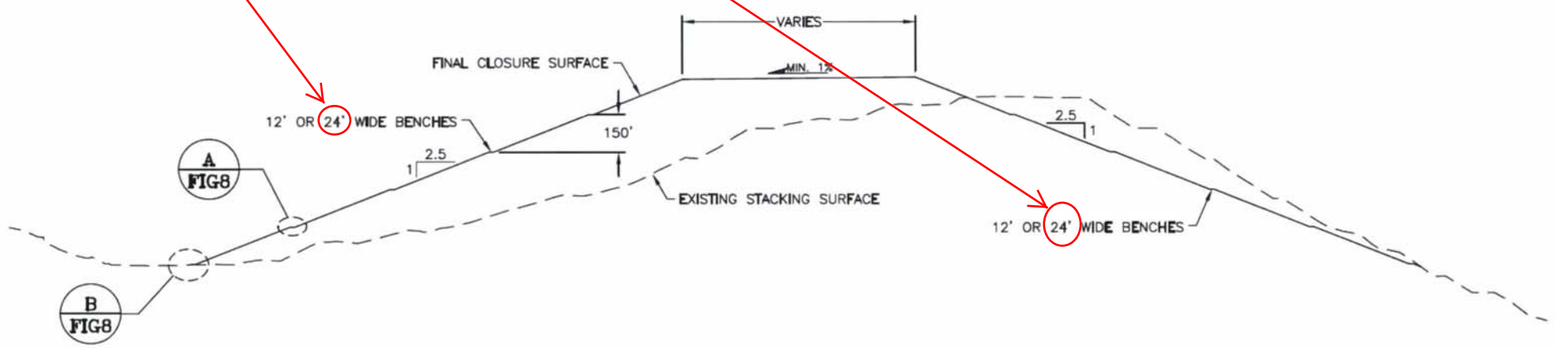
This flat area will erode due to the runoff energy and generate sediment to reduce the channel capacity. Move the channel adjacent to the uphill slope

A FIG2 A FIG3 A FIG4 A FIG5 A FIG6 A FIG7 A FIG8 TYPICAL ROCK CHECK DAM/BENCH CHANNEL

How does a rock check dam fit in here?



B FIG2 B FIG3 B FIG4 B FIG5 B FIG6 B FIG7 B FIG8 TYPICAL PERIMETER CHANNEL



C FIG2 C FIG3 C FIG4 C FIG5 C FIG6 TYPICAL VLF/OSA SECTION

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NewFields | CLIENT CRIPPLE CREEK AND VICTOR GOLD MINING COMPANY

PROJECT: VLF/OSA CLOSURE STUDY

TITLE: TYPICAL SECTIONS AND DETAILS

FILENAME: 106.025.008F

FIGURE NO.: 8

REVISION: 0