NEW GOLD RAINY RIVER MINE
APPENDIX L
OMS MANUAL

RAINY RIVER PROJECT

PART I - GENERAL

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL WATER MANAGEMENT STRUCTURES

New Gold Inc.
Rainy River Mine
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	Mine Manager		
	Sylvie St. Jean	NG Environment	Environment Manager		
	Tony Lord	NG Maintenance	Mobile Maintenance Manager		
	Andre Zerwer	BGC Engineering Inc.	Engineer of Record		
Approved by	Tyler Buckingham	NG Mill	Mill 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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1.0 OBJECTIVE

The objective of this document is to provide procedures for the operation, maintenance, and surveillance (OMS) of the Tailings Management Area (TMA) 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 – Tailings Management Area
- PART 3: WMP – Water Management Pond
- PART 4: MRP – Mine Rock Pond
- PART 5: SEDIMENT PONDS
- PART 6: WATER DIVERSIONS STRUCTURES
- PART 7: WATER TREATMENT
- PART 8: EPP

2.0 SITE REFERENCE DATA

2.1 Regulatory Requirements

Applicable codes, guidelines, and regulations governing the RRM TMA are listed below:

- Canadian Dam Association (CDA) Dam Safety Guidelines (CDA 2003)
- CDA Bulletin Application of Dam Safety Guidelines to Mining Dams (CDA 2014)
- CDA Technical Bulleting: Dam Safety Reviews (CDA 2016)
- Mining Association of Canada Guidelines (MAC 2017)
- LRIA-FF-2017-03
- LRIA-FF-2015-04C

2.2 Grid System and Maps

The mine coordinate system is based on UTM NAD 83 Zone 15 Datum. Elevations are referenced to mean sea level.

3.0 CORPORATE ORGANIZATION

3.1 Organization Chart

An organization chart identifying the parties involved with the management of the RRM and the chain of command is presented in Figure 1. Key staff for the owner, consultants, and external advisors are included. Responsibilities for named individuals are presented in Table 3.

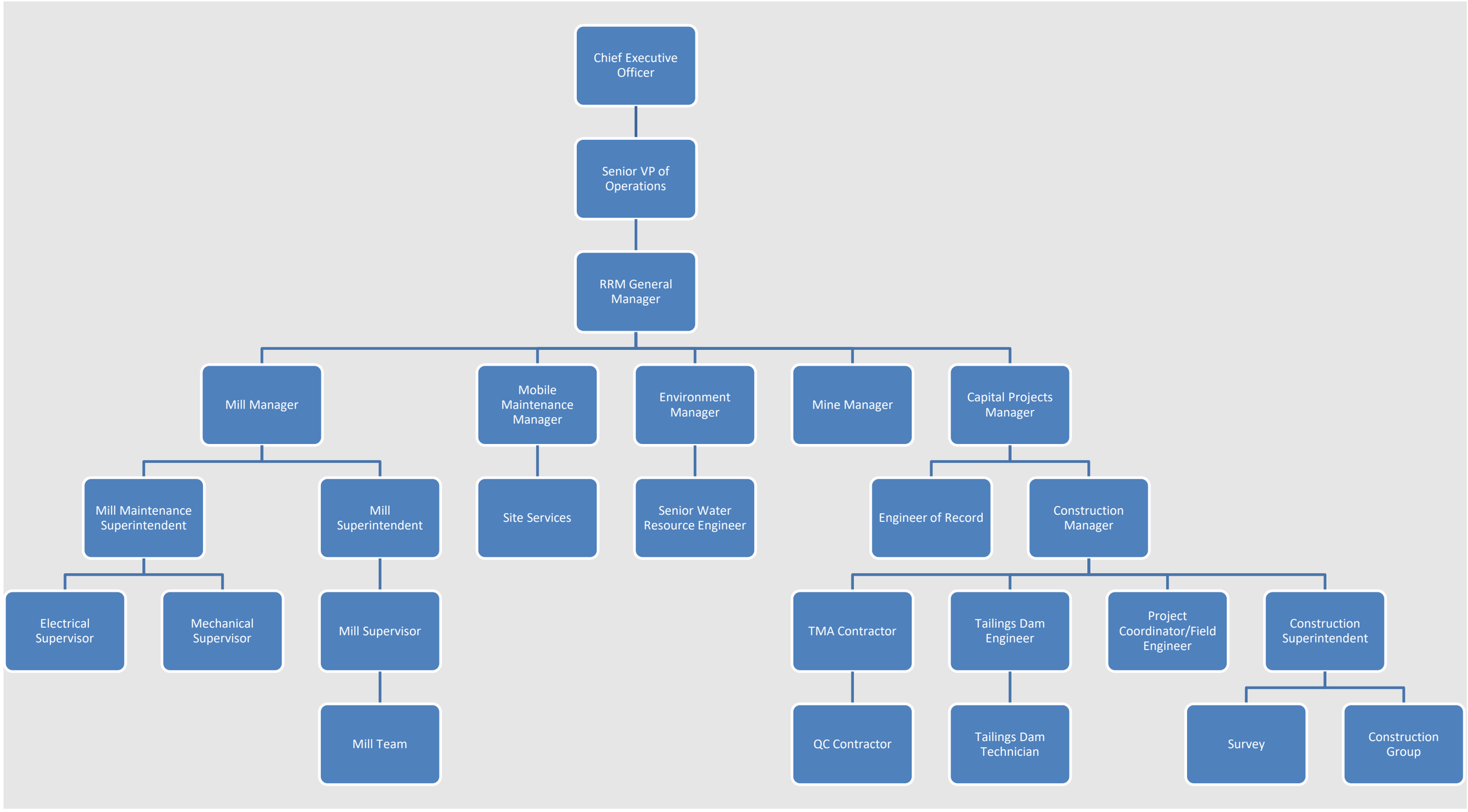

Figure 1 - Organization Chart for Tailings and Water Management

3.2 Responsibilities for Named Individuals

The roles and responsibilities of personnel formally assigned roles in the OMS of the TMA are defined in Table 3.

Table 3 - Responsibilities for Named Individuals

Role	Name	Company/ Department	Responsibilities	Phone #	Email
Chief Executive Officer	Renaud Adams	NG Corporate	• Has responsibility for the corporate "Tailings, Heap-Leach and Waste Rock Facilities Management Policy" (Included as Appendix C)	(416) 324-6002	Renaud.Adams@newgold.com
Senior VP of Operations	Eric Vinet	NG Corporate	• Provides corporate accountability for the operations of Rainy River Mine	(416) 645-7283	Eric.Vinet@newgold.com
RRM General Manager	Suresh Kalathil	NG Corporate	• Has accountability for tailings management • Provide support for the implementation of this plan • Ensure resources are available for the management of water quality and effluent release • Ensure that all dam structures meet the Canadian Dam Association Dam Safety Guidelines	(416) 881-7405	Suresh.Kalathil@newgold.com
Mill Manager	Tyler Buckingham	NG Mill	• Owner of the TMA • Accountable for the safe operation of TMA	(807) 707-7241	Tyler.Buckingham@newgold.com
Mill Superintendent	Todd Durand Derrick Colquhoun	NG Mill	• Responsible for TMA maintenance and operation	(807) 708-8408 (807) 707-8598	Todd.Durand@newgold.com Derrick.Colquhoun@newgold.com
Mill Supervisor	Mykel Spinks Simon Tremblay Jody Roussy James Carlson	NG Mill	• Responsible for inspecting tailings facilities and pipelines	(807) 708-1172	Mykel.Spinks@newgold.com Simon.Tremblay@newgold.com Jody.Roussy@newgold.com James.Carlson@newgold.com
Mill Maintenance Superintendent	Raphael Boutin Michael Lenart	NG Mill	• Accountable for maintenance of the TMA, and related infrastructure	(819) 277-0504 (807) 708-3952	Raphael.Boutin@newgold.com Michael.Lenart@newgold.com
Electrical Supervisor	Gary Loveday Darcy Mosbeck	NG Mill	• Responsible for maintenance of pumps, electrical housing, and other electrical requirements	(807) 708-6776 (807) 708-9891	Darcy.Mosbeck@newgold.com Gary.Loveday@newgold.com
Mechanical Supervisor	Scott Hillier	NG Mill	• Responsible for maintenance of pumps, and other mechanical requirements	(807) 276-8515	Scott.Hillier@newgold.com
Mobile Maintenance Manager	Tony Lord	NG Maintenance	• Accountable for operations fleet and dewatering maintenance	(647) 456 8475	Tony.Lord@newgold.com
Site Services Superintendent	Derek McKinnon	NG Maintenance	• Responsible for maintenance of HDPE pipelines	(807) 482 0900 Ext 8329	Derek.McKinnon@newgold.com
Environment Manager	Sylvie St. Jean	NG Environment	• Accountable for regulatory compliance	(807)-707-3497	Sylvie.St.Jean@newgold.com
Senior Water Resource Engineer	Sitotaw Yirdaw	NG Environment	• Responsible for monitoring and reporting water balance and pond levels • Responsible for communicating requirements of maintaining water balance • Responsible for compliance testing and sampling	(807) 482 0900 Ext 8353	Sitotaw.Yirdaw@newgold.com
Mine Manager	Darrol VanDeventer	NG Mine Operations	• Accountable for supplying ore to the mill • Accountable for supplying required/available rock (NAG/PAG) for TMA construction	(807) 482 0900 Ext 8281	Darrol.Vandeventer@newgold.com
Capital Projects Manager	Brian Gagne	NG Capital Projects	• Accountable for all Capital Projects • Accountable for TMA construction	(807) 482 0900 Ext 8295	Brian.Gagne@newgold.com
Construction Manager	Travis Pastachak	NG Capital Projects	• Responsible for construction of the TMA	(807) 482 0900 Ext 8205	Travis.Pastachak@newgold.com

Tailings Dam Engineer	Patrick Green	NG Capital Projects	• Responsible person for the TMA • Owner of the TMA and small dam instrumentation • Owner of data quality of site instrumentation	(807) 620-9611	Patrick.Green@newgold.com
Tailings Dam Technician	Tanvir Rahman	NG Capital Projects	• Responsible for reading and maintaining instrumentation at site	(902) 809 1971	Tanvir.Rahman@newgold.com
Project Coordinator	Brent McFarlane Jason Bell	NG Capital Projects	• Coordinate contracts and projects related to dam construction	(807) 707 3433	Brent.McFarlane@newgold.com Jason.Bell@newgold.com
Construction Superintendent	Garry Noga	NG Capital Projects	• Generally responsible for upstream and downstream buttress construction on the TMA	(807) 707 2015	Garry.Noga@newgold.com
Surveyor	Jessica Dark Jessica Ricklefs	NG Capital Projects	• Provides survey support for construction team • Responsible for survey of tailings beach elevations	(807) 707 7485	Jessica.Dark@newgold.com Jessica.Ricklefs@newgold.com
Consultants					
Engineer of Record	Andre Zerwer	BGC Engineering	• Verifies the TMA and water diversion structures (WDS) are constructed and operated as per the design intent • Performs Annual Dam Safety Inspections (DSI) • Provides support for safe operation and construction of the TMA and WDS • Performs QA during dam construction	(705) 222-3192	Azerwer@bgcengineering.ca
TMA Construction Contractor	Varies	Varies	• Generally responsible for TMA core and filter construction, including abutments		
Survey and Drafting Support	Jason Tremelling	Tulloch Engineering	• Provides QA survey services • Provides drafting support as required	(705) 255 2649	Jason.Tremelling@tulloch.ca

4.0 ADMINISTRATIVE CONTROLS

4.1 Document Control

Controlled Documents are kept on the Document Control site on SharePoint in the “Controlled Documents” library and monitored by the site Document Control Specialist. All drawings from the original Engineer of Record (EoR) Amec Foster Wheeler (AMECFW) are kept in the “Amec E&I Drawings” library. This library is accessible to all New Gold employees. All drawings from the current Engineer of Record BGC Engineering (BGC) are kept in a separate SharePoint site in the “BGC Engineering” folder.

4.2 Risk Assessment and Management of Change

The risk assessment and management of change process is described in SAF-SOP-0008; the scope entails the following:

- A process to analyse and manage Health, Safety, Environment, Community, and operational risks
- Changes are effectively considered prior to execution and communicated across the organization, and within the workplace, using a standardized approach
- All workplaces are inspected regularly for hazards and unsafe conditions
- Hazards and unsafe conditions are identified, recorded, and resolved.

4.3 Competency and Training Requirements

Training will be provided to employees to ensure responsible personnel are competent. The RRM, in conjunction with the EoR, will provide training on the use of the OMS Manual. It will be the responsibility of the Managers to ensure all responsible parties have undergone OMS Manual and ERP awareness training. Table 4 outlines mandatory training requirements.

Table 4 – Mandatory Training Requirements

	Chief Executive Officer	Senior VP Operations	General Manager	Mill Manager	Mill Supervisor	Mill Maintenance Superintendent	Electrical Supervisor	Mechanical Supervisor	Mobile Maintenance Manager	Site Services Superintendent	Environment Manager	Senior Water Resource Engineer	Mine Manager	Capital Projects Manager	Construction Manager	Tailings Dam Engineer	Tailings Dam Technician	Project Coordinator	Construction Superintendent	Surveyor & Drafting Support	Engineer of Record	TMA Construction Contractor
OMS – Part 1 General	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
OMS – Part 2 TMA				X	X	X	X	X			X	X		X	X	X					X	X
OMS – Part 3 WMP				X	X	X	X	X			X	X			X	X						
OMS – Part 4 MRP				X	X	X	X	X			X	X			X	X						
OMS – Part 5 Sediment Ponds										X	X	X			X	X						
OMS – Part 6 Diversion Structure											X	X			X	X						
OMS – Part 7 Water Treatment				X	X	X	X	X			X	X			X	X						
OMS – Part 8 Pinewood & Culvert										X	X	X			X	X						
OMS – Part 9 EPP	X	X	X	X	X	X				X	X	X	X	X	X	X		X	X		X	X
ENV-SOP-0001 Spill Reporting				X	X	X				X	X	X		X	X	X	X	X	X	X	X	
ENV-SOP-0008 Water Elevation Survey												X			X	X			X	X		
MIL-BCR-SOP-0004 BCR 2 Operation				X	X	X					X	X				X						
MIL-CND-SOP-0009 Line Inspections				X	X	X				X					X	X	X			X		
MIL-GEN-SOP-0043 Switching Pumps				X	X	X										X						
MIL-WTP-SOP-0002 Response to Upset				X	X	X										X						
MIL-WTP-0010 Nitrification Cell Op.				X	X	X										X						
MIL-WTP-SOP-0014 Bio. Treatment Op.				X	X	X										X						
CST01-4340-M03-0001.001 WTP Op & Maint. Manual				X	X	X										X						
SAF-SOP-0008 Risk Assessment and MOC		X	X	X	X	X				X	X	X		X	X	X		X	X		X	X
SAF-SOP-0011 Incident Management Procedure	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X
SAF-SOP-0045 Working Around Water					X					X	X	X			X	X	X	X	X	X	X	X
(TBD) Reading Geo. Inst.																X	X	X	X	X	X	
(TBD) **Dam Safety Inspection**			X	X							X	X		X	X	X	X	X	X		X	

4.4 RASCI Charts

Specific critical tasks are detailed by using RASCI Charts (Responsible, Accountable, Supportive, Consulting, Informed). These are regularly being created and reviewed annually, or earlier. A list of developed RASCI charts is summarized below and provided in Appendix H.

- TMA Tailings Discharge & Pipe Relocation
- TMA Geotechnical Instrumentation
- Tailings & Water Line Inspections

5.0 SITE BASELINE CONDITIONS

5.1 Site Location and Tenure

The site is located in the Township of Chapple, approximately 70 kilometers (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, however surface rights are not owned throughout the site boundary.

The RRM is located within lands used by Indigenous Groups for traditional and ceremonial purposes. NGI has regulatory requirements and/or bipartisan agreements to engage with the communities including, but not necessarily limited to:

- Rainy River First Nations,
- Naicatchewenin First Nation,
- Big Grassy River First Nation,
- Naotkamegwanning (Whitefish Bay) First Nation,
- Anishinaabeg of Naongashiing (Big Island) First Nation,
- Animakee Wa Zhing #37 First Nation,
- Ojibways of Onigaming First Nation, and
- Sunset Country Métis community (represented by Métis Nation of Ontario Region 1 Consultation Committee).

Road access to the site is by provincial Highways 600 and 71 and Korpi Road (east access road). A site location map is provided in Figure 2. The mine is serviced by local municipal infrastructure and is in close proximity to Fort Frances, Ontario.

The site topography is variable with elevations ranging from 350 m to 390 m, with all elevations referenced in this manual to sea level. The terrain is comprised of both forested and non-forested areas, including agricultural and wetland areas. The local drainage systems are characterized by numerous small creeks that drain into the Pinewood River. The small creeks typically originate from rocky uplands or headwater wetland systems.

The forested areas are dominated by mixed poplar and black spruce forests. Wetlands are comprised mainly of treed and open fens, together with wetland thickets and marsh areas.

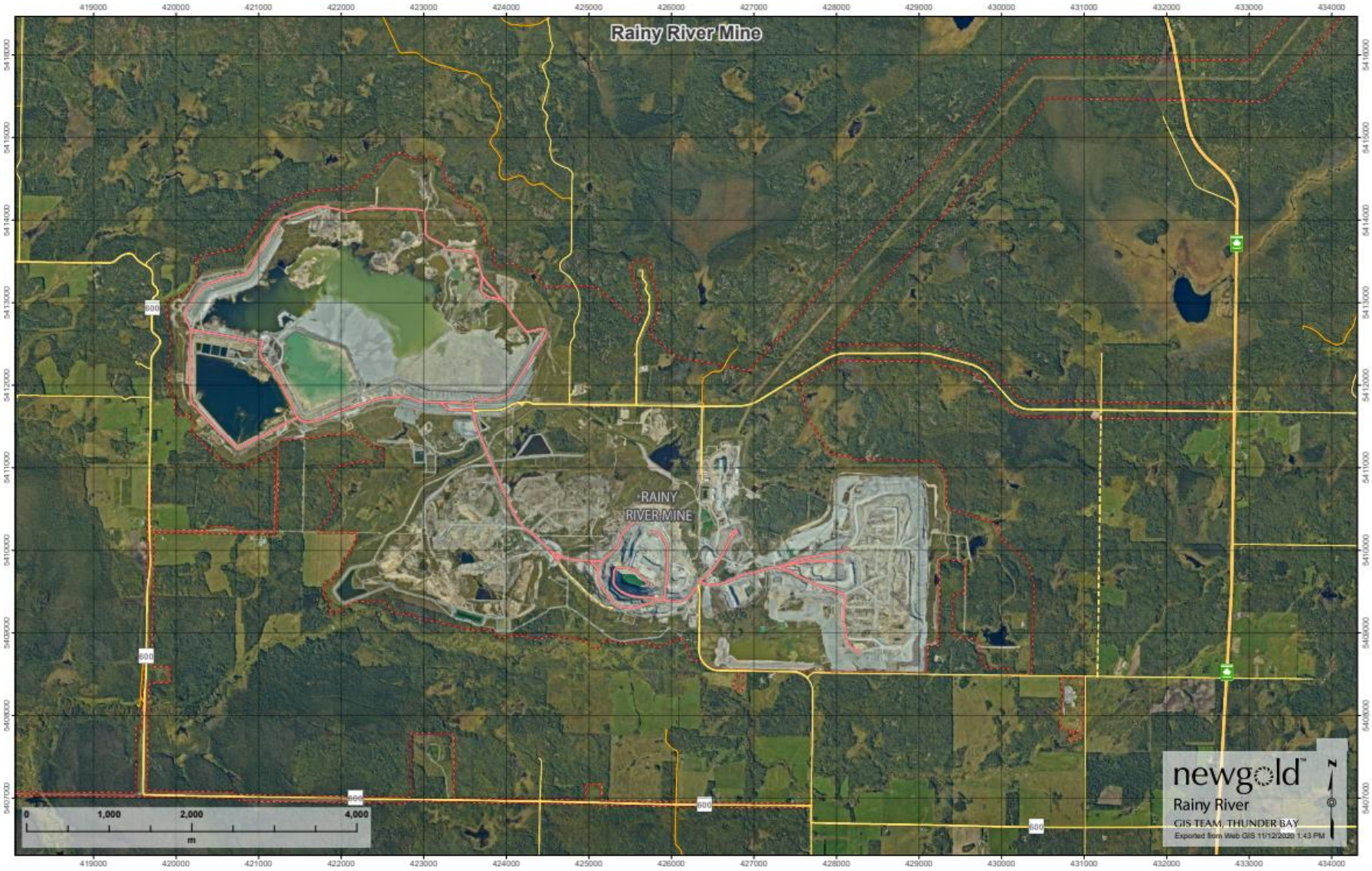

Figure 2 - Site Map

5.2 Temperature

The mean annual temperature and precipitation for RRM is outlined in the 1971 to 2000 Canadian Climate Normals (CCN). Temperatures from the Barwick meteorological station (Station 6020559; Environment Canada 2012), located 20 km to the south, were used for a baseline and are summarized in Table 5 (AMEC, 2013).

Table 5 - Summary of Temperature Climate Normals

Summary of Temperature Climate Normals (°C)													
Climate Station	**Jan**	**Feb**	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Barwick	-15.9	-11.6	-4.4	4.2	11.7	16.2	18.8	17.8	12.1	5.5	-3.8	-12.7	3.2

5.3 Precipitation

There is an average of 695 mm of precipitation annually at RRM, with 552 mm of this falling as rain and the remaining 143 mm as snow. Most precipitation occurs in the summer months and the CCN records an extreme precipitation event of 152 mm of daily rainfall. The monthly mean precipitation is given in Table 6.

Table 6 - Mean Monthly Precipitation

Mean Monthly Precipitation													
Type	**Jan**	**Feb**	Mar	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Precipitation (mm)	28.3	24.1	29.7	40	68.3	113.8	99	84	80	56.2	41.7	29.7	694.7
Rainfall (mm)	0.3	3.3	11	30.4	67.3	113.8	99	84	79.4	50.4	12.8	0.8	552.4
Snowfall (cm)	28.0	20.8	18.7	9.6	1.0	0.0	0.0	0.0	0.6	5.8	28.9	28.9	142.3

The Ministry of Transportation provides a tool which interpolates intensity, duration, and frequency (IDF) data published by Environment Canada for any location in Ontario. Prior to 2020, all designs were based on this data, excluding the probabilistic water balance model. The IDF return event quantities are provided for latitude 48.83 °N longitude -94.00 °E in Table 7.

Table 7 - Interpolated IDF Return Events

Interpolated IDF Return Event (mm)									
Return Period (year)	Storm Duration								
	5 min	10 min	15 min	30 min	1 hr	2 hr	6 hr	12 hr	24 hr
2	8.5	12.3	15.2	19.8	24.2	29.4	38.1	44.6	50.8
5	10.8	15.4	19.6	24.1	29.4	33.4	40.9	44.9	50.9
10	12.9	17.7	21.8	27.8	39.4	48.7	72.2	86.7	92.5
25	13.4	20.3	26.6	39.5	49.7	62.8	80.4	93.8	102.0
50	14.7	22.6	29.8	44.6	56.7	71.4	91.0	106.0	116.0
100	16.1	25.1	33.0	49.8	63.1	80.0	101.0	118.0	129.0

The Environmental Design Flood (EDF) events for many dams at site are 1:100 year 30-day events, which is not readily available from Environment Canada. Since the methods used to determine the EDF event were not clear, further investigations determined that using the IDF information from Baudette Minnesota was reasonably accurate and better representative of site weather patterns. The historical data events range up to 1:1000 year 60-day events. From 2020 onwards, all design storms will follow the IDF return event quantities in Table 8 (National Oceanic and Atmospheric Administration, 2020).

Table 8 - Precipitation Frequency Estimates

PDS-based precipitation frequency estimates (in mm)										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	7.8	9.3	11.8	14.0	17.3	20.0	22.9	26.2	30.5	34.0
10-min	11.5	13.6	17.2	20.5	25.3	29.5	33.5	38.1	44.5	49.8
15-min	14.0	16.6	21.0	25.0	31.0	35.8	40.9	46.5	54.4	60.5
30-min	19.0	22.3	28.2	33.5	41.4	48.0	55.1	62.7	73.4	82.0
60-min	24.4	28.7	35.8	41.9	51.3	58.7	66.5	74.9	86.6	96.0
2-hr	30.0	34.8	43.2	50.5	61.0	69.6	78.2	87.4	99.8	109.7
3-hr	33.5	38.9	48.0	55.6	66.8	75.2	84.1	93.2	105.4	114.8
6-hr	39.6	45.7	55.9	64.8	77.2	87.4	97.5	108.2	122.7	134.1
12-hr	45.5	52.1	63.8	74.4	90.2	103.6	117.9	133.1	154.9	172.5
24-hr	51.3	58.9	73.2	86.4	106.9	124.5	143.8	165.1	195.6	220.7
2-day	58.2	67.6	84.6	100.8	126.0	147.6	170.9	196.9	234.2	264.2
3-day	64.3	73.7	91.4	108.2	134.6	157.2	182.1	209.6	249.4	281.9
4-day	69.6	79.2	97.0	114.0	140.5	163.6	189.0	216.9	256.5	289.6
7-day	83.1	93.5	112.5	130.0	157.0	179.8	204.7	231.9	271.8	302.3
10-day	95.0	106.7	127.3	145.8	173.5	196.6	221.0	247.1	284.5	315.0
20-day	128.8	144.8	171.5	194.1	225.3	249.9	274.3	299.7	335.3	360.7
30-day	157.5	176.8	207.8	233.2	266.7	292.1	320.0	342.9	375.9	401.3
45-day	194.3	216.9	252.5	281.9	317.5	345.4	370.8	396.2	426.7	447.0
60-day	226.1	251.0	289.6	320.0	358.1	386.1	411.5	436.9	464.8	485.1

5.4 Evaporation

The Hydrological Atlas of Canada (1978) estimates the RRM region experiences 600-700 mm/year of lake evaporation and 500-600 mm/year of evapotranspiration. Consultants Klohn Crippen Berger (KCB) (2011) predicted average evapotranspiration in the RRM area of likely between 315-560 mm/year (45-80% of average annual precipitation). The nearest evaporation data is available from the Atikokan Climate Station (Station 6020379) located 175 km east of the RRM. This data is summarized in Table 9.

Table 9 - Mean Monthly Evaporation

Mean Monthly Evaporation at Atikokan Station (mm)							
Type	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Annual**
Pan Evaporation	141	149	167	133	79	45	713
Lake Evaporation	111	116	129	104	63	36	560

5.5 Hydrology

The collection of runoff and hydrology data for the RRM is challenged by low gradient, small systems, and frequent beaver impoundment. Water Survey of Canada Station 05PC011 at the Pinewood River provides the longest and most reliable available data set. Water Survey of Canada Station 05PC023 (at Highway 617) provides a shorter period of record and is known to provide erroneous readings of up to 20%. Table 10 presents mean streamflow data in the Pinewood River as presented in the EA application, which have been pro-rated where required and in winter months.

Table 10 - Monthly Streamflow in the Pinewood River at WSC 05PC011 (m^3/s)

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	Annual
Mean	0.218	0.144	0.538	9.595	7.135	5.412	3.163	1.536	1.787	2.352	1.913	0.383	194.8
5^{th} %ile	0.073	0.049	0.181	3.228	2.400	1.820	1.064	0.517	0.601	0.791	0.644	0.129	65.5
95 %ile	0.440	0.292	1.087	19.41	14.43	10.95	6.398	3.107	3.615	4.758	3.870	0.776	394.1

The RRM site on the north side of the Pinewood River is drained by four small creek systems, which include from east to west: Clark Creek (Teeple Drain), West Creek, Marr Creek and Loslo Creek (Cowser Drain). These creek basins range in size from 7.3 km^2 (Marr Creek) to 16.35 km^2 (West Creek). Major portions of the Clark Creek, Marr Creek and Loslo Creek basins will be overprinted by RRM developments, principally the TMA and stockpiles. West Creek currently diverted around the pit and flows to Loslo Creek via West Creek Diversion.

It should be also noted that the lower approximately 3.3 km reach of Loslo Creek and 2.3 km of Clark Creek leading to the outflow into the Pinewood River have been previously designated as Municipal drains under the Drainage Act (respectively, the Cowser Drain constructed in 1980 and the Teeple Drain constructed in 1994).

5.6 Geology

The geology at the Rainy River Mine consists of glacial sediments deposited during advance and retreat of the Laurentide Ice Sheet during the Late Wisconsinan, between approximately 20,000 and 11,500 years before present (Bajc, 2001). Glacial advance and retreat led to the deposition

of fine-grained glaciolacustrine soils and glacial (till) deposits. The typical stratigraphic sequence (from oldest to youngest) observed in the TMA and water management dam foundations includes the following stratigraphic units:

- Whiteshell Till (WST): generally comprised of a dense, granular lodgement till deposited by Labradorean ice advancing from northeast to southwest.
- Wylie Formation: generally comprised of interbedded silt and clay deposited in a glaciolacustrine environment.
- Whitemouth Lake (WML) Till: generally comprised of a high plastic clay lodgement till with trace amounts of sand and gravel deposited by the Keewatin ice advancing from west to east. The WML Till contains sheared and softened zones attributed to glacial deposition processes.
- Brenna Formation and Sherack Formation: comprised of variable silt and clay deposited in a glaciolacustrine environment.
- Poplar River Formation: comprised of glaciofluvial sands and gravels deposited in fluvial channels.

The WST is a semi-confined aquifer that hosts artesian groundwater pressure in localized areas of the mine. The artesian condition arises from recharge from surface exposures on topographic highs, hydraulic connection between the recharge points and more deeply buried occurrences, and the relatively impermeable overlying soils. The observed artesian pressures will reduce dissipation rates of construction-induced excess pore pressures developed in the overlying cohesive soils.

The Wylie Formation, WML Till, and the Brenna Formation contain swelling clay minerals with possible coarse-grained intervals. This heterogeneity in permeability and hydraulic conductivity affect pore pressure response at depth.

The geological conceptual model is given in Figure 3.

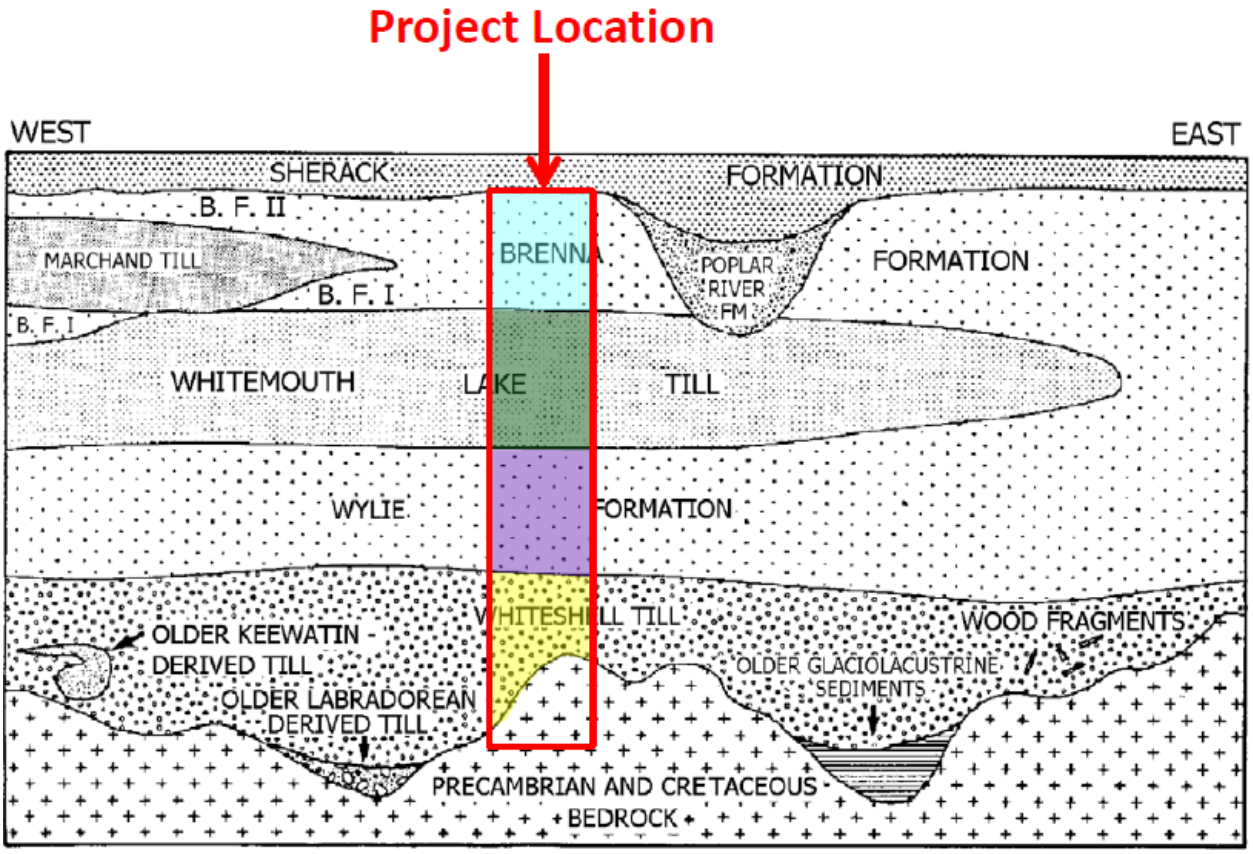

Figure 3 - Geological Conceptual Model

Deformation features from glacial advance in the WML Till include rip-up clasts, slickensided surfaces, and small-scale (up to 1.0 m in thickness) strain-softened zones. Although large-scale zones of strain-softening or slickensides have not been conclusively identified, small-scale softened zones may increase stress concentration, grow, and coalesce under external loading (such as the loading caused by dam construction). Brittle failures have been observed in over steepened excavation faces of the WML Till where high strain rates are present (BGC, September 10, 2019).

5.7 Hydrogeology

Regional groundwater flow is generally towards the west in the Pinewood River watershed, but locally is towards the Pinewood River corridor. Horizontal gradients are relatively steep on higher ground, approaching 0.01, but become more subdued in the lower lying areas where they decrease to approximately 0.003. This change in horizontal gradient is a strong indication that, as the groundwater flows from the higher ground to lower elevations, there is flow from the relatively impermeable shallow bedrock to the more permeable Whiteshell Till and other granular material immediately above the bedrock, referred to generically as the Pleistocene lower granular deposits (PLGD).

The hydrological conceptual model is given in Figure 4.

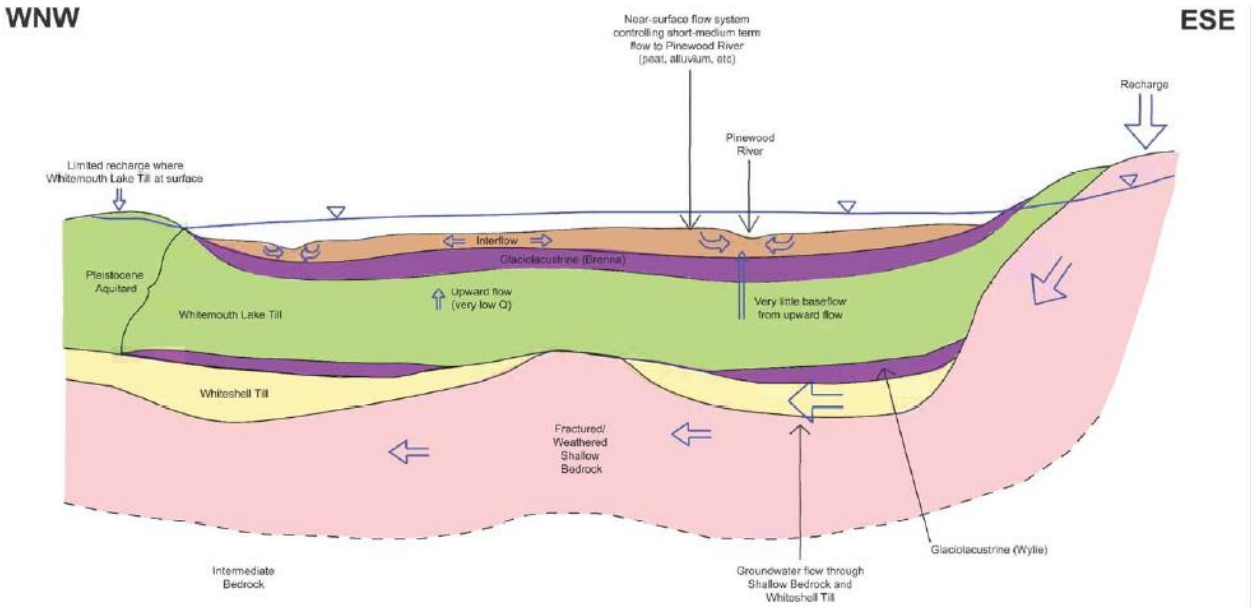

Figure 4 - Hydrogeological Conceptual Model *(ITRB 2018-04-04)*

Groundwater in the shallow bedrock and PLGD becomes confined as it moves westwards and towards the Pinewood River beneath the lower permeability silty clays of the WML Till and the glaciolacustrine deposits that largely sandwich this till (the Pleistocene Aquitard). Artesian conditions within the shallow bedrock and PLGD are common along the stream corridors with upwards gradients on the order of 0.03 to 0.1, while downwards gradients occur in the higher areas between the streams.

Groundwater quality is typical calcium magnesium-bicarbonate type water with the majority of sampling points having total dissolved solids exceeding 500 mg/L. Sampling of groundwater since 2007 has indicated metal concentrations above application guidelines e.g., arsenic, cobalt, iron, molybdenum, zinc, mercury and uranium.

5.8 Water Quality

Water quality at the RRM is influenced by the presence of clays/silts and water quality guidelines are frequently exceeded at baseline or upstream sites. There are several circumstances where exceedance of the Provincial Water Quality Objectives (PWQO) and Canadian Environmental Quality Guidelines (CEQG) values are common:

- Total metal values for samples showing elevated total suspended solids (TSS), especially for very common minerals such as aluminum and iron
- Total aluminum concentrations in areas where clay / silt soils are common, as aluminum is a common clay mineral
- Samples collected from under the ice in low volume water systems, because the process of ice formation tends to exclude ions from the ice crystal lattice, thereby concentrating the ejected ions in the underlying water column
- Samples collected during summer drought conditions in low volume water systems, because of ion concentration due to evaporative processes

The majority of parameters for surface waters met PWQO and CEQG for the protection of aquatic life, with the exception of common exceedances for aluminum (mainly CEQG), iron and phosphorus; frequent exceedances for cadmium (CEQG), copper (mainly CEQG) and cobalt (PWQO); and occasional, to rare, exceedances for arsenic, lead, nickel and zinc.

5.9 Tailings

Based on geochemical testing, the tailings are PAG with an expected lag time to net acidic conditions of approximately 30 years. In addition, there is a potential risk of elevated cadmium concentrations in the TMA during operations due to leaching from the tailings.

Metal release from subaerial (beached) tailings may occur prior to acidic conditions and management of the tailings pond water may be required at this time. Metal release may occur from submerged tailings; however, subaerial tailings appear to be a greater source of loadings than submerged tailings. The milled ore is also a substantial source of loadings to the tailings pond, in some cases (e.g., cadmium) it is the dominant loading source early in mining operations.

Geochemical assessments suggest that cadmium concentrations in the TMA may exceed the working site-specific value (0.001 mg/L subject to confirmation through permitting) within 1 year after mining begins. Reductions in the tailings beach areas could extend the period until exceedance is reached. Water treatment in the WMP has been employed to support discharges from the WMP meeting discharge effluent quality targets.

5.10 Biodiversity

5.10.1 Fish

The fish community proximal to the RRM is dominated by baitfish and forage fish species with sportfish (e.g., Walleye and Northern Pike) in the lower Pinewood River below the Pinewood Pumphouse. Presently the lower reaches of Marr and Loslo Creek remain fish bearing after the headwaters have been cut off by the TMA construction. West Creek and Clark Creek are former tributaries to the Pinewood River and have been offset for by the Clark Creek and West Creek Diversion structures. Clark Creek and West Creek Diversion structures are offsetting habitat and support all life history stages of baitfish and forage fish species.

The freshwater diversions are fish bearing waters and subject to protection under numerous permits and legislation e.g., *Fisheries Act*. Cowser Drain (Loslo Creek) and the Pinewood River are also fish bearing. Water quality discharges into these areas must meet MMER and ECA permit requirements. Additional studies as required by the ECA e.g., for mercury, sulphate and ammonia are ongoing, the results of which may influence operation of the TMA.

5.10.2 Vegetation

The RRM is within Ecoregion 5S (Agassiz Clay Plain) and there are no published “Significant Wildlife Habitat Ecoregion Criteria Schedules” for this ecoregion. Aspen-Birch hardwood forest is the dominant (46.6 %) forest type proximal to the mine, followed by coniferous swamp / wetland (29.4 %). Agricultural lands are present across 8% of the area proximal to the mine, primarily along roads and in areas of well drained clays. No records of rare vegetation communities or rare plants were identified during the Environmental Assessment.

Based on the ecoregion, the growing season length is 180-190 days with mean annual temperatures of 1.5 to 3.0 ºC. The frost-free period is ~125 days from mid-May to mid/late September (Ministry of Agriculture; 1976-2005).

5.10.3 Wildlife

Key wildlife aspects influencing the OMS manual include the presence of:

- Species at risk including but not limited to Eastern Whip-poor-will and Bobolink which require consideration of limits of disturbance, timing of works, noise mitigation and dust management
- Snapping turtles, for which measures must be taken to prevent them entering the TMA, process water and water treatment facilities
- Migratory birds requiring noise mitigation measures, reduced light pollution, timing windows on clearing, deterrents to prevent use of the TMA and monitoring for use of the TMA
- Deer, which along with other wildlife require that a fence is to be constructed around the active tailings deposition areas
- Bear, which along with other wildlife need to be managed through controlling wildlife-human interactions including reporting, no harassing of wildlife, no fishing or hunting on the mine site, speed restriction and waste management to exclude wildlife.

5.11 Natural Hazards

Natural hazards to the RRM are limited to weather related hazards e.g., flooding, drought, extreme cold or high winds and forest fires. Other natural hazards e.g., volcanic activity, subsidence, avalanches, and landslides are not expected to affect the mine given surrounding geology and topography. Responses to natural hazards are considered as part of the site EPRP. Potential natural hazards relating to the OMS are discussed here, however further consideration on how to respond to natural hazards is considered in the maintenance and contingency sections.

- Forest Fire: there is potential for forest fires to affect operations of the mine, with the cycle in the area of the RRM being 63 to 210 years.
- Pit Slope Failure: could be caused by flooding or slope instability. Modelling of the 1:100 year flow in the Pinewood River would result in the Pinewood River cresting adjacent to the pit between elevations 347-349 m. A proposed flood protection berm will provide protection during potential ice jams in the Pinewood River.
- Flooding: there is potential for flooding, and associated rainfall to affect operations of the mine. Design of the dams and diversion structures has considered these events. Results of flooding leading to a potential need to discharge additional water is offset by the increased assimilative capacity of the receiving environment at the permitted 1:1 discharge ratio.
- Drought: drought conditions may result in a reduction in water availability for processing and discharge. Drought conditions for processing is mitigated through the design of the WMP and water storage. In the event of 5th percentile low flow fall, only 1.53 Mm^3 could

be discharged. However, this is managed through capacity in the TMA, WMP and water treatment. Water balance model is regularly updated and reviewed by RRM management.

- Seismic Hazard: the site is located in the Canadian Shield which is comprised of Precambrian granites and gneisses that host some of the oldest rocks in the world. No earthquakes recorded with a magnitude greater than M 4.5 have occurred within approximately 500 km of the site. Further details regarding the PSHA are provided in the *2013/2014 Geotechnical Site Investigations Report* (AMEC, 2014d).

6.0 FACILITY DESCRIPTIONS

The components of the RRM relative to the scope of the OMS include tailings and process water management, water treatment, and freshwater diversions. This section will describe the interconnectivity between the systems at a high level. For more detail, see the individual Parts as described in Section 1.0.

6.1 Tailings and process water management

Tailings and process water management is accomplished by the following structures:

- TMA – This includes Cells 1, Cell 2, Cell 3, seepage collection, and associated pipelines
- WMP
- MRP.

The TMA provides long term containment for the tailings. The mill make-up water is reclaimed from the Tailings Management Area (TMA), the Water Management Pond (WMP) and/or the Mine Rock Pond (MRP).

The TMA dam raising schedule is divided into seven stages and has been set to ensure sufficient pond storage to satisfy mill make-up water supply and effluent management requirements. Both the WMP and MRP are constructed to final elevation.

The TMA has been designed to optimize natural degradation processes, by ensuring there is sufficient time to allow for heavy metals to precipitate to low levels in the pond. The natural degradation processes are most effective during warm weather conditions when biophysical activity is optimal and are also augmented by exposure to sunlight.

Bubblers (10) throughout the WMP provides sufficient aeration to treat for ammonia and will keep the water over the WMP from completely freezing during the winter. Mill make-up water is provided through reclaim from the TMA and/or the transfer of contact water from the Mine Rock Pond (MRP) decided by the reclaim logic described in Appendix A.1.

6.2 Water Treatment

A schematic diagram of the Water Treatment Train (WTT) is shown in Figure 4. Water treatment is provided by:

- Water Treatment Plant (WTP), Biochemical Reactor 1 (BCR 1) and Biochemical Reactor 2 (BCR 2); and
- Sediment ponds 1, 2 and 3

Treated surplus water is transferred to the WMP before it is discharged to the environment, predominately via Biochemical Reactor 2 (BCR2) and the Outflow Basin (OB), to the Loslo Creek confluence with the Pinewood River (EDL2). A pipeline to the Pinewood River downstream of McCallum Creek (EDL1) can also discharge water at times of higher flow and when there is insufficient flow at EDL2. BCR2 will treat for phosphates and sulphates and residual metals. Effluents planned for discharge to the environment will meet discharge criteria or be pumped back to the WMP for further treatment.

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).

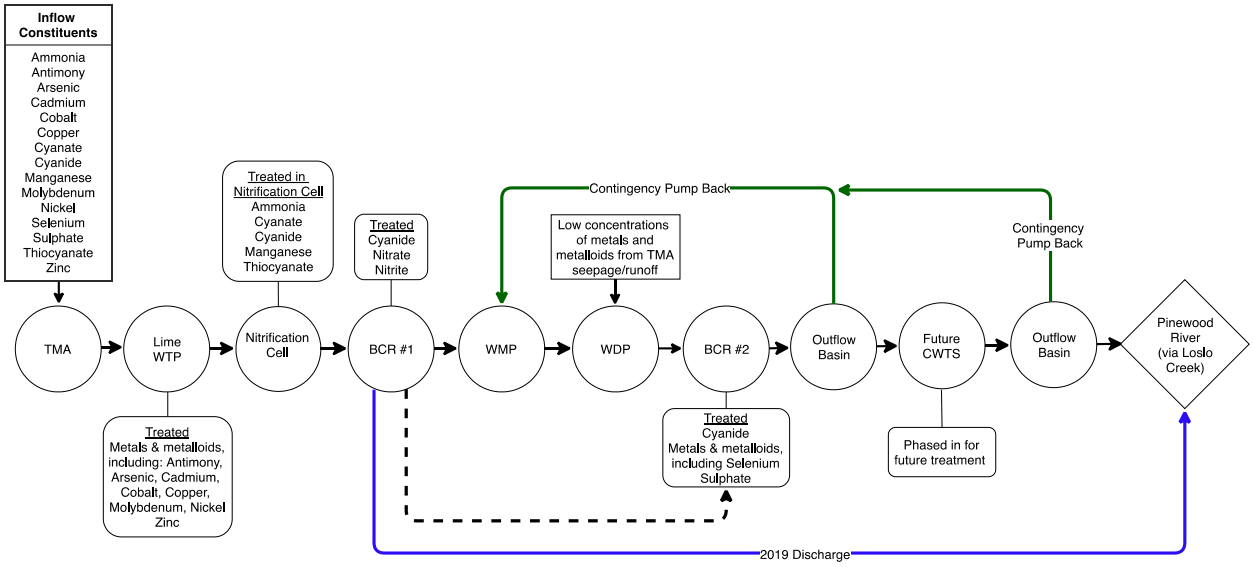

Figure 4 - Water Treatment Train Overview

6.3 Freshwater Diversion System:

The Freshwater Diversion system includes:

- Marr and Loslo Creek diversion ditches
- Clark Creek diversion including the Clark Creek and Teeple dam structures
- West Creek diversion including the Stockpile and West Creek dam and diversions structures.

The freshwater diversions function to reduce inflows to the RRM and provide offsetting habitat for the loss of portions of Loslo, Marr, Clark and West Creeks. Diversion of the non-contact runoff from these catchments reduces the effluent management requirements. All structures support fish habitat with the exception of Marr and Loslo diversion ditches.

7.0 REGULATORY

7.1 Approval Summary

Approvals for permits as well as Environmental Assessment (EA) commitments can be found on the Environment SharePoint webpage at

https://newgold4.sharepoint.com/sites/yag_environment/SitePages/Home.aspx

7.2 Commitment Tracking

All Regulatory requirements are tracked in the Intelex software application. A link can be found on the Environment webpage

https://newgold4.sharepoint.com/sites/yag_environment/SitePages/Home.aspx

The Environmental Management System framework is found in the EMS Manual ENV-MAN-EMS-0001 draft.

RAINY RIVER PROJECT

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL

PART II - TAILINGS MANAGEMENT AREA

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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	Mine Manager		
	Sylvie St. Jean	NG Environment	Environment Manager		
	Tony Lord	NG Maintenance	Mobile Maintenance Manager		
	Andre Zerwer	BGC Engineering Inc.	Engineer of Record		
Approved by	Tyler Buckingham	NG Mill	Mill 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
Appendix F RASCI Charts
Appendix G Inspection Sheets
Appendix F1 - Daily Inspection Sheets,
Appendix F2 - Weekly Inspection Sheets
Appendix F3 - Inspection Sheets For Unusual Event

1.0 OBJECTIVE

The objective of this document is to provide procedures for the operation, maintenance, and surveillance (OMS) of the Tailings Management Area (TMA) 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

2.0 DOCUMENT USER GUIDE

This document is organized as follows:

Section 3.0 – Site and Facilities Description – Provides an overview of the facilities at the RRM including dam consequence classifications. Additional details, including history and dam construction details are presented in Appendix A.

Section 4.0 – Operations – Provides details on how the facilities should be operated and includes:

- Water management and treatment requirements
- Management of tailings deposition within storage facility
- Maximum pond water levels and hazard and alert levels

Section 5.0 – Surveillance – Provide surveillance requirements for the facilities including:

- Procedures for visual inspection, inspection frequency, and responsibility. Standard inspection forms are provided in Appendix G
- Procedures for measurement of geotechnical instrumentation, frequency of measurement, and the establishment of hazard and alert levels
- Procedures for surveying the pond water elevations and tailings elevations at spigots
- Requirements for water sampling and testing as per water license requirements
- Requirements for conducting topographic and bathymetric surveys
- Procedures for conducting annual Dam Safety Inspections and periodic Dam Safety Reviews as required

Section 6.0 - **Maintenance**

Provides requirements for routine and preventative maintenance to be conducted

Section 7.0 - **Emergency Preparedness and Response Plan (EPRP)**

Provides procedures for identifying, preparing for, and responding to an on-site emergency, including:

- Identification of determined hazard and alert levels and specific actions which require implementation should these levels be reached

- Emergency contacts and call-out procedures
- Preventative and remedial responses to incidents
- Identification of external resources to assist with incidents

3.0 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 RRP through direct ownership or option agreement.

3.1 TMA Overview

The purpose of the TMA is to:

- Contain tailings waste material produced from the milling process
- Provide recycle water to the mill
- Provide sufficient time for heavy metals to naturally degrade to low levels

Annually, the TMA construction is planned to provide volume to contain the tailings waste and recycle water anticipated for that year and includes an approximate one-year buffer on volume requirements following 2021 construction. The life-of-mine plan for each dam raise and tailings volume requirements are provided in the draft Tailings Deposition Plan (TDP) (BGC June 26, 2020).

Stripping and construction of the TMA commenced in 2016 with the TMA Cell 1. Tailings deposition in TMA Cell 1 commenced in November 2017 with placement into TMA Cell 2 beginning in May 2018. Tailings placement into TMA Cell 3 began in May 2019. Generally, the tailings deposition strategy is to establish tailings beaches upstream of the perimeter dams (i.e. TMA North Dam, TMA West Dam [Dams 4 and 5], and TMA South Dam), while maintaining a pond around the fixed reclaim located at TMA Cell 2.

3.2 Dam Consequence Classification

The TMA Dams (North, West and South) were classified as VERY HIGH using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria”. This is generally equivalent to a Canadian Dam Association (CDA) consequence of EXTREME.

SRK Consulting has completed “Dam Break Inundation Study” in February 2019 and it is available on the Document Control site.

3.3 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.

4.0 OPERATIONS

4.1 Water Management

The mill follows logic to draw process water, which is tracked and reported by the Environmental department. The Mill reclaim logic decision tree is shown in Figure 1.

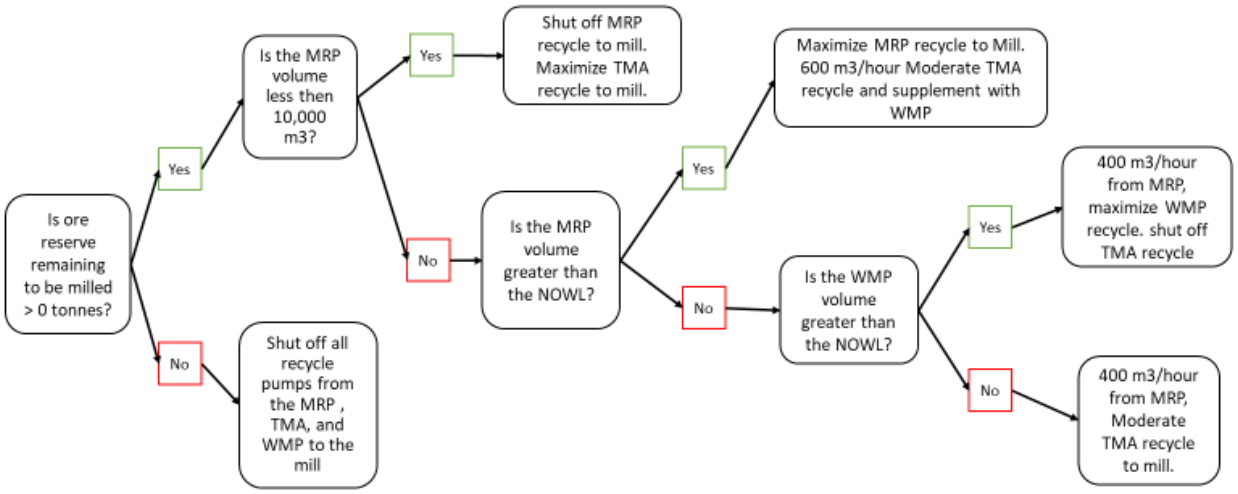

Figure 1 - Mill Reclaim Logic

4.2 Water Treatment

The water treatment starts in the TMA and ends with treated water being discharged into the Pinewood River. Figure 2 provides an overview of the treatment process. Part 7 of the OMS Manual provides further details on the Water Treatment Train.

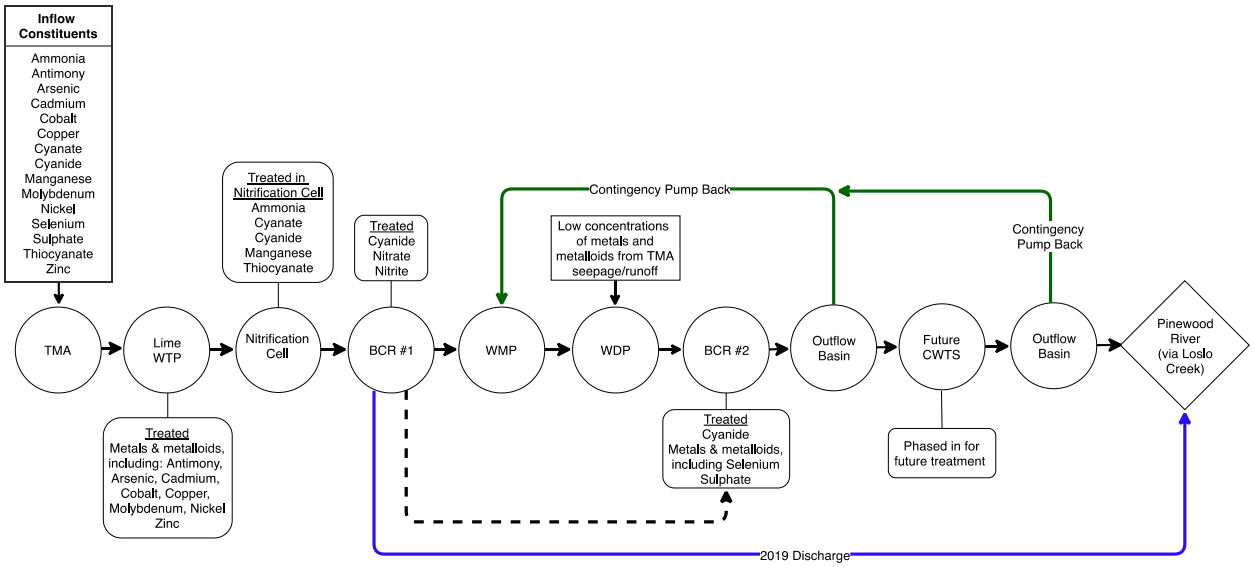

Figure 2 Water Treatment Train Overview

4.3 Pond Storage Capacity

Estimates of storage capacity with respect to elevation are based on comparison with as-built drawings, bathymetric and LiDAR surveys, tailings density modelling, and future raise designs. Figure 3 illustrates the proposed dam raise schedule.

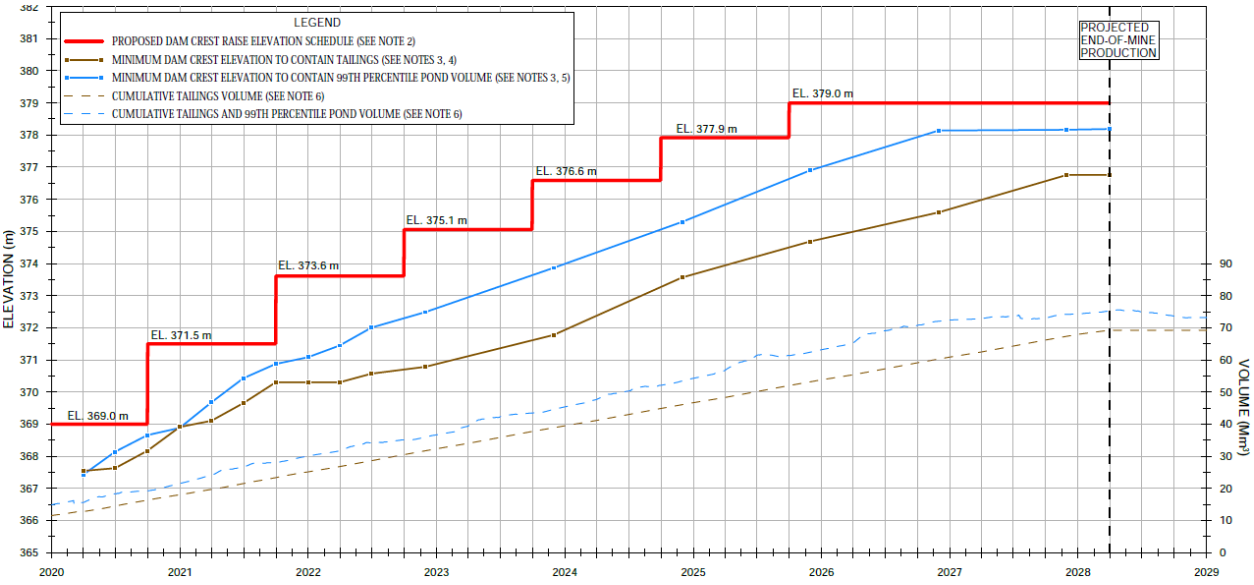

Figure 3 - Proposed Dam Raise Schedule

4.4 Flood Capacity

The design of the TMA spillway invert elevation is based on modelling the 99th percentile flood conditions at site. The crest of the dam is 1.8 m above this modelled elevation, which allows the

passage of the Probable Maximum Precipitation (PMP) event of 586 mm, of no specific return period.

The typical water levels are to be maintained at or below the Normal Operating Water Level (NOWL). The NOWL elevation was determined using the spillway invert elevation and subtracting the volume (converted to a depth) of an Environmental Design Flood (EDF) event, as defined by the CDA. The EDF event is equal to 320 mm of rain and is based on a 1:100 year 30-day event using information from the PF estimates from Baudette, Minnesota, published values from the National Oceanic and Atmospheric Administration (NOAA).

There is a level of conservatism to this, as the spillway would require the 1:100 year 30-day event and the PMP event immediately following to activate. If the volume becomes a bottleneck in the future, these assumptions can be refined.

4.5 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 solid tailings are 0.4 m below the crest of the dam or the bottom of spillway invert elevation
- The primary freeboard is designed to be 0.5 m below the spillway invert elevation, which will accommodate the EDF above the NOWL.

4.6 Pond Alert Levels

The ponds are surveyed three times per week. Should the ponds exceed the EDF elevation, a plan to return water levels to below the EDF will be implemented. This plan includes options of transferring fluids or shutting down the mill. The actions implemented will be decided by the Mill Manager in consultation with the Environmental Manager.

4.7 Environmental Protection

The TMA is surrounded by a wildlife fence installed to reduce wildlife contact with the TMA. The wildlife fence is inspected for any damage at least once per month.

When possible, tailings will be kept saturated with water to mitigate risk of airborne tailings fines during high wind events. When this saturation is not possible, other dust suppression methods will be utilized, where practicable (example: latex dust suppression).

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 (Section 6.3)
- Measurement of geotechnical instruments (Section 6.4)
- Sampling and testing in accordance with requirements (Section 6.5)
- LiDAR and bathymetry survey (Section 6.6)
- Collection of climate data from weather station (Section 6.7)
- Annual Dam Safety Inspections (DSI) (Section 6.8)
- Dam Safety Reviews (DSR) to be conducted in accordance with CDA, based on dam classification (Section 6.9)
- Event driven geotechnical inspections following any extreme weather events, including wind, rainfall, or earthquakes (Section 6.10)

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 3.

Table 3 - Failure Modes and Observable Conditions

Failure Mode	Conditions Related to Possible Increased Risk of Potential Failure Mode
Overtopping	• High water level • Blockage of water management structures • Extreme meteorological event • Dam settlement • Excessive accumulation of solids (near reclaim pocket) • Erosion from burst tailings pipe
Instability	• Cracking • Dam settlement • Slope movement • Dam bulging • Increased pore water pressures within the dam

	• Increased seepage • Erosion • Seismic event
Piping	• Sediment laden seepage • Wet spots at downstream dam toe or on downstream slope • Sinkholes

Inspection frequencies are followed as per Table 4 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 7)
Comprehensive Review (DSR):	
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 4 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
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Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

During depositing of tailings, the Mill Supervisor and Site Services Superintendent delegate those who are required to complete inspections daily. Reporting is to be escalated to hourly observations if a rainfall event is escalating and the Cell 2/3 pond level is within 500 mm of the emergency spillway elevation (equals or exceeds 369.2 m, based on Stage 2 spillway). The Mill Manager will decide whether to provide additional surveillance resources in the case where additional duties including maintenance and operation of the Cell 2/3 dewatering pumps is required to be performed.

5.4 Geotechnical Instrumentation

The performance of the dams is monitored using a variety of instruments. Instrumentation measurements, along with visual inspections, serve as the primary mechanisms for performance monitoring of the TMA and Water Management dams. A brief description of each instrument is provided below. Additional details are available in BGC-4910-DT00-MAN-0002.001.

- Slope Inclinometers (SI) – A vertical PVC pipe (either red or blue) installed through the ground typically into bedrock that measures horizontal deformation

- Vibrating Wire Piezometers (VWP) – A pressure transducer and polyurethane coated wire that measures the pore water pressure within the dam fill materials and foundation soils

- Standpipe Piezometers – A vertical PVC pipe with a perforated or screened section that is capable of measuring water levels and allows collecting water samples

- Settlement Plates – A base plate is installed at some depth with a riser pipe extending to surface, which allows the monitoring of vertical consolidation/settlement of soils

- Magnetic Extensometers – Used to monitor vertical consolidation, these are installed as a series of magnetic rings, either around corrugated PVC tubing or slope inclinometer casing within the foundation

- Survey Monuments – A bar of steel is driven into the ground and the top of the bar is surveyed to monitor displacement

The following sub-sections are subject to change and should be read in conjunction with BGC-4910-DT00-MEM-0014.001.

5.4.1 Reading Frequency

Table 5 presents the data collection, reporting, and submission frequencies for geotechnical instrumentation. Note that these frequencies may change based on EoR observations.

Table 5 - Data collection, threshold reporting, and data submission frequencies

Instrument Type	Data Collection/Processing and Threshold Exceedance Reporting Frequency (Days)	

	Active Construction	Post Construction	Operations	Data Submission Frequency
SI	7	14	30	30
VWP	Twice Weekly	7	7	7
Standpipe	7	14	30	30
Settlement Plate	30			30
Magnetic Extensometer	30			30
Survey Monuments	30			30

5.4.2 Data Collection and Processing

The Tailings Dam Technician is responsible for data collection and maintenance of the VWP automated system. All instruments are manually collected, except for VWP. The VWP is connected to a datalogger, which records hourly readings for the instrument. These readings are then transmitted by radio frequency to Hubs located at the Marr site or the E-House at the intersection of WD4, WD5 and Cell 1 Dam. The Hubs transmit the collected data through cell service to the Cloud, which is stored as .csv files. These files are located at:

\\pcs01-yag\Campbellsci\LoggerNet

All geotechnical instrumentation is processed using VBA enabled excel spreadsheets. These spreadsheets store the collected data from all instruments. Additional tools for scheduling, quality assurance, monitoring trends and reporting are built into the sheets. These files are located at:

\\FPS02-YAG\\Engineering\Geotechnical\07 - Instrumentation (V: Drive)

The Tailings Dam Engineer is accountable for scheduling, collecting measurements, assuring data, and maintenance of geotechnical instrumentation. The EoR is responsible for interpretation of this data.

The raw data provided by the Barron Weather Station is used in the piezometer processing sheets to correct for barometric pressure.

5.4.3 Thresholds

Instruments have been installed to form a network of monitoring points to provide information as a basis to assess geotechnical performance of the TMA and Water Management dams. Instrument measurements are compared against defined thresholds linked to the design basis. The trigger level threshold indicates a value exceeding those used as a basis for meeting the design criteria. An alert level threshold indicates a more significant magnitude threshold exceedance.

5.4.4 GIS

The VWP have been included in the New Gold GIS web viewer. These are updated twice weekly using the processing sheets. While it is intended for all instruments to be integrated into the New Gold GIS web viewer, only the VWP have been added. The following folder link stores the automated process for adding piezometers into the GIS system:

V:\Engineering\Geotechnical\07 - Instrumentation\00) GIS

The “To_Import.csv” file is updated using the processing spreadsheets. Once complete, it is copied into the “To_Import” folder. A script searches every 30 seconds for a file and automatically uploads the data to the GIS web viewer. The “To_Import.csv” is then moved to the “Imported” folder and relabelled with the time it was uploaded (YYYY-MM-DD_HRMMSS).

To view this data in the GIS web viewer, the “Geotechnical Database” must be selected. The layers “Piezos 30-Day Rolling V2” or “Total Head Elev. By Geology” are both updated through this process. The symbols used for the 30-Day rolling are as shown in Figure 4. The green, yellow, and red colours indicate that it is either below, above trigger, or above alert thresholds, respectively. The numbers indicate the magnitude of change in the last 30 days.

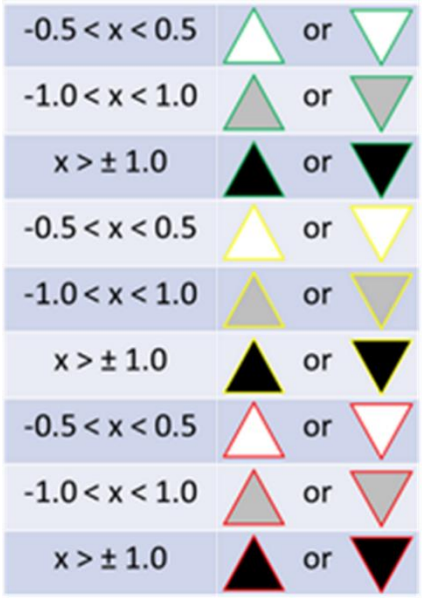

Figure 4 - Symbols for VWP used in GIS

5.5 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.

5.6 Survey and Bathymetry

During construction, survey is completed for all material contact boundaries of the TMA. A combination of general contractor QC survey and NG survey are compiled by drafting support. Annually, the crests of all dams are surveyed to confirm that consolidation has not reduced the closure elevation of the dams.

When tailings are actively discharged from pipelines, elevations of the tailings (either water level or solids level) are collected weekly. The NG Construction surveyors collect these readings and they are stored by the Tailings Dam Engineer and Environmental team. A forecast is completed monthly to monitor expected days of contingency for tailings placed at its current location.

Bathymetric surveys are completed annually by the Environmental team. These coincide with LiDAR surveys.

A summary report titled "TMA Cell 2/3 Water Levels" is circulated daily at 9 a.m. to summarize the measured water and tailings levels as of 4 p.m. the day prior. This report is prepared and circulated by the Environmental Manager or designate. The purpose of the report is to highlight trend data for Cell 2/3.

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.

The “Fill Placement Summary” (FPS) is collected weekly and data is submitted monthly. The FPS includes maps of weekly fill placement and fill elevation heatmaps relative to TMA Stage 3 design surface.

5.7 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.

5.8 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.

5.9 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)
TMA AND WMP DAMS					
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
WATER MANAGEMENT DAMS					
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.

5.10 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 Mill 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.

5.11 Documentation

Documentation of surveillance and monitoring activities shall be maintained by the Mill 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.

5.12 Reporting

The Mill 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 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 5.

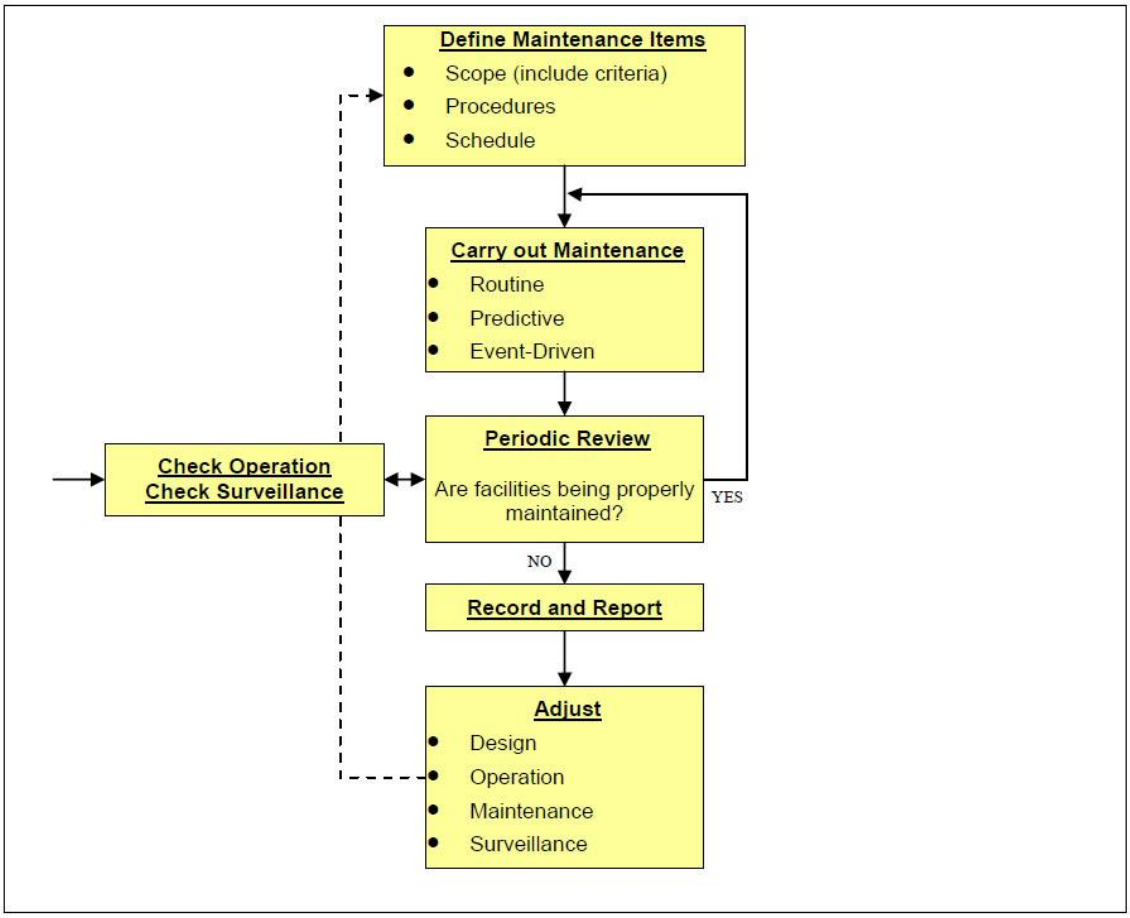

Figure 5 - Maintenance Flow Chart

6.1 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.

6.2 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

6.3 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.

6.4 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 Mill Manager and 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.

6.5 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

6.6 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.

6.6.1 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

6.6.2 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

6.6.3 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

6.7 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.

7.0 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.

RAINY RIVER MINE

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL

PART III – WATER MANAGEMENT POND (WMP)

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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		
	Sylvie St. Jean	NG Environment	Environmental Manager		
	Tony Lord	NG Maintenance	Director, Asset and Energy Management		
	Andre Zerwer	BGC Engineering Inc.	EoR		
Approved by	Tyler Buckingham	NGM	Mill 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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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 WMP Overview

WMP Dams 1 through 5 (Dams) contain the WMP pond with a crest elevation of 371.5 m and NOWL of 369.7 m. Treated surplus water is transferred to the WMP before it is discharged to the environment (through the BCR 2 and outflow basin) or used as recycle water in the mill. Any effluents planned for discharge to the environment will meet discharge criteria or be pumped back to the WMP for further treatment.

Construction of the dams and ancillary structures under the original LRIA work permit No. FF-2015-04 began in September 2015. Construction of the dams, spillway, and intake channel were completed by early August 2017 followed by completion of the seepage collection system in September 2017. Works were completed in 2017 under amended LRIA work permits FF2015-04A and FF2015-04B based on revised design details.

Suspended construction periods occurred due to poor weather conditions, a stop work order issued by the MNRF for WMP Dams 4 and 5, supplemental geotechnical investigations and design updates.

Design Revisions Major design revisions at the WMP included:

- Addition of toe berms to WMP Dams 2, 3, 4 and 5 following supplemental geotechnical investigations to satisfy revised design criteria
- Revised toe drain details to suit interim 2015/early 2016 As-Built conditions and mitigate potential stability issues
- Remedial works to the interim clay fill placed in 2015/early 2016 at WMP Dam 3 which included a 14 m wide key trench through the existing crest of the dam
- Utilization of additional thickness of Zone 8 (WMP Dam 2) and Zone 3 (Dam 4) to address underbuilt or trimmed clay fill slopes to satisfy the neat line geometry
- Re-alignment of the emergency spillway to avoid in place infrastructure.

2.2 Dam Consequence Classification

The WMP Dams were classified as VERY HIGH using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria”. This is generally equivalent to a Canadian Dam Association (CDA) consequence of EXTREME.

SRK Consulting has completed “Dam Break Inundation Study” in February 2019 and it is available on the Document Control site.

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 Water Management

The mill follows logic to draw process water, which is tracked and reported by the Environmental department. The Mill reclaim logic decision tree is shown in Figure 1.

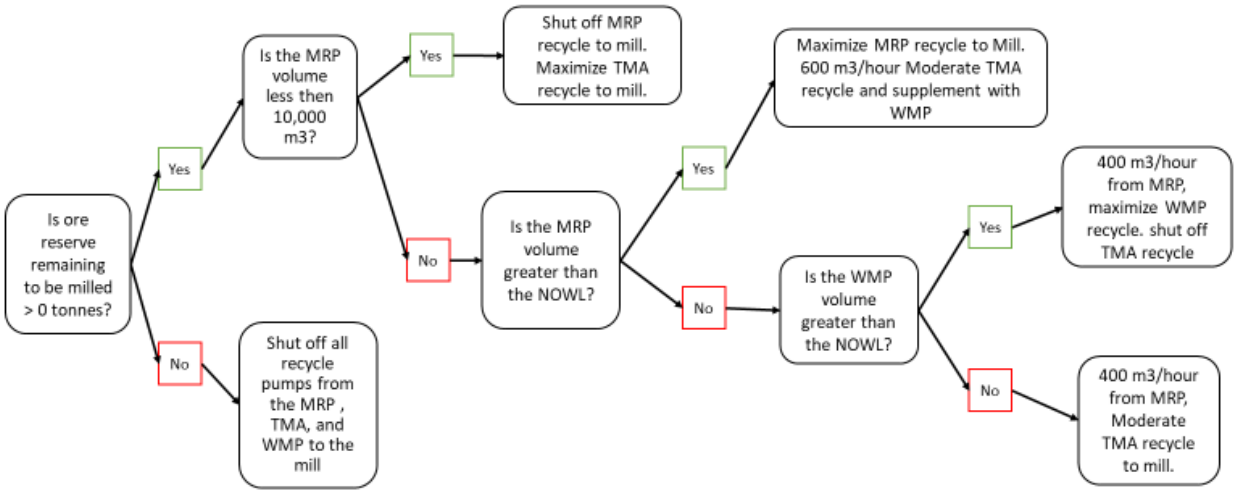

Figure 1 - Mill Reclaim Logic

Water that is meant for discharge to the environment will be either discharged to the environment via EDL1 or sent to BCR 2 and outflow basin for further treatment prior to discharge to the environment via EDL1 or EDL2.

Bleed flow and decant to Pinewood River can only occur if there is sufficient flow in the Pinewood River to achieve a minimum mixing ratio of 1:1 with the two discharges combined. A pre-winter inventory of 2.8 Mm^3 will be targeted to comply with environmental commitments to supply the bleed flow through constructed wetlands in all climatic conditions.

This volume is sufficient to maintain supply to the mill through dry winters and springs, up to the beginning of June, at which time the transfer from the TMA can replenish the WMP inventory. The mill make-up water demand is 22,605 m^3/day which will be supplied by the TMA, MRP and WMP. The make-up water will be preferentially taken from the MRP and TMA with the WMP supplying the difference. The site requires freshwater for various processes at a rate of 1,729 m^3/day which will be supplied from the WMP.

3.2 Water Treatment

The water treatment starts in the TMA and ends with treated water being discharged into the Pinewood River. Figure 2 provides an overview of the treatment process. Part 7 of the OMS Manual provides further details on the Water Treatment Train.

Bubblers (10) throughout the WMP provide sufficient aeration to treat ammonia and will keep the water over the WMP from completely freezing during the winter if required.

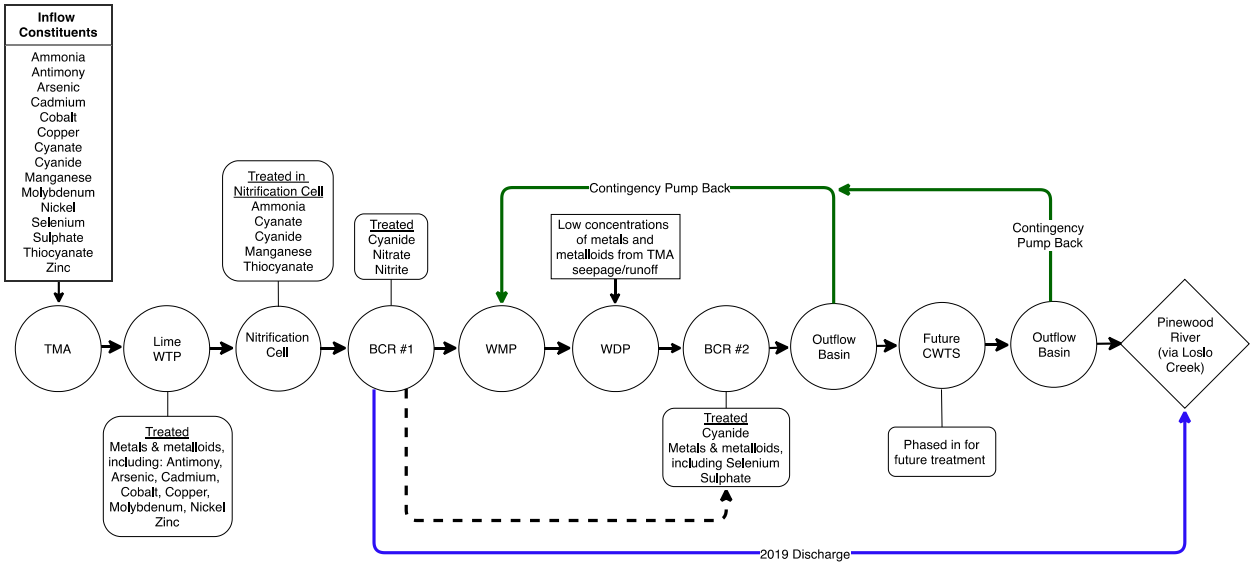

Figure 2 Water Treatment Train Overview

3.3 Pond Storage Capacity

Estimates of storage capacity with respect to elevation are based on comparison with as-built drawings.

Table 3 and Figure 3 provide the stage storage relationship for the WMP.

Table 3 - Stage Storage for WMP

Elevation (m)	Water Storage (m^3)	Elevation (m)	Water Storage (m^3)	Elevation (m)	Water Storage (m^3)
355.0	0	361.0	409,425	367.0	3,142,089
355.5	169	361.5	541,181	367.5	3,486,292
356.0	1,016	362.0	687,276	368.0	3,846,892
356.5	2,384	362.5	845,119	368.5	4,229,229
357.0	4,803	363.0	1,012,352	369.0	4,625,413
357.5	11,417	363.5	1,223,489	369.5	5,033,241
358.0	21,533	364.0	1,452,674	370.0	5,451,690
358.5	38,013	364.5	1,698,321	370.5	5,879,025
359.0	75,235	365.0	1,958,559	371.0	6,314,382
359.5	132,541	365.5	2,233,087	371.3	6,579,245
360.0	207,591	366.0	2,520,422		
360.5	299,155	366.5	2,821,561		

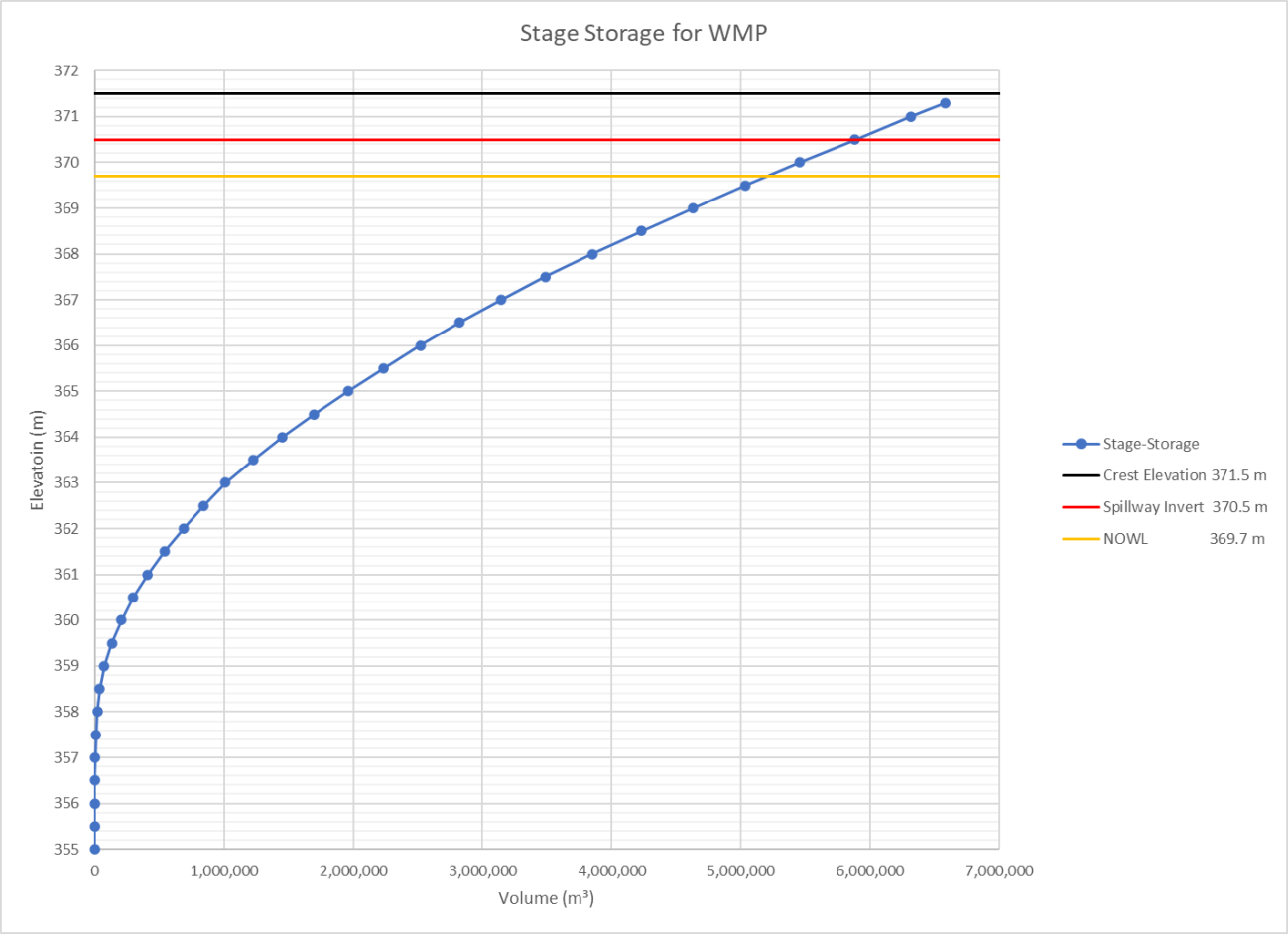

Figure 3 - Stage Storage for WMP

3.4 Flood Capacity

The design of the WMP spillway invert elevation is based on 24-hr Probable Maximum Flood (PMF) event, with the emergency spillway invert at 370.5 m. The Probable Maximum Precipitation (PMP) event of 586 mm.

Any flooding events are routed through the emergency spillway constructed in bedrock, towards the Water Discharge Pond and (when constructed) the Constructed Wetlands.

3.5 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. A freeboard between the emergency spillway sill elevation and NOWL is 0.8 m.

3.6 Pond Alert Levels

The ponds are surveyed three times per week during ice-free conditions and once per week during frozen conditions. Should the ponds exceed the EDF elevation, a plan to return water levels to below the EDF will be implemented. This plan includes options of transferring fluids or shutting down the water treatment plant. The actions implemented will be decided by the Mill Manager in consultation with the Environment Manager.

3.7 Environmental Protection

The WMP and TMA is surrounded by a wildlife fence installed to reduce wildlife contact. The wildlife fence is inspected for any damage at least once per month.

Additional monitoring, described in “Surveillance” later in this document, describes additional environmental protections. This includes surface and ground water quality, spills, etc.

3.8 Seepage Collection System

Seepage collection systems are in place and required for the WMP and TMA only. The design criterion is to manage a 1:25 year 24h rainfall. WMP seepage involves 3 sumps, including a sump shared with the north starter dam and will be pumped back to the TMA. The capacity of the sumps is 18,200, 11,800 and 20,000 m^3 for sumps 1, 2 and 3, respectively.

3.9 Closure

The WMP dams will be breached to prevent retention of water once it no longer has a water management function. Upstream dam faces that become exposed will be revegetated.

The constructed wetlands will be left in place as this system is designed to operate passively. It is expected to stabilize as a wetland complex during operations.

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 4.

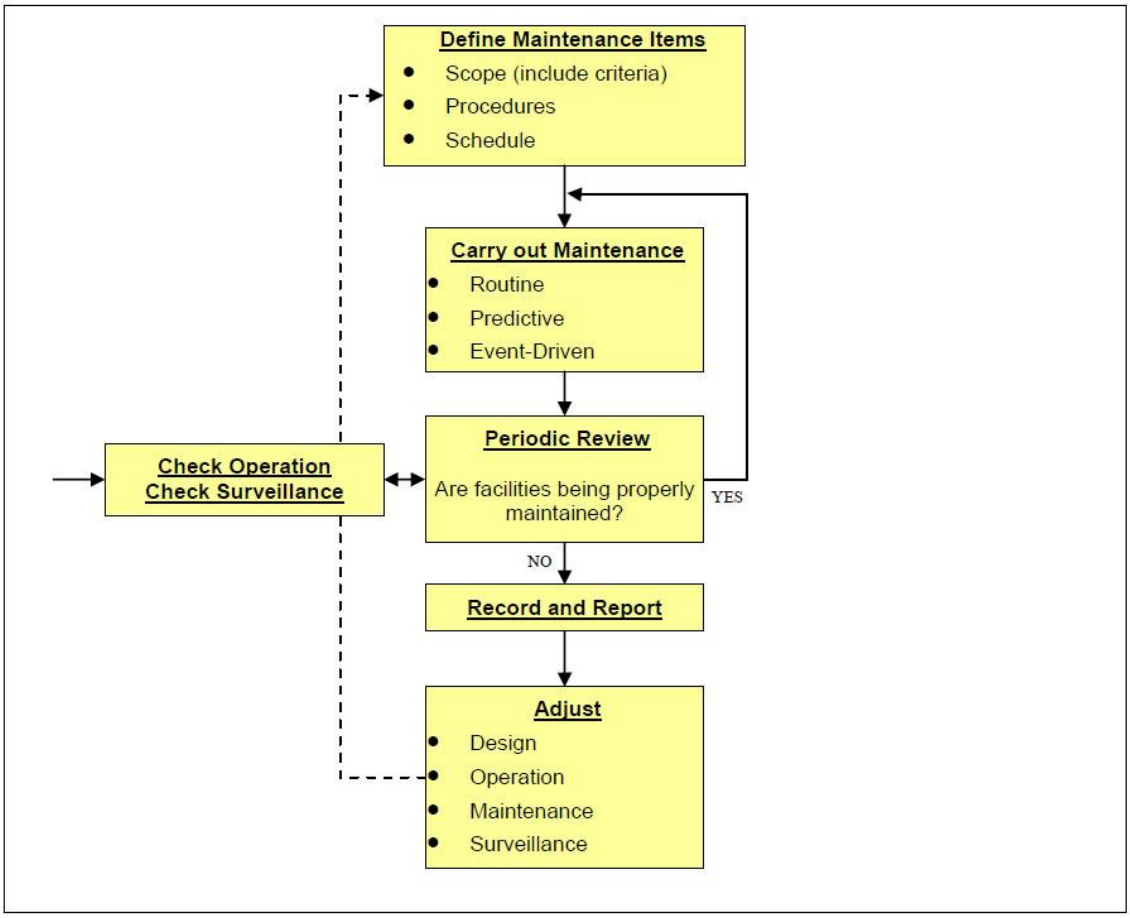

Figure 4 - Maintenance Flow Chart

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 diesel pump requires spill pan, spill kit, and flotation device. Changes to pumping configurations, ditching, piping, or operating parameters need to be approved by the Mill Manager and 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 signs 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 8, 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 (Section 6.3)
- Measurement of geotechnical instruments (Section 6.4)
- Sampling and testing in accordance with requirements (Section 6.5)
- LiDAR and bathymetry survey (Section 6.6)
- Collection of climate data from weather station (Section 6.7)
- Annual Dam Safety Inspections (DSI) (Section 6.8)
- Dam Safety Reviews (DSR) to be conducted in accordance with CDA, based on dam classification (Section 6.9)
- Event driven geotechnical inspections following any extreme weather events, including wind, rainfall, or earthquakes (Section 6.10)

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

Failure Mode	Conditions Related to Possible Increased Risk of Potential Failure Mode
Overtopping	• High water level • Blockage of water management structures • Extreme meteorological event • Dam settlement • Excessive accumulation of solids (near reclaim pocket) • Erosion from burst tailings pipe
Instability	• Cracking • Dam settlement • Slope movement • Dam bulging • Increased pore water pressures within the dam

	• Increased seepage • Erosion • Seismic event
Piping	• Sediment laden seepage • Wet spots at downstream dam toe or on downstream slope • Sinkholes

Inspection frequencies are followed as per Table 5 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 8)
Comprehensive Review (DSR):	
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
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 8)
Comprehensive Review (DSR):	
Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

During depositing of tailings, the Mill Supervisor and Site Services Superintendent delegate those who are required to complete inspections daily. Reporting is to be escalated to hourly observations if a rainfall event is escalating and the Cell 2/3 pond level is within 500 mm of the emergency spillway elevation (equals or exceeds 369.2 m, based on Stage 2 spillway). The Mill Manager will decide whether to provide additional surveillance resources in the case where additional duties including maintenance and operation of the Cell 2/3 dewatering pumps is required to be performed.

5.4 Geotechnical Instrumentation

The performance of the dams is monitored using a variety of instruments. Instrumentation measurements, along with visual inspections, serve as the primary mechanisms for performance monitoring of the TMA and Water Management dams. A brief description of each instrument is provided below. Additional details are available in BGC-4910-DT00-MAN-0002.001.

- Slope Inclinometers (SI) – A vertical PVC pipe (either red or blue) installed through the ground typically into bedrock that measures horizontal deformation

- Vibrating Wire Piezometers (VWP) – A pressure transducer and polyurethane coated wire that measures the pore water pressure within the dam fill materials and foundation soils

- Standpipe Piezometers – A vertical PVC pipe with a perforated or screened section that is capable of measuring water levels and allows collecting water samples

- Settlement Plates – A base plate is installed at some depth with a riser pipe extending to surface, which allows the monitoring of vertical consolidation/settlement of soils

- Magnetic Extensometers – Used to monitor vertical consolidation, these are installed as a series magnetic rings, either around corrugated PVC tubing or slope inclinometer casing within the foundation

- Survey Monuments – A bar of steel is driven into the ground and the top of the bar is surveyed to monitor displacement

The following sub-sections are subject to change and should be read in conjunction with BGC-4910-DT00-MEM-0014.001.

5.4.1 Reading Frequency

Table 6 presents the data collection, reporting, and submission frequencies for geotechnical instrumentation. Note that these frequencies may change based on EoR observations.

Table 6 - Data collection, threshold reporting, and data submission frequencies

Instrument Type	Data Collection/Processing and Threshold Exceedance Reporting Frequency (Days)	

	Active Construction	Post Construction	Operations	Data Submission Frequency
SI	7	14	30	30
VWP	Twice Weekly	7	7	7
Standpipe	7	14	30	30
Settlement Plate	30			30
Magnetic Extensometer	30			30
Survey Monuments	30			30

5.4.2 Data Collection and Processing

The Tailings Dam Technician is responsible for data collection and maintenance of the VWP automated system. All instruments are manually collected, except for VWP. The VWP is connected to a datalogger, which records hourly readings for the instrument. These readings are then transmitted by radio frequency to Hubs located at the Marr site or the E-House at the intersection of WD4, WD5 and Cell 1 Dam. The Hubs transmit the collected data through cell service to the Cloud, which is stored as .csv files. These files are located at:

\\pcs01-yag\Campbellsci\LoggerNet

All geotechnical instrumentation is processed using VBA enabled excel spreadsheets. These spreadsheets store the collected data from all instruments. Additional tools for scheduling, quality assurance, monitoring trends and reporting are built into the sheets. These files are located at:

\\FPS02-YAG\\Engineering\Geotechnical\07 - Instrumentation (V: Drive)

The Tailings Dam Engineer is accountable for scheduling, collecting measurements, assuring data, and maintenance of geotechnical instrumentation. The EoR is responsible for interpretation of this data.

The raw data provided by the Barron Weather Station is used in the piezometer processing sheets to correct for barometric pressure.

5.4.3 Thresholds

Instruments have been installed to form a network of monitoring points to provide information as a basis to assess geotechnical performance of the TMA and Water Management dams. Instrument measurements are compared against defined thresholds linked to the design basis. The trigger level threshold indicates a value exceeding those used as a basis for meeting the design criteria. An alert level threshold indicates a more significant magnitude threshold exceedance.

5.4.4 GIS

The VWP have been included in the New Gold GIS web viewer. These are updated twice weekly using the processing sheets. While it is intended for all instruments to be integrated into the New Gold GIS web viewer, only the VWP have been added. The following folder link stores the automated process for adding piezometers into the GIS system:

V:\Engineering\Geotechnical\07 - Instrumentation\00) GIS

The “To_Import.csv” file is updated using the processing spreadsheets. Once complete, it is copied into the “To_Import” folder. A script searches every 30 seconds for a file and automatically uploads the data to the GIS web viewer. The “To_Import.csv” is then moved to the “Imported” folder and relabelled with the time it was uploaded (YYYY-MM-DD_HRMMSS).

To view this data in the GIS web viewer, the “Geotechnical Database” must be selected. The layers “Piezos 30-Day Rolling V2” or “Total Head Elev. By Geology” are both updated through this process. The symbols used for the 30-Day rolling are as shown in Figure 5. The green, yellow, and red colours indicate that it is either below, above trigger, or above alert thresholds, respectively. The numbers indicate the magnitude of change in the last 30 days.

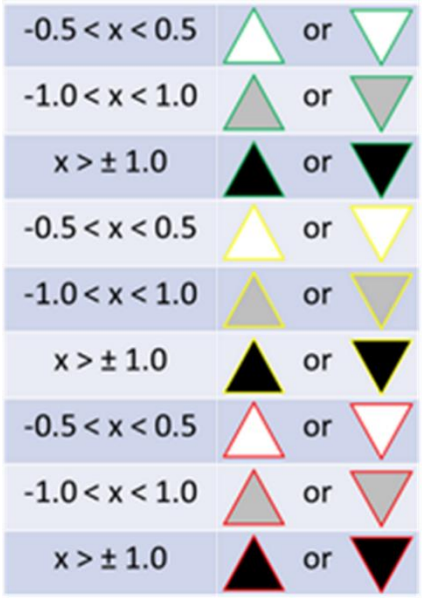

Figure 5 - Symbols for VWP used in GIS

5.5 Other instrumentation

Additional instrumentation to support the OMS manual and management of water includes;

- Densometer on the tailings pipeline;
- Flow meters on the water management pipelines including from the Pinewood River, tailings reclaim lines, MRP line and freshwater line from the WMP and

- Pressure transducers in the WMP, Clark/Teeple Ponds.

This instrumentation provides continuous recording, which is collected during routine inspections and included.

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

During construction, survey is completed for all material contact boundaries of the TMA. A combination of general contractor QC survey and NG survey are compiled by drafting support. Annually, the crests of all dams are surveyed to confirm that consolidation has not reduced the closure elevation of the dams.

When tailings are actively discharged from pipelines, elevations of the tailings (either water level or solids level) are collected weekly. The NG Construction surveyors collect these readings and they are stored by the Tailings Dam Engineer and Environmental team. A forecast is completed monthly to monitor expected days of contingency for tailings placed at its current location.

Bathymetric surveys are completed annually by the Environmental team. These coincide with LiDAR surveys.

A summary report titled "TMA Cell 2/3 Water Levels" is circulated daily at 9 a.m. to summarize the measured water and tailings levels as of 4 p.m. the day prior. This report is prepared and circulated by the Environmental Manager or designate. The purpose of the report is to highlight trend data for Cell 2/3.

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.

The “Fill Placement Summary” (FPS) is collected weekly and data is submitted monthly. The FPS includes maps of weekly fill placement and fill elevation heatmaps relative to TMA Stage 3 design surface.

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 7. 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 7 - 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)
TMA AND WMP DAMS					
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
WATER MANAGEMENT DAMS					
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 8.

Table 8 - 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 Mill 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 Mill 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 an 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 Mill 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.

RAINY RIVER MINE

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL

PART IV – MINE ROCK POND

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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		
	Sylvie St. Jean	NG Environment	Environmental Manager		
	Tony Lord	NG Maintenance	Director, Asset and Energy Management		
	Andre Zerwer	BGC Engineering Inc.	EoR		
Approved by	Tyler Buckingham	NGM	Mill 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)
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Appendix D Tailings Deposition Plan (Schematic)
Appendix E Process Water Balance Overview
Appendix F RASCI Charts
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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-2015-05A: Construction Ditch and Dam, Mine Rock Pond Cofferdam, and the Ultimate Mine Rock Pond am.

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

The Mine Rock Pond Dam (MRP) has been designed to collect runoff and seepage from the East Mine Rock Stockpile (EMRS), Low Grade Ore Stockpile (LGOS), and dewatering from the Open Pit and underground mine. The MRP design details are summarized in Table 3.

Table 3 - Design Document Summary

Document Title	Reference
Design Brief – Water Management Dams	3098004-004400-A1-ETR-0004-00
Mine Rock Pond Dam – Design Revision and Operating Guidelines	RRP-GEO-REP-007-R0
MRP As-built Report	RRP-GEO-REP-033 R1
Drawing Title	New Gold Document Number
Mine Rock Pond Dam – Typical Cross Section	3098004-002590-A1-D70-0004
Interim Mine Rock Pond – Plan, Cross Sections, and Details	3098004-002590-A1-D50-0006

Construction of the MRP commenced in 2015, and with a hiatus in 2016, was completed in the fall of 2017. The MRP Dam is located in the remnant lower Clark Creek and is required to manage mine water pumped from the Open Pit and underground mine workings as well as runoff collected from the East Mine Rock Stockpile (EMRS). The seepage and runoff collected in the MRP will be pumped to the mill and underground mine for use as make-up water. There is no direct discharge to the environment from the MRP.

The MRP will be operated to minimize volume in the pond to reduce seepage and for increased dam safety, there is no seepage collection system for the MRP as it is the seepage collection system for the EMRS.

A fixed pumping station can supply 680 m^3/hr to the mill, which is able to supply the mill with 59% of the total mill make-up water demand. It is planned to provide 45% of mill make-up water annually. Prior to winter, the MRP will be drawn down to the minimum pond volume to reduce ice losses.

2.2 Dam Consequence Classification

The MRP Dams were classified as VERY HIGH using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria”. This is generally equivalent to a Canadian Dam Association (CDA) consequence of EXTREME.

SRK Consulting has completed “Dam Break Inundation Study” in February 2019 and it is available on the Document Control site.

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 Water Management

The mill follows logic to draw process water, which is tracked and reported by the Environmental department. The Mill reclaim logic decision tree is shown in Figure 1.

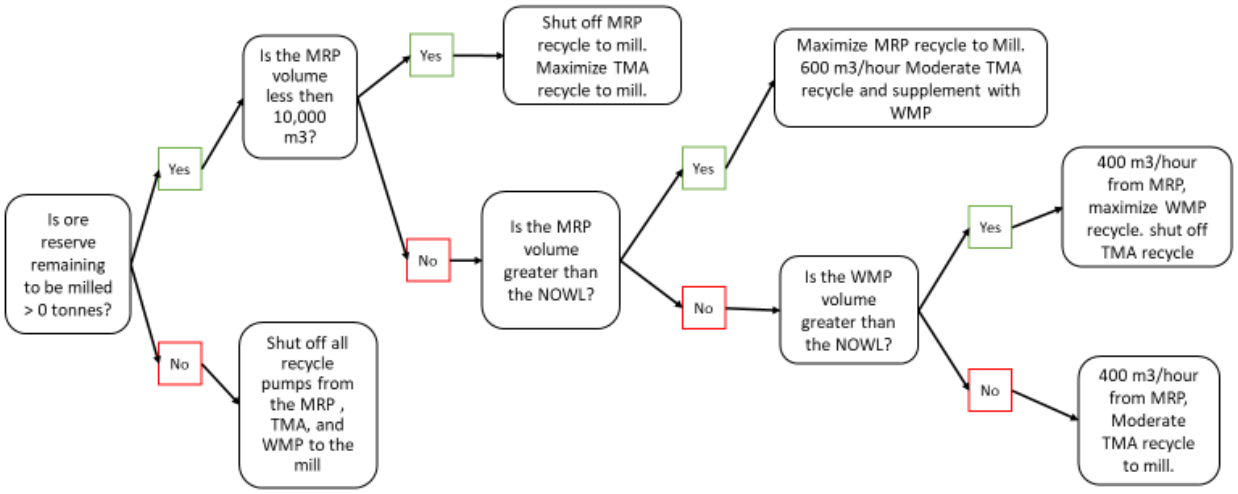

Figure 1 - Mill Reclaim Logic

This volume is sufficient to maintain supply to the mill through dry winters and springs, up to the beginning of June, at which time the transfer from the TMA can replenish the WMP inventory. The mill make-up water demand is 22,605 m³/day which will be supplied by the TMA, MRP and WMP. The make-up water will be preferentially taken from the TMA and MRP with the WMP supplying the difference. The site requires freshwater for various purposes at a rate of 1,729 m³/day which will be supplied from the WMP.

The MRP has two pumps, both able to provide 680 m³/hr to the mill. Their equipment ID are 2590-PU0030 and 2590-PU-0031.

3.2 Pond Storage Capacity

The MRP has a maximum water storage of 1.3 Mm³ and minimum of 0.1 Mm³ (required to ensure Underground has sufficient water for operations). The maximum operating water volume is 0.5 Mm³. The stage storage relationship is provided in Table 4 and Figure 2.

Table 4 - Stage Storage Relationship

Elevation (m)	Volume (m^3)	Notes
351.0	0.0	
352.0	3,104	
353.0	25,569	
354.0	82,650	
355.0	176,903	
356.0	332,548	
356.8	525,000	NOWL
357.0	579,383	
358.0	931,120	
358.9	1,300,000	Spillway elevation
359.0	1,382,836	
360.0	1,930,022	
360.2	2,048,496	Dam Crest

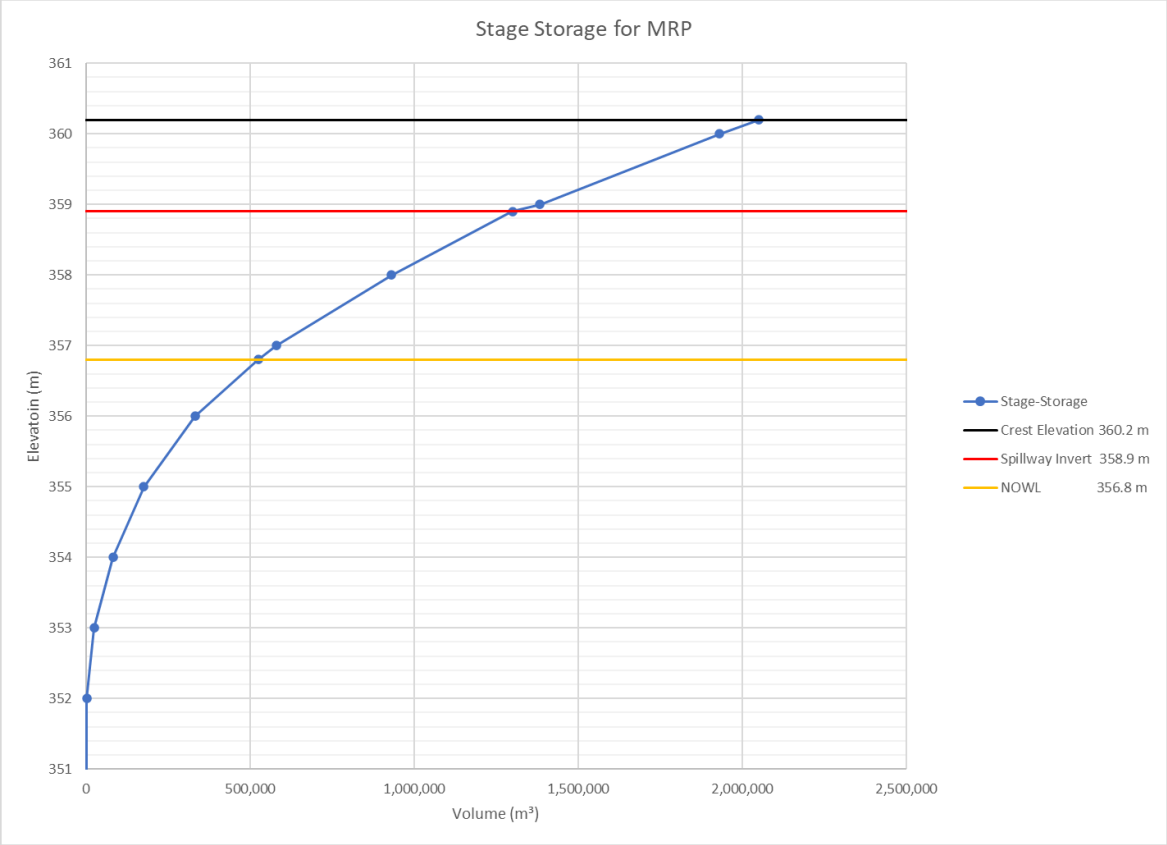

Figure 2 - Stage Storage for MRP

3.3 Flood Capacity

The design of the MRP spillway invert elevation is based on 24-hr Probable Maximum Flood (PMF) event. The Probable Maximum Precipitation (PMP) event of 586 mm.

The available pond storage at the emergency spillway invert is reduced to 1.3 Mm^3. The MRP pumps will pump 680 m^3/hr, and run continuously until the pond is empty. This 30% increase to the pumping rate and change in pumping philosophy means the normal pond will range between 100,000 m^3 and about 525,000 m^3 depending on the open pit dewatering pump capacity. The larger decant pumps also mean that the EDF capacity required in the MRP is 775,000 m^3. The Maximum Operating Water Level (MOWL) in the MRP has been set at 525,000 m^3.

Overtopping of the Clark Creek Dam was considered in the design of the MRP. The Clark Creek Dam and Pond are designed for a 1:100-year 24-hour event. If this is exceeded, then water will spill from the dam and flow toward the EMRS. Water on the eastern side of the EMRS reports to a sump and flows through a NAG rock French-drain under the EMRS to the MRP. Given this flow path the contribution of this flow is not significant on the peak inflows to the MRP.

3.4 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 dam crest elevation is 360.2 m and the emergency spillway invert is 358.9 m. The MOWL is set at 356.8 m. The MRP will be operated with a freeboard of 3.4 m to allow for the EDF (1:100-year 30-day event), a maximum wave height of 0.78 m with a required 0.31 m of freeboard remaining.

3.5 Pond Alert Levels

The ponds are surveyed three times per week during ice-free conditions and once per week during frozen conditions. Should the ponds exceed the EDF elevation, a plan to return water levels to below the EDF will be implemented. This plan includes options of transferring fluids or shutting down the mill. The actions implemented will be decided by the Mill Manager in consultation with the Environmental Manager.

3.6 Closure

At closure, the MRP will collect runoff and seepage from the EMRS. This will then be directed to the Open Pit to help flooding.

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 3.

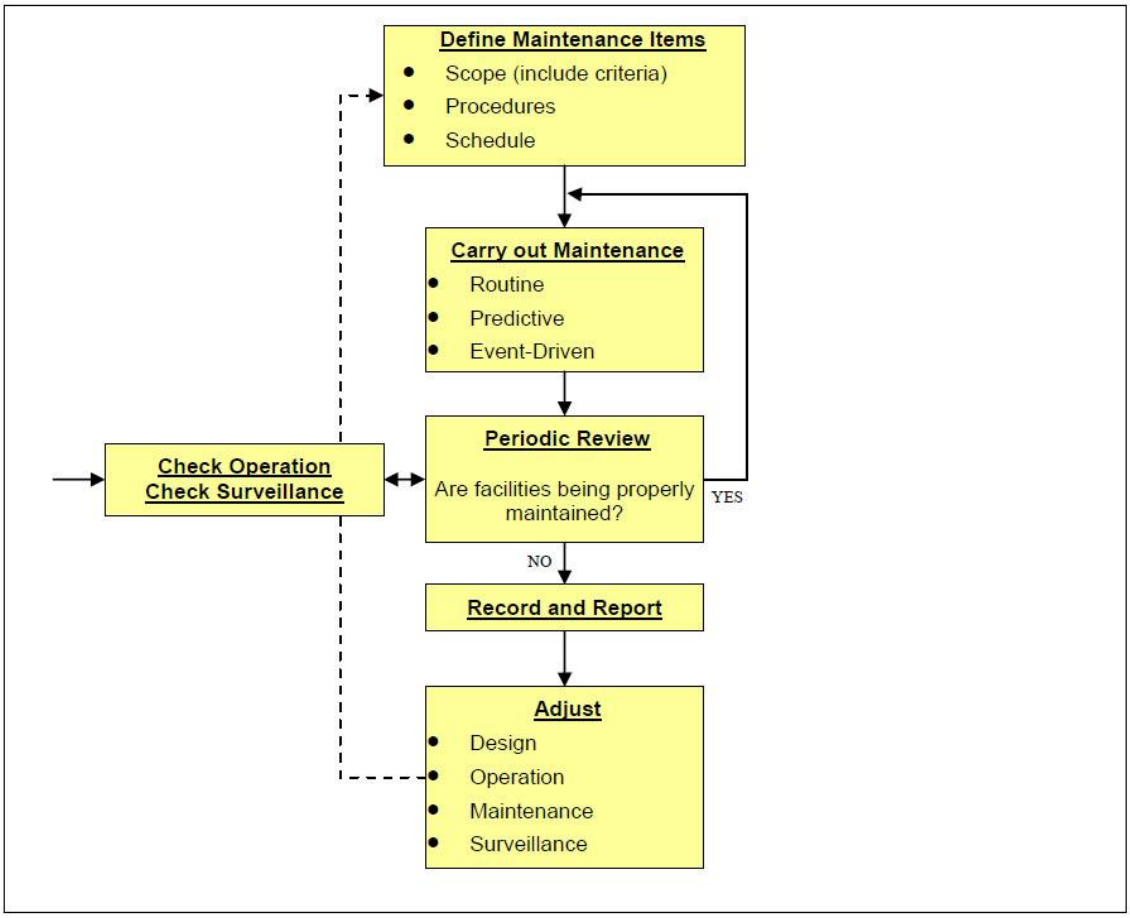

Figure 3 - Maintenance Flow Chart

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 Mill Manager and 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 9, 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 (Section 6.3)
- Measurement of geotechnical instruments (Section 6.4)
- Sampling and testing in accordance with requirements (Section 6.5)
- LiDAR and bathymetry survey (Section 6.6)
- Collection of climate data from weather station (Section 6.7)
- Annual Dam Safety Inspections (DSI) (Section 6.8)
- Dam Safety Reviews (DSR) to be conducted in accordance with CDA, based on dam classification (Section 6.9)
- Event driven geotechnical inspections following any extreme weather events, including wind, rainfall, or earthquakes (Section 6.10)

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 5.

Table 5 - Failure Modes and Observable Conditions

Failure Mode	Conditions Related to Possible Increased Risk of Potential Failure Mode
Overtopping	• High water level • Blockage of water management structures • Extreme meteorological event • Dam settlement • Excessive accumulation of solids (near reclaim pocket) • Erosion from burst tailings pipe
Instability	• Cracking • Dam settlement • Slope movement • Dam bulging • Increased pore water pressures within the dam

	• Increased seepage • Erosion • Seismic event
Piping	• Sediment laden seepage • Wet spots at downstream dam toe or on downstream slope • Sinkholes

Inspection frequencies are followed as per Table 6 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 9)
Comprehensive Review (DSR):	
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 6 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 9)
Comprehensive Review (DSR):	
Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

During depositing of tailings, the Mill Supervisor and Site Services Superintendent delegate those who are required to complete inspections daily. Reporting is to be escalated to hourly observations if a rainfall event is escalating and the Cell 2/3 pond level is within 500 mm of the emergency spillway elevation (equals or exceeds 369.2 m, based on Stage 2 spillway). The Mill Manager will decide whether to provide additional surveillance resources in the case where additional duties including maintenance and operation of the Cell 2/3 dewatering pumps is required to be performed.

5.4 Geotechnical Instrumentation

The performance of the dams is monitored using a variety of instruments. Instrumentation measurements, along with visual inspections, serve as the primary mechanisms for performance monitoring of the TMA and Water Management dams. A brief description of each instrument is provided below. Additional details are available in BGC-4910-DT00-MAN-0002.001.

- Slope Inclinometers (SI) – A vertical PVC pipe (either red or blue) installed through the ground typically into bedrock that measures horizontal deformation

- Vibrating Wire Piezometers (VWP) – A pressure transducer and polyurethane coated wire that measures the pore water pressure within the dam fill materials and foundation soils

- Standpipe Piezometers – A vertical PVC pipe with a perforated or screened section that is capable of measuring water levels and allows collecting water samples

- Settlement Plates – A base plate is installed at some depth with a riser pipe extending to surface, which allows the monitoring of vertical consolidation/settlement of soils

- Magnetic Extensometers – Used to monitor vertical consolidation, these are installed as a series magnetic rings, either around corrugated PVC tubing or slope inclinometer casing within the foundation

- Survey Monuments – A bar of steel is driven into the ground and the top of the bar is surveyed to monitor displacement

The following sub-sections are subject to change and should be read in conjunction with BGC-4910-DT00-MEM-0014.001.

5.4.1 Reading Frequency

Table 7 presents the data collection, reporting, and submission frequencies for geotechnical instrumentation. Note that these frequencies may change based on EoR observations.

Table 7 - Data collection, threshold reporting, and data submission frequencies

Instrument Type	Data Collection/Processing and Threshold Exceedance Reporting Frequency (Days)	

	Active Construction	Post Construction	Operations	Data Submission Frequency
SI	7	14	30	30
VWP	Twice Weekly	7	7	7
Standpipe	7	14	30	30
Settlement Plate	30			30
Magnetic Extensometer	30			30
Survey Monuments	30			30

5.4.2 Data Collection and Processing

The Tailings Dam Technician is responsible for data collection and maintenance of the VWP automated system. All instruments are manually collected, except for VWP. The VWP is connected to a datalogger, which records hourly readings for the instrument. These readings are then transmitted by radio frequency to Hubs located at the Marr site or the E-House at the intersection of WD4, WD5 and Cell 1 Dam. The Hubs transmit the collected data through cell service to the Cloud, which is stored as .csv files. These files are located at:

\\pcs01-yag\Campbellsci\LoggerNet

All geotechnical instrumentation is processed using VBA enabled excel spreadsheets. These spreadsheets store the collected data from all instruments. Additional tools for scheduling, quality assurance, monitoring trends and reporting are built into the sheets. These files are located at:

\\FPS02-YAG\\Engineering\Geotechnical\07 - Instrumentation (V: Drive)

The Tailings Dam Engineer is accountable for scheduling, collecting measurements, assuring data, and maintenance of geotechnical instrumentation. The EoR is responsible for interpretation of this data.

The raw data provided by the Barron Weather Station is used in the piezometer processing sheets to correct for barometric pressure.

5.4.3 Thresholds

Instruments have been installed to form a network of monitoring points to provide information as a basis to assess geotechnical performance of the TMA and Water Management dams. Instrument measurements are compared against defined thresholds linked to the design basis. The trigger level threshold indicates a value exceeding those used as a basis for meeting the design criteria. An alert level threshold indicates a more significant magnitude threshold exceedance.

5.4.4 GIS

The VWP have been included in the New Gold GIS web viewer. These are updated twice weekly using the processing sheets. While it is intended for all instruments to be integrated into the New Gold GIS web viewer, only the VWP have been added. The following folder link stores the automated process for adding piezometers into the GIS system:

V:\Engineering\Geotechnical\07 - Instrumentation\00) GIS

The “To_Import.csv” file is updated using the processing spreadsheets. Once complete, it is copied into the “To_Import” folder. A script searches every 30 seconds for a file and automatically uploads the data to the GIS web viewer. The “To_Import.csv” is then moved to the “Imported” folder and relabelled with the time it was uploaded (YYYY-MM-DD_HRMMSS).

To view this data in the GIS web viewer, the “Geotechnical Database” must be selected. The layers “Piezos 30-Day Rolling V2” or “Total Head Elev. By Geology” are both updated through this process. The symbols used for the 30-Day rolling are as shown in Figure 4. The green, yellow, and red colours indicate that it is either below, above trigger, or above alert thresholds, respectively. The numbers indicate the magnitude of change in the last 30 days.

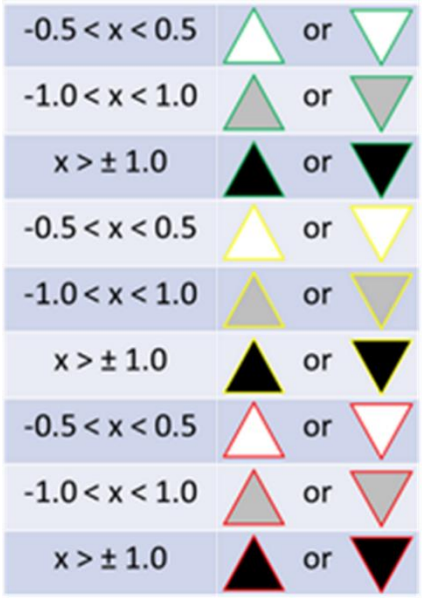

Figure 4 - Symbols for VWP used in GIS

5.5 Other instrumentation

Additional instrumentation to support the OMS manual and management of water includes;

- Densometer on the tailings pipeline;
- Flow meters on the water management pipelines including from the Pinewood River, tailings reclaim lines, MPR line and freshwater line from the WMP and

- Pressure transducers in the WMP, Clark/Teeple Ponds.

This instrumentation provides continuous recording, which is collected during routine inspections and included.

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

During construction, survey is completed for all material contact boundaries of the TMA. A combination of general contractor QC survey and NG survey are compiled by drafting support. Annually, the crests of all dams are surveyed to confirm that consolidation has not reduced the closure elevation of the dams.

When tailings are actively discharged from pipelines, elevations of the tailings (either water level or solids level) are collected weekly. The NG Construction surveyors collect these readings and they are stored by the Tailings Dam Engineer and Environmental team. A forecast is completed monthly to monitor expected days of contingency for tailings placed at its current location.

Bathymetric surveys are completed annually by the Environmental team. These coincide with LiDAR surveys.

A summary report titled "TMA Cell 2/3 Water Levels" is circulated daily at 9 a.m. to summarize the measured water and tailings levels as of 4 p.m. the day prior. This report is prepared and circulated by the Environmental Manager or designate. The purpose of the report is to highlight trend data for Cell 2/3.

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.

The “Fill Placement Summary” (FPS) is collected weekly and data is submitted monthly. The FPS includes maps of weekly fill placement and fill elevation heatmaps relative to TMA Stage 3 design surface.

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 8. 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 8 - 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)
TMA AND WMP DAMS					
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
WATER MANAGEMENT DAMS					
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 9.

Table 9 - 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 Mill 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 Mill 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 Mill 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.

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
Emo, Ontario
P0W 1E0

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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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.

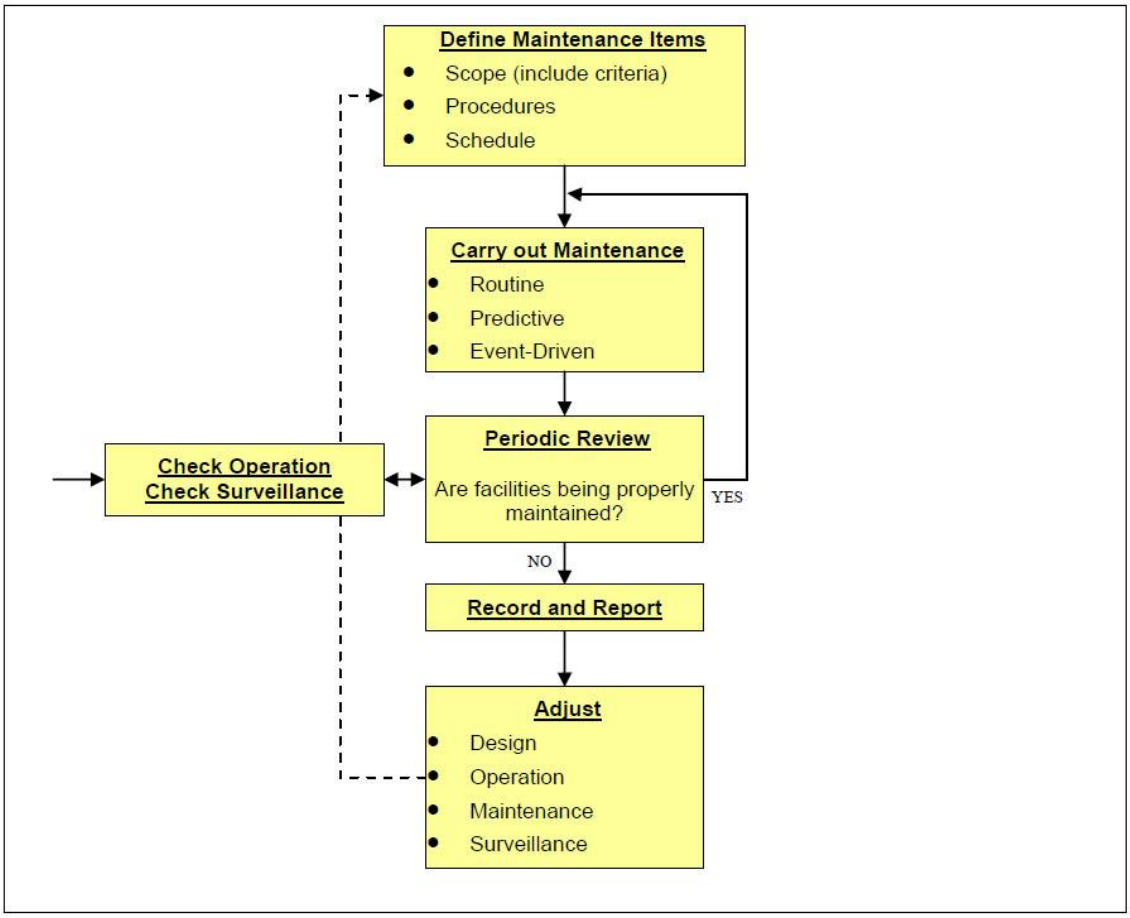

Figure 1 - Maintenance Flow Chart

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

Failure Mode	Conditions Related to Possible Increased Risk of Potential Failure Mode
Overtopping	• High water level • Blockage of water management structures • Extreme meteorological event • Dam settlement • Excessive accumulation of solids (near reclaim pocket) • Erosion from burst tailings pipe
Instability	• Cracking • Dam settlement • Slope movement • Dam bulging • Increased pore water pressures within the dam

	• Increased seepage • Erosion • Seismic event
Piping	• Sediment laden seepage • Wet spots at downstream dam toe or on downstream slope • Sinkholes

Inspection frequencies are followed as per Table 5 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 7)
Comprehensive Review (DSR):	
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
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 7)
Comprehensive Review (DSR):	
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)
TMA AND WMP DAMS					
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
WATER MANAGEMENT DAMS					
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.

RAINY RIVER PROJECT

OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL

PART VI - DIVERSIONS

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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	Mine Manager		
	Tyler Buckingham	NG Mill	Mill Manager		
	Tony Lord	NG Maintenance	Mobile Maintenance Manager		
	Andre Zerwer	BGC Engineering Inc.	Engineer of Record		
Approved by	Sylvie St. Jean	NG Environment	Environment 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 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 Diversion channels and dams 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

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.

The freshwater diversions function to reduce inflows to the RRM and provide offsetting habitat for the loss of portions of Loslo, Marr, Clark, and West creeks. Diversion of the non-contact runoff from these catchments reduces the effluent management requirements. All structures support fish habitat. Freshwater diversion is provided by two systems:

- West Creek diversion including the Stockpile and West Creek dam, ponds, and diversions
- Clark Creek diversion including the Clark Creek and Teeple dam, ponds, and diversions

The freshwater ponds are designed to minimize the net freshwater inflows into the project by diverting non-contact runoff around the site via dams, ponds, and diversion channels. The West Creek Pond, Clark Creek Pond, Stockpile Pond and Teeple Pond dams were developed in a single dam raise during the construction phase to support the requirements of the *Water Management Plan for Operations* (Amec Foster Wheeler, 2015).

The freshwater diversion structures have been developed in accordance with the design briefs and as-built reports summarized in

Table 3. A detailed list of Drawings is provided in Appendix A.

Table 3 - Supporting Documents for the West Creek and Clark Creek Diversions

Document Title	Reference
Design Brief – Water Management Dams	(Amec Foster Wheeler, 2015b)
Design Update – Clark Creek Pond Dam	(Amec Foster Wheeler, 2016i)
Stockpile Pond Dam – Design Revision and Operating Guidelines	(Amec Foster Wheeler, 2016j)
West Creek Dam – Design Revision and Operating Guidelines	(Amec Foster Wheeler, 2016k)
Clark Creek Diversion – As-built Report	(Amec Foster Wheeler, 2017a)
West Creek Diversion – As-built Report in preparation	(Amec Foster Wheeler, 2017b)
Drawing Title	**New Gold Document Number**
West Creek Pond Dam – Layout and Foundation – Preparation Plan & Details	3098004-002510-A1-D50-0001
West Creek Diversion Channel – Plan and Profile	3098004-002510-A1-D70-0003
Stockpile Pond Dam – Plan, Typical Section and Profile	3098004-002580-A1-D70-0002
Stockpile Pond Diversion Channel – Plan and Profile	3098004-002580-A1-D70-0004
Clark Creek Pond Dam – Plan, Typical Section and Profile	3098004-004400-A1-D70-0001
Clark Creek Pond Diversion Channel – Plan and Profile	3098004-004400-A1-D70-0002
Teeple Road Dam – Plan, Typical Section and Profile	3098004-004400-A1-D70-0003
Teeple Road Pond Diversion Channel – Plan and Profile	3098004-004400-A1-D70-0004

2.1 Dam Consequence Classification

The structures for the West Creek Diversion (Stockpile Pond Dam and West Creek Pond Dam) were classified as VERY HIGH using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria”. This is generally equivalent to a Canadian Dam Association (CDA) consequence of EXTREME.

The Clark Creek structures (Teeple Dam and Clark Creek Dam) were classified as LOW using the Ontario Lakes and Rivers Improvement Act (LRIA) “Classification and inflow design flood criteria”. This is generally equivalent to a Canadian Dam Association (CDA) consequence of LOW.

2.2 West Creek Diversion

The West Creek Diversion system diverts flows from the West Creek and its tributaries around the Open Pit and discharges into the Pinewood River at Loslo Creek. It includes the Stockpile Pond Dam and Diversion Channel, which divert flows around the Plant Site, and the West Creek Pond and Diversion Channel, whichdiverts flows around the Open Pit. The following sections describe the components of this diversion.

2.2.1 Stockpile Pond and Diversion Channel

The objective of the Stockpile Pond is to divert freshwater from natural ground into the West Creek Watershed. The Stockpile Pond Diversion Channel was designed to convey the Probable Maximum Flood (PMF) from the plant site area to the West Creek Pond. The Stockpile Pond Diversion will also provide fish habitat compensation. The Stockpile Pond Diversion Channel base width varies from 6 to 33 m with 4H:1V side slopes. The total length of the diversion channel is about 1,200 m.

The dam height is 7.5 m with 4:1 slopes with a crest width of 6 m and length of 175 m. The dam crest elevation is 375.5 m and the diversion channel invert is 372.2 m. NOWL provides capacity for 93,700 m^3 of storage with greater volumes discharges through the 33 m spillway into the diversion channel. The diversion channel is a low (<1%) gradient channel reporting to the West Creek Pond with a typical bottom width of 6 m.

The design brief for the dam is RRP-GEO-REP-003. Construction was completed on the diversion in November 2016 and confirmed by the EOR (RRP-GEO-MEM-080-R1). Construction of the dam was completed in May 2017 and confirmed by the EOR (RRP-GEO-MEM-119-R1). The dam was constructed with a central clay core and random fill and or NPAG rock shells.

2.2.2 West Creek Pond and Diversion Channel

The West Creek Pond is located north of the Open Pit and west of the Process Plant at a point that allows for the raising of the pond water level sufficiently to divert flows westerly through a diversion channel and around the Open Pit. The West Creek Dam intercepts all West Creek flows from the north, as well as drainage from two tributaries to the east, diverted through the Stockpile Diversion Channel.

The West Creek Dam is a central clay core with random fill upstream shell and NPAG mine rock downstream shell. It has a crest elevation of 364.9 m (~156,000 m^3), maximum height of 7.4 m, and overall side slopes of 7.9H:1V including rock toe berms. The West Creek Pond has been designed to contain the PMF while discharging to the West Creek Diversion Channel.

The first 615 m of the West Creek Diversion Channel acts as the Emergency Spillway of the West Creek Dam and has been designed to convey a PMF event. The spillway invert elevation is 361.0 m and is 8 m wide. This provides a freeboard of 4.0 m at normal water level in the pond. During a PMF event the peak water level would rise to 364.5 m, leaving 0.4 m of freeboard.

2.2.3 West Creek Diversion Overflow Structure

The Overflow Structure (or weir) is located at Sta. 0+615 within the Diversion Channel. A box culvert (62.5 m long by 2.4 m wide/tall) constricts the channel flow such that a side overflow weir may be activated (invert elevation 360 m, width 50 m). The purpose of the overflow structure is to restrict the flow rate discharging from the culvert under high flow conditions. The remaining ~4,000 m of diversion channel is over flat ground with minimal elevation change. The reduced flows through this section of diversion channel allow a much smaller channel excavation.

The overflow structure has been designed such that during a PMF event, the flow rate downstream of the culvert, i.e., in the channel, does not exceed the 100-year flood outflow from the West Creek Pond (26.9 m^3/s). The diversion channel upstream of the diversion structure will back up, with excess flows diverted through the side overflow channel. Containment is provided above the culvert by a berm across the diversion channel with a crest elevation of 363 m. The peak water level in the diversion channel during a PMF event will be 362.5 m, providing 0.5 m of freeboard to the crest of the berm.

The overflow structure will be activated for events greater than the 10-year storm. The peak overflow channel discharge during a PMF event will be 163.8 m^3/s. The overflow channel discharges onto a flat, grassy plain south of the West Creek Diversion Channel and north of the ultimate WMRS. This area, termed the exclusion zone, is shown on Figure 1 and is required to remain undeveloped to prevent the loss of natural vegetation until Sediment Pond 1.

2.3 Clark Creek Diversion

The purpose of the Clark Creek diversion is to divert natural drainage and runoff around the East Mine Rock Stockpile and provide fish habitat offsetting. The Clark Creek Diversion Channel diverts runoff from the Clark Creek upstream of the Clark Creek Dam and the EMRS, through the Clark Creek diversion channel into Teeple Pond and subsequently into Teeple Diversion and to the Pinewood River via a culvert under Teeple Road.

Construction of the Clark Creek Diversion occurred between August 29, 2015 and December 4, 2016 and authorised by LRIA FF-2015-03A and the Fisheries Act approval. There are applicable federal and provincial EA commitments, however as a freshwater diversion there a limited MECP requirements beyond sediment control.

Clark Creek and Teeple Dams were constructed as homogenous clay fill embankments utilizing native clay overburden. The clay fill is protected by gravel and cobble sized materials, with a layer of geotextile separation, to prevent erosion. Overflow sections for Teeple Dam are included on the dams to carry storm flows (i.e., activated by 2-year event) and have been designed to handle events more than the 100-year return design flow. Overflow sections are provided to permit the safe passage of water in the event the pond level exceeds the maximum operating water level. There are no active controls on the water flows. Clark Creek Dam features a 20 m wide overflow section and Teeple Road Dam features a 150 m wide overflow section designed to allow water and fish to flow over the structure.

The diversions are designed to convey the 1:100-year flow and are typically 6 m wide (base width) with 4:1 slope. The Clark Creek diversion is 1,200 m and the Teeple Diversion is 580 m long.

Table 4 - Design Parameters for the Clark Creek Diversion

Design Parameter	Unit	Clark Creek	Teeple
Embankment dam crest elevation	m	380.0	379.0
Dam overflow section invert elevation	m	379.9	378.7
Normal Water Level (NWL) elevation	m	378.75	378.5
Diversion channel inlet invert elv.	m	378.75	378.5
Diversion channel outlet elv.	m	377.6	371.5
Diversion channel gradient (average)	%	0.1	1.2
Diversion channel side slopes		4:1	4:1

Deviations from design occurred for both diversions, however not anticipated to have a negative effect of stability. Examples of deviation include absence of low flow channel, oversized boulders, variances on habitat feature frequency and riffles either not meeting design elevation or being too steep

2.4 Site Access

Access to Clark Creek and Teeple dam requires the MCL Gate Key to access the old Haul Road 1, via Teeple Road. The remaining diversion structures are normally accessible on site.

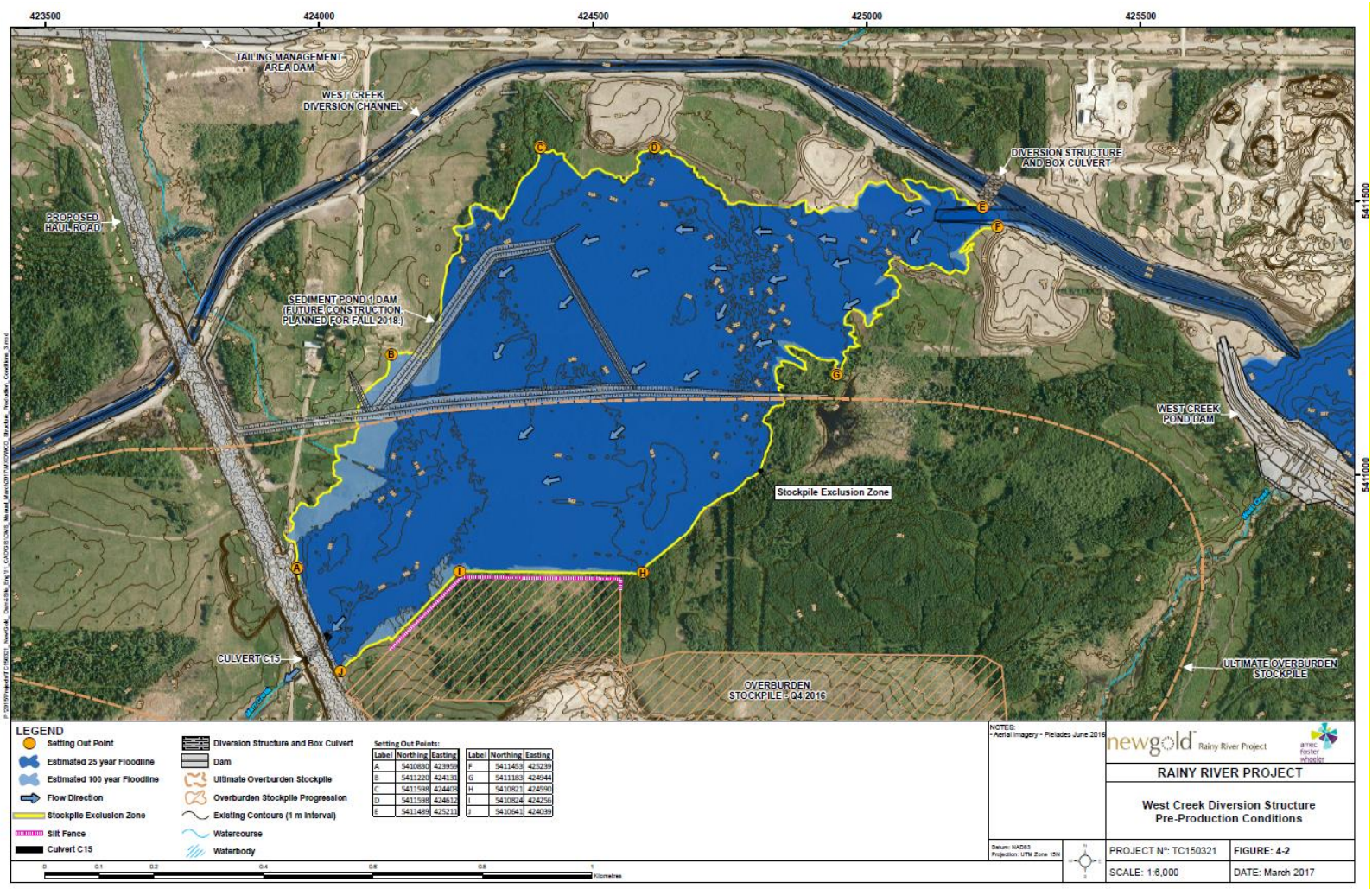

Figure 1 - West Creek Diversion Overflow Map

3.0 OPERATIONS

The freshwater diversion structures (dams and diversion channels) are designed to be operated passively. Clark, Teeple and West Creek Ponds are full, and the diversions are flowing naturally.

Stockpile pond is currently under investigation as the pond has not filled as per design. It is suspected that water is escaping into the underlying aquifer and bypassing the dam. Further investigations are planned for 2021, with potential solutions to be implemented late 2021 or 2022.

3.1 Closure Plan

Closure of the embankments will typically involve but is not limited to reaching of embankments to prevent ponding of water and revegetating slopes to reclaim the area. Some embankment structures will still have a role during the closure phase, and these will not be breached. Freshwater diversion and constructed wetland structures are designed to operate passively and will remain in place at closure

3.2 Reporting Requirements

Reporting is sub-divided as routine, planned reports of defined frequency, and those that are non-routine.

Routine

- Monthly monitoring report including a summary of all monitoring data collective, all non routine calibration/maintenance procedures, tabulation and description of any bypass/upset conditions
- Annual reporting to MECP on March 31 for the previous year, a works performance report and a surface water monitoring report
- Quarterly electronic effluent monitoring reports to ECCC
- Annual electronic effluent monitoring report and environmental effects monitoring reports to ECCC by March 31
- Annual reporting on compensation habitat to the Department of Fisheries and Oceans (DFO) as well as Environment and Climate Change Canada (ECCC) by December 31

Non-routine

- Report all spills as defined in the Environmental Protection Act immediately to spills action centre (SAC), follow New Gold Incident Reporting Guidelines and follow up in writing to MECP within 10 days describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation
- Any observation of sheen/foam/settable solids within the works report immediately to (SAC) immediately and written reporting within 7 days
- Any exceedance of effluent limits report to SAC immediately, written confirmation to MECP within 7 days

- If acute toxicity tests fail, within 15 days report in writing to MECP with the cause and remedial actions proposed/implemented
- Notify ECCC immediate if MMER Sch 4 limits are exceeded, pH is outside 6-9.5 range or if the effluent is acutely lethal with a written report within 30 days

Records are retained consistent with CEAA condition 11 for a minimum of 25 years or until decommissioning ends, whichever is longer and kept locally. This exceeds the ECA permit requirement of 3 years. Records include place/date/time of sampling, dates and analysis performed, analytical techniques used, names of persons collected/analyzing sampling and results of analysis.

Each of the regulatory approval requirements related to the construction, operation and eventual reclamation of the Site have specific compliance reporting requirements with defined deadlines or reporting periodicity. In general, the reporting includes:

- Operation, Maintenance and Surveillance Plan(s) for dams, water management (water quality) and air/noise emissions
- Emergency Preparedness Plan(s)
- As-Built Drawings and related Construction Reports
- Dam Safety Inspection and Review Reports
- Environmental Monitoring Plans
- Environmental Monitoring and Performance Reports.

The environmental approvals and permits received from the government that are maintained by the New Gold Environmental Department should be referred to for details of monitoring, inspection and reporting requirements.

In addition, the New Gold Environmental Department should be notified of any proposed major modification to RRM facilities, in order that they can liaise with the appropriate government ministries to determine if additional approvals or amendments to existing approvals are required.

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 2.

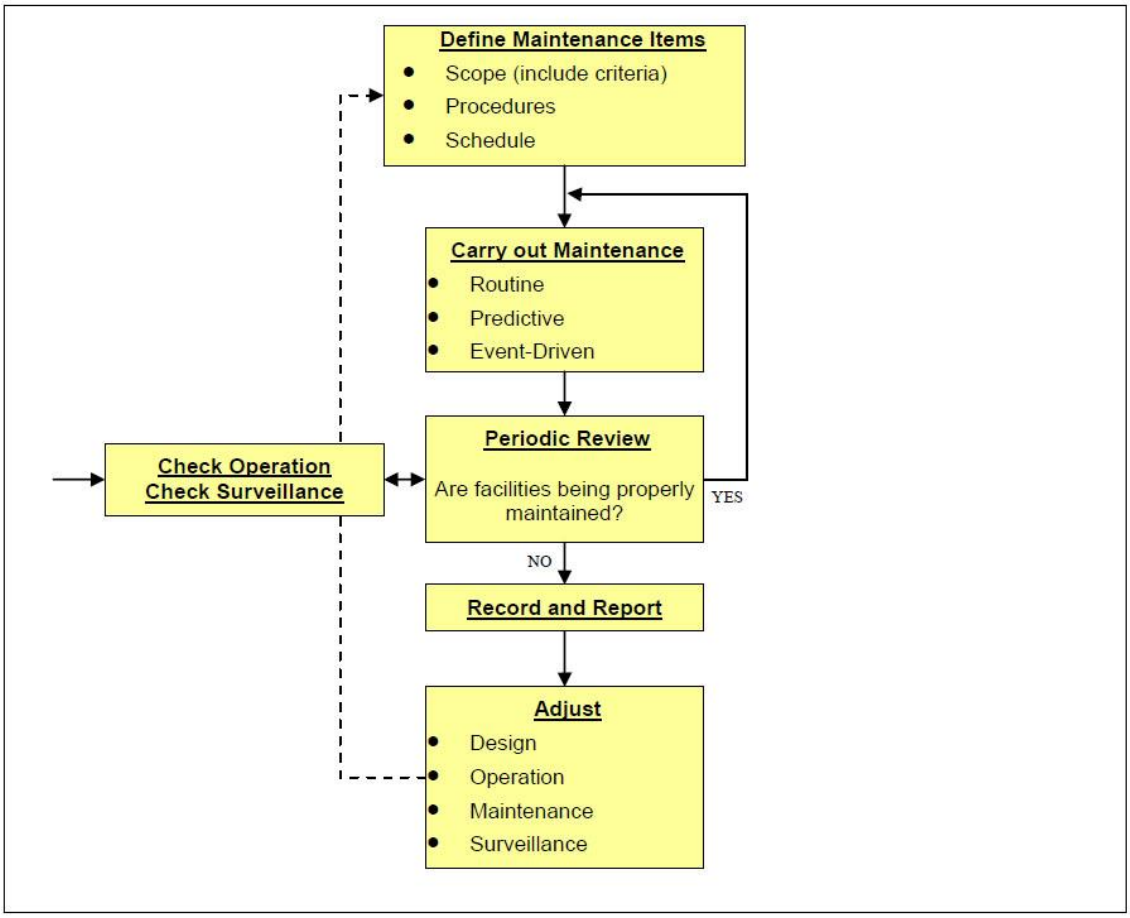

Figure 2 - Maintenance Flow Chart

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 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

4.6.2 Flood Event

Following a flood event, as defined in Table 9, 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 5.

Table 5 - Failure Modes and Observable Conditions

Failure Mode	Conditions Related to Possible Increased Risk of Potential Failure Mode
Overtopping	• High water level • Blockage of water management structures • Extreme meteorological event • Dam settlement • Excessive accumulation of solids (near reclaim pocket) • Erosion from burst tailings pipe
Instability	• Cracking • Dam settlement • Slope movement

	• Dam bulging • Increased pore water pressures within the dam • Increased seepage • Erosion • Seismic event
Piping	• Sediment laden seepage • Wet spots at downstream dam toe or on downstream slope • Sinkholes

Inspection frequencies are followed as per Table 6. 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 6 - Inspection Frequencies

Type	Frequency
Routine Inspection:	
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
Tailings Pond Monitoring:	Weekly
Pump intake	Target 2x per shift
Inflows, Outflows, Condition	Monthly
Annual Dam Inspection	Annually, with no snow cover
Event Driven Inspection	Following unusual events (defined in Table 9)
Comprehensive Review (DSR):	
Low and Moderate HPC dams	Every 10 years and prior to decommissioning
Very High HPC dams	Every 5 years and prior to decommissioning

All dams are formally inspected by the Tailings Dam Engineer monthly and results are reported to management and the EoR. During snow cover, access to Clark Creek Dam and Teeple Pond Dam may restrict formal inspections but will be attempted.

5.4 Geotechnical Instrumentation

The performance of the dams is monitored using a variety of instruments. Instrumentation measurements, along with visual inspections, serve as the primary mechanisms for performance monitoring of the TMA and Water Management dams. A brief description of each instrument is provided below. Additional details are available in BGC-4910-DT00-MAN-0002.001.

- Slope Inclinometers (SI) – A vertical PVC pipe (either red or blue) installed through the ground typically into bedrock that measures horizontal deformation

- Vibrating Wire Piezometers (VWP) – A pressure transducer and polyurethane coated wire that measures the pore water pressure within the dam fill materials and foundation soils

- Standpipe Piezometers – A vertical PVC pipe with a perforated or screened section that is capable of measuring water levels and allows collecting water samples

- Settlement Plates – A base plate is installed at some depth with a riser pipe extending to surface, which allows the monitoring of vertical consolidation/settlement of soils

- Magnetic Extensometers – Used to monitor vertical consolidation, these are installed as a series of magnetic rings, either around corrugated PVC tubing or slope inclinometer casing within the foundation

- Survey Monuments – A bar of steel is driven into the ground and the top of the bar is surveyed to monitor displacement

The following sub-sections are subject to change and should be read in conjunction with BGC-4910-DT00-MEM-0014.001.

5.4.1 Reading Frequency

Table 7 presents the data collection, reporting, and submission frequencies for geotechnical instrumentation. Note that these frequencies may change based on EoR observations.

Table 7 - Data collection, threshold reporting, and data submission frequencies

Instrument Type	Data Collection/Processing and Threshold Exceedance Reporting Frequency (Days)			Data Submission Frequency
	Active Construction	Post Construction	Operations	
SI	7	14	30	30
VWP	Twice Weekly	7	7	7
Standpipe	7	14	30	30
Settlement Plate	30			30
Magnetic Extensometer	30			30
Survey Monuments	30			30

Leveloggers are installed in all diversion Ponds. These readings are collected quarterly by the Environment team.

5.4.2 Data Collection and Processing

The Tailings Dam Technician is responsible for data collection and maintenance of the VWP automated system. All instruments are manually collected, except for VWP. The VWP is connected to a datalogger, which records hourly readings for the instrument. These readings are then transmitted by radio frequency to Hubs located at the Marr site or the E-House at the intersection of WD4, WD5 and Cell 1 Dam. The Hubs transmit the collected data through cell service to the Cloud, which is stored as .csv files. These files are located at:

\\pcs01-yag\Campbellsci\LoggerNet

All geotechnical instrumentation is processed using VBA enabled excel spreadsheets. These spreadsheets store the collected data from all instruments. Additional tools for scheduling, quality assurance, monitoring trends and reporting are built into the sheets. These files are located at:

\\FPS02-YAG\\Engineering\Geotechnical\07 - Instrumentation (V: Drive)

The Tailings Dam Engineer is accountable for scheduling, collecting measurements, assuring data, and maintenance of geotechnical instrumentation. The EoR is responsible for interpretation of this data.

The raw data provided by the Barron Weather Station is used in the piezometer processing sheets to correct for barometric pressure.

5.4.3 Thresholds

Instruments have been installed to form a network of monitoring points to provide information as a basis to assess geotechnical performance of the TMA and Water Management dams. Instrument measurements are compared against defined thresholds linked to the design basis. The trigger level threshold indicates a value exceeding those used as a basis for meeting the design criteria. An alert level threshold indicates a more significant magnitude threshold exceedance.

5.4.4 GIS

The VWP have been included in the New Gold GIS web viewer. These are updated twice weekly using the processing sheets. While it is intended for all instruments to be integrated into the New Gold GIS web viewer, only the VWP have been added. The following folder link stores the automated process for adding piezometers into the GIS system:

V:\Engineering\Geotechnical\07 - Instrumentation\00) GIS

The “To_Import.csv” file is updated using the processing spreadsheets. Once complete, it is copied into the “To_Import” folder. A script searches every 30 seconds for a file and automatically

uploads the data to the GIS web viewer. The “To_Import.csv” is then moved to the “Imported” folder and relabelled with the time it was uploaded (YYYY-MM-DD_HRMMSS).

To view this data in the GIS web viewer, the “Geotechnical Database” must be selected. The layers “Piezos 30-Day Rolling V2” or “Total Head Elev. By Geology” are both updated through this process. The symbols used for the 30-Day rolling are as shown in Figure 3. The green, yellow, and red colours indicate that it is either below, above trigger, or above alert thresholds, respectively. The numbers indicate the magnitude of change in the last 30 days.

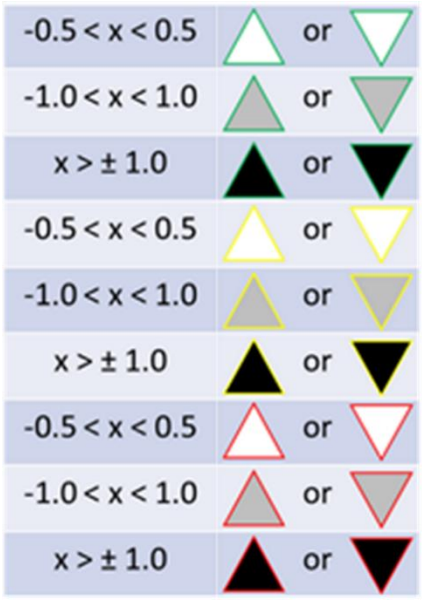

Figure 3 - Symbols for VWP used in GIS

5.5 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.

5.6 Survey

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.

5.7 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.

5.8 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.

5.9 Dam Safety Reviews

The Dam Safety Review (DSR) is a requirement of the CDA. DSR scheduling requirements are summarized in Table 8. 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 8 - 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)
TMA AND WMP DAMS					
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
WATER MANAGEMENT DAMS					
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.

5.10 Event Driven Procedures

A list of unusual events and post-inspection requirements are given in Table 9.

Table 9 - 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 Environment Manager. Consider initiating Emergency Response Plan
Significant change in an instrumentation reading –	Check the historical readings paying special attention to seasonal changes and check the measurement again.

Unusual Event	Post – Event Inspection/Surveillance
see table below for definition of significant change	Carry out visual inspection of all areas in the vicinity of the instrument of interest. Contact the Engineer of Record.

5.11 Documentation

Documentation of surveillance and monitoring activities shall be maintained by the Environment 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.

5.12 Reporting

The Mill 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.

RAINY RIVER PROJECT

PART VII – WATER TREATMENT - OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL WATER MANAGEMENT STRUCTURES

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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 van Deventer	NG Mine Operations	Mine Manager		
	Sylvie St. Jean	NG Environment	Environment Manager		
	Tony Lord	NG Maintenance	Mobile Maintenance Manager		
	Andre Zerwer	BGC Engineering Inc.	Engineer of Record		
Approved by	Tyler Buckingham	NG Mill	Mill 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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1.0 OBJECTIVE

The objective of this document is to provide procedures for the operation, maintenance, and surveillance (OMS) of the Pinewood River and Culverts 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

The OMS has been prepared to directly meet requirements for the following regulatory approvals:

- LRIA-FF-2015-08: Culvert Crossing C-15
- LRIA-FF-2016-02A: Culvert Crossing CPL5
- LRIA-FF-2015-01: Culvert C2, C6, C8
- LRIA-FF-2015-07: Pinewood River Intake/Discharge Structure

2.0 FACILITY DESCRIPTIONS

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.

The focus of this part of the OMS is the Pinewood River and associated culverts. The Pinewood River is the main receiving body for all water that is acceptable to be released to the environment, based on compliance with regulated water quality parameters.

2.1 Process Affected Water (PAW)

The Mill uses water, which is then discharged (PAW) into the Tailings Management Area (TMA). The water can then be recycled back to the mill or treated. The overall water treatment process for PAW is shown in Figure 1.

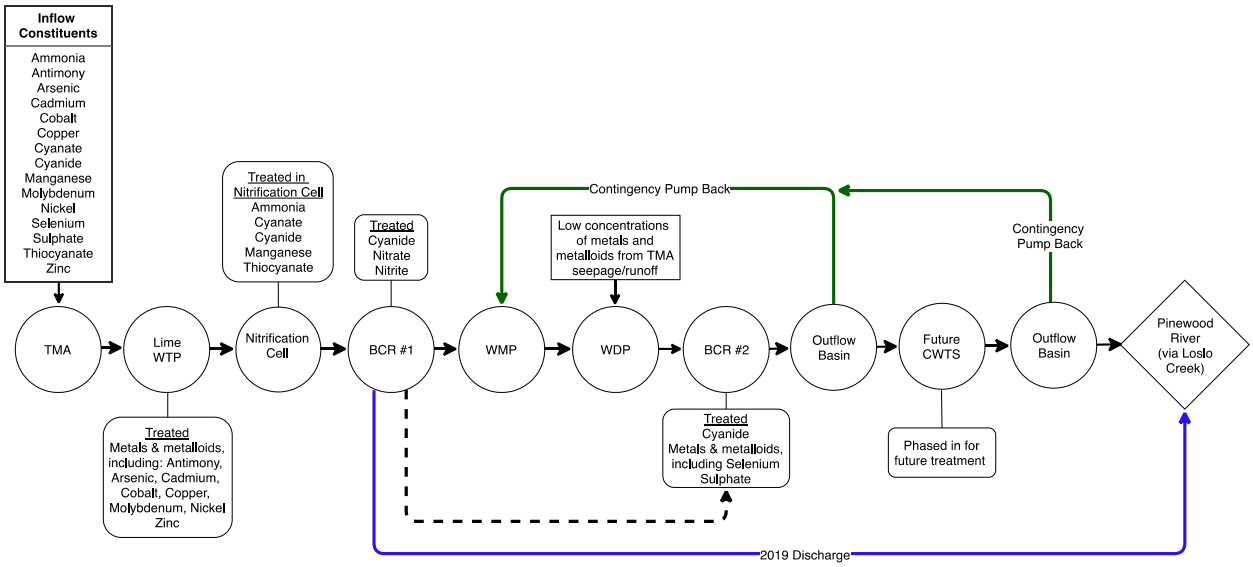

Figure 1 - Overall Water Treatment Process Schematic

The TMA has been designed to optimize natural degradation processes to provide further water treatment, by ensuring there is sufficient retention time to allow these reactions to occur. The natural degradation processes are most effective during warm weather conditions when biophysical activity is optimal, and are also augmented by exposure to sunlight. Effluents that are planned for discharge to the environment will be held for a sufficient period of time under warm weather conditions, to maximize the effects of natural degradation. Such effluent aging will take place mainly in the summer months (June through mid-September) in both the TMA and WMP.

To optimize both water quality and river flow effects, final effluent is released to the Pinewood River at two separate locations:

- At closure, through the constructed wetland to the Pinewood River at the Loslo Creek outflow (via lower Loslo Creek)

- Directly to the Pinewood River via Effluent Discharge Location 1 (EDL1) just downstream of the McCallum Creek outflow, by pipeline.

- Directly to the Pinewood River via Effluent Discharge Location 2 (EDL2) just downstream of the Loslo Creek outflow, by pipeline

EDL2 is the primary discharge and will be prioritized over EDL1. Discharge through EDL1 can be greater than EDL2, however.

The rationale for using two separate discharge locations derives from the need to achieve effective water quality treatment while minimizing adverse flow effects on the Pinewood River, under varying hydrologic operating conditions. EDL2 is located further upstream on the Pinewood River and will help to maintain flow in the Pinewood River but has a lower assimilative capacity. All effluent from the water management pond which is not discharged to EDL2 will be discharged by pipeline to EDL1 downstream of McCallum to take advantage of increased river assimilative capacity at this point.

The treatment of water (for discharge to the environment) will normally occur during the months of May through September. To facilitate this process, the water in the WMP would be drawn down by the end of April in each year. The release of WMP effluent to EDL1 and 2 in the Pinewood River would occur during the spring and fall. Water which is not discharged in the fall would be held over in the WMP until the following spring for release.

Each discharge has specific discharge criteria as specified in MECP ECA #7004-BC7KQ5 which must be met prior to discharge.

2.2 Contact and Non-Contact Water Runoff

Contact water can be either rain or overland flow that has traveled over mine infrastructure and must be collected and treated by law (ECCC). This water is collected by a network of ditches and sumps, except EMRS runoff which is collected within the MRP. Contact water is then pumped into the TMA, Mine Rock Pond (MRP), or is recycled back into the mill.

Existing creeks and smaller water bodies are diverted through the mine with a system of dams and ditches and is referred to as non-contact runoff. Three major systems are:

- Clark Creek originates north-east of the mine and flows towards the south-west, originally passing through the East Mine Rock Stockpile (EMRS) and MRP footprints. Clark Creek is diverted away from the EMRS and MRP by the Clark Creek Dam, Clark Creek diversion channel, Teeple Dam, and Teeple Pond Outlet channel.

- The West Creek system originates northeast of the mine and flows south, originally passing through the open pit, plant site, and crusher. The Stockpile Pond Dam (SPD) and West Creek Dam (WCD) were constructed to divert water into the West Creek diversion channel, which travels south of the TMA and discharges into the Pinewood River via Loslo Creek.

- Loslo Creek and Marr Creek would normally pass through the TMA footprint, but have been diverted towards the east of the TMA as Loslo and Marr Diversion Ditches, ultimately entering the WCD.

Sediment Ponds #1, #2, and #3 collect runoff water from the WMRS and often has higher suspended solids caused by eroding soil being caught up in the overland flow. To treat these suspended solids, the runoff is diverted/pumped to the sediment ponds where a lag time allows these solids to settle prior to discharge to the environment. If water quality objectives cannot be met prior to discharge, the water is to be pumped back to the TMA to allow further treatment. Water quality must always be determined before discharging to the environment. Sediment Ponds are discussed in detail in Part 5 of the OMS.

To prevent the flooding of the pit, a diversion berm was planned to be constructed between the Pinewood River and the open pit. This is no longer part of design but requires monitoring the water elevations in the Pinewood River in the range of the open pit.

2.3 Discharge Locations

There are four provincially and federally permitted locations where discharge from the mine into the environment can occur:

- Effluent Discharge Location #1 (EDL1), consisting of a 10 km pipeline and an effluent mixing structure (EMS#1) with two duckbill diffusers and riverbed armouring, downstream of the McCallum Creek and Pinewood River confluence

- Effluent Discharge Location #2 (EDL2), consisting of a 2 km pipeline and an EMS (#2) with two duckbill diffusers and riverbed armouring, downstream of the Loslo Creek and Pinewood River confluence

- Sediment Pond 1, discharging to the West Creek Diversion then reporting to the Pinewood River at the Loslo Creek confluence via splash pad at the Sediment Pond 1 spillway

- Sediment Pond 2, discharging to the Pinewood River just upstream of the Loslo Creek and Pinewood River confluence via splash pad in the field south of the pond

The locations of these discharge points are presented in Figure 2.

2.4 Water Discharge Pond and Constructed Wetlands

The Water Discharge Pond (WDP) has been designed to collect runoff from natural ground catchment south of the TMA, seepage from the seepage collection ditch, and bleed flow from the WMP (design rate of 10,000 m^3/day) for discharge to the constructed wetland. The WDP will also provide sediment control south of the TMA.

The constructed wetlands will collect the water discharged from the WDP. They have been designed to provide a target 30-day retention time following discharge from the WDP. The wetlands will be comprised of five ponds (Pond A, B, C, D, E), and the downstream pond (Pond A) will feature a control structure to stop discharge if the water quality does not meet discharge criteria. If required, water in Pond A would be pumped back to the TMA or WMP.

With the construction of BCR2, the wetlands are largely redundant until the end of mine life. The wetlands will be the primary discharge location for passive flow through the TMA at closure. The design criteria for the Water Discharge Pond Dam and Constructed Wetlands dams are provided in Table 3.

Table 3 - Water Discharge Pond and Constructed Wetlands Document Summary

Document Title	**Reference**
LAKES AND RIVERS IMPROVEMENT ACT WORK PERMIT APPLICATION SUPPORT DOCUMENT WATER DISCHARGE POND AND CONSTRUCTED WETLAND	RRP-GEO-LRIA-004D R2
As-built Report(s)	**TBD**
Drawing Title	New Gold Document Number
Water Discharge Pond Dam – Plan and Typical Cross Sections	3098004-004410-A1-D70-0002
Constructed Wetland – Plan, Profiles & Section	3098004-004420-A1-D70-0002

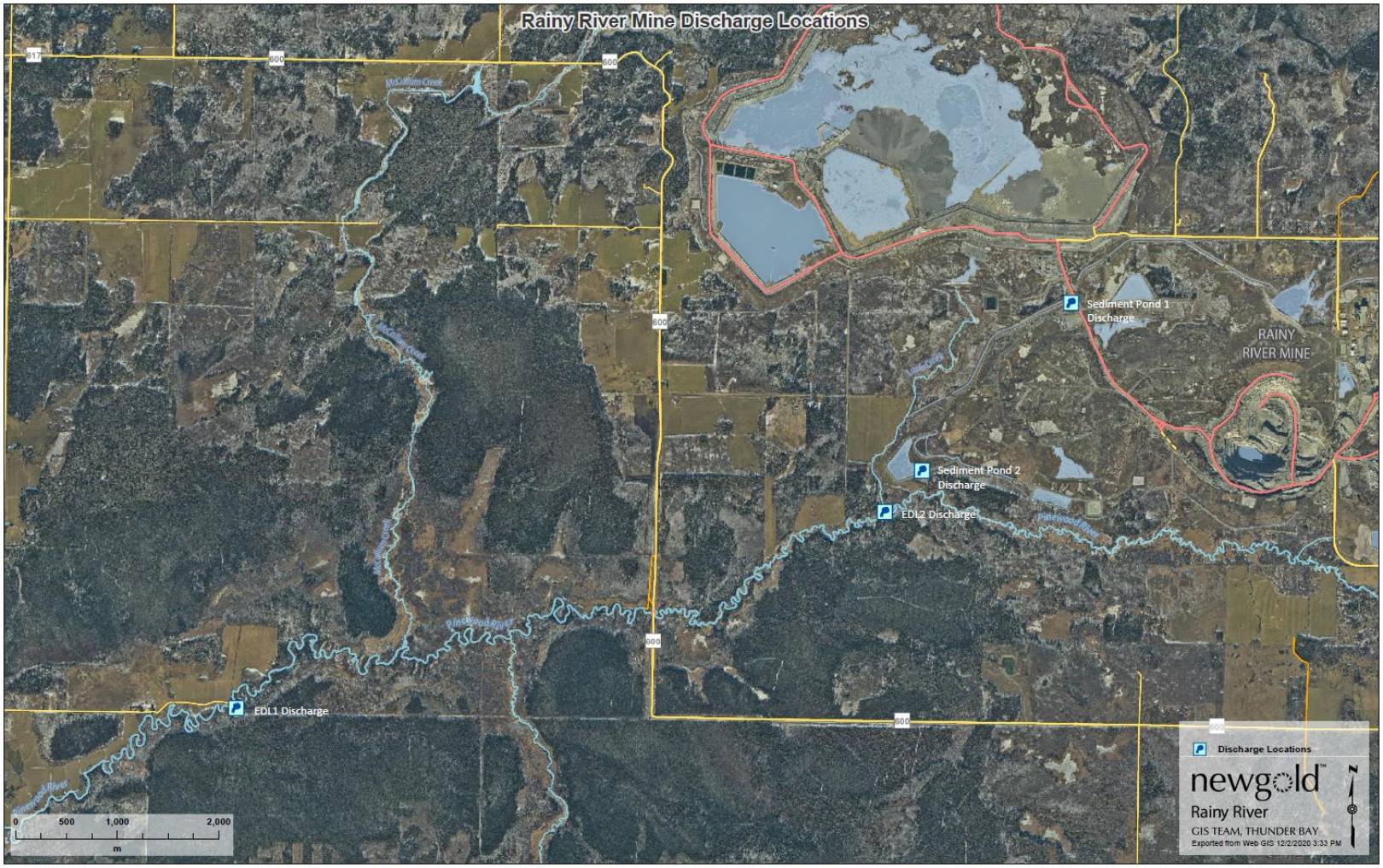

Figure 2 - Discharge Locations

3.0 OPERATIONS

3.1 Discharge Conditions

Discharge of site contact water or treated effluent can only occur at permitted final discharge points. The following conditions of ECA #7004-BC7KQ5 apply to discharges to the environment at the four permitted final discharge points at RRM:

- Treated effluent shall only be discharged to the Pinewood River via EDL1 and/or EDL2 seasonally. No water shall be discharged after December 1st of each year until spring melt when the Pinewood River is largely ice free and meets the minimum flow threshold (Condition 4(8))

- No treated effluent shall be discharged via EDL1 and/or EDL2 or any other means unless the Pinewood River is flowing at 10,000 m^3/day or greater as measured at hydraulic station H1 (formerly site 19) unless specified by the District Manager, in writing (Condition 4(9))

- The Owner shall control the combined effluent discharge rate from EDL1 and EDL2 such that at all times the ratio of the combined effluent flow rate to the flow rate of the receiver at hydrometric station H1 (i.e., the flow rate of the Pinewood River downstream of the McCallum Creek confluence) is less than or equal to 1:1 (i.e. the cumulative flow rate of the effluent must be less than or equal to the flow rate of the receiver) (Condition 4(10))

- The Owner shall ensure that the discharge at EDL2 is prioritized. The Owner shall only discharge from EDL1 if there is not sufficient flow in the receiver (i.e. Loslo Creek) for EDL2. (Condition 4(11))

- Discharge from the four final discharge point does not exceed the respective daily and monthly average objectives and limits listed in OMS Section 6.2.4, Table 6-2 (Condition 5 and 6)

- Discharge samples are collected for the effluent parameters at the monitoring frequencies listed in OMS Section 6.2.4, Table 6-3 (Condition 8(2) and 8(3))

- The Owner shall operate, and maintain the Works such that the effluent from EDL1, EDL2, Sediment Pond #1, and Sediment Pond #2 is non-acutely lethal to Rainbow Trout and *Daphnia magna* by ensuring that each Rainbow Trout acute lethality test and each Daphnia magna acute lethality test performed on any grab sample of effluent shall not result in >50% mortality of the test organism in undiluted final effluent (i.e. 100% effluent).

- The Owner shall control the effluent discharge rate from Sediment Pond #1 such that at all times the ratio of the flow rate of the effluent to the flow rate of the receiver (West Creek Diversion) is less than or equal to 1:5 (i.e. the flow rate of the effluent must be less than or equal to 16.7% of the total flow rate of the receiver once mixed).

- The Owner shall control the effluent discharge rate from Sediment Pond #2 such that at all times the ratio of the flow rate of the effluent to the flow rate of the receiver (Pinewood River) is less than or equal to 1:10 (i.e. the flow rate of the effluent must be less than or equal to 9.1% of the total flow rate of the receiver once mixed).

3.2 Discharge Roles and Responsibilities

Environment Department

- Maintain hydrometric stations and calculate daily Pinewood River and West Creek Diversion flows

- Monitor site contact water and treated effluent quality for compliance with daily and monthly average objectives and limits listed in OMS Section 6.2.4 Table 6-2 prior to discharge

- Notify Environment and Climate Change Canada of planned discharge dates and cessation of discharge

- Conduct discharge sampling for parameters at the frequencies listed in OMS Section 6.2.4 Table 6.3

- Report on daily and monthly average discharge quality

- Discharge volume calculations

- Daily discharge report with allowable discharge volume by final discharge point and cumulative discharge statistics

Mill

- Discharge the allowable volume at final discharge points EDL1 and EDL2 as indicated in the daily discharge report

- Ensure flow meters and inline temperature and pH probes are always functioning during discharge, and make the data available if not accessible

- During active tailings deposition, the Mill is responsible for inspecting the tailings lines at a frequency established in Table 4

- Report any incidents relating discharge and associated infrastructure to the Environment Department immediately

Site Services

- Discharge the allowable volume at final discharge points Sediment Pond 1 and Sediment Pond 2 as indicated in the daily discharge report

- Ensure flow meters are always functioning during discharge, and provide pumping records

- Site services is responsible for inspecting the active water lines at a frequency established in Table 4

- Report any incidents relating to discharge and associated infrastructure to the Environment Department immediately

3.3 Reporting Requirements

The environmental approvals and permits received from the government are maintained by the New Gold Environmental Department. They should be referred to for details of monitoring, inspection, and reporting requirements.

Records are retained consistent with IACC condition 11 for a minimum of 25 years or until decommissioning ends, whichever is longer and kept locally. This exceeds the ECA permit requirement of 5 years. Records include place/date/time of sampling, dates and analysis performed, analytical techniques used, names of persons collecting/analyzing samples and results of analysis.

3.3.1 Routine

Below is a list of routine reporting requirements:

- Submission of as-builts within 3 months of construction for any major part of the ECA permitted Works, ie WMP, TMA, MRP, Sediment ponds 1 and 2, etc.

- Monthly performance report including an overview of the success and adequacy of the Works, summary of all non-routine calibration/maintenance procedures, tabulation and description of any bypass/upset conditions, a summary of all effluent monitoring data collected, other relevant information including QA/QC measures and occurrences requiring implementation of an investigation, contingency or remedial action plan, and a summary of all modifications completed as a result of Schedule B of the ECA to MECP

- Quarterly electronic effluent monitoring reports to MECP

- Annual reporting to MECP on March 31 for the previous year, a works performance report, and a surface water monitoring report

- Quarterly electronic effluent monitoring reports to ECCC

- Annual electronic effluent monitoring report and environmental effects monitoring reports to ECCC by March 31

3.3.2 Non-routine

Below is a list of non-routine (event driven) reporting requirements:

- Report all spills as defined in the Environmental Protection Act immediately to spills action centre SAC, follow New Gold Incident Reporting Guidelines and follow up in writing to MECP within 10 days describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation

- In the event an effluent objective is exceeded for two consecutive months as specified in condition 5, notify the MECP in writing within seven (7) days, and submit to the District Manager, within sixty (60) days, a plan to assess the cause of the exceedance and recommend actions to address potential impact

- In the event of a non-compliant event, including an exceedance of daily or monthly average limits, pH outside of 6-9.5 or an acute toxicity failure, notify the MECP as soon as reasonably possible, followed by a written report within seven (7) days. Within fifteen (15) days of a toxicity test failure, the Owner shall submit a written report to the District Manager outlining the cause(s) of toxicity and proposed or implemented remedial measures to control toxicity a written report to the District Manager outlining the cause(s) of toxicity and proposed or implemented remedial measures to control toxicity.

- Any observation of sheen/foam/settable solids within the works report immediately to MECP immediately, and followed by a written report within 7 days

- Any exceedance of effluent limits report to SAC immediately, written confirmation to MECP within 7 days

- Notify ECCC immediately if MDMER Schedule 4 limits are exceeded, pH is outside 6-9.5 range or if the effluent is acutely lethal, followed by a written report without delay (when most results are available)

3.3.3 Operations Report

A monthly Water Balance Update Memo is prepared by the Senior Water Resource Engineer or designate. The report includes metrics and information collected as part of normal operation. Examples of information contained in the Operations report include:

- Total monthly tailings deposition tonnage and slurry water volume

- Total monthly reclaim volume

- Pond level and freeboard

- Updated water balance

- Water quality results
- Discharge quantities.

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)
- 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 3.

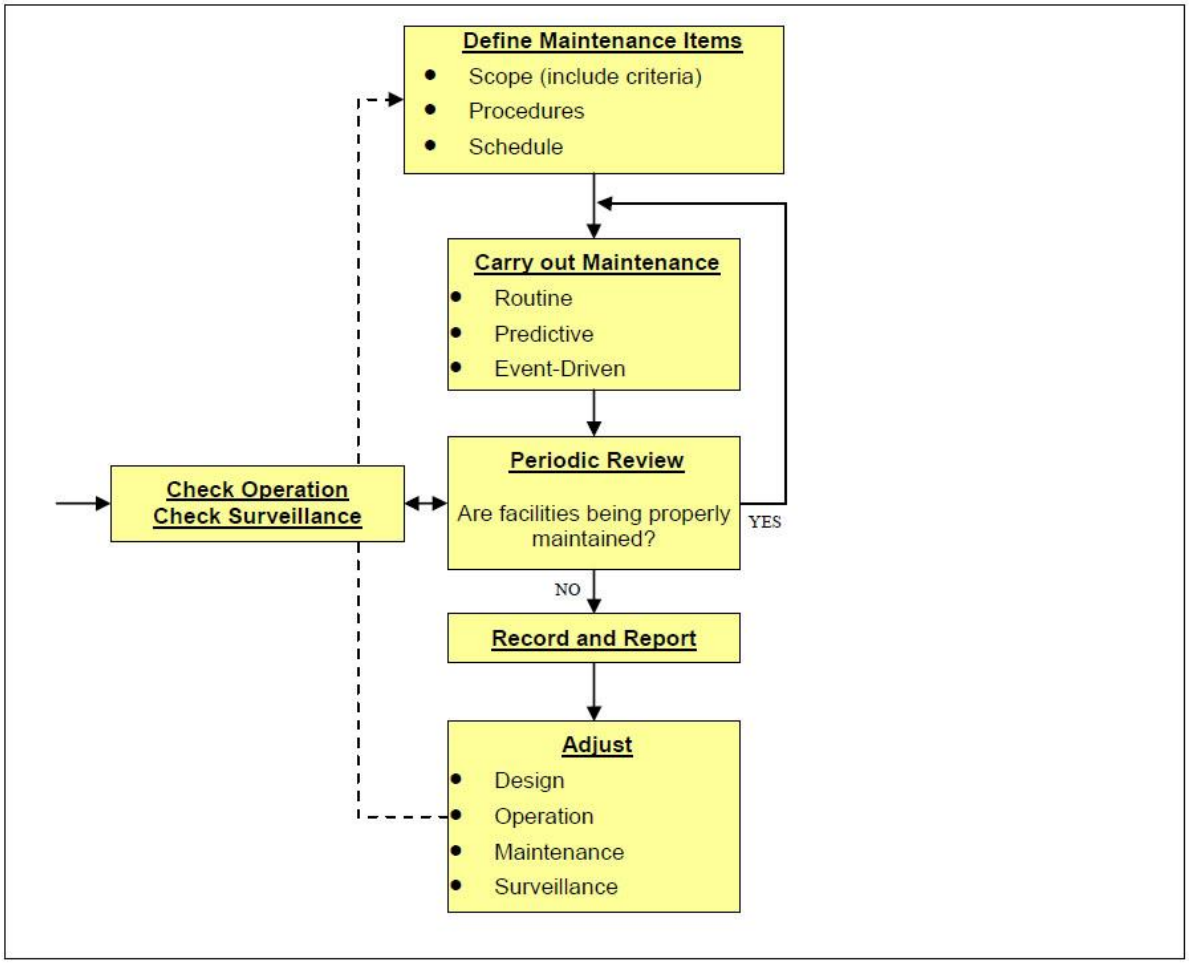

Figure 3 - Maintenance Flow Chart

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 when required.

4.2 Pumps

The maintenance of pumps is the responsibility of New Gold and maintenance records are required to be maintained. Each installation requires to be equipped with spill tray and spill kits. Changes to pumping configurations, ditching, piping, or operating parameters need to be approved by the New Gold Mill Manager, the New Gold Maintenance Manager, and the New Gold Environmental Manager, during normal working hours. This is particularly the case if splash pads need to be altered in any way.

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

- Perform regular performance tests on seepage pond pumps

- Perform annual calibration and maintenance as required on flow meters

- Perform regular non-destructive testing appropriate for components of the tailings delivery system, including for example, periodic measurement of pipeline thickness to identify areas of wear and to schedule pipeline replacement if necessary and repair liners as required

- Replace pipe work, bends and fitting components as required

- Remove accumulated debris from valves, reducers and off takes

- Carry out 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

4.3 Discharge Lines

During discharge, active lines require daily inspections. All water discharge lines are the responsibility of Site Services to maintain and inspect, while tailings lines are the responsibility of the Mill.

See RASCI - 3 for roles and responsibilities around water and tailings discharge lines.

4.4 Ditches and spillways

Ditch maintenance includes replacement or enhancement of erosion protection to prevent sediment generation or sloughing of slopes, as required.

4.5 Diversions

There are approximately 10 km of diversions associated with the Clark and West Creek diversion, as discussed in Part 6 of the OMS. Maintenance activities required include:

- Repair erosion and bank stability particularly in areas of concentrated flow e.g., culverts

- Remove debris, and where required and approved beaver dams, that are not part of natural progression of channel development

- Repair/modify fish habitat features if monitoring determines they are not meeting the success criteria per Fisheries Act Authorization 15-HCAA-00039, including dam crest/slope

4.6 Water Monitoring Instrumentation

Instrumentation is calibrated by the manufacturer prior to shipment. Calibration certificates will be maintained by maintenance department. Following instrument installation, initial reading procedures will be followed. Subsequent calibration will follow manufacturer's recommendations. Malfunctioning or damaged instruments may require repair or replacement per manufacturer guidelines or approved procedure.

4.7 Mobile Equipment

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

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

4.8 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 are 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. Normal documentation and maintenance records will be maintained because of any event driven maintenance actions. Unusual conditions that require maintenance are also communicated to maintenance staff as they occur.

4.8.1 Pipeline Leaks or Breaks

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

- Report to the Environment Department immediately, by phone call, to initiate sampling and external reporting, when required
- Inspect entire pipeline
- Repair or replace affected components
- Perform opportune and scheduled maintenance
- Repair any collateral damage caused by a leak or break
- Collect any released tailings and place in the tailings impoundment
- Reclaim any disturbed areas
- Follow any spill reporting that may be required pending type of spill and following documentation procedures.

4.8.2 Flood Event

Following extreme storms (as defined in section 7) the following are undertaken:

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

4.9 Reporting

Maintenance information will be communicated internally through formal and informal meetings, interaction between various levels of the organization (department and/or crew meetings), through information posted at the site and through this OMS Manual.

Communications with applicable contractors involved in tailings management will be conducted daily and weekly during tailings activity meetings, as appropriate. All employees and contractors are encouraged to communicate openly with site management about operational conditions requiring maintenance and reporting any significant observations such as event-driven maintenance or any maintenance requirements that exceed expected norms.

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 (Section 5.2.1)
- Inspections required after unusual events (Section **Error! Reference source not found.**)
- Water Monitoring and other instrumentation (Section 5.2.2)
- Sampling and testing in accordance with requirements (Section 5.2.3)

5.2.1 Visual Monitoring by Site Staff

Inspection frequencies are followed as per Table 4. 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 4 - Inspection Frequencies

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

During depositing of tailings, the Mill Supervisor and Site Services Superintendent delegate those who are required to complete inspections daily. Reporting is to be escalated to hourly observations if a rainfall event is escalating and the Cell 2/3 pond level is within 500 mm of the emergency spillway elevation (equals or exceeds 369.2 m, based on Stage 2 spillway). The Mill Manager will decide whether to provide additional surveillance resources in the case where additional duties including maintenance and operation of the Cell 2/3 dewatering pumps is required to be performed.

During spring and fall freshet, the absence of the flood protection berm along the south side of the open pit presents a hazard. Site Services inspections during spring and fall will be completed by driving along the service road between the Pinewood and Open Pit a minimum of weekly.

Weekly inspection sheets and SOPs are provided in Appendix F. All weekly inspections will be documented in a report and will be compiled as part of the annual DSI.

5.2.2 Water Monitoring and other instrumentation

Additional instrumentation to support the OMS manual and management of water includes:

- Densometer on the tailings pipeline
- Flow meters on the water management pipelines including discharge, tailings reclaim lines, MRP line and freshwater line from the WMP
- Continuous water levels loggers (pressure transducers) and water levels alarms in the WMP, Outflow Basin and MRP. Data loggers are installed at the Stockpile, West Creek, Clark, Teeple Ponds as well as defined sections within the Pinewood River.
- Water sampling wells to monitor background levels and seepage potential

This instrumentation provides continuous recording, which is collected during routine inspections and included.

Table 5 - Maintenance Requirements following an Unusual Event

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 Dam Safety Inspector.

Unusual Event	Post – Event Inspection/Surveillance
Rapid snowmelt and/or heavy rainstorms exceeding a 1:2-year 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 Dam Safety Inspector. 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	Inspect clarity of seepage, rate of seepage and amount of material sloughed. Notify tailings dam engineer – site engineering and EOR. Consider initiating Emergency Response Plan
Pond/River level close to, or approaching a critical level	Notify 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.

5.2.3 Sampling Frequency, Requirements and Effluent Discharge Limits

Table 6 provides a summary of the sampling parameters and frequency for the four final discharge points.

Table 6 - Discharge Sampling Parameters and Frequency by Final Discharge Point

Effluent Parameter	Frequency	
	EDL1 & EDL2	Sediment Pond 1 & Sediment Pond 2
Temperature	Continuous, Weekly	Weekly
pH	Continuous, Thrice Weekly	Weekly
Hardness	Weekly	Weekly
Alkalinity	Weekly	Weekly
Total Suspended Solids	Thrice Weekly	Weekly

Total Dissolved Solids	Weekly	Weekly
Turbidity	Weekly	Weekly
Conductivity	Weekly	Weekly
Chloride	Weekly	Weekly
Sulphate	Weekly	Weekly
Orthophosphate	Weekly	Weekly
Total Kjeldahl Nitrogen	Weekly	Weekly
Total Ammonia	Weekly	Weekly
Nitrate	Weekly	Weekly
Nitrite	Weekly	Weekly
Dissolved Organic Carbon	Weekly	Weekly
Dissolved Oxygen	Weekly	Weekly
CBOD5	Weekly	NA
E. Coli	Weekly	NA
Total Cyanide	Thrice Weekly	Annually
Weak Acid Dissociable Cyanide	Thrice Weekly	NA
Free Cyanide	Thrice Weekly	NA
Thiocyanate	Weekly	NA
Cyanate	Weekly	NA
ICP Metals	Weekly	Weekly
Radium-226 (MDMER)	Weekly	Weekly
Acute Toxicity (*Daphnia* and Rainbow Trout) (*MDMER)*	Monthly	*Monthly/*Quarterly

Table 7 provides a summary of the effluent discharge limits that must be prior to and during discharge to the environment.

Table 7 - ECA Effluent Objectives and Limits by Final Discharge Point

Effluent Parameter	Effluent Objectives and Limits (mg/L)			
	EDL1 & EDL2		Sediment Pond 1 & Sediment Pond 2	
	Daily Max	Monthly Avg	Daily Max	Monthly Avg
CBOD5		25		25
Cadmium		0.001		0.001
Cobalt		0.0044		0.0044
E. Coli		100/100 mL		100/ 100mL
Total Suspended Solids	30	15	30	15
Unionized Ammonia	0.08	0.04	0.2/0.4	0.1/0.2
Total Phosphorus		0.1		
Total Cyanide	0.1	0.05		
Free Cyanide	0.02	0.01		
Total Arsenic	0.034	0.017	0.034	0.017
Total Copper	0.028	0.014	0.028	0.014
Total Lead	0.03	0.015	0.03	0.015
Total Nickel	0.094	0.047	0.094	0.047
Total Zinc	0.348	0.174	0.348	0.174
Acute Toxicity (Daphnia and Rainbow Trout)	Not greater than 50% mortality in undiluted effluent			
pH	Maintained between 6.0 and 9.5 at all times			
Radium-226 (MDMER)	1.11 Bq/L	0.37 Bq/L	1.11 Bq/L	0.37 Bq/L

To monitor background water chemistry and changes that may occur because of mining activities, the “PLAN” sets out water sampling well frequencies and targets. Should there be risks associated with seepage impacting the Pinewood river, a remediation program will be designed and implemented.

5.3 Documentation

Documentation of surveillance and monitoring activities shall be maintained by the Mill 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 and testing

- Analyses and evaluations
- Reviews.

Documentation will include, as a minimum, the following:

- Weekly routine inspection log
- Twice/year instrumentation reports

Documentation will include a hard copy (paper) and electronic filing system for inspection reports, photographic and video records, incident reports, instrumentation readings, instrumentation plots, annual inspections, and third-party reviews, so that they can be quickly retrieved for review and in case of an emergency.

5.4 Reporting

The Mill Manager, or designated responsible party, and Tailings Dam 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 MRNF. Reporting includes:

- An annual report based on the DSI including ECA approval requirements
- Monthly water quality monitoring report
- Annual report including any operating problems and corrective actions, a 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 CLOSURE PLAN

This section summarizes the objectives of the Closure Plan. The Rainy River Mine Comprehensive Closure Plan Amendment (O'Kane Consultants, 2019) provides the closure plan and includes temporary closure options for short and medium-term shut-down of site facilities.

6.1 Structure Closure Overview

6.1.1 Tailings Management Area

Closure of the TMA will include, but is not limited to, the following:

- Flooding of the TMA with a 2 m or deeper water cover
- A perimeter zone of tailings beach will be maintained to keep the central pond away from the dams, this zone will be covered with a low permeability cover
- NPAG rock will be placed at the TMA transition zone with the tailings to prevent erosion and suspension and oxidation of solids; and
- Dam structures containing the TMA have been designed with adequate safety factors to provide overall long-term safety and stability.

Water entering the TMA is intended to passively flow through the final spillway into the WMP. From the WMP, flow will enter the WDP and then the constructed wetlands. Active monitoring and treatment of this system will occur for approximately 10 years following closure. Once water quality parameters have been verified to be satisfactory, the system will enter passive monitoring.

6.1.2 Open Pit

The open pit will collect overland flow and discharge into the Pinewood River. It is expected that it will take 75 years to fill the pit.

6.1.3 Other Structures

Closure of the embankments will typically involve, but is not limited to, reaching of embankments to prevent ponding of water and revegetating slopes to reclaim the area. Some embankment structures will still have a role during the closure phase, and these will not be breached. The following structures will continue to be operated during the closure phase:

- MRP will collect runoff and seepage from EMRS, which will be directed to the Open Pit to help flooding
- Sediment Ponds #1, #2, and #3 will be maintained until site is recognized as a closed mine and monitoring associated with the Metal and Diamond Mining Effluent Regulation is no longer required

- The water discharge pond dam will be breached once it no longer has a water management function.

- The constructed wetland will be left in place as this system is designed to operate passively and will have stabilized as a wetland complex during operations.

Freshwater diversion and constructed wetland structures are designed to operate passively and will remain in place at closure.

6.2 Monitoring

Monitoring requirements are described in the Rainy River Mine Comprehensive Closure Plan Amendment (O'Kane Consultants, 2019).

7.0 CONTINGENCIES

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.

7.1 Water Treatment

Two contingency plans have been developed as part of MECP approvals for water treatment:

- Pinewood River Quality Contingency Plan, Version 1 August 2016
- Groundwater and Surface Water Contingency Plan, Version 2 October 2015

Contingency options are to limit discharges, acceleration of TMA dam raises, add water quality treatment, additional monitoring, provision of water to affect areas and increased mixing ratios/improved mixing. The trigger for implementation of contingency in surface water is if protection of aquatic life criteria is not achieved 90 % of the time. The trigger for contingencies in groundwater is if water quality parameters exceed background metals concentrations in groundwater at the mining lease boundary or groundwater wells outside of the zone of influence are affected.

RAINY RIVER Mine

PART VIII - EMERGENCY PREPARDNESS & RESPONSE PLAN - OPERATION, MAINTENANCE AND SURVEILLANCE MANUAL WATER MANAGEMENT STRUCTURES

New Gold Inc.
Rainy River Project
5967 Highway 11/71, P.O. Box 5
Emo, Ontario
P0W 1E0

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	Mine Manager		
	Sylvie St. Jean	NG Environment	Environment Manager		
	Tony Lord	NG Maintenance	Mobile Maintenance Manager		
	Andre Zerwer	BGC Engineering Inc.	Engineer of Record		
Approved by	Tyler Buckingham	NG Mill	Mill 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)
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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 Emergency Preparedness and Response Plan (EPRP) 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

2.0 DOCUMENT USER GUIDE

This document is organized as follows:

Section 3.0 –Facility Description – Provides an overview of the different types of water at site and the pathways available to use this water in the Mill or treat and discharge to the Pinewood River

Section 4.0 – Operations – Provides details on discharge criteria, roles and responsibilities, and reporting requirements

Section 5.0 – Maintenance - Provides requirements for routine and preventative maintenance to be conducted

Section 6.0 – Surveillance – Provide surveillance requirements for the facilities including:

- Visual Monitoring by site staff
- Inspections required after unusual events
- Water monitoring and other instrumentation
- Sampling and testing requirements

Section 7.0 – Closure Plan - This section summarizes the objectives of the Closure Plan

3.0 GENERAL

3.1 Definitions

An emergency is defined as:

> *"A situation or a set of circumstances which, if not promptly eliminated, controlled or contained, results or could result in a significant injury to people (including the community) and/or damage to the tailings facility, property and/or the environment."*

3.2 Potential Dam Failure Modes

Several potential failure modes exist for the various tailings storage and water management facilities. These potential failure modes, along with likely triggers, observable visual and instrumentation indicators of the failure mode are presented in Table 9-1.

External hazards originate outside the boundary of the dam and reservoir system and are beyond the control of the dam owner. External hazards include the following:

- Meteorological events, such as floods, intense rainstorms (causing local erosion or landslides), temperature extremes, ice, lightning strikes, and windstorms
- Seismic events, either natural, cause by economic activity such as mining, or even reservoir induced
- The reservoir environment, including rim features, such as upstream dams and slopes around the reservoir that pose a threat
- Vandalism and security threats.

Internal hazards may arise from the ageing process or from errors and omissions in the design, construction, operation, and maintenance of the dam and water conveyance structures. Internal hazards can be subdivided by source:

- Components that retain or interfere with the body of water
- Water conveyance structures required to direct water around or through the dam in a controlled way
- Mechanical, electrical, and control subsystems
- Infrastructure and plans, including instruments, operating orders, maintenance strategies and procedures, surveillance procedures, and emergency plans, as well as inflow forecasts.

A failure mode describes how a component failure occurs to cause loss of the system function. Failure modes may be interdependent and change in nature and significance at different stages of a dam's life. In any analysis, the failure characteristics, including extent and rate of development, should be determined to an appropriate level of detail. At a general level, there are three dam failure modes:

- Overtopping – water flows over the crest of the dam, contrary to design intent
- Collapse – internal resistance to the applied forces is inadequate
- Contaminated seepage – contaminated fluid escapes to the natural environment

Dam safety risk management is directed to (1) prevention of the initiation of a failure sequence; (2) control of a deteriorating situation, and (3) mitigation of situations where the failure sequence cannot be stopped.

Table 3 - 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	Test 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	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 porewater pressure within the dam (filters becoming non-functional, earthquake included)	Bulging, slumping, sliding or cracking of dam, increase in volume of seepage	Increase in porewater 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 porewater 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 raveling of upstream or downstream faces of dam	None
Internal Erosion	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	Rapid change if the in porewater 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 monuments or 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
- Earthquakes
- Major storm events or flood
- Sabotage and other criminal activities

3.3 Warning Signs and Threshold Criteria

The warning signs for an emergency are defined below:

- Level I: Conditions that do not yet represent a potential emergency but that do require investigation and resolution on a prompt basis, along with intensified surveillance.
- Level II: Conditions that represent a potential emergency if allowed to continue to progress, but no such emergency is imminent.
- Level III: An obvious emergency has occurred or is imminent.

Table 9-2 discusses potential warning signs, consequences and actions to be taken.

Table 4 - Warning Signs, Level of Emergency and Responses

Level	Warning Sign/Situation	Actual or Potential Consequences	Action(s) to be Taken
1	Unusually high, one-time reading from a single piezometer.	Possible early warning sign of worsening piezometric/seepage conditions.	• Check piezometer reading, and check for infilling of piezometer. • If reading confirmed, check all other piezometers, and examine downstream area of dam for changed seepage conditions. • Intensify piezometer readings.
	Decreased seepage discharge accompanied by gradually increasing piezometer levels.	Possible sign of clogging of internal drainage system of dam.	• Check chemistry of seepage discharge for any changes relative to normal. • Request tailings dam engineer to re-evaluate slope stability at this location.
	Increase in size of erosion gullies.	Possible erosion resulting from seepage and/overland runoff. May lead to accelerated erosion and result in dam failure.	• Backfill gullies with filter material and fine rockfill.
2	Increase in seepage discharge, accompanied by discharge of tailings within seepage (dirty water).	Possible indication of a developing internal erosion (piping), that could eventually lead to dam breach/pond release, or excessively high levels of saturation that could result in slope instability.	• Initiate chain of communication (Figure 9-2) and monitor the situation. • Discontinue tailings discharge in the seepage area. • Intensify monitoring of seepage at this location. • Note if the seepage discharge and/or turbidity continue to increase. • Read piezometers. • Be prepared to place filter material in area of discharge from emergency stockpiles.

Level	Warning Sign/Situation	Actual or Potential Consequences	Action(s) to be Taken
	Seepage on dam abutments, causing localized erosion and slumping of dam slope.	Could lead to progressive slope failure on abutment, resulting in dam failure and breach of pond.	• Discontinue tailings discharge in the seepage area. • Place filter material over seepage area using emergency stockpiles. • Continue to monitor area on an intensified basis. • Initiate chain of communications if situation does not improve.
	Extended period of unusually heavy rainfall, or unusually large snowmelt.	Could lead to raised levels of saturation within the dam slope, which could in turn lead to slope instability.	• Increase frequency of piezometer readings to weekly. • Intensify inspections of downstream dam slope, looking for signs of localized instability/concentrated gully erosion, and for soft ground (saturated slope) conditions.
	Relatively high, unexplained, and ongoing increase in piezometer levels within the dam and/or foundation – threshold limits being approached.	Probable sign of progressive deterioration of toe drainage provided by starter dams. Could, if left unattended eventually lead to failure of the dam.	• Assess rate of rise and determine if it is steady or accelerating. • If piezometer level increase was sudden, check the reading (repeat it) to eliminate the possibility of a reading error. • Sound bottoms of piezometers to check for infilling. • Send piezometer readings to the tailings dam engineer. • Inspect downstream area for increased seepage and/or turbidity of seepage discharge.
	Long term or sudden increase in rate of inclinometer movements.	Possible sign of impending slope instability.	• Check reading, and contact the Geotechnical Engineer and EOR if confirmed. • Inspect area for any visible signs of instability, bulging on outer slope or at toe, or tension cracks on dam crest. • If tailings discharge is occurring near the inclinometer that indicates unexplained movement, relocate discharge point further away. • Increase frequency of inclinometer readings. • Read nearby piezometers.
	Ongoing cracking and evidence of dam and/or foundation movement.	Possible sign of impending failure of dam, especially if the rate of movement/cracking is accelerating.	• Check inclinometer readings. • If rate of deformation is accelerating, initiate chain of communication. • Read piezometers. • Check for water inflow into tension cracks. • Regrade to channel runoff away from tension cracks, as water inflow can result in accelerated movement.

Level	Warning Sign/Situation	Actual or Potential Consequences	Action(s) to be Taken
	Highly turbidity discharge from decant outlet.	Possible sign of collapse of a portion of the decant, allowing tailings into outlet. Can, if left unattended, lead to internal erosion failure and eventual dam breach.	• Check decant inlet to see if water turbidity matches that in discharge. • If water at inlet is clear, then close off decant inlet to prevent further discharge. • Notify tailings dam engineer and develop alternate decant arrangements. • Inform Mill.
	Rupture of tailings and/or water pipelines on crest of dam, resulting in erosion of downstream dam slope	Could lead to erosive failure of dam, and pond breach, if allowed to continue.	• Contact Mill and have discharge of tailings stopped. • Repair the rupture. • Inspect and repair the washed-out portion of the dam slope. • Do not discharge tailings into the area of the washout. • Notify tailings dam engineer to design slope re-construction.
	Seepage daylighting from tailings slope at a significantly higher elevation than had previously been observed at that particular location.	Could lead to erosion, and progressive slope failure, resulting in dam failure and breach of pond.	• Read piezometers. • Assess rate of seepage and whether or not internal erosion is occurring. • If piezometers confirm high phreatic levels, initiate chain of communication. • Carry out weekly monitoring of the seepage discharge area of concern. • Avoid discharge of tailings into the impoundment adjacent to the area.
	Severe flood/intense rainstorm or rapid snowmelt.	Overtopping and washout of dam, and release of pond. Concentrated erosion of tailings slopes, resulting in localized gullying, over-steepening, and potential slope failure. Raising of phreatic surface as a result of infiltration possible.	• Initiate chain of communications (Figure 9-2). • Check the minimum width of tailings beaches. • Inspect spillway for flow and condition. • Stop tailings discharge and slowly lower tailings pond by removing stop logs. • Carry out detailed inspection of dam and pond. • Inspect dam slopes for areas of concentrated erosion, and repair. • Read all piezometers. • Mobilize emergency pumps if needed.
3	Failure or suspected imminent failure of a dam.	Catastrophic breach and release of pond.	• Initiate chain of communications (Figure 9-3). • Stop tailings discharge and lower tailings pond by removing stop logs.

Level	Warning Sign/Situation	Actual or Potential Consequences	Action(s) to be Taken
	Slumping, sliding, or bulging of a dam slope or adjacent ground.	Catastrophic breach and release of pond.	• Initiate chain of communications (Figure 9-3). • Lower pond by removing stop logs. • Do not attempt construction (e.g., construction of a stabilizing berm) until the EOR is on the site (earthmoving equipment should be mobilized).
	Water vortex (whirlpool) within the tailings pond.	Indicates an internal erosion failure in progress, with potential breach of the tailings dam.	• Initiate chain of communications (Figure 9-3). • Stop tailings discharge and lower tailings pond by removing stop logs. • Check downstream area of dam for areas of increased and/or turbid seepage discharge. • Place granular filter buttress against any such areas, using emergency stockpiles. • Go directly to decant outlets if vortex is on a decant line; plug decant outlet with granular material if tailings are discharging through decant.
	Sinkhole observed on tailings beach or on a downstream dam slope.	Indicative of internal erosion, which could progress to the point where dam breach results.	• Initiate chain of communications (Figure 9-3). • Stop tailings discharge and lower tailings pond by removing stop logs. • Immediately check dam toe areas/decant outlets for heavy seepage that is transporting tailings solids. • Place granular filter buttress against any such areas, using emergency stockpiles.
	Large earthquake.	Dam failure, breach and release of pond.	• Initiate chain of communications (Figure 9-3). • Carry out detailed post-earthquake inspection of the dam. • Read all instrumentation (piezometers and inclinometers).
	Rapid, unexplained, orders of magnitude increase in seepage rate and turbidity (dirty water indicating transport of tailings) at a dam slope seepage location and/or foundation.	Internal erosion (piping) failure leading to dam breach and release of pond. Elevation of pore pressure conditions that could initiate a slope failure.	• Initiate chain of communications (Figure 9-2). • Place stockpiled filter materials over seepage discharge area to prevent further erosion of material. • Read piezometers in area of seepage discharge.

3.4 Inundation Map

The results completed by SRK Consulting Inc. (SRK) in February 2019 include the detailed dam break inundation presented in Figure 1. Several properties, buildings, highways, and waterways would be impacted.

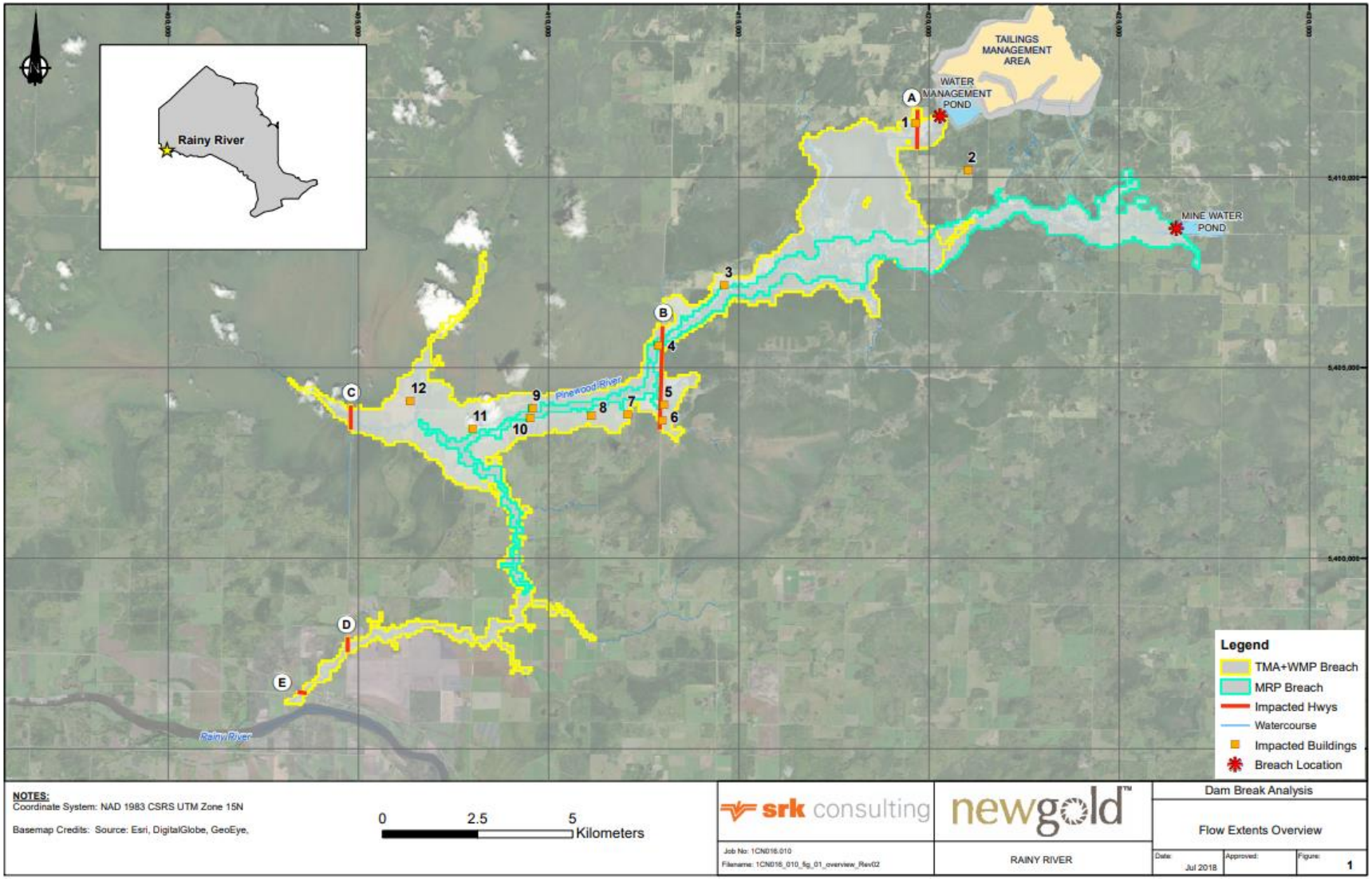

Figure 1 - Inundation Map

4.0 EMERGENCY PREPAREDNESS

Emergency preparedness refers to the steps taken prior to, during, and after an emergency. This manual covers only those emergency situations that could potentially pose a threat to the structural integrity of the dams or result in the release of tailings and/or supernatant pond water into the surrounding environment. This document was developed to work in conjunction with the Emergency Preparedness and Response Plan (EPRP), as reviewed annually and maintained by New Gold H&S team.

The goal is to protect:

- human life and health
- social well-being of the local community and employees
- public infrastructure and company facilities
- environmental conditions and habitats

The following sections are meant to compliment the EPRP owned by the H&S team. Some aspects of the EPRP were not included within this Part of the OMS, though the EPRP does consider all aspects of this OMS.

4.1 Prior to Emergency

Assuming an emergency will take place, it is required that certain tasks be completed prior to the actual event occurring. These tasks are discussed below.

4.1.1 Testing of the ERPP and Training

To fulfill Mining Association of Canada (MAC) Towards Sustainable Mining (TSM) protocols, both "tabletop" and full crisis simulations are planned at site. The specific timing of these events is decided by the H&S team, though minimum frequencies for "tabletop" exercises are annually and full crisis simulations are every three years.

Lessons learned from these events are captured and discussed to improve response. These are documented and held by the H&S team.

A list of critical roles and the training required is given in Table 4 of Part 1 of the OMS manual.

4.1.2 Maintain Buttress Material at Frank's Pad

In the event that uncontrolled movement on the dams occur, the EoR may require a buttress be placed quickly along the toe. A minimum stockpile volume of 200,000 m^3 of material shall always be available at Frank's Pad. This volume relates to the amount of material that can be placed within a month by only the Construction fleet (all 100T and 40T). This assumes Mine Ops is not able to provide live placement, as having shovels in NAG cannot be guaranteed.

4.1.3 Contact List for Community Members Downstream of Inundation

During the unlikely event of a catastrophic failure of the dams, community farms, buildings, and highways downstream of the inundation zone may be impacted. A list of impacted landowners,

emergency responders, and community leaders will be created. This list is available with the H&S team and is updated annually.

4.1.4 Develop a Plan with Community Emergency Responders

To reduce response time, a plan is to be developed with emergency responders in the surrounding communities. This will include alignment of strategy with hospitals, police, fire, and community leaders. They may be involved in some testing of the ERPP to resolve potential communication errors in the response. The details of this plan will be held with the H&S team.

4.1.5 Increased Instrumentation Frequency

Instruments provide early warning of potential failures and continuous monitoring of failures as they occur. Should there be any sign of an uncontrolled event, the EoR will increase the required reading frequencies. If manual readings of instruments become hazardous for the technicians, other automated systems (such as SAA by Measurand) will be considered.

4.2 During Emergency

During an active emergency, it is critical that everyone follows the specified actions. Actions that may happen during an emergency are listed below.

4.2.1 Incident Command System

The primary function of the Incident Command Centre is to coordinate resources, obtain response and mitigation efforts inside the emergency area perimeter and carry out the objectives set by the Incident commander. The site Emergency Operations Centre is in the Wabooz Meeting Room at the Administration office. The incident commander will typically be the highest-ranking manager on site or their designate. The incident commander will be familiar with the EPRP and the tailings management area.

4.2.2 Place Buttress Material

The EoR may recommend buttress material be placed on the toe of failure areas. Depending on the situation, placing material may stop or reduce the failure event. As the situation evolves, evaluation of the risk of operators placing material may require they be withdrawn. This risk level will be decided by the Capital Projects Manager, in consultation with the Mill Manager and EoR.

4.2.3 Shut Down Mine and Mill

Emergency responders will be focusing on the situation, leaving no resources available for other potential emergencies that could occur. As a result, the Mill and Mine will be in standby mode, as per emergency response protocols.

4.2.4 Draw Down Water Levels

Given enough warning, drawing down pond levels can significantly reduce the consequences of a failure event. Based on the situation, the EoR can recommend drawing down pond levels.

4.3 Following an Emergency

The aftermath of an emergency will likely be hectic and the efficiency of the response may be reduced. The below protocols are in place to improve field response time and align emergency response. The details for each are available in the ERPP owned by the H&S team.

4.3.1 First Aid

Emergency responders on site are trained in first aid. The mine rescue vehicles and trained First Responders are equipped with first aid equipment. First aid kits and fire extinguishers are supplied in onsite vehicles.

4.3.2 Injuries or Fatalities

Injuries require immediate attention. On-site nurses and emergency vehicles can provide a level of care, for most situations, that will allow transport of seriously injured individuals to the La Verendrye Hospital in Fort Frances.

4.3.3 Missing Persons

The Incident Commander is responsible to ensure that employees are accounted for. However, it is also the responsibility of employees to immediately report to the Incident Commander persons who cannot be accounted for.

4.3.4 Fires

Emergency response vehicles are equipped for fires.

5.0 EMERGENCY RESPONSE

The detailed emergency response is owned and available with the H&S team. The below sections highlight some of the roles required in relation to dams and levels of emergency response.

5.1 Incident Notifications Procedures

Roles and responsibilities:

- Any individual who observes an incident shall initiate the appropriate notification procedure
- All members listed on the notification procedures shall be familiar with established protocol and familiar with the OMS Manual
- If a member of the team on the notification procedures is not contactable then the Incident Commander shall be notified and proceed with the notification procedure

Notification procedures have been developed for Level I, II and III emergencies provided below to ensure quick onsite responses in the event of an identified emergency. The Mill Manager will be in charge of initiating the site wide EPRP in the event of a Level III emergency.

The notification procedures for a Level I and Level II emergency are illustrated on Figure 2. The notification procedure and initiation of the EPRP in the event of a Level III emergency is shown on Figure 3. Rapid response to Level III emergencies is critical to ensuring that staff, contractors and site visitors safely reach a muster station and that timely notification is made to appropriate local and provincial authorities as well as external stakeholders.

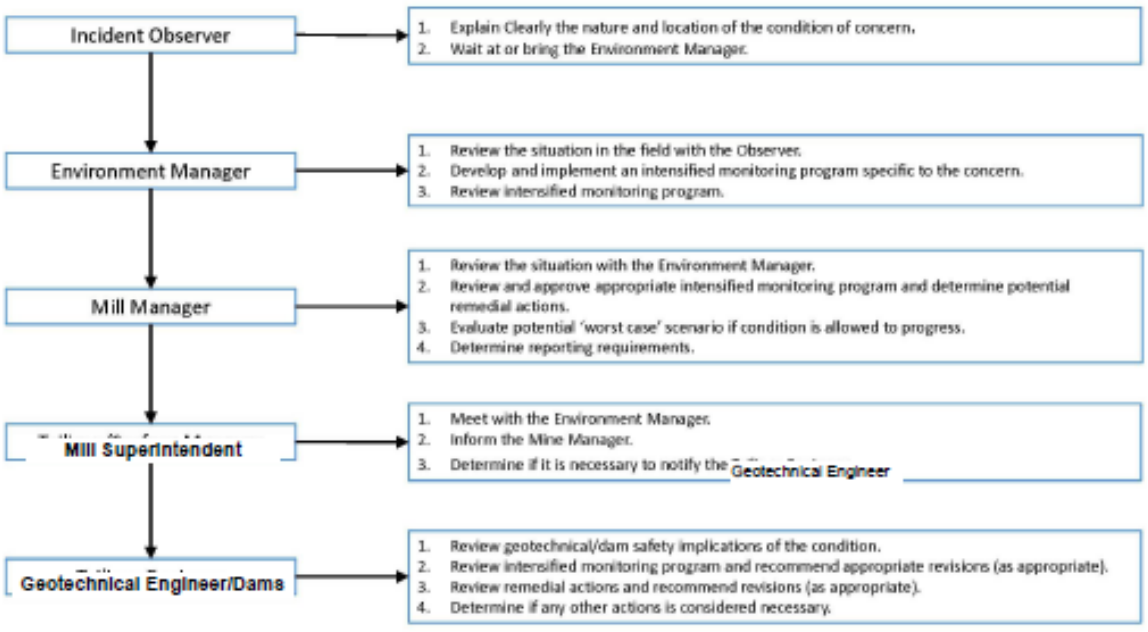

Figure 2 - Level 1 and 2 Emergency Notification Procedure Flowchart

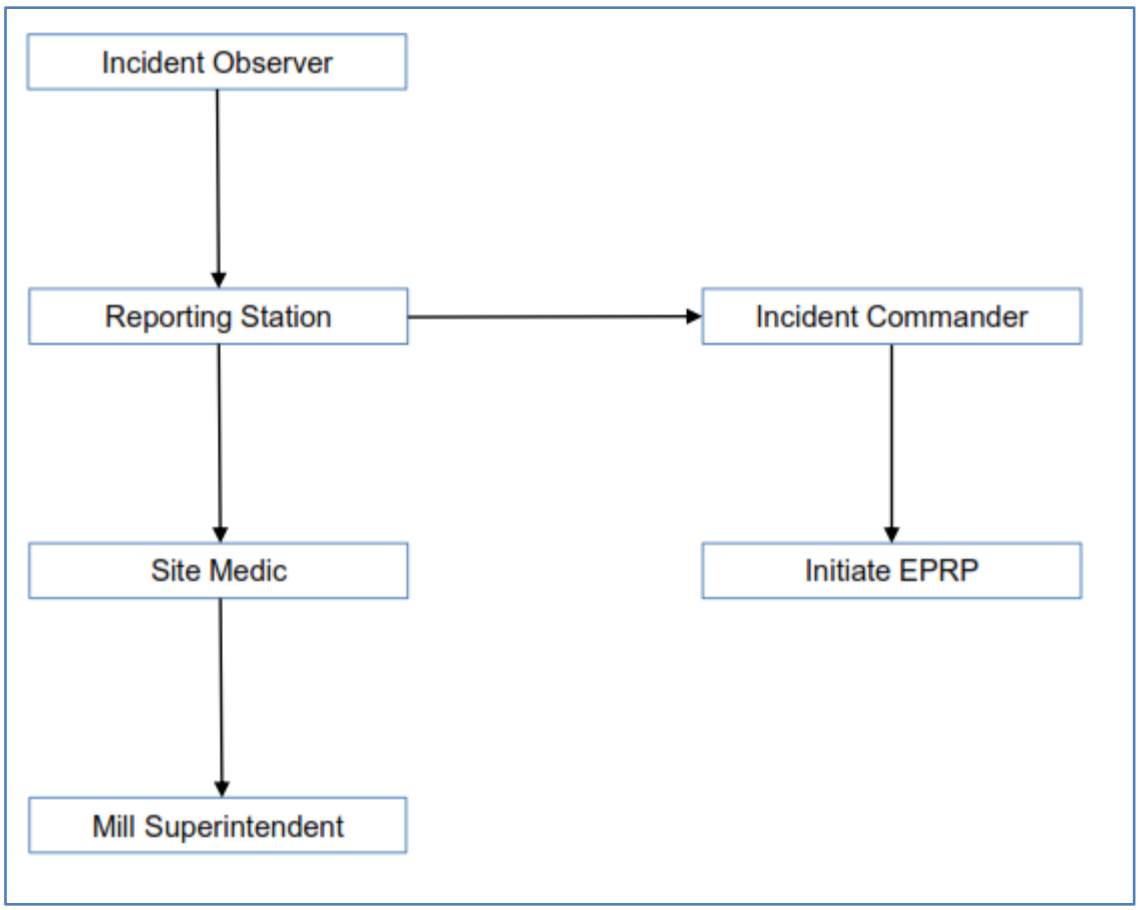

Figure 3 – Level 3 Emergency Notification Procedure Flowchart

5.2 Emergency Contacts

Internal emergency contact information is provided RRM EPRP. An emergency response can be initiated through;

- RRM radio channel 4 – state ‘Emergency, Emergency, Emergency’ and describe the type and location of the emergency
- RRM internal phone system – dial 8888
- RRM security direct line – 1-807-708-0646