

### CONSTRUCTION NOTES

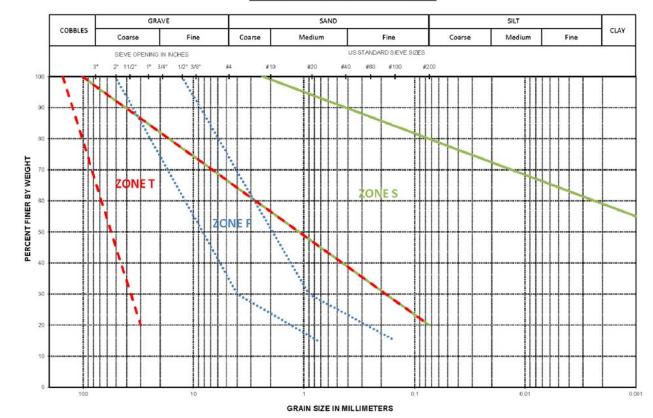
- 1. SITE PREPARATION
- i) The site preparation work shall be performed by experienced earthworks personnel, and shall be inspected by and completed to the approval of the field engineer. Proposed changes in the site preparation plan shall be discussed and agreed upon by the owner, contractor, AMEC Support Engineer, and AMEC's Principal Engineer prior to being undertaken.
- ii) All topsoil, organic material, and other unsuitable materials are to be removed from the foundation area, to expose the native foundation subgrade of dense glacial till, or bedrock. The subgrade shall be further excavated or proofrolled where deemed necessary by the AMEC Support Engineer.
- iii) Surface water shall be directed away from the foundation area of the dam prior to surficial soil stripping, to reduce the potential for water softening and weakening of the foundation materials by construction activity.
- 2. CUTOFF TRENCH CONSTRUCTION (SEE DWG. NO. 2013.07)
- The cutoff trench shall extend a minimum of 500 mm into the native glacial till, where the foundation (subgrade) glacial till is at least 2000 mm thick. Confirmation of the minimum 1500 mm basal till thickness below the base of the cutoff trench shall be conducted by soil probing, to the approval of AMEC's Support Engineer. Where the foundation basal till is less than 2000 mm thick, the cutoff trench shall extend to sound bedrock. Removal of highly fractured and/or weathered bedrock overlying the sound bedrock shall be conducted to the approval of the AMEC
- The cutoff trench shall have a minimum width of 2 m at its base, in the glacial till or in the sound bedrock. Where bedrock is encountered, the AMEC Support Engineer may direct that overburden be removed for the full 5 m width of the Zone S core.
- The cutoff trench walls shall slope up from the base elevation to the adjacent dam foundation level at a maximum slope of 1 H: 1 V (1 horizontal: 1 vertical) in the overlying foundation soils or weathered bedrock.
- Shallow groundwater seepage into the cutoff trench shall be controlled by temporary pumping or other measures, as required.
- The cutoff trenches for the Stage 9 dam extensions shall be keyed into the trench at the abutments of the Stage 8A dams to ensure that the cutoff is continuous and
- Where bedrock is encountered on steep abutment slopes, special considerations exist and special bedrock treatment measures may be required. At a minimum this will include removal of all residual soil to fully expose bedrock, excavation of relatively loose, diggable bedrock, and cleaning of the rock surface via high air and/or water pressure jetting. Subsequent to such preparation, the AMEC Support Engineer may designate placement of bentonite, shotcrete and/or dental concrete prior to till fill placement against the approved abutment surface.
- 3. BORROW MATERIAL SPECIFICATIONS, PLACEMENT, AND COMPACTION
- i) The cutoff trench key and Zone S shall be constructed of compacted, organic-free, well graded till.
- The till borrow material shall fall within the design grain size distribution envelope, and shall be placed at a moisture content between 1% dry of and 1% wet of Standard Proctor compaction optimum moisture content for the material.
- iii) Stockpiled borrow material that is moisture-sensitive should be protected from excessive wetting by smoothrolling the borrow pile surface to enhance water runoff. In situ borrow material should not be excavated or worked during periods of heavy rainfall or snowfall. Overly wet material shall be set aside or placed in a general fill dump area, and shall not be used in its overwet condition for construction.
- The glacial till structural fill shall be compacted by a 10-ton vibratory smooth drum compactor and uniform routing of haul truck traffic to a minimum dry density of 95% of the Standard Proctor maximum dry density. Construction compaction densities shall be determined in the field by MPMC field inspectors, and must be reviewed and approved by the AMEC Support Engineer as part of overall approval of the dam
- The maximum allowable loose lift thickness for the glacial till fill shall be established by the AMEC Support Engineer from the results of the field density testing. In any case, the maximum allowable loose lift thickness shall not exceed 300 mm.
- The surface of the existing, compacted till lifts shall be scarified to make rough, immediately prior to placement and compaction of the next lift of glacial till structural fill. Scarification should only be carried out for the areas that will be immediately covered. Moisture conditioning may be required for areas of the scarified surface
- vii) A granular wearing surface may be placed on the dam crest. Any such materia placed on the dam crest shall be removed, and wasted over the upstream crest of the dam, and any underlying frost-softened and/or overwet till removed, prior to subsequent dam raises. Area to be inspected by AMEC Support Engineer prior to placement of additional till lifts.

- 4. MATERIALS AND CONSTRUCTION TESTING Borrow materials testing shall be carried out by the AMEC Support Engineer
- and/or the AMEC soils laboratory in Prince George. Atypical or abnormal test results shall be reassessed by retesting of similar material (soil from the same general borrow soil source location).
- The intent of the borrow materials testing is to confirm that the proposed borrow soil is within the design material specifications for construction of the dam. Where the testing program identifies a zone or stockpile of proposed borrow soil that falls outside of one or more design specifications, that identified material shall not be used for construction of the dam without further review and approval by the AMEC
- The glacial till borrow material shall be tested for natural moisture content, and grain size at minimum frequency of one test suite per 10,000 m<sup>3</sup> of soil.
- Moisture-density (Standard Proctor) reference tests shall be performed at a minimum frequency of 1 test per biweekly for glacial till borrow soil.
- Compacted field density tests shall be performed on Zone S fill at a minimum frequency of 1 test per 100 linear m per compacted lift, throughout the thickness of the compacted lift being tested.
- Grain size analyses on sand and gravel filter material (Zone F) shall be conducted on samples obtained from the Zone F stockpile and from samples placed on the embankments. Test pits shall be excavated in Zone F by shovel to confirm that excessive segregation of Zone F material has not occurred.

### EMBANKMENT ZONE MATERIAL GRADATION AND PLACEMENT SPECIFICATIONS

EMBANKMENT ZONE	DESCRIPTION	MATERIAL TYPE	SPECIFICATIONS	SUBGRADE BASE PREPARATION	PLACEMENT AND COMPACTION	ON-SITE TESTING	OFF-SITE TESTING	SAMPLE COLLECTION SCHEDULE	SAMPLE SIZE
s	TILL CORE	GLACIAL TILL	Well graded till moisture content at ±1% of optimum. (See Gradation Envelope below)	Strip all topsoil and organic material. Excavate cutoff trench as per detail. (see Detail 1) Strip all frost softened and weakened soils, proof roll then scarify base soils.	Place, moisture condition and spread in maximum 300mm loose lifts.  Compaction with vibratory compactor and uniform routing of haul truck traffic to 95% of standard proctor maximum density.  Density tested min. once (1) per 100 linear m per lift.	Source Classification: Visual inspection of borrow material.  In-Place Testino: Visual inspection of zone dimension, and material.  ND Density Testing (D6938-10) Moisture Content (D2216-10)	Source Classification and In- Place Testing; Proctor (D698-07 / D4718-07) Alterberg (D421-07 / D4318-10) Hydrometer Gradation (D421-07 / D422-07) Sieve Gradation (D6913-09)	Source Classification: One (1) per blweekly per source or one (1) per 10,000 m² per source In-Place Testing: One (1) per offset blweekly per source or one (1) per 6,500 linear meters per source  Moisture Content: One (1) per 1000 linear meters per lift per day	Source Classification: Two (2) three-quarter (3/4) full five (5) gallon bucket, void of oversized rocks In-Place Testino: Two (2) three-quarter (3/4) full five (5) gallon bucket, void of oversized rocks Moisture Content: Minimum sample 700g
F	FILTER	SAND AND GRAVEL (NAG)	Sand and gravel sized material. Gap-graded material not acceptable. (See Gradation Envelope below)	Strip all frost softened and weakened soils. Expose previously placed material.	Place, and spread in maximum 900mm loose lifts. Compaction not required.	During Production/Transportation: Wash Sieve Gradation (C117-04 / C136-06)  During Placement: Frequent supervision and visual inspection to check that material gradation meets specification and that handling procedures do not result in excessive segregation.  Wash Sieve Gradation (C117-04 / C136-06)	During Production/Transportation: Wash Sieve Gradation (C117-04 / C136-06) In-Place Testing: Wash Sieve Gradation (C117-04 / C136-06)	During Production/Transportation: One (1) per 5,000 m³ per stockpile A duplicate sample for off-site testing one (1) per stockpile In-Place Testing: One (1) per placement event or one (1) per 2,500 linear meters A duplicate sample for off-site testing one (1) per 4,500 linear meters	During Production/Transportation: One (1) three-quarter (3/4) full five (5) gallon bucket, void of oversized rocks  In-Place Testing: One (1) three-quarter (3/4) full five (5) gallon bucket, void of oversized rocks
T	TRANSITION	FINE ROCKFILL (NAG)	Cobble and gravel sized material. (See Gradation Envelope below)	Strip all frost softened and weakened soils. Expose previously placed material.	Place, and spread in maximum 900mm loose lifts. Compaction by uniform routing of haul truck and spreading equipment.	In-Place Testinc: Wash Sieve Gradation (C117-04 / C136-06) 1 per 5000 m² material placed Confirmation of waste rock inertness, as required. Visual inspection of material size, compaction, preparation, and zone dimension.	In-Place Testing: Wash Sieve Gradation (C117-04 / C136-06)	In-Place Testing: one (1) per 5,000 m³ material placed. A duplicate sample for off-site testing one (1) per 10,000 m³	In-Place Testing: Three (3) bree-quarter (3/4) full five (5) gallon bucket
с	ROCKFILL	GENERAL ROCKFILL (NAG)	Specified as nominal 1m maximum particle size.	Strip all frost softened and weakened soils.  Scarify previously placed material.	Placed and spread in maximum 1200mm loose lifts.  Boulder-rich rockfill not to be placed adjacent to fine rock transition zone.	Confirmation of waste rock inertness, as required.  Visual in-place inspection of material size, preparation, and placement.	Not Applicable	Not Applicable	Not Applicable
u	UPSTREAM FILL	SELECT FILL	Cell construction is to be utilized. Constant reworking of the tailings is needed to ensure proper distribution within the cell.  If NAG waste rook is used: To be well-graded and maximum 0.5m diameter.	Not Applicable	Placement and compaction requirements to be determined based on material selection.  If NAG waste rock is used: Place, and spread in maximum 600mm loose lifts.	Not Applicable	Not Applicable	Not Applicable	Not Applicable

### EMBANKMENT ZONE MATERIAL GRADATION LIMITS



AS SHOW

VM005600

APRIL 2013

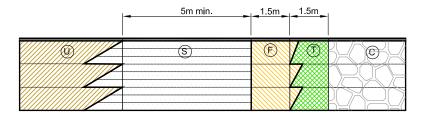
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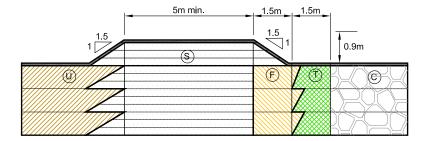
# **ISSUED FOR CONSTRUCTION**

NAD 83 NOTE: MOUNT POLLEY MINE TAILINGS STORAGE FACILITY MOUNT POLLEY MINING CORPORATION UTM ZONE 1 THIS DRAWING TO BE READ IN CONJUNCTION WITH THE STAGE 9 CONSTRUCTION MONITORING MANUAL, DATED APRIL 2013. STAGE 9 TAILINGS EMBANKMENT EVIEWED BY: AMEC Environment & Infrastructure amec **NOTES & SPECIFICATIONS** ISSUED FOR CLIENT REVIEW

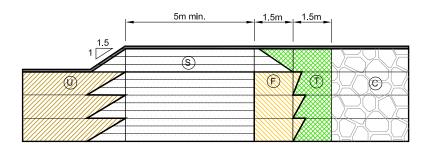
ISSUE/REVISION DESCRIPTION



### STEP 1



## STEP 2



## STEP 3

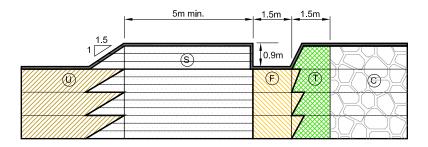


Upstream Fill S Till Core

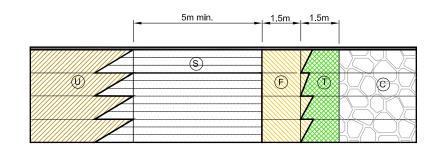


Transition Rock Fill





## STEP 4



## STEP 5

Zone U, S, F and C at similar elevations in preparation for continuing till placement.

Three 0.3 m lifts (maximum of 0.9-m total vertical thickness) of Zone S (compacted till) placed on embankment crest. Note: compacted till requires minimum crest width of 5-m centered on existing compacted till alignment.

Zone T (Transition NAG rockfill) placed adjacent to D/S till core with a maximum lift thickness of 0.9-m. Note: material adjacent to till crest should consist of fine NAG rockfill a minimum width of 3.0-m.

Remove Zone T and Zone S within the area designated as Zone F (sand and gravel filter). The till cut may be vertical with the transition NAG rockfill sloped at a minimum of 1:1.5 (H:V). The trench shall have a minimum width of 1.5-m at its base, with all overlying till and rockfill removed from the underlying sand and gravel filter. This will likely result in removal of some Zone F material from the previous lift.

The excavated trench shall be inspected by and completed to the approval of the MPMC Field Inspector before sand and gravel filter placement. Sand and gravel filter placement shall consist of a 0.9-m lift placed within the excavated trench and compacted with construction equipment. This will be monitored by the MPMC Field Inspector to check that segregation of the filter material is minimized. This will include hand-excavated test pits & sampling.

### NOTES:

- 1. PROPOSED CHANGES TO THE FOLLOWING CONSTRUCTION NOTES SHALL BE DISCUSSED AND AGREED UPON BY THE OWNER, CONTRACTOR, AMEC'S SUPPORT ENGINEER AND AMEC'S PRINCIPAL ENGINEER PRIOR TO BEING UNDERTAKEN.
- 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE STAGE 9 CONSTRUCTION MONITORING MANUAL, DATED APRIL 2013.

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ISSUE/REVISION DESCRIPTION



MOUNT POLLEY MINING CORPORATION

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MOUNT POLLEY MINE TAILINGS STORAGE FACILITY UTM ZONE 10 STAGE 9 TAILINGS EMBANKMENT EVIEWED BY:

NOTES & SPECIFICATIONS FOR VERTICAL FILTER CONSTRUCTION VM00560C

APRIL 2013

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**ISSUED FOR CONSTRUCTION** 

