NEW AFTON PROJECT

TAILINGS AND WATER MANAGEMENT FACILITIES

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

SAF-PLAN-001

Rev No.	Date	Rev Description	Approver
V2012-01	June 2012	Creation of TSF EPRP	Dennis Wilson
V2014-01	March 31 2014	2014 Update to EPRP	Rod Tyreman

March 2014

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1. INTRODUCTION

This Emergency Preparedness and Response Plan (EPRP) serves to establish a clear emergency response structure, specific to the New Afton Tailings Storage Facility (TSF). New Afton plans for and responds to emergency situations that could cause significant harm to people or the environment. In planning for emergencies, New Afton has developed a list of potential emergency situations and works cooperatively to ensure adequate response capabilities in case of an incident.

This plan details the conditions or events that indicate existing or potential emergencies, provides a means of identifying an existing or potential emergency, outlines procedures for assessing the severity and magnitude of an existing or potential emergency, and designates the persons(s) responsible for identifying and evaluating the emergency and activating the emergency response. By executing the preparedness and response plan, the following emergency response goals can be achieved:

- Tailings personnel will be accounted for and located. Unaccounted for personnel will be identified
- Emergency operations for the orderly recovery of trapped or injured personnel will be initiated
- Expertise in critical disciplines will be assigned and key responsibilities defined
- Communication requirements internal and external to the tailings operation will be initiated
- A team will be established to handle phases of the emergency response as they develop.

Additionally, this plan lists and classifies site-specific warning signs with reference to potential tailings and water management facility failure modes or emergencies—from both structural failure and failure due to environmental impacts. EPRP training, testing, and updating guidelines are also included to ensure uniformity across the organization.

The EPRP is developed as an evolving document that will be improved upon through drills and review by key personnel.

1.1. Policy Directive

Ongoing input is required in the following areas to ensure the EPRP is effective.

- Utilize the existing emergency communications system, and incorporate it into use by the Tailings Operations Team for rapid response to situations by establishing the Command Center to manage the emergency
- Continually assess tailings personnel needs based on crew size, shift rotation, normal work area (tailings personnel may be in a muster station and unavailable), and availability of off-site resources
- Incorporate the EPRP into the New Afton site Crisis Management Plan
- Incorporate other emergency scenarios in the plan as appropriate
- De-brief and review any time after the Emergency Procedures are activated, whether it is a planned drill or a real emergency
- Identify areas for improvement and implement immediately.

1.2. Application

This EPRP will apply to all New Afton employees, contractors, partnerships and visitors. It is important to have a consistent/harmonized approach between this plan and the EPRP for Underground and Surface. Key focus will be to align all emergency management programs/processes to provide resources and tools to assist and encourage compliance to emergency policies.

1.3. Document Control

New Afton's TSF EPRP will be reviewed on a yearly basis and following any emergency, spill, incident or emergency simulation exercise. The reviews will ensure that the EPRP is consistent with current best management practices in the field of emergency response and spill management. This review will involve a de-briefing to allow the assessment and documenting of what went right, what went wrong, and what changes should be implemented to improve the performance/outcome. Furthermore, the updating process provides a mechanism that allows for timely adjustments to the EPRP (outside of the annual review), if required, as the circumstances at the mine site evolve.

The Safety Manager (and Safety Department) and Mill Manager are responsible for updating the EPRP annually. The list of personnel on the Emergency Response Teams is the responsibility of the Safety Department. The Safety Department will maintain and update the communication hierarchy and the Contact List of all the appropriate site and company personnel.

All changes to the plan are to be accompanied by a revised title page showing the latest revision date as well a revision summary page. Revisions are to be forwarded to all personnel on the primary distribution list. Outdated copies are to be returned to Safety Department for disposal. Each new hardcopy is to include an updated distribution list on its cover. If changes to the EPRP are minor or involve only one section, to minimize waste, only those sections relevant to the changes need be distributed with instructions for replacement of the out-dated sections. In all cases, whether complete or partial replacement of the hard copy, the revised title page with the latest revision date and the revision summary page are required.

2. PROGRAM MANAGEMENT

2.1. Leadership and Commitment

New Afton senior management is committed to provide leadership and assume overall responsibility, accountability and authority for the EPRP. The EPRP Coordinator shall be appointed and authorized to develop, implement, administer and keep the Plan current. The EPRP Advisory Committee will provide guidance and advice to improve the program. The Advisory Committee shall include the EPRP Coordinator and others who have the expertise, knowledge of the TSF and the capability to identify resources from all functional areas. Consideration should be given to include other stakeholders and community representation.

2.2. Program Administration

The TSF EPRP shall have a document process that includes:

- An established Plan that clearly states goals and objectives;
- An established Plan that clearly states processes and procedures;
- An emergency preparedness budget;
- A records management process to demonstrate conformity; and
- A review process for continuous improvement.

2.3. Legal and Regulatory

The TSF EPRP shall comply with all applicable legislation, policies, regulatory requirements, and directives as required by the Environmental Management System (EMS) Standard - Legal and Other Requirements.

3. ROLES AND RESPONSIBILITIES

It is critical that roles and responsibilities are clearly defined if an emergency occurs. The Tailings Facility Operations Team must set up the Incident Command center and follow the duty cards for each assigned responsibility. The Incident Commander is in charge of all aspects of the rescue and recovery operation and all personnel assigned by the Incident Commander will report directly to him/her.

3.1. EPRP Management Organization Chart

The following organizational charts shown in Figure 3-1 provide a responsibility and reporting framework for the EPRP.

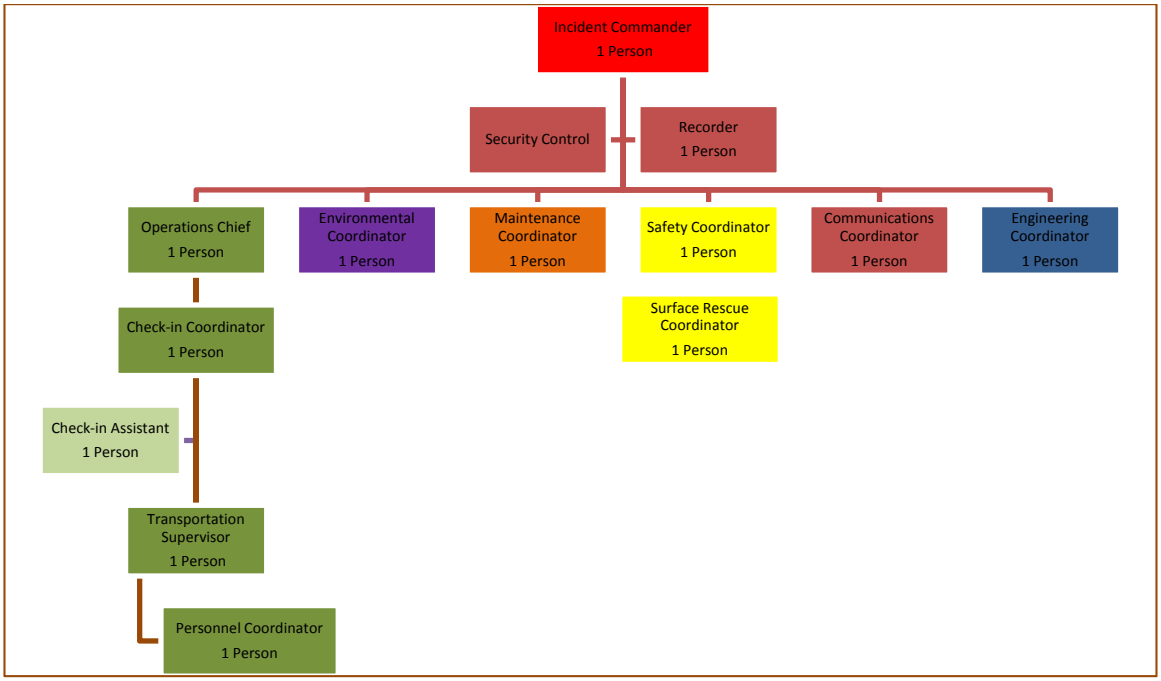

Figure 3-1. New Afton Tailings Facility Emergency Response Organization

3.2. TSF/Surface Emergency Roles and Responsibilities

Refer to Section 11 for duty cards listing the primary responsibilities of key members of the Emergency Response Team:

Duty cards and assignments, for the following, can be found in Section 11:

- Incident Commander
- Security Control
- Recorder
- Operations Chief
- Check-In Coordinator
- Check-In Assistant
- Transportation Supervisor
- Personnel Coordinator
- Environmental Coordinator
- Maintenance Coordinator;
- Safety Coordinator
- Surface Rescue Coordinator
- Communications Coordinator
- Engineering Coordinator.

3.3. Organizational Structure

The organizational structure for the New Afton tailings operations is illustrated by the following organizations flowchart, Figure 3-2 and Figure 3-3. The New Afton/New Gold personnel associated with the positions referenced within each organizational flow chart, can be found in Section 3.4.1. The responsibilities of each position are discussed in Section 3.4.

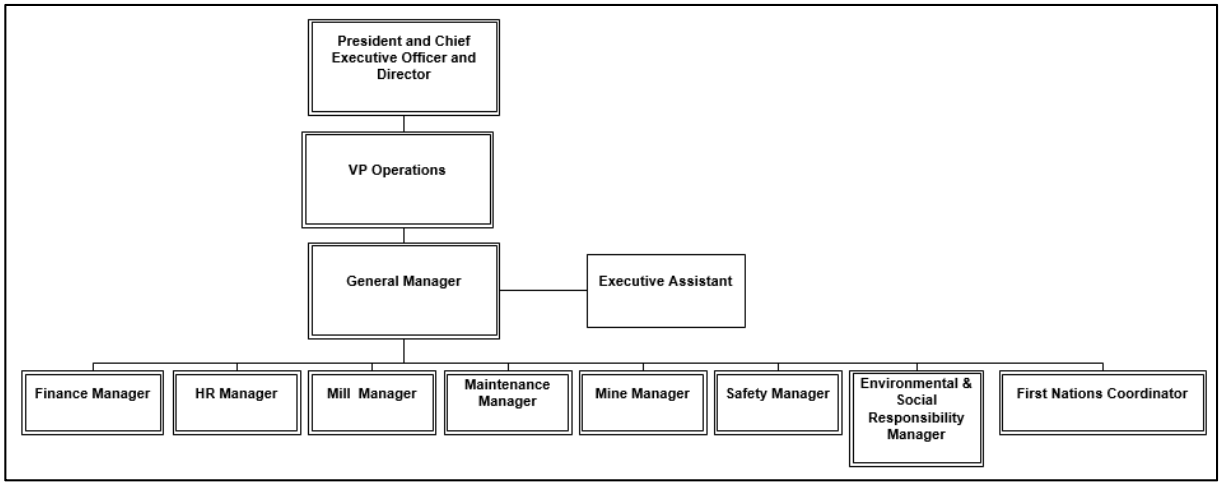

Figure 3-2. Executive/Management Hierarchy Flowchart

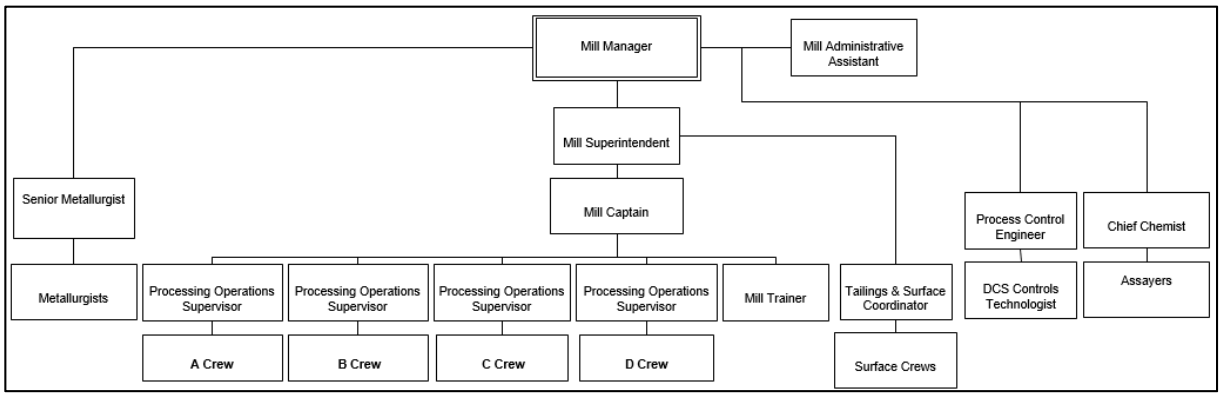

Figure 3-3. Mill Operations Flowchart

3.4. Management/Personnel Roles and Responsibilities

Mill Manager will:

- Contact Engineer of Record in case of emergency;
- Review and approve the EPRP;
- Ensure preparedness activities are performed and equipment is maintained;
- Ensure drills are conducted and testing occurs; and
- Participate, as required, in all emergency response exercises and drills.

Health and Safety Manager will:

- Ensure that Emergency Response Team is adequately trained and resourced in case of an emergency;
- Ensure that the EPRP is current and communicated to personnel; and
- Oversee EPRP planning and management in conjunction with Mill Manager.

Department Managers will:

- Assist the Emergency Response/Safety Advisor in identifying all reasonable emergency situations with their department during the annual department review; and

- Participate, as required, in all emergency response exercises and drills.

Environmental Department will:

- Coordinate community consultation or engagement activities in the case of tailings emergency;
- Carry out all monitoring that may be associated with an emergency (water, soil or instrumentation)
- Review revision/update requests and participate in an annual review of the EPRP; and
- Participate, as required, in all emergency response exercises and drills.

Tailings Personnel will:

- Maintain emergency preparedness equipment; and
- Participate, as required, in all emergency response exercises and drills.

3.4.1. Contact Information

The contact information, for the positions listed in Section 3.3, can be found below in Table 3-1. BGC Engineering is the Engineer of Record for the TSF, and the contact information for BGC can be found below in Table 3-2.

Table 3-1. New Afton Contact Information

Position	Name	Phone Number	Radio	Mobile	Email
Environmental Manager	Scott Davidson	+1 250 377 2785	[redacted]		Scott.Davidson@newgold.com
Finance Manager	Bryan Swanton	+1 250 377 2740			Bryan.Swanton@newgold.com
First Nations Coordinator	Candy-Lea Chickite	+1 250 377 2718			CandyLea.Chickite@newgold.com
General Manager	Kurt Keskimaki	+1 250 377 2751			Kurt.Keskimaki@newgold.com
HR Manager	Vacant				
Maintenance Manager	John Ritter	+1 250 571 2039			John.Ritter@newgold.com
Mill Manager	Rod Tyreman	+1.250.377.2712			Rod.Tyreman@newgold.com
Mine Manager	Sean Masse	+1 250 377 2779			Sean.Masse@newgold.com
Safety Manager	Kevin Mihalicz	+1 250 377 2770			Kevin.Mihalicz@newgold.com

Table 3-2. BGC Engineering Contact Information

Position	Name	Phone Number	Mobile	Email
Engineer of Record	Clint Logue	604-684-5900 Ext. 41106	[redacted]	clogue@bgcengineering.ca
Project Director	Warren Newcomen	604-684-5900 ext. 40206		wnewcomen@bgcengineering.ca

4. FACILITY OVERVIEW

In accordance with the Canadian Dam Association (CDA, 2007), dams have specific EPRP requirements. New Afton's TSF dams have a rating of "Very high" consequence. This section discusses New Afton's plan which has been developed to provide a systematic means to:

- Identify emergency conditions threatening a dam;
- Expedite effective response actions to prevent failure; and
- Reduce loss of life and property damage should failure occur.

4.1. Facility Components and Infrastructure

The principal facility components of the mine site to be addressed in this manual are the New Afton TSF dams (Starter Dam A, B, and C, West Dam and South Dam), Main Tailings Pond and the Pothook Pit Dam and Tailings Pond. Other components include the following:

- Tailings beaches
- Impoundment area
- Dust control systems
- LLDPE Geomembrane Liners
- Primary and Secondary cyclones
- Diversion ditches
- Seepage collection ponds and water return system
- Tailings pipeline
- Reclaim water barge, pumps and pipeline
- Reclaim water storage tanks
- Monitoring instrumentation and wells
- Roads and Fences
- Power supply.

The following sections provide a brief description of the various containment structures at the New Afton TSF and the Pothook Pit TSF. Containment of the New Afton TSF is provided to the west by Starter Dam A and B, to the north by Starter Dam C, and to the south and southeast by the West Dam and South Dam, respectively. Design sections of the dams, and plan general arrangements, are provided in Appendix A. A selection of photographs of each structure are provided in Appendix B.

There is no spillway associated with the New Afton TSF, as the facility is designed to store the Inflow Design Flood (IDF) defined by the 24-hour Probable Maximum Precipitation (PMP). A spillway will likely be incorporated into the design later during mine life.

4.1.1. Dam A, B and C

The New Afton TSF is contained to the west and north by three separate starter dams, Starter Dam A, B and C. The starter dams, comprising compacted till, were constructed with 2H:1V upstream and 3H:1V downstream slopes and a maximum height of 10 m, to an elevation of 5735 m (mine grid), between April 27, 2011 and November 8, 2011 under Vector's supervision as the engineer-of-record (EOR). The dams were constructed of compacted glacial till borrowed from within the basin and surrounding areas. A key way was also constructed into till foundations. The starter dams were built into topographic highs between Starter Dam A and B, and between Starter Dam B and C.

The 2013 construction activities for the New Afton TSF consist of foundation preparation activities as well as Phase 1 Fine Filter, Coarse Filter and Upstream Cyclone Sand shell construction to elevation 5735 m (mine grid). Downstream mechanically placed Cyclone Sand construction was undertaken at Dam A only, and was not completed to elevation 5735 m (mine grid). Collectively these activities were carried out between July 15 and November 20, 2013.

The starter dam foundations at New Afton comprise approximately 50 % till and 50 % waste rock. The portion of the TSF underlain by waste rock, deposited and compacted during the mining of the Afton Pit, required a linear low-density polyethylene (LLDPE) geomembrane liner to provide containment. Therefore, Dam C and a portion of Dam B, as well as the area between Dam B and C is lined (Vector, 2008 and Ausenco, 2012). The LLDPE geomembrane liner was installed by Western Tank and Lining Ltd. in conjunction with starter dam construction. The liner was reportedly installed with 150 mm bedding layer, and keyed into existing till foundation (Vector, 2008 and Ausenco, 2012). A Layfield LP10 or equivalent geotextile liner is installed along the downstream toe between Dam B and C where a waste rock foundation is present.

Starter Dam A is approximately 240 m in length, Dam B is approximately 520 m in length and Dam C is 860 m in length. The starter dams will be raised throughout the mine life to form a single Ultimate Dam. The proposed Ultimate Dam will be approximately 2 km in length and up to 40 m high, with a crest elevation of 5765 m (mine grid). Where till foundations are present, the dam will comprise a centerline raised till core with Cyclone Sand upstream and downstream shells, a filter (chimney drain) separating the till core and the downstream Cyclone Sand shell, and a basal drainage/filter blanket along the base of the downstream Cyclone Sand shell. Where waste rock foundations are present, a 60-mil LLDPE geomembrane liner will be utilized in favour of a raised till core. The compacted till core / LLDPE liner

controls seepage through the dam, while the blanket drain allows for adequate drainage. The crest width of the dam will remain constant at 20 m throughout the construction, from starter dam to build-out.

Two different filter configurations are required depending on the foundation conditions. For dam sections on till foundation (Dam A and part of Dam B), a blanket drain comprising a 2 m thick layer of Coarse Filter underlying a 1 m thick layer of Fine Filter is required. Where waste rock foundations are present (part of Dam B and Dam C), the blanket drain comprises 1 m thick layer of Coarse Filter underlying a 1 m thick layer of Fine Filter. In all locations, the dam will include a chimney filter comprising a 2 m thick Fine Filter zone located directly downstream of the compacted till core. The dam cross sections are shown in the IFC drawings in Appendix A.

4.1.2. South and West Dam

The New Afton TSF is contained to the south and southeast by the West Dam and South Dam, respectively. The South and West Dams were built to the ultimate containment elevation of 5765 m between April 27, 2011 and November 8, 2011 under Vector's supervision as the EOR. The South and West Dams include a compacted till core and key way constructed into till foundations, with upstream and downstream filters and waste rock shells. The waste rock shells were constructed with 2H:1V upstream and 3H:1V downstream slopes and a maximum height of 20 m and 23 m, to their ultimate elevation of 5765 m, respectively for the South Dam and West Dam.

The South Dam is 200 m long and the West Dam is 280 m long. Containment is also provided by a topographic high between the dams. These dams have be completed, and no further construction is planned.

4.1.3. Pothook Pit Dam and Spillway

The Pothook Pit and Dam will also provide tailings containment throughout mine life, and are located to the northwest of the New Afton TSF. The Pothook Dam was constructed between October 8 and December 6, 2008 to an ultimate containment elevation of 5730 m, under Vector's supervision as the EOR. The Pothook Dam comprises a rockfill dam with a central compacted till core separated by filters. A smooth 60-mil LLDPE liner was installed on the upstream face of the dam in 2011 in response to seepage beneath the dam. The Pothook Pit Dam is 430 m long, and containment is provided to the south by natural topography.

A spillway was also constructed in the northeastern portion of the facility. Based on the Vector design (Vector, 2008) the spillway invert elevation is 5729.5 m, and is 0.5 m deep, and 20 m wide, with 5H:1V side slopes as shown in the Vector Pothook report (Vector, 2009). The emergency spillway design has the capacity to safely pass the 1000-year Probable Maximum Flood (PMF) without overtopping of the dam crest. To date, the water level in the Pothook TSF has not been high enough to flow over the spillway.

4.2. Dam Emergency Occurrence and Action Guidelines

A reference directory of occurrences and emergency actions to be taken if needed specific to the Tailings Dams is found in Table 4-1.

Table 4-1. Dam Emergency Occurrence and Action Guidelines

Occurrence →	Overtopping	Wave erosion	Embankment Slides	Eroding Flows	Outlet Failure	Mass Sliding	Embankment Saturation	Spillway Backcutting	Embankment Settlement	Loss of Abutment	
Emergency Action ↓											
Hydraulic											
Lower Water Level	X	X	X	X	X	X	X		X	X	
Increase outlet flows	X			X				X			
Controlled Breach	X										
Sandbags (increase freeboard)	X		X								
Plug leak entrance				X	X					X	
Close outlet					X						
Erosion Control											
Sandbags	X	X						X			
Riprap	X	X						X			
Weight toe area			X	X							
Operations											
Inspect		X	X	X	X	X			X	X	
Monitor	X		X	X	X	X	X		X		
Repair & maintain					X	X		X		X	
Emergency notification	X					X		X		X	
Operate at reduced level		X	X	X	X	X	X	X	X		

4.3. Inundation Plan

Inundation mapping is not proposed for Dams A, B, and C due to the immediately available downstream barrier to off-property flows offered by the New Afton open pit. Drawing NA-RB-03-06, in Appendix A, illustrates the potential flow paths of fluid if there was a release of fluid from the facility. The New Afton Pit provides sufficient capacity to store any potential release from the New Afton TSF. A release from either Dam A or B is expected to report to the existing Teck TSF, which includes both a retention dam and an emergency spillway leading to the New Afton Pit. Releases from Dam A or B are most likely to flow through the Teck spillway to the New Afton Pit. Although considered unlikely, the potential exists for a large release from Dam A or B to impact the safety of the downstream Teck TSF, thus it is recommended that release, or imminent danger of release, from Dam A or B be included in the New Afton TSF EPRP with the same assigned actions as a Teck TSF release, and that the downstream inhabitants (i.e. the Cherry Creek Estate community) be evacuated.

4.4. Liquefaction Potential

Liquefaction refers to the sudden loss of shear strength of soil due to a rapid increase of pore-water pressure, which causes the soil to behave as a fluid. The integrity of the TSF can be compromised in the event of liquefaction. Vector Engineering Inc. (Vector) completed a liquefaction assessment, and

details of this assessment are documented in a report entitled *Design Report for the Tailings Storage Facility at the New Afton Gold and Copper Mine* (Vector, 2008). The liquefaction analyses indicated that some of the waste rock materials within the dam footprints may be susceptible to liquefaction. However, for this to occur, several conditions must develop, including the saturation of the waste rock, a significant increase in density of the waste rock, and a seismic event.

A linear low density polyethylene (LLDPE) geomembrane liner was also installed within the portion of the TSF underlain by waste rock.

More information regarding this liquefaction potential can be found in New Afton's TSF technical report and can be accessed in the offices of the Mill Manager and the Environment and Social Responsibility (ESR) Manager.

4.5. Basin Settlement and Liner/Core Rupture

4.5.1. Potential for Differential Settlement

The total and differential settlement under the TSF has been estimated for the impoundment area founded on waste rock; it is assumed that settlement of natural ground will be comparatively negligible. Using the calculation methodology detailed in BGC Report "Response to the Ministry of Energy and Mines Report of Geotechnical Inspector "(BGC, 2014c), a map of potential settlement under the TSF has been produced, as shown on NA-RB-03-07. Maximum settlement is estimated to be approximately 3.4 m, located near the intersection of Dams B and C, where the underlying waste rock thickness is the greatest. The maximum differential settlement would be expected to occur in locations where the settlement contours are closest together, along the upstream face and toe of Dam B at approximately station 1+300 m. This agrees with the location of cracking that was observed in Dam B in June, 2013 (BGC, 2013b). It should be noted that both the settlement estimation methodology and waste rock deformation properties have been selected to yield what are judged to be conservative (high) estimates of the total and differential settlements.

4.5.2. Potential for Rupture of the LLDPE Liner

The installation of the LLDPE liner at the New Afton TSF included a program of Quality Control and Quality Assurance testing. Based on BGC observations of the exposed portions of the liner, no ruptures or indications of strain were apparent other than post-construction tool marks (BGC, 2013a and BGC, 2014b).

The New Afton TSF basin liner is a smooth LLDPE liner produced by Solmax. A conservative maximum allowable strain for this type of liner is 12% (Peggs et.al., 2005). Using the vertical settlement map discussed above, liner strains have been estimated, as shown on NA-RB-03-08. Maximum strain in the liner is conservatively estimated to be approximately 1% along the upstream face and toe of Dam B at approximately station 1+300 m and along Dam C upstream at approximately station 0+600 m. Based on comparison of these conservatively estimated liner strain values with the strain capacity of the installed liner, the potential for rupture of the LLDPE liner as a result of differential settlement of the underlying waste rock is considered to be low.

4.5.3. Potential for Rupture of the Till Core and/or Till Liner

The potential for rupture of the till core is greatest at Dam B, where the largest vertical and differential settlements of waste rock can be expected (see NA-RB-03-07 and NA-RB-03-08). Here, settlement varies by up to 3 cm over a 1 m horizontal distance, with maximum strain oriented perpendicular to the dam reference line (i.e. parallel to the historic gully that was filled with waste rock). Field observation at Dam B (BGC, 2013b) indicate that this degree of strain may result in minor cracking oriented parallel to the historic gully.

The LLDPE basin liner was reportedly placed on a minimum of 0.15 m of compacted bedding material specified to have a maximum grain size of 12 mm (Vector, 2008 and Ausenco, 2012). At the maximum differential settlements estimated above, the effective thickness of this layer is expected to be minimally

impacted, allowing continued prevention of underlying angular waste rock particles contacting the liner directly. However, available construction records reporting do not provide details on the bedding material thickness or particle size distribution other than to say that the facility was built in accordance with the design (Ausenco, 2012).

4.5.4. Consequence of Rupture of Liner or Till Core

In all areas where the New Afton TSF dams are founded on waste rock, the upstream LLDPE liner will be raised, as shown on issued-for-tender (IFT) drawing NA-XD-03-19 (BGC, 2014b), providing secondary containment to the till core. Further, all dams are expected to have some degree of cracking, including low hydraulic conductivity core zones. To prevent internal erosion associated with any concentrated seepage in through-going cracks, a 2 m wide graded granular filter zone is located adjacent to the downstream till core boundary in the New Afton TSF dams. Differential vertical movement of 3 cm per 1 m horizontal distance, parallel to the dam reference line, will have no functionally significant impact on the effective available width of the filter zone. Thus, cracking of the core due to differential settlement would result in a manageable increase in seepage quantities, but would not lead to internal erosion (piping) of the core. Thus, the consequence of till core rupture is considered to be negligible.

Given the specification for the bedding layer, it is possible that filter compatibility between the bedding layer and the underlying waste rock, and between the bedding layer and the overlying tailings may be satisfied. However, as noted previously, the construction records reporting does not contain sufficient detail to confirm filter compatibility between these materials. Consequently, in the case where the LLDPE basin liner ruptures, there is the potential for internal erosion/piping of the underlying bedding layer to occur into the waste rock, allowing the stored tailings in the TSF reservoir to connect with the underlying high hydraulic conductivity waste rock. Once internal erosion/piping has started, this process may continue, or a new equilibrium may be established (i.e. the tailings solids could potentially 'blind off' the rupture area). The resulting leakage would report into the underlying waste rock and travel along the waste dump foundation surface towards the New Afton Pit, where it would be intercepted by the pit and underground dewatering systems. In the case of a large rupture developing, tailings and supernatant water could lead to erosion of the underlying waste rock, potentially leading to additional liner strain and rupture. This may result in a scenario that precludes continued use of the tailings facility due to loss of ability to maintain containment, or downstream safety issues.

4.5.5. Detection of Liner Rupture and Seepage

The ability to detect a liner rupture would be dependent on the magnitude of the seepage, and potential internal erosion of tailings, that resulted. If the rupture was large enough, a surface expression of it could eventually develop within the tailings impoundment, although with ongoing tailings discharge and maintenance of a pond it is possible that a sinkhole would not develop to surface. The impoundment is regularly monitored and inspected, and a sinkhole, if present, would likely be noted and reported. Discharge of tailings from the waste rock adjacent to the open pit would be another indicator of a significant rupture in the liner. However, to reach the state where tailings discharge in the open pit is observed, it is likely that significantly increased seepage would likely have been previously detected. Given the use of tailings in the cyclone sand construction of the downstream dam shells and the downstream waste rock pile, detection of a rupture by use of chemistry signature with TSF leakage is not considered possible.

4.5.6. Contingency Plans if Liner Performance is Unsatisfactory

If a surface expression of liner rupture was observed, this would indicate a loss of tailings solids and supernatant water into the underlying waste rock. The supernatant and possibly the tailings would report the open pit, albeit at a lesser rate than discussed above for the case of dam breach. Tailings and supernatant water are not expected to report off site.

If the liner performance was unsatisfactory, the pond level in the TSF could be lowered to reduce the driving head through the rupture, and alternative mitigation measures evaluated.

In the worst case, deposition at the TSF would be stopped and the facility decommissioned.

5. PLANNING

5.1. Potential Failure Modes

Several potential failure modes exist for the various tailings storage facilities. These potential failure modes, along with likely triggers, observable visual and instrumentation indicators of the failure mode are presented in Table 5-1. Other failure modes might also include the following:

- Slumping, sliding, cracking or bulging of the tailings dam
- Rapid increase or unexplained cloudy appearance of seepage through the tailings dam and/or its foundation
- Formation of sinkholes on the tailings beach or dam
- Breakage of tailings pipelines, which may result in dam erosion and/or release of tailings slurry
- Large earthquakes
- Major storm events or flood
- Sabotage and other criminal activities.

Table 5-2 outlines the potential failure modes and likelihood of occurrence at New Afton.

Table 5-1. Potential Failure Modes, Triggers and Observable Effects

Potential Failure Modes	Possible Causes	Visual Indications	Instrumentation Effects
Break down of pump stations	Blockages, lack of maintenance	No flows	Tests on pumps and other related components
Pipeline damage, cracking, blocking, or freezing	Flows blocked by excessively turbid water, debris or ice blockages, extreme weather	No or partial flows; pipeline leaking, cracking or bulging	Pipeline thickness; line pressures; pipeline flow rates
Overtopping	Liquefaction, excessive foundation movements, high wind and wave erosion of beach landslide generated wave, erosion of freeboard, settlement of crest, gully growth towards upstream crest due to seepage, surface runoff or pipe ruptures	Instability in reservoir slopes – slumping, sliding, etc. Damage to upstream face of dam, breach of crest	None
Slope Failure	Changes to pore water pressure within the dam (filters becoming non-functional, earthquake included)	Bulging, slumping, sliding or cracking of dam, increase in volume of seepage	Increase in pore water pressures measured within dam
Foundation Failure	Changes to pore water pressure in the foundation or increases to load applied to foundation (Increase in dam height or pond elevation)	Bulging, slumping, sliding or cracking of dam, or natural ground surrounding the dam	Increase in pore water pressures measured within dam and/or foundation, increase in rate of movement observed in inclinometers and/or survey prisms
Surface Erosion	Waves, wind or precipitation	Slumping or ravelling of upstream or downstream faces of dam	None

Potential Failure Modes	Possible Causes	Visual Indications	Instrumentation Effects
Internal Erosion (Piping)	Erosion of core, creating a pipe/conduit for water flow through dam, growth of a gully behind the crest of dam, turbid seepage water,	Rapid increase or unexplained cloudy appearance of seepage through the tailings dams and/or their foundations; appearance of seepage in new locations; formation of sinkholes in dam or on tailings beach	Increase in pore water pressures measured within dam and/or foundation
Cracking	Differential settlement of dam, earthquake induced	Cracks on dam crest or faces; bulging or slumping of dam	Increase to rate of movement observed in inclinometers or survey prisms

Other failure modes might also include the following:

- Slumping, sliding, cracking or bulging of the tailings dam
- Rapid increase or unexplained cloudy appearance of seepage through the tailings dam and/or its foundation
- Formation of sinkholes on the tailings beach or dam
- Breakage of tailings pipelines, which may result in dam erosion and/or release of tailings slurry
- Large earthquakes
- Major storm events or flood
- Sabotage and other criminal activities.

Table 5-2. Primary types of Failures and Likelihood of Occurrence at New Afton

Type of Failure	Likelihood of This Failure Mode
Break down of pump stations	Low likelihood, pump stations are subject to routine maintenance.
Pipeline damage, cracking, blocking, or freezing	Low likelihood, Cycloning is discontinued in the winter, and whole tailings are discharged into the TSF.
Overtopping	Possible at New Afton TSF due to proximity of pond, high spring runoff and no spillway
Slope Failure	Possible if dams are constructed too steep or high pore pressures develop. Low likelihood as the slopes are designed and constructed to account for materials used and foundation conditions. In addition water levels are monitored on a routine basis.
Foundation Failure	Low likelihood as the dams are designed and constructed to account for materials used and foundation conditions. Half of the facility is founded on till, and the remaining portion on Waste Rock. A LLDPE Geomembrane liner was placed over the Waste Rock, for added protection.
Surface Erosion	Possible as the downstream portion of the dams is constructed of Cyclone Sand, using hydraulic placement.
Internal Erosion	Low likelihood, dams incorporate filters to minimize the risk of migration of fines.
Cracking	Low likelihood, but possible. Differential settlement of the Waste Rock and till, can cause cracking. Monitoring of these areas are completed.
Earthquake	Low likelihood, dams designed to account for design earthquakes.
Subsidence	Low likelihood as the dams are not constructed over underground openings. However, do to the TSF proximity to the Underground Mine, continual monitoring of both facilities is completed.

5.2. Preventative and Remedial Action

In an unlikely event, the tailings dams could fail with an ensuing flood of water and liquefied tailings threatening the downstream area. The dam breach could be triggered by any of the potential failure modes outlined above in Section **Error! Reference source not found.**. It is difficult to predict where a dam breach would be initiated and precisely what corrective actions would be required. Nevertheless, to assist the mine in dealing with emergency situations threatening the New Afton TSF, this section describes the resources available to the mine and potential course of actions that could be taken promptly to avert a dam breach. These actions could be summarized as:

- Lower tailings pond level
- Arrest or retard dam internal erosion
- Arrest or retard dam external erosion.

The current mining operation involves continual personnel presence around the New Afton TSF. If a situation arises that requires immediate attention, New Afton has at its disposal the equipment, material, labour and engineering expertise to respond immediately. These resources include those within the mine and those available through outside contractors and the Engineer of Record.

Some remedial or preventative actions include:

- Lowering the pond level:
    - New Afton TSF water level could be lowered by discharging to Pothook Pit.
- Methods to stabilize potentially unstable embankment:
    - Place downstream buttress fill in the area of indicated movement.
- Methods to slow or stop internal erosion:
    - Lower pond levels;
    - Place weighted, inverted filter over the area of discharging seepage if this is from foundation soils. Use of Zone 4 or 5 sand and gravel filter as the first layer, weighed down by Waste Rock, is an appropriate response
    - If sinkholes appear in conjunction with turbid seepage discharge indicative of internal erosion, dumping of Zone 4 or 5 sand and gravel filter material, or, if unavailable Waste Rock, should be undertaken.
- Methods to slow or stop external erosion:
    - Construction diversions to route any concentrated abutment stream flow away from the face and/or toe of the dams
    - Place Coarse Zone 4 or 5 sand and gravel filter material or if unavailable Waste Rock against areas of surface erosion.
- Methods to mitigate downstream consequences:
    - Evacuate any New Afton personnel working downslope of the tailings dams.
- Methods to mitigate Overtopping:
    - Adherence to freeboard; and
    - Maintain minimum beach length.

Inundation mapping is not proposed for Dams A, B, and C due to the immediately available downstream barrier to off-property flows offered by the New Afton open pit. The New Afton Pit provides sufficient capacity to store any potential release from the New Afton TSF. A release from either Dam A or B is expected to report to the existing Teck TSF, which includes both a retention dam and an emergency spillway leading to the New Afton Pit. Releases from Dam A or B are most likely to flow through the Teck spillway to the New Afton Pit. Although considered unlikely, the potential exists for a large release from Dam A or B to impact the safety of the downstream Teck TSF, thus it is recommended that release, or imminent danger of release, from Dam A or B be included in the New Afton TSF EPRP with the same assigned actions as a Teck TSF release, and that the downstream inhabitants (i.e. the Cherry Creek Estate community) be evacuated.

All of these situations require site personnel to first be observant and recognize a potential emergency or unusual situation, then follow an established communication procedure and finally, respond appropriately. Particular attention will be given to inspecting and, where necessary, repairing the tailings

facility following unusual or extreme events. Due to the remote location of the tailings facility, the response procedures and all necessary remedial action shall be the responsibility of the on-site personnel. The relevant government agencies and officials will be notified as soon as practically possible.

Particular attention shall be given to inspecting and, where necessary, repairing the facilities following unusual or extreme events. All unusual events shall be reported to supervisory personnel. In an unlikely event that anomalously high seepage flows occur downstream of the tailings dams, and particularly if seepage water is carrying soil particles from the dams or their foundations, an early indication of a potential piping problem, it shall be reported immediately and the Engineer of Record be notified.

In the event of an emergency or unusual situation, all instrumentation in the affected area shall be monitored during and/or immediately following the event by mine engineering personnel. This information shall be forwarded to the Engineer of Record immediately so that the situation can be assessed and any required remedial actions taken promptly.

5.3. Risk Assessment

The New Afton TSF ensures thorough risk assessment through the Environmental Management System Performance Standard – *Risk and Change Management.* Risks are assessed, prioritized and managed appropriate to the nature, scale and EHS impacts of the operations and activities. Risks are recorded and maintained in a risk register which is reviewed and updated at least annually, and following a significant incident, learning experience or more often if the nature of the risk requires. Risks are evaluated by the appropriate level of management, consistent with the significance of the risks. Risk management decisions are documented and the implementation of resulting actions is tracked. More information regarding risk assessment can be accessed through the offices of the Mill Manager, Safety Manager and the ESR Manager.

5.4. Business Impact Analysis

Impacts to the business were analyzed as part of the site-wide risk assessment addressing what could happen should an event occur. Results of the site Risk Assessment can be accessed through the Safety office.

5.5. Planning Process

The EPRP shall follow a planning process to develop and maintain its Emergency Management/ Business Continuity Plans. The planning process shall result in integrated or single plan documents, or a combination thereof. The Plan will recognize that organizations and jurisdictions have different mandates and capabilities while still emphasizing a comprehensive approach to emergency management.

6. IMPLEMENTATION

6.1. Prevention and Mitigation

New Afton shall develop and implement a strategy specific to the Tailings Facility Operations to reduce risk through prevention and mitigation activities. The prevention and mitigation strategies shall be based on the information obtained from the hazard identification and risk assessment.

6.1.1. Inspection, Monitoring and Surveillance

TSF personnel all share the responsibility of daily inspection, monitoring and surveillance to ensure normal operations. This is a requirement of the prevention and mitigation process. The TSF procedures for Inspection, Monitoring and Surveillance can be accessed through the office of the Mill Manager.

6.1.2. Maintenance

Maintenance that is predictive, routine and event driven is a requirement of the prevention and mitigation process. Complete maintenance procedures for the TSF can be accessed through the Maintenance office.

6.2. Resource Management

An assessment shall be conducted to identify the resource capability shortfalls and the steps necessary to overcome any shortfalls. A current inventory of internal and external resources shall be maintained. The following resources shall be prepared as part of the Resource Management process:

- Emergency Response Centre Contacts (internal)
- Emergency Numbers (external)
- Employee List
- Emergency Warehouse:
    - Emergency Inventory Process
    - Incident/Accident Materials
    - Emergency Material List.

6.3. Mutual Aid/Mutual Agreement

The term Mutual Aid/Mutual Assistance includes cooperative assistance agreements, service level agreements, intergovernmental compacts, or other terms commonly used for the sharing of resources. Refer to Table 6-1, for the Community Contact List, Regulatory Contact List and Emergency Services Contact List for all external resources for an incident/emergency event.

Table 6-1. Emergency Contact List (External)

Agency/Organization	Name / Title / Location	Phone No.
Provincial Emergency Program		1-800-663-3456
Ministry of Environment	Brian Yamelst	250-371-6323
RCMP	Kamloops	911 or 250-828-3000
Kamloops General Hospital		250-374-5111
Ambulance		911 or 250-374-4411
Poison Control Centre		1-800-567-8911
Ministry of Forests (Forest fires)		1-800-663-5555
Ministry of Energy and Mines	Steve Rothman	250-371-3780
Mine Rescue	Stephen Rothman	250-371-3780
Chief Inspector	Al Hoffman	1-250-426-1252
CANUTEC (24 hr. MSDS, dangerous and toxic goods information)		613-996-6666
Terasen Gas (natural gas pipeline)		1-800-663-9911
B.C. Hydro		1-888-769-3766
Pembina Pipeline (oil pipeline)		1-800-360-4706
Oil and Gas Commission	Fort St John	1-250-261-5700

6.3.1. First Responders

6.3.1.1. Internal

Internal First Responders are assigned Tailings personnel who can assume an operational response to an emergency situation. First Responders should be located at the Incident Command Post and will adopt the following responsibilities:

- Ensure that the incident area is safe
- Report the status of the following items:
  - Arrival time
  - Incident/emergency event description
  - The extent of personal property damage
  - Is there media coverage?
  - Are emergency services on site?
  - Is more assistance required?
- Assume the responsibilities of the Incident Commander when responding to priorities until relieved by the assigned Incident Commander
- Sign-in upon arrival at the Incident Command Post
- Respond to directions from the Tailings Operations personnel and interact with response personnel to end the incident
- Maintain clear, concise records and record all discrepancies
- Participate in post-incident review as required
- Participate in periodic emergency response plan drills.

Designated First Responders will receive appropriate/additional EPRP training to ensure that they are competent with the assigned responsibilities when acting as first response to an incident.

6.3.1.2. External

External First Responders are emergency personnel who can respond to an emergency situation at the New Afton Tailings Facility. Examples of external resources are as follows:

- Fire Departments – EPRP training program will be conducted with local fire departments one every 3 years. Local full-time and volunteer fire fighters will be offered the opportunity to:
    - Participate in training activities as required
    - Meet and discuss New Afton's EPRP
    - Tour and review the Tailings Facility
- Police and Ambulance Departments – EPRP training program will be conducted with local police departments once every 3 years. Local full-time and part-time police forces and ambulances will be offered the opportunity to:
    - Participate in training activities as required
    - Meet and discuss New Afton's EPRP
    - Tour and review the Tailings Facility
- Municipalities – Municipal governments will be offered the opportunity to:
    - Meet and discuss New Afton's EPRP
    - Tour and review the Tailings Facility
- Public Awareness Program – designated landowners will be sent information regarding New Afton's EPRP. Joint training with external resources such as contractors and partners will be conducted whenever the opportunity arises. Non New Afton responders will be offered the opportunity to:
    - Share EPRP information
    - Participate in training activities as required.

6.4. Emergency Response

6.5. Notification and Emergency Communication

The EPRP can be initiated by any person who encounters incident water, or other threatening and uncontrolled events within the TSF. Rapid response is critical to ensuring that everyone safely reaches a muster station. Security Control can be notified as directed below in Section 6.5.1.

The Security attendant will collect key information from the caller and activate the appropriate emergency response protocols. If Security is unable to activate these protocols they will contact the Command Center to request assistance. The Security attendant will follow the instructions on his/her duty card and initiate the emergency radios on Channel 5 to summon the Emergency Response Team and also compile the Surface Emergency Management Team. Figure 6-1 is the Notification Procedure Flowchart.

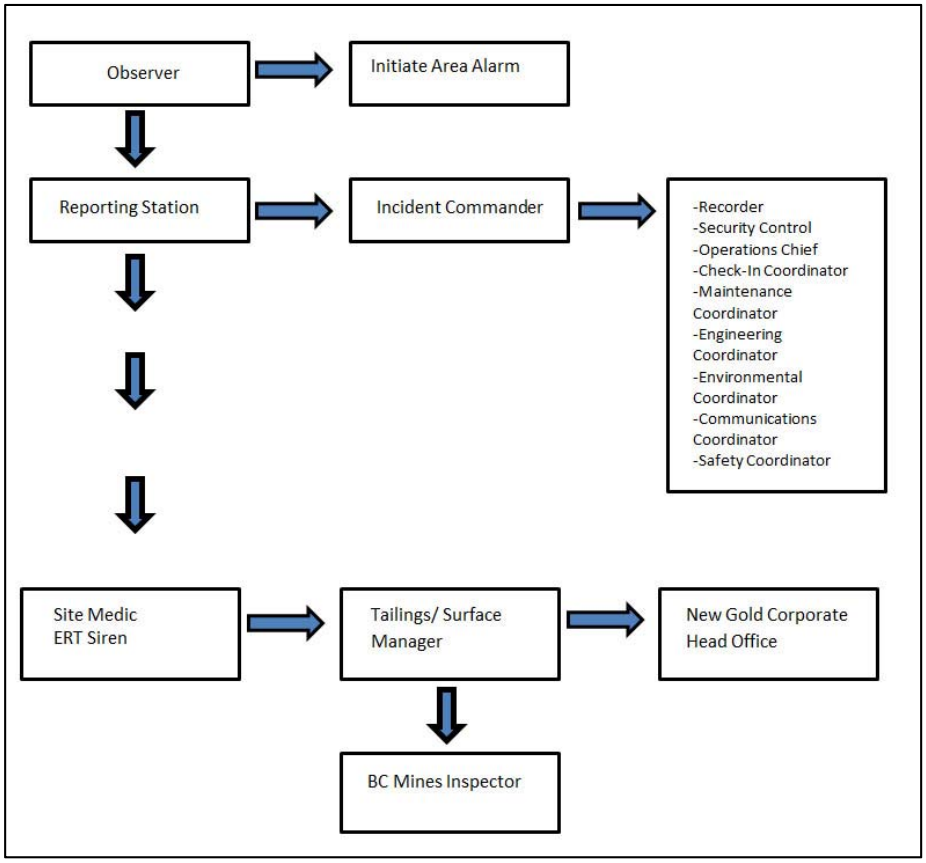

Figure 6-1. Notification Procedure Flowchart

6.5.1. Code One Protocol

Code 1 Procedure

On your telephone:

1. Dial (250) 377-2727

On the Mike Radio:

1. Turn the Mike Radio to Channel 5
2. Call: "CODE1CODE1CODE1"
3. "This is (your name)"
4. "There is (state the nature of your emergency)"
5. "We are located (state the location of the emergency)"
6. Stay on Channel 5 for further instructions.

When a Code 1 in Announced

Tailings Specific Code 1:

- i.e. "CODE1CODE1CODE1 –Tailings Alarm – all work in Tailings must cease immediately."
- All work in the affected area must cease immediately.
- Report to your muster station.
- Wait for further instruction from your Supervisor.
- ALL OTHER WORK ON SITE CAN CONTINUE

Site Wide Code 1:

- i.e. “CODE1CODE1CODE1-Site Wide – all work on site must cease immediately.”
- All work in all areas on site must stop as soon as it is safe to do so.
- If you are driving, pull to the side of the road until emergency vehicles pass and proceed to muster station
- Follow instructions from your Supervisor.

All Clear:

- When the emergency situation has been mitigated to the satisfaction of the Incident Commander and Security Control, order an “All Clear” to be called.
- “All Clear, All Clear, All Clear… The emergency in the (state location) has been terminated. All work may resume.”

Refer to Code One Emergency procedure SAF-SWI-001 for more information.

6.5.2. Personnel Accounting Procedure

In the early stages of a Tailings Facility emergency, personnel accounting is the single most important action to verify the location and condition of all personnel. Once all personnel are accounted for, a systematic approach to rescue, evacuation and mine rehabilitation can begin.

A rigorous crew roster/muster station procedure will ensure that unaccounted for personnel are identified. Once identified, the employee’s supervisor can be contacted and their last known workplace identified to assist rescue planning as needed.

Duty cards for a Check-In Coordinator and Check-In Assistants are included in this plan to guide the personnel accounting process. This process will be facilitated by maintaining up-to-date rosters of all Tailings Facility employees.

Lastly, the personnel accounting process will be assisted by ensuring that all contractors indicate their company affiliation on their tag. This will assist in identifying an employee’s supervisor and ensuring direct communication with contractor officials.

6.5.3. Muster Station Procedure and Check-In

If you encounter an emergency event, stop work immediately and shut down any equipment that you are operating. Do not park equipment in a way that may block access to the main routes.

Proceed to the nearest muster station and follow the procedures posted inside the station. Once at the muster station keep radio and telephone usage to an absolute minimum – **emergency communication only**. Select one person to be the Muster Station Attendant.

The Attendant will:

1. Legibly record the names of all persons entering the muster station.
2. Ensure compliance with established muster station procedures.
3. Answer all calls from the Incident Command Centre/Check-In Personnel
4. Provide the Command Centre with the following information:
    - Command Center phone number is 377-2732 or use Femco phone:
    - Muster station name and location
    - Attendant’s name
    - Other relevant information such as observations made during travel to the muster station
    - Relay the list of names of personnel in the muster station. The caller will repeat the names for verification.
5. Wait in the muster station until given the “all clear” by the Command Centre or instructed by ER personnel.

6.6. Emergency Shutdown

Supervisors are to ensure that emergency shutdown procedures, as far as practicable, are executed for their area of responsibility. This including shutting off all hand tools, burning, welding and other maintenance or test equipment, and terminating all confined space entries.

All New Afton personnel and all contractor personnel are to ensure that these emergency shutdown procedures are followed in their individual work areas.

6.7. Emergency Site Management Organization

The Mill General Foreman, his/her designate or person on-call activating the emergency procedure is the person in charge, and is responsible for determining the potential or actual extent of the emergency. The initial person(s) activating the emergency may be assisted by the Response Team. The Mill General Foreman or designate will notify the Mill Manager of any changes to the level of emergency and will communicate the ALL CLEAR. In the case of the potential of a spill entering the environment, advise security to notify the Environmental Manager or designate.

The Mill Manager is responsible for notifying and apprising the Mine General Manager of the situation.

6.8. Authorizing an Evacuation

The Processing Operations Supervisor (as shown in Figure 3-3) or designate has the authority to authorize an evacuation of any building or areas within the New Afton TSF. The Kamloops Emergency Services are to be notified immediately to ensure the public downstream of the dam are notified of the release and need to evacuate.

The person on-call or designate may also direct the New Afton TSF supervisor to evacuate a building or area on site.

Evacuation of the downstream public may be necessary, depending on the circumstances of the emergency. Only the Mine General Manager, based on discussions with the Mill Manager or Executive On-Call, is authorized to initiate such an evacuation in cooperation with the Kamloops Emergency Services.

6.9. Incident Management

There are two types of incidents that are subject to emergency/crisis management: operational and non-operational crises.

6.9.1. Operational Emergencies/Crises

- *Industrial emergencies* such as accidents resulting in critical injury or property damage
- *Natural disasters* that threaten employee safety or jeopardize operations
- *Accidental releases of materials* such as tailings dam failure or a major chemical spill that could threaten people and the environment.

6.9.2. Non-Operational Emergencies/Crises

- Political and security risks such as kidnapping, extortion, bomb threats, sabotage, political or civil unrest, disgruntled employees, illegal detention by authorities and insurgent or guerrilla activity.
- Corporate/business related threats such as litigation, white-collar crime, market issues and other matters with a material impact on the company.
- Missing person incidents related to criminal or non-criminal circumstances.
- Medical emergencies in jurisdictions where quality medical care is either remote or entirely lacking.
- Workplace issues such as sexual harassment, workplace violence, allegations of unethical behaviour, etc.

- Any other event that threatens the health and safety of employees or the communities in which the company operates.

In the case of operational situations, including those where fatalities or injuries may have occurred, New Afton site Emergency Response Plan complements the Crisis Management Plan to provide emergency and first responder services at the incident location. Emergencies/Crises will also have a severity dimension which will determine the organization, resources and communications requirements for its response management.

As soon as possible after all appropriate actions have been initiated, the severity of the incident must be determined in order to make emergency-related decisions and to ensure that all appropriate personnel within the New Gold group are alerted. There are important factors that need to be considered and prioritized. The Incident Assessment and Response Matrix that follows categorize these factors and shall be used to provide guidance regarding application of the Emergency/Crisis Management.

Refer to Figure 6-2 Incident Assessment and Response Matrix for assessment categories and response required.

		ASSESSMENT CATEGORY						
		Injuries or Fatalities	**Threat to public health and safety**	**Environmental Damage**	**Property damage**	**Operations / Production Disruption**	**Media interest**	**Reputational Damage to New Gold**
RESPONSE	**Handle at Site by Emergency Response Team – Alert Site Crisis Management Team**	Medical treatment only or less	The incident poses no threat to off-site areas.	Moderate short term effects affecting part but not all of eco-system	Moderate financial loss (up to $100K)	Up to 72 hr. production delay	Localised to the regional media	Minor or Moderate damage to reputation
	Activate Site Crisis Management Team – Advise Corporate Office	Fatality or Permanent Disability.	Actions are necessary by off-site resources to contain incident.	Serious medium term impact affecting whole ecosystem	Major financial loss (>$100K - $500K)	Unplanned duration up to 7 days	Receiving state/province wide media attention (neutral or negative)	Potential for Major damage to reputation
	Activate Site and Corporate Crisis Management Teams	Multiple fatalities or injuries	Protective actions by external entities are necessary and ongoing.	Irreparable damage, very serious long term impairment of ecosystems	Financial loss expected to exceed $500,000	Impact corporate guidance	Receiving national or international media attention (neutral or negative)	Potential for Extreme damage to reputation

Figure 6-2. Incident Assessment and Response Matrix

New Afton utilizes an Incident Management System to direct, control, and coordinates response and recovery operations

6.9.3. Incident Command Centre

The following equipment and material is recommended for the Surface Incident Command Centre.

Communications

- Telephone (2)
- Personal radios
- Internet connection (if available)
- Necessary writing tools.

Emergency Response

- Tailings Emergency Response Plan
- New Afton Site Emergency Response Plan
- Duty Cards (3 copies)
- Muster Station Checklist (10 copies)
- Crew Roster Checklist (4 copies)
- Current Employee/Contractor Roster - (for that shift)
- Duty Color Vests
- Recorder's Bound Record Book.

Information Resources

- Current mine plans showing tailings operations flow, muster station, all major infrastructure and hazardous material storage
- Current site plans showing primary electrical distribution and installations.

6.9.4. Management Org. Chart for Incident Command

Refer to Section 3.3 of the EPRP for organization chart.

6.9.5. Crisis Management Plan

In accordance with New Gold's Crisis Management Plan, New Gold Inc. has a responsibility to its investors, customers, employees, surrounding communities it serves, and investors to ensure measures are taken to prepare for continuation of critical and essential business operations in the event of an emergency or significant business interruption.

An Executive Crisis Management Team (ECMT) has been created to formulate and approve overall crisis management strategy and subsequent policies and programs. The Crisis Management Plan (CMP) is administered by New Gold Inc. consisting of a director and program coordinators for each discipline. Reporting to the Executive Crisis Management Team, New Gold develops programs for each of the six disciplines, monitors New Afton's state of readiness by reviewing organizations' adherence to the Crisis Management Plan, and assesses the effectiveness of, the Crisis Management Plan throughout New Gold Inc.

The CMP consists of programs for each of the six disciplines, which are used to mitigate potential crises, manage an actual crisis, and resume business operation in the most efficient manner. These six disciplines are emergency response, crisis management for mining operations, business continuity, disaster recovery (IT), external affairs and security services.

This CMP defines the management structure and processes used to mitigate potential crises on an ongoing basis, as well as to manage an actual crisis. The structure is designed to provide capabilities for the monitoring of escalating scenarios, to provide guidance, information, direction and decision making as necessary, while at the same time allowing the non-affected critical business operations of New Afton's other business functions to continue operations in the most efficient manner possible. The specific goals of the Crisis Management Plan are as follows:

- Comply with all applicable laws and regulations addressing emergency response and crisis management
- Identify and develop an emergency response procedures for all storage and pipeline facilities
- Provide for the protection and safety of employees and the surrounding communities during and emergency or crisis
- Manage activities & resources during an emergency or crisis event
- Recover and restore the affected facility and/or infrastructure as soon as possible
- Annually update, validate and test crisis management plans.

The New Gold Crisis Management Plan ensures that the following are in place:

- A proactive approach for responding to emergencies and incidents that may lead to a crisis
- A defined crisis management structure with clearly assigned roles and responsibilities
- Processes for prompt, effective internal and external communication with all stakeholders
- Effective policies and procedures for responding to a heightened security threat level.

The Program provides guidelines, requirements, standards, templates, maintenance criteria and other resources as appropriate to ensure the Company has the capability to pro-actively mitigate potential crises and undertake effective crisis management and emergency response, if and, when incidents occur. Refer to New Gold- New Afton Crisis Management Plan which can be accessed through the Mill Manager Office.

6.10. Communications and Warning

New Afton shall establish and maintain the capability to provide crisis communication during an incident.

As part of New Afton's Infrastructure Management Plan, telecommunications and other communication systems are needed to support all elements of this EPRP. It is required that all telecommunications and other communications systems are identified, assessed and evaluated for effectiveness during event practice drills. Public awareness and public education programs shall be implemented where the public is potentially impacted.

6.10.1. Notification and Activation Procedure

The Emergency Preparedness Response Plan (EPRP) can be initiated by any person who encounters incident water, or other threatening and uncontrolled event within the TSF. Rapid response is critical to ensuring that everyone safely reaches a muster station. Security Control can be notified by calling on radio Channel 5.

The Security attendant will collect key information from the caller and activate the appropriate emergency response protocols. If Security is unable to activate these protocols they will contact the Command Center to request assistance. The Security attendant will follow the instructions on his/her duty card and initiate the emergency radios on Channel 11 to summon the Emergency Response Team and also compile the Surface Emergency Management Team.

Refer to a Notification Procedure Flowchart that can be found in Section 6.5.

6.11. Declaring All Clear

For New Afton emergencies, the Mill Manager or his/her Designate is authorized to declare ALL CLEAR.

6.12. Operational Procedures

The EPRP Coordinator will ensure that the following responsibilities are completed:

- Manual updates completed a minimum of annually
- Be responsible for ensuring Emergency Response Plan documents are accurate and reviewed annually
- Ensure Emergency Response Plan training is **available** to designated personnel
- Publish information on the Emergency Response Plan, as necessary to:
    - Other internal company departments and personnel, as required
    - External agencies (e.g., government), as required
    - Contractors.
- Plan and execute **corporate** exercises to validate the Emergency Response Plan and familiarize **personnel** with its provisions
- Ensure training records are kept
- Review incident reports
- Review the impact of incidents on company operations and conduct incident reviews when required
- Liaise with federal, provincial and **industry contacts** on matters of common interest related to emergency preparedness
- Ensure New Afton has appropriate **plans**, resources and equipment available.

The Tailings Facility Management shall develop, coordinate and implement procedures to support the EPRP and its execution in an event.

The following procedures shall be addressed:

- Health and safety
- Incident stabilization
- Operational/ business continuity
- Property conservation
- Environmental protection.

6.13. Facility Components and Infrastructure

6.13.1. Tailings Facility

The principal facility components of the mine site to be addressed in this manual are the New Afton TSF dams (Starter Dam A, B, and C, West Dam and South Dam), Main Tailings Pond and the Pothook Pit Dam and Tailings Pond. Other components include the following:

- Tailings beaches
- Impoundment area
- Dust control systems
- LLDPE geomembrane liners
- Primary and Secondary cyclones
- Diversion ditches
- Seepage collection ponds and water return system
- Tailings pipeline
- Reclaim water barge, pumps and pipeline
- Reclaim water storage tanks
- Monitoring instrumentation and wells
- Roads and fences
- Power supply.

The following sections provide a brief description of the various containment structures at the New Afton TSF and the Pothook Pit TSF. Containment of the New Afton TSF is provided to the west by Starter Dam A and B, to the north by Starter Dam C, and to the south and southeast by the West Dam and South Dam, respectively. Design sections of the dams, and plan general arrangements, are provided in Appendix A. A selection of photographs of each structure are provided in Appendix B. Further details on the Tailing Facility are discussed in Section 4.0.

There is no spillway associated with the New Afton TSF, as the facility is designed to store the Inflow Design Flood (IDF) defined by the 24-hour Probable Maximum Precipitation (PMP). A spillway will likely be incorporated into the design later in the mine life.

6.13.2. Emergency Operations Centre

New Afton has established a primary and an alternate Emergency Operations Centre (EOC) capable of managing continuity, response, and recovery operations. Refer to Business Continuity, Section 6.15 and Post Incident Recovery and Investigations, Section 6.16.

6.14. Training

New Gold Inc. will ensure that all personnel receive the level of training that they are required to have, including but not limited to, Industrial First Aid, Mine Rescue, Fire Fighting, Environmental Response, spill containment and response, Material Substances Data Sheets (MSDS) and Workplace Hazardous Materials Information Systems (WHMIS). Emergency Response Leaders will be assigned to operational areas of the Mine Project. Training levels will be current and of an ongoing nature and involve regular practice drills as per requirements specified by the Environmental Management System and Safety Management System.

Training is a basic requirement of any effective emergency response organization. It is a continuous process and must be delivered in varying degrees to personnel within the Emergency Operations Organization. Training for personnel involved with tailings facility operations will be conducted to ensure familiarity with all elements of the operation, maintenance and surveillance of the facility, and the EPRP, as specified in the OMS Manual. Training will focus on operational procedures, improvements planned for the tailings operation system, an overview of planned construction and maintenance activities, and a review of emergency response plans, specifically focusing on roles and responsibilities, dam breach prevention measures, and notification procedures. More information regarding the procedures and processes of EPRP Training Program can be found in the Safety Department.

Relevant information about the emergency plan is provided to any New Afton employee who may be affected by an emergency. The training consists of an overview of the plan itself and actions that are expected from the employees. Refresher training should be conducted once every year, with Emergency Response Plan basic training programs offered once per year.

In addition to training, the EPRP will be tested for effectiveness via a validation drill, and updates or amendments to the EPRP completed as necessary to ensure adequacy.

6.15. Business Continuity

An emergency may adversely affect normal operating conditions. This effect may be felt for an extended period of time depending on the severity of the incident. Impairment may be a result of injury to personnel, damage to the physical plant, and loss of records or government regulatory action.

This issue must be addressed and processes put in place to minimize the impact of interruption to the business operation. The following Business Continuity Plans currently exist:

Tailings Facility Operations:

- Facilities Operations and Coordination

Regulatory Affairs and Business Services:

- Regulatory Affairs and Business Services
- Payroll
- Accounts Payable
- Information Technology
- Finance
- Human Resources
- Legal.

More information about New Afton's Business Continuity procedure can be found in the office of the General Manager.

6.16. Post Incident Recovery and Investigations

6.16.1. Post incident Recovery

Post incident recovery activities should be initiated as soon as possible, preferably while response operations are still underway. Actions taken during response operations should be decided, whenever possible, with post incident recovery in mind. Recovery operations include:

- Inspections and investigations
- Repair of damaged structures
- Restoration of services such as power, heat and communications
- Clearing of access routes
- Restore damaged units to production
- Remediation
- Employee Assistance.

6.16.2. Post Incident Investigations

Every emergency involving a fatality, a critical injury, and loss or significant damage to New Afton property will be investigated based on the current Incident Review Procedure, as soon as possible after an incident. The following are main topics that must be considered while conducting a post incident investigation:

- Preserving evidence
- Removing evidence
- Critical injury/fatality investigation requirements
- Insurance and external agencies investigation requirements
- Emergency response evaluations and post incident reviews
- Incident response team reporting.

7. POST INCIDENT ANALYSIS

7.1. Post Incident Review Meeting

The initial review meeting should take place no later than 2 weeks after the incident, and will be conducted to gather and document the sequence of events to identify areas for improvement of the EPRP. Review meetings may include the following people or groups:

- Incident Commander
- Tailings Management
- Tailings personnel directly involved in the incident (including 3rd party contractor representation as appropriate)
- Environmental Coordinator
- Safety Coordinator

- Maintenance Coordinator
- Engineering Coordinator
- Security
- Legal
- Any other resources that may have been involved in responding to the incident, such as Emergency Service Providers.

Participants will ensure that all relevant notes taken during the incident are available during the review meeting e.g., Emergency Event Logs, personal notes, RM notes, tracking sheets, repair as-built information, etc.

7.2. Incident Review Form

Details of the incident response will be recorded on an Incident Review Form, and shall include:

- Establishment of a chronological order of events
- Assignment of action items (i.e. areas for improvement) and expected completion dates will be assigned and recorded on the Incident Review form.

7.3. Review Recommendations and Corrective Actions

Recommendations from an incident review will be added to the Emergency Response Program as appropriate. Detailed records of the incident and recommendations items will be circulated to the individuals assigned with action items. All corrective actions will be performed and submitted for implementation to the standard operating procedure that is related.

7.4. Incident Response Team Reporting

During the course of a major incident investigation, written reports, statements, notes, photographs, videotapes, audiotapes, etc., will be generated. Outside consultants and investigators may prepare written reports as part of their activities. The preparation of such material and reports will be coordinated through the Litigation Counsel and lead investigator. All reports related to a specific incident will be stored and controlled as part of the EPRP process.

8. EXERCISES, EVALUATIONS AND CORRECTIVE ACTIONS

8.1. Exercises

Exercises accomplish a number of preparedness purposes, such as:

- Validating emergency plans and training
- Familiarizing personnel with roles and responsibilities
- Practicing the skills of emergency response
- Identifying opportunities to improve emergency plans
- Testing equipment, procedures and protocols
- Develop working relationships with other emergency response organizations
- Creating confidence in the emergency response organization and the plan
- Maintaining awareness of the plan with company staff.

There are three basic types of emergency response exercises, each serving a unique purpose. The recommended frequency is once per year. Below is a brief description of each along with the recommended frequency of practice. The exercise coordinator will determine the personnel who will participate in the exercises listed below. All exercises will be followed up with a documented post-exercise review.

8.1.1. Table Top Exercises

Table top exercises are round table discussions of a potential emergency situation. They are developed to evaluate elements of the Emergency Response Plan and structured to meet the specific objectives. They are conducted at the New Afton site level and are the responsibility of the Safety Manager or designate.

8.1.2. Drills

Drills are practicing certain skills with hands on activities that test specific elements of the emergency response system. It can be facilitated at New Afton or Corporate level and are the responsibility of the Safety Manager or designate to ensure that it has been completed in their respective Districts. Examples include: Emergency Operations Centre activation, Building Evacuation, and Community Notification.

8.1.3. Full Simulations

Full Simulations test as many elements of the company's emergency response organization as possible. An actual incident is "staged" and the organization is mobilized to deal with it. Full-scale simulations may also include outside agencies such as municipal emergency responders, and contractors. A simulation centre is used to generate the outside world and community resources can be invited to participate in the exercise simulation. A full simulation can be facilitated at a New Afton or Corporate level.

8.2. Evaluations

Emergency Response Plan quality assurance should include drill and full simulation. Properly conducted, these evaluations provide critical information on the value of the planning process, the quality of planning products and priorities for future improvements to the EPRP. These evaluations represent an opportunity to evaluate actual personnel performance, training program effectiveness, plan and procedure adequacy, and equipment and facility adequacy. Performance evaluations should be undertaken as soon as possible after a drill or incident.

8.3. Corrective Actions

All corrective actions from the drill and full simulation evaluations will be documented and submitted for implementation to the EPRP Training Program.

9. MANAGEMENT REVIEW

The EPRP Coordinator, Advisory Committee and designated TSF personnel will review the Emergency Preparedness and Response Plan at least annually. Any changes identified in the review process will be incorporated into the TSF EPRP as required. This review will ensure a commitment to continuous improvement with the Plan.

The Management Review will be performed in conjunction with the Environmental Management System Review. Refer to the EMS for additional specific responsibilities, processes, forms and outputs. The Management Review provides information into the Annual Business Planning process whereby Emergency Preparedness equipment, resources etc. can be budgeted.

9.1. Tailings EPRP Specific Requirements

Ongoing input is required in the following areas to ensure the Emergency Preparedness and Response Plan is effective.

- Utilize the existing emergency communications system and incorporate it into being used by the Emergency Response Team in conjunction with Tailings Operations Team for rapid response to the situation by establishing the Command Center to manage the emergency.

- Continually assess tailings personnel needs based on crew size, shift rotation, normal work area (Tailings personnel may be in a muster station and unavailable), and availability of off-site resources.
- Incorporate the Tailings EPRP into the New Afton site crisis management plan.
- Continually update Crew roster sheets to assist check-in. This is to be provided from Security or IT departments and updated monthly.
- Incorporate other emergency scenarios in the plan as appropriate.
- De-brief and review any time after the Emergency Procedures are activated, whether it is a planned drill or the real emergency. Identify areas for improvement and implement immediately.

10. INCIDENT COMMANDERS ASSIGNMENTS

The Incident Commander will assign the Positions in the Left Column

Recorder	
Security Control	
Operations Chief assigns:	
	Personnel Supervisor
	Transportation Supervisor
Check-In Coordinator assigns:	
	Check-In Assistants
Maintenance Coordinator assigns:	
	Electrical Supervisor
	Mechanical Supervisor
Engineering Coordinator	
Environmental Coordinator	
Communications Coordinator	
Safety Coordinator assigns:	Surface Rescue Coordinator

11. DUTY CARDS

The following list includes the Positions and Duty Card Assignments that will be used in the event of a Tailings Facility incident/emergency:

- Incident Commander
- Recorder
- Operations Chief
- Safety Coordinator
- Communications Coordinator
- Check-In Coordinator
- Check- In Assistant(s)
- Engineering Coordinator
- Maintenance Coordinator
- Transportation Supervisor
- Personnel Coordinator
- Environmental Coordinator
- Surface Rescue Coordinator
- Security Control.

As part of the EPRP Training Program, each individual that is assigned or designated to be responsible for the implementation of these duty cards in the event of an incident/emergency will be trained on its application. The templates are stored in Environment Department as part of New Afton's document control procedure.

References

Ausenco Engineering Canada Inc., 2012. New Afton New Gold Tailings Storage Facility (TSF). Letter dated, June 4, 2012.

BGC Engineering Inc. 2013a, New Afton Mine Tailings Storage Facility Liner Inspection and Repair – December 2012. Document No: DM-0921005.0013. February 6, 2013

BGC Engineering Inc. 2013b, New Afton TSF – Review of Dam B Cracks – June 2013. Document No: DM-0921007.0049. July 10, 2013

BGC Engineering Inc. 2014a, 2014 Issue-for-Tender Drawings. Document No: 0921010.0079c, March 13, 2014

BGC Engineering Inc. 2014b, New Afton Mine Tailings Storage Facility Liner Review. Document No: DM-0921007.0027. February 18. 2014

BGC Engineering Inc. 2014c, Response to the Ministry of Energy and Mines Report of Geotechnical Inspector. Document No: RP-0921011.0089. 2014

Canadian Dam Association, 2007. Dam Safety Guidelines, Technical Bulletin: Hydrotechnical Considerations for Dam Safety, 2007

I. Peggs, B. Schmucker, P. Carey, 2007. Assessment of Maximum Allowable Strains in Polyethylene and Polypropylene Geomembranes. July 17, 2007

Vector, 2008. Design Report for the Tailings Storage Facility at the New Afton Gold and Copper Mine. Document No: 061802.00. October, 2008

Vector, 2009. Final Construction Quality Assurance Report for the Pothook Dam at the New Afton Copper and Gold Mine Facility. Document No: 061802.00. April, 2009

Incident Commander

First or Most Senior Person Responding to Incident

(This position could change if a more qualified or senior person were to respond)

New Afton Surface/Tailings Emergency Command Centre (Mesquite Conference Room) 250-377-2732

SECURITY 2727

☐ 1. Oversee all aspects of response & determine the specifics of the emergency by contacting the Operation Chief or Security Centre:

a. Location & type of emergency: _____

☐ 2. Select Recorder (assign duty card and log book)

☐ 3. Review and assign only the responsibility cards listed below, with the associated matching card as follows:

Incident Commander	Name of Person Assigned	Assign Card
Recorder		
Operations Chief		
Check-In Coordinator		
Maintenance Coordinator		
Engineering Coordinator		
Communications Coordinator		
Safety Advisor		
Environmental Coordinator		

☐ 4. Record all information in the Incident Command Logbook.

☐ 5. Contact senior New Afton personnel and update as required.

- Surface/Tailings Manager
- Vice President Operations
- Safety Supervisor (Incident Management Team Leader)

☐ 6. Follow up and monitor assigned responsibilities.

☐ 7. At the conclusion of the incident, sign the log book and inform the Surface Rescue Coordinator and Security Control that they may stand down.

☐ 8. Ensure that incident debriefing is completed and corrective actions are identified and documented

Recorder

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

*The Recorder will record all information in the Recorder Logbook

- ☐ 1. Record events, commands, orders as they happen in the recorder logbook.
- ☐ 2. Record all times, events, orders, and decisions by Command Centre.
- ☐ 3. Compile any or all photos, written orders, and directions.
- ☐ 4. Set up easels and tear-away wall sheets.
- ☐ 5. Have all records in the logbook signed by the Incident Commander.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Operations Chief

New Afton Surface/Tailings Emergency Command Centre (Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

- ☐ 1. Oversee all immediate needs of the Incident Commander.
- ☐ 2. Assign the following responsibilities and emergency cards:

Operations Chief	Assign Card	← Reports To
	Personnel Coordinator	
	Transportation Coordinator	

- ☐ 3. Call Security to ensure the Surface/Tailings Group Page List has been activated or Surface Rescue Team members have been notified.

Security	

- ☐ a. Arrange & coordinate with the Safety Supervisor for any surface rescue members on crew to standby.
- ☐ 4. If applicable, barricade or post guards at the incident area to prevent any unauthorized access and remove all non-essential personnel.
- ☐ 5. Record information in the Operations Chief Logbook
- ☐ 6. Brief and keep the IC informed.
- ☐ 7. Follow up and monitor assigned responsibilities.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Safety Coordinator

New Afton Surface/Tailings Emergency Command Centre (Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

Safety Coordinator	**Assign Card**
	Surface Rescue Coordinator

- ☐ 1. Assign above positions and duty cards
- ☐ 2. Oversee all safety aspects of the rescue/recovery operation.
- ☐ 3. Ensure that only mine rescue and support personnel are allowed in the response area.
- ☐ 4. Keep personnel safe during the operation.
- ☐ 5. Follow up with Security Control to ensure off surface mine rescue personnel and additional mine rescue teams (mutual assistance) are notified.
- ☐ 6. Ensure company representatives and applicable authorities have been notified.
- ☐ 7. Communicate with surface response teams and rescue personnel.
- ☐ 8. Record information in the Safety Supervisor logbook
- ☐ 9. Contact environmental personnel as needed.
- ☐ 10. Relay the Stand Down from the site Incident Commander to the Surface Rescue Team.
- ☐ 11. Convene a debriefing meeting following the incident and incorporate improvements into the emergency response plan.

RADIO CHANNEL USAGE DURING EMERGENCY:	
Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Communications Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

- ☐ **1. Inform all personnel in the Administration and Operations building of the emergency and have them wait in their office until they receive a task from the Control Center.**
- ☐ 2. Connect and test incident command phones and radios.
- ☐ 3. Answer and log telephone and radio communications to the Control Centre.
- ☐ 4. Record information in the Communication Logbook
- ☐ 5. Brief and keep the IC informed.
- ☐ 6. Arrange technical assistance or IT help as needed.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Check-In Coordinator

The Check-in Coordinator is responsible to determine the location and condition of all tailings personnel using the following procedure:

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

- ☐ 1. Designate the utilization of the muster area(s).
- ☐ 2. Assign (2) Check-In Assistants to oversee the crew roster/muster station identification process, ensuring 1 assistant is assigned to muster stations.

  Name_____ Name_____

  Name_____ Name_____
- ☐ 3. Account for ALL personnel that are **signed in on the Surface/Tailings Crew Roster.**
- ☐ 4. Ensure Check- In Assistants are established with telephone and radio communications.
  - Assign radios for direct communications with Check-In Assistants
  - Ensure check – in assistants are located in appropriate offices (use office 141 & 142 directly outside command center)
- ☐ 5. Monitor and direct the activities of the Check-In Assistants personnel.
- ☐ 6. Provide a list of personnel accounted and unaccounted for and any Muster Stations that have not reported to the Control Centre.
- ☐ 7. Once the control centre gives the **Stand Down**, communicate with the individual muster stations, proceed with releasing personnel.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Check In Assistant(s)

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

As Assigned By the Check–In Coordinator

& Reports Directly to the Check-In Coordinator

- ☐ 1. Take the SURFACE/TAILINGS CREW ROSTER RECORD and list all personnel. Enter their name in the appropriate column on the record sheet.
- ☐ 2. Take and use the MUSTER STATION RECORD sheets to call all MUSTER stations and mark the name, employer/company name, muster location, and condition of all personnel. Repeat the names to the muster station attendant for verification. Ensure to include the muster station attendant name.
- ☐ 3. The check-in assistants will then compile the MUSTER STATION RECORD sheets and SURFACE/TAILINGS CREW ROSTER RECORD sheets to determine unaccounted personnel.

  IMPORTANT: Take the information from the MUSTER STATION RECORD and check the colored box on the SURFACE/TAILINGS CREW ROSTER RECORD next to the person's name. Using this method, personnel listed on the SURFACE/TAILINGS CREW ROSTER RECORD will already be marked in the light colored boxes, and the personnel accounted for in the muster stations will be marked in the darker boxes with an X.
- ☐ 4. Provide a list of personnel unaccounted-for to the Check-In Coordinator.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Engineering Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

Duties of Engineering Coordinator:

- 1. Have complete, up to date plans showing tailings areas, flows and controls, location of phones, fire equipment, etc.
- 2. Maintain plans to show the location of equipment, muster stations, escape routes, etc.
- 3. Record information in the Engineering Coordinator logbook
- 4. Provide technical assistance to the Incident Commander.
- 5. Follow up and monitor all assigned responsibilities.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Maintenance Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

- ☐ 1. Provide maintenance support, advise the Incident Commander in maintenance support matters.
- ☐ 2. Under the direction of the Incident Commander, provide the necessary maintenance support to the emergency operation
- ☐ a. Oversee responsibilities
- ☐ 3. Assign a Mechanical Supervisor
- ☐ b. Oversee responsibilities
- ☐ 4. Record information in the Maintenance Coordinator logbook

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Transportation Supervisor

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Operations Chief

- ☐ 1. Compile a list of available surface/tailings vehicles
- ☐ 2. Get all available sets of keys from Maintenance Planner – Mike #2788
- ☐ 3. Assign vehicles as needed and monitor usage
- ☐ 4. Arrange logistics, both on and off site transportation.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Personnel Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Operations Chief

- ☐ 1. Guide all personnel accounted for to the designated muster area. (AFTON, CERRO, PEAK conference rooms.
- ☐ 2. Monitor all personnel in the muster area. – **Ask for help from Finance team if available**
- ☐ 3. Inform employees not to leave the muster point until notified.
- ☐ a. Ensure telephones are not used without authorization (no external telephone communication access).
- ☐ b. Assign personnel requested for tasks by the Control Centre.
- ☐ 4. Organize food and refreshments to team.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Environmental Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Incident Commander

- ☐ 1. Assemble at the Control Centre.
- ☐ 2. Provide technical information as to the emergency and any environmental requirements.
- ☐ 3. Provide any and all needed expertise concerning involved chemicals or other toxins.
- ☐ 4. Provide any and all needed expertise concerning health risk & hazard analysis on chemicals or other toxins.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Surface Rescue Coordinator

New Afton Surface/Tailings Emergency Command Centre

(Mesquite Conference Room) 250-377-2732

Reports directly to the Safety Supervisor or Incident Commander

- ☐ 1. Confirm with the Control Centre that surface rescue personnel are required.
- ☐ 2. Contact the Incident Commander when the rescue team has been activated.
- ☐ 3. Ensure that only surface rescue and support personnel are allowed in the rescue room.
- ☐ 4. Keep track of surface rescue teams, which have reported for duty.
- ☐ 5. Keep track of surface rescue teams and personnel on standby to report their progress to the Control Centre.
- ☐ 6. See to any immediate & long term needs for rescue teams
- ☐ 7. Sign in surface rescue personnel as they report to the surface rescue room.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 11	Mine Rescue

Security Control

New Afton Surface/Tailings Emergency Command Centre (Mesquite Conference Room) 250-377-2732

- ☐ 1. When notified, gather as much information as possible about the event.

  Time of Event: _____ Time Notified:_____

  Location of Event: _____

  Event Description: _____

  Person reporting event & radio #. Inform them to stay on channel 5:

  _____

  Injuries & number of casualties: _____
- ☐ 2. **Close Gates**, ask people to leave the security shack, no one in or out. Do NOT give out any information to visitors on the situation. Call CODE ONE 3 times on channels 11, 1, 2, 3, 4, 5, 7, 99, Femco Phone and dial 9000 on land phone lines to announce location and nature of the incident.
- ☐ 3. Print surface & underground rosters ASAP, keep a copy for security, second copy to be delivered to the Incident Commander or designate.
- ☐ 4. *IF THIS IS A MEDICAL EMERGENCY THEN RESPOND WITH FIRST AID EQUIPMENT AND SITE AMBULANCE call 9-1-1 if required.
- ☐ 5. Call Designated Duty Officer (see schedule). Time: _____
- ☐ 6. Call Surface Manager or Designate Surface Manager to inform of the situation.

  Time: _____
- ☐ 7. Call Leanne Litchfield to inform of the situation. Time: _____
- ☐ 8. For a fire - Call Fire & Surface Rescue personnel on CHANNEL 11 and contact other personnel as requested by Duty Officer. Call Fire Surface Rescue Team members or Management if requested.
- ☐ 9. Contact the Incident Commander at 250-377-2732 at the Emergency Operations Centre with updates whenever possible. (Update any relevant incoming calls)
- ☐ 10. Establish off site unauthorized communication restriction. “Only to be done under the direction of the Incident Command” – Not yet available
- ☐ 11. During emergencies requiring management call list to be utilized only Management, Fire & Surface Rescue members, & Ministry of Mines shall be allowed to enter site. Any other personnel shall only be allowed to enter/leave under the direction of the Incident Commander. During the initial stages of any Code 1 or at any time Security Control is overwhelmed by radio traffic related to the emergency Security may restrict access/egress to mine site temporarily.
- ☐ 12. Standby and respond as required.

RADIO CHANNEL USAGE DURING EMERGENCY:

Channel 1	Underground
Channel 2	Pit
Channel 3	Underground - spare
Channel 4	Surface/Tailings
Channel 5	Emergency
Channel 7	Dispatch
Channel 11	Mine Rescue
Channel 99	Parked Channel

*NOTE: Additional CODE 1 announcements may be requested by the Emergency Operations Centre.

*NOTE: IF additional resources (911) are required, then Incident Command will initiate the process.

12. SITE EMERGENCY MANAGEMENT TEAM CONTACT INFORMATION

New Afton Mine Site Emergency Contacts

New Afton Surface/Tailings Command Centre 250-377-2732

Position	Name	Phone Number	Radio	Mobile	Email
A/B Electrical Supervisor	John Lowe	+1 250 571 2806	[redacted]		John.Lowe@newgold.com
A/B Electrical Supervisor	Monte Jezewsky	+1 250 377 2761			Monte.Jezewsky@newgold.com
A/B Mill Mechanical Supervisor	Roger Porter	+1 250 571 2025			Roger.Porter@newgold.com
C/D Crew (Both Shifts)	Bruce Dahlgren	-			Bruce.Dahlgren@newgold.com
C/D Electrical Supervisor	Chris Dawson	+1 250 377 2045			Chris.Dawson@newgold.com
C/D Electrical Supervisor	Dustin Coxon	+1 250 571 2020			Dustin.Coxon@newgold.com
C/D Mill Mechanical Supervisor	Gary Hockett	+1 250 571 2025			Gary.Hockett@newgold.com
Community Specialist	Korah DeWalt-Gagnon	+1 250 377 2810			Korah.Dewalt-Gagnon@newgold.com
Electrical Superintendent	Dean Warren	+1 250 377 2725			Dean.Warren@newgold.com
Environmental Engineer	Emily O'Hara	+1 250 377 2104			Emily.OHara@newgold.com
Environmental Manager	Scott Davidson	+1 250 377 2785			Scott.Davidson@newgold.com
Environmental Officer	Luke Holdstock	+1 250 571 2018			Luke.Holdstock@newgold.com
Environmental Technician	Chrystal Simon	+1 250 571 2018			Chrystal.Simon@newgold.com
Executive Assistant	Rebecca Sullivan	+1 250 377 2781			Rebecca.Sullivan@newgold.com
Finance Manager	Bryan Swanton	+1 250 377 2740			Bryan.Swanton@newgold.com
Fire & Mine Rescue Chief	Mike Owens	+1 250 377 2889			Mike.Owens@newgold.com
First Nations Coordinator	Martha Manuel	+1 250 377 2718			Martha.Manuel@newgold.com
General Manager	Kurt Keskimaki	+1 250 377 2751			Kurt.Keskimaki@newgold.com
HR Manager	Vacant				
HR Supervisor	Katie Koleszar	+1 250 377 2827			Katie.Koleszar@newgold.com
HR Supervisor	Brianna Bloom	+1 250 377 2723			Brianna.Bloom@newgold.com
HR Supervisor	Joanna McKamey	+1 250 377 2716			Joanna.McKamey@newgold.com
Industrial Hygenist	Lisa Robertson	+1 250 377 2752			Lisa.Robertson@newgold.com
Maintenance Manager	John Ritter	+1 250 571 2039			John.Ritter@newgold.com
Mill Captain	Robert Imbeault	+1 250 377 2812			Robert.Imbeault@newgold.com
Mill Manager	Rod Tyreman	+1.250.377.2712			Rod.Tyreman@newgold.com
Mill Superintendent	Martin Froehling	+1 250 377 2713			Martin.Froehling@newgold.com
Mine Manager	Sean Masse	+1 250 377 2779			Sean.Masse@newgold.com
President and CEO	Bob Gallagher	+1 604 639 2001			Robert.Gallagher@newgold.com
Process Operations Supervisor - A Crew	Scott Campbell	+1 250 377 2122			Scott.Campbell@newgold.com
Process Operations Supervisor - B Crew	Vince Sager	+1 250 377 2884			Vince.Sager@newgold.com
Process Operations Supervisor - C Crew	Darryl Fizzard	+1 250 377 2122			Darryl.Fizzard@newgold.com
Process Operations Supervisor - D Crew	Ken Henderson	+1 250 377 2884			Ken.Henderson@newgold.com
Mill Control Room		+1 250 377 2120			
Reliability Leader, Maintenance	Shane Kozoriz	+1 250 377 2130			Shane.Kozoriz@newgold.com
Projects Engineer, Maintenance	Matt Davis	+1 250 377 2125			Matt.Davis@newgold.com
Safety Administrator	Sarah Smith	+1 250 377 2717			Sarah.Smith@newgold.com
Safety Advisor	Ashley Hooper	+1 250 571 2011			Ashley.Hooper@newgold.com
Safety Manager	Kevin Mihalicz	+1 250 377 2770			Kevin.Mihalicz@newgold.com
Tailings & Suface Coordinator	Tim Keane	+1 250 377 2735			Tim.Keane@newgold.com
Training Coordinator	Leanne Litchfield	+1 250 571 2006			Leanne.Litchfield@newgold.com
VP Operations	Vacant				
Ministry of Environment	Brian Yamelst	+1 250 371 6323			brian.yamelst@gov.bc.ca
Ministry of Energy & Mines - Inspector	Stephen Rothman	+1 250 371 3780			Stephen.Rothman@gov.bc.ca
Ministry of Energy & Mines - Geotechnic	Michael Cullen	+1 250 339 2633			michaelcullen@shaw.ca

13. MINE RESCUE TEAM CONTACT INFORMATION

Mine Rescue Team Contact Info

Name	Crew	Office	Cell	Mike No	Email	Home
Mine Rescue Co-ordinator						
Mike Owens	**5/2**	**250-377-2889**			mike.owens@newgold.com	
Kevin Mihalicz	**5/2**	**250-377-2770**			kevin.mihalicz@newgold.com	
Fire & Mine Rescue Officers						
Cpt. Chris O'Hara (5/2)	A	250-377-2102			christopher.ohara@newgold.com	
Lt. Kyle Staples	A	250-377-2132			K_staples2@hotmail.com	
Cpt. Jared Moe*	B	250-377-2789			jared.moe@newgold.com	
Lt. Monte Spencer	B	250-377-2132			mspencer_79@hotmail.com	
Cpt. Calvin Fedechko	C	None			calvin_fedechko@hotmail.com	
Lt. Jordyn Radymski	C	250-377-2132			jordgski@hotmail.com	
Cpt. Ron Hart	D	None			rghart@hotmail.ca	
Lt. Peter Klaponski (5/2)	D	250-571-2019			peter.klaponski@newgold.com	
Bench Technician						
Jane McCaw	5/2	250-377-2790			jane.mccaw@newgold.com	
Fire & Mine Rescue Members						
Adam Marsh	A/B	250-377-2875			adam.marsh@gmail.com	
Ahsan Chaudhary	5/2	250-571-2021			ahsan.chaudhary@newgold.com	
Alan Long	A/B	250-377-2734			alan.long@newgold.com	
Andrew Horton	D				arphorton@gmail.com	
Andrey Sharay	A				andreysharay@gmail.com	
Barry Knorr	A/B	250-377-2132			barry_knorr18@hotmail.com	
Brandon Moe	A				moebrandon@gmail.com	
Carson Fraser	B	250-377-2132			deepsea420@yahoo.com	
Chris Fournier	C	250-377-2132			chris.fournier@newgold.com	
Chris Sydenham	B	250-377-2132			syde_69@hotmail.com	
Clint Burton	5/2	250-571-2022			clint.burton@newgold.com	
Clint Gill	A	250-571-2016			clint.gill@newgold.com	
Coran Wlodarczyk	A	250-377-2734			coran.wlodarczyk@newgold.com	
Curtis Smith	C/D				curtissmith14@hotmail.com	
Dan Light	C				df_light@hotmail.com	
Dan Waterman	B	250-377-2132			thewaterman4@gmail.com	
Dustin Coxon*	C/D	250-377-2128			dustin.coxon@newgold.com	
Grant Kornelson	B	250-377-2731			grant.kornelson@newgold.com	
Greg Reynolds	A	250-377-2132			greynolds88@live.ca	
Jay Froese	C	250-377-2132			jay.froese@newgold.com	
Jayson Kennedy	D	250-377-2132			jaysonkennedy6@gmail.com	
Jerald Fiddick	A/B				swiftwatertech@gmail.com	
Jim Faulkner	5/2	250-377-2816			jim.faulkner@newgold.com	
Ken MacLeod	C				Kenneth.MacLeod@newgold.com	
Kris Edwards	D	250-377-2734			krisdavidedwards@gmail.com	
Kyle Kubin	A				kylekubin@gmail.com	
Logan Reese	B				reeselogan@live.ca	
Matt Baikov	B				mathew.baikov@newgold.com	
Michael Letterlough	D				michael.letterlough@newgold.com	
Mick Sidhu	C/D	250-377-2132			micksid64@gmail.com	
Mike Birtwistle	C	250-377-2132			mike.birtwistle@newgold.com	
Mike Harrison	D	250-377-2132			tinroof@shaw.ca	
Mike Martin	A	250-377-2132			mike.martin@newgold.com	
Mike Petherick	A/B	250-377-2775			mike.petherick@newgold.com	
Nicholas Smith	C	250-377-2824			nicholas.smith@newgold.com	
Peter Prochotsky	D	250-377-2676			peter.prochotsky@newgold.com	
Petri Pesonen	D				everythinglog@hotmail.com	
Roger Spencer	D				rog07@hotmail.com	
Ryan Favali	5/2	250-377-2882			ryan.favali@newgold.com	
Susan Filipe	A	None			susan.filipe@newgold.com	

* Bench Tech

14. LOGBOOK TEMPLATES

The following list includes the Log and Logbook Templates that will be used in the event of a Tailings Facility incident/emergency:

- Communication Logbook
- Incident Command Logbook
- Operations Chief Logbook
- Engineering Coordinator Logbook
- Maintenance Coordinator Logbook
- Safety Advisor Logbook
- Environmental Logbook
- Muster Station Log
- Recorder Logbook
- Check-In Coordinator Logbook
- Surface Crew Roster Record
- Transportation Supervisor Logbook
- Surface Rescue Team Record

As part of the EPRP Training Program, each individual that is assigned or designated to be responsible for the implementation of these logs in the event of an incident/emergency will be trained on its application.

Logbook Template

Control Centre: 377-2732

Tailings/Surface Emergency Assignment: _____

Type of Emergency: _____

Completed By: _____

Date: _____

Sign Off: _____

Time	Name of Caller	Location of Caller	Comments/ Conditions

Surface Rescue Team Record

Coordinators Name:

Date:

Time Arrived	Team No.	On or Off	Time In	Time Out	Remarks

SURFACE / TAILINGS CREW ROSTER RECORD

CONTROL CENTRE PHONE NUMBER: 250-377-2732

TIME:_____am/pm

CHECK-IN ASSISTANT NAME:

IMPORTANT: Print Employee Names Clearly

Step 1 – refer to the crew roster and record ONLY the names of personnel that are signed in on the surface/tailings crew roster.

Step 2 – Use one sheet per muster station & mark an X in the shaded column once accounted for:

	X	Name		X	Name
1.			**26.**		
2.			**27.**		
3.			**28.**		
4.			**29.**		
5.			**30.**		
6.			**31.**		
7.			**32.**		
8.			**33.**		
9.			**34.**		
10.			**35.**		
11.			**36.**		
12.			**37.**		
13.			**38.**		

14.			**39.**		
15.			**40.**		
16.			**41.**		
17.			**42.**		
18.			**43.**		
19.			**44.**		
20.			**45.**		
21.			**46.**		
22.			**47.**		
23.			**48.**		
24.			**49.**		
25.			**50.**		

CHECK-IN ASSISTANT NAME:_____

Muster Station Location : Tailings Storage Facility Muster Point
Conditions in Muster Station:
Communication by: Femco or Radio

USE ONE SHEET PER MUSTER STATION & MARK AN X IN THE COLUMN WHEN PERSONNEL IS ACCOUNTED FOR IN STATION

	X	Name	Company		X	Name	Company
1.				27.			
2.				28.			
3.				29.			
4.				30.			
5.				31.			
6.				32.			
7.				33.			
8.				34.			
9.				35.			
10.				36.			
11.				37.			
12.				38.			
13.				39.			
14.				40.			

15.				41.			
16.				42.			
17.				43.			
18.				44.			
19.				45.			
20.				46.			
21.				47.			
22.				48.			
23.				49.			
24.				50.			
25.				51.			
26.				52.			

APPENDIX A
DRAWINGS

ULTIMATE DAM CONSTRUCTION POINTS					
POINT #	STATION (m)	UTM NAD 83 ZONE 10 (m)		MINE GRID (m)	
		EASTING (m)	NORTHING (m)	EASTING (m)	NORTHING (m)
UD-1	0+000	676671.5	5613833.8	3643.3	449.0
UD-2	0+281	676456.0	5614014.2	3642.9	730.1
UD-3	0+942	675795.4	5614042.0	3239.7	1254.1
UD-4	1+209	675572.1	5613896.1	2984.3	1331.4
UD-5	2+200	675607.4	5612906.0	2248.4	667.9

NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
4. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 PROVIDED BY NEW GOLD INC., JULY 2013 LIDAR PROVIDED BY CHALLENGER GEOMATICS LTD. AND 2008 SURVEY PROVIDED BY ACRES ENTERPRISES LTD. 2013 CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 1, 2014 AND FEBRUARY 13, 2014 SURVEY, BOTH PROVIDED BY NEW GOLD INC. CONTOUR INTERVAL IS 1 m.
5. WASTE ROCK BOUNDARY TAKEN FROM OCTOBER 2008 DESIGN REPORT UPDATE BY VECTOR ENGINEERING INC.
6. LLDPE GEOMEMBRANE LINER BOUNDARY TAKEN FROM FEBRUARY 20, 2012 SURVEY PROVIDED BY ACRES ENTERPRISES LTD.
7. TYPICAL CYCLONE SAND DIMENSIONS ARE 75.0 m IN LENGTH AND 30.0 m IN WIDTH. THE DIMENSION OF CYCLONE SAND CELL US4B AND US6A WILL VARY, AND WILL NEED TO BE FIELD FIT, AS DIRECTED BY THE ENGINEER.
8. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

ISSUED FOR TENDER

LEGEND
- STATION MARKER
- UD-1 CONSTRUCTION POINT
- US1A TYPICAL UPSTREAM CELL ID
- DS1A TYPICAL DOWNSTREAM CELL ID
- TYPICAL CYCLONE SAND CELL
- SURVEY BOUNDARY
- SEEPAGE POND
- DAM REFERENCE LINE
- WASTE ROCK BOUNDARY
- LLDPE GEOMEMBRANE LINER

SCALE 1:3,000
50 0 50 100 150
METRES

THIS BAR MEASURES 100 mm AT FULL SIZE ALL SCALES REFERENCED TO FULL SIZE.

X:\Projects\0921 New Gold Inc\007 - New Afton\Workspace\20140116_JFT_REV_A_NEW_AFTON_PROJECTMA-XD-03-12_-_REV_A_TSF_2014_RAISE_-_GEN

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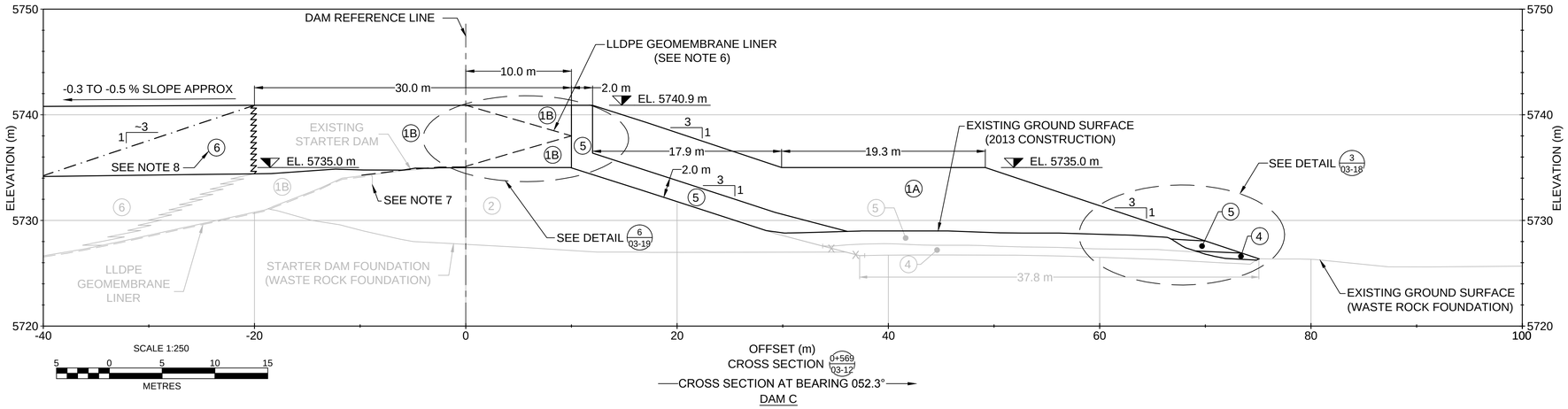
A	14	03	13	CJT	AR	TH	CL	ISSUED FOR TENDER									

DRAWN BY: CJT	CHECK DRAWING: CJT	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: NEW AFTON PROJECT
DESIGN BY: AR	CHECK DESIGN: CL		TITLE: TSF 2014 RAISE - GENERAL ARRANGEMENT
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014	CLIENT: NEW GOLD INC.	SCALE: 1:3,000 / DWG NO.: NA-XD-03-12 / REV.: A
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014		

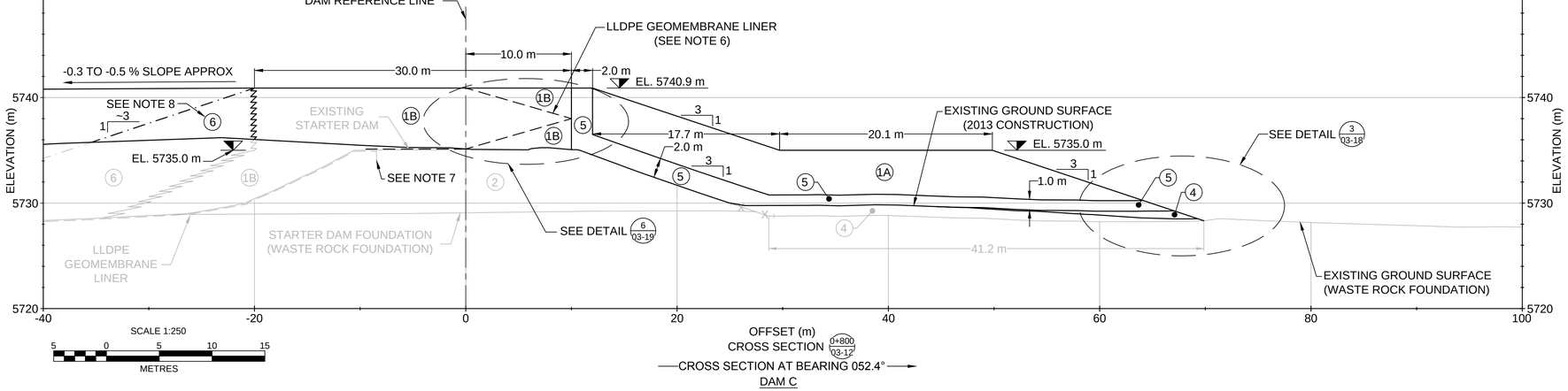
SOUTH UTM NAD 83 ZONE 10 (E: 676,167, N: 5,613,986)
SOUTHWEST MINE GRID (E: 3,436, N: 934)
UPSTREAM

NORTH UTM NAD 83 ZONE 10 (E: 676,173, N: 5,614,126)
NORTHEAST MINE GRID (E: 3,547, N: 1,019)
DOWNSTREAM



SOUTH UTM NAD 83 ZONE 10 (E: 675,936, N: 5,613,996)
SOUTHWEST MINE GRID (E: 3,295, N: 1,117)
UPSTREAM

NORTH UTM NAD 83 ZONE 10 (E: 675,942, N: 5,614,136)
NORTHEAST MINE GRID (E: 3,406, N: 1,202)
DOWNSTREAM



ISSUED FOR TENDER

LEGEND

- 1A DOWNSTREAM CYCLONE SAND[4]
- 1B UPSTREAM CYCLONE SAND[4]
- 2 TILL
- 4 COARSE FILTER
- 5 FINE FILTER
- 6 MIXED ZONE: CYCLONE SAND AND WHOLE TAILINGS
- APPROXIMATE EXTENT OF MIXED ZONE
- LLDPE GEOMEMBRANE LINER
- DAM REFERENCE LINE
- GEOTEXTILE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 AND 2013 CONSTRUCTION RECORDS SURVEY DATED JANUARY 1, 2014 BOTH PROVIDED BY NEW GOLD INC. STARTER DAM FOUNDATION SURVEY TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 8, 2012 BOTH PROVIDED BY ACRES ENTERPRISES LTD.
4. MATERIAL 1A AND 1B WILL BE CONSTRUCTED BY THE OWNER. MECHANICALLY PLACED MATERIAL 1B WILL BE CONSTRUCTED BY THE CONTRACTOR PER THE TECHNICAL SPECIFICATIONS. 2.0 m OF MECHANICALLY PLACED MATERIAL 1A WILL BE CONSTRUCTED BY THE CONTRACTOR TO PROTECT THE FINE FILTER AS DIRECTED BY THE ENGINEER.
5. DOWNSTREAM COARSE FILTER AND FINE FILTER BLANKETS ARE MEASURED NOMINAL TO THE GROUND SURFACE. 1.0 m OF COARSE FILTER IS REQUIRED OVER WASTE ROCK FOUNDATION.
6. FOR THE PURPOSE OF THIS DRAWING THE LLDPE GEOMEMBRANE LINER HAS BEEN SIMPLIFIED, AND WILL BE CONSTRUCTED PER THE TECHNICAL SPECIFICATIONS AND DESIGNS PROVIDED ON DRAWING NA-XD-03-19 DETAIL 6.
7. GEOMEMBRANE ANCHOR TRENCH LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. REMOVAL OF MATERIAL 1B WILL BE REQUIRED TO EXPOSE THE LINER WITH APPROPRIATE EQUIPMENT SO AS NOT TO DAMAGE OR DISPLACE THE LINER PRIOR TO SEAMING, AS DIRECTED BY THE ENGINEER.
8. APPROXIMATE ZONE OF MIXED CYCLONE SAND AND WHOLE TAILINGS.
9. DEPTH OF FOUNDATION PREPARATION AS APPROVED BY THE ENGINEER BASED ON FOUNDATION CONDITIONS. SEE DRAWING NA-XD-03-21 FOR FOUNDATION PREPARATION DETAILS.
10. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

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DRAWN BY: AH	CHECK DRAWING: CJT
DESIGN BY: AR	CHECK DESIGN: CL
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: NEW GOLD INC.

PROJECT: NEW AFTON PROJECT

TITLE: TSF 2014 RAISE - CROSS-SECTIONS 0+569 AND 0+800

SCALE:	DWG NO.:	REV.:
1:250	NA-XD-03-13	A

THIS BAR MEASURES 100 mm AT FULL SIZE. ALL SCALES REFERENCED TO FULL SIZE.

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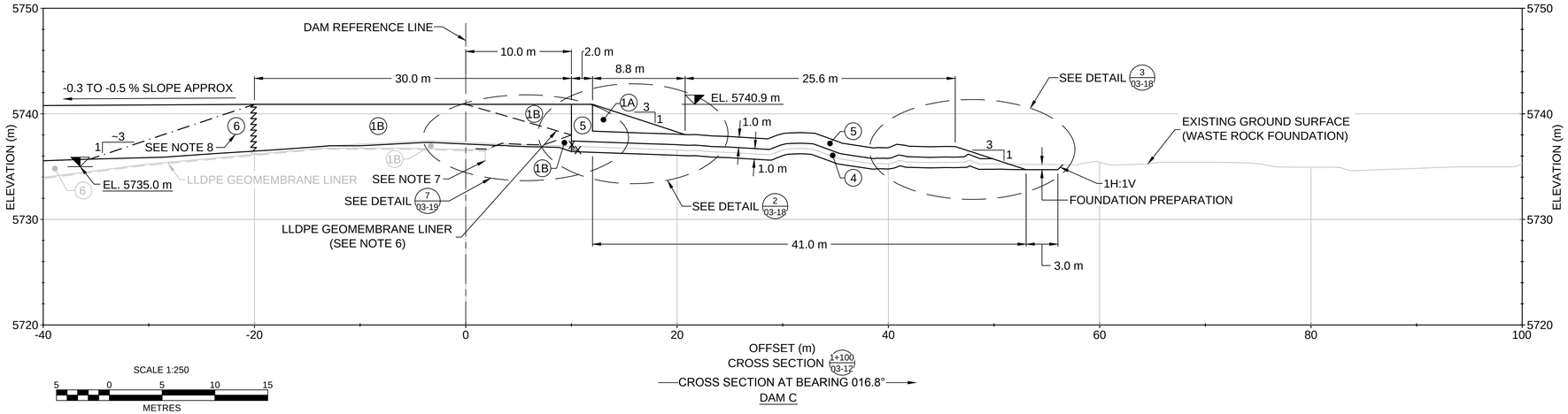

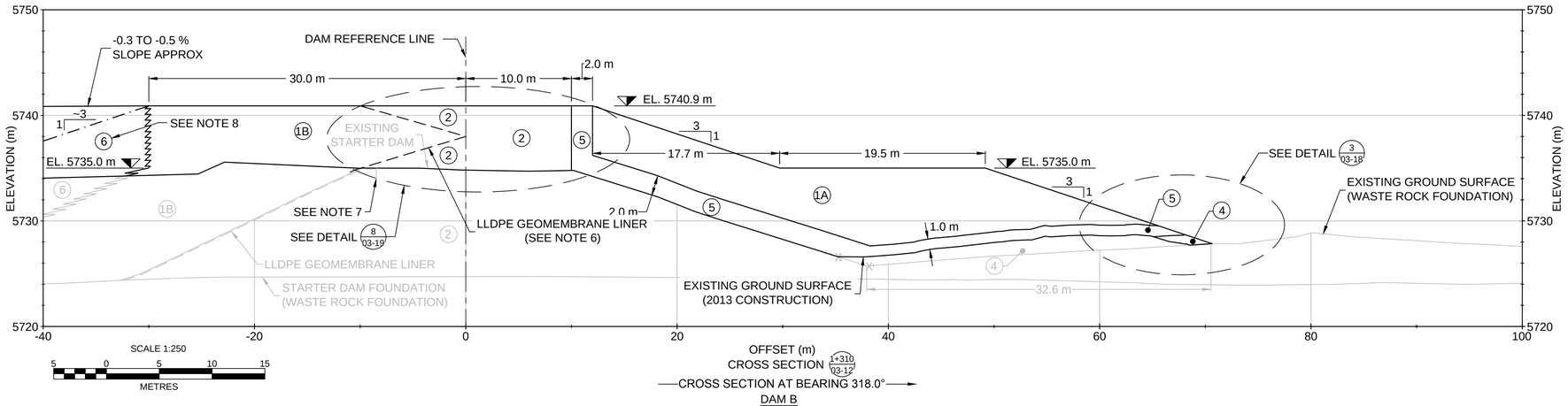

ISSUED FOR TENDER

LEGEND

- 1A — DOWNSTREAM CYCLONE SAND[4]
- 1B — UPSTREAM CYCLONE SAND[4]
- 2 — TILL
- 4 — COARSE FILTER
- 5 — FINE FILTER
- 6 — MIXED ZONE: CYCLONE SAND AND WHOLE TAILINGS
- APPROXIMATE EXTENT OF MIXED ZONE
- LLDPE GEOMEMBRANE LINER
- DAM REFERENCE LINE
- GEOTEXTILE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 AND 2013 CONSTRUCTION RECORDS SURVEY DATED JANUARY 1, 2014 BOTH PROVIDED BY NEW GOLD INC. STARTER DAM FOUNDATION SURVEY TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 8, 2012 SURVEY BOTH PROVIDED BY ACRES ENTERPRISES LTD.
4. MATERIAL 1A AND 1B WILL BE CONSTRUCTED BY THE OWNER. MECHANICALLY PLACED MATERIAL 1B WILL BE CONSTRUCTED BY THE CONTRACTOR PER TECHNICAL SPECIFICATIONS. 2.0 m OF MATERIAL 1A WILL BE CONSTRUCTED BY THE CONTRACTOR TO PROTECT THE FINE FILTER AS DIRECTED BY THE ENGINEER.
5. DOWNSTREAM COARSE FILTER AND FINE FILTER BLANKETS ARE MEASURED NOMINAL TO THE GROUND SURFACE. 1.0 m OF COARSE FILTER IS REQUIRED OVER WASTE ROCK FOUNDATION.
6. FOR THE PURPOSE OF THIS DRAWING THE LLDPE GEOMEMBRANE LINER HAS BEEN SIMPLIFIED, AND WILL BE CONSTRUCTED PER THE TECHNICAL SPECIFICATIONS AND DESIGNS PROVIDED ON DRAWING NA-XD-03-19 DETAIL 7 AND DETAIL 8.
7. GEOMEMBRANE ANCHOR TRENCH LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. REMOVAL OF MATERIAL 1B WILL BE REQUIRED TO EXPOSE THE LINER WITH APPROPRIATE EQUIPMENT SO AS NOT TO DAMAGE OR DISPLACE THE LINER PRIOR TO SEAMING, AS DIRECTED BY THE ENGINEER.
8. APPROXIMATE ZONE OF MIXED CYCLONE SAND AND WHOLE TAILINGS.
9. DEPTH OF FOUNDATION PREPARATION AS APPROVED BY ENGINEER BASED ON FOUNDATION CONDITIONS. SEE DRAWING NA-XD-03-21 FOR FOUNDATION PREPARATION DETAILS.
10. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

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DRAWN BY: CJT	CHECK DRAWING: CJT
DESIGN BY: AR	CHECK DESIGN: CL
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: NEW GOLD INC.

PROJECT: NEW AFTON PROJECT

TITLE: TSF 2014 RAISE - CROSS-SECTIONS 1+100 AND 1+310

SCALE:	DWG NO.:	REV.:
1:250	NA-XD-03-14	A

THIS BAR MEASURES 100 mm AT FULL SIZE. ALL SCALES REFERENCED TO FULL SIZE.

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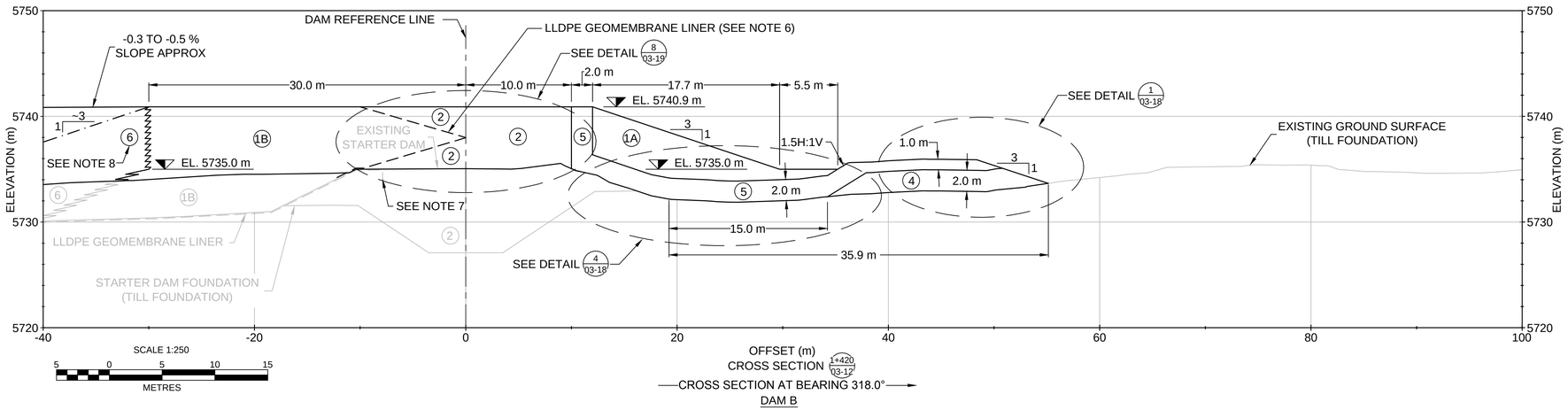
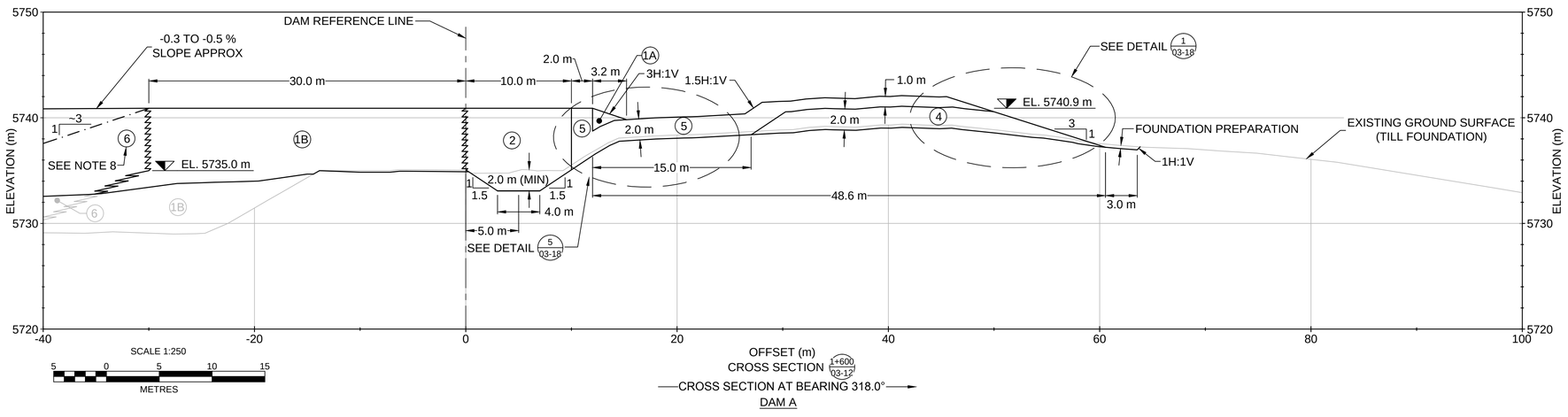
EAST UTM NAD 83 ZONE 10 (E: 675,620, N: 5,613,687)
SOUTHEAST MINE GRID (E: 2,854, N: 1,160)
UPSTREAM

WEST UTM NAD 83 ZONE 10 (E: 675,480, N: 5,613,682)
NORTHWEST MINE GRID (E: 2,760, N: 1,264)
DOWNSTREAM



EAST UTM NAD 83 ZONE 10 (E: 675,626, N: 5,613,507)
SOUTHEAST MINE GRID (E: 2,721, N: 1,040)
UPSTREAM

WEST UTM NAD 83 ZONE 10 (E: 675,486, N: 5,613,502)
NORTHWEST MINE GRID (E: 2,627, N: 1,144)
DOWNSTREAM



NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 AND 2013 CONSTRUCTION RECORDS SURVEY DATED JANUARY 1, 2014 BOTH PROVIDED BY NEW GOLD INC. STARTER DAM FOUNDATION SURVEY TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 8, 2012 SURVEY BOTH PROVIDED BY ACRES ENTERPRISES LTD.
4. MATERIAL 1A AND 1B WILL BE CONSTRUCTED BY THE OWNER. MECHANICALLY PLACED MATERIAL 1B WILL BE CONSTRUCTED BY THE CONTRACTOR PER TECHNICAL SPECIFICATIONS. 2.0 m OF MECHANICALLY PLACED MATERIAL 1A WILL BE CONSTRUCTED BY THE CONTRACTOR TO PROTECT THE FINE FILTER AS DIRECTED BY THE ENGINEER.
5. DOWNSTREAM COARSE FILTER AND FINE FILTER BLANKETS ARE MEASURED NOMINAL TO THE GROUND SURFACE. 2.0 m OF FINE FILTER IS REQUIRED FOR 15.0 m TRANSITIONING TO 2.0 m OF COARSE FILTER OVER TILL FOUNDATION.
6. FOR THE PURPOSE OF THIS DRAWING THE LLDPE GEOMEMBRANE LINER HAS BEEN SIMPLIFIED, AND WILL BE CONSTRUCTED PER THE TECHNICAL SPECIFICATIONS AND DESIGNS PROVIDED ON DRAWING NA-XD-03-19 DETAIL 8.
7. GEOMEMBRANE ANCHOR TRENCH LOCATION IS APPROXIMATE AND WILL BE DETERMINED IN THE FIELD BY THE ENGINEER. REMOVAL OF MATERIAL 1B WILL BE REQUIRED TO EXPOSE THE LINER WITH APPROPRIATE EQUIPMENT SO AS NOT TO DAMAGE OR DISPLACE THE LINER PRIOR TO SEAMING, AS DIRECTED BY THE ENGINEER.
8. APPROXIMATE ZONE OF MIXED CYCLONE SAND AND WHOLE TAILINGS.
9. THE DEPTH OF THE CORE TRENCH WITHIN THE TILL FOUNDATION IS 2.0 m MINIMUM OR AS APPROVED BY THE ENGINEER BASED ON OBSERVED FOUNDATION CONDITIONS. KEYING INTO THE EXISTING CORE TRENCH IS REQUIRED PER THE TECHNICAL SPECIFICATIONS.
10. DEPTH OF FOUNDATION PREPARATION AS APPROVED BY ENGINEER BASED ON FOUNDATION CONDITIONS. SEE DRAWING NA-XD-03-21 FOR FOUNDATION PREPARATION DETAILS.
11. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

ISSUED FOR TENDER

LEGEND
- 1A — DOWNSTREAM CYCLONE SAND[4]
- 1B — UPSTREAM CYCLONE SAND[4]
- 2 — TILL
- 4 — COARSE FILTER
- 5 — FINE FILTER
- 6 — MIXED ZONE: CYCLONE SAND AND WHOLE TAILINGS
- APPROXIMATE EXTENT OF MIXED ZONE
- DAM REFERENCE LINE

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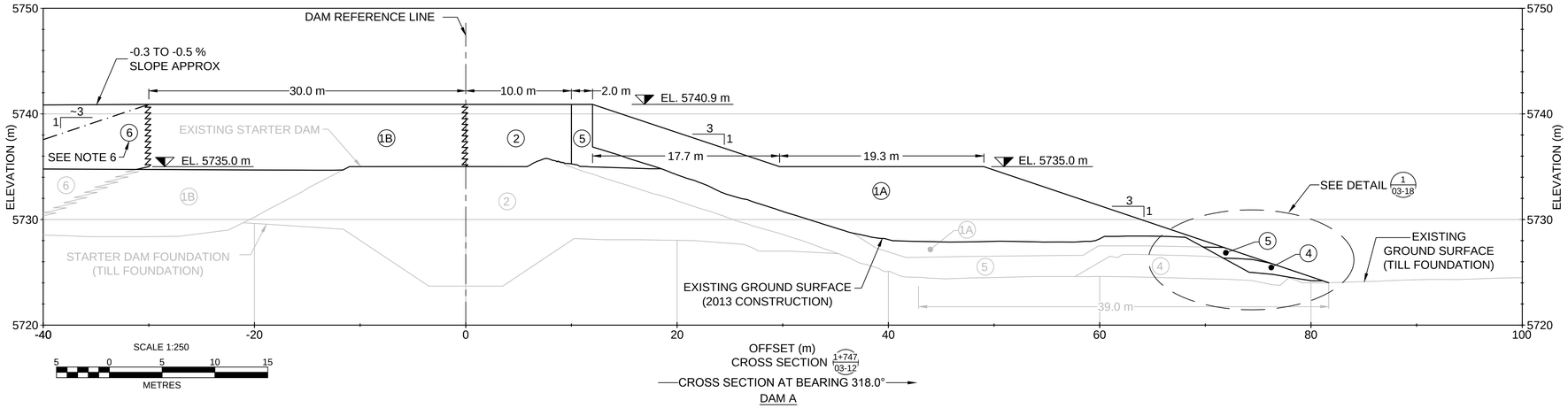
A	14	03	13	CJT	AR	TH	CL	ISSUED FOR TENDER

REV. NO.	YY	MM	DD	DRAWN	DESIGN	CHECK	APPROVED	REVISION / ISSUED DESCRIPTIONS

DRAWN BY: CJT	CHECK DRAWING: CJT	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: NEW AFTON PROJECT
DESIGN BY: AR	CHECK DESIGN: CL		TITLE: TSF 2014 RAISE - CROSS-SECTIONS 1+420 AND 1+600
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014	CLIENT: NEW GOLD INC.	SCALE: 1:250 / DWG NO.: NA-XD-03-15 / REV.: A
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014		

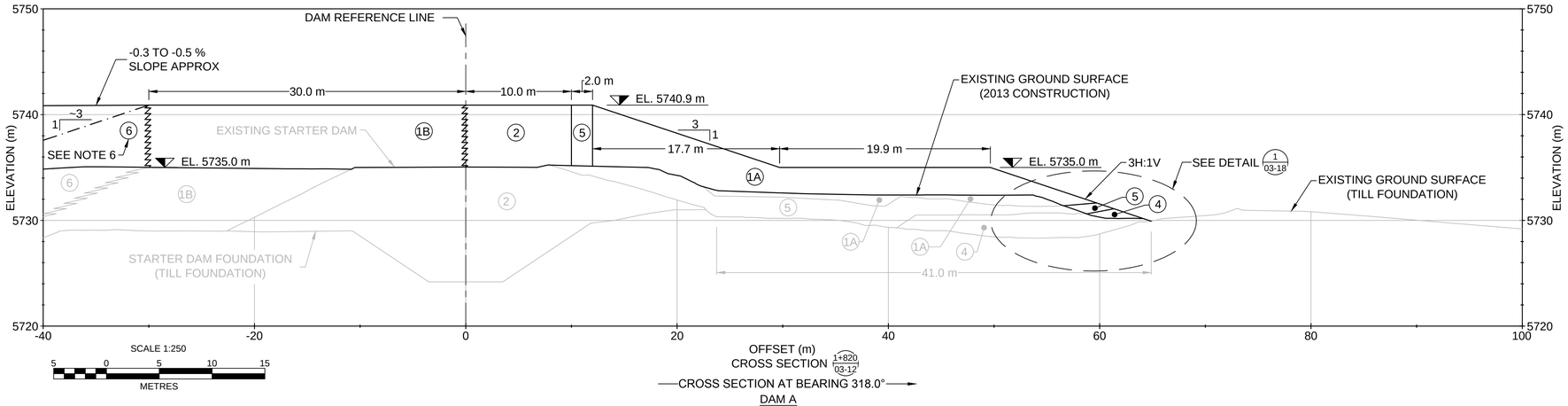
EAST UTM NAD 83 ZONE 10 (E: 675,631, N: 5,613,360)
SOUTHEAST MINE GRID (E: 2,612, N: 942)
UPSTREAM

WEST UTM NAD 83 ZONE 10 (E: 675,491, N: 5,613,355)
NORTHWEST MINE GRID (E: 2,518, N: 1,046)
DOWNSTREAM



EAST UTM NAD 83 ZONE 10 (E: 675,634, N: 5,613,287)
SOUTHEAST MINE GRID (E: 2,463, N: 997)
UPSTREAM

WEST UTM NAD 83 ZONE 10 (E: 675,494, N: 5,613,282)
NORTHWEST MINE GRID (E: 2,557, N: 893)
DOWNSTREAM



ISSUED FOR TENDER

LEGEND
- 1A — DOWNSTREAM CYCLONE SAND[4]
- 1B — UPSTREAM CYCLONE SAND[4]
- 2 — TILL
- 4 — COARSE FILTER
- 5 — FINE FILTER
- 6 — MIXED ZONE: CYCLONE SAND AND WHOLE TAILINGS
- APPROXIMATE EXTENT OF MIXED ZONE
- DAM REFERENCE LINE

NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 AND 2013 CONSTRUCTION RECORDS SURVEY DATED JANUARY 1, 2014 BOTH PROVIDED BY NEW GOLD INC. STARTER DAM FOUNDATION SURVEY TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 8, 2012 SURVEY BOTH PROVIDED BY ACRES ENTERPRISES LTD.
4. MATERIAL 1A AND 1B WILL BE CONSTRUCTED BY THE OWNER. MECHANICALLY PLACED MATERIAL 1B WILL BE CONSTRUCTED BY THE CONTRACTOR PER THE TECHNICAL SPECIFICATIONS. 2.0 M OF MECHANICALLY PLACED MATERIAL 1A WILL BE CONSTRUCTED BY THE CONTRACTOR TO PROTECT THE FINE FILTER AS DIRECTED BY THE ENGINEER.
5. DOWNSTREAM COARSE FILTER AND FINE FILTER BLANKETS ARE MEASURED NOMINAL TO THE GROUND SURFACE. 2.0 m OF FINE FILTER IS REQUIRED FOR 15.0 m TRANSITIONING TO 2.0 m OF COARSE FILTER OVER TILL FOUNDATION.
6. APPROXIMATE ZONE OF MIXED CYCLONE SAND AND WHOLE TAILINGS.
7. DEPTH OF FOUNDATION PREPARATION AS APPROVED BY ENGINEER BASED ON FOUNDATION CONDITIONS. SEE DRAWING NA-XD-03-21 FOR FOUNDATION PREPARATION DETAILS.
8. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

REVISION INFORMATION

REV. NO.	YY	MM	DD	DRAWN	DESIGN	CHECK	APPROVED	REVISION / ISSUED DESCRIPTIONS
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REV. NO.	YY	MM	DD	DRAWN	DESIGN	CHECK	APPROVED	REVISION / ISSUED DESCRIPTIONS

DRAWN BY: CJT	CHECK DRAWING: CJT
DESIGN BY: AR	CHECK DESIGN: CL
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: NEW GOLD INC.

PROJECT: NEW AFTON PROJECT

TITLE: TSF 2014 RAISE - CROSS-SECTIONS 1+747 AND 1+820

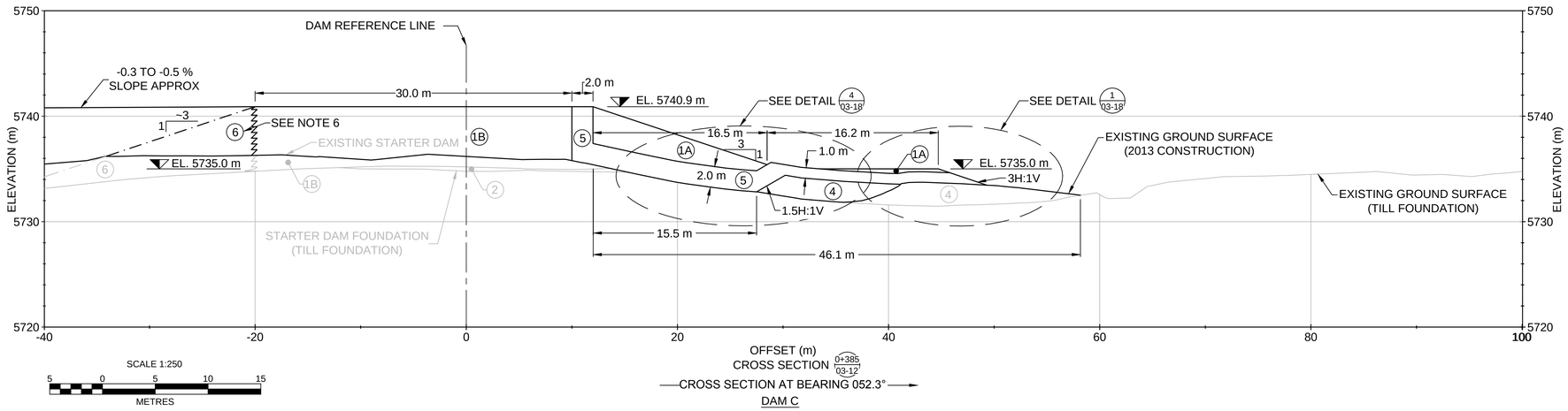
SCALE:	DWG NO.:	REV.:
1:250	NA-XD-03-16	A

THIS BAR MEASURES 100 mm AT FULL SIZE. ALL SCALES REFERENCED TO FULL SIZE.

X:\Projects\0921 New Gold Inc\007 - New Afton\Workspace\20140116_JFT_REV_A_NEW_AFTON_PROJECT\ NA-XD-03-16 - _REV_A_TSF_2014_RAISE_-_CROSS-SECTIONS_1+747_AND_1+820.dwg Layout: NA-XD-03-16 Plot Date: Mar 13 14 Time: 1:20 PM

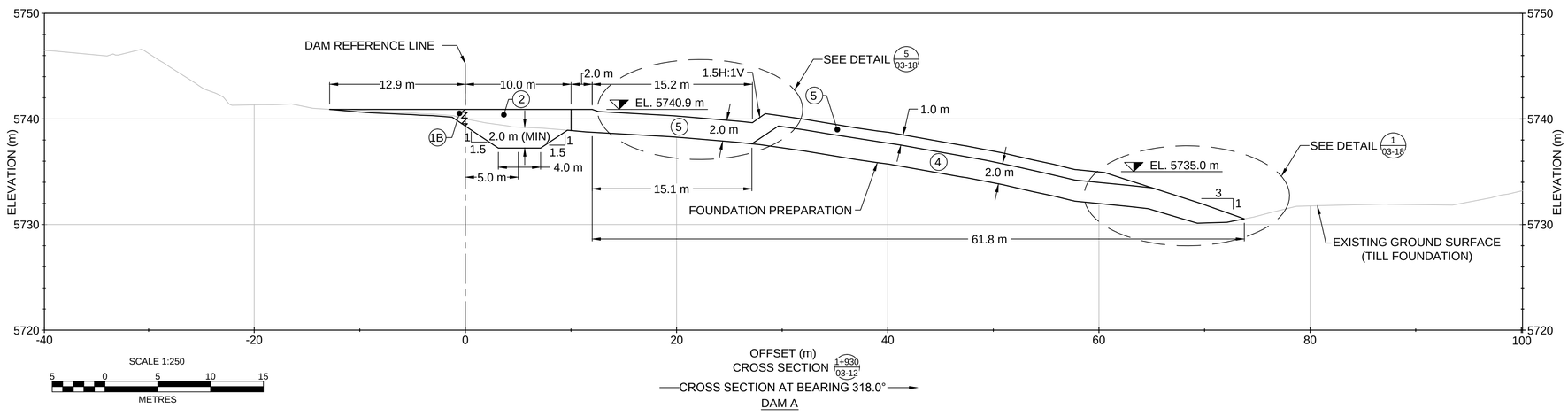
SOUTH UTM NAD 83 ZONE 10 (E: 676,331, N: 5,613,979)
SOUTHWEST MINE GRID (E: 3,535, N: 804)
UPSTREAM

NORTH UTM NAD 83 ZONE 10 (E: 676,331, N: 5,613,979)
NORTHEAST MINE GRID (E: 3,646, N: 889)
DOWNSTREAM



SOUTH UTM NAD 83 ZONE 10 (E: 675,638, N: 5,613,177)
SOUTHWEST MINE GRID (E: 2,475, N: 819)
UPSTREAM

NORTH UTM NAD 83 ZONE 10 (E: 675,498, N: 5,613,172)
NORTHEAST MINE GRID (E: 2,381, N: 923)
DOWNSTREAM



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3. EXISTING GROUND SURFACE TAKEN FROM FOUNDATION PREPARATION SURVEY DATED NOVEMBER 25, 2013 AND 2013 CONSTRUCTION RECORDS SURVEY DATED JANUARY 1, 2014 BOTH PROVIDED BY NEW GOLD INC. STARTER DAM FOUNDATION SURVEY TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURVEY TAKEN FROM JANUARY 8, 2012 SURVEY BOTH PROVIDED BY ACRES ENTERPRISES LTD.
4. MATERIAL 1A AND 1B WILL BE CONSTRUCTED BY THE OWNER. MECHANICALLY PLACED MATERIAL 1B WILL BE CONSTRUCTED BY THE CONTRACTOR PER TECHNICAL SPECIFICATIONS. 2.0 m OF MECHANICALLY PLACED MATERIAL 1A WILL BE CONSTRUCTED BY THE CONTRACTOR TO PROTECT THE FINE FILTER AS DIRECTED BY THE ENGINEER.
5. DOWNSTREAM COARSE FILTER AND FINE FILTER BLANKETS ARE MEASURED NOMINAL TO THE GROUND SURFACE. 2.0 m OF FINE FILTER IS REQUIRED FOR 15.0 m TRANSITIONING TO 2.0 m OF COARSE FILTER OVER TILL FOUNDATION.
6. APPROXIMATE ZONE OF MIXED CYCLONE SAND AND WHOLE TAILINGS.
7. THE DEPTH OF THE CORE TRENCH WITHIN THE TILL FOUNDATION IS 2.0 m MINIMUM OR AS APPROVED BY THE ENGINEER BASED ON OBSERVED FOUNDATION CONDITIONS. KEYING INTO THE EXISTING CORE TRENCH IS REQUIRED PER THE TECHNICAL SPECIFICATIONS.
8. DEPTH OF FOUNDATION PREPARATION AS APPROVED BY ENGINEER BASED ON FOUNDATION CONDITIONS. SEE DRAWING NA-XD-03-21 FOR FOUNDATION PREPARATION DETAILS.
9. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

ISSUED FOR TENDER

LEGEND
- 1A — DOWNSTREAM CYCLONE SAND[4]
- 1B — UPSTREAM CYCLONE SAND[4]
- 2 — TILL
- 4 — COARSE FILTER
- 5 — FINE FILTER
- 6 — MIXED ZONE: CYCLONE SAND AND WHOLE TAILINGS
- APPROXIMATE EXTENT OF MIXED ZONE
- DAM REFERENCE LINE

REVISION INFORMATION

REV. NO.	YY	MM	DD	DRAWN	DESIGN	CHECK	APPROVED	REVISION / ISSUED DESCRIPTIONS
A	14	03	13	CJT	AR	TH	CL	ISSUED FOR TENDER

REV. NO.	YY	MM	DD	DRAWN	DESIGN	CHECK	APPROVED	REVISION / ISSUED DESCRIPTIONS

DRAWN BY: CJT	CHECK DRAWING: CJT	BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: NEW AFTON PROJECT
DESIGN BY: AR	CHECK DESIGN: CL		TITLE: TSF 2014 RAISE - CROSS-SECTIONS 0+385 AND 1+930
LEAD ENGINEER: CL	APPROVAL DATE: MARCH 13, 2014	CLIENT: NEW GOLD INC.	SCALE: 1:250 / DWG NO.: NA-XD-03-17 / REV.: A
PROJECT MANAGER: CL	APPROVAL DATE: MARCH 13, 2014		

ULTIMATE DAM CONSTRUCTION POINTS UTM NAD 83 ZONE 10 (m)			ULTIMATE DAM CONSTRUCTION POINTS MINE GRID (m)		
POINT #	EASTING (m)	NORTHING (m)	POINT #	EASTING (m)	NORTHING (m)
UD-1	676671.5	5613833.8	UD-1	3643.3	449.0
UD-2	676456.0	5614014.2	UD-2	3642.9	730.1
UD-3	675795.4	5614042.0	UD-3	3239.7	1254.1
UD-4	675572.1	5613896.1	UD-4	2984.3	1331.4
UD-5	675607.4	5612906.0	UD-5	2248.4	667.9

DECANT POND 2
DECANT POND 1
DECANT POND 3
POTHOOK DAM
POTHOOK PIT
WATER RECLAIM POND
PHASE 1 FILTER EXTENT
PHASE 1 FILTER EXTENT
DAM A
DAM B
DAM C
WASTE ROCK BOUNDARY
LLDPE GEOMEMBRANE LINER
WEST DAM
SOUTH DAM
DAM REFERENCE LINE
DEC 2012 AND 2008 SURVEY BOUNDARY
JAN 8, 2012 AND DEC 2012 SURVEY BOUNDARY
DEC 2012 AND 2008 SURVEY BOUNDARY
UD-1
UD-2
UD-3
UD-4
UD-5
TB-1
TB-2
TB-3
TB-4
TB-5
NAP-1
NAP-2
NAP-3
NAP-4
NAP-5
NAS-1
NAS-2
NAS-3
NAS-4
NAS-5
SP 29210
SP 29202
SP 29203
SP 34560
VW 29221
VW 29208
VW 29218
VW 29220
VW 29206
VW 29211
VW 29213
VW 29216
VW 29222
VW 29215
VW 29217
VW 29209
VW 29212
SP 29201
VW 29207
0+000
0+100
0+200
0+300
0+400
0+500
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2+200
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N 500
E 675,000
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N 5,614,000
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N 5,613,000
N 5,613,500
SCALE 1:3000
50 0 50 100 150
METRES

LEGEND
- STATION MARKER
- UD-1 CONSTRUCTION POINT
- VW EXISTING PIEZOMETER
- SP EXISTING STANDPIPE PIEZOMETER
- 29217 EXISTING INCLINOMETER
- NAS-1 PROPOSED SETTLEMENT PLATE
- NAP-1 PROPOSED PIEZOMETER
- TB-1 TEMPORARY READ-OUT BOX
- SURVEY BOUNDARY
- PHASE 1 FILTER CONSTRUCTION
- DECANT POND
- DAM REFERENCE LINE
- WASTE ROCK BOUNDARY
- LLDPE GEOMEMBRANE LINER
- CABLE

1 m CONTOUR INTERVAL (ACRES 2008), (ACRES JAN. 2012), (NEW GOLD DEC. 2012) (UTM NAD 83 ZONE 10), (MINE GRID)

ISSUED FOR CONSTRUCTION

NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING DRAWINGS AND TECHNICAL SPECIFICATIONS. THE OWNER SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD UNCERTAINTIES ARISE.
2. ALL COORDINATES ARE PROVIDED IN BOTH UTM NAD 83 ZONE 10 GRID AND MINE GRID COORDINATE SYSTEM. ELEVATIONS ARE PROVIDED IN MINE GRID COORDINATE SYSTEM ONLY.
3. EXISTING GROUND SURFACE TAKEN FROM DECEMBER 2012 SURVEY PROVIDED BY NEW GOLD INC. AND 2008 SURVEY PROVIDED BY ACRES ENTERPRISES LTD. STARTER DAM FOUNDATION SURFACE TAKEN FROM 2008 SURVEY AND STARTER DAM CONSTRUCTION RECORDS SURFACE TAKEN FROM JANUARY 8, 2012 SURVEY, PROVIDED BY ACRES ENTERPRISES LTD.
4. WASTE ROCK BOUNDARY TAKEN FROM OCTOBER 2008 DESIGN REPORT UPDATE BY VECTOR ENGINEERING INC.
5. LLDPE GEOMEMBRANE LINER BOUNDARY TAKEN FROM FEBRUARY 20, 2012 SURVEY PROVIDED BY ACRES ENTERPRISES LTD.
6. INSTRUMENTATION, CABLE LEADS AND READ-OUT BOX LOCATIONS ARE APPROXIMATE AND WILL NEED TO BE FIELD FIT AS DIRECTED BY THE ENGINEER.

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.
0	2013/07/11	ISSUED FOR CONSTRUCTION	SS	TH	CL

SCALE: 1:3000
DATE: JUL 2013
DRAWN: SS
DESIGNED: CL
CHECKED: TH
APPROVED: CL

PROFESSIONAL SEAL:

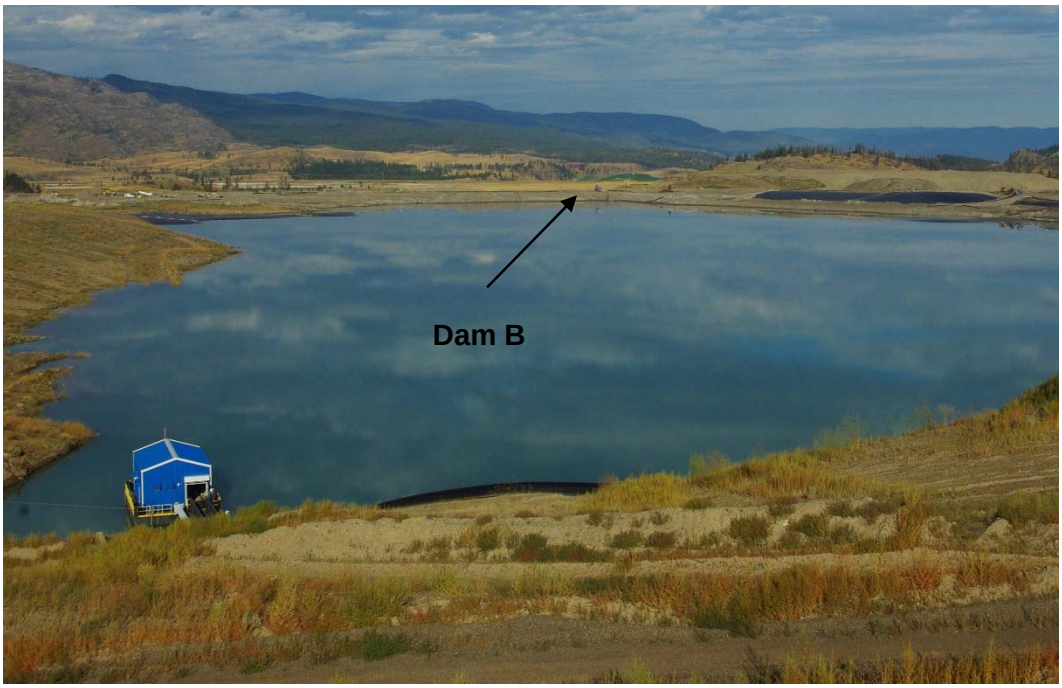
BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: NEW GOLD INC.

PROJECT: NEW AFTON - TSF CONSTRUCTION TO EL. 5735 m
TITLE: PHASE 1 INSTRUMENTATION - GENERAL ARRANGEMENT
PROJECT No.: 0921007
DWG No: NA-XD-04-01
REV.: 0

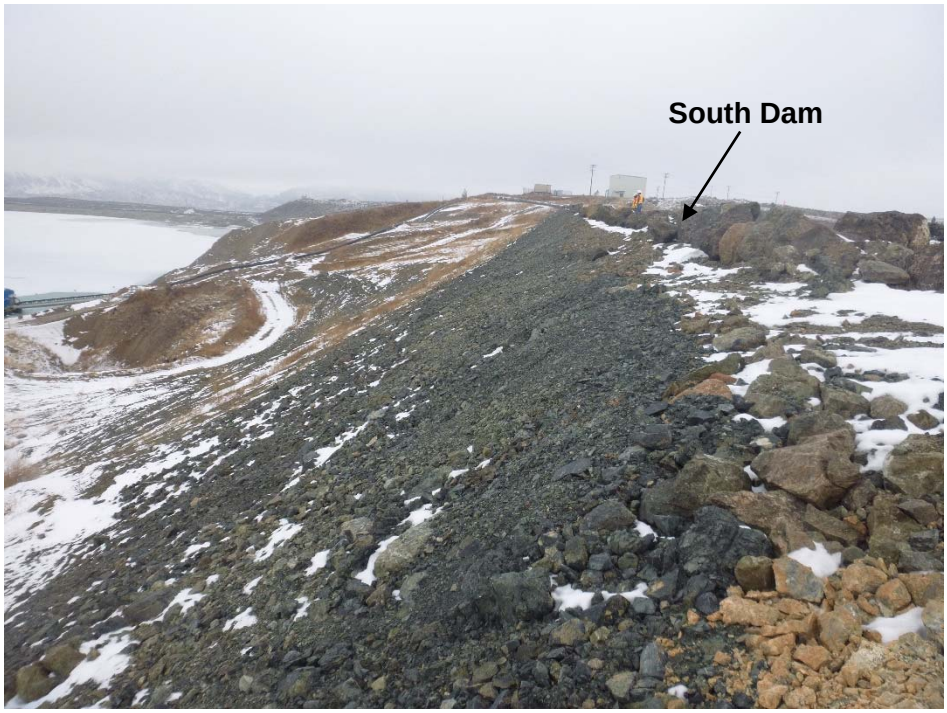
APPENDIX B
PHOTOGRAPHS

Photograph 1: View looking north-northwest from approximately 75 m southeast of Dam A. Arrow pointing to mid-point of dam and till core at crest. October 17, 2013.



Photograph 2: View looking north at Dam B from adjacent to Reclaim Barge. Arrow pointing to mid-point of dam at upstream cyclone sand shell. October 1, 2013.

Photograph 3: View looking west from approximately 75 m east of Dam C. Arrow pointing to mid-point of dam and till core at crest. October 17, 2013.



Photograph 4: View looking north at upstream face of South Dam from right abutment. Arrow pointing to mid-point of dam. Primary cyclone house visible in the background of photo. November 28, 2013.

Photograph 5: View looking west along upstream crest of West Dam from left abutment. Arrow pointing to mid-point of dam. Dam A and Teck TSF visible in top right of photo. November 27, 2013.

Photograph 6: View looking southwest along upstream face of Pothook Dam from crest at intersection of middle and right thirds of the dam. Pond of Pothook Pit visible at the left side of photo. November 28, 2013.

Photograph 7: View looking west at Seepage Pond 1 located downstream of Dam A. November 27, 2013.

Photograph 8: View looking north northwest at tailings line and water reclaim line. Tailings line is on the left and water reclaim line is on the right. November 28, 2013.

Photograph 9: View looking southeast at Tailings Spill Pond. Note the spill pond is relatively full. November 28, 2013.

APPENDIX C
TECHNICAL SPECIFICATIONS

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 02 Foundation Preparation

.2 Section 03 Geotextiles

.3 Section 04 Fills

.4 Section 05 Geomembrane

.5 Section 06 Cyclone Sand Cells

1.3 DEFINITIONS

.1 Owner: New Gold Inc.

.2 Supervisor: New Gold Inc. or a designate duly authorized by the Owner to act on its behalf.

.3 Engineer: The Engineer of Record duly authorized by the Owner to act on its behalf.

.4 Contractor: The contractor named in the Contract Agreement.

.5 Work: Unless otherwise defined, the whole of the construction including equipment, materials, procedures, control, and labour performed by the Contractor to satisfactorily complete this Contract per the Drawings and Technical Specifications.

.6 Contract Documents: Documents referring to, or representing part of, the Contract, including, but not limited to, the Contract, Technical Specifications, Drawings and change orders to the Work.

.7 Material: All construction materials including supplies, consumables, and everything other than persons and Contractor’s Equipment, which are manufactured, processed, or transported to the site, or existing on the site, and required to complete the Work.

.8 Equipment: All equipment, including its maintenance, tools and supplies, used by the Contractor in performance of the Work.

.9 Installer: The party responsible for field handling, transporting, storing, deploying, seaming, temporary restraining (against wind), and installation of the geomembrane.

.10 Work Area: Includes, but is not limited to, Dam A, Dam B and Dam C, as well as associated access roads, pipelines, seepage collection ponds, sediment control structures, and associated borrow, disposal, and stockpile areas.

.11 Stripping: Excavation and removal of topsoil and vegetation, and disposing of these materials as approved by the Engineer. The area of stripping shall extend 3 m beyond the Fill limits.

.12 Grubbing: Excavation and removal of stumps and roots to not less than 300 mm below ground level, and disposing of these materials in the designated area as approved by the Engineer.

.13 Common Excavation: Excavation of materials, such as waste rock, placed till, native till, waste, organic debris, road pavement, fluvial sediments, clay, silt, sand, gravel, cobbles, boulders and rock pieces less than 1 m^3 in size.

.14 Foundation Preparation: Preparation of a satisfactory, undisturbed stratum of waste rock or till according to the minimum requirements defined in the Drawings and these Technical Specifications for areas to receive Fill.

.15 Fill: Material that is sourced from a borrow area or that is provided by the Owner and that is selected or processed and installed according to these Technical Specifications.

1.4 WORDS

.1 Words denoting the singular shall include the plural and vice versa and words denoting the masculine gender shall include the feminine and words denoting persons shall include bodies corporate.

.2 Where the words shown, indicated, detailed, specified, or words of a similar import are used, such words refer to the Technical Specifications and/or Drawings unless expressly stated otherwise.

.3 Where the words directed, permitted, approved, accepted, required, satisfactory or words of similar import are used, such words shall refer to the direction, permission, approval, acceptance, requirements, or satisfaction of the Engineer unless expressly stated otherwise.

1.5 WORK INCLUDED IN TECHNICAL SPECIFICATIONS

.1 Work within these Technical Specifications comprises construction within the Work Area including, but not limited to the following:

.1 Site Preparation

.1 Strip, Grub and excavate the Work Area as shown on the Drawings or as approved by the Engineer.

.2 Develop borrow, storage, stockpile and processing areas as required.

.3 Provide all measures to keep the Work Area in a satisfactorily workable condition including pipelines, culverts, ditches, and pumps required for surface water management as approved by the Engineer.

.2 Dam Construction

.1 Conduct Common Excavation and Foundation Preparation, where required, at Dam A, Dam B and Dam C as shown on the Drawings and as outlined in these Technical Specifications and as approved by the Engineer.

.2 Construct Dam A, Dam B and Dam C as shown on the Drawings and outlined in these Technical Specifications and as approved by the Engineer.

.2 Supply all necessary labour, supervision, equipment, tools, installed and consumable materials, services, testing devices and warehousing and all items necessary for the

supply, fabrication, field erection, application, handling, hauling, unloading and receiving, installation, construction, assembly, testing, evaluation, and quality control of the Work.

.3 Organize, coordinate, and attend all meetings required to facilitate the Work. This will include reporting on all action items and submission of information and data in a timely manner as required by the Engineer.

1.6 WORK BY OTHERS

.1 Other contractors and/or the Owner may be active elsewhere on site during the period of this Work. The Contractor is expected to cooperate with other contractors and/or the Owner in carrying out their respective works, including but not limited to sharing haul and access roads and sharing access to stockpiled and warehoused materials as required by the Owner.

.2 Coordinate the Work with that of other contractors and/or the Owner. If any part of work under this Contract depends for its proper execution or result upon work to be performed by another contractor and/or the Owner, then any defects or delays caused by other parties, which may interfere with proper execution of the Work, shall be reported promptly to the Engineer in writing.

.3 Coordination of Work with other contractors and/or the Owner will require regular meetings on site as necessary.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 01 Summary of Work and Definitions

.2 Section 04 Fills

1.3 SECTION INCLUDES

.1 This section specifies requirements for furnishing all supervision, labour, materials, tools and equipment for the preparation of foundations, either in waste rock or in till, to receive Fill. This may include stripping, scraping, scaling, cleaning and conditioning of surfaces, foundation water management, disposal of excavated material resulting from these operations, water conditioning of exposed foundations, proof rolling, and scarification of exposed soil foundation.

Part 2 Execution

2.1 PREPARATION

.1 Confirm the Stripping, Grubbing, and Common Excavation limits by surveying and flagging all areas. The Engineer will then confirm or adjust these limits prior to commencement of the Work.

2.2 GRUBBING

.1 Where required, and as a minimum in areas to be excavated or to receive Fill, Grub areas to remove all stumps, roots and buried logs to the satisfaction of the Engineer.

2.3 STRIPPING OF TOPSOIL

.1 Commence Stripping of topsoil and any remaining vegetation after the areas have been Grubbed and are approved for Stripping by the Engineer.

.2 Excavate topsoil to depths as approved by the Engineer.

2.4 STOCKPILING

.1 Stockpile materials designated for reuse and topsoil in the designated areas as approved by the Engineer.

.2 Stockpile granular materials in a manner to prevent segregation.

.3 Protect Fill materials from contamination and moisture modification from heavy rainfall or exposure to sun, unless approved otherwise by the Engineer.

2.5 EXCAVATION

.1 Advise the Engineer at least three days in advance of excavation operations.

.2 Allow time for detailed survey of Stripped and Grubbed areas prior to commencement of excavation.

.3 Keep excavated and stockpiled materials a safe distance away from edges of excavations and other parts of the Work as agreed with the Engineer.

.4 Restrict vehicle operations directly adjacent to open excavations.

.5 Carry out all temporary and permanent excavations in such a way as to ensure that excavated slopes are sound and stable at all times.

.6 Do not excavate beyond the specified excavation limits shown on the Drawings without prior approval from the Engineer.

.7 Ensure that slopes are provided with adequate drainage measures and are free of any ponded water at all times.

.8 Upon completion of the Work, grade all exposed excavated surfaces to be no steeper than 2H:1V, or as approved by the Engineer.

2.6 FINISHED SURFACE

.1 Leave the ground surface in a condition suitable for subsequent construction activities as approved by the Engineer.

.2 The exposed foundation surface shall be conditioned and proof rolled to ensure the exposed foundation is suitably prepared to receive Fill.

.3 Only foundations ready for Fill placement shall be approved by the Engineer. Any foundations left exposed may require additional cleaning prior to approval and Fill placement as directed by the Engineer.

.4 Foundations for Fill placement shall be free of surface water and loose or deleterious material as approved by the Engineer.

.5 Disposal and stockpile areas are to be levelled and graded such that no ponding water remains on the pile.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 01 Summary of Work and Definitions

.2 Section 02 Foundation Preparation

.3 Section 04 Fills

1.3 SECTION INCLUDES

.1 This section specifies requirements for furnishing all supervision, labour, materials, tools and equipment for installation of polymeric geotextiles as shown on the Drawings and specified herein.

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM) latest version.

.1 ASTM D4354 – Standard Practice for Sampling of Geosynthetics for Testing

.2 ASTM D4632 – Test Method for Grab Breaking Load and Elongation of Geotextiles

.3 ASTM D4759 – Standard Practice for Determining the Specification Conformance of Geosynthetics

Part 2 Products

2.1 MATERIAL

.1 The geotextile shall be a non-woven needle-punched material that meets or exceeds the material specifications outlined in Table 2.1.

Table 2-1. Material Specifications

Material Property	Requirement
Grab Strength (Tensile)	1100 N
Elongation at break	50%
Tear Strength	444 N
CBR Puncture(1)	2890 N
Permittivity	0.8 sec^{-1}
Water Flow	3050 $l/min/m^2$
UV (500 hours)(2)	70%
AOS(3)	0.150 mm

1. California bearing ratio (CBR).
2. Ultraviolet (UV) exposure.
3. Apparent opening size (AOS).

Part 3 Execution

3.1 INSTALLATION

.1 Handle the geotextile in such a manner as to ensure that it is not damaged in any way. Should the Contractor damage the geotextile to the extent that it is no longer usable, as determined by these Technical Specifications or by the Engineer, the Contractor shall replace the geotextile at its own cost.

.2 Remove only the amount of geotextile from original packaging that can be placed in a given day.

.3 Geotextile can be deployed either parallel or perpendicular to the dam centerline.

.4 Place geotextile smooth and free of tension stress, folds, wrinkles and creases. Retain the deployed geotextile in position with sand bags until covered with Fill.

.5 The geotextile shall not be exposed to precipitation prior to being installed and shall not be exposed to direct sunlight for more than 15 days after installation.

.6 Join successive and adjacent strips of geotextile by sewn seams made using polymeric thread with chemical resistance equal to or exceeding that of the geotextile. Use thread with a color that contrasts with the geotextile to assist inspection of the seam.

.7 For all sewn seams, use a prayer or flat seam joined with continuous stitches located a minimum of 75 mm from the geotextile edges. Use a 2-thread type 401 double-lock chain stitch. Tie off thread ends, and provide a 450 mm stitching overlap where discontinuities are present.

.8 The seam strength shall provide at least 85% of the grab strength of the geotextile material as measured in accordance with ASTM D4632.

.9 Protect installed geotextile from displacement, damage or deterioration before, during and after placement. Load exposed geotextiles with sandbags or an approved equivalent to prevent wind damage. Such anchors shall be installed during placement and shall remain in place until replaced with cover material.

.10 Carefully place any material overlying the geotextile to avoid wrinkling or damage to the geotextile. Place and compact soil layers over the geotextile in accordance with the Fill placement specifications.

.11 Do not allow rocks, clods of earth, trash, tools, or other matter that could damage the geotextile to become trapped under the geotextile. Remove all such material.

.12 Repair or replace any geotextile that is damaged from penetration or distress caused by foreign objects.

.13 Replace damaged or deteriorated geotextile to approval of the Engineer.

.14 All geotextile seams shall consist of minimum 450 mm overlaps. Greater overlaps shall be provided if there is potential for the overlap to move.

3.2 PROTECTION

.1 Heavy equipment or vehicular traffic is not permitted directly on geotextile.

3.3 QUALITY ASSURANCE

.1 The Engineer, along with the Contractor, shall examine the geotextile rolls upon delivery to the Work Area and report any deviations from project specifications to the Owner.

.2 The Engineer may decide to arrange conformance testing of the rolls delivered to the Work Area. For this purpose, the Engineer shall take a sample one meter (along the roll length) by roll width according to ASTM D4354. The sample shall be properly marked, wrapped and sent to an independent laboratory for conformance testing.

.3 The pass or fail of the conformance test results shall be determined according to ASTM D4759.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 01 Summary of Work and Definitions

.2 Section 02 Foundation Preparation

.3 Section 05 Geomembrane

1.3 SECTION INCLUDES

.1 This section specifies requirements for furnishing all supervision, labour, materials, tools and equipment for placement of Fills to the lines and grades shown on the Drawings and specified herein.

.2 The Work shall include:

.1 The supply, processing, hauling, placing, moisture conditioning and compacting of the specified Fills as shown on the Drawings. Note that some Fill materials will be provided by the Owner.

.2 All related surveys for layout and control of the Work and applicable quantity surveys for payment.

.3 Conducting quality control testing.

.4 Timely submission of quality control testing results for review of the quality of the work and subsequent payment.

.5 Assisting the Engineer in quality assurance testing, including provision of labour and equipment.

.6 The exploitation, maintenance, and restoration of Materials from borrow areas.

.3 Fills to be placed, moisture conditioned, scarified where required, and compacted as shown on the Drawings and as required by the Engineer include, but are not limited to, the following:

.1 Fine Filter

.2 Coarse Filter

.3 Till

.4 Cyclone Sand (mechanically placed)

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM) latest version.

.1 ASTM C88 – Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.

.2 ASTM C127 – Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.

.3 ASTM C535 – Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.4 ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.

.5 ASTM D854 – Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer.

.6 ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

.7 ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

.8 ASTM D2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

.9 ASTM D4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.10 ASTM D5093 – Standard Test Method for Field Measurement of Infiltration Rate Using Double-Ring Infiltrometer with Sealed-Inner Ring.ASTM D2434 – Standard Test Method for Permeability of Granular Soils (Constant Head).

.11 ASTM D6913 – Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.

.12 ASTM 6928 – Standard Test Method for Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus.

Part 2 Products

2.1 MATERIALS

.1 Excavate, select, process, and handle Fill materials as necessary to conform to the specified gradation limits and placement moisture conditions. The gradation limits apply to the Fill after it has been placed, spread and compacted in the required embankment.

.2 All Fill shall be free of organic or similar impurities.

.3 Water used for moisture conditioning shall be sediment free and have a pH of greater than five.

.4 The gradation and distribution of Fill throughout each zone shall be free from lenses, pockets, streaks and layers of materials differing substantially in texture, gradation or plasticity from surrounding material in the zone and as determined by the Engineer.

.5 Material gradations for Fill placed as part of the Work, as determined following compaction, are presented in Table 2-1. Determine gradations in accordance with ASTM D6913.

.6 The Cyclone Sand will be constructed from underflow tailings (Cyclone Sand) produced by the Owner from mobile secondary cyclones. The Cyclone Sand is required to have no more than 15% finer than the No.200 sieve (0.075 mm) by dry weight. The fines content

of the Cyclone Sand will be the Owner's responsibility and will be controlled through the Cyclone Sand Plant. The Contractor will be responsible for preventing the fines content from increasing above the 15% specification during placement and compaction.

2.2 FILL GRADATIONS AND SIZES

Table 2-1. Fill Gradations

Particle Size		Fill Type and Percent Finer (by weight)			
US Standard Sieve	**Approximate Size (mm)**	**Fine Filter**	**Coarse Filter**	**Till**	**Cyclone Sand**
3 in	75			100	
2 in	50				
1.5 in	37.5				
1 in	25				
3/4 in	19		100	80 – 100	
1/2 in	12.5				
3/8 in	9.5	100	80 – 100	70 – 100	
No. 4	4.75	90 – 100	65 – 90	65 – 100	
No. 8	2.36	80 – 100	45 – 80		
No. 16	1.18	60 – 90	25 – 60		
No. 30	0.60	40 – 75	7 – 40		
No. 40	0.45			45 – 90	
No. 50	0.3	15 – 30	0 – 20		
No. 60	0.25				
No. 100	0.15	0 – 30	0 – 7		
No. 200	0.075	0 – 5	0 – 5	30 – 85	0 – 15

1. Particle size refers to equivalent sphere diameter

2. The Fill materials shall be graded within the specified gradation limits.

2.3 OTHER FILL REQUIREMENTS

.1 Fine Filter and Coarse Filter materials shall conform to all of the following:

.1 Filter material shall be clean, dense, durable, and sound blasted rock fragments or river deposits free from cracks, seams and other defects which would reduce its resistance to water or atmospheric deterioration and be non-acid producing, chemically inert, and non- metal leaching. The material shall be non-limestone in origin and conforming to the following test requirements:

1. Soundness (ASTM C88): Weight loss less than 12% after 5 cycles.
2. Specific gravity (ASTM D854 for particle sizes smaller than 4.75 mm and ASTM C127 for particle sizes larger than 4.75 mm): Greater than 2.6.
3. Durability (ASTM C535): Weight loss less than 50%.
4. Durability (ASTM D6928): Weight loss less than 18%.

.2 Till shall conform to all of the following:

.1 The Till material should appear to be glacial till in origin, and zones of fluvial or lacustrine materials should be avoided, as directed by the Engineer.

.2 Field and laboratory hydraulic conductivity $<10^{-7}$ m/s (ASTM D5093 and ASTM D2434)

.3 Plasticity index >10% (ASTM D4318).

.4 Soil classification CL, CH, ML, or MH (ASTM D2487)

Part 3 Execution

3.1 GENERAL

.1 Develop placement methods, techniques and procedures with due consideration for safety, the environment, and the nature of the materials to be placed and include such precautions as necessary to preserve, in an undisturbed condition, all materials outside the Work Area. Submit request for approval with supporting data, where applicable, well in advance to the Engineer.

3.2 COMPACTION EQUIPMENT

.1 Provide compaction equipment that is the appropriate size and type to achieve the specified densities of the respective Fills (as shown in Table 3-1). Note that the requirements in Table 3-1 may be modified at the sole discretion of the Engineer in light of compaction trials and ongoing field experience and testing.

.2 Where compaction procedures (lift thickness, number of passes, and compactor type) are specified, provide compactors that meet or exceed those described in the specifications.

.3 Use smaller hand operated compactors, as specified, in restricted areas and adjacent to concrete, and as approved by the Engineer.

3.3 MOISTURE CONDITIONING

.1 Adjust the moisture content of all Fills, when necessary, in borrow areas or at the stockpile. If required during Fill placement, make minor additions of moisture by sprinkling with water trucks or hoses, then discing and mixing the soil until the moisture content of the entire layer is uniform and within the specified limits.

.2 Equip water trucks with pressure spray bars to give a uniform application of water to areas being covered and a positive control of application at all times.

.3 If placed Fill is too wet, remove or aerate the Fill until it conforms to the specified range of moisture content using plows, discs, dozers, motor graders or other approved equipment or methods of excavation, subject to approval by the Engineer. Aerate the Fill in such a manner that will distribute the moisture uniformly throughout the lift.

.4 During construction, maintain all temporary construction surfaces within the moisture range specified for compaction until the placement of the subsequent lift. Aerate areas which become overly wet by means of discs, plows, harrows and re-compact them within the specification limits. Re-work, moisture condition and re-compact areas which become dried as above.

.5 In case of wet weather, it may be necessary to cover the exposed borrow areas with tarps and provide temporary drainage measures to avoid ponding.

3.4 RESTRICTIONS DUE TO WEATHER AND SUSPENSION OF FILL PLACEMENT OPERATIONS

.1 Do not place any Fill when conditions for such operations are unsatisfactory due to rainfall, fire hazard, or any other reason.

.2 Where operations have been discontinued by the Contractor or suspended by the Engineer, the Engineer will assess the effects of rain, desiccation, or other adverse conditions. Where the surface layer of the Fill no longer meets the specified requirements or is required by the Engineer, treat or replace the affected Fill to the satisfaction of the Engineer before resumption of Fill placement. In the event that the Contractor is negligent in protecting the Work from the effects of rain, desiccation, or other adverse conditions, the Contractor will bear the cost of treatment or replacement before resumption of Fill placement.

.3 Before suspension of operations each day and before suspension due to inclement weather, compact the surface of the Till with a smooth drum compactor to protect the surface and minimize damage to the Till from water.

3.5 FILL PLACEMENT

.1 Do not place Fill on the prepared foundations until they have been inspected and approved in writing by the Engineer.

.2 Compact embankment material in a systematic, orderly, and continuous manner.

.3 Where feasible, commence Fill placement at the lowest foundation level and progress laterally and upward.

.4 Place all Fills on prepared foundation surfaces or suitably prepared material surfaces when Fill types are different, as approved by the Engineer.

.5 Compact Fills immediately following moisture conditioning, placement, and spreading of the lift to the desired thickness.

.6 Where depressions or holes exist in the foundation, place and compact acceptable Fill as required by the Engineer. Special techniques, including manual placement of Fill, special water conditioning and the use of hand operated compaction equipment may be required.

.7 Deliver, spread and level the Fill in horizontal lifts in such a manner as to avoid segregation and to obtain a consistently graded mass. The Engineer may require the

removal and replacement of any segregated materials, especially in the Fine Filter and Coarse Filter zones, at no cost to the Owner.

.8 Till obtained from borrow sources or stockpiles may contain oversize material in excess of the particle sizes specified in Table 2-1. The Contractor will be required to remove oversize material that does not conform to the specifications provided in Table 2-1.

.9 Strictly control traffic routing on the Fill to prevent cross contamination of adjacent zones. If an equipment crossing is unavoidable, the location shall first be approved by the Engineer. Special measures such as the temporary placement of tarps over filter zones or the use of sacrificial material that is subsequently removed may be required to prevent contamination. Remove areas contaminated as determined by the Engineer at no cost to the Owner.

.10 Route hauling equipment to avoid following the same paths over compacted Fill.

.11 Scarify by harrowing or by other approved methods the compacted surfaces of fine grained Fill, such as Till, prior to the placement of a subsequent lift. If one pass of the equipment does not accomplish the breaking up and blending of the Fill, additional passes of the equipment may be required.

.12 Maintain the entire surface of any section of the embankment in a condition that will enable construction equipment to travel on it.

.13 Remove and replace any Fill, which, in the opinion of the Engineer, has been overly watered and/or damaged due to construction traffic, at no cost to the Owner.

.14 Apply water to Coarse Filter and Fine Filter materials at the point of compaction if such filter materials are dry when placed for compaction.

.15 Compact Till, Fine Filter and Coarse Filter per Table 3-1. Over-working will not be permitted. Overlap adjacent individual passes of the compactor by a minimum of 300 mm. Perform periodic field control tests as required by the Engineer.

.16 The Contractor may be required to construct test fills, at the discretion of the Engineer, to evaluate the Fill placement methods.

.17 Keep filter zones one lift above the adjacent surface of compacted Till in order to prevent contamination of the filters zones from rainwater ingress. Slope compacted surfaces in Till so that the surface water will drain away from the filter materials.

.18 Slope the Fill surface to provide drainage during construction, and prevent surface water runoff or water from any other source from eroding Fills placed for the Work. Repair any damage resulting from such erosion immediately to the approval of the Engineer.

.19 In restricted areas and trenches, and adjacent to structures and instrumentation, use special compactors such as small hand operated compactors and reduce lift thicknesses as approved by the Engineer. If the Contractor damages any instrumentation, the Contractor will repair or replace such instrumentation as approved by the Engineer at no cost to the Owner.

.20 Fill placed on and within 2 m, measured horizontally, of the geomembrane liner must be placed carefully so as not to displace the geomembrane liner. Within this area, Fill must be placed in lift thicknesses not exceeding 150 mm and compacted with small hand operated compactors until the geomembrane is covered with at least 300 mm of compacted Fill. Subsequent compaction of adjacent Fill must overlap this protective layer by 500 mm.

.21 Where tying into existing Fill materials, each lift shall be cut into the existing slope to expose and tie into existing Fill material that meets the Technical Specifications or as

approved by the Engineer. Construction joints should be made no steeper than 2H:1V. Existing Fill material will need to be trimmed to 2H:1V and removal of softened material will be required. Fill placed directly over existing Fill materials should be placed in lift thicknesses not exceeding 150 mm and compacted with small hand operated compactors until the existing Fill is covered with at least 300 mm of compacted Fill.

.22 At the discretion of the Engineer and at no cost to the Owner, rework or remove and dispose of any placed Fill that does not meet the specified requirements to produce a material which satisfies the specified requirements.

.23 The Contractor shall be solely responsible for achieving the specified density. The maximum lift thicknesses, moisture conditioning requirements and compaction requirements shall be as indicated in Table 3-1. Note that the requirements in Table 3-1 may be modified in writing at the sole discretion of the Engineer after reviewing ongoing field experience, or testing.

Table 3-1. Compaction Requirements

Fill Description	As Placed Moisture Content	Maximum Lift Thickness Before Compaction (mm)	Minimum Density	Minimum Passes per Lift, Compactor Type
Fine Filter	-2% to +2%(1)	300	98% Standard Proctor(2)	4 passes, 10 tonne single smooth drum vibratory roller(3)
Coarse Filter	Saturated	300	N/A	6 passes, 10 tonne single smooth drum vibratory roller(3)
Till	-2% to +2%(1)	300	98% Standard Proctor(2)	6 passes, 10 tonne single smooth drum vibratory roller(3)
Cyclone Sand (mechanically placed)	-2% to +2%(1)	300	100% Standard Proctor(2)	4 passes, 10 tonne single smooth drum vibratory roller(3)

1. Relative to optimum Standard Proctor moisture content, ASTM D698.

2. Relative to maximum Standard Proctor dry density per ASTM D698.

3. Compactor type capable of vibration frequency of between 1500 and 2200 vibrations per minute during operation.

3.6 TOLERANCES OF FILL PLACEMENT

.1 Place Fills in horizontal lifts to the lines and levels shown on the Drawings or as approved by the Engineer and to tolerances of zero to +300 mm in elevation and zero to +100 mm in horizontal dimensions.

.2 Place additional Fill to maintain the specified grade during construction to account for any settlement of the subgrade or the Fill.

3.7 INSTRUMENTATION

.1 Install and construct settlement markers for deformation measurement and piezometers in accordance with the details, locations and elevations shown on the Drawings and as determined by the Engineer.

.2 Establish elevation references, under the direction of the Engineer for all instrument locations.

.3 Cooperate during the installation of instrumentation and performance of construction operations so that no damage occurs to any of the instruments.

.4 Do not allow equipment to pass over any embedded instrumentation or tubing until it is covered with at least 500 mm of compacted Fill.

.5 Provide sufficient barricades and signage to protect instrumentation and tubing rising through the dams.

.6 Coordinate the Work with the Engineer to reduce to a minimum the possible delays caused by placement of instrumentation. No additional payments shall be made due to delays caused by placement of instrumentation. The installation of all instrumentation, including any necessary excavation, placement and compaction of materials required as part of the installation process, shall be performed by the Contractor.

.7 Provide adequate protection from vandalism for all instrumentation and read-out locations, as approved by the Engineer.

3.8 QUALITY CONTROL

.1 During placement of Fill, regular supervision of the construction activities are required by the Supervisor. The quality of Fill placement shall be controlled based on observations made by the Supervisor and documented using photographs and the laboratory testing outlined in Table 3-2.

Table 3-2. Routine CQC Testing Requirements

Test	Standard	Fill Type and Testing Frequency			
		Fine Filter	**Coarse Filter**	**Till**	**Cyclone Sand[3]**
Moisture Content	ASTM D2216	1 per 1,000 m^3 or 1 per day[2]	N/A	1 per 1,000 m^3 or 1 per day[2]	1 per 1,000 m^3 or 1 per day[2]
Grain Size Distribution	ASTM D6913	1 per 1,000 m^3 or 1 per day[1,2]	1 per 1,000 m^3 or 1 per day[1,2]	1 per 1,000 m^3 or 1 per day[1,2]	1 per 1,000 m^3 or 1 per day[1,2]
Field Density	ASTM D2922	1 per 1,000 m^3 or 1 per day[1,2]	N/A	1 per 1,000 m^3 or 1 per day[1,2]	1 per 1,000 m^3 or 1 per day[1,2]
Standard Proctor	ASTM D698	1 per week	N/A	1 per week	1 per week
Specific Gravity	ASTM D854 and ASTM C127	1 per month	1 per month	1 per month	1 per month

1. Whichever is more frequent.
2. For the first month of construction, 2-3 tests per shift are required, following which routine testing, as indicated in Table 3-2, will be required.
3. Mechanically placed Cyclone Sand.

.2 Conduct both laboratory and field tests on in-place Fill to check the quality after placement and compaction of the Fill. Perform testing in accordance with the principles and methods prescribed by the standards referenced in this Technical Specification.

.3 Perform testing across the full length, width and depth of the various Fill zones so as to fully represent the overall quality of the structure. Reference test results to Fill type, location (indicating both Northing and Easting; or station and offset), and elevation measured using a total station or other appropriate survey equipment

.4 The testing results shall be summarized and reported to the Engineer on a weekly basis. Each report shall be issued to the Engineer by email during the week after the reporting period corresponding to each report. A summary of the days worked during the reporting period, the weather, and notable events, including non-conformances, shall be

summarized in the weekly report. A general arrangement plan map showing the location of the samples collected during that reporting period shall be included.

.5 In the event that a test indicates that a Fill does not demonstrate compliance with the Technical Specifications, notify the Engineer immediately and undertake actions necessary to meet the Technical Specifications.

.6 Conduct the testing program on the compacted Fill as outlined in Table 3-2. These requirements may be modified or relaxed by the Engineer on the basis of test Fills, field and laboratory testing data, material variability, and ongoing field experience.

3.9 CONSTRUCTION QUALITY ASSURANCE

.1 The Engineer will conduct periodic site visits as part of the Construction Quality Assurance for the placement of Fills. Where appropriate, the Supervisor may be required to provide assistance while collecting samples.

.2 Testing shall be performed in accordance with the principles and methods prescribed by the standards referenced in this Technical Specification.

.3 Construction Quality Assurance testing shall not relieve the Contractor of its sole responsibility to construct the Work in accordance with the specified requirements.

3.10 ACCEPTANCE

.1 Final acceptance of Fills by the Engineer will be made only after materials have been dumped, spread, moisture conditioned, and compacted, and tests and surveys have demonstrated compliance with the Drawings and Technical Specifications.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 02 Foundation Preparation

.2 Section 04 Fills

1.3 SECTION INCLUDES

.1 Installation of Linear Low Density Polyethylene (LLDPE) 60 mil (1.5 mm) geomembrane as part of construction of Dam B and Dam C.

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM) latest version.

.1 ASTM D5641 – Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber

.2 ASTM D5820 – Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes

.3 ASTM D6392 – Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods

.4 ASTM D6497 – Standard Guide for Mechanical Attachment of Geomembrane to Penetrations or Structures

.2 Geosynthetic Research Institute (GRI)

.1 GM17, Test Methods, Test Properties and Testing Frequency for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes

1.5 SUBMITTALS

.1 Provide evidence of the successful installation of LLDPE geomembrane liner at five or more projects of similar size and scope. Provide written certification that the LLDPE geomembrane manufacturer considers the Installer a competent installer of the geomembrane. The manufacturer's certification of the Installer shall be furnished to the Owner with the bid submission.

.2 Submit shop drawings indicating installation layout, dimensions and details, field seams and anchor trenches to Engineer at least four weeks prior to beginning the Work.

.3 Submit manufacturer's recommendations for installation and quality control testing to the Engineer at least four weeks prior to beginning the Work.

.4 Submit geomembrane installation warranty to the Engineer at least four weeks prior to beginning the Work. The Contractor is to warrant the entire work specified in this section for a two year period following date of acceptance by the Owner, against defects

in material and workmanship. If the Contractor unduly delays warranty repair or replacement work, the Owner may make reasonable arrangements to have the work carried out by others, in which case, the Contractor shall pay the Owner the repair and replacement costs.

.5 Submit the following to the Engineer at least one week prior to beginning the Work.

.1 Resin Data.

.1 Statement of production date or dates.

.2 Certification stating that all resin is from the same manufacturer.

.3 Copy of the quality control certificates issued by the manufacturer.

.4 Test reports from the manufacturer.

.2 Geomembrane Roll.

.1 Statement of production date or dates.

.2 Laboratory test results and certification stating that the geomembrane meets the material requirements specified in Part 2.1.

.3 Certification stating that all geomembrane rolls are furnished by one supplier, and that rolls are manufactured from one resin type obtained from one resin supplier.

.4 Copy of the quality control certificates issued by the manufacturer.

.5 Test reports from the manufacturer.

.3 Extrudate Beads and/or Rod.

.1 Statement of production date or dates.

.2 Certification stating that one manufacturer manufactures all extrudate and one supplier supplies the resin.

.3 Copy of the quality control certificates issued by the manufacturer.

.4 Test reports from the manufacturer.

.5 Certification stating that the extrudate bead or rod is compatible with the resin used to manufacture the geomembrane used in the Work.

.6 Prepare a plan drawing and documentation, as part of the daily acceptance of geomembrane placement, and submitted to the Engineer, including the following details.

.1 Roll numbers

.2 Sign-off

.3 Quality control

.4 Testing results

.5 Location and description of patches or repair work completed

Part 2 Products

2.1 MATERIALS

.1 Smooth LLDPE geomembrane composed of linear low density polyethylene resins produced in a certified production plant with carbon black added to base plastic to resist deterioration by ultra-violet rays and heat exposure. The geomembrane will be supplied

in rolls by the Contractor. The Contractor shall supply, as part of the contract cost, all equipment and supplies necessary for installation and testing of the geomembrane described in this section, including but not limited to LLDPE welding rod for extrusion welding.

.2 Physical properties:

.1 LLDPE geomembrane in general conformance with GRI GM17 for 60 mil (1.5 mm) smooth LLDPE geomembrane.

Part 3 Execution

3.1 STORAGE AND HANDLING

.1 Store rolls in the original manufacturer's packaging, off the ground, in a dry area and protected from the direct rays of the sun under a light-coloured heat reflective cover in a manner that provides a free flowing air space between the packaged material and the opaque cover. Protect geomembrane from mud, dirt, dust, debris and rodents.

.2 Do not use hooks, tongs, or other sharp tools or instruments for handling geomembrane rolls. Slings or a pole which extends a minimum of 300 mm beyond each end of the roll are acceptable means of handling individual rolls.

.3 Do not drag geomembrane rolls over the ground.

3.2 PREPARATION FOR GEOMEMBRANE PLACEMENT

.1 Construct the finished subgrade to within plus or minus 100 mm of the lines shown on the Drawings and to within plus or minus 50 mm of the specified elevations shown on the Drawings.

.2 Maintain the exposed surface of the compacted subgrade on which the geomembrane is to be placed in a firm, dry, clean and smooth condition before and during the geomembrane installation. Compact and grade smooth exposed subgrade surfaces directly beneath the geomembrane per Section 04 Fills. Remove any depressions or localized low areas prior to geomembrane placement.

.3 Remove from the surface of the compacted subgrade all rocks, roots, gravel, grade stakes, or debris that may puncture the geomembrane. Remove all rocks greater than 30 mm in the largest dimension from the surface of the subgrade. Remove all rocks with greater than 20 mm protrusions on the subgrade surface.

.4 Protect the compacted subgrade from flooding and desiccation until such time as the geomembrane installation begins. Repair any significant desiccation cracks (>5 mm width or depth), swelling, heaving or other surface damage prior to geomembrane placement.

.5 The Engineer and the Contractor shall perform a complete and detailed inspection of the compacted subgrade surface immediately prior to the installation of the geomembrane to determine acceptance of the finished surface and elevations. Repair any erosion or other damage to the subgrade that has occurred since final preparation prior to placement of the geomembrane.

3.3 INSTALLATION

.1 Do not proceed with geomembrane placement and seaming when ambient temperatures are above 38 degrees C, during precipitation, in presence of excessive moisture (e.g. fog, dew), nor in presence of strong winds.

.2 Excavate the anchor trench to the lines, grades, and width shown on the Drawings prior to geomembrane placement. Round the corners of the trench if necessary to avoid sharp bends in the geomembrane.

.3 Unroll only the amount of geomembrane material that can be positioned, anchored and seamed completely in that day. Keep a written daily record and plan drawing of roll unpacking, placement and seaming, noting dates and times of these events by field panel number. Make this daily record available to the Engineer for review upon request.

.4 Deploy geomembrane in such a way as to minimize handling. Do not drag geomembrane over the ground.

.5 Arrange geomembrane panels in the orientation and location indicated in shop drawings to minimize field seaming, especially in corners and odd-shaped locations. In general, orient field seams down the steepest slopes, with no horizontal field seam closer than 1.5 m to the toe of the slope.

.6 Minimize folds and wrinkles, avoid scratches and crimps to the geomembrane and avoid damage to the supporting subgrade.

.7 Protect installed geomembrane from displacement, damage or deterioration before, during and after placement of covering layers. Do not drag materials, sandbags, or equipment across the surface of the geomembrane and prohibit workers from sliding down geomembrane slopes. Provide pads on the base of all equipment such as lights, blowers, vacuums and generators to prevent damage or scuffing of the geomembrane. Personnel working on the geomembrane shall not wear shoes that can damage the geomembrane or engage in activities that may damage the geomembrane. If the geomembrane surface is scuffed during installation, the damaged areas must be cleaned and patched at no cost to the Owner.

.8 Smoking on the geomembrane is prohibited.

.9 Vehicle traffic on the geomembrane is prohibited.

.10 Replace damaged, torn or permanently twisted geomembrane panels to approval of the Engineer. Remove rejected damaged panels from the Work area to a designated discard area as approved by the Engineer.

.11 If required, fit and seal the geomembrane around all pipe penetrations using pre-manufactured fittings or boots per ASTM D6497.

.12 Cover the geomembrane in the anchor trench as soon as possible, taking care not to damage the geomembrane during the covering operation. Use Fill as shown on the Drawings and per Section 04 Fills that is free of foreign and organic material, sharp objects, or debris of any kind that could potentially damage the geomembrane. Compact the Fill in the trench in accordance with the Technical Specifications.

.13 Repair any geomembrane that is damaged in the anchor trench prior to the backfilling.

.14 If there is risk of windy conditions, ensure that any exposed geomembrane is temporarily anchored in place. Any temporary anchors or weights (such as tires or sandbags) used to prevent uplift of the geomembrane must not be damaging to the geomembrane in any manner.

3.4 FIELD SEAMING

.1 General Seaming Procedures

.1 Provide a superintendent who has installed a minimum of 200,000 m^2 of LLDPE geomembrane installation to direct all installation work. The superintendent shall directly supervise all seaming personnel to verify proper welding procedures are followed.

.2 Train all welding operators in the operation of the specific seaming equipment being used and have them qualify by performing a test weld at the beginning of each shift as described in the paragraphs below.

.3 Extend seaming through the full width of the geomembrane in anchor trenches.

.4 For each seam, mark on the geomembrane the initials of the welding operator, welding machine number, time and date welding started, and seam length.

.2 Dual-track Hot Wedge Welding

.1 Use a dual-track hot wedge welder as the primary seaming method. All wedge welding machines shall be equipped with temperature readout to continually monitor the temperature of the wedge, and they shall have controls that allow the temperature, pressure and speed to be adjusted to meet specific site conditions.

.2 Dual-track hot wedge welds shall produce an air channel allowing for air-pressure testing of the seam per ASTM D5820 and as further described below.

.3 Overlap the geomembrane panels a minimum of 125 mm for wedge welding.

.4 Clean seam area thoroughly, removing moisture, dust, sand or any debris.

.5 Adjust the geomembrane panels to minimize any differential wrinkles.

.6 Do not include wrinkles, or “fish mouths”, within the seam area. Where fish mouths occur, cut and overlap the material, and apply an extrusion fillet weld as described in the following section.

.3 Extrusion Fillet Welding

.1 In restricted areas such as corners, small patches, and panel intersections (T-seams) where the wedge welder cannot be used, use extrusion fillet welding. The extrusion welding machines shall have temperature readouts which continually monitor the temperature of the extrudate, and they shall have controls that allow the temperature of the extrudate and the pre-heat air to be adjusted to meet specific site conditions.

.2 Overlap the geomembrane panels a minimum of 100 mm for extrusion fillet welding. Clean seam area prior to welding to remove moisture, dust, sand or debris of any kind.

.3 Grind the seam area that will be covered by the extrusion fillet, removing not more than 10% of the geomembrane thickness. Do not to grind areas which will remain exposed after the welding. Use only clean and relatively fresh grinding disks.

.4 Repair minor tears and pinholes by patching until non-destructive testing is successful. Patches are to be round or oval in shape, extend a minimum of 75 mm beyond edge of defect, and made of the same LLDPE material as the geomembrane.

3.5 QUALITY CONTROL

.1 Test Seams

.1 Have each welding operator perform a test seam prior to the start and at the end of seaming each day and at least once every four hours of seaming for each welding machine in use. Make test seams on scraps of geomembrane in use under the same conditions as the production seams.

.2 Make test seams at least 3 m long for wedge-welded seams and 1.5 m long for extrusion welded seams from two pieces of geomembrane approximately 200 mm in width.

.3 Visually inspect the seam for squeeze-out, deformation and general appearance.

.4 When the test seam has cooled to ambient temperature, cut ten specimens and test them, five in shear and five in peel per ASTM D6392 using a field tensiometer. Four out of five specimens tested in shear and peel must meet or exceed the values specified in Table 3-1, and the fifth test must meet or exceed 80% of the strength values and 100% of the elongation values specified in Table 3-1.

Table 3-1. Testing Requirements

Test	Hot Wedge Seams	Extrusion Fillet Seams
Shear strength	394 N/25 mm	394 N/25 mm
Shear elongation at break	50%	50%
Peel strength	328 N/25 mm	290 N/25 mm
Peel separation	25%	25%

1. Testing to be conducted per ASTM D6392.

.5 In shear and peel tests of specimens from a hot wedge welded seam, the location-of-break codes AD and AD-BRK per ASTM D6392 are not acceptable and indicate a failed test.

.6 In shear and peel tests of specimens from an extrusion welded seam, the location-of-break codes AD1 and AD2 per ASTM D6392 are not acceptable and indicate a failed test. A location-of-break code AD-WLD is also not acceptable unless the minimum strength is achieved.

.7 All test seams must meet the criteria specified above before starting production seaming. If a welding machine fails two consecutive test welds, do not use that welding machine until the deficiencies are corrected and a passing test weld is achieved.

.8 After successful completion of the test weld, discard the remaining portions of the test weld.

.9 Record the date, welding operator, machine, ambient temperature, machine settings (temperature and speed) and the test results for each test seam, and make this information available to the Engineer.

.2 Non-destructive Seam Testing

.1 Test all geomembrane seams by non-destructive methods over their full length using pressurized air channel testing on wedge-welded seams and vacuum box testing on extrusion-welded seams.

.2 Pressurized air channel testing

.1 Pressurize air channel in the seam per ASTM D5820 to at least 200 kPa. Record initial pressure after a two-minute waiting period, then monitor the pressure for an additional five minutes. If the pressure decreases by more than 20 kPa over the five-minute period, locate and repair the faulty area of the seam per Part 3.5.2.3 in this specification.

.2 At the end of a successful pressure test, open the air channel at the end away from the pressure gauge. Air should rush out and the pressure gauge should register an immediate drop in pressure, indicating that the entire length of the seam has been tested. If this does not happen, either the air channel is blocked or the equipment is faulty, and the test is not valid. Locate the problem and retest the seam.

.3 For a non-complying pressurized air channel test, use the following procedure until an acceptable test result is attained.

.1 Verify the integrity of the seals at each end of the air channel, the penetration of the pressure feed and all of the attached equipment.

.2 Visually inspect the seam looking for any possible leak locations. If a flaw is located in the air channel, cut the seam at that location and record two separate air tests, one on each side of the flaw location. Following the test, patch the area where the seam was cut.

.3 If it is not possible to achieve a successful air test result over any reasonable length of seam, either (1) remove the entire defective seam and install a thin strip of geomembrane with two new wedge welds that are pressure-tested per above; or (2) extrusion-weld the overlap over the entire length of the seam and vacuum-test the resulting weld as described below

.4 Vacuum box testing

.1 Perform vacuum box testing per ASTM D5641 along the entire length of all extrusion-fillet welds. Mark all non-complying areas for repair by additional extrusion welding or by patching.

.2 Perform vacuum box testing per ASTM D5641 on all repairs for which extrusion welding was used.

.5 Record the date, welding operator, machine, ambient temperature, machine settings (temperature and speed), test results, and repairs for each seam, and make this information available to the Engineer at the end of each shift.

.3 Destructive Testing

.1 The average frequency of destructive test samples will be 1 per 150 m of seaming. The Engineer may increase or decrease this frequency depending on the seaming conditions and the results from previous testing.

.2 The Engineer will mark random locations along geomembrane seams for removal of destructive test samples. At these locations, cut, prepare, and test the samples per ASTM D6392. Minimum sample size is 450 mm long and 300 mm wide with the seam centered in this width. Minimum strength, elongation, and

location-of-break shall be the same as prescribed for test welds in this specification.

.3 If a destructive test fails, attempt to determine the extent of the faulty area by taking additional samples as described above. Take samples a minimum of 3 m on either side of the failing sample.

.1 If the failing area can be bounded by passing destructive samples on either side, repair the faulty seam area either by (1) removing the entire area or seam between the two successful destructive tests and installing a narrow strip of geomembrane with two new fusion welds and pressure testing the new seams, or by (2) extrusion-welding the overlap over the length of the area (or seam) between the two successful destructive tests and vacuum-testing the resulting weld.

.2 If the failing area cannot be bounded by passing destructive samples, repair the entire length of seam that was welded by the same welding machine immediately before and after the defective area.

.4 Record the date, welding operator, machine, ambient temperature, machine settings (temperature and speed), test results, and repairs for each seam, and make this information available to the Engineer at the end of each shift.

3.6 QUALITY ASSURANCE

.1 The Owner will engage and pay for the services of a laboratory, independent of the geomembrane manufacturer, to perform Quality Assurance conformance testing on geomembrane rolls.

.2 Conformance samples will be collected by the Engineer from geomembrane rolls delivered to the Work Area.

.3 The samples will be tested for conformance with the Technical Specifications.

.4 Quality Assurance testing shall not relieve the Contractor of its sole responsibility to construct the Work in accordance with the specified requirements.

3.7 CLEANING

.1 After completion of the Work specified herein, leave the entire area in a neat and presentable condition, free of all construction debris, waste and surplus or other objectionable materials. Remove and dispose of all such material away from the site of work and in conformance with all applicable codes, ordinances and regulations, and to the satisfaction of the Engineer.

3.8 PROTECTION

.1 Heavy equipment or vehicular traffic is not permitted directly on the geomembrane.

END OF SECTION

Part 1 General

1.1 DOCUMENTS

.1 This section of the Technical Specifications forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

.2 Should a conflict between the Drawings and Technical Specifications exist, the Drawings shall govern.

1.2 RELATED SECTIONS

.1 Section 01 Summary of Work and Definitions

.2 Section 04 Fills

.3 Section 05 Geomembrane

1.3 SECTION INCLUDES

.1 This section specifies requirements for furnishing all supervision, labour, materials, tools and equipment for construction of Cyclone Sand Cells to the lines and grades shown on the Drawings and specified herein.

.2 The Work shall include:

.1 Hydraulic placement and compaction of cyclone sand as shown on the Drawings.

.2 All related surveys for layout and control of the Work.

.3 Conducting quality control testing.

.4 Timely submission of quality control testing results for review of the quality of the work.

.5 Assisting the Engineer in quality assurance testing, including provision of labour and equipment.

1.4 REFERENCES

.1 American Society for Testing and Materials International (ASTM) latest version.

.1 ASTM C127 – Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.

.2 ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.

.3 ASTM D854 – Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer.

.4 ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

.5 ASTM D2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

.6 ASTM D4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.7 ASTM D6913 – Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis.

Part 2 Products

2.1 MATERIALS

.1 The Cyclone Sand Cells will be constructed from underflow tailings (Cyclone Sand) produced by the Owner from mobile secondary cyclones. The Cyclone Sand is required to have no more than 15% finer than the No.200 sieve (0.075 mm) by dry weight. The fines content of the Cyclone Sand will be the Owner's responsibility and will be controlled through the Cyclone Sand Plant.

Part 3 Execution

3.1 GENERAL

.1 Develop placement methods, techniques and procedures with due consideration for safety, the environment, and the nature of the materials to be placed and include such precautions as necessary to preserve, in an undisturbed condition, all materials outside the Work Area. Submit requests for approval of methods, techniques and procedures with supporting data, where applicable, well in advance to the Engineer.

3.2 RESTRICTIONS DUE TO WEATHER AND SUSPENSION OF CYCLONE SAND PLACEMENT OPERATIONS

.1 Do not place any Cyclone Sand when conditions for such operations are unsatisfactory such as, excess rain, snow, or ambient air temperatures that result in freezing of the Cyclone Sand and/or the formation of ice, as determined by the Engineer.

.2 Where operations have been discontinued by the Contractor or suspended by the Engineer, the Engineer will assess the effects of the adverse conditions. Where the surface layer of the Cyclone Sand Cell no longer meets the specified requirements or is required by the Engineer, treat or replace the affected material to the satisfaction of the Engineer before resumption of Cyclone Sand placement.

3.3 CYCLONE SAND PLACEMENT

.1 The Cyclone Sand will be placed hydraulically from the mobile secondary cyclones positioned along the crest of the dam. The Cyclone Sand will be discharged into the cells via distributor pipelines extending down the face of the dam.

.2 Cyclone Sand Cells will be constructed per the dimensions shown on the Drawings. Each cell may require adjustments in the field due to operational and construction equipment constraints.

.3 A dozer will continuously spread and compact the Cyclone Sand as it is being discharged into the cell, and the cell will be raised as shown on the Drawings.

.4 Compact Cyclone Sand in a systematic, orderly, and continuous manner. Compaction shall be carried out by routing equipment parallel to the embankment centerline and will achieve the compaction requirements indicated in Table 3-1.

.5 Longitudinal cell "construction joints", where the Cyclone Sand will receive minimal to no compaction, are to be staggered to avoid creation of continuous zones of weakness within the dam.

.6 Move, extend/retract and maintain distributor pipelines as required during cell construction.

.7 Maintain the surface of the cell at a slope of approximately 0.2% to provide positive drainage to the outside corner of the cell, where a temporary drain will form. Stagger the position of these cell drains to prevent a continuous zone of slimes-bearing material from forming.

.8 Periodically traffic the cell drains with a dozer to break up any slime layers, allowing the suspended material to drain from the cell.

.9 Manage cell drains such that capture of Cyclone Sand within the cells is maximized.

.10 Construct, maintain, and raise containment berms as the cells advance in elevation.

.11 Install, maintain, and raise all decant pipes from containment berms as the cells advance in elevation.

.12 Mechanically place and compact a minimum 1 m thickness of Cyclone Sand over Filter materials prior to starting hydraulic placement within the cell. This will provide the base for cell construction. Mechanical placement of Cyclone Sand will be per Section 04 Fills of the Technical Specifications.

.13 The Contractor shall be solely responsible for achieving the specified density. The maximum lift thickness, and compaction requirements shall be as indicated in Table 3-1. Note that the compaction requirements may be modified in writing at the sole discretion of the Engineer after reviewing ongoing field experience, or testing.

Table 3-1. Compaction Requirements

Fill Description	Placement Method	Maximum Lift Thickness Before Compaction (mm)	Minimum Density
Cyclone Sand	Hydraulic	500	100% Standard Proctor(1)

1. Relative to maximum Standard Proctor dry density per ASTM D698.

3.4 TOLERANCES OF FILL PLACEMENT

.1 Place Cyclone Sand to the lines and levels shown on the Drawings or as approved by the Engineer and to tolerances of zero to +300 mm in elevation, zero to +100 mm in horizontal dimensions adjacent to the Till core, zero to +300 mm in horizontal dimension on the outside slope in the downstream direction and zero to 1 m in the horizontal dimension on the outside slope in the upstream direction.

3.5 QUALITY CONTROL

.1 During placement of Cyclone Sand, regular supervision of the construction activities are required by the Supervisor. The quality of Cyclone Sand placement shall be controlled based on observations made by the Supervisor and documented using photographs and the laboratory testing outlined in Table 3-2.

Table 3-2. Routine CQC Testing Requirements

Test	Standard	Cyclone Sand Testing Frequency
Moisture Content	ASTM D2216	1 per 1,000 m^3 or 1 per day(2)
Grain Size Distribution	ASTM D6913	1 per 1,000 m^3 or 1 per day(1,2.3)
Field Density	ASTM D2922	1 per 1,000 m^3 or 1 per day(1,2,3)
Standard Proctor	ASTM D698	1 per week
Specific Gravity	ASTM D854 and ASTM C127	1 per month

1. Whichever is more frequent.
2. For the first month of construction, 2-3 tests per shift are required, following which routine testing, as indicated in Table 3-2, will be required.
3. At every field density testing location, a grain size distribution is also required.

.2 Conduct both laboratory and field tests on in-place Cyclone Sand to check the quality after placement and compaction of the Cyclone Sand. Perform testing in accordance with the principles and methods prescribed by the standards referenced in this Technical Specification.

.3 Perform testing across the full length, width and depth of the various Cyclone Sand Cells so as to fully represent the overall quality of the structure. Reference test results to material type, location (indicating both Northing and Easting), and elevation measured using a total station or other appropriate survey equipment

.4 The testing results shall be summarized and reported to the Engineer on a weekly basis. Each report shall be issued to the Engineer by email during the week after the reporting period corresponding to each report. A summary of the days worked during the reporting period, the weather, and notable events, including non-conformances, shall be summarized in the weekly report. A general arrangement plan map showing the location of the samples collected during that reporting period shall be included.

.5 In the event that a test indicates that Cyclone Sand does not demonstrate compliance with the Technical Specifications, notify the Engineer immediately and undertake actions necessary to meet the Technical Specifications.

.6 Conduct the testing program on the compacted Cyclone Sand as outlined in Table 3-2. These requirements may be modified or relaxed by the Engineer on the basis of field and laboratory testing data, material variability, and ongoing field experience.

3.6 CONSTRUCTION QUALITY ASSURANCE

.1 The Engineer will undertake periodic site visits as part of the Construction Quality Assurance for the placement of Cyclone Sand. Where appropriate, the Supervisor may be required to provide assistance while collecting samples.

.2 Testing shall be performed in accordance with the principles and methods prescribed by the standards referenced in this Technical Specification.

.3 Construction Quality Assurance testing shall not relieve the Contractor of its sole responsibility to construct the Work in accordance with the specified requirements.

3.7 ACCEPTANCE

.1 Final acceptance of Cyclone Sand Cells by the Engineer will be made only after materials have been placed, spread, and compacted, and tests and surveys have demonstrated compliance with the Technical Specifications.

END OF SECTION

APPENDIX D
INSTRUMENTATION CALIBRATION RECORDS

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Tel: 604 540 1100 • Fax: 604 540 1005 • Toll Free: 1 800 665 5599 (North America only)
e-mail: info@rstinstruments.com • Website: www.rstinstruments.com

Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21539**	
Mfg Number:		1128136	
Customer ID:		SD	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		50	meters
Cable Markings:		102066 m - 102115 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	9021	9021	9021	1.9	0.27	0.03
140.0	8159	8159	8159	139.2	-0.11	-0.07
280.0	7283	7284	7284	278.7	-0.18	0.01
420.0	6403	6404	6404	418.9	-0.15	0.04
560.0	5520	5521	5521	559.6	-0.06	0.00
700.0	4629	4630	4630	701.6	0.23	-0.01
			Max. Error (%):		0.27	0.07

Linear Calibration Factor:	**C.F.=**	**0.15933 kPa/B unit**
Regression Zero:	**At Calibration =**	**9032.8 B unit**
Temperature Correction Factor:	**Tk =**	**0.01313 kPa/°C rise**

Polynomial Gage Factors (kPa) A: -6.4471E-07 B: -0.15053 C: 1410.6

Pressure is calculated with the following equations:

Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$

Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	9022	19.7	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = $Hz^2 / 1000$ ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

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e-mail: info@rstinstruments.com • Website: www.rstinstruments.com

Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.
Model:		VW2100-0.7
Serial Number:		**VW21540**
Mfg Number:		1128137
Customer ID:		WD 1
Range:		700.0 kPa
Temperature:		23.1 °C
Barometric Pressure:		999.6 millibars
Work Order Number:		Q021659
Cable Length:		45 meters
Cable Markings:		103007 m - 103052 m
Cable Colour Code:	Red / Black (Coil)	Green / White (Thermistor)
Cable Type:		EL380004
Thermistor Type:		3 Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8793	8793	8793	1.5	0.21	0.00
140.0	8012	8011	8012	139.7	-0.04	0.00
280.0	7225	7226	7226	278.7	-0.18	-0.01
420.0	6433	6434	6434	418.8	-0.17	0.01
560.0	5637	5637	5637	559.7	-0.04	0.00
700.0	4835	4836	4836	701.5	0.21	0.00
				Max. Error (%):	0.21	0.01

Linear Calibration Factor:	**C.F.=**	**0.17687 kPa/B unit**
Regression Zero:	**At Calibration =**	**8801.5 B unit**
Temperature Correction Factor:	**Tk =**	**-0.04682 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -7.1587E-07 **B:** -0.16712 **C:** 1524.8

Pressure is calculated with the following equations:

Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$

Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8799	19.8	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = $Hz^2 / 1000$ ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

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e-mail: info@rstinstruments.com • Website: www.rstinstruments.com

Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21541**	
Mfg Number:		1128138	
Customer ID:		WD 2	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		41	meters
Cable Markings:		103053 m - 103093 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	9044	9045	9045	1.4	0.20	0.00
140.0	8125	8125	8125	139.7	-0.04	0.00
280.0	7199	7199	7199	279.0	-0.15	0.01
420.0	6269	6270	6270	418.8	-0.17	-0.01
560.0	5333	5332	5333	559.7	-0.04	0.00
700.0	4390	4391	4391	701.4	0.20	0.00
			Max. Error (%):		0.20	0.01

Linear Calibration Factor:	**C.F.=**	**0.15041 kPa/B unit**
Regression Zero:	**At Calibration =**	**9053.8 B unit**
Temperature Correction Factor:	**Tk =**	**0.02646 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -4.8519E-07 **B:** -0.14389 **C:** 1341.1

Pressure is calculated with the following equations:
Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	9049	19.7	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = $Hz^2 / 1000$ ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21542**	
Mfg Number:		1128139	
Customer ID:		TSFS A	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		37	meters
Cable Markings:		102029 m - 102065 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8870	8874	8872	1.6	0.23	0.00
140.0	8115	8115	8115	139.7	-0.04	0.00
280.0	7353	7353	7353	278.7	-0.18	0.00
420.0	6586	6587	6587	418.6	-0.21	-0.02
560.0	5813	5812	5813	559.8	-0.04	0.02
700.0	5035	5035	5035	701.6	0.23	0.00
			Max. Error (%):		0.23	0.02

Linear Calibration Factor:	**C.F.=**	**0.18243 kPa/B unit**
Regression Zero:	**At Calibration =**	**8880.8 B unit**
Temperature Correction Factor:	**Tk =**	**0.06292 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -8.3253E-07 **B:** -0.17085 **C:** 1581.3

Pressure is calculated with the following equations:
Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8874	19.6	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21543**	
Mfg Number:		1128140	
Customer ID:		TSFS B1	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		33	meters
Cable Markings:		103094 m - 103127 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	9017	9018	9018	1.3	0.18	0.00
140.0	8219	8219	8219	139.8	-0.03	0.01
280.0	7418	7418	7418	278.8	-0.17	-0.03
420.0	6609	6610	6610	419.1	-0.13	0.01
560.0	5799	5798	5799	559.8	-0.03	0.01
700.0	4983	4984	4984	701.2	0.17	-0.01
			Max. Error (%):		0.18	0.03

Linear Calibration Factor:	**C.F.=**	**0.17351 kPa/B unit**
Regression Zero:	**At Calibration =**	**9024.8 B unit**
Temperature Correction Factor:	**Tk =**	**-0.007014 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -5.8300E-07 **B:** -0.16535 **C:** 1538.4

Pressure is calculated with the following equations:
Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	9022	19.6	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = $Hz^2 / 1000$ ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21544**	
Mfg Number:		1128141	
Customer ID:		TSFS B2	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		36	meters
Cable Markings:		100074 m - 100109 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8874	8875	8875	1.5	0.22	0.00
140.0	8102	8103	8103	139.6	-0.06	-0.02
280.0	7322	7323	7323	279.0	-0.14	0.03
420.0	6541	6542	6542	418.7	-0.18	-0.01
560.0	5754	5753	5754	559.6	-0.05	-0.01
700.0	4960	4960	4960	701.5	0.22	0.01
			Max. Error (%):		0.22	0.03

Linear Calibration Factor:	**C.F.=**	**0.17882 kPa/B unit**
Regression Zero:	**At Calibration =**	**8882.9 B unit**
Temperature Correction Factor:	**Tk =**	**-0.01506 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -7.2679E-07 **B:** -0.16877 **C:** 1555.0

Pressure is calculated with the following equations:
Linear: $P(kPa) = C\ F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8880	19.7	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21545**	
Mfg Number:		1128142	
Customer ID:		TSFS BC	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		31	meters
Cable Markings:		102117 m - 102147 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8870	8871	8871	1.3	0.19	0.00
140.0	8061	8061	8061	139.8	-0.03	0.00
280.0	7248	7248	7248	278.8	-0.17	-0.02
420.0	6428	6429	6429	419.0	-0.15	0.01
560.0	5605	5605	5605	559.8	-0.03	0.01
700.0	4778	4778	4778	701.3	0.18	-0.01
				Max. Error (%):	0.19	0.02

Linear Calibration Factor:	**C.F.=**	**0.17103 kPa/B unit**
Regression Zero:	**At Calibration =**	**8878.3 B unit**
Temperature Correction Factor:	**Tk =**	**0.004402 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -5.9025E-07 **B:** -0.16297 **C:** 1492.1

Pressure is calculated with the following equations:

Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$

Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8870	19.6	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

This instrument has been calibrated using standards traceable to the NIST in compliance with ANSI Z540-1

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21546**	
Mfg Number:		1128143	
Customer ID:		TSFS C1	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		36	meters
Cable Markings:		103128 m - 103163 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8857	8857	8857	1.5	0.22	0.00
140.0	8087	8087	8087	139.7	-0.04	0.01
280.0	7313	7312	7313	278.8	-0.17	0.00
420.0	6533	6533	6533	418.7	-0.18	0.00
560.0	5748	5748	5748	559.6	-0.05	0.00
700.0	4957	4958	4958	701.6	0.22	0.00
			Max. Error (%):		0.22	0.01

Linear Calibration Factor:	**C.F.=**	**0.17952 kPa/B unit**
Regression Zero:	**At Calibration =**	**8865.4 B unit**
Temperature Correction Factor:	**Tk =**	**-0.006262 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -7.6171E-07 **B:** -0.16900 **C:** 1556.6

Pressure is calculated with the following equations:
Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8860	19.7	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21547**	
Mfg Number:		1128144	
Customer ID:		TSFS C2	
Range:		700.0	kPa
Temperature:		23.1	°C
Barometric Pressure:		999.6	millibars
Work Order Number:		Q021659	
Cable Length:		38	meters
Cable Markings:		100000 m - 100037 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8818	8818	8818	1.2	0.17	-0.01
140.0	8008	8009	8009	139.8	-0.03	0.01
280.0	7195	7195	7195	279.1	-0.13	0.02
420.0	6378	6379	6379	418.9	-0.16	-0.01
560.0	5557	5556	5557	559.6	-0.05	-0.01
700.0	4729	4729	4729	701.3	0.19	0.01
			Max. Error (%):		0.19	0.02

Linear Calibration Factor:	**C.F.=**	**0.17122 kPa/B unit**
Regression Zero:	**At Calibration =**	**8825.0 B unit**
Temperature Correction Factor:	**Tk =**	**-0.03257 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -5.6710E-07 **B:** -0.16354 **C:** 1486.1

Pressure is calculated with the following equations:

Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$

Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8819	19.7	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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Calibration Record

Vibrating Wire Piezometer

Customer:		Acres Enterprises Ltd.	
Model:		VW2100-0.7	
Serial Number:		**VW21548**	
Mfg Number:		1142962	
Customer ID:		TSFS C3	
Range:		700.0	kPa
Temperature:		22.7	°C
Barometric Pressure:		996.7	millibars
Work Order Number:		Q021659	
Cable Length:		36	meters
Cable Markings:		100038 m - 100073 m	
Cable Colour Code:	Red / Black (Coil)	Green / White	(Thermistor)
Cable Type:		EL380004	
Thermistor Type:		3	Kohms

Applied Pressure (kPa)	First Reading (B units)	Second Reading (B units)	Average Reading (B units)	Calculated Linear (kPa)	Linearity Error (% FS)	Polynomial Error (% FS)
0.0	8986	8987	8987	1.8	0.25	0.02
140.0	8158	8159	8159	139.4	-0.08	-0.04
280.0	7320	7321	7321	278.7	-0.18	0.01
420.0	6478	6478	6478	418.8	-0.17	0.02
560.0	5631	5630	5631	559.7	-0.05	0.01
700.0	4777	4777	4777	701.6	0.22	-0.01
			Max. Error (%):		0.25	0.04

Linear Calibration Factor:	**C.F.=**	**0.16624 kPa/B unit**
Regression Zero:	**At Calibration =**	**8997.1 B unit**
Temperature Correction Factor:	**Tk =**	**0.04313 kPa/°C rise**

Polynomial Gage Factors (kPa) **A:** -6.9272E-07 **B:** -0.15671 **C:** 1464.3

Pressure is calculated with the following equations:
Linear: $P(kPa) = C.F.(Li-Lc) - [Tk(Ti-Tc)] + [0.10(Bi-Bc)]$
Polynomial: $P(kPa) = A(Lc)^2 + BLc + C + Tk(Tc-Ti) - [0.10(Bc-Bi)]$

	Date (dd/mm/yy)	VW Readout Pos. B (Li)	Temp °C (Ti)	Baro (Bi)
Shipped Zero Readings:	12-Apr-12	8991	19.6	1009.7

Li, Lc = initial (at installation) and current readings
Ti, Tc = initial (at installation) and current temperature, in °C
Bi, Bc = initial (at installation) and current barometric pressure readings, in millibars
B units = B scale output of VW 2102, VW 2104, VW 2106 and DT 2011 readouts
B units = Hz^2 / 1000 ie: 1700Hz = 2890 B units

Technician: Benson Yu Date: 12-Apr-12

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