

**RAINY RIVER MINE**

**OPERATION, MAINTENANCE AND SURVEILLANCE  
MANUAL**

**PART V – SEDIMENT PONDS**

**New Gold Inc.  
Rainy River Project  
5967 Highway 11/71, P.O. Box 5  
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**February 2021**

**Version 2021-1**

## REVIEW AND REVISION HISTORY

The OMS Manual shall be reviewed annually and following any significant changes at the site to assess if the document is representative of the current condition and operation of the dam at the time of the review. Revisions to the manual should be undertaken within six months of changes. It is the responsibility of the Tailings Dam Engineer to initiate the OMS review.

The review team and approval record are given in Table 1. The version history of the OMS Manual is shown in Table 2.

**Table 1 - Review Team**

	Name	Company /Department	Position	Signature	Date
Prepared by	Patrick Green	NG Capital Projects	Tailings Dam Engineer		
Reviewed by	Travis Pastachak	NG Capital Projects	Capital Projects Manager		
	Darrol VanDeventer	NG Mine Operations	Mining Manager		
	Tyler Buckingham	NG Mill	Mill Manager		
	Tony Lord	NG Maintenance	Director, Asset and Energy Management		
	Andre Zerwer	BGC Engineering Inc.	EoR		
Approved by	Sylvie St. Jean	NG Environment	Environmental Manager		

**Table 2 - Revision Summary**

Revision Number	Details of Revision	Date of Issue	Comment
Rev A	Issue for Review	February 9, 2021	N/A

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Appendix B	Water Pumping Data (simple list of pumps, capacity, PFDs, other)
Appendix C	New Gold Tailings, Heap Leach and Waste Rock Facilities Management Policy
Appendix D	Tailings Deposition Plan (Schematic)
Appendix E	Process Water Balance Overview
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## 1.0 OBJECTIVE

The objective of this document is to provide procedures for the operation, maintenance, and surveillance (OMS) of the Water Management Pond (WMP) at the New Gold Inc. (NGI) Rainy River Mine (RRM), located near Emo, Ontario. This OMS Manual serves as a reference for the safe operation of the structures related to tailings, water management, and water diversion structures. For readability, the OMS Manual has been separated into “Parts”, as listed below:

- Part 1: General
- Part 2: TMA
- Part 3: WMP
- Part 4: MRP
- **Part 5: SEDIMENT PONDS**
- Part 6: DIVERSIONS
- Part 7: WATER TREATMENT
- Part 8: EPP

To simplify and condense the OMS Manual, the site conditions were removed from the individual structure parts and covered in Part 1 of the OMS Manual. The topics discussed in Part 1 under Section 4.0 – Site Baseline Conditions are:

- Site Location and Tenure
- Temperature
- Precipitation
- Evaporation
- Hydrology
- Geology
- Hydrogeology
- Water Quality
  - Tailings
  - Biodiversity
  - Fish
- Vegetation
- Wildlife
- Natural Hazards

This document is consistent with the New Gold Tailings, Heap Leach and Waste Rock Facilities Management Policy and was prepared pursuant to the MAC guidelines for *Developing an*

*Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities (MAC, 2011).*

The following is a list of permits that this section of the OMS complies with:

- LRIA-FF-2015-04B: WMP Dams 1,2 and 3
  
- LRIA-FF-2015-04A: WMP Dams 4 and 5

## **2.0 SITE AND FACILITIES DESCRIPTION**

The RRM site is in the Township of Chapple located 70 kilometres (km), by road, northwest of Fort Frances, in Northwestern Ontario. New Gold has 100% interest in the lands forming the RRM through direct ownership or option agreement.

### **2.1 Overview**

Water treatment is provided by the following;

- Water Treatment Plant, Water Discharge Pond (WDP) and the Constructed wetland – (CW)
- BCR2 and Outflow Basin
- Sediment ponds

Sedimentation ponds have been designed to allow for the settlement of total suspended solids present in the non-contact runoff or effluent prior to discharge to the environment. Sediment Ponds #1, #2, and #3 receive runoff and seepage from the West Mine Rock Stockpile (WMRS).

Sediment Ponds #1 and #2 collect seepage and runoff from the West Mine Rock Stockpile (WMRS) to allow for settlement of Total Suspended Solids (TSS). The sediment ponds have been designed to provide a 12-day hydraulic retention time. Sediment Pond #1 will also receive overflow water from the West Creek Box Culvert Spillway during large storm events. Critical to the function of the sediment ponds is progressive reclamation. The ponds have been designed to meet the retention time objectives for Year 3 of mine operations.

Sediment Pond #3 consists of collection ditches, a sump located in the Marr Creek valley, the WMRS Temporary Sump 1, the WMRS Temporary Sump 2, and a containment berm with an emergency overflow spillway. Construction of Sediment Pond 3 occurred between July 14, 2019 and January 26, 2020.

Seepage collection ditches have been constructed around the Overburden and NPAG stockpiles to convey runoff to the sediment ponds. The ditches will be constructed to minimize erosion protection requirements where practically possible. Flows may also be directed to the ponds using roadside ditches.

Good engineering practices for placement, sediment and erosion control will be adopted for the management of the overburden pile to help reduce the sediment load and increase the chance that settling alone (as opposed to the addition of coagulants and flocculants) can be used for settling out the TSS. These practices include pre-settling ponds that are regularly cleaned out, construction of ditches with appropriate slopes, maintenance of the ditches, and progressive re-vegetation of the overburden stockpile.

Further details on design are available in documents in Table 3.

**Table 3 - Document Summary**

Document Title	Reference
LRIA Work Permit Application Support Document Sediment Ponds	RRP-GEO-LRIA012 R1
As-Built Report – Sediment Pond #1	RRP-GEO-REP-040 R1
As-Built Report – Sediment Pond #2	RRP-GEO-REP-038 R1
As-Built Report – Sediment Pond #3	BGC-4460-DT00-RPT-0011
Drawing Title	New Gold Document Number
Temporary Sedimentation and Plan and Details	3098004004430-A1D70-0002
Sediment Pond #2 – Plan, Cross Sections, and Details	3098004-004440-A1-D70-0002

## **2.2 Dam Consequence Classification**

The Sediment Pond Dams were not classified using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria” or the Canadian Dam Association (CDA)

A Dam Safety Review (DSR) is planned for 2021. It is expected that unclassified dams will be classified during this exercise.

## **2.3 Utilities**

The following major utilities are used on site:

- Power to the plant site is provided by 230 kV transmission lines that are connected to Hydro One northwest of the site at a Switching Station;
- The 230 kV substation is located adjacent to the Process Plant to provide power to the process equipment by underground supply lines. Power to the remainder of the site is provided by a network of overhead and underground power lines fed from the substation; and
- Site telecommunications and Process Control are distributed by a network of overhead and underground fiber optic lines.



## **3.0 OPERATIONS**

### **3.1 Flood Capacity**

Sediment ponds are designed to provide a 12-day hydraulic retention time for all events up to and including the 25-year return period, 24-hour storm.

Sediment Pond #1 collects runoff from the WMRS and will also receive inflow from overflow of the West Creek Diversion during events greater than the 25-year 24-hour storm event. The low flow outlet is designed to achieve the required retention time for the 25-year 24-hour storm event. To prevent dam overtopping, the emergency spillway is designed for the 100-year storm event discharging to the West Creek Diversion Channel.

Sediment Pond #2 also collects runoff from the WMRS (Non-Potentially Acid Generating and is closer to the Pinewood River). The low flow outlet is designed to achieve the required retention time for the 25-year 24-hour storm event. To prevent dam overtopping, the high flow spillway is designed for the Regional Storm Event (Timmins Storm Event), discharging directly to the Pinewood River.

Consistent with the design of other sediment ponds at the Rainy River Mine, the Sediment Pond 3 sump was sized to contain an EDF corresponding to the 25-year 24-hour, and the 25-year 30-day rainfall events. Similarly, the Sediment Pond 3 sump and emergency spillway have been sized to pass an IDF event of the 24-hour 100-year return period rainfall event.

### **3.2 Minimum Freeboards**

Freeboard is typically defined as the vertical distance between the still water level and the top of the impervious core of a dam or dyke.

The Sediment Pond 3 emergency spillway and berm were sized to provide freeboard meeting the following conditions:

- Containment for wind setup and wave runup for the 1:100-year wind event with the pond at the maximum routed elevation during passage of the IDF
- Containment for wind setup and wave runup for the 1:1,000-year wind event with the pond at the Maximum Operating Water Level (MOWL)

### **3.3 Pond Alert Levels**

The ponds are surveyed three times per week during ice-free months and once a week over the winter months. Should the ponds exceed the EDF elevation, a plan to return water levels to below the EDF will be implemented. This plan includes the options of transfer of water to another pond. The actions implemented will be decided by the Environmental Manager in consultation with the Environmental Manager.

### **3.4 Closure**

Sediment Ponds will be maintained until the site is recognized as a closed mine and monitoring associated with the Metal Mining Effluent Regulation is no longer required. At such time, all Sediment Ponds will be breached, and residual pond sites will be stabilized by infilling with overburden and revegetated.

### **3.5 Contingency**

The operations are sensitive to water balance and water quality in discharges. The following are contingencies based on water management and functioning of the diversions.

#### **3.5.1 Sediment Pond #1**

If water from Sediment Pond #1 cannot be discharged to the environment, Sediment Pond #1 will be continuously pumped to the TMA or Sediment Pond #2 and water level will be kept at 1.5 m from the bottom. The following contingency plan of Sediment Pond #1 will be required if one of the following criteria are met:

1. Sediment Pond #1 water level has exceeded the MOWL of 353.7 m
2. Dam performance conditions deemed unsafe by the Engineer of Record
3. In the event the water quality nears discharge exceedance values, water will be pumped at greater volume to prevent unauthorized discharge.

Should criteria 1 or 2 be triggered:

- Notify the authorities
- If insufficient, pump water to the TMA
- If insufficient, pump water to the MRP
- If insufficient, pump to the Pit

Should criteria 3 be triggered:

- Notify the authorities
- Add pumping capacity to the TMA
- If insufficient, pump water to the MRP
- If insufficient, pump to the Pit

If the dewatering is required, the MECP and MNRF will be informed immediately of the planned emergency procedures. Dam safety is of primary importance and the EOR should be contacted immediately.

#### **3.5.2 Sediment Pond #2**

If water from Sediment Pond #2 cannot be discharged to the environment, Sediment Pond #2 will be continuously pumped to the TMA and water level will be kept at 1.5 m from the bottom. The following contingency plan of Sediment Pond #2 will be required if one of the following criteria are met:

1. Sediment Pond #2 water level has exceeded the MOWL of 348.2 m.
2. Dam performance conditions deemed unsafe by the Engineer of Record
3. In the event the water quality nears discharge exceedance values, water will be pumped at greater volume to prevent unauthorized discharge.

Should criteria 1 or 2 be triggered:

- Notify the authorities
- Add pumping capacity to the TMA
- If insufficient, pump water to the MRP
- If insufficient, pump to the Pit

Should criteria 3 be triggered:

- Notify the authorities
- Add pumping capacity to the TMA
- If insufficient, pump water to the MRP
- If insufficient, pump to the Pit

If the dewatering is required, the MECP and MNRF will be informed immediately of the planned emergency procedures. Dam safety is of primary importance and the EOR should be contacted immediately.

### **3.5.3 Sediment Pond #3**

Sediment Pond #3 will operate at its NOWL. Should a major storm be predicted anytime within one week, it shall be pumped empty. It will be maintained in an empty state before winter freshet.

## 4.0 MAINTENANCE

The following periodic maintenance is required:

- Maintain the tailings and reclaim pumps and associated lines and containment
- Clear debris, snow and ice which may block flow through the decant facility or emergency spillways
- Maintain water management structures including spillways, ditches, and diversions
- Maintain equipment, power and water lines, and instrumentation
- Repair any deficiencies as noted in the Dam Safety Inspections (DSI); and
- Reconstruct the support for tailings discharge pipelines wherever washouts occur.

Maintenance records are retained by maintenance personnel performing the work in accordance with the procedures described in this document. Timing of maintenance actions for unusual conditions should be based on specific recommendations from surveillance findings. Scope and time frames for routine maintenance activities are determined and scheduled by the Maintenance Department and based on manufacturer's recommendations and best practices.

The maintenance flowchart is illustrated in Figure 1.

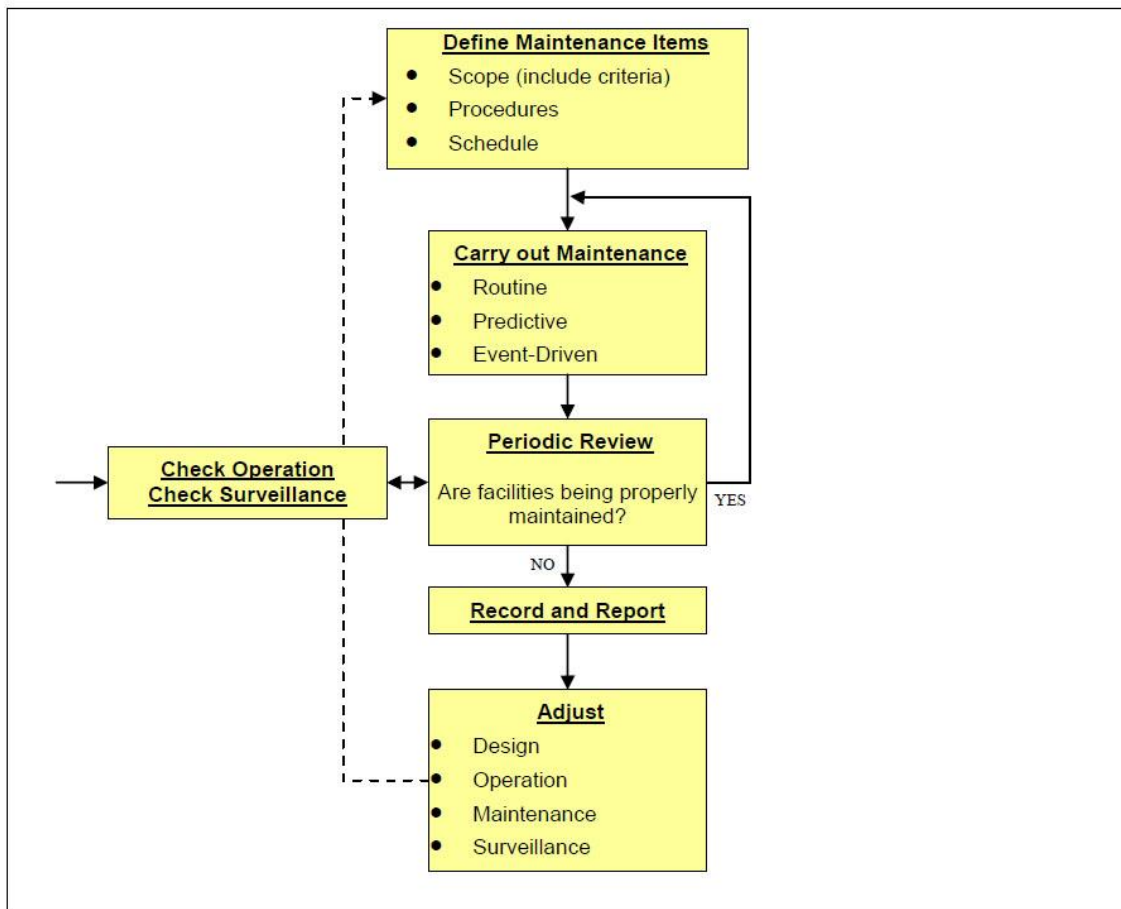


Figure 1 - Maintenance Flow Chart

#### **4.1 Routine and Predictive Maintenance**

Routine and predictive maintenance includes removal of vegetation, beaver dams, ice blockage or sediment accumulation that would otherwise affect the performance of a structure.

#### **4.2 Dams**

The following are examples of specific maintenance activities:

- Regularly check diversion ditches, spillways and culverts for accumulation of debris or sediment, or any other form of blockage including ice, and remove if required
- Visually inspect diversions, spillways, seepage collection sumps, dams and all ditches for cracking, bulging, slumping, and any other indications of slope movement (note, any indications of slope movement shall be reported to a qualified geotechnical engineer)
- Re-grade the dam crest, as required, to prevent local ponding and direct surface runoff towards the pond
- Repair erosion gullies, local slumps or slides in the dam face, diversion ditches or spillway channels
- Regularly check diversion ditches for accumulation of debris or sediment, or any other forms of blockage, and remove if required
- Removal of vegetation
- If annual survey determines necessary, correct dam crest, overflow spill way and diversion channel invert irregularities to avoid concentrated runoff

#### **4.3 Geotechnical and Water Monitoring Instrumentation**

Geotechnical and water monitoring instrumentation is calibrated by the manufacturer prior to shipment. Following instrument installation, initial reading procedures will be followed. Subsequent calibration will follow manufacturer's recommendations.

Calibration certificates will be maintained by Mill Maintenance for water monitoring instrumentation. Geotechnical instrumentation records are maintained by the Tailings Dam Engineer

Malfunctioning or damaged instruments may require repair or replacement per manufacturer guidelines and in consultation with the EoR or approved procedure. In the event of replacement of dam instrumentation, several overlapping readings of the old and new instrument are required to ensure continuity of the data records.

#### **4.4 Pumping Systems and Pipelines**

Maintenance of the tailings delivery, water recirculation systems and seepage pumps will include:

- Regular performance tests on seepage pond pumps
- Annual calibration and maintenance as required on flow meters
- Replace pipe, bends and fitting components as required
- Remove accumulated debris from valves, reducers and off takes

- Carryout maintenance as recommended by fitting and valve suppliers
- Regularly inspect major wear components
- Maintain emergency dump ponds in a dewatered/empty state
- Maintain and replace system instrumentation as required

The maintenance of pumps is the responsibility of New Gold and maintenance records are required to be maintained. Each pump requires spill pan, spill kit, and flotation device. Changes to pumping configurations, ditching, piping, or operating parameters need to be approved by the Environmental Manager. In an emergency call out (after hours), the Managers or their alternate, will provide direction in consultation with the New Gold Environmental Department.

Fundamental to the successful operation of the ponds and pumping strategy is a timely reaction to rainfall events, ensuring that pumps come 'online' or are taken 'offline' as design trigger levels are reached.

#### **4.5 Mobile Equipment**

Mobile equipment is maintained based on a planned reliability program and as otherwise required. Equipment includes:

- Dozers
- Excavators
- Water truck
- Pickup trucks
- Mobile crane
- Flatbed and picker truck
- Replacement of mobile equipment as required

#### **4.6 Event Driven Maintenance**

In the event of unusual conditions or incidents that require immediate maintenance actions but are not considered an emergency, repairs and replacement of facility components are made as required and activities documented. RRM staff will provide a means to assess event driven maintenance needs through response action planning. Response planning is based on risk prioritization, maintenance crew mobilization or "call out" procedures, required repairs and replacement material availability. Event driven maintenance actions will follow applicable safety and performance procedures. Unusual conditions that require maintenance are to be communicated to maintenance staff as per RASCI.

##### **4.6.1 Pipeline Leaks or Breaks**

In the event of a pipeline leak or break the system is de-energized and repaired as follows:

- Inspect entire pipeline
- Repair or replace affected components

- Perform scheduled maintenance
- Repair damage caused by a leak or break
- Remediate area of released tailings
- Reclaim disturbed areas
- Follow spill reporting procedures

#### **4.6.2 Earthquake Occurrence**

Subsequent to an earthquake, the following are undertaken:

- Inspect dam and beach areas for sign of distress due to deformation
- Inspect dam for signs of liquefaction (e.g., local sand boils, etc.)
- Measure freeboard for compliance with design requirements
- Inspect toe area of dam for signs of deformation or piping of fines
- Inspect diversions, ditches, and spillways for sign of slumping or changes in geometry
- Inspect seepage collection areas
- Collect instrumentation data and submit to EoR for analysis

#### **4.6.3 Flood Event**

Following a flood event, as defined in Table 7, the following will be undertaken:

- Measure freeboard for compliance with design requirements
- Inspect dam, diversions, ditches, spillways, and diversions for signs of excessive erosion
- Inspect seepage return system for adequacy
- Implement appropriate response based on observations/measurements as defined in this manual

#### **4.7 Reporting Requirements**

Maintenance information will be communicated as per RASCI chart and in accordance with this OMS Manual.

Equipment logs and manuals will be maintained for reference and use by responsible staff.

Maintenance diaries and logs shall be maintained and accessible for review by other parties.

## 5.0 SURVEILLANCE

### 5.1 Objectives

The objective of the surveillance program is to provide confirmation of the adequate performance of the facility, including containment, stability, and operational function by observing, measuring, and recording data relative to potential failure modes and specific operational controls.

### 5.2 Surveillance Procedures

A program of regular periodic surveillance is required to ensure that the facilities are performing adequately and that problems are detected for necessary corrective actions to be implemented in a timely manner. The following surveillance procedures will be conducted:

- Visual monitoring by site staff
- Measurement of geotechnical instruments
- Sampling and testing in accordance with requirements
- LiDAR and bathymetry survey
- Collection of climate data from weather station
- Annual Dam Safety Inspections (DSI)
- Dam Safety Reviews (DSR) to be conducted in accordance with CDA, based on dam classification
- Event driven geotechnical inspections following any extreme weather events, including wind, rainfall, or earthquakes

### 5.3 Visual Monitoring by Site Staff

Visual monitoring by site staff is undertaken to identify potential failure modes, the associated visual observations are described in Table 4.

**Table 4 - Failure Modes and Observable Conditions**

<b>Failure Mode</b>	<b>Conditions Related to Possible Increased Risk of Potential Failure Mode</b>
Overtopping	<ul style="list-style-type: none"><li>• High water level</li><li>• Blockage of water management structures</li><li>• Extreme meteorological event</li><li>• Dam settlement</li><li>• Excessive accumulation of solids (near reclaim pocket)</li><li>• Erosion from burst tailings pipe</li></ul>
Instability	<ul style="list-style-type: none"><li>• Cracking</li><li>• Dam settlement</li><li>• Slope movement</li><li>• Dam bulging</li><li>• Increased pore water pressures within the dam</li></ul>



	<ul style="list-style-type: none"> <li>• Increased seepage</li> <li>• Erosion</li> <li>• Seismic event</li> </ul>
Piping	<ul style="list-style-type: none"> <li>• Sediment laden seepage</li> <li>• Wet spots at downstream dam toe or on downstream slope</li> <li>• Sinkholes</li> </ul>

Inspection frequencies are followed as per Table 5 - Inspection Frequencies

Type	Frequency
<i>Routine Inspection:</i>	
Dam	Target 2x per shift
Diversions	Monthly
Sediment Ponds	Monthly
Ditches	Weekly
Seepage collection system	Target 2x per shift
Spillways	Weekly
Pipelines & Spigots	Target 2x per shift
<i>Tailings Pond Monitoring:</i>	
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
<i>Annual Dam Inspection</i>	Annually, with no snow cover
<i>Event Driven Inspection</i>	Following unusual events (defined in Table 7)
<i>Comprehensive Review (DSR):</i>	
Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

. The TMA and WMP dams are inspected simultaneously to the tailings pipelines (See MIL-CND-SOP-0009 for details). Forms are available in Appendix G.

**Table 5 - Inspection Frequencies**

Type	Frequency
<i>Routine Inspection:</i>	
Dam	Target 2x per shift
Diversions	Monthly
Sediment Ponds	Monthly
Ditches	Weekly
Seepage collection system	Target 2x per shift
Spillways	Weekly
Pipelines & Spigots	Target 2x per shift
<i>Tailings Pond Monitoring:</i>	
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
<i>Annual Dam Inspection</i>	Annually, with no snow cover
<i>Event Driven Inspection</i>	Following unusual events (defined in Table 7)
<i>Comprehensive Review (DSR):</i>	
Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

#### **5.4 Geotechnical Instrumentation**

There are no geotechnical instruments installed in the Sediment Ponds.

#### **5.5 Other instrumentation**

Flow meters are recommended for all piping associated with the Sediment Ponds, with records of all water transfer submitted to the Environment department. Where a flow meter does not exist, pumping estimates for non-discharge water transfers are acceptable. All flow meters associated with discharge to the environment must be calibrated annually.

#### **5.6 Water License Sampling and Testing**

At RRM, water and effluent quality monitoring is conducted in accordance with the prescribed analytes and sampling frequency as required by Amended Environmental Compliance Approval (ECA) #7004-BC7KQ5 issued on February 11, 2020 by the Ontario Ministry of Environment, Conservation and Parks (MECP), replacing expired ECA #5781-9VJQ2J (construction) and rescinded ECA #5178-9TUPD9 (operation) issued on May 8, 2015 and September 1, 2015 respectively. Additionally, the federal *Metal and Diamond Mining Effluent Regulation SOR/2002-222 (MDMER)* and provincial O. Reg 560/94: *Effluent Monitoring and Effluent Limits – Metal Mining Sector* also have prescribed analytes and sampling frequencies that are applicable to RRM.

The NG Environment Department collects all water and effluent quality samples. Water and effluent quality data is stored by the Environment Department in the environmental data management software EQUIS by EarthSoft. A water and effluent quality sampling schedule is produced by the Environment Department in Q4 annually for the following year to ensure compliance with ECA and other regulatory sampling requirements.

#### **5.7 Survey and Bathymetry**

All dam crest elevations and spillway/diversion channel invert elevations will be surveyed annually. This is to verify that foundation consolidation has not lowered the effective containment elevations of the dam structures.

#### **5.8 Weather Stations**

The RRM weather station was installed at the Barron Site in September 2016 and is maintained by the Environment Department. The data collected by the Barron weather station is hosted by Campbell Scientific, and the data is updated twice per day at 09:00 and 16:00. In Q4 2020, the Barron weather station was upgraded to include an all-weather precipitation gauge, snow depth sensor, evaporation pan and newer models of existing instruments.

#### **5.9 Dam Safety Inspections**

The annual Dam Safety Inspection (DSI) is completed by the EoR, typically during the summer months. Recommendations from the DSI are recorded in an action tracker to closure.

The DSI is not required when the Dam Safety Review (DSR) is completed.

#### **5.10 Dam Safety Reviews**

The Dam Safety Review (DSR) is a requirement of the CDA. DSR scheduling requirements are summarized in Table 6. The DSR must be completed by a consultant who is free of any conflict of interest that could be caused by prior participation in the design, construction, operation, maintenance, or inspection of the dam under review. The CDA Dam Safety Guidelines recommend that a DSR be conducted every 5 years for an EXTREME consequence dam.

Table 6 - DSR Schedule

Dam Name	Construction Complete (DD-MMM-YY)	CRR Issued	Date of Initial Filling	Initial DSR (3 year from filling)	DSR Frequency (5 years from initial)
<b>TMA AND WMP DAMS</b>					
TMA North Dam	05-Sep-18	15-Jan-19	2019	2021	2026
TMA West Dam (Dam 4)	18-Jul-17	31-Oct-17	2019	2021	2026
Settling Pond Dam	18-Jul-17	31-Oct-17	2018	2021	2026
TMA West Dam (Dam 5)	07-Aug-17	31-Oct-17	2017	2021*	2026
TMA South Dam (0+000 – 0+800)	06-Sep-17	06-Dec-17	2017	2021*	2026
TMA South Dam (0+800 – 1+250)	19-Oct-17	15-Jan-19	2018	2021	2026
TMA South Dam (1+250 – 3+250)	16-Nov-18	29-Mar-19	2019	2021	2026
TMA Cell 1 Dam**	03-Sep-17	06-Dec-17	2017	NA	NA
TMA Cell 2 Dam**	NA	NA	2018	NA	NA
WMP Dam 1	18-Oct-16	31-Oct-17	2018	2021	2026
WMP Dam 2	02-Jul-17	31-Oct-17	2018	2021	2026
WMP Dam 3	07-Jul-17	31-Oct-17	2018	2021	2026
<b>WATER MANAGEMENT DAMS</b>					
Sediment Pond 1 Dam	31-Oct-18	12-Aug-19	2019	2021	2026
Sediment Pond 2 Dam	24-Sep-17	29-Dec-17	2017	2021*	2026
Sediment Pond 3 Dam			2020	2021	2026
West Creek Pond Dam	21-May-17	29-Dec-17	2017	2021*	2026
Stockpile Pond Dam	11-Oct-17	12-Jan-18	2018	2021	2026
Mine Rock Pond Dam	04-Dec-16	19-May-17	2017	2021*	2026
Clark Creek Pond Dam	25-Nov-16	19-May-17	2017	2021*	2026
Teeple Pond Dam	23-Sep-18	27-Feb-19	2019	2021	2026
Water Discharge Pond Dam	31-Oct-18	12-Aug-19	2019	2021	2026
Plant Site Ponds					

\* Initial DSR is due 2020 but will be completed in 2021.

\*\* Dams to be overtopped and inundated by tailings.

## 5.11 Event Driven Procedures

A list of unusual events and post-inspection requirements are given in Table 7.

**Table 7 - Inspection Requirements Following Unusual Events**

Unusual Event	Post – Event Inspection/Surveillance
Earthquakes	Carry out a detailed walkover of all dam structures, including crests, downstream and upstream (visible) slopes and dam toes, and all spillways, looking for signs of cracks, bulging, settlement, and/or other deformations. Look for and note any changes in seepage, particularly with respect to the rate of seepage flows at dam slopes and seepage clarity. Read all piezometers. Inspect downstream toes of dams for sand boils and dam slopes for sinkholes. Inspect ponds upstream of the dams looking for 'whirlpools. Inspect all pump stations and pipelines. Discuss findings with the Engineer of Record.
Rapid snowmelt and/or heavy rainstorms exceeding a 1:1-year, 24 hr rainfall (51 mm)	Inspect the (visible) slopes and the crests of all the tailings dams looking for areas of concentrated runoff and erosion. Make note of saturated ground/soft ground conditions at dam slopes and toes. Examine dam slopes for indications of localized slumping/instability. Inspect all pump stations and pipelines. Check the water levels in all ponds/reservoirs against the critical levels and keep checking these levels until the pond/reservoir inflows subside. Discuss findings with the Engineer of Record. Check piezometric levels at dam sites if instructed to do so.
Unusually high winds (exceeding 60 kph i.e., 75 % of maximum likely used in design)	Check the condition of erosion protection on the upstream slopes of the dams.
Extreme snowpack (170cm cumulative snowfall) (i.e., 120% or greater than normal snowfall at Barwick)	Check the water levels in all ponds/reservoirs against the critical levels and keep checking these levels until the spring freshet is over. Evaluate the situation in terms of possible snowmelt scenarios. Make predictions as to the expected storage capacity available in ponds/reservoirs. If deemed necessary, mobilize pumping and mobile treatment equipment to site.
Significant, relatively rapid erosion (any cause) of dam slope of 'sudden' seepage break at dam slope or downstream of dam in form of continuous seepage or boils	Notify Tailings Dam Engineer and EOR. Inspect clarity of seepage, rate of seepage and amount of material sloughed. Consider initiating Emergency Response Plan
Pond level close to, or approaching a critical level	Notify Environmental Manager. Consider initiating Emergency Response Plan
Significant change in an instrumentation reading – see table below for definition of significant change	Check the historical readings paying special attention to seasonal changes and check the measurement again. Carry out visual inspection of all areas in the vicinity of the instrument of interest. Contact the Engineer of Record.

## **5.12 Documentation**

Documentation of surveillance and monitoring activities shall be maintained by the Environmental Manager, or as designated, as described in the preceding sections and will include recording of:

- Routine visual observations (departures from normal conditions)
- Photographs
- Instrumentation monitoring
- Analyses and evaluations
- Reviews

Documentation will include, as a minimum, the following:

- Weekly routine inspection log
- Monthly tailings facility and process water pond monitoring report
- Monthly instrumentation reports
- Annual Dam Safety Inspection reports
- Comprehensive Dam Safety Review report

Documentation will include a electronic filing system for inspection reports, photographic and video records, incident reports, instrumentation readings, instrumentation plots, annual inspections and third-party reviews, readily available for review in an emergency event.

## **5.13 Reporting**

The Environmental Manager, or designated responsible party, and Geotechnical Engineer will review collected data records from facility monitoring and assess the need for maintenance activities or response. Corrective actions will be identified and tracked to closure.

The Environmental Manager is responsible for overseeing sample and data collection and analysis. Reporting will meet MECP requirements and the annual DSI report will also be submitted to the MNRF. Reporting includes:

- As built reports of the dams, excluding the Clark and West Creek diversions, will be submitted to MECP within 90 days of completion
- An annual report based on the DSI including ECA approval requirements
- Monthly water quality monitoring report
- Annual report shall include:
  - Operating problems and corrective actions
  - Summary of calibration and maintenance works
  - Use of contingency plans

- Surface water and groundwater monitoring reports including water balance
- ML/ARD updates
- Discharge volumes and quality

Additional reporting requirements may be developed as the RRM progresses.

## **6.0 EMERGENCY PREPAREDNESS AND RESPONSE PLAN**

Emergency preparedness aims to ensure that the strategic direction and required building blocks for an eventual response are in place. A detailed Emergency Response and Preparedness Plan (ERPP) is outlined in Part 8 of the OMS.