29 April 2015

VM00482D.1.300

Copper Mountain Mine
P.O. Box 1400
Princeton, BC V0X 1W0

VIA EMAIL

Attention: Don Strickland
Mine Manager

Dear Mr. Strickland:

Re: Copper Mountain Mine Tailings Management Facility
Response to February 3, 2015 Ministerial Orders

INTRODUCTION

On February 3, 2015, the Chief Inspectors office of the BC Ministry of Energy and Mines (MEM) issued orders to all mines in BC related to the recent findings of the Expert Panel that was convened to examine the Mount Polley tailings dam breach which occurred on August 4, 2014. The ministerial order required that a letter of assurance be provided from each mine site to determine if the tailings facilities at each may be at risk due to:

1. Undrained shear failure of silt and clay foundations;
2. Water balance adequacy; or
3. Filter adequacy.

For Copper Mountain Mine (BC) Ltd. (CMML), the ministerial order applies to the two dams containing the Copper Mountain Mine (CMM) Tailings Management Facility (TMF), namely the East and West Dams. Thus CMML requested that Amec Foster Wheeler Environmental & Infrastructure (Amec Foster Wheeler), prepare such a letter of assurance in response to the ministerial order. This letter is intended to satisfy that request.

The most recent annual Dam Safety Inspection (DSI) was conducted in September 2014. The results of that inspection are described in the report titled “Tailings Management Facility – 2014 Dam Safety Inspection”, which was issued on November 7, 2014 (AMEC, 2014). Unlike previous years where the DSI and as-built conditions of the TMF were documented in a single annual review report, the 2014 as-built conditions were documented under separate cover in the report titled “Tailings Management Facility 2014 Annual Review & As-Built Report” which was issued on March 30, 2015 (Amec Foster Wheeler 2015). Detailed discussions pertinent to several aspects of this letter are documented in those two reports and will not be repeated herein. Rather, summary comments will be provided in order to address the ministerial orders with specific references made to the previous studies. The commentary presented in this letter is based upon the existing configurations of the East and West Dams with respect to the ministerial orders. For convenience, selected as-built drawings for the 2014 configuration of the TMF are appended to this letter.

The scope of this letter includes the following:

- A brief review of the project history and background as it relates to the TMF
- Section 1.0: a discussion on the impact of glaciolacustrine sediments
- Section 2.0: a discussion on water balance adequacy
- Section 3.0: a discussion on filter adequacy

For clarity, within Sections 1.0 to 3.0, the individual assessment requirements specified in the ministerial orders under each risk category are listed as subsection headings, and corresponding responses discussed therein.

To summarize this letter, the following statements are made regarding the Copper Mountain Mine TMF in the context of the ministerial orders of February 3, 2015:

1. A thin layer of glaciolacustrine clay was encountered in a single drillhole upstream of the East Dam starter dam and conservatively treated in design using residual strength parameters. No glaciolacustrine sediments have been encountered at the West Dam. The proposed dam designs meet the required factors of safety. Even so, additional investigations have been planned for 2015 to increase confidence in the current geological models and further delineate the extents and properties of the glaciolacustrine clay layer in support of the continued advancement to the ultimate dam configurations.

2. The TMF is currently operated with a net water balance deficit which relies on freshwater makeup from the Similkameen River to maintain the balance of process water needs. This allows CMML to consistently maintain a small reclaim pond, large above-water beaches and abundant freeboard at both dams well in excess of the design requirements.

3. The TMF dams are essentially homogenous sand fills that are inherently filter compatible with the tailings they retain. Internal erosion risks are mitigated by large above-water beaches and detailed foundation preparation and abutment contact prescriptions combined with regular quality control inspections.

The East and West Dams have been classified as "very high" based on the system outlined in the CDA guidance and have been designed to accommodate the maximum credible earthquake and probable maximum flood for both during operations and throughout the closure phase in accordance with recommendations presented in the 2014 Mining Dams Bulletin.

PROJECT DESCRIPTION AND CURRENT STATUS

The CMM, owned and operated by CMML, is located approximately 15 kilometers southwest of Princeton, south-central British Columbia. The project area is situated approximately 300 km east of Vancouver, at Lat. 49 20' N, Long. 120 31' W. Elevations at the site range from 770 m to 1300 m. The TMF is located in a small valley, which trends east-west and is bounded by the Similkameen River valley to the west and the Wolfe Creek valley to the east.

Open pit production mining and use of the TMF commenced in 1972. The mine continued to operate until November 1996 at which time operations were suspended due to market conditions. The mine and the tailings area had remained inactive until the mine was reactivated in 2011 after 15 years of inactivity.

The TMF incorporates two tailings dams located at the east and west ends of the valley. Initially, the dams were constructed using the centerline method of construction, with the cycloned sands and talus materials mechanically placed and compacted downstream of centerline. From 1980 to 1996, the dams were raised using both centerline and upstream construction methods with the cycloned sand being placed by direct deposition without compaction. By the end of 2014, both dams had been raised to El. 930 m which corresponds to an equivalent centerline height of about 125 m (Amec Foster Wheeler 2015).

The TMF is defined as a major impoundment with major dams under the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC). Both the East and West Dams were assigned a "very high" consequence classification rating during the 2011 TMF reactivation design under the 2007 CDA guidelines, based on the perceived "significant" environmental damages and "very high" economic losses associated with a hypothetical dam failure (AMEC, 2011). This was supported by the Dam Breach Inundation Study performed in 2011 and updated in 2013 (AMEC 2013c). The classification system remains unchanged following the 2014 CDA Mining Dams Bulletin. The responsibility for assigning and accepting Risk Classification rests with the owner, and has been subsequently concurred with by MEM.

Per the 2014 CDA Mining Dams Bulletin updating the guidelines for mining dams, the minimum limit equilibrium factors of safety (FoS) required for static loading conditions is 1.5. Under post-seismic conditions the required FoS is 1.2. Both the East and West Dams are stewarded to these targets. Additional discussion is provided in Section 1.0 (c) below on FoS predictions made on the basis of the current understanding of the TMF foundation conditions.

SECTION 1.0 - UNDRAINED SHEAR FAILURE OF SILT AND CLAY FOUNDATIONS

Of note is that the ministerial orders request an assessment with respect to potential undrained shear failure of silt and clay foundations. It is our understanding that the objective of this request is to ascertain if rapid contractant behaviour during shear (i.e. constant volume during shear leading to excess pore pressures and rapid reduction in effective stress or strength conditions) has been adequately considered in the design. Simply put, whether the potential presence of weak silt and clay foundation layers have been adequately addressed.

a) Including a determination with respect to whether or not similar foundation conditions exist below the dams on your site

Preliminary and detailed design studies for the reactivation of the TMF were conducted by AMEC throughout 2008 to 2011. In 2010, detailed site investigation and terrain hazard programs were performed to support the final reactivation design (AMEC 2011). Of particular significance in terms of the glacial history of the area and its influence on the foundation conditions for the TMF is the deposition of glaciolacustrine sediments within the Smelter Lake valley.

Prior to the initial construction of the TMF, near-surface deposits up to 15 m thick of soft silt were encountered along the edges of the original Smelter Lakes. These lacustrine sediments were interpreted to have been deposited during regional deglaciation. They are interpreted to be confined to within the footprint of the TMF upstream of both the East and West starter dams. Historical site investigations for the East and West Dams, as summarized by Klohn Leonoff (1990), reported no such sediments below and downstream of the starter dam embankments which were constructed near the lake edge in 1972. The 2010 drilling programs supported this assertion.

Given the glacial history of the area and the presence of high plastic glaciolacustrine varved clays at elevations up to 1,000 m on the banks of the nearby Similkameen Valley (Preto 1972)[1], there was the potential for the presence of undetected weak glaciolacustrine sediments (silts and clays) below the dams. As the 2010 mud rotary drilling refused on dense gravels and did not extend to bedrock in all areas, the possible presence of these clays could not be ruled out at that time. This led to the execution of the 2012 sonic drilling and instrumentation installation campaign, which identified a single occurrence (about 0.5 m thick) of glaciolacustrine varved clay within the sand and gravel sequence upstream of the East Dam starter dam in BH12-01E between El. 779.2 and 779.7 m (AMEC 2013). This glaciolacustrine silt and clay differed from the upstream lacustrine deposits identified during initial construction; the occurrence in

[1] Preto (1972) noted, in reference to Smelter Lake valley, and other similarly east-west oriented valleys to the east of the Similkameen River, “the nature and positioning of these valleys leave little doubt that they represent former meltwater channels which ran along a northward retreating ice front and drained glacial lakes to the south. During the Pleistocene, the entire region was buried by ice sheets of sufficient thickness to cover mountains now in excess of 2,600 m in height. Mountain tops in the area are generally subdued and well-rounded owing to glacial scour, and are mantled by till.

BH12-01E consisted of very stiff, pre-sheared silt and clay that is interpreted to be deposited prior to regional cover by glaciation, as it was encountered 25 m below the original ground surface, below a glacial till layer. However, it appeared this the glaciolacustrine silt and clay layer was discontinuous throughout the valley bottom and believed to have been eroded away by the higher energies associated with the later deposition of sands and gravels in the Wolfe Creek drainage (Matthews 1944)[2]. This was evidenced by the lack of glaciolacustrine sediments encountered in BH10-04E, BH10-05E, BH10-06E and BH12-02E downstream of the starter dam and closer to Wolfe Creek. Environmental groundwater monitoring wells installed separately by CMML in 2011 suggest the presence of a clay layer on the valley side slopes further down the Wolfe Creek valley in the lower gradient areas which further substantiates the conceptual model of a previously continuous glaciolacustrine layer locally eroded at the toe of the East dam by the higher energy flows associated with Wolfe Creek development and deposition. Drawing TMF.05 presents the interpreted geologic cross section which forms the current basis of the East Dam design.

To date no glaciolacustrine sediments have been encountered beneath the starter dam or downstream shell of the West Dam which is interpreted to be founded on a relatively thin veneer of sand and gravel overlaying competent bedrock. Drawing TMF.06 presents the interpreted geologic cross section which forms the current basis of the West Dam design.

b) Whether or not sufficient site investigation (drill holes, etc.) has been completed to have confidence in this determination

As shown on drawing TMF.03, the toe of the east dam is laterally constrained by bedrock cliffs within the relatively narrow Wolfe Creek valley. Since 2010, eight boreholes have been drilled into the foundation soils; two upstream of the starter dam (BH1E and BH12-01E) and six downstream of the starter dam (BH12-02E, BH10-04E, BH10-05E, BH10-06E, GW07, and GW14). The glaciolacustrine layer is interpreted to be discontinuous below the East Dam, only encountered upstream of the starter dam (at BH12-01E) and possibly downstream of the ultimate dam toe (at GW07), which is consistent with the observed behavior of the dam over the past 40 years and the monitored performance of the reactivated facility to date.

This toe of the West Dam is similarly constrained as shown on Drawing TMF.04 by the meandering bedrock hillsides. Since 2010 six boreholes have been drilled into the foundation of the West Dam without encountering glaciolacustrine sediments (BH12-01W, BH12-02W, BH10-01W, BH10-02W, BH10-04W, BH10-05W).

[2] Matthews (1944) summarized the late glacial history of the Princeton basin. As related by Preto (1972), it was characterized by the formation of ice-dammed lakes in the valleys of the Similkameen River (to the west of Smelter Lake valley) and Wolfe Creek (to the east of Smelter Lake valley). As the ice retreated northward, these lakes drained to the east via a series of gradually lowering spillways now marked by the east-west trending valleys such as Smelter Lake valley. Once the ice had fully disappeared, the northerly pattern of drainage was re-established, and post-glacial canyons such as that of the Similkameen were formed.

The level of investigation performed to date is considered to be commensurate with the understanding of the geologic variability of the site and scale of the facility. Where uncertainty exists, conservative assumptions have been made regarding the extent and continuity of glaciolacustrine sediments. As outlined in the TMF design report (AMEC, 2011), periodic investigation and instrumentation campaigns throughout the development of the facility are necessary to support the ongoing adoption of the observational approach to design in consideration of the "very high" dam classifications. As such, additional investigation and instrumentation installations have been planned for 2015 to refine the current geological models for both dams as discussed in Amec Foster Wheeler (2015).

c) If present, whether or not the dam design properly accounts for these materials

As discussed in the 2011 reactivation design and still asserted today, the upstream lacustrine deposits, on the basis of site investigations conducted to date, appear sufficiently confined such that, for the as-built and design ultimate configurations of the dams (i.e. to El. 997 m), they do not affect dam stability.

The effect of the deeper glaciolacustrine layer on the stability of the East Dam was assessed following the 2012 investigation campaign using the 2-dimensional limit equilibrium methods and the inclusion of a discontinuous weak glaciolacustrine layer. As noted above, the ministerial order focuses on the concept of undrained shear failure which is considered appropriate for normally consolidated clays or clays that once being over-consolidated, may now behave as normally consolidated due to the increased stress conditions associated with construction of large dam fills. As such, when performing slope stability calculations it is typical to apply a ratio of undrained shear strength (S_u) to the vertical effective stress (σ_v') or S_u/σ_v' to the clay in question if rapid undrained behaviour is expected.

As noted above, the geological history of the Copper Mountain area suggests significant glacial loading with the potential for pre-shearing within the glaciolacustrine layer. This was evidenced by a single slickenside in the sample recovered from BH12-01E indicating that slower drained residual strength behaviour will likely govern which is typically characterized by a drained residual strength friction angle (Φ'_r). It should be noted that when utilized in a slope stability analysis model, such as Slope/W for a horizontal sheared soil layer, as can be the case of glaciolacustrine deposits, there is an analytical equivalence between Φ' and S_u/σ_v'. For example, for a given effective stress or σ'_v using a $S_u/\sigma_v' = 0.21$ or a $\Phi'_r = 12°$ provides the same hypothetical shear strength level within the stability model for calculation of soil shearing resistance and it is important to understand the governing behaviour (i.e. drained or undrained) when selecting appropriate values of Φ' or S_u/σ_v'.

Stark and Eid (1994) present empirical correlations between liquid limit (LL), clay content, and secant residual friction angle (varying with pressure conditions). As noted by Martin et al (2002), the residual shear strength for the presheared glaciolacustrine foundation of the Kemess Mine tailings dam (LL = 60%, clay content = 65%) as determined from drained direct shear testing as $\Phi'_r = 10°$ matches very well with this correlation. The Mount Polley Mine tailings facility failure has been attributed to sliding through glaciolacustrine silt and clay present in the foundation (Morgenstern et al, 2015). Back calculations performed by the independent review panel yielded a S_u/σ_v' ratio of 0.23-0.27 in these sediments.

Using laboratory data from the 2012 Copper Mountain site investigation (LL = 60%, clay content = 37%) with the Stark and Eid correlation suggests a lower bound for the residual friction angle of 19° (analytically equivalent to a S_u/σ_v' ratio of 0.34) in the glaciolacustrine sediments due to the lower clay content than the other sites noted above. However, the glaciolacustrine at Copper Mountain has so far only been characterized from a single occurrence, and the laboratory testing performed did not discriminate between individual clay varves and potential coarser silt layers. Therefore, for the base case used in this 2015 stability update (AMEC 2015), a residual friction angle of 12° was conservatively applied to the entire glaciolacustrine layer rather than the lab correlated value of 19°. This equates mathematically to using a S_u/σ_v' of 0.21 which is lower than that back calculated for Mount Polley based on undrained failure conditions.

The design of the East Dam is predicated on two stability analysis sections as shown on Drawing TMF.03. Section A1 as shown on Drawing TMF.05, perpendicular to the dam crest, coincides with the section utilized in the detailed design stability sections (AMEC 2011) and the 2014 stability update (AMEC 2014). This design section was updated in 2015 to more accurately reflect the topography of the valley, namely the large bedrock hillside opposite Wolfe Creek that rises up from the toe of the dam. A second section (A2), aligned slightly oblique to the crest and oriented more to the north and downstream, was also analyzed. This section was chosen as it trends along the valley bottom. Despite not being the steepest section of the dam, it was assessed as it may represent a critical direction for potential movement due to the lack of passive buttressing afforded by the bedrock hillside. For the purposes of stability modeling, the glaciolacustrine layer was extended from BH12-01E to the upstream model limits in the foundation below the original Smelter Lake as a 4 m thick layer (conservatively assumed despite only encountered at 0.5 m thick in BH12-01E). For the sake of conservatism, the layer was extended to the downstream as far as BH12-02E, a sonic borehole drilled to bedrock where glaciolacustrine clay was absent.

The resulting FoS predictions for the East Dam indicate that for discontinuous glaciolacustrine layer with a S_u/σ_v' ratio of 0.21 (analytically equivalent to a residual strength friction angle of 12°), a static FoS of 1.5 is maintained for both the proposed 2015 crest elevation and the ultimate dam configuration which meets the target FoS as per CDA guidance (Amec Foster Wheeler 2015). Sensitivity analysis on the strength and continuity of the glaciolacustrine layer also suggests that continuity in the foundation has a significant effect on the calculated FoS. However, it is noted that even for the worst conceivable case, with several layers of conservatism (i.e. a continuous glaciolacustrine layer despite known absences, very low residual strength values below empirically derived values, entirely normally consolidated and hydrostatic pore pressures despite observed downward gradients, and no consideration of 3D effects), a static FoS of 1.2 is still maintained in all cases. The required post-seismic FoS of 1.2 is achieved for both the proposed 2015 crest elevation and the ultimate dam configuration under the loading from the Maximum Credible Earthquake (MCE). The MCE is defined as a magnitude 7.0 (M7) seismic event, with an associated peak (horizontal) ground acceleration (PGA) of 0.38g.

To date no glaciolacustrine sediments have been encountered beneath the starter dam or downstream shell of the West Dam which is interpreted to be founded on a relatively thin veneer of sand and gravel overlaying competent bedrock. As noted by Amec Foster Wheeler (2015), in both static and post-seismic analyses, critical slip surfaces for the West Dam represent shallow sliding surfaces within the outer cyclone sand shell, for both the proposed 2015 and ultimate dam configurations maintaining a FoS at or above the target of 1.5. Post-seismic stability analyses for the West Dam satisfy the target FoS of 1.2 under the loading of the MCE.

d) If any gaps have been identified, a plan and schedule for additional sub-surface investigation

As previously noted, additional investigation has been planned for 2015 to further delineate the extents of the glaciolacustrine layer encountered upstream of the East Dam starter dam and increase confidence in the current geological model (discontinuous glaciolacustrine layer) which forms the basis for the East Dam design. Although glaciolacustrine sediments have not been encountered to date at the West Dam, additional drill holes have been planned to further validate its absence and gain additional understanding of the foundation stratigraphy to inform design decisions. Additional piezometers will be installed at both dams to supplement the existing network and support the continued use of the observational approach to design and construction. The proposed 2015 investigation locations are also shown on Drawings TMF.03 and TMF.04.

SECTION 2.0 - WATER BALANCE ADEQUACY

The catchment providing runoff into the tailings impoundment is relatively limited. That, along with the relatively dry climate of the area, results in a net annual water deficit (i.e. total inflows < total outflows). As such, under average conditions, no discharge of surplus water from the impoundment is required which is consistent with historical operating experience. Further, no runoff diversions are required to minimize runoff inflows to the impoundment.

For every cubic meter of process water discharged with the tailings into the impoundment, approximately 0.75 cubic meters is available for reclaim to the process plant and 0.25 cubic meters of water is lost to seepage, inter-particle void spaces and evaporation. Thus additional freshwater must be drawn from the Similkameen River in order to balance the process water requirements. Reclaim pumping operations are managed in conjunction with freshwater pumping to maintain a stable supernatant pond volume of about 1.0 to 1.5 million cubic meters which provides sufficient clarification capacity to achieve the water quality requirements of the process plant. The supernatant pond accounts for about 60-80 ha or roughly half of the total impoundment surface area (about 140 ha at El. 930 m), and its level and extent are monitored regularly. The remainder of the impoundment consists of large above water tailings beaches at both dams.

a) Including the total volume of surplus mine site water (if any) stored in the tailings storage facility

This is not applicable as surplus water is not stored in the TMF due to the net water balance deficit. Nonetheless, a supernatant pond volume of about 1.0 to 1.5 million m^3 is maintained by the combined reclaim/freshwater pumping operations.

b) The volume of surplus mine water that has been added to the facility over each of the past five years

This is not applicable as surplus water is not stored in the TMF due to the net water balance deficit. However, CMML's water balance indicates that the supernatant pond volume could be increased to a maximum of roughly 2.0 million m^3 using make-up water from various site sources as necessary to offset seepage and seasonal losses. Nonetheless, CMML has advised that its current water management strategy is to maintain a smaller operational water pond fluctuating seasonally from 1.0 to 1.5 million m^3, as this lesser volume is expected to be sufficient for maintaining the reclaim water needs of the milling process while maximizing available freeboard and dam safety.

c) Any plans that are in place or that are under development to release surplus mine water to the environment

As noted above, a small supernatant pond is maintained to meet milling requirements with no requirement to release ponded water to the environment due to an overall water balance deficit. Thus no plans for release are required or being developed at this time.

d) Recommended beach width(s), and the ability of the mine to maintain these widths

As outlined in the TMF OMS Manual (AMEC, 2013d), the effective beach width (also called, Beach Above Water) across the dam, defined as the distance between the dam crest and the closest approach of the reclaim water pond, was set to be more than 100 m and 300 m for the East and West Dams, respectively. CMML consistently maintains beaches well in excess of these requirements as noted in the 2014 DSI where the beaches for the East and West Dams were measured at greater than 300 and 600 m, respectively.

e) The ability of the TSF embankments to undergo deformation without the release of water (i.e. the adequacy of the recommended beach width)

The design of the TMF essentially consists of a well-drained homogeneous cycloned sand embankment with no internal thin structural elements such as a low permeability core or chimney filter/drainage system. Refer to Drawings TMF.05 and TMF.06. This design section combined with the very wide above water beaches and substantial freeboard allowance (roughly 10 m at the end of 2014) provide ample flexibility for the system to accommodate deformations without the risk of release of the relatively small operating water pond.

f) Provisions and contingencies that are in place to account for wet years

As per the CDA (2007) guidelines, for a “very high” consequence rating in the absence of an emergency spillway during operations, the dams are required to safely contain, without release, the runoff associated with an inflow design flood (IDF) corresponding to 2/3 between the 1:1000 year flood and the Probable Maximum Flood (PMF). However, as an added measure of conservatism, the TMF is designed and constructed to safely contain the PMF at all times. This IDF corresponds to a consequence classification of “extreme”, the most stringent rating in the CDA guidelines.

During operations, as the tailings facility is progressively raised, there will not be an open channel emergency spillway to route extreme inflow events. Freeboard and dam staging considerations during operations are based on shorter duration (high intensity) runoff events. Thus, IDF capacity to accommodate the entire PMF (derived from the 72-hour Probable Maximum Precipitation [PMP = 473 mm] which results in an inflow volume of 2.5 million m^3 within a 3 day period based on a runoff coefficient of 1.0) represents the minimum acceptable flood storage capacity (AMEC 2011). The IDF corresponds to an approximately 2 m rise in the level of the free water pond.

Freeboard for the dams accommodates the routed (or stored) inflow from the IDF, and additional freeboard above that IDF pond level to account for wind set-up and wave run-up, as per CDA guidelines. The design minimum freeboard is 2 m above the appropriate IDF pond level.

The installed reclaim water pumping capacity (about 3,200 m^3/hour, or 76,800 m^3/day) and net water balance deficit would allow the surplus water associated with longer duration events of lower intensity, such as the 1:100 wet year to be removed throughout the year. This could be achieved during active tailings discharge by increasing reclaim pumping and reducing seepage return and/or the draw of freshwater from the Similkameen River to the mill process.

g) If any gaps have been identified, a plan and schedule for addressing these issues

No gaps have been identified with respect to water balance adequacy.

SECTION 3.0 - FILTER ADEQUACY

a) Including the beach width and filter specifications necessary to prevent potential piping

The design of the TMF represents a permeable mass barrier and essentially consists of a well-drained homogeneous cycloned sand embankment which is directly filter compatible with the total tailings that it retains. The dam does not contain any internal structural elements that would be prone to internal erosion such as a low permeability core. That being said, the historical dam does include a starter dam composed of random fill as well as a short talus chimney drain and sand and gravel drainage blanket below the downstream shell. These elements were constructed in the 1970’s and there is little construction information available. However, available as-built cross sections and discussion provided by Klohn Leonoff (1989) indicates that the coarse chimney drain talus rockfill was separated from the cycloned sand with a layer of filter fabric and that the talus underdrainage system was covered with a “processed” sand and gravel filter. Highly pervious talus deposits along the abutments downstream of the dam centerlines were also covered by a “sand and gravel filter blanket to prevent piping of cycloned sand into the talus” which was then connected to the main valley bottom drainage system. Going forward, the dam raise construction methodology employs similar foundation and abutment preparation prescriptions to safeguard against internal erosion including placement of filter sand and gravel over highly pervious zones as needed based on detailed inspections of prepared sand contact areas. These prescriptions are outlined in the TMF OMS Manual.

As noted above, the beach width guidelines for the TMF have been set to be more than 100 m and 300 m for the East and West Dams, respectively, in order to provide phreatic surface control through the dam shell in the absence of a constructed seepage barrier. These large beach widths inherently limit seepage gradients, thereby limiting internal erosion potential. However this is not a controlling design issue given the homogeneity of the dam design section.

b) Whether or not the filter has been constructed in accordance with the design

Detailed construction documentation for the historic dams are not available, however the available records indicate that the previous drainage element designs are in keeping with modern filter design practice. Although not conclusive evidence, it is also important to note that there has been no indication of internal erosion through the foundation or abutments in the past 40+ years.

c) If any gaps have been identified, a plan and schedule for addressing these issues

No gaps have been identified with respect to filter compatibility.

CLOSING REMARKS AND LIMITATIONS

This letter was prepared by Andrew Witte, P.Eng. and reviewed by Dr. Ed McRoberts, P.Eng. We trust that this meets your current needs regarding the February 3, 2015 ministerial orders.

The conclusions presented herein are based on a technical evaluation of the findings of the work noted. If conditions other than those reported are noted during subsequent phases of the project, Amec Foster Wheeler should be notified and be given the opportunity to review and revise the current conclusions, if necessary.

This letter has been prepared for the exclusive use of Copper Mountain Mine (BC) Ltd. for specific application to the area within this letter. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. Amec Foster Wheeler accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this letter. It has been prepared in accordance with generally accepted soil and tailings dam engineering practices. No other warranty, expressed or implied, is made.

Please contact the undersigned at (604) 295-3264 should you have any questions or wish to discuss any aspects of this letter.

Respectfully submitted,

Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited

Original paper copies signed and sealed by
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AW/EM/jvp

Attachments:

- List of References
- Drawings TMF.02, TMF.03, TMF.04, TMF.05, and TMF.06

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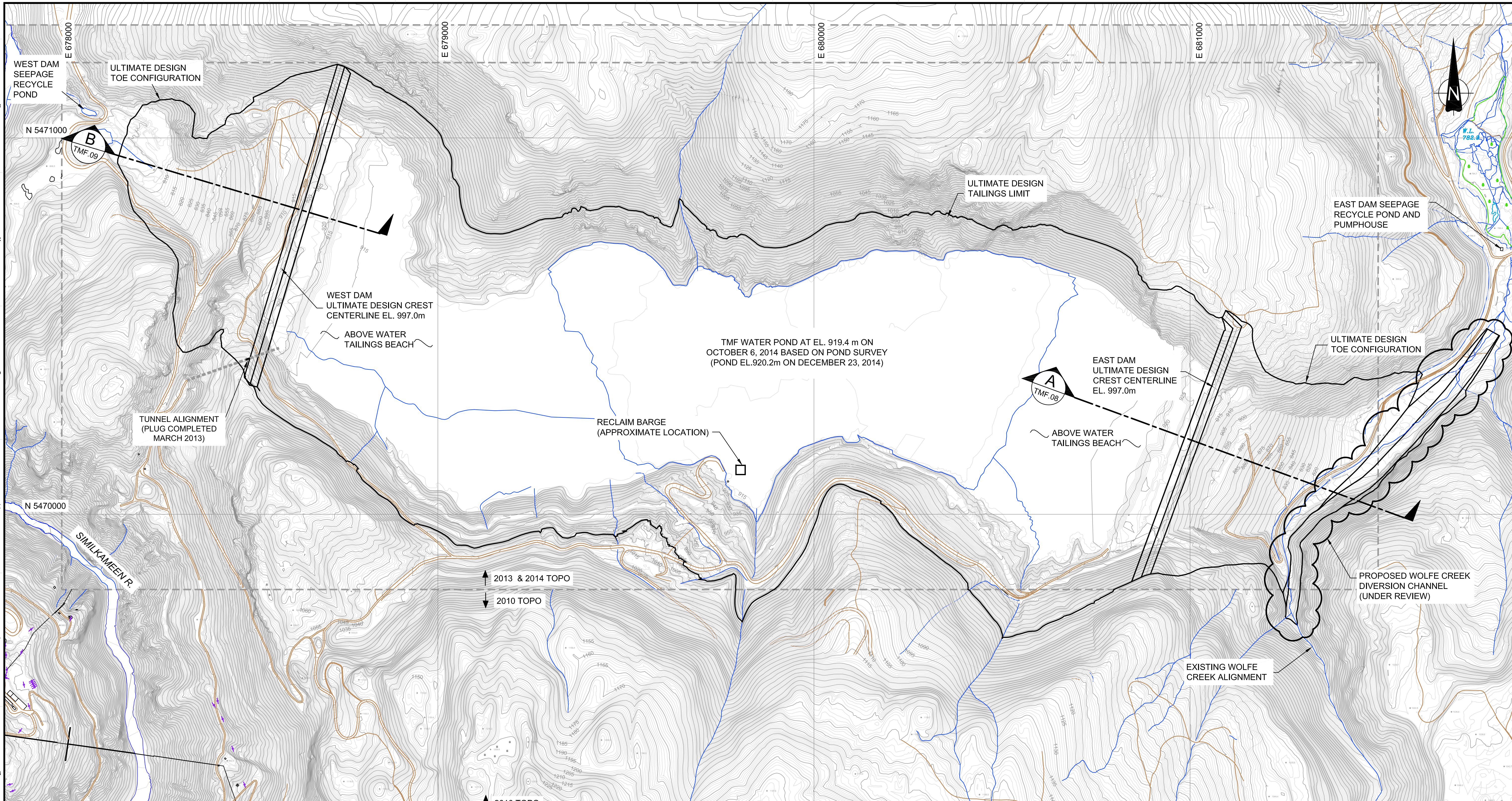


NOTES:

1. GENERAL TOPOGRAPHIC CONTOURS ARE BASED ON A COMPOSITE OF 2007, 2010 AND OCTOBER 2013 AIRBORNE GEOMATICS SURVEYS PROVIDED BY CMML. DETAILED CONTOURS OF DAM CRESTS BASED ON NOVEMBER (EAST DAM) AND DECEMBER (WEST DAM) 2014 SURVEY PROVIDED BY CMML.

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE REPORT "2014 ANNUAL REVIEW AND AS-BUILT" DATED MARCH 2015.

0m 100 200 300 400

SCALE (m)

ISSUED FOR CONSTRUCTION

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
6						
5						
4						
3						
2	28	03	2015	ISSUED FOR CONSTRUCTION	MH	AW
1	28	03	2014	ISSUED FOR 2014 CONSTRUCTION	MM	AW
0	31	03	2013	ISSUED FOR 2013 CONSTRUCTION	MM	AW

Client Logo: COPPER MOUNTAIN MINE

Client: COPPER MOUNTAIN MINE (BC) LTD.

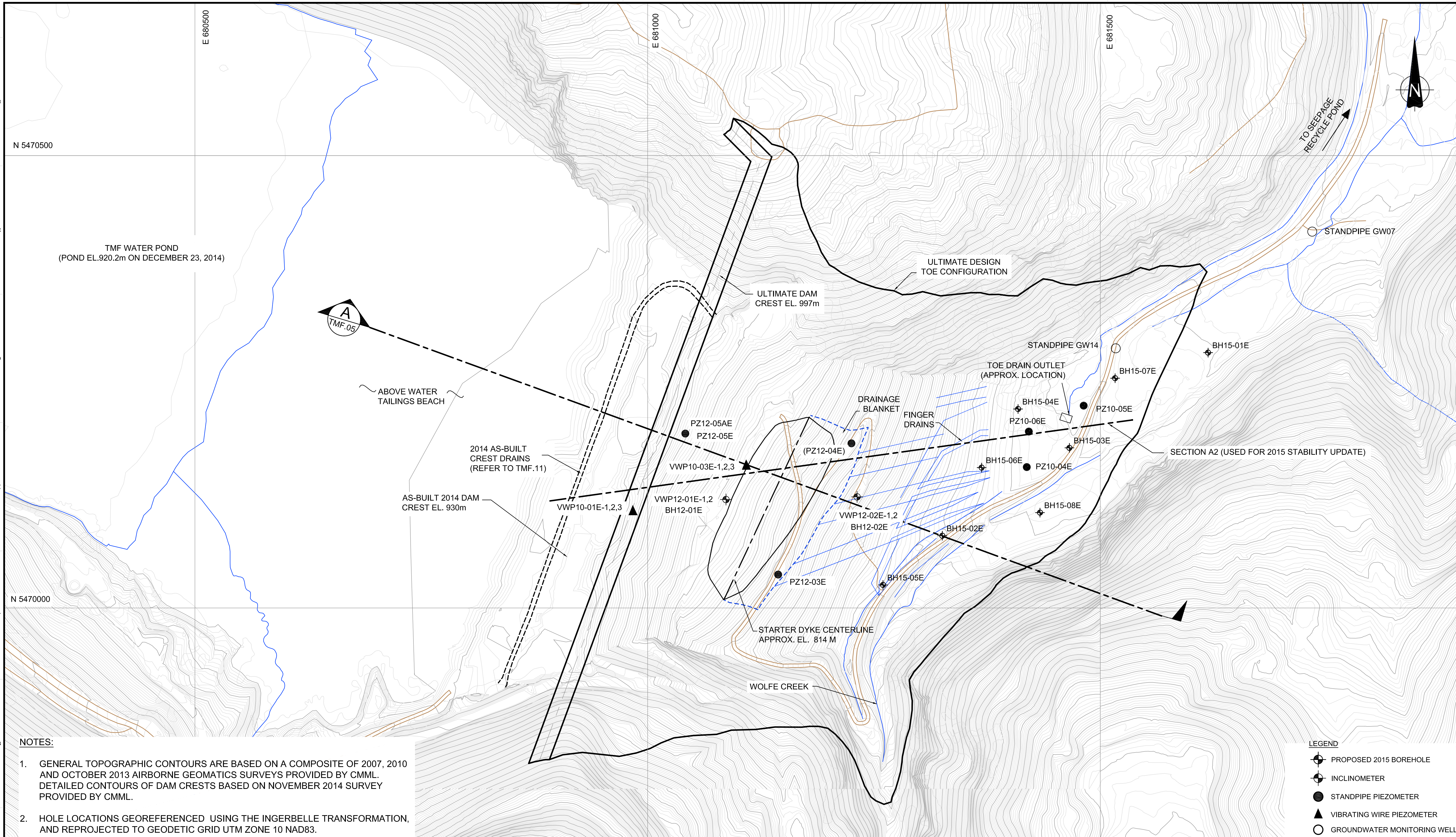
Amec Foster Wheeler
Environment & Infrastructure
Suite 600 - 4445 Lougheed Highway, Burnaby, BC V5C 0E4
Tel. 1-604-294-3811 Fax 1-604-294-4664

DRAWN BY:	YC
CHECKED BY:	AW
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	AS SHOWN

PROJECT: COPPER MOUNTAIN MINE TAILINGS MANAGEMENT FACILITY

TITLE: TMF GENERAL ARRANGEMENT

DATE:	MARCH 2015
PROJECT NO:	VM00482D.1.200
REV. NO:	2
DRAWING NO:	TMF.02
SHEET NO:	1 of 1



NOTES:

1. GENERAL TOPOGRAPHIC CONTOURS ARE BASED ON A COMPOSITE OF 2007, 2010 AND OCTOBER 2013 AIRBORNE GEOMATICS SURVEYS PROVIDED BY CMML. DETAILED CONTOURS OF DAM CRESTS BASED ON NOVEMBER 2014 SURVEY PROVIDED BY CMML.
2. HOLE LOCATIONS GEOREFERENCED USING THE INGERBELLE TRANSFORMATION, AND REPROJECTED TO GEODETIC GRID UTM ZONE 10 NAD83.

LEGEND

- PROPOSED 2015 BOREHOLE
- INCLINOMETER
- STANDPIPE PIEZOMETER
- VIBRATING WIRE PIEZOMETER
- GROUNDWATER MONITORING WELL

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE REPORT "2014 ANNUAL REVIEW AND AS-BUILT" DATED MARCH 2015.

0m 40 80 120 160

SCALE (m)

ISSUED FOR CONSTRUCTION

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
8						
7						
6						
5						
4	28	03	2015	ISSUED FOR CONSTRUCTION	MH	AW
3	28	03	2014	ISSUED FOR 2014 CONSTRUCTION	MM	AW
2	31	03	2013	ISSUED FOR 2013 CONSTRUCTION	MM	AW

Client Logo:

COPPER MOUNTAIN MINE

Client:

COPPER MOUNTAIN MINE (BC) LTD.

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DRAWN BY:	YC
CHECKED BY:	AW
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	AS SHOWN

PROJECT:
COPPER MOUNTAIN MINE
TAILINGS MANAGEMENT FACILITY

TITLE:
EAST DAM INSTRUMENTATION PLAN

DATE:	MARCH 2015
PROJECT NO:	VM00482D.1.200
REV. NO:	2
DRAWING NO:	TMF.03
SHEET NO:	1 of 1

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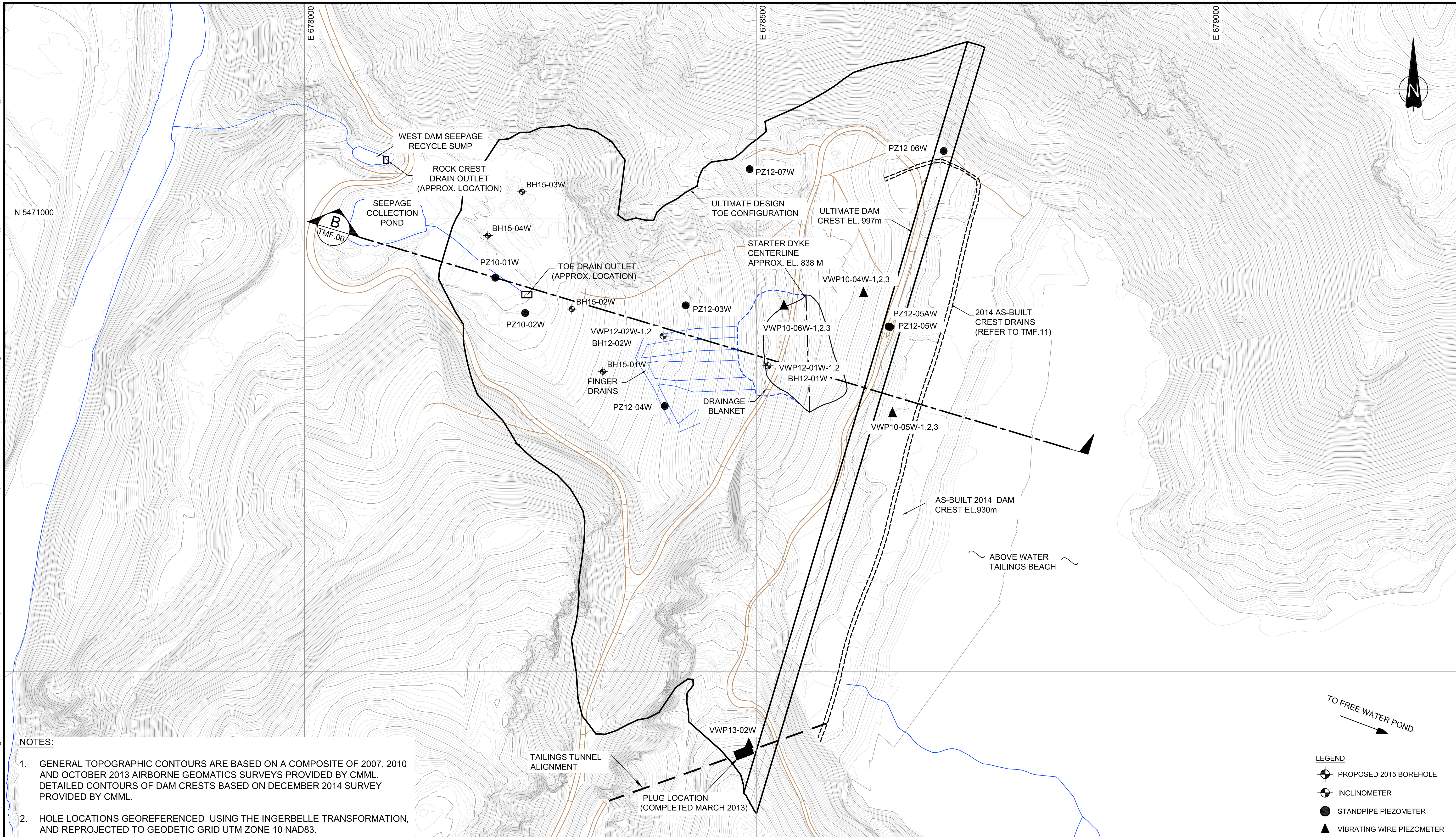

NOTES:

1. GENERAL TOPOGRAPHIC CONTOURS ARE BASED ON A COMPOSITE OF 2007, 2010 AND OCTOBER 2013 AIRBORNE GEOMATICS SURVEYS PROVIDED BY CMML. DETAILED CONTOURS OF DAM CRESTS BASED ON DECEMBER 2014 SURVEY PROVIDED BY CMML.
2. HOLE LOCATIONS GEOREFERENCED USING THE INGERBELLE TRANSFORMATION, AND REPROJECTED TO GEODETIC GRID UTM ZONE 10 NAD83.

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE REPORT "2014 ANNUAL REVIEW AND AS-BUILT" DATED MARCH 2015.

SCALE (m): 0m 40 80 120 160

ISSUED FOR CONSTRUCTION

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
6						
5						
4						
3						
2	28	03	2015	ISSUED FOR CONSTRUCTION	MH	AW
1	28	03	2014	ISSUED FOR 2014 CONSTRUCTION	MM	AW
0	31	03	2013	ISSUED FOR 2013 CONSTRUCTION	MM	AW

Client Logo: COPPER MOUNTAIN MINE

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DRAWN BY:	YC
CHECKED BY:	AW
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	AS SHOWN

PROJECT: COPPER MOUNTAIN MINE TAILINGS MANAGEMENT FACILITY

TITLE: WEST DAM INSTRUMENTATION PLAN

DATE:	MARCH 2015
PROJECT NO:	VM00482D.1.200
REV. NO:	2
DRAWING NO:	TMF.04
SHEET NO:	1 of 1

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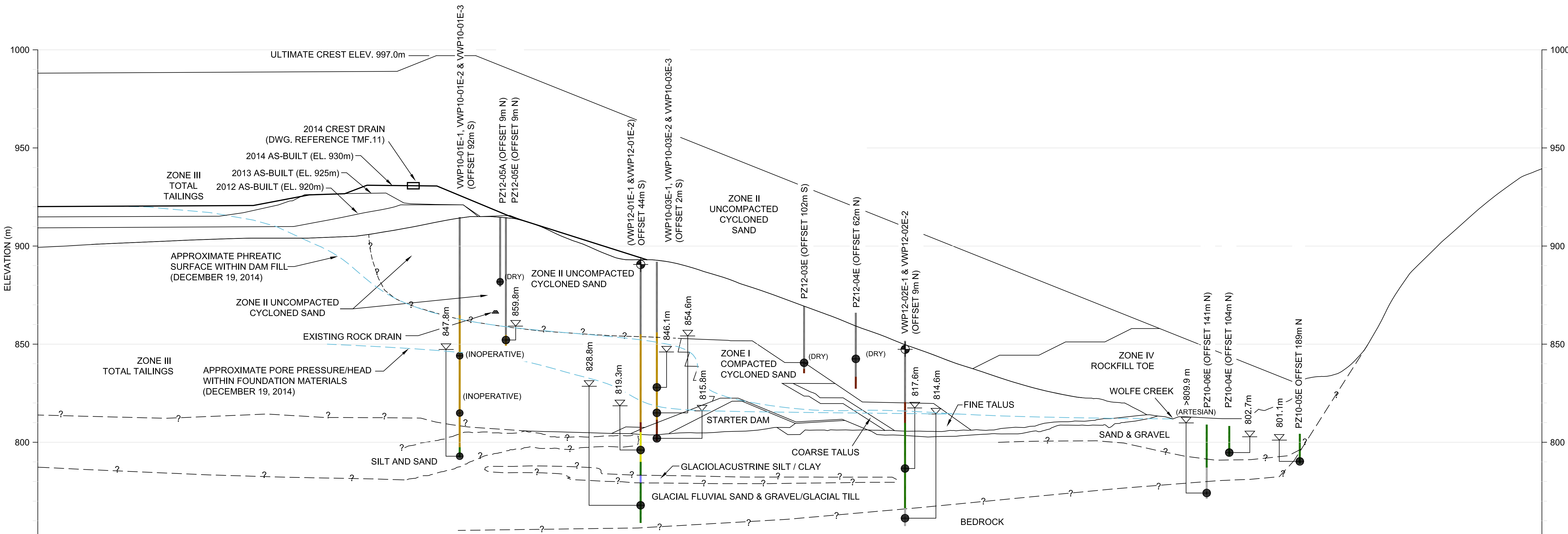

SECTION A TMF.03

LEGEND

- PIEZOMETER TIP/SCREEN
- (846.1m) END OF DECEMBER 19, 2014 PIEZOMETER READING
- INCLINOMETER
- FINE TALUS/DAM FILL
- CYCLONED SAND
- TOTAL TAILINGS
- GLACIOFLUVIAL
- GLACIOLACUSTRINE
- GLACIAL TILL
- BEDROCK

NOTES:

1. FOR 2014 PIEZOMETER READINGS AND THRESHOLD LIMITS IN EAST DAM, REFER TO TABLE 6.2 OF "2014 AS-BUILT REPORT" DATED MARCH 2015.
2. 2014 INCLINOMETER READINGS AND THRESHOLD LIMITS ARE PROVIDED IN APPENDIX - C AND TABLE 6.4 OF "2014 AS-BUILT REPORT" DATED MARCH 2015.

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE REPORT "2014 ANNUAL REVIEW AND AS-BUILT" DATED MARCH 2015.

0m 20 40 60 80
SCALE (m)

ISSUED FOR CONSTRUCTION

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
3	28	03	2015	ISSUED FOR CONSTRUCTION	MH	AW
2	28	03	2014	ISSUED FOR 2014 CONSTRUCTION	MM	AW
1	31	03	2013	ISSUED FOR 2013 CONSTRUCTION	MM	AW

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DRAWN BY:	YC
CHECKED BY:	AW
DATUM:	NAD 83
PROJECTION:	UTM Zone 10
SCALE:	AS SHOWN

PROJECT: COPPER MOUNTAIN MINE TAILINGS MANAGEMENT FACILITY

TITLE: EAST DAM INSTRUMENTATION SECTION

DATE:	MARCH 2015
PROJECT NO:	VM00482D.1.200
REV. NO:	1
DRAWING NO:	TMF.05
SHEET NO:	1 of 1

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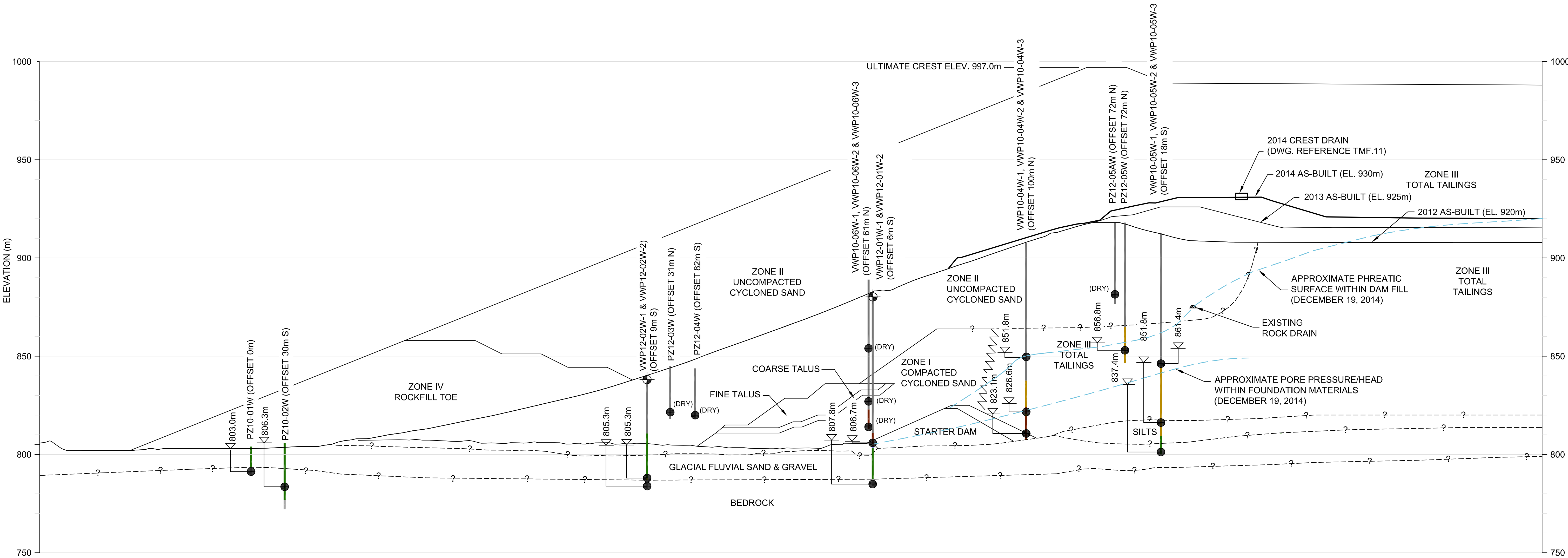

SECTION B TMF.04

LEGEND

- PIEZOMETER TIP/SCREEN
- (846.1m) END OF DECEMBER 19, 2014 PIEZOMETER READING
- INCLINOMETER
- FINE TALUS/DAM FILL
- CYCLONED SAND
- TOTAL TAILINGS
- GLACIOFLUVIAL
- GLACIOLACUSTRINE
- GLACIAL TILL
- BEDROCK

NOTES:

1. FOR 2014 PIEZOMETER READINGS AND THRESHOLD LIMITS IN WEST DAM, REFER TO TABLE 6.3 OF "2014 AS-BUILT REPORT" DATED MARCH 2015.

2. 2014 INCLINOMETER READINGS AND THRESHOLD LIMITS ARE PROVIDED IN APPENDIX - C AND TABLE 6.4 OF "2014 AS-BUILT REPORT" DATED MARCH 2015.

NOTE: THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE AMEC FOSTER WHEELER ENVIRONMENT & INFRASTRUCTURE REPORT "2014 ANNUAL REVIEW AND AS-BUILT" DATED MARCH 2015.

0m 20 40 60 80
SCALE (m)

ISSUED FOR CONSTRUCTION

REV	D	M	Y	ISSUE / REVISION DESCRIPTION	ENG.	APPR.
3	28	03	2015	ISSUED FOR CONSTRUCTION	MH	AW
2	28	03	2014	ISSUED FOR 2014 CONSTRUCTION	MM	AW
1	31	03	2013	ISSUED FOR 2013 CONSTRUCTION	MM	AW

Client Logo: COPPER MOUNTAIN MINE

Client: COPPER MOUNTAIN MINE (BC) LTD.

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DRAWN BY: YC
CHECKED BY: AW
DATUM: NAD 83
PROJECTION: UTM Zone 10
SCALE: AS SHOWN

PROJECT: COPPER MOUNTAIN MINE
TAILINGS MANAGEMENT FACILITY

TITLE: WEST DAM
INSTRUMENTATION SECTION

DATE: MARCH 2015
PROJECT NO: VM00482D.1.200
REV. NO: 1
DRAWING NO: TMF.06
SHEET NO: 1 of 1