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March 7, 2008

Via email and Xpresspost

Mr. Richard Dwyer
Licensing Administrator
Nunavut Water Board
PO Box 119
Gjoa Haven, NU X0B 1J0
Phone: (867) 360-6338

Dear Mr. Dwyer,

Re: Meadowbank Type A Water License – Response to Pre-Hearing Commitments

Agnico-Eagle Mines Ltd. (AEM) is pleased to provide the Nunavut Water Board (NWB) with the following supplemental information in response to the Table of Commitments generated during the Meadowbank Pre-Hearing Technical Meeting held in Baker Lake on February 24th and 25th, 2008. AEM has prepared the information with the objective of seeking resolution of all major issues with the intervening parties ahead of the Water License Public Hearing.

Table 1 entitled "*AEM Response Summary March 7, 2008*" contains the list of commitments generated at the technical meeting (as provided by the NWB) and addresses how AEM has responded to each commitment.

Table 2 entitled "*AEM Response to Meadowbank Type A Water License Intervenor Comments*" provides each of the intervenors' comments and recommendations (similar to the table provided to the NWB at the technical meeting) with AEM's revised responses.

Table 2 is divided into six sections by intervenor as follows:

- Table 2a – Government of Nunavut, Department of Environment;
- Table 2b – Indian and Northern Affairs Canada;
- Table 2c – Fisheries and Oceans Canada;
- Table 2d – Environment Canada;
- Table 2e – Kivalliq Inuit Association; and
- Table 2f – Nunavut Water Board.

In several instances, a separate attachment has been referenced and attached to provide additional information as requested by the intervenor. These attachments include:

- Appendix A – Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine (in response to Table 1, Items 5 and 6)
- Appendix B – Dewatering Dike Dredge Disposal Options – Meadowbank Gold Project (in response to Table 1, Item 8)
- Appendix C – Meadowbank Gold Project – Water Quality and Flow Monitoring Plan – Supplemental Information (in response to Table 1, Item 9)
- Appendix D – Preliminary Assessment of Potential Effects of Pit Lake Flooding On Third Portage and Wally Lakes, Meadowbank Gold Project, Nunavut (in response to Table 1, Item 10)
- Appendix E – Errata – Meadowbank Gold Project – Preliminary Closure and Reclamation Plan (in response to Table 1, Item 11)
- Appendix F – Clarification – Location and Volume of Freshwater source for the Explosives Mixing Facility (in response to Table 1, Item 12)
- Appendix G – Meadowbank Gold Project - Proposed Discharge Water Quality Criteria (in response to Table 1, Item 13)
- Appendix H – Type A Water License Application Documents (in response to Table 1, Item 18)
- Appendix I – Clarification – Meadowbank Gold Project Landfill Design (in response to Table 1, Item 20)
- Appendix J – Figure – Meadowbank Plantsite Finish Grading & Location Plan (in response to Table 1, Item 21)
- Appendix K – Clarification – Meadowbank Sewage Treatment Plant Design (in response to Table 1, Item 22)
- Appendix L – Clarification – Status of Bulk Fuel Storage Facility Construction at Meadowbank Site Authorized Under Type B WL 2BC MEA-0507 (in response to Table 1, Item 33)
- Appendix M – Clarification – Freshwater Intake Pump Screens and Dewatering Discharge Pipeline Detail (in response to Table 1, Item 34)
- Appendix N – Third Portage Lake Outlet Capacity and Stability Assessment – Meadowbank Gold Project (in response to Table 1, Item 35)

Should you have any questions regarding this submission, please contact me directly at 604-622-6527 or via email at rgould@agnico-eagle.com.

Regards,

Agnico-Eagle Mines Ltd.

Rachel Lee Gould,
Project Manager, Environmental Permitting and Compliance Monitoring

cc: L. Manzo – KIA
J. Rogers – INAC
A. Liu – DFO
A. Wilson – EC
H. Yeh – GN-DoE

Table 1: AEM Response Summary March 7, 2008

Table 1: AEM Response Summary March 7, 2008

No	Issue Reference	Pre-Hearing Commitment	Party	Timeline for Submission	Additional Comment	AEM Response - March 7, 2008
SCOPE						
1	NWB	Provide Type B water licence compliance reports	INAC	intervention deadline	AEM provide past performance exhibit for other jurisdictions	
CONSTRUCTION						
2	INAC-5	Core material will not be placed until rockfill embankments have been closed shore to shore	AEM	7-Mar-08	revision to response table	Table 2 - INAC-5: Response revised
3	BGC	Golder submitted copy of till investigation and lab testing report entitled "2007 Till Core Material Investigation and Laboratory Testing, Meadowbank Gold Project" dated January 25, 2008	AEM	completed	NWB to post to public registry	
4	INAC-8 - INAC-12	Provide clarification to response to INAC issue 8-12 (Contractor to provide plan for instrumentation installation. Plan to be approved prior to completion by engineer.)	AEM	7-Mar-08	revision to response table	Table 2 - INAC-8 to 12: Responses revised
5	DFO-2	Provide additional detail for monitoring plans for inside and outside silt curtains (including contingencies and **thresholds**) for TSS during dike construction and dewatering	AEM	7-Mar-08		Appendix A: Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine
6	DFO-2	Provide the distance of the silt curtain relative to the dike construction area	AEM	7-Mar-08		
7	INAC-3	Provide coupled seepage/thermal analysis at central dike	AEM	licence issue	not required before final hearing.	
8	BGC	Provide memo clarifying where dredged lakebed sediment under dewatering dike footprint will be disposed.	AEM	7-Mar-08		Appendix B: Document 620 - Technical Memorandum: Dewatering Dike Dredge Disposal Options Meadowbank Gold Project
9	INAC-13	AEM will provide reference for monitoring non-contact water including parameters pH, turbidity, sulphate. Metals (Cu, Ni, Zn, Pb)	AEM	7-Mar-08	INAC to confirm if reference to Doc 450 is sufficient. Provide in table revision.	Table 2 - INAC-13: Response revised Appendix C: Meadowbank Gold Project. Water Quality and Flow Monitoring Plan - Supplemental Information
WATER						
10	DFO-16	AEM to provide reference for elevation change in lakes due to drawdown	AEM	7-Mar-08		Appendix D: Preliminary Assessment of Potential Effects of Pit Lake Flooding On Third Portage and Wally Lakes, Meadowbank Gold Project, Nunavut
11	EC-8	Provide errata to closure and reclamation plan clarifying that dike breaching will occur where water quality meets CCME, background, or risk based assessment criteria as determined through an approvals process	AEM	7-Mar-08		Table 2 - EC-8 Response revised Appendix E: Errata - Meadowbank Gold Project Preliminary Closure and Reclamation Plan
12	NWB	Provide memo clarifying location of water source and water volumes for re-located explosives storage facility	AEM	7-Mar-08		Appendix F: Clarification - Location and Volume of Freshwater Source for the Explosives Mixing Facility
13	EC	Provide table of end of pipe water quality standards for both the Portage diffuser from the Portage Attenuation Pond and the Wally diffuser from the Vault Attenuation Pond	AEM	7-Mar-08		Appendix G: Meadowbank Gold Project - Proposed Discharge Water Quality Criteria

Table 1: AEM Response Summary March 7, 2008

No	Issue Reference	Pre-Hearing Commitment	Party	Timeline for Submission	Additional Comment	AEM Response - March 7, 2008
14	EC	Provide comments to AEM on technical memo regarding dewatering and attenuation pond water quality discharge criteria	INAC, EC	prior to intervention deadline	any other interested parties	
WASTE						
15	INAC	clarify if NPR ratio used affects volume of rock available for closure			to be confirmed by INAC	
16	GNDOE - 5	Elaborate response to GNDOE issue 5	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-5: Response revised
17	GNDOE-25	Clarify intent of 10-15 year predictions in thermal model for freezing, and the monitoring commitment	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-25: Response revised
18	NWB	Provide updated Document list and any missing documents including: Doc 538-Till Testing; Doc 548-Groundwater Quality Memo; and any others	AEM	7-Mar-08		Appendix H: Type A Water License Application Documents
19	GNDOE-18	Clarify hydrocarbon fractions that will be monitored for hydrocarbon contaminated soils	AEM	7-Mar-08		Table 2 - GNDOE-18: Response revised
20	INAC	Provide clarification memo regarding NPAG material to be used at landfill	AEM	7-Mar-08		Appendix I: Clarification - Meadowbank Gold Project Landfill Design
21	INAC-15	Provide clarifications related to incinerator (design, operation and monitoring) committed to in February 20, 2008 meeting minutes	AEM	7-Mar-08		Table 2: INAC-15 Response revised Appendix J: Figure - *Meadowbank Plantsite Finish Grading & Location Plan*
22	INAC-19	Provide flow process outline of STP stages and detailed information from supplier on STP units. Emergency contingency plans.	AEM	7-Mar-08		Table 2: INAC-19 Response revised Appendix K: Clarification - Meadowbank Sewage Treatment Plan
23	na	Place AEM Technical Meeting presentation on Public Registry	NWB	asap		
24	GNDOE-12	Clarify proposed use of CCME Guidance and provide table of proposed effluent discharge criteria (as per Technical Meeting presentation)	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-12: Response revised
25	GNDOE-12	Provide information to AEM regarding new national COD standards/requirements	NWB	completed	posted to ftp site	
26	GNDOE-13	AEM to inform communities of contingency measures that rely on community infrastructure and/or services	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-13: Response revised
CLOSURE						
27	GNDOE-22	Provide correction to closure plan regarding timeline for monitoring re-vegetation success.	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-22: Response revised
28	GNDOE-23	Revise response to GNDOE-23 issue regarding wildlife passage through waste rock piles	AEM	7-Mar-08	revision to response table	Table 2 - GNDOE-23: Response revised
29	NWB	Provide combined security estimates and holdings for all Type B licences and proposed Type A licence	AEM	at Final Hearing		

Table 1: AEM Response Summary March 7, 2008

No	Issue Reference	Pre-Hearing Commitment	Party	Timeline for Submission	Additional Comment	AEM Response - March 7, 2008
30	NWB	Parties will meet and assess options for holding of security	INAC, KIA, GN	meeting as quickly as possible (March 3, 2008 proposed by KIA, subject to INAC and GN confirmation); submission at intervention deadline	AEM to participate if invited	
GENERAL						
31	NWB	Provide list of plans, reports and designs that need revising including a timeframe for providing them	AEM	At the Final Hearing		
32	NWB	Submit final version of response tables providing clarification where requested	AEM	7-Mar-08		Table 2 Specific references to clarification available in this list
33	NWB	Provide clarification regarding status of bulk fuel storage facility construction (Type B exploration water licence 2BE-0507)	AEM	7-Mar-08		Appendix L: Clarification - Status of Bulk Fuel Storage Facility Construction at Meadowbank Site Authorized Under Type B WL 2BE MEA-0507
34	DFO-25	Follow freshwater end of pipe guidelines, provide detail design for effluent discharge for outfall diffuser and provide intake screen design	AEM	7-Mar-08		Appendix M: Clarification - Freshwater Intake Pump Screens and Dewatering Discharge Pipeline Detail
35	DFO-24	Provide assessment of easternmost channel enhancement	AEM	7-Mar-08		Appendix N: Third Portage Lake Outlet Capacity and Stability Assessment, Meadowbank Gold Project
36	DFO-6	Submit baseline information (AEMP monitoring reports for 2006 and 2007)	AEM	31-Mar-08		
37	NWB	Provide a summary list of commitments made to all the parties	AEM	at the Final Hearing		

Table 2: AEM Response to Meadowbank Type A Water License Intervenor Comments

Table 2a – Government of Nunavut, Department of Environment

Table 2b – Indian and Northern Affairs Canada

Table 2c – Fisheries and Oceans Canada

Table 2d – Environment Canada

Table 2e – Kivalliq Inuit Association

Table 2f – Nunavut Water Board

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-1	**General**	n/a p2	Supporting documents relevant for this technical review are inconsistent with the documents outlined by the applicant in a list (namely Doc. 502 dated Dec. 5, 2007). For example, the Bathymetric Surveys (Doc. 309) and the Incineration Waste Management Plan (Doc. 581) submitted for review, are not currently on the list. Additionally, at the beginning of this review, regulators such as GN-DOE received many documents through electronic mail and regular mail delivery	Documents relevant for this review should be clarified	**Application Document 502 was inclusive of materials submitted on or prior to December 5, 2007**. It does not include supplemental submissions provided after this date; including Application Documents 309, 548 and 581, and various application correspondence from Agnico-Eagle Mines. **Copies of all application and supporting documents may be obtained from the NWB ftp site, Username: public, Password: registry at ftp://nunavutwaterboard.org/2AM%20-%20MINING/2AM-MEA/ or by contacting Agnico-Eagle Mines Ltd. at lconnell@agnico-eagle.com.**
GNDOE-2		n/a p2		Terms and conditions from previously issued Type B water licenses (namely 8BC-TEH, 8BC-MEA, and 3BC-THE respectively), be incorporated into a single enforceable Type A water license that deals with management, mitigation and monitoring of waste and water related issues holistically	AEM agrees. AEM previously wrote to the NWB and all intervening parties to ask that they consider the previous Type B Water License application materials (3 licenses - the Baker Lake facilities, the AWPAR and the Meadowbank Exploration site) as part of this Type A License Application process so that all can be incorporated into one Type A License for Meadowbank Project.
GNDOE-3	**A. Water Quality**	Issue #1: Acid Rock Drainage and Metal Leaching p8-10	It is noted...that analysis for neutralization potential (NP) has been reported as Sobek methodology and that the CaNP, based on CO2 analysis, are comparable (pg 10, Fig 3-4, Doc 425). Although these values are similar, in reviewing the geochemistry data presented to date some samples currently classified as NPAG because of NPR>2, may now be classified as PAG because the NPR<2 if using the CO2 determination for NP.	The applicant should clarify how changing NP determination using on-site analysis (i.e., CaNP test) affects material classification and waste volume calculations. In re-evaluating the ARD/ML potential over the next two years, the applicant should also revisit the existing database and confirm that waste volume calculations are still valid. These revisions should also be reflected in revised water quality predictions.	For all future collected data, tests will be completed to verify the current set of results and to update the water quality prediction model. **It is expected that as more data is obtained a threshold value for PAG rock (based on NP, AP and/or NAG test result) will be established that will incorporate a margin of safety to avoid mis-diagnosis of samples and support adequate management.**
GNDOE-4		p8-10	Applicant suggests that segregation of PAG and NPAG IV may be difficult operationally (pg, 54, Doc 485) and that if it cannot be done then all the material will be managed to minimize ARD potential.	Applicant should clarify how IV material will be managed if it cannot be segregated, and when the decision point will be made to segregate NPAG and PAG IV material. If the material cannot affectively be separated, it should all be managed as PAG.	The water quality predictions assumed that segregation of PAG rock would not be possible and concentrations predicted in a possible poor-end case reflect a portion of Vault rock generating ARD. **Should segregation be effective, the predicted water quality will likely differ and assuming the ARD mitigation strategies are fully functional during operation, water quality may be improved from predictions**.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-5		p8-10	Applicant proposes that over the project life that total metal analysis will be assessed as a tool to indicate metal leaching. It has not been possible to make this correlation to date (pg 10, footnote, Doc 425), however, with on-going work on understanding geochemistry the applicant may be able to establish some useful correlations	In re-evaluating the ARD/ML potential over the next two years, the applicant should include an analysis establishing correlations between metal concentration and leach rates for NPAG material. They should also consider including some PAG material in these programs. Although the intent is to encapsulate the PAG material in order to mitigate leaching potential, the inclusion of these samples in the program may improve correlations by providing additional information with respect to maximum rates possible from material on-site	**From the start of open pit mining AEM will conduct a sampling and analytical program designed to verify the geochemical characterization work that was conducted during the EA process for the Meadowbank Project. This program will consist of the following main elements: a) A program of sampling and analysis of open pit blast hole drill cuttings to provide the data to guide the pit geological staff in defining PAG, Non-PAG and ore limits for mine staff who are tasked with excavating the blasted rock so that this rock can be handled in accordance with AEM's waste rock management plan. The blast hole cuttings will be analyzed on site for Total S. A correlation curve will be developed early in the mine life to define the relationship between Total S and NPR as determined from standard ABA testing. Standard ABA testing will be conducted throughout the mine life and used by the mine staff to verify and update this correlation curve so that Total S analysis can be used as a quick (overnight) analysis to differentiate PAG from Non-PAG waste rock; and b) A program of follow up sampling and analysis conducted on a continuous basis (projected to be in the first six months, decreasing over time as the geochemistry from each zone is defined).** **The samples collected will be submitted for conventional ABA testing with a smaller subset sent for Total metals analyses and BC MEM Shake flask extraction testing. AEM will also continue to operate a set of humidity cells and larger field cells on PAG and Non-PAG waste rock to better understand the metal leaching potential of both PAG and non-PAG waste rock placed into the Portage and Vault Waste Rock Storage Facilities. The metal leaching data collected will also be used to update the predictive water quality modeling of closure conditions.**
GNDOE-6		p8-10	applicant has also committed to using NPAG material in road construction (Table 2.1, Doc. 500)	Clarification of what ARD/ML screening criteria will be used for material used to construct site roads, and for exposed outcrop along the road that may be subject to cutting, should be included in the waste and water management plan. Given that work will continue on-site to improve geochemistry this work should be expanded to include access routes as well	To date, the majority of quarry locations tested showed very little sulphur. **Agnico-Eagle is committed to surveying rock quality and drainage water chemistry at each quarry site over the summer 2008 in order to finalize quarry closure plans.**

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-7		Issue #2: Water Management & Water Quality p10-13	The applicant is proposing to construct the dikes primarily from materials mined on-site with the designs including a downstream rockfill, a filter zone and an upstream impermeable element (pg. 62, Doc. 485). The proposed design includes either a geomembrane liner or compacted till as the impermeable element will depend on the availability of till at the time of construction and the construction costs at that time. Water management also includes a network of ditches and sumps to facilitate site management of contact and non-contact water. The applicant has not provided detailed design or maintenance procedures for these structures, however, they do state commitments to ensure that the challenges presented by ice-rich ground will be considered (pg 65, Doc. 485).	The applicant should provide information with respect to: a) using the liner or till for the dike; and b) design details for the ditch and sump construction before work proceeds	**Schedule and cold weather may prevent the use of till - bituminous liner may be placed in the cold.** Finalization of dike related ditches and sumps for seepage collection will necessarily depend on lakebed conditions which are only revealed upon dewatering. **The seepage collection system is therefore finalized in the field, during construction.** A schematic representation can be provided. **Agnico-Eagle will provide design and maintenance details for onland ditches and sumps to NWB for review prior to construction.** Further details on proposed onland ditch and sump sizings are provided in Application Documents 485 (Section 3.2.7) and 500 (Section 11).
GNDOE-8		p10-13	Discharge to the environment is planned to be from the attenuation pond through a diffuser into Wally Lake in the Vault area throughout operations. In the Portage area discharge to the environment is from the attenuation pond into Third Portage Lake during years 1 to 5, and from the reclaim pond to the open pit from year 5 to closure. Modelling indicates that the discharge complies with MMER at the diffuser discharge point, except during year 6 to closure in the Portage area; there are possible exceedances of cyanide and copper. In reviewing the provided information, GN-DOE notes that at the diffuser, the effluent quality has several parameters that exceed HC DW and CCME FWAL, and the applicant notes that these criteria will potentially be approached within a 30 m radius from the diffuser (pg 70, Doc. 485)	GN-DOE acknowledges that effluent plume modelling from the diffuser must account for effluent discharge, water quality and flow, however, the applicant should clarify at what distance the CCME FWAL criteria are met if it is outside the 30m boundary. As a minimum, the applicant should ensure the effluent discharge to the receiving environment meets the CCME FWAL criteria within a 30 m radius from the Third Portage Lake diffuser.	Discharge of contact water to the environment during operations is currently planned from the Portage Attenuation Pond in Years 1 to 5, and from the Vault Attenuation Pond in Years 4 to 9 (refer to Doc. 500). Discharge of reclaim pond water to the environment is not currently planned. Instead, treated reclaim water will be released to the Portage Pit Lake at closure. The Portage Pit Lake will be isolated from the natural lake environment in closure until discharge water quality monitoring indicates that the water is of suitable quality to be released to the natural environment. **Current diffuser modelling predictions indicate that aquatic life guidelines will be achieved within a 30 m radius mixing boundary from the diffuser centre (Application Documents 412 and 497)**. Water quality within the receiving environment will be monitored under the Project AEMP (Application Document Cumberland 2005).

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-9		p10-13	the applicant has developed a Water Quality and Flow Monitoring Plan (Doc. 450) to track changes in drainage chemistry. This plan incorporates compliance points (CM), where drainage is discharged to the environment and must meet MMER, and internal monitoring locations (IM) to monitor contact water across the site for operational purposes.	The proposed monitoring plan, and its associated triggers and response mechanisms are sufficient to address water quality issues over the mine life. However, GN-DOE suggests that the applicant confirms the data presented in Appendix C: Table C-1 in the Doc. 450 and clarify if these are the triggers for action for IM locations (i.e., are these 10x predicted "possible poor end"? pg 18, Doc. 450). Further, there is a commitment from the applicant that some locations will meet the HC DW criteria such as the pit lakes and adaptive management may need to reflect a change in applying MMER criteria to HC DW criteria over mine life. This consideration should be reviewed annually with the monitoring program.	The data in Table C-1 are averages intended to provide qualitative information to the reader on the range of concentrations. **The IM triggers will be based on the predicted values in Tables of Appendix III of Application Doc. 516.** Agnico-Eagle is not proposing to meet drinking water quality criteria for water bodies that are located within the mine footprint and are isolated from the natural receiving environment during operations. However, **Agnico-Eagle is committed to meeting DW criteria within the pit lakes at closure to enable dike breaching and water mixing with neighbouring lakes.**
GNDOE-10		p10-13	the NIRB Project Certificate conditions (#9) include providing water treatment details for process and attenuation pond water. Proposed treatment methods are presented (Doc. 467) to address concentration of TSS, metals and cyanide species. GN-DOE acknowledges that water treatment would be implemented on an "as needed" basis during operation to ensure MMER compliance and implemented at closure to ensure flooded pit water meets HC DW prior to dike breach. A metal that seems to be of concern is arsenic and proposed treatment includes the addition of iron to the drainage prior to pH adjustment with lime (pg 11, Doc. 467). Current water quality predictions indicate that iron concentrations may be above the HC DW and CCME FWAL criteria under the "expected probable" case. Additional treatment for arsenic may introduce additional iron into the drainage, and for iron exceedances, treatment will be implemented by adding lime to precipitate the iron.	GN-DOE acknowledges that even the best models cannot compare with the evaluation of operational monitoring data that allow for refined predictions and management plans. GN-DOE therefore recommends that the applicant refines water quality predictions and management plans (i.e., treatment needs) based on updated monitoring data during operation.	**Agnico-Eagle is committed to updating and refining water quality predictions and management plans, including treatment needs, as additional mine water data becomes available through operations**.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-11		Issue #3: Waste Management & Water Quality p13	The Mine Waste and Water Management Plan (Doc. 500) indicates that dust-control water (pg 10-5) will be drawn from Portage attenuation pond for use in the Portage Mine Area and drawn from Phaser Lake for use in areas outside the Vault and Portage catchment areas. GN-DOE recognizes that dust suppression will be necessary to minimize contamination of soil and vegetation and will ensure visibility on the road and safe passage for mine traffic. It is anticipated that the road corridors will be part of the site water management system with ditches and sumps directing impacted drainage toward the attenuation ponds. However, there may be areas that fall outside the proposed water management network (e.g., Vault haul road)	GN-DOE recommends that water from the noted areas be used, unless on-going monitoring indicates that it exceeds MMER and will require treatment prior to discharge to the environment. If other dust suppressants are to be used, the applicant is to refer to GN-DOE *Guideline for Dust Suppression* issued under the *Environmental Protection Act* .	**Dust control water for the Portage and Vault mining areas is planned to be drawn from the Portage Attenuation Pond and Vault Attenuation Pond, respectively. Dust control water for the haul roads outside the Vault and Portage catchment areas will be drawn from Phaser Lake** (Application Document 500 Sections 10.4.1, 10.5.1).
GNDOE-12	**B. Waste Management**	Issue #4: Sewage Treatment & Management p13-14	In the submitted documents, the applicant indicates that during mine construction treated sewage will be discharged to a fishless lake, namely Tear Drop Lake; however, it is unclear what the impact will be on the water quality in the lake. Page 10 and 11 of Doc. 355 indicates that a Rotating Biological Contacting (RBC) sewage treatment system will be able to meet a range of effluent quality (i.e., 4 to 40 mg/L for Biochemical Oxygen Demand and Total Suspended Solids). However, there is no further discussion on specific effluent discharge criteria that the applicant intends to meet	To ensure water quality of the Lake is not compromised, GN-DOE recommends as a minimum that the applicant meets *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* , and that monitoring at the lake be conducted to ensure the lake water complies with the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* .	AEM is currently working with Raymac Environmental and Seprotech of Ottawa Ontario to ensure that the proposed Meadowbank sewage treatment facilities meet the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest. AEM has provided a copy of this guidance to Seprotech along with a copy of the recent Water License for the Doris North Project as an example of expected STP discharge standards. During operations the treated sewage effluent and sludge will be co-disposed with mill tailings in the TIA and the water recycled to the Mill. During construction treated STP effluent will be discharged into Tear Drop Lake (the proposed site stormwater management pond). The sludge will be filtered and the dried filter cake incinerated. The plant discharge will be monitored under the Water License and the results reported under the SNP. Tear Drop Lake will be pumped into the northwest arm of Second Portage in the area of the proposed attenuation pond thus providing significant dilution of the treated effluent during the construction phase of the project. At the Technical Meeting AEM provided additional information on proposed end of pipe discharge standards for treated STP effluent (see Doc 621 Table on Page 4 - Appendix G). At the same meeting AEM and EC presented proposed discharge standards for water released to the environment from Tear Drop Lake when treated STP effluent is being discharged into Tear Drop Lake (see Doc 621 Table 4 in Appendix G). Tear Drop Lake will be pumped into the northwest arm of Second Portage in the area of the portage Portage Attenuation Pond thus providing significant dilution of the treated effluent during the construction phase of the Project.
GNDOE-13		p13-14		the applicant should discuss contingency measures in the case of RBC malfunction, and indicate how and where the raw sewage will be handled and placed.	The following contingent measures can be applied by AEM in the event of an RBC malfunction at the Meadowbank Sewage Treatment Plant: a) cut back on allowable camp water until the malfunction is corrected and use the equalization tank to retard the peak flow to the remaining RBC unit; b) shut down the malfunctioning RBC unit until the malfunction is repaired and use only one of the two parallel units until repairs are completed; c) Shut down all water use in the camp until the repairs are complete. Other contingent measures that could be applied include: By passing untreated STP influent around the malfunctioning RBC unit and holding this untreated influent in a holding tank or lined pond on site until the repairs are complete. The untreated sewage would then be pumped back to the STP when the units is repaired. This will require the coincidental restriction of water use to minimize the volume of untreated influent being bypassed. No untreated sewage would be trucked to the Hamlet of Baker Lake for disposal in the Hamlet's sewage treatment lagoon without the written consent of the Hamlet Council. It is assumed that such consent would not be given without due consultation with the Hamlet and its elected representatives. Under winter conditions this is an unlikely option due to the 2 hour road distance between the Meadowbank site and the Hamlet of Baker Lake.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-14		Issue #5: Landfill Design Drawings & Management Procedures p14-15	The applicant has provided preliminary design drawings for two proposed landfills	given that the project is in licensing stage and construction can be started once a water license is granted, the applicant should have the final design drawings available for review	**Detailed design drawings for Landfill #1 are provided in Application Document 562.** The preparation of detailed design drawings for Landfill #2 is not currently possible as it will be located on a structure that is to be built during mine operations (i.e., the Portage Rock Storage Facility). It is proposed that the detailed design of Landfill #2 be completed a minimum of one year prior to commissioning of the landfill. It is Agnico-Eagle's understanding that "Final" design drawings (herein assumed to mean final construction drawings) were not specifically requested as part of the NIRB Conditions or the NWB Guidelines for the application. Furthermore, in Agnico-Eagle's opinion, the detailed design drawings provided are suitable for the application review process. **The preparation of final construction drawings will be completed and submitted to the NWB for review prior to commencing construction.** It should be noted that the final design drawings will likely include provisions to adapt the design to conditions observed in the field at the time of construction.
GNDOE-15		p14-15	Page 11 of Doc. 458 provides a list of materials to be landfilled including asbestos, white goods (i.e., refrigerators), and light bulbs (items of concerns are fluorescent lamp tubes); however, the applicant has not provided detailed landfilling procedures for these items of concern.	The applicant is to refer to GN-DOE guidelines and policy documents regarding landfilling of asbestos, equipment containing ozone depleting substances, and fluorescent lamp tubes.	Agnico-Eagle intends to handle, segregate, and manage all wastes from the Project in compliance with relevant federal and territorial guidelines. Agnico-Eagle would like to thank GN-DOE for providing information and guideline references on the proper handling and landfill disposal of asbestos, white goods and fluorescent lamp tubes. All hazardous wastes will be handled in accordance to the Hazardous Materials Management Plan (Application Document 457 Section 4.1.3).
GNDOE-16		Issue #6: Landfarm Design Drawings & Management Procedures p15	The applicant has provided a preliminary design drawing for the proposed landfarm.	However, given the project is in the licensing stage and construction can be started once a water license is granted, the applicant should have the final design drawings available for review.	**Detailed design drawings for the landfarm are provided in Application Document 564.** It is Agnico-Eagle's understanding that "Final" design drawings (herein assumed to mean final construction drawings) were not specifically requested as part of the NIRB Conditions or the NWB Guidelines for the application. Furthermore, in Agnico-Eagle's opinion, the detailed design drawings provided are suitable for the application review process. **The preparation of final construction drawings will be completed and submitted to the NWB for review prior to commencing construction.** It should be noted that the final design drawings will likely include provisions to adapt the design to conditions observed in the field at the time of construction.
GNDOE-17		p15	page 5 of the Doc. 564 states “if the soil and snow/ice cells do not have sufficient capacity to accommodate a large spill, a temporary stockpile area could be set up adjacent to the landfarm.” However, the applicant has not provided any further details on management and design of this temporary storage area. For example, how will this area be managed to ensure contaminants do not enter the surrounding environment? Will a liner be installed? What is the capacity of this temporary storage area?	The applicant should provide further design and management details regarding the temporary emergency stockpile area for hydrocarbon contaminated soil	It is AEM's intent that all hydrocarbon contaminated snow generated by the project will be transported to the assigned snow melt cell in the landfarm. Upon melting the hydrocarbons would be recovered to the maximum extent possible using adsorbent media. The remaining snowmelt would be treated through an oil water separator unit, the water tested and released through the reclaim pond once water quality has achieved the water license discharge standard for such release. In the unlikely event of a large volume of contaminated snow being generated that would overwhelm the planned landfarm then the snow would be moved to an alternate containment area such as the fuel tank farm containment where the snowmelt can be contained and treated as above. This would only be done with the consent of the KIA, GN DoE, NWB and Water Resources.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-18		Issue #7: Remediation Guidelines for Hydrocarbon Contaminated Soils p16	It is unclear which remediation guidelines the applicant intends to use, and what parameter will be measured, for remediation of hydrocarbon contaminated soil. Requires clarification if intend to use one set of guidelines or the most stringent levels from combination of guidelines	The applicant should clarify the remediation guidelines that will be used for hydrocarbon contaminated soil, how the guidelines will be used, and what parameters will be measured	In assessing the remediation success on hydrocarbon contaminated soils being treated at the proposed Meadowbank landfarm facility, AEM will use a combination of the following standards to determine if soil has been suitably treated for removal from the landfarm (for use in site reclamation): The Canadian Council of Ministers of Environment (CCME) Canada Wide Standards for Petroleum Hydrocarbons (PHC) in soil and the published GN-DoE Guideline for Contaminated Site Remediation. The parameters to be measured will include hydrocarbon Fraction 1 and Fraction 2, Total Petroleum Hydrocarbons (TPH), BTEX (benzene, toluene, ethylbenzene and xylene) and lead as recommended by GN DoE. These parameters will then be compared to the above noted guidance (CWS + GN DoE) to determine whether soil has been adequately remediated prior to eventual disposal of the soil. AEM will update the Landfarm Design and Management Plan prior to the start of landfarm operations to incorporate the inconsistencies and errors noted by GN-DoE in their February 13th submission to the NWB (e.g. correction of the remediation guideline for coarse grained contaminated soil to reflect the Fraction 2 CWS guideline of 760 mg/Kg). AEM will also analyze for lead and polychlorinated bitotal metals where appropriate.
GNDOE-19		Issue #8: Treatment and Monitoring of Hydrocarbon Contaminated Water p16-17	when treating contaminated water by the oil-water separator, it is generally advised to include an additional filtration treatment step such as the use of an activated carbon filter. Further guidance on this can be found in the Government of the Northwest Territories Generic Plans and Operating Procedures of a Remediation Facility for Hydrocarbon Contaminated Materials in the NWT.	The applicant should consider additional treatment beyond the use of an oil-water separator for treatment of hydrocarbon contaminated water	It is Agnico-Eagle's opinion that the inclusion of an additional filtration treatment step is not required. As noted by GN-DOE, water collected within the landfarm containment area sumps will be treated by an oil-water separator prior to being reused in process or discharged to the reclaim pond. Reclaim pond water is not planned to be discharged to the environment during operations. Moreover, reclaim water remaining at the end of operations will be treated as required before being discharged to the Portage Pit Lake (Application Documents 467, 500). Finally, the Portage Pit Lake will be isolated from the natural lake environment until discharge water quality monitoring indicates that the water is of suitable quality to be released. Given the above control measures, **Agnico-Eagle proposes to treat landfarm water using a oil-water separator only**. As noted by GN-DOE, Agnico-Eagle is committed to monitoring and treating contact water prior to discharge to the environment.
GNDOE-20	**C. Spill Contingency Planning**	Issue #9: Spill Contingency Planning p17-19; p23-25	GN-DOE believes the Spill Contingency Plan is generally satisfactory; however, we have provided specific comments below for further improvement. Additionally, GN-DOE recognizes the plan cannot be fully completed until the mine and associated infrastructure is in place and operational. Spill plans are evolving documents that must be updated from time to time to adapt to changing circumstances	*The applicant is expected to re-visit and revise their spill contingency plan when the mine becomes operational* ; subsequent to this, the plan should be re-visited and updated yearly.	AEM commits to review the Meadowbank spill contingency as needed (at a minimum on an annual basis) and update the plans as warranted. The updated spill contingency plans will be made public and provided to the KIA, NWB, GN DoE, Hamlet of Baker Lake and INAC Water Resources.
GNDOE-21	**D. Closure & Reclamation**	Issue #10: Closure & Reclamation p19-21	The applicant has submitted a *Preliminary Closure & Reclamation Plan* (Doc. 511) describing how the project site will be restored after closure, and further indicated in page IV of Doc. 511 that a final version of the plan will be submitted. However, the timeline of this submission is unclear, and whether the applicant will seek consultation with relevant regulators such as GN-DOE on the final plan.	The applicant should clarify when the final closure and reclamation plan will be submitted, and should commit to submit this final plan to relevant regulators such as GN-DOE for review	The INAC Guidelines for preparation of mine closure plans indicate that at this phase in a mine development the Mine Closure Plan is to be referenced as a Preliminary Closure and Reclamation Plan. AEM commits to review the Meadowbank Mine Closure and Reclamation Plan as needed (at a minimum on an annual basis) and update the plan as required. The updated Mine Closure and Reclamation Plan will be made public and provided to the KIA, NWB, GN DoE, Hamlet of Baker Lake and INAC Water Resources. In accordance with the INAC Guidelines the Plan will not be finalized until several years before the projected date of mine closure so that the as built conditions are appropriately addressed.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-22		p19-21	GN-DOE is concerned about the proposed timeline for monitoring re-vegetation success at disturbed project sites post-closure.	The applicant should clarify when the final closure and reclamation plan will be submitted, and should commit to submit this final plan to relevant regulators such as GN-DOE for review	AEM will continue to monitor the conditions at the reclaimed Meadowbank site, including the success of revegetation measures until the landowner (the KIA) and the NWB are satisfied that the site is chemically and physically stable and that the ongoing risk of release of contaminants to the surrounding environment has been adequately addressed. AEM has this responsibility to the landowner. AEM has predicted that it will take many decades for natural vegetation using native plants to become successful established over the lands disturbed during mining. The performance of site vegetation will have to be monitored well into the future however given the extended timeframe and slow pace of growth this monitoring will not be required every year. Once the reclaimed site is confirmed to be physically and chemically stable, then vegetation monitoring can be completed through site visits at intervals of five to ten tears apart.
GNDOE-23		p19-21	GN-DOE is concerned about the proposed methodology to restore disturbed wildlife habitat sites. The applicant indicates on page 11-2 of the Doc. 511 that they will cover the Tailings Storage Facility and Rock Storage Facilities with a layer of coarse grained waste rock, with potential to add another layer of fine till.	The applicant is recommended to cover waste rock piles with finer grain materials and/or to provide corridors through the rock piles to ease wildlife passage	As a component of final reclamation of the Tailings Storage Facility (TSF) and Waste Rock Storage Facilities (RSF) AEM will ensure that slopes are graded and shaped so that safe wildlife passage through the reclaimed minesite is not impeded. AEM does not recommend that the TSF or RSF be considered suitable wildlife habitat in the future. The underlying tailings and waste rock contain elevated levels of metals in comparison to other lands and thus wildlife browsing should not be encouraged on these reclaimed facilities. AEM will cover both facilities with a layer of coarse grained non acid generating waste rock to ensure that the summer active thaw layer stays within the capping layer and to provide an isolating barrier between the surface and underlying material. AEM does not recommend placing soils on top of the TSF or RSF for the following reasons: a) There is very limited availability on site of any organic soils for reclamation and these should be used in priority areas for establishment of vegetation (disturbed lands draining into local watersheds) and b) to discourage the use of the capped TSF and RSF by wildlife for future browsing activity.
GNDOE-24		Issue #11: Water Quality & Closure p21-22	The closure plan incorporates the use of a cover of NPAG material to ensure geochemical stability on the Portage Rock Storage Facility (RSF) and the Tailings Storage Facility (TSF); however, it is proposed that the Vault RSF will not require a cover. It is presented that the decision to cap one but not the other is based on current geochemical understanding and the predicted water quality. The long term geochemical stability of the RSFs and TSF is dependent on assumptions that the establishment and maintenance of frozen conditions will occur, that the proposed classification of waste rock is correct, and that management plans will be appropriately implemented and mitigation measures are successful	The applicant should revise closure plans regarding the TSF and the RSFs as operational information and management plans are revised	AEM agrees. The Vault waste rock is not potentially acid generating and thus will not warrant special waste rock management procedures to prevent acid generation. This will be confirmed during the mine life through additional waste characterization of the Vault deposit as it is mined. The Mine Closure Plan will be updated accordingly.

Table 2a: AEM Response to Meadowbank Type A Water License Intervenor Comments - Government of Nunavut Department of Environment (GN-DOE)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
GNDOE-25		p21-22	The Mine Waste and Water management plan (Doc. 500) suggests that freezing conditions will not be established until 10 to 15 years after operations cease and it is unclear the post-closure monitoring period (pg 14-2, Doc. 511) or if it incorporates thermal monitoring	The applicant should clarify the timing of post-closure monitoring of the TSF thermal conditions; the Mine Waste and Water Management Report (Doc. 500) suggests that freezing conditions will not be established until 10 to 15 years after operations cease and it is unclear the post-closure monitoring period	Doc. 500 states that the degree of freezing, time to reach fully frozen tailings, and the depth of the frozen foundation below the tailings pile will be dependent upon the placement of the tailings and the duration of the exposure of the tailings to air temperature. The 10 to 15 year period was provided as reference to the upper limit of thermal modelling results for a select range of tailings properties and climatic scenarios (see Application Doc. 420 for more detailed description of thermal modelling), and not as a definitive statement on the anticipated time to freeze post-operations. AEM will continue to monitor the thermal conditions within the Tailings Storage Facility (TSF) through the final decommissioning phase, through the placement of the proposed waste rock cover and through the post closure time period until it can be clearly demonstrated that the underlying tailings mass has fully frozen and no longer presents an environmental risk to the surrounding environment. For the purposes of estimating reclamation liability it has been assumed that this will require a minimum post closure time period for this monitoring of 15 years, AEM is responsible to the landowner and committed to continue this thermal monitoring until the landowner (the KIA) and the NWB are satisfied that the TSF thermal conditions have been verified and that the risk of release of contaminants to the surrounding aquatic environment has been adequately addressed. This thermal monitoring will also be used to verify the pre-development predictions of TSF performance with a minimum 2 meter thick rock fill cap and will be used to adaptively modify this cap design (thickness, etc) to ensure that the underlying tailings are physically and chemically stable after reclamation has been completed.
		p21-22		The applicant should commit to monitor thermal conditions within the Vault and the Portage RSF areas with mitigative measures implemented if predicted thermal response is not realized	AEM agrees with this and intends to monitor thermal conditions and chemical drainage conditions in both RSF to verify physical and chemical stability. Mitigative measures will be employed if monitoring indicates that chemical and physical stability are not present.
GNDOE-26		p21-22	The applicant proposes that water quality in the flooded pits will be monitored and predictions indicate that the chemical constituents will comply with MMER criteria and CCME FWAL criteria except for arsenic, cadmium, chromium and manganese	The applicant should ensure the water quality of the flooded pits meets the CCME FWAL criteria (i.e., metals) prior to dike breaching	AEM commits that water quality in the flooded pits will be monitored and that the dikes will only be breached once regulatory approval has been provided. It is our intent that water quality will either meet CCME FWAL criteria or match existing background water quality in Second and Third Portage Lake or that water quality will not result in downstream environmental harm as demonstrated through risk assessment and only with KIA and NWB approval.

Table 2b: AEM Response to Meadowbank Type A Water License Intervenor Comments - Indian and Northern Affairs Canada (INAC)

No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-1	**General Conditions**	Sec 2.1 pg.2 and Sec.2.4.1 pg.3	In a December 10th, 2007 letter from the NWB to AEM, NWB appeared to accept the proposal by AEM that the NWB grant a Water Licence with the condition that AEM provided detailed technical review and expert analysis of the final design of the Goose Island Dike.	This expert review will be required prior to commencement of the Goose Island Dike (at least 12 months).	AEM commits to establish a geotechnical expert review panel to oversee and provide advice on the geotechnical design and operation of all dewatering dikes and dams at the Meadowbank Project. Dr Morgenstern has agreed to head this panel and report to AEM. This panel will review and provide comment on the design of the Goose Island Dike. The design will be provided for NWB approval at least one year prior to the start of planned construction (summer of 2010).
INAC-2		pg.2	Dr. Norbert R. Morgenstern suggested in a March 30, 2007 draft letter to Cumberland Resources Ltd. that the Proponent form an independent dike safety review board.	This approach has been used at Diavik and other mines and is strongly recommended by INAC and its review team for the Meadowbank Gold Project as a general condition of the Licence	AEM commits to establish an independent review panel under Dr Morgenstern's leadership to review all aspects of dewatering dike design, construction, operation and monitoring
INAC-3	**Design and Construction**	2.3.1 Mitigative Measures For Seepage From Tailings Facility pg.2	Rpt 371 appears intended to address the issues identified in Condition #20 and states "Natural freezing of the Central dyke and the Tailings Storage Facility (TSF) resulting permafrost encapsulation (a natural process resulting from climatic conditions at the site)". However, the thermal analysis (rpt 420) does not appear to have considered the implications of seepage on the development of permafrost in the dyke or TSF. The analysis of seepage may have over-predicted the development of permafrost in the dyke and TSF.	The statement that permafrost in the dyke and TSF is a mitigative measure may be inappropriate.	Application Document 375 Section 2 (see also Application Document 500 Section 6.4) lists a number of measures that will reduce the risk of potential seepage from the TSF including installation of a grout curtain beneath the Central Dike, westward advancement of the Reclaim Pond within the TSF, maintenance of a tailings beach at the dike, and natural freezing resulting in permafrost encapsulation. The dike design (Application Document 420) makes the conservative assumption of completely unfrozen conditions to assess seepage. Nevertheless, **Agnico-Eagle has committed to further seepage/thermal/transport modeling which is in progress as of February 2008.**
		pg.2		A coupled seepage and thermal analysis should be carried out as originally noted in NIRB Commitment #65.	
INAC-4		2.3.1 Mitigative Measures For Seepage From Tailings Facility pg.2	Reference is made (Rpt 500) to an evaluation of the effect of groundwater flow on tailings freezing using a coupled model for advective groundwater flow and conductive heat transport.	The report infers that this numerical model predicted minimal effects on the timeframe for tailings freezing, although a clear demonstration of these minimal effects on tailings freezing was not presented.	Section 6.3.1 of Application Document 500 clearly states that a coupled seepage-thermal model had not been developed by the time of application submission. The text refers to the seepage modelling presented in Application Document 420, and notes the conservative assumptions used in the analysis. **Agnico-Eagle has committed to further seepage/thermal/transport modeling which is in progress as of February 2008.**

Table 2b: AEM Response to Meadowbank Type A Water License Intervenor Comments - Indian and Northern Affairs Canada (INAC)

No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-5		2.3.2 Final Report, Design Of Dewatering Dykes pg.3	Sections 6.4.1 and 6.4.2 note that a turbidity barrier will be put in place prior to placement of materials in the lake and that the two rockfill embankments will be placed by “bulk-heading” with the till subsequently placed between the two rockfill embankments. Figure 6.1 shows the till being placed somewhat behind the advancing fronts of the two rockfill embankments. Since the till contains a significant portion of fine material (on average about 25 percent silt and clay sizes), a considerable amount of sediment may be expected to be released into the water column between the rockfill embankments with only the turbidity barrier to prevent the turbid material from reaching the larger lake environment.	AEM should consider additional methods to limit the potential release of sediments into the environment such as by placing the entire length of the outer rockfill embankment before any till is placed inside do the rockfill will act as a filter for the sediments reduced by the till when it is placed in the water.	Core material will not be placed until rockfill embankments have been closed shore to shore.
		pg.3		The implications of this issue and alternative methods on aquatic resources should also be reviewed.	
INAC-6	**Final Design of Dewatering Dikes**	2.4.1 Use of Cement in All Cutoffs pg.3	AEM does not commit to using cement in the cutoff wall for the initial construction for the East and Bay Zone Dikes.	If the proposed design approach is to follow an observational approach drawing on experience from design and construction of dikes in water depths of less than 10 m to support (prove) the future design of the same concept for use in water depths of greater than 10 m, then INAC believes that cement should be considered for all initial cutoffs to provide an important link to the rest of the designs, to reduce the possibility of unexpected high water volume management and to reduce the likelihood of internal erosion.	Bay Zone Dike includes cement in cutoff. **Agnico-Eagle is considering use of cement in East Dike. Cutoff design, including use of cement, is based on hydraulic gradient and water depth, not dike location**. See discussion in Application Document 342 Appendix IV.

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No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-7		2.4.1 Use of Cement in All Cutoffs pg.4	Dr. Morgenstern highlights that the special considerations of the cutoff wall are: 1. Ability to embed the cutoff wall in the bedrock. 2. Ability to seal the cutoff wall/bedrock interface. 3. Consolidation and resulting properties of the till core. 4. Response of the cutoff wall to lateral loads as a result of deformation of the till core.	Suggest adding internal erosion (piping) at the dike foundation and lakebed contact to list of considerations. If an erosion resistant cutoff is not constructed and if the lakebed is not prepared before placing of the till core, a potential exists for piping failure after dewatering of the pit. AEM should show that piping is not a possibility or AEM should either design for the possibility or piping and/or provide clear direction for an Emergency Response to an erosion pipe developing under the dike.	1) The dike design does consider piping and internal erosion, and therefore includes a granular filter and grouting of the bedrock (see Application Document 342). 2) The use of cement in the cutoff design is governed by hydraulic gradient, or more simply, by water depth. The cutoff at the abutments of the East Dike includes soil-cement-bentonite for protection against preferential flow associated with freeze and thaw. Agnico-Eagle is considering the use of cement in other sections of the East Dike. Cement is included for erosion protection in the cutoff for the deeper water sections in the Bay Zone and Goose Island Dikes. 3) Construction will include preparation of the foundation, including the bedrock surface at the cutoff alignment, and grouting of the cutoff/bedrock contact. 4) Till borrow material has been characterized with respect geotechnical behaviour by laboratory testing, and lateral deformations have been predicted to be minor for the East Dike. 5) **Agnico-Eagle is currently developing adaptive management strategies, such as revision of the core material specification, in order to mitigate other risks to construction schedule associated with long times to consolidation.**
INAC-8		2.4.2 Dike Instrumentation: concerns with design of instrumentation program & explanation of instrumentation for initial construction pg.4	Specifications call for the use of vibrating wire piezometer model Geokon 4500MLP which is designed to provide intimate contact with the wall of the borehole reducing potential for lag time in monitoring pore water pressure. Literature describing the installation of the 4500MLP references boreholes in cohesive materials which provide wall stability. The core till within the dewatering dike may not exhibit these characteristics and casing may be required to maintain an open hole.	Installation may be cumbersome therefore alternative models of vibrating wire piezometers should be explored as a contingency	**Contractor to provide plan for instrumentation installation that suits the specific construction equipment that will be provided by the Contractor. Plan to be approved by engineer prior to completion. If any instrumentation does not work, fails, or requires maintenance during the life of the dike, then it will be replaced or repaired.**
INAC-9		2.4.2 Dike Instrumentation: concerns with design of instrumentation program & explanation of instrumentation for initial construction pg.4	The thermistor cable leads and piezometer cable leads are to be extended from the installation location to the data logger sheds in PVC conduit. No allowances have been made to use multi-conductor cable to limit the quantity of cable lead. From each crosssection of the dewatering dikes there will be 13 to 16 cables that have to be extended and bundled through PVC conduit.	This could prove to be a monumental task of managing electrical cables as well as plumbing PVC pipe as each additional cross-section joins up with the trench	**Contractor to provide plan for instrumentation installation that suits the specific construction equipment that will be provided by the Contractor. Plan to be approved by engineer prior to completion. If any instrumentation does not work, fails, or requires maintenance during the life of the dike, then it will be replaced or repaired.**

Table 2b: AEM Response to Meadowbank Type A Water License Intervenor Comments - Indian and Northern Affairs Canada (INAC)

No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-10		2.4.2 Dike Instrumentation: concerns with design of instrumentation program & explanation of instrumentation for initial construction pg.4-5	Specifications for inclinometer casing call for an externally coupled shear wire connection. The anticipated settlements within the core till are 2.5 metres prior to dewatering.	There is no mention of anticipated settlements post pre-loading of the core till and prior to dewatering. There will likely be some settling of the core till however no allowance has been made for collapsible joints in the inclinometer casing. There is a good chance the inclinometer pipe will fail as a result of high vertical deformations due to settlement if it is not allowed to collapse. This would preclude use of the instrument for any longer term evaluations of horizontal deformations;	**Contractor to provide plan for instrumentation installation that suits the specific construction equipment that will be provided by the Contractor. Plan to be approved by engineer prior to completion. If any instrumentation does not work, fails, or requires maintenance during the life of the dike, then it will be replaced or repaired.**
INAC-11		2.4.2 Dike Instrumentation: concerns with design of instrumentation program & explanation of instrumentation for initial construction pg.5	Slope indicator installations in an uncemented cutoff are expected to be problematic for the dewatering dike cutoffs without adequate strength (typically provided by using cement).	The following questions should be raised: Do Slope indicator need to be installed in the cutoff? Or would SI's on either side of the cutoff serve the designer's purpose.	**Contractor to provide plan for instrumentation installation that suits the specific construction equipment that will be provided by the Contractor. Plan to be approved by engineer prior to completion. Inclinometer casing installation and use are common.**
		2.4.2 Dike Instrumentation: concerns with design of instrumentation program & explanation of instrumentation for initial construction pg.5		What is the expected strength of the soil-cement backfill within the cutoff wall? Will this strength be sufficient to transfer lateral pressures to the inclinometer pipe?	
				How will the inclinometer pipe be installed within the soil-cement backfill?	
				What method of drilling is proposed?	
				What methods are proposed to check the QC of the soil-bentonite and soilcement backfill?	

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No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
				Figure 6000-31, Typical Section A, shows the inclinometer pipe and thermistor cable are installed within the cutoff wall. The section is confusing in that it shows lake bed till - the cutoff wall is to extend to the bedrock therefore no lake bed till. Also, the inclinometer pipe and thermistor cable are positioned 5 metres from centerline piezometer. What is the centerline piezometer?	QC plan for slurry trench backfill is to be submitted by the Contractor for review and approval by the Engineer - see Application Document 342, Appendix V, Specification 1000-05 Section 2.10. Lakebed surface on Drawing 6000-31 and 32 is a dashed line indicating it is not on the section. Final quantities to be taken from drawings. Drawings and quantities to be clarified for construction. Piezometers are offset 2 m perpendicular to dike centreline and 5 m along the dike crest.
				The report includes a summary table for thermistor cable locations and slope inclinometer locations but not a summary table for piezometer locations.	
				Drawing Nos. 6000-31, 32 show typical piezometer layout. Twelve piezometers per cross-section and 16 cross sections. 192 piezometers, 32 thermistor cables 488 beads) and 16 slope inclinometers. Document 342 Volume 1 Section 6.5.6 states 56 piezometers and 18 thermistors.	
INAC-12		2.4.3 Central Dike Instrumentation pg.5-6	Several instrumentation and constructability and layout questions follow	Shallow piezometers are to be placed upstream of grout curtain under a concrete mat and bituminous liner and, as well, thermistor cables and piezometer cables are to be installed along the slope and crest of the embankment through the bituminous liner. Discussions for these sequences is lacking, including whether the installation may jeopardize the integrity of bituminous liner since access for monitoring purpose during construction to the thermistor cable and piezometer cable locations will require foot traffic on bituminous liner. Little discussion of piezometer installations within the fault zone was found.	Contractor to provide plan for instrumentation installation that suits the specific construction equipment that will be provided by the Contractor. Plan to be approved by engineer prior to completion. Bituminous liner was selected for durability - it may be walked on - and for cold weather construction - it may be welded at -25C. Leads are not to cross the liner. Upstream piezometer leads run up the face. Thermistors leads running along the slope are below the liner, within the fine filter and do not cross the liner. Instrumentation section locations would be optimized in the field based on subsurface conditions. The existing thermistor layout provides adequate information to determine temperatures within the dike.
				Horizontal thermistor bead spacing of 20 metres have 6 beads per cable. AEM does not indicate why only 6 beads installed per cable are proposed when closer spacings would require little extra cost and would permit the failure of a bead without seriously jeopardizing loss of information.	
				AEM should clarify why, although the thermistor cable installations extend 5 metres into bedrock, none of the cables are planned to extend deeper into bedrock.	
INAC-13	**Water Management**	2.6 pg. 6	Non-contact water is discussed in the context of the proposed final discharge water quality criteria from the Portage and Vault Attenuation Ponds (Report #515). Noncontact water will be diverted and discharged to the receiving environment throughout mining operations, based on water turbidity as the monitored parameter.	Greater assurance is warranted to demonstrate that non-contact water has not mixed with water exposed to mining activities, so that all non-contact water can only be released to the receiving environment via a surveillance monitoring location.	Non-contact water diversions are included as compliance monitoring (CM) points within the proposed Water Quality and Flow Monitoring Plan (Application Document 450) for the Project. AEM commits to the inclusion of monitoring of diverted non-contact waters in the WL SNP to assure that all water being released from the Project is meeting standards to protect the receiving environment. Specifically, AEM proposes to monitor non-contact water for pH, TSS, sulphate, As, Cu, Pb, Ni, Zn, total cyanide and turbidity during operations and closure in accordance with the revised monitoring table (Doc. 626) provided as an appendix to this submission.

Table 2b: AEM Response to Meadowbank Type A Water License Intervenor Comments - Indian and Northern Affairs Canada (INAC)

No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-14		pg. 6	The top elevation of the shoreline protection system to protect the diffuser pipe from ice action at the shoreline is set at 135.0 masl for Third Portage Lake.	During technical conference calls, AEM agreed to provide the Board with an explanation of how this elevation was determined and an estimate whether this elevation will be exceeded during the lifespan of the project.	**The selection of a top elevation of 135 masl was based on natural Third Portage Lake levels reported by AMEC (Meadowbank Gold Project Mine Dewatering Analysis of Effects, Nov. 2005) during the EA process.** A copy of this report can be provided if requested; however, for ease of reference, 100-yr wet spring water levels are estimated to be 134.19 masl. **Agnico-Eagle will undertake regular maintenance inspections of the shoreline protection system, and intends to monitor lake levels within both Third Portage and Second Portage lakes throughout operations.**
INAC-15	**Waste Management Design and Plans**	2.7.1 Incineration Waste Management Plan pg. 6	This is a conceptual document. The incinerator (type and size or performance) has not been selected nor has the location of the facility been identified. been selected nor has the location of the facility been identified. One idea is to locate itnear the landfill, although a location nearer to the camp and administration complex may be more appropriate for proximity to electrical power. The document provides only a concept and outline of the proposed incineration plan. All waste materials that may cause odours, are included for incineration (foods, paper/wood, food packaging, sewage sludge, dead animals). A comment on Page 5 says “the incinerator at Meadowbank will be designed for, and achieve, compliance immediately upon attaining normal full scale operation”. This comment could imply that the incinerator may not be in operation or operate effectively for conditions other than full production.	For license approval, the proponent should provide the initial attempt at selecting the incinerator type and size to handle the projected waste stream. In addition, the proponent suggests a bag house may not be needed. Before drawing this conclusion, the proponent must provide the pre-design selection process for the incinerator and performance standards and also allow for provision of a bag house, based on appropriate modeling.	The site incinerator will be an off the shelf purpose built dual chamber, forced air high temperature incinerator package specified to meet the CWS for Dioxins and Furans and Mercury. Being a pre-packaged unit AEM expects that this incinerator will meet the CWS Guidelines from the first start up provided that it is operated correctly and that only appropriate waste is sent to the incinerator as is AEM's intent. The incinerator will be sized to burn all putresicible kitchen wastes, all paper and packaging materials that has been in contact with food such as camp, office and lunchroom wastes. During construction STP filtered sludge will also be incinerated. The objective is to deflect from the landfill and only incinerate those wastes that could cause odours that could otherwise attract wildlife. All other conbustible wastes will not be burned but sent to the site landfill. The incinerator will be located on the plant site to the west of the mill and to the north of the fuel storage tank (see Hatch Drawing 600-C-0114 in Appendix J for location). The incinerator unit will be sited on the NW corner of a 10,000 sq m rockfill pad designated for the temporary storage and segregation of non-hazardous wastes pending their transfer to the site landfill. AEM does not believe that a baghouse unit will be required on this incinerator due to the relatively small volumes of waste to be burnt and the use of a high temperature forced air unit but commits to retrofit such facilities if stack monitoring indicates that such a unit is required to meet discharge standards in Nunavut. AEM has committed to annual stack monitoring to verify that these emission standards are being met.

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INAC-16		2.7.1 Incineration Waste Management Plan	On Page 7, Sec 3.3 it states that any waste ash above criteria will be buried in the tailings storage facility. This may contravene the regulatory requirements. Section 4.0 suggests that the incinerator has not been selected. On Page 14, the data identified suggest that an incinerator may have been selected but no details are provided. Many sections of this document appear contradictory and need clarification. It also is not clear if the tailings storage facility will be lined to control any unwanted leachate development from materials that cannot go in the landfill.	as above	Incinerator ash will be tested on a regular periodic basis to check for levels of contaminants such as metals. The ash will be disposed of in either the landfill or within the TIA. If the ash is found to contain high levels of contaminants it will be packaged in drums or other appropriate packaged and sent to a hazardous waste disposal site in the south. AEM requests advice from the GN DoE on what standard would be appropriate for making this distinction. The landfill has been carefully sited so that all seepage will drain into the TIA and thus deflected from water to be released to the environment. Water from the TIA will be recycled to the mill as part of the process water.
INAC-17		2.7.2 Landfill Design and Management Plan pg.7	Supplemental information provided on the Portage Rock Storage Facility appears complete. The base of the landfill appears to be on gravel and therefore permeable material.	Any potential leachate developed through the base will need to be monitored.	All leachate from the landfill will report to the Waste Rock water collection system. The water is proposed to be collected within sumps that will be monitored for water quality. Depending on results of monitoring, the sump water will be pumped to either the attenuation pond (years 1 to 5) or the Reclaim Pond.
				The landfill monitoring plan should include both a surface water and groundwater monitoring program.	
				The management plan and the incineration plan allude to waste diversion and purchasing practices to minimize wastes, but details were not provided.	AEM will work with suppliers to minimize packaging by purchasing materials in bulk where practical. Waste materials that can be practically recycled will be segregated and stored separately within the landfarm footprint pending recycle or reuse.
				For landfill final closure, the final cover must have a design that will provide long-term care of the site that also minimizes greenhouse gas development.	The final cover on the landfill will be of sufficient thickness to prevent material being frost heaved from the closed landfill. AEM committs to monitor water quality draining from the landfill to aid in mine closure planning. See AEM Doc 627 in Appendix I for additional information on use of Non-PAG waste rock and proposed thickness of the final rock covers over the two proposed landfill sites.
INAC-18		2.7.3 Landfarm Design and Management Plan pg.7	Document suggests the holding time for hazardous waste material is an open-ended period.	The holding time for hazardous waste material should be per regulation.	Other hazardous wastes will be packaged and shipped off site on an annual basis via the annual sea lift under a GN Waste Generator Manifest to an appropriate southern recyling or disposal facility. In most cases waste will be shipped annually with the caveat that small volumes may be retained until the following year until a suitable volume of common waste is generated to justify off site shipment.

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No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
			Page 11 indicates that contaminated snow may be removed	Contaminated snow should be handled and treated as contaminated water	It is AEM's intent that all hydrocarbon contaminated snow generated by the project will be transported to the assigned snow melt cell in the landfarm. Upon melting the hydrocarbons would be recovered to the maximum extent possible using adsobent media. The remaining snowmelt would be treated through an oil water separator unit, the water tested and released through the reclaim pond once water quality has achieved the water license discharge standard for such release. In the unlikely event of a large volume of contaminated snow being generated that would overwhelm the planned landfarm then the snow would be moved to an alternate contaniment area such as the fuel tank farm containment where the snowmelt can be contained and treated as above. This would only be done with the consent of the KIA, GN DoE, NWB and INAC Water Resources.
INAC-19		2.7.4 Supplementary Info on STP pg.7	The movement and quality of treated effluent is unclear, including transfers to Tear Drop Lake. A model and specification for the proposed sewage treatment plant has been identified (Model L-400, BioDisk Corp., Ontario). The design basis for secondary treatment appears to be sufficient, with waste sludge being sent to the incinerator.	AEM should clarify, in one document, the route for sewage, especially during construction.	AEM is currently working with Raymac Environmental and Seprotech of Ottawa Ontario to ensure that the proposed Meadowbank sewage treatment facilities meet the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest. AEM has provided a copy of this guidance to Seprotech along with a copy of the recent Water License for the Doris North Project as an example of expected STP discharge standards. During operations the treated sewage effluent and sludge will be co-disposed with mill tailings in the TIA and the water recycled to the Mill. During construction treated STP effluent will be discharged into Tear Drop Lake (the proposed site stormwater management pond). The sludge will be filtered and the dried filter cake incinerated. The plant discharge will be monitored under the Water License and the results reported under the SNP. AEM will raise the level in Tear Drop Lake to maximize retention. Excess water meeting acceptable discharge criteria will be pumped into the northwest arm of Second Portage in the area of the proposed attenuation pond thus providing significant dilution of the treated effluent during the construction phas See the Ltr dated March 06, 2008 entitled "Clarification - Meadowbank Sewage Treatment Plant Design" in Appendix K for additional information on the design, layout and capacity of the proposed STP facility with proposed contingent measures for malfunctions.

Table 2b: AEM Response to Meadowbank Type A Water License Intervenor Comments - Indian and Northern Affairs Canada (INAC)

No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-20		2.7.5 Underground Water Quality pg.7-8	Predictions of mine pit water quality are based on a groundwater monitoring well network of seven wells. For the period 2003 to 2007, 13 groundwater samples plus field duplicates, were collected from which baseline groundwater quality values were presented for the main rock types in the mine pits and tailings storage areas (Reports #317 and #548). This dataset was used in the context of the accelerated mine plan (8,500 TPD) to predict mine water quality requiring storage and ultimately treatment (Report #499). Parameter sensitivity analyses indicate significant changes to the predictions of mine pit water quantity and quality will occur if the baseline water quality or hydraulic conductivity of the Bay Zone and Second Portage faults, or other fractured rock flows, are underestimated.	Continued validation of this mine pit model is warranted using actual mine pit water data when it becomes available, to compare actual to predicted mine water balance and water treatment requirements for demonstrating the underlying reliability of the basis for all operational and post-closure water quality commitments.	The NIRB commitment to replace faulty monitoring wells will be executed in summer 2008 with installation of 3 new wells. Groundwater quality will continue to be monitored, as well as pit sump water quality, as described in Application Doc. 450 (an Internal Monitoring site). **Agnico-Eagle is committed to updating and re-running the water quality model as additional mine water data becomes available through operations.**
INAC-21		2.7.6 Proposed Water Treatments pg.8	The proposed water quality criteria for Portage and Vault Attenuation Ponds (Report #515) describes contact water will be discharged during mine operations, contingent on the water quality complying with the water quality standards specified in the MMER.	Contingencies are provided if reclaim (process) water does not meet release standards,although details of contingencies are not described for the attenuation ponds.	Discharge of contact water to the environment during operations is currently planned from the Portage Attenuation Pond in Years 1 to 5, and from the Vault Attenuation Pond in Years 4 to 9 (refer to Doc. 500). Discharge of reclaim pond water to the environment during mine operations (see Application Document 500). **Application Document 467 provides contingency water treatment plans for Attenuation Pond and Reclaim Pond water.**

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No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-22	**Contingency Planning**	2.8.1 Spill Contingency Plan pg.8	The current spill contingency plan is inadequate to cover all aspects of the project and other spill plans exist. Report #483 does not discuss spill contingencies for the proposed all-weather road or marina, which is included under the B licence.	Before a water licence can be approved, these contingency plans need to be finalized and accepted. As requested by NIRB, a more comprehensive risk assessment of spills is equired to include cyanide, hazardous materials and pit/dike/dam failures with mitigation alternatives and consultation with local communities.	Spill contingency plans for the All-Weather private Access Road, Baker Lake Marshalling Area and the marine shipping environment were reviewed and approved under a separate Type-B Water License. Copies of these spill contingency plans were provided on the Application CD sent to all the interveners in December 2007, or may be obtained from the NAB ftp site, Username: public, Password: registry at ftp://nunavutwaterboard.org/2AM%20-%20MINING/2AM-MEA/ or by contacting Agnico-Eagle Mines Ltd. at lconnell@agnico-eagle.com. **Agnico-Eagle is committed to the preparation of an overall spill contingency plan which incorporates all aspects of the Project.** An accidents and malfunctions report (Document 196) was prepared in April 2006 to address NIRB Condition #75. This document may also be obtained from the NWB ftp site, Username: public, Password: registry at ftp://nunavutwaterboard.org/2AM%20-%20MINING/2AM-MEA/ or by contacting Agnico-Eagle Mines Ltd. at lconnell@agnico-eagle.com. It should be noted however, that the **information provided in Document 196 has been included and expanded in the Emergency Response Plan (Application Document 482 Section 5, Appendix A), Spill Contingency Plan (Application Document 483 Section 6 and Appendices) and Hazardous Materials Management Plan (Application Document 457 Sections 5 through 8, Appendices C through E).**
INAC-23		2.8.2 Emergency Response Plan pg.8	The currently proposed Emergency Response Plan requires an amendment which will satisfy NIRB's request for involving the local communities in the Plan.	Amendments should be completed before a water licence is approved.	AEM is currently working with the Hamlet of Baker Lake to begin coordination of emergency response teams and procedures. Response will be updated as these processes evolve. AEM and the hamlet are currently working on search and rescue procedures as priority 1.
INAC-24	**Closure and Reclamation**	2.9.1 Disposal of Buildings and Infrastructure pg.8-9	If buildings and infrastructure cannot be safely or economically salvaged, the disposal at open pits and/or rock facilities (waste dumps) is only recommended if a strict policy for avoiding placement of toxic or hazardous materials is implemented.	A cleaning and stripping area is recommended to remove oil, grease, fuels, chemicals and any other material which may be harmful to the environment.	All buildings and equipment will be cleaned of potentially hazardous materials prior to demolition.
				After placement of these materials into the open pits or rock facilities, a monitoring and remediation program should be developed and established to report on any long-term impacts on the environment.	All non-salvageable demolition debris and equipment will be placed permanently in the proposed demolition landfill to be constructed within the Portage RSF. AEM will not use the open pits to dispose of demolition debris or equipment. This commitment was recently communicated to NWB and NIRB in a letter.

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No.	Aspect	Technical Comment # Page Refernece	Comment/Concern	Intervenor Recommendation	AEM Response
INAC-25		2.9.2 Tailings Cover pg.9	A two metre thick cap is proposed for covering tailings during reclamation	A plan to install and monitor this capping is recommended to verify the adequacy of the cap and make adjustments as necessary to protect the environment	In accordance to NIRB Conditions #18 and #19, **Agnico-Eagle is committed to providing a minimum of two (2) metres cover of tailings at closure to confine the active layer within relatively inert materials, and will install instrumentation as required to monitor tailings freezeback efficiency and cap performance.** Agnico-Eagle has also committed to a pro-active tailings management strategy through active monitoring, inspection, and mitigation. The tailings management strategy will include the review and evaluation of any future changes to the rate of global warming, compliance with regulatory changes, and the ongoing review and evaluation of relevant technology developments, and will respond to studies conducted during the mine operation. Further details, including monitoring plans can be found in Application documents 485 (Sections 4.2, 4.9, 6.1), 425 (Section 2.1), 450, 500 (Sections 6, 15), and 511 (Sections 7.3, 12.1, 14).
INAC-26		2.10 Closure Plan pg.9	The proposed closure plan requires amendment to satisfy reclamation of the port facility, rock quarries for road construction and all-weather road (unless this is to become a permanent feature).	The closure plans included under the water license for the road and the laydown area in Baker Lake should be referenced.	AEM commits to combine the closure and reclamation plans previously prepared for the Baker Lake port and marshalling facilities and the all weather private access road to the Meadowbank site with the closure and reclamation of the Meadowbank Mine Closure Plan in the next planned update to the Plan (expected to be in 2010 following the completion of construction phase).

Table 2c: AEM Response to Meadowbank Type A Water License Intervenor Comments - Fisheries and Oceans Canada (DFO)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
DFO-1	**Impacts to Fish & Fish Habitat**	3.1..1 Sediment and Water Quality Issues **Construction pg.4**	<u>Road Construction, Diversion Ditches</u> It is DFO's position that all materials used for works or undertakings, including fish habitat compensation measures such as dikes, shoals and fish compensation works in or near water, is clean competent rock, non-acid generating (NAG) and non-metal leaching (NML). It is likely that many of these impacts from sediment due to construction activities can be mitigated through best management practices, however specific details are lacking. These need to be addressed specifically in the various management plans.	DFO recommends that all construction, operation, modification, decommissioning, abandonment and restoration plans for all infrastructure works or undertakings in or near water include best management practices for sediment and erosion control that will mitigate potential harmful impacts to fish and fish habitat. Management plans should include specific detail of mitigation measures during and after construction as it relates to ice-rich soils, steep slopes, sedimentation control and bank remediation.	AEM is committed to protecting fish and fish habitat from potentially harmful impacts. Best management practices with respect to sediment and erosion control will be used for all works or undertakings near the aquatic environment. Site management plans will include mitigation measures for sedimentation and erosion control. AEM understood that DFO had previously agreed to the use of PAG rock under very specific conditions in the underwater portions of the habitat compensation measures. In an underwater setting this rock will not be a source of net acid generation and a minimal source /or metal leaching thus making it suitable for fish habitat purposes.
DFO-2		3.2. Dike Construction Activities pg.4	Construction of the dikes is proposed to occur by sequentially adding materials into the lake (p 59-60 of Application) which will cause substrate disturbance and fine sediment disruption which will increase turbidity and TSS levels in the lake. This activity will cause sediment to be suspended in the water column and settle out in other areas of the lake. This could potentially disrupt and limit the ability of fish to locate food sources and feed. Additionally the sediment when it settles out could also smother benthic invertebrates and fish eggs or other biota. It is not certain how far this HADD could potentially reach out into the lakes. Sediment that accumulates at a depth greater than 1 mm will smother and kill biota therefore this impact must be minimized and mitigated to the greatest extent possible.	Details should be provided in regards to the projected sediment plumes and details need to be provided on the extent of this disturbance. Details on mitigative techniques to contain the disturbance and impacts should be provided. The Application document (p.59-60) and the AEMP indicates that a silt curtain will be utilized to contain some of the sediment but specific details on the location have not been presented.	Silt curtains will be installed on either side of the dike construction zone to mitigate sediment disturbance to the area. Consequently, no sediment plume is anticipated. Details for the location of the silt curtains is provided in the document "Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine", attached in Appendix A. In addition, the document "Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine", attached in Appendix A, discusses the TSS monitoring plan being developed for the construction period, including the location and frequency of turbidity monitoring and trigger thresholds, and mitigative actions.
				This detailed information needs to be presented in the Plan in relation to background data on lake currents, projected sediment plumes and what measures will be taken to monitor turbidity and sediment accumulation.	

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
DFO-3		3.3. Dewatering Activities pg.5	It is proposed that some of the water to be decanted will be pumped to the natural environment and that some may also be pumped to a number of attenuation ponds or to other lakes. As water levels in the dewatered areas lower, there is potential for sediment to slump and potentially greatly increase TSS and turbidity. The increased levels could potentially harm fish and also result in excess sediment being discharged to some of the lakes. Details are lacking as to threshold values of turbidity and suspended sediment. It is not clear what criteria are to be used to establish threshold limits when alternative areas such as attenuation ponds to allow excess sediment to settle out are to be used. It is also not clear what areas will potentially be used and what the capacity of attenuation ponds will be.	DFO would like clarification and a detailed explanation of the dewatering process and water management during this process to ensure impacts to fish and fish habitat from sediment are fully mitigated. Threshold levels for TSS need to be established for management purposes.	Dewatering will begin in October 2008 from two barges located in the deeper pools in the northwest arm of Second Portage Lake (SPL). The maximum volume of water that may be pumped from SPL is 14 million m3; 6 pumps will operate at 300 m3/hr. The document "Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine", attached in Appendix A, discusses the TSS monitoring plan being developed for the dewatering period, including the location and frequency of turbidity monitoring and trigger thresholds, and mitigative actions.
				It also proposed that a fish salvage operation will occur in conjunction with dike construction and dewatering activities. Since there is potential that fish could become entrained in pumps, proper screening on intakes will be required. DFO recommends that the company adhere to DFO's Freshwater End-of-Pipe Fish Screen Guidelines (DFO 1995) for proper screening and submit engineering designs for approval.	Dewatering pumps will meet DFO end-of-pipe screen requirements.
DFO-4		4.1 Fish Salvage Program pg.5	Meadowbank has been working on developing a specific fish-out program for the project lakes to submit for approval.	The Fish-Out program should follow the general methods listed in DFO's Fish-Out Protocol and should include the following: a) Daily electronic reports of the CPUE phase and numbers on total removal phase b) Results of community consultations c) Method of dealing with excess fish d) Phasing of fish out within Second Portage, Third Portage and Vault Lakes.	A draft fish-out protocol was submitted to DFO for review on Monday February 18, 2008. This protocol includes all of the points (a-d) mentioned here. The current schedule for fish out activities is: East dike (northwest corner of Second Portage Lake) - 2008; Bay Zone dike (Third Portage Lake) - 2009; Goose Island dike (Third Portage Lake) - 2010; and Vault Lake - approximately 2015.

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DFO-5		5 Aquatics Effects Mgmt Program pg.6	It appears that Meadowbank has identified a number of comprehensive monitoring programs; however, many of the Plans are very conceptual. For example in the "Type A Water License Application on page117 in reference to the AEMP, it is stated that; "This program will be developed in detail".	This detail needs to be provided for the completion of an adequate technical review and before a Type A Water Licence is issued. The review is necessary to determine whether the Monitoring Plans will have the scientific rigour necessary to distinguish project impacts from natural variation.	The AEMP is, and will continue to be, an evolving document as more scientific information is collected at the site. Targeted studies will be added to address specific issues as, or if, they arise. It is our understanding that a Type A water license does not require all of the details of the AEMP to be outlined prior to issuance of the license; a condition of the license can be the submittal of the AEMP for approval prior to implementation of the plan. AEM is committed to completing all of the studies, using best management practices with adequate scientific rigour, to distinguish project impacts from natural variation. AEM is committed to meeting the environmental protection goals consistent with the northern mining industry.
				In addition, monitoring should verify impact predictions.	
DFO-6		pg.6	As well, the adequacy of baseline data has not been determined. Meadowbank had also committed during the Environmental Assessment to collect further baseline data during pre operating phases and this information has not been presented.	This information needs to be presented and discussed at the technical sessions in relation to the proposed monitoring plans.	Additional baseline data has been collected in 2006 and 2007, as developed in consultation with DFO. Reporting of this data is currently underway; the reports will be available by March 31, 2008.
DFO-7		pg.6		AEMP needs a detailed table along with mapping or illustrations that identify the specific locations of sample sites, the numbers of samples and each parameter that is proposed for sampling.	This information will be included in the AEMP.
DFO-8		pg.6		The monitoring schedule for the life of the mine and post closure needs to be developed and presented.	A monitoring schedule for the life of the mine and post-closure will be developed and included in the AEMP.
DFO-9		pg.6	Of particular importance to DFO is the monitoring of biological community and the integrity of the aquatic ecosystem	Monitoring needs to be rigorous enough to document that the project does not impact various trophic level organisms such zooplankton that fish such as lake trout or char depend on.	AEM is committed to protecting fish and fish habitat from potentially harmful impacts. All monitoring will be conducted in such a manner, using best management practices with adequate scientific rigour, as to distinguish project impacts from natural variation. AEM is committed to meeting the environmental protection goals consistent with the northern mining industry. Sentinel fish species will be considered when developing the Environmental Effects Monitoring (EEM) program for the site.
				As is mentioned the monitoring program also needs to avoid impacts to fish populations; therefore, sentinels species should be considered when selecting organisms to ascertain metal levels in fish or other biota.	
DFO-10		pg.7	A number of targeted monitoring studies are also identified to deal with particular issues. For instance, all dike faces will be constructed from low metal leaching iron formation rock. There is to be a sampling plan to determine metal levels that leach into the water from the dike material but the plan is very conceptual.	Details need to be provided as to methodology, schedule, sampling apparatus and protocols.	Details for each targeted monitoring study will be developed and submitted for approval prior to program implementation

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DFO-11		pg.7	An additional study mentioned in the AEMP is one to monitor the utilization of spawning habitat by lake trout after dike construction since it is proposed that lake trout will use the dike face.	DFO recommends that details on how the monitoring of the utilization of dike faces as spawning habitat by lake trout after dike construction will be carried out and how success or effectiveness is measured.	Details for each targeted monitoring study will be developed and submitted for approval prior to program implementation.
DFO-12		pg.7	It is mentioned that the principles of adaptive management will be utilized in monitoring activities.	However, details need to be provided in how this will be carried out. Threshold levels for action need to be an integral part of any adaptive Management Plan and since they have not been provided, the Plans are incomplete.	Threshold triggers and mitigative actions will be incorporated into all adaptive management plans.
DFO-13		pg.7	Finally, the requirements for reporting and approving the various monitoring Plans and subsequent monitoring reports needs to be determined and included as conditions of a Type A Water License.		Agreed.
DFO-14		6. Blasting Plan pg.7	A number of outstanding concerns need to be addressed with the blasting Plan to ensure that fish and fish habitat are not impacted during mine blasting operations.	Calculations need to be redone since an Overpressure of 100 kPa was used for calculations when the proponent was advised to use 50 kPa during the EA phase.	**A Technical Memorandum titled "Item #85/85A - Meadowbank Gold Project Blasting Addendum", dated October 6, 2005, was produced by Golder which addressed blast design for ice covered waters, using an instantaneous pressure change of 50 kPa.** The document, which was produced in response to the technical meetings held in Baker Lake on June 2 and June 3 2005, was provided on the Application CD sent to all the interveners in December 2007. Copies of all application and supporting documents may also be obtained from the NWB ftp site, Username: public, Password: registry at ftp://nunavutwaterboard.org/2AM%20-%20MINING/2AM-MEA/ or by contacting Agnico-Eagle Mines Ltd. at lconnell@agnico-eagle.com. Reference Doc 449 Section 12.
DFO-15		pg.7	It is also stated that for portions of dike or shoreline where the 13mm/s guideline is exceeded, modified blast designs can be used or additional fill materials could be placed along the shoreline or dike upstream (lake side) face to increase distance from blast area. This is a concern to DFO since additional fill placed along the shoreline or dike upstream face could result in a HADD if the material is placed in the lake.	Therefore details need to be provided on what will be done for portions that exceed 13 mm/s guideline.	The Technical Memorandum referenced above also presented a diagram of Peak Particle Velocity Isopleths for the 13 mm/s guideline, which indicated that with the exception of a portion of the eastern wall of the Portage Pit, the 13 mm/s guideline will not be exceed with the proposed 77 kg charge weight. The analyses show that for this section of the pit, reducing the charge weight to 12 kg results in non-exceedance of the guideline. The TM goes on to identify other mitigative measures that could be taken to reduce PPV in these areas. Since the time of the writing of the 2005 Technical Memorandum, the dike alignment in the area of the east wall of the **Portage Pit has been modified, and the current design location is such that the 13 mm/s isopleth now remains within the dike footprint itself, so that the guideline is not exceeded for the current set of assumptions used for the analyses**.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
				Provide a detailed vibration monitoring program for blasting activities	It is noted that the analyses make assumptions of site specific parameters for the calculation of PPV for the confinement parameter, k, and for the site specific parameter, b. In reality, these parameters can only be determined through a program of test blasting and blast vibration monitoring and modelling, which will not be undertaken until initial mining is underway at which time a detailed vibration monitoring program will be developed to optimize the blast designs.
DFO-16		7. Closure & Reclamation pg.7	The Closure and Reclamation Plan is conceptual in nature but some detail should be provided in regard to processes on refilling the pits and possible effects on the natural lakes.	Management Plans need to include provisions so that excess water withdrawal of natural water bodies will not occur.	SD 500 Section 12.5 discusses the proposed rate of pit reflooding. Additionally, the document "*Preliminary Assessment of Potential Effects of Pit Lake Flooding on Third Portage and Wally Lake* " has been attached as Appendix D. This analysis was completed based on estimated low flow rates and outlet discharge. This analysis will be reviewed and updated as additional data is collected during mining operations. It is AEM's intention that the rate at which the pits are reflooded is set in balance with available water to ensure that significant draw down of the surrounding natural lakes does not occur.
DFO-17		pg.7	Since dike breaching will not occur until water quality is acceptable within the pits, contingencies need to be developed in the event that dikes will not be breached.	A requirement for contingency planning should be part of the closure plan.	AEM indicated that it would assess water quality as the pits are reflooding and if the trend indicates a situation where the pit dikes could not be breached that it would initiate contingent measures such as water treatment at that time (Doc 500 Section 12.5.1).
DFO-18		8. Habitat Loss, Compensation & NNLP pg.8	The NNLP submitted by Meadowbank has been accepted in principle as a result of discussions during the Environmental Assessment phase where it was determined that the habitat losses could likely be compensated.	However it was expected that there would be changes to the design of some of the compensation works and that there may be other suitable areas or projects for compensation.	Golder is developing detailed NNLP habitat compensation designs (a conceptual design plan was submitted to DFO in February 2008 for their review). Azimuth Consulting and DFO identified/explored other habitat compensation options prior to completing the NNLP.
DFO-19				A chart and schedule should be developed to identify when certain habitat compensation measures are being implemented.	A schedule for building/implementation of habitat compensation measures will be developed following DFO approval of the habitat compensation structures. The schedule will incorporate the need for habitat compensation in a timely manner, construction activities, and the availability of rock.
DFO-20			DFO's concern is that much of the compensation is delayed until mine closure which will result in an extended loss of productive capacity during the time the compensation is deferred. Much of the compensation is also contingent on acceptable water quality within the pit areas.	Other opportunities should therefore be actively pursued before and during the mine operation period so that the effectiveness of compensation can be determined. There may be many opportunities within the watershed as a whole and these have not been explored to the extent that they should be.	The NNLP Addendum (Feb 07) provides for additional habitat during mine operations; this was done at the request of DFO.

Table 2c: AEM Response to Meadowbank Type A Water License Intervenor Comments - Fisheries and Oceans Canada (DFO)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
DFO-21			It will also be very important that effectiveness is determined where compensation has been proposed during operations such as along the face of the dike. This area is supposed to be suitable habitat for spawning and this should be determined during mine operations. Monitoring activities should begin immediately after construction of the dikes to determine if there is a concern due to metal leaching from the rock materials used in dike construction.	Details on monitoring and sampling protocols of the interstitial waters and methods for determining fish use of these areas have not been provided.	A targeted monitoring program on the dike wall will begin 1 year following dike construction. Decision criteria will be implemented into the monitoring program to evaluate the effectiveness of habitat compensation and provide mitigation measures if necessary. Details of the study will be developed and submitted for approval prior to program implementation. AEM has developed models to predict future pit water quality conditions. Contingency measures have also been developed to treat the water in-situ should the water quality exceed threshold criteria. AEM commits to developing alternate compensation measures should the water quality in the pits not be of sufficient quality to breach the dike walls.
				In addition threshold levels should be determined so that an adaptive management plan can be utilized in the event that predictions are not realized.	
				DFO recommends that other fish habitat compensation measures be explored in the watershed. In addition a contingency plan for compensation in the event water quality within the pits is not acceptable must be presented.	The NNLP Addendum (Feb 07) provides for additional habitat during mine operations; this was done at the request of DFO.
DFO-22		8.2.1 HL from Drawdown And Water Diversions pg.9	There is potential loss and impact to fish habitat from many proposed water drawdown and diversion activities that are proposed as a result of infrastructure development.	Controls need to be put in place to ensure that there is no excessive drawdown of the water bodies which could result in fish kills. The water license also needs to contain measures to ensure that drawdowns and diversions do not result in fish habitat losses and impacts from sediment.	AEM has proposed fish removal for all drawdowns proposed for Second Portage Lake. If this is in reference to a potential draw down of Phaser Lake then this is no longer a valid concern as the current plan is to build up the road rather than draw down Phaser Lake to accommodate any excess spring melt water (Doc 485 Section 3.2.9).
DFO-23		8.2.2 HL from Diversion of Phaser Lake Outflow pg.9	Phaser Lake discharge will be redirected to Turn Lake since the natural drainage has been altered. However, no details have been provided to demonstrate that the connecting channel is passable fish. Section 4.2.5 of the NNLP just states that there is no net difference in water balances and therefore that there is no impact to fish habitat, but this is not necessarily true if connecting channels are eliminated or impassable. The text (at least in section 4.2.5) does not indicate that discharge will be pumped, but figures in other reports indicate a dewatering barge will be employed. In addition, erosive conditions that will potentially increase sediment transport and deposition need to be monitored in this location as well as in others.	DFO recommends that details of the diversion channel of Phaser Lake outflow be provided to demonstrate that the connecting channel is passable to fish.	Phaser Lake outflow was reported as impassable to fish, even during freshet, in the NNLP. As an additional point of clarification, the application shows that the water is to be pumped from Phaser Lake to Turn Lake (i.e., no outlet channel). The outlet from Phaser Lake is to Vault Lake and not Turn Lake.
				DFO recommends that the NNLP Monitoring include monitoring of the runoff or sedimentation from the diversion channel of Phaser Lake outflow.	No diversion channel is planned. Water will be pumped from lake to lake using appropriate screening. Monitoring will occur as required.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
DFO-24		8.2.3 HL from Portage Lakes Connecting Channel pg.9	Construction of the dikes will eliminate the westernmost of three channels connecting Secondand Third Portage lakes and it is proposed that the easternmost channel may need to be widened to facilitate flow. It is possible that this enhancement could serve as compensation for fish habitat loss but the detailed engineering survey as suggested in the NNLP (4.2.1) has not been provided.	DFO recommends that the detailed drawings of the proposed modification of the westernmost channel connecting Second and Third Portage Lakes be provided and a hydraulic assessment of the proposed channel modification and the impact on water levels between the two lakes.	**A Technical Memorandum (Doc. 575 Ver. 0) has recently been completed summarizing field observations and the hydraulic analysis and modelling results completed to assess the stability and capacity of the existing Third Portage Lake (3PL) channel outlets and to evaluate the potential impacts, if any, on 3PL water levels during dewatering and mine operations.** The Technical Memorandum includes a proposed monitoring plan for erosion and verification of lake levels, and design recommendations with respect to the capacity upgrade of the easternmost outlet channel.
DFO-25		8.2.4 HL from Intake & Effluent Pipes pg.9	Three pipelines are to be constructed in the project lakes one of which will be for the intake and two for effluent discharge to a diffuser located in the lakes.	Detailed drawings including the plan, profile and cross-section of the freshwater intake pipe need to be provided as well as the site and design of the fish intake screen. The intake end of the pipe will be screened in accordance with the DFO “Freshwater End-of-Pipe Fish Screen Guidelines	**The fresh water intake is currently planned to be a floating barge. The piping will run under the walkway from the barge to shore and will not be on the bottom of the lake. Agnico-Eagle is committed to ensuring the intake end of the pipe will be screened in accordance with the DFO “Freshwater End-of-Pipe Fish Screen Guidelines".**
				Detailed drawings including the plan, profile and cross-section of the effluent pipes also need to be provided.	Detailed design details and drawings for the outfall diffuser in Third Portage Lake are provided in Application Doc. 536, while a conceptual design for the Wally Lake outfall diffuser has been provided in Application Doc. 412. It should be noted that the final design of the Wally Lake outfall diffuser is not required until Year 4 of mine operations. Accordingly, Agnico-Eagle proposes to delay detailed design the Wally Lake Diffuser until Year 3 of operations to allow for the collection of additional background data to aid in the design process. **The preparation of final detailed design and construction drawings for the outfall diffusers will be completed and submitted to the NWB and DFO for review prior to commencing construction.**
DFO-26		8.2.5 HL from Turn Lake Road Crossing pg.10	The access road between the plant site and the Vault development will require two 75 m long, 2.5 m diameter round culverts with a sideslope ratio of 3H:1V. Under freshet conditions discharge velocity will not exceed 0.6 m/s so that fish passage should not be impeded.	Detailed estimates of water velocities and depth of flow during low, medium and high flow events should be provided.	**Agnico-Eagle is committed to conducting a flow monitoring program to measure flow velocities and depths across a range of flows and flow periods within the channel in order to gather additional information to assist with detailed design of the crossing. The preparation of final detailed design and construction drawings will be completed and submitted to the NWB and DFO for review prior to commencing construction.**

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
DFO-27			DFO does not agree with the statement in section 4.2.3 that migratory habitat will not be adversely affected. The NNLP states that fish migration is uncommon and that large boulders are likely preventing the movement of fish between the two lakes. As the culvert installation will result in a HADD of fish habitat, the removal of the fish barrier will provide access between lakes thus providing greater access. This could be considered compensation for the HADD associated with the culvert installation.	DFO recommends that the details of the HADD and fish habitat compensation associated with the Turn Lake Road culvert installation be provided.	While fish passage via this channel was considered unlikely, AEM commits to verifying this statement and will work with DFO so that this issue is resolved satisfactorily.
DFO-28			Adequate mitigation to facilitate passage should include embedding the culvert at least 20% with the backfill material in the culvert matching the upstream and downstream gradients.	Monitoring will need to confirm that the installation of the culverts do not block fish migration.	AEM commits to monitoring if needed (see above).
DFO-29			It is also stated that standard construction practices are to be employed during culvert installation and details should therefore be provided.	Detailed drawings of the plan, profile, and cross-section of the Turn Lake Road culvert crossing will need to be prepared. The construction sequence should be described.	**Details on the design of the Turn Lake Road Crossing (or "Vault Haul Road Culvert") are provided in Section 3.2.8 of Application Doc. 500.** Included are design criteria and details for the crossing, as well as a general sediment and erosion control practices that will be applied during the construction of the culvert crossing, and an inspection schedule and plan to monitor structural integrity and channel stability. **The preparation of final detailed design and construction drawings will be completed and submitted to the NWB for review prior to commencing construction.**

Table 2d: AEM Response to Meadowbank Type A Water License Intervenor Comments - Environment Canada (EC)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-1	**Ground Water**	2.1 Baseline Ground Water Quality Data pg.4	There are several problems concerning the reporting and use of the total dissolved solids data particularly in the most recent report on the 2007 Baseline Ground Water Quality. * Specific points raised on 2006 & 2007 reports on pg 4-6 *	The reviewer recommends that more robust permanent ground water quality monitoring wells be installed at the Meadowbank site as soon as possible and ground water quality samples be collected and analyzed to establish baseline ground water quality at the permanent sites prior to the start of active mining. The new baseline data should initially be compared to the existing baseline data to determine whether there are any significant variations between the two data sets.	**Agnico-Eagle intends to install and sample more robust wells this summer, to replace non-functioning wells**. A scope of work for new well installation is in progress.
EC-2		2.2 Revised Predictions of Brackish Water Upwelling pg.6-9	In conclusion, the estimates of total flows and average TDS concentrations of brackish ground water predicted in the report dated July 27, 2007 for the accelerated mining rate of 8500 TPD are considered reasonably conservative and may be used in the site water balance model (GoldSim model) to predict overall water balances and water quality for the site. As mining progresses, however, monitoring of the quantity and quality of ground water inflows to the open pits will be needed to verify these predictions and water management plans may need to be reviewed and updated depending on the results of the monitoring.	The reviewer recommends that some updating and rerunning of the model be considered as data become available during the early stages of mining at the site. However, as mining advances, the need for predictive modeling will be replaced by the collection of actual monitoring data from the site.	**Agnico-Eagle is committed to updating and re-running the water quality model as additional mine water data becomes available.** Pit water quality monitoring is included in the Water Quality and Flow Monitoring Plan for the Project (Application Doc. 450).
EC-3		2.3 Ground Water Monitoring Installations pg.9	The high degree of failure of the well installations is disappointing but the reviewer is assured that a better understanding of the baseline groundwater quality has been obtained even though the reliability of the installations has been limited. The installation of the three replacement wells near the sites of the original wells is a required procedure that will allow comparison of the successive sets of ground water quality data even though the sites will eventually be destroyed by the mining development. Subsequent installations, however, should be placed outside areas of direct development such that they can provide a more permanent monitoring capability and, in addition, the design of the new installations needs to be revised, as suggested, to improve their reliability.	The reviewer recommends that more robust permanent ground water quality monitoring wells be installed at the Meadowbank site as soon as possible and ground water quality samples be collected and analyzed to establish baseline ground water quality at the permanent sites prior to the start of active mining.	**Agnico-Eagle intends to install and sample more robust wells this summer, to replace non-functioning wells.** The summer 2008 round of monitoring well installations will be placed as close to existing wells as possible per NIRB condition no. 8. The location of other monitoring wells will be selected based on the mine development plan.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-4	**Water Quality**	3.1 Lake Sediment Removal pg.10	Removal of lake bottom sediments will involve handling of saturated materials which are high in several metals (As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn), and having a fine clay/silt particle size. The relatively limited volume to be placed upstream of the tailings dike following excavation of the footing area should not significantly compromise supernatant quality. With respect to the balance of the lake bottom sediments, placement in the footprint of the Portage pit lake may represent a liability when the area is re-watered and may negatively impact water quality during re-watering as a result of suspended solids and metal concentrations. Given the high metals content and fine particle size, it is unlikely that the sediments would be useful for terrestrial reclamation purposes. As the proposed disposal area is shallow (2-8 m maximum), consideration should be given to disposal to the bottom of the Portage pit prior to flooding, or other disposal methods where the materials will be effectively isolated from wind and wave action following rewatering.	Options for disposal of lake bottom sediments should be refined and disposal methods developed that minimize the potential for effects on surface waters. This may simply involve placing materials in deeper areas of the lake floor, and ensuring that a minimum water cover depth will be overlying at closure.	**Agnico-Eagle is committed to testing the lake bottom sediments to confirm its suitability for use for terrestrial reclamation purposes prior to use.** Agnico-Eagle proposes to screen against the most stringent federal and territorial criteria for soils based on the objective to return the mine site footprint back to productive use post-closure (see Application Doc. 511). **Lake bottom sediments not meeting this objective will be disposed within deeper sections (>8m water depth) of the dike impoundments or codisposed with tailings within the tailings Storage Facility.**
EC-5		3.2 Dewatering of Lakes pg.11	Use of 60% as the proportion of water which can be drawn down untreated is reasonable, based on Diavik's experience during pool dewatering in the open water season. It is not clear how the balance of potentially turbid water will be treated before discharge. Table 12.1 shows Portage Pit dewatering of 4.57 Mm3 to Third Portage, and 0.39 Mm3 (or 8.5%) being discharged to the attenuation pond. Goose Island Pit will have 1.47 Mm3 dewatered to Third Portage Lake, and 0.007 Mm3 (or 0.5%) pumped to the attenuation pond. Table 12.2 does not show the dewatering volumes expected to go to Wally Lake in Year 4 from Vault Lake.	Dewatering discharges will need to be of sufficient quality and clarity that receiving water bodies are not adversely impacted. EC recommends that there be discussion regarding what would be protective limits to set for this activity, and how the proponent will achieve them. Such limits should be in the order of 15 mg/L TSS, and include total metals parameters.	Dewatering planning is underway. AEM commits to ensuring no unacceptable impacts to receiving water clarity or quality. See document in Appendix A entitled "*Proposed water quality monitoring and management plan for dike construction and dewatering at the Meadowbank Mine* " for AEM's proposed trigger values, monitoring and contingency plans.
EC-6		3.3 Effluent Quality Criteria and Water Treatment pg.11	Receiving waters in the project area contain very low concentrations of all parameters, and are ultra-oligotrophic with respect to having low nutrient levels and productivity. Ecosystems are based on very simple food webs, and as such are vulnerable should impacts occur to any compartment of the ecosystem. A very high level of protection is warranted when discharging effluent into such a pristine system, and it must be noted that the MMER discharge criteria provide only a minimum national standard for discharge quality, as these criteria were not developed based on biological impacts. Water treatment will almost certainly be required for reclaim pond discharges, and very possibly for pit lakes and attenuation ponds, depending on water quality. All effluent discharged should pass acute toxicity tests using rainbow trout and Daphnia magna.	It is important that impacts to water quality be avoided (where possible) or minimized through the implementation of mitigation measures, including using best available water treatment practices. Conceptual plans for water treatment have been provided, and MMC should strive to ensure that end of pipe discharge levels are as low as possible prior to discharge. Effluent quality criteria should be set in the water licence which are protective of the receiving environment, and consistent with other mining operations operating in the NWT and NU where experience has not demonstrated unacceptable impacts have resulted.	AEM has committed to minimize the discharge of water to the greatest extent possible by recycling all water from the TIA to the mill. AEM has committed to treating mill effluent within the mill using BAT (the SO2 Air Process). AEM has committed to meet CCMe or background within a 30 m mixing zone of the diffuser planned for Third Portage Lake for the release of all other contact waters through the planned attenuation pond. AEM commits that water discharged through thediffuser will meet MMER regulations including being non-acutely toxic at feed into the diffuser. AEM has committed to additional water treatment as an adaptive management strategy to meet the previously stated committments.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-7		3.4 Water Quality Predictions – Cyanide Degradation Products pg.12	WAD CN does not include the degradation products cyanate (CNO) or thiocyanate (SCN), which will remain in the water column and will degrade to form ammonia. This was seen at the Colomac mine, where an annual progression in the tailings and Zone 2 pit chemistry was observed as SCN and CNO dropped and ammonia and nitrate increased over time. It is not clear whether predictions for ammonia in reclaim water included CNO and SCN breakdown products; if not, ammonia levels may have been significantly underestimated.	MMC should clarify whether ammonia predictions for the reclaim pond included all CN breakdown products, and if not, adjust ammonia predictions to account for these sources. EC asks that the proponent commit to periodic re-calibration of the water quality predictions modeling for parameters of concern.	Application Doc 516, p.31, last box of Table 4-4 on that page, states that **CN degradation products SCN and CNO are modeled to accumulate in the Reclaim Pond, while free CN is constant (fixed by CN-destruction process at mill)**. Water quality in the reclaim pond will be monitored as part of the Internal Monitoring stations (see Application Doc. 450). Application Doc. 450 states that should concentrations (of any of the modeled parameters) exceed 10x predicted possible poor-end concentrations, an action plan will be triggered which will include review of data, additional sampling, investigation of cause and either remedial action or modeling of impacts. **Agnico-Eagle is committed to updating and re-running the water quality model as additional mine water data becomes available.**
EC-8		3.5 Water Quality in Pit Lakes pg.13	With respect to the Portage pit post-closure chemocline disappearance, there is uncertainty as to whether the chemocline will erode. ...A deeper chemocline is predicted to develop in Vault pit, and would be less likely to erode given the lack of a talik connection to groundwater. It is unclear why the potential for stratification is not predicted for Goose pit. Ground water discharges to the pits are not included in the GoldSim model during flooding after mine closure, i.e. the ground water taps are turned off at the end of active mining. Modelling of the evolution of pit lake water quality was also done independently of the GoldSim modelling using the model CE-QUAL-W2. It is unclear whether ground water discharge was taken into account in this model.	EC recommends that water quality criteria be set as a prerequisite to be met prior to removal of the dewatering dykes, in order to ensure protection of the receiving environment.	AEM agrees with this. AEM commits that water quality in the flooded pits will be monitored and that the dikes will only be breached once regulatory approval has been provided. It is our intent that water quality will either meet CCME FWAL criteria or match existing background water quality in Second and Third Portage Lake or that water quality will not result in downstream environmental harm as demonstrated through risk assessment and only with KIA and NWB approval (see also Application Doc. 625 provided as Appendix E to this submission).
				Clarification of the role of groundwater inputs/discharges in the evolution of pit water quality is requested.	Pit lake water quality is only predicted for Portage pit, the evolution of water quality and formation of chemocline at other pits is inferred based on results of the Portage Pit Lake. The Portage Pit Lake was selected because it is the largest and will contain waste rock. As such it has the greatest potential for poor water quality conditions to develop and persist. Groundwater will be a source of more chemically charged water to the Portage and Goose pits (not Vault as there is no through talik there) but the inflow of groundwater will decrease as the pit fills until the pit lake water level is at its maximum and groundwater pressures are equal to those created by the open water in the pit. The pits will not have a permanent source of significant chemical loading over the long term (only exposed pit walls at Portage, none at Vault or Goose) and as such, the chemocline is expected to slowly degrade by diffusion into the upper layer. Should a chemocline form and remain longer than anticipated at Portage, (and inferred at Vault and Goose), it is predicted to be thin and deep, away from fish habitat.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-9		3.6 Aquatic Monitoring/EEM Integration pg.14	The report notes that either gradient or control-impact study designs will be used, and it should be confirmed that sufficient baseline data has been collected to characterize the full range of natural variability and provide a basis for the study design selected. Other points of discussion would include sediment quality parameters, usefulness of zooplankton monitoring, sampling locations, and capturing seasonal effects. Linkage to the Surveillance Network Program and to adaptive management will be important.	EC recommends that the construction phase SAPs be developed as early as possible, and circulated for review.	Azimuth is developing detailed plans for the target AEMP studies related to dike construction and dewatering. These will be circulated for review.
				With respect to groundwater monitoring, the proponent has developed a general ground water monitoring plan as part of the overall water quality and flow monitoring plan but details on the proposed ground water monitoring installations are scattered through several documents. It would help understand the proposed ground water monitoring if the proponent consolidated these details in a more specific plan that includes a schedule for the phased installation of monitoring wells and a brief discussion of the reason for each installation.	The rationale for the installation of each monitoring well is provided in the Golder report on Groundwater Quality (2004). The wells were installed to assess the groundwater quality in through talik zones (under Second Portage Lake at the proposed tailings basin to assess baseline conditions prior to placing tailings; in the talik under the Portage and Goose Pits to assess probable groundwater quality that will inflow into pits during operation). Three new monitoring wells will be installed in summer 2008 to replace the 3 faulty wells. Installation details will be provided in the 2008 groundwater quality report to be submitted in the fall of 2008, once all results are received and analyzed.
EC-10	**Tailings & Waste Rock Mgmt**	4.1 Design Depth of the Long-term Active Zone pg.14	However, the proponent has suggested an upper climate change within the next century in the order of 6 °C. Although the mine site will remain within the zone of continuous permafrost, the thickness of the active layer would likely deepen. .....This would appear to increase the active layer to the current design of 2 meters. Given the crucial function of this cover, the thickness of 2 meters would appear to be a minimum particularly in light of the potential factors such as pile geometry and configuration (i.e. more heating to a south-facing curved pile face resulting in deeper active zone), vegetation (or lack thereof) effects, placement errors and longer term climatic changes that may make the nominal thickness of 2 meters insufficient.	The proponent should confirm the necessary thickness of the capping material to accommodate the active zone in the upper limit climate change simulation to ensure the capping material is effective in the long-term, and, that sufficient benign capping material is available to cover the required facilities	**Agnico-Eagle is committed to providing a minimum of two (2) metres UM cover on the Portage RSF and TSF at closure to confine the active layer within relatively inert materials. Instrumentation will be installed as required to monitor freezeback efficiency and cap performance. Agnico-Eagle is also committed to a pro-active waste management strategy through active monitoring, inspection, and mitigation**. The strategy will include the review and evaluation of any future changes to the rate of global warming, compliance with regulatory changes, and the ongoing review and evaluation of relevant technology developments, and will respond to studies conducted during mine operation. A preliminary materials balance for the Project is provided in Volume 1, Appendix II of Application Docs. 420 and 342. **Agnico-Eagle anticipates that sufficient UM material is available for the necessary capping thickness.** Capping volume requirements will be confirmed once a final materials balance and detailed waste rock deposition plan is developed for the site.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-11		4.2 Viable contingency for waste rock piles if freezing approach insufficient pg.15	Although it is appreciated that much effort has gone to establish preferred approach to manage mine rock waste, a contingency should be presented. It should be technically viable and mitigate concern. It may be inferred in the company's Adaptive Management Approach that contingency would be developed as necessary.	The proponent should develop a contingency that if the preferred approach is inadequate, that it would commit to undertake to address the concern. By way of examples, and not meant to limit or direct the company's deliberations, such a contingency could be additional thickness of the cover, altering its permeability to air and water, accelerating vegetation, or even relocation or sustainable polishing of problematic drainages so as not to impact nearby fishery waters.	**Agnico-Eagle is committed to providing a minimum of two (2) metres UM cover on the Portage RSF at closure in order to confine the active layer within relatively inert materials. Instrumentation will be installed as required to monitor cap performance. Agnico-Eagle is also committed to a pro-active waste management strategy through active monitoring, inspection, and mitigation**. The strategy will include the review and evaluation of any future changes to the rate of global warming, compliance with regulatory changes, and the ongoing review and evaluation of relevant technology developments, and will respond to studies conducted during mine operation. As indicated in Application Document 450, any drainage from the waste rock facilities will be directed to contact water collection points during operations and closure, and will be monitored for water quality prior to release to the environment. Further information, including monitoring plans can be found in Application documents 485 (Sections 4.1, 4.9, 6.2), 425 (Section 2.1), 450, 500 (Sections 5, 15), and 511 (Sections 7.4, 12.1, 14).
EC-12		4.3 Environmental characteristics of the till pg.16	Sections 2.3.5.3 and 4.1 in the License application appear to be somewhat in conflict. Much of the soil would presumably overlie the ore body. Table 2.17 suggests a substantial portion may be problematic in terms of at least pH. Natural surface waters in the area appear to have low buffering capacity.	The proponent should address if there is in fact a conflict in conclusions. If there is some problematic till, the proponent should describe the effect of any of this material being incorporated in roads, surface toppings or in the core will have bearing on their environmental performance. If this potentially problematic material would have a detrimental effect, the proponent should describe control measures that would be implemented to ensure that this problematic material is not inadvertently incorporated in those environmentally sensitive structures.	As noted in Section 2.3.5.3 of Application Document 485, all samples of till tested by the time of the Application, with the exception of Third Portage trench soil piles, have no potential to generate ARD, and the leachate from all till materials was compliant with MMER. **Agnico-Eagle is committed to testing the till to confirm its suitability prior to use in environmentally sensitive structures.** Agnico-Eagle proposes to screen against the most stringent federal and territorial criteria for soils based on the objective to return the mine site footprint back to productive use post-closure (see Application Doc. 511). **Problematic till would not be used in environmentally sensitive structures that may potentially runoff to the natural receiving environment.** Excess till will be disposed of within the Waste Rock Storage facility.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-13		4.4 Defining the Plan to effectively segregate site mine rock pg.16-17	It is recognized than an Adaptive Management Approach is going to be followed in which techniques and environmental protection measures would be iteratively improved as understanding and experience is accumulated. However, with the excavation commencing soon, the company should be in a position to propose criteria for the metal leaching. Conversely, they should be in a position to substantiate a view that by controlling acid generation, either as measured by sulfur content or neutralizing potential or the ratio, the mine rock will be effectively segregated. As much of the initial excavated material will be incorporated into site infrastructure, these long-term features must be robust and environmentally protective. The purpose of reporting the total neutralizing and acid potential in the rock cells is unclear. Is there a ratio or net magnitude that is a design criterion that has not been expressed in the license application?	Relatively rapid and 'conservative' (i.e. ensuring problematic material do not become incorporated into sites where they become a liability) segregation of problematic mine waste is fundamental to environmental protection measures at many mining operations. A credible segregation system should be in place prior to excavation and based on best current understanding. The role of potentially confounding factors should be recognized and accounted for in the segregation system. For example, such factors can include accounting for the presence of siderite (which can potentially overestimate the neutralizing capacity) or high moisture content, which can result in imprecise measures of arsenic using XRE. The system should be audited periodically to affirm it continues to operate effectively and conservatively.	The segregation system proposed in Application Doc. 425 forms the basis of what will need consideration from a geochemistry perspective, when the final waste rock disposal plan is finalized. **Agnico-Eagle is committed to updating and adapting the plan as mining advances and additional data is obtained.** It has been found that the ARD potential is principally defined by sulphur content. As more data is obtained, the sulphur and other component trigger levels will be refined, which will incorporate a safety margin to minimize mis-diagnosis. The purpose of reporting the ratio per rock cell is to assess the overall ARD potential of the material in each cell and to identify any potentially problematic periods (and consequently, problematic areas in the RSF) during RSF construction. These are estimates will be verified with data obtained during mining operation.
EC-14	**Waste Mgmt**	5.1 Waste Incineration – Compliance w\ CWS for dioxins and furan emissions & mercury emissions. pg.18	As our Air Quality Specialist is unavailable before March 17th, we have to defer detailed evaluation of the IWMP, but would anticipate further discussion on aspects such as waste stream management, operator training and ash disposal.	EC would like to confirm that there are no plans for open burning.	AEM does affirm that there are no other plans for open burning and requests clarification from EC and GN DoE on regulatory guidance as to the statutes in Nunavut/Canada that prohibit open waste burning. The site incinerator will be an off the shelf purpose built dual chamber, forced air high temperature incinerator package specified to meet the CWS for Dioxins and Furans and Mercury. The incinerator will be sized to burn all putresicible kitchen wastes, all paper and packaging materials that has been in contact with food such as camp, office and lunchroom wastes. During construction STP filtered sludge will also be incinerated. The objective is to deflect from the landfill and only incinerate those wastes that could cause odours that could otherwise attract wildlife. All other combustible wastes will not be burned but sent to the site landfill. AEM does not believe that a baghouse unit will be required on this incinerator due to the relatively small volumes of waste to be burnt and the use of a high temperature forced air unit but commits to retrofit such facilities if stack monitoring indicates that such a unit is required to meet discharge standards in Nunavut
EC-15		5.2 Landfarm Operation - Treatment	EC has some concern that soils and/or ice/snow contaminated with metals, solvents, glycol and heavy oils may find their way into the landfarm facility.	The proponent should provide details on storage and treatment options for these contaminants, noting measures to ensure they remain outside the landfarm facility.	It is AEM's intent that all hydrocarbon contaminated soil generated by the project will be transported to the landfarm for on-site remediation wherever practical. Similarly as hydrocarbon contaminated snow will be transported to the assigned snow melt cell in the landfarm. Upon melting the hydrocarbons would be recovered to the maximum extent possible using adsorbent media. The remaining snowmelt would be treated through an oil water separator unit, the water tested and released through the reclaim pond once water quality has achieved the water license discharge standard for such release. In the unlikely event of a large volume of contaminated snow being generated that would overwhelm the planned landform then the snow would be moved to an alternate containment area such as the fuel tank farm containment where the snowmelt can be contained and treated as above. This would only be done with the consent of the KIA, GN DoE, NWB and Water Resources. AEM acknowledges that soils/snow contaminated with glycol, metals, solvents will not be remediated by landfarming and need to be treated as hazardous materials. Contaminated snow will have to melted and the resultant water treated to recover the contaminant for off site disposal.

Table 2d: AEM Response to Meadowbank Type A Water License Intervenor Comments - Environment Canada (EC)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-16		5.3 Landfarm Operation - Containment pg.19	Should contaminated soil and/or snow/ice exceed expected volumes, there should be an efficient and workable plan in place for the safe containment of significant volumes regardless of season and location of spill.	Should it be necessary to construct a second landfarm, the proponent should have a contingency plan in place whereby: • Construction time has been considered • There will be adequate personnel and equipment on site to facilitate construction of a second landfarm • Construction materials, e.g., granular materials, HDPE liner etc, will be available.	AEM concurs with this comment and will initiate such contingency planning.
EC-17		5.4 Landfarm Operation - Spillway operation pg.19	More detail is required describing the design components/specifications of this spillway.	The proponent should specify what the design components of the spillway will be that will prevent the release of PHCs to the environment.	The landfarm has been designed to store, in the absence of pumping, the average annual total snowfall (147 mm water equivalent) plus the precipitation from a 100 year 24-hour rainfall event with 25 cm freeboard. It is anticipated that a spillway would not be required as water collected within the landfarm would be actively pumped to the oil-water separator for treatment and ultimately discharge to the Reclaim Pond. However, if a spillway is deemed necessary for dam safety purposes, it is proposed to be located along the north-eastern berm of the snow/ice remediation cell, and would likely consist of a pair of culverts buried at elevation within the berm wall. In the unlikely event that the spillway is activated, water released from the landfarm would drain naturally (via surface gravity flow) towards downstream contact water collection points located adjacent to existing haul roads, or alternatively to the Portage Open Pit or the site stormwater collection pond via culverts installed beneath the haul road (see DWG 2 in Application Doc. 564). The water would not be released to Second Portage or Third Portage lakes. **Agnico-Eagle will handle a spillway release in accordance the Spill Contingency Plan (Application Doc. 482) for the Project.** Spilled water would be collected, treated using the oil-water separator system, and pumped to the Reclaim Pond. Any soils that become contaminated as a result of a spill would be sent to the landfarm for remediation.
EC-18		5.5 Landfarm Operation - Potential exceedances in sump volume pg.19	Careful monitoring will be required to ensure sump volumes are not exceeded during the snow melt period.	EC recommends regular onsite monitoring in order to ensure trigger points are recognized and excess volumes are transported to the oil-water separator for treatment as needed.	AEM concurs with this comment and will initiate such contingency planning
EC-19		5.6 Landfarm Operation - HDPE liner integrity pg.20	It may be difficult to ensure a consistent and minimum depth of 0.3 m over the liner system. Also, during the tilling process, inexperienced operators may inadvertently disrupt or tear through the marker layer and into the liner system.	EC encourages the operators to take steps to prevent damage to the HDPE liner during mechanical operation of the landfarm, e.g., employ experienced operators, ensure an adequate depth of soil, ensure adequate depths of granular material (marker layer) covering the liner etc.	AEM concurs.

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No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-20	**Emergencies**	6.1 Hazardous Material Management Plan pg.20	Under the E2 under Part 8 (CEPA), anyone storing or using a listed substance above the specified thresholds or who has a container with a capacity for that substance, will have to notify Environment Canada. Hydrochloric and Hydrofluoric Acids are regulated substances listed in Schedule 1 of the E2 Regulations. The threshold for Hydrochloric Acid in Schedule 1 of the E2 regulations is 6.80 tonnes at a concentration equal to or greater than 30% and for Hydrofluoric Acid the threshold is 0.45 tonnes at a concentration of 50% or more.	1. Meadowbank must determine whether the maximum quantity of each substance or mixture used or stored at the place is greater than the threshold quantity listed in Schedule 1 of the E2 Regulations. If it is, you must comply with section 200 Regulations for that substance. 2. Spill reporting requirements under Section 201 of CEPA 1999 requires for any of the substances on the list established on Schedule 1, any person who has charge, management or control of the substance shall, as soon as possible, notify a CEPA Enforcement Officer. In addition, this person must abide by a number of other requirements, such as taking all reasonable measures consistent with the protection of the environment and public safety and providing a written report to Environment Canada.	AEM concurs.
EC-21		6.2 Revisions required to Spill Contingency Plan pg.21	Revisions	Table 5.2 - Environment Canada's contact is (867) 766-3737 for a 24-hour emergency pager monitored by Emergency and Enforcement Officers. This contact information should be updated in AEM's other spill contingency plans as well. A section should be added to the spill contingency plan which deals with the handling and disposal of hydrocarbon-contaminated materials that are too large to go to the landfarm. Experience at other northern open pit mines has recorded a high frequency of hydraulic fluid and other spills on rocks, which are difficult to clean up. In the case of both Ekati and Diavik such materials are being segregated inside the waste rock pile. MMC should specify what their intent is for dealing with such materials.	AEM will add this correct number to its spill response plan. AEM will take this under advisement and develop plans as suggested by EC for incorporation into its waste management and spill contingency plans
EC-22	**Closure & Reclamation**	7.1 Removal of Dewatering Dykes pg.21	The removal of the dykes could impact water quality in the affected lakes. Depending on the removal method chosen, water quality impacts could include increased TSS loadings, increased dissolved metal loadings from oxidization of exposed pit walls, and/or ammonia levels from blast residue (if blasting is used to remove dykes). It is also unclear if these potential impacts have been included in the water quality modelling. MMC will have to ensure that appropriate mitigation is identified and implemented for the chosen method.	EC recommends that further information regarding the method to be used to remove/breach the dewatering dykes be provided. Potential impacts of the chosen method should be discussed and mitigation measures identified.	Further information on dike breaching is provided in Section 9.4 of Application Doc. 500 and is repeated again in Section 3.2.12 of Application Doc. 485). **Agnico-Eagle is committed to ensuring that appropriate mitigation measures has been identified and implemented prior to the initiation of dike breach, and proposes to submit a detailed dike breaching plan to NWB for review prior to commencing the work.**

Table 2d: AEM Response to Meadowbank Type A Water License Intervenor Comments - Environment Canada (EC)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-23		7.2 Post-closure maintenance of dykes pg.22	Will there be ongoing inspections to ensure there has been adequate freezing of the tailings and to ensure the central dike is preventing contaminated drainage into the Portage Pit? Post-closure, is there a maintenance plan in place that will regularly inspect and maintain the dewatering dikes as required?	EC recommends that the C&R Plan outline whether an inspection and maintenance program has been considered for the central Dike and to provide additional details on this program. The final design and construction of all dams/dikes should include provisions for: • the worst possible case environmental events • also recommended that best environmental management practices in Canada and elsewhere for dam design and construction be referenced in order to identify provisions for seepage collection and treatment; and • a dam safety inspection and maintenance program should be prepared for post-closure	AEM has committed to monitoring the thermal freezing of the tailings in the TIA. Golder has been commissioned to prepare an OMS (Operation, Maintenance, Surveillance) Manual for the TIA and its associated structures that will incorporate the EC recommendations contained here.
EC-24		7.3 Tailings Storage Facility Closure pg.22	Insufficient detail has been provided concerning the environmental protocol describing the discharge water quality and the water management structures for the TSF; there is not enough detail provided on this 'approved environmental protocol' to assess the efficacy of this strategy.	EC recommends that more detail be provided on what the 'environmental protocol' would involve.	AEM has committed to monitoring the thermal freezing of the tailings in the TIA. Golder has been commissioned to prepare an OMS (Operation, Maintenance, Surveillance) Manual for the TIA and its associated structures that will incorporate the EC recommendations contained here.
EC-25		7.4 Monitoring program for the RSF areas. pg.23	There is inadequate detail provided and we are therefore unable to evaluate whether objectives of the C&R Plan can be met.	EC recommends that there be discussion presented on what treatment/containment options will be employed should water quality of the drainage water be above guidelines or licence requirements. EC also recommends that testing be continued post-closure to verify expected behaviour of mine rock over the long term. In addition, a verification and field monitoring program for waste rock and the development of a contingency plan to deal with reactive material found in the non-mineralized waste rock storage piles is recommended.	AEM has committed to monitoring water quality draining from the waste rock storage facilities and to a program of ongoing waste rock characterization during the mine's operational life to verify our understanding of the predicted acid generating and metal leaching characteristics of this rock. Reference: water quality monitoring provided in Doc 450, treatment methods in Doc 467. Runoff from RSF may report to sumps which will be pumped to either the attenuation pond or reclaim pond in years 1 to 5 depending upon water quality results, and then reclaim pond in year 5 through closure.
EC-26		7.5 Water Management Plan to minimize and control contaminated drainage pg.23	There is inadequate detail in this section to explain how contaminated drainage will be minimized and controlled.	1. More detail is required concerning water quality monitoring to be carried out and subsequent treatment options (passive or active).	1. Water treatment options are explained in detail in Document 467.
				2. Will the water management plan contain contingencies in the event of high contaminant concentrations and/or high volumes?	2. Pit water will be directed to the Attenuation Pond and used to satisfy process water needs. Pit water will be monitored and treated, if required, prior to release to the environment. Pit water may also be directed to the Reclaim Pond for storage and treatment at the end of operations (Application Doc. 500). Application Doc. 450 explains how water quality will be monitored and trigger levels for action plans.

Table 2d: AEM Response to Meadowbank Type A Water License Intervenor Comments - Environment Canada (EC)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
				3. More detail is required concerning the statement that new surface drainage patterns will be established.	As a clarification there will be no new surface drainage patterns created as the pits are to eventually be reflooded restoring original drainage patterns, where practical.
				4. The proponent states that the fill rate of the open pits will be based on the maximum acceptable drawdown in each lake. Have these maximum drawdowns been determined?	4. Information on the maximum acceptable drawdowns in the source lakes during pit flooding are provided in Section 12.5 of Application Doc. 500.
				5. Has consideration been given to the need to inspect and possibly maintain the dewatering dikes until the pit lake water levels achieve static conditions and the water quality is considered acceptable for release to the environment without treatment?	5. AEM is committed to maintain dewatering dikes will until water quality is acceptable (see Application Docs. 485 (Section 4.9), 450, 511).
				6. Is the proponent aware that water license criteria may be more stringent than MMER and CCME guidelines?	6. AEM has committed to meet CCME guidelines or background at the outside edge of the 30m mixing zone surrounding the diffuser discharging water from the attenuation pond into Third Portage Lake. AEM acknowledges that for this to occur some discharge levels in the feed to the diffuser may have to be lower than those allowed for under MMER.
				7. EC recommends ongoing modeling and laboratory testing of evolving water quality in the flooded pit, of discharge rates and of the type and length of treatment required	7. Application Doc. 450 indicates that Pit Lake water quality will constitute an Internal Monitoring point (Tables 3-4, A-3 and A-4). Agnico-Eagle is committed to updating and re-rerunning the water quality model as additional mine water quality data becomes available through operations.
				8. EC recommends a strategy to reduce the time that the open pit walls will be exposed before the pit is flooded.	8. AEM acknowledges the benefit of minimizing the exposure time for the pit walls during flooding, however this time needs to be balanced with where and how much water can be re-directed into flooding the pits without causing unacceptable downstream impacts. Future closure planning will address how this balance is to be best met and will be subject to ongoing review by the KIA, NWB, EC, DFO, INAC before final implementation.
				9. Potential seepage pathways between the open pit and local waterbodies could and should be monitored, using strategically placed groundwater monitoring wells, which would give ample warning if contaminants (using suitable threshold levels for contaminants) were migrating through the subsurface/bedrock. MMC would then need to take corrective action, which could presumably include continuing to pump and treat the water in the pit.	9. AEM acknowledges this and has committed to such groundwater monitoring and to appropriate mitigative measures including continued pumping and treatment to prevent adverse impacts to water quality in Third and Second Portage Lake. A hydraulic gradient toward Goose, Second and Third Portage Lakes will only exist once pits are fully flooded. Pit lake water quality will be monitored to ensure quality is adequate in anticipation of obtaining satisfactory water quality to allow breaching of dikes as soon as possible after the pit lakes are fully flooded. It is in Agnico-Eagle's interest that pit water quality be as good as possible during flooding to avoid having to treat a large body of water at closure. Fully flooded pit lakes are expected to have water quality near CCME and as such, contaminant load to surrounding lakes through dike or fractured bedrock under dikes is anticipated to be very small.

Table 2d: AEM Response to Meadowbank Type A Water License Intervenor Comments - Environment Canada (EC)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
EC-27		7.6 Closure of the Water Treatment Plant (if required) pg.24	Details on closure practices for this facility (if required) are lacking	Details on how this facility will be decommissioned (if one is required) should be included in the C & R report.	There are two proposed contingency treatment options for reclaim water: in-situ and active (Application Doc. 467). In-situ treatment would occur within the Reclaim Pond, while active treatment would involve installing a treatment facility within the mill and processing plant, making use of processing equipment where possible. C&R of an active treatment plant would be conducted in general accordance with the measures outlined in Section 8 of Application Doc. 511. It should be noted, however, that the type of treatment required will be dependent upon reclaim water quality monitoring completed during operations, and as such, specific details on a water treatment plant are not available at this time. However, **Agnico-Eagle is committed to designing and operating the Meadowbank Project with final C&R in mind. Accordingly, the Project C&R Plan will be reviewed and improved on a regular basis throughout mine operations to incorporate results of environmental studies, performance monitoring data and operational changes, as required.**
EC-28		7.7 Progressively Closing the RSFs pg.25	There is inadequate detail provided to evaluate whether objectives of the C&R Plan can be met.	EC recommends that additional information be provided that details what procedures will be modified and how and under what circumstances they will be modified.	**A detailed monitoring and instrumentation plan will be prepared and submitted to the NWB for review once a final waste rock deposition plan has been developed for the site.** Agnico-Eagle is committed to a pro-active waste management strategy that will include the review and evaluation of any future changes to the rate of global warming, compliance with regulatory changes, and the ongoing review and evaluation of relevant studies and technology developments. Agnico-Eagle is also committed to designing and operating the Meadowbank Project with final C&R in mind. As such, the **RSF monitoring and instrumentation plan will be an evolving document that will be reviewed on a regular basis and updated as required to achieve overall C&R objectives.**
EC-29		7.8 Post-closure monitoring of landfills and other waste management disposal areas pg.25	More information is required regarding the nature of post-closure monitoring of the landfills	EC recommends that the proponent develop a post-closure monitoring plan that outlines how the following will be monitored and, if required, mitigated for: • chemical characteristics of any landfill leachate and/or sludge • the ground thermal regime hasn't been compromised • cover performance is maintained into the long term (e.g., has permafrost aggraded into the landfill etc.) • the cover does not crack or slump over time.	The landfills will ultimately be buried within the Portage Waste Rock Facility at closure. Additional design information for the landfill design and monitoring can be found in Application Docs. 458, 562, 485 (Sections 3.3.4, 4.1, 4.6, 6.2 and 6.5) and 450. **Agnico-Eagle is committed to preparing a detailed post-closure monitoring plans, if required, for all waste handling facilities related to the Project including the landfills.** The post-closure monitoring plans will be developed and updated based on the results of environmental studies and performance monitoring data collected during the operations and closure phases of the Project. **The post-closure monitoring plans will be incorporated into updates of the overall Closure and Reclamation Plan submitted to NWB on a regular basis throughout mine operations.**

Table 2e: AEM Response to Meadowbank Type A Water License Intervenor Comments - Kivalliq Inuit Association (KIA)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
KIA-1	**Dewatering Dike Design**	2.1.1 Lake Bed Sediments pg.2 (App A)	The data collected on lakebed sediments indicate that they are weak and of limited thickness. It is projected that these sediments will be displaced and/or incorporated into the dike rockfill. However, some of the data from borehole's indicates a stiff clay layer on the lakebed which may affect rock berm stability on a local basis. MMC's expert reviewer suggests that during construction there may be a need to flatten the design slopes due to the variability of lakebed conditions.	KIA concurs with MMCs reviewer - additional boreholes be used to more accurately determine the distribution and thickness of this stiff clay layer in order to better determine the extent of change to the dewatering dike design.	Application Document 342 Section 6.3 includes this recommendation. Additional investigations are planned prior to and during dike construction.
KIA-2		2.2.2 Boulder Distribution pg.2 (App A)	The boulder distribution within the till below the dewatering dikes is unknown and can only reasonable be determined once excavation and dike construction is undertaken. A higher than planned boulder distribution will affect the construction schedule in that it may take longer to construct certain sections of the cut-off wall.	KIA suggests that a more conservative worst case construction schedule be presented with implications of its cascading effects on other work schedules.	Geotechnical investigations were conducted for the purpose of feasibility level dike design, and additional investigations are planned prior to and during dike construction. Available data show boulders and cobbles in foundation soils, and the existing design accounts for such conditions. **The construction methodology will optimized based on available data, and will include foundation preparation.**
KIA-3		2.1.3 Till Source & Quality pg.2 (App A)	The quality and source of the almost 600,000 m3 of till that is required for the till cores of the dewatering dikes. In terms of quality the data collected from site confirms that the till is of variable hydraulic conductivity and cannot be relied upon as an impervious layer for cut-off wall construction. This was in evidence for work completed on the runway extension where the near surface soil and till flowed when thawed. The till could have a higher moisture content than is considered optimal.	KIA suggests additional consolidation testing for the wet till is required to determine the magnitude of potential problems with till settlement and consolidation rates. For the source of till it is stated that there will be sufficient till available from the pre-stripping of the North Portage and Third Portage deposits.	**Application Document 342 Section 6.3 includes this recommendation.** Till borrow has been quantified and characterized further for the East Dike since submission of the Application (Document 538). Copies of Document 538 may be obtained from Agnico-Eagle at lconnell@agnico-eagle.com.
				KIA would like to see more detail on the location of these till sources, specifically map locations with expected volumes and quality of till, and a quarrying schedule of the various till types to achieved the desired homogenous dyke core quality material	
KIA-4		2.1.4 Dike seepage pg.3 (App A)	Seepage volumes are predicted to range from 820 m3/day (East Dike) to 1900 m3/day (Goose Island Dike). These volumes can create potential for long term degradation of the seepage controls that are being put in place. A program to delineate and mitigate increased dike seepage over time has been tabled by MMC.	KIA recommends that an independent "dike safety review committee" should be formed to monitor all aspects of dike construction and performance during operational life. Any deficiencies found in design, construction materials, or during operations should be reported to the monitoring committee. This committee would have the authority to recommend changes to rectify deficiencies. The value of this committee is that the members would be able to view the broad issues associated with the dikes without being burdened by day to day operational issues that sometimes mask problems or delay response.	AEM commits to establish an independent review panel under Dr Morgenstern's leadership to review all aspects of dewatering dike design, construction, operation and monitoring This Board will be independent and will follow terms of reference established by AEM.

Table 2e: AEM Response to Meadowbank Type A Water License Intervenor Comments - Kivalliq Inuit Association (KIA)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
KIA-5	**Central (Tailings) Dike & TIA Design**	2.2 Central Dike & TIA Design pg.3	The Central Dike design has been changed such that it does not rely on a processed till core, but on impervious geo-textile materials. This addresses one of the greatest potential concerns from seepage of contaminated water during mine operation and after closure. A potential issue still exists with the Central Dike and with the bottom of the tailings area leaking due to incomplete freezing of the bottom of the tailings area. The dike is being constructed on a known fault the extends through the entire length of the tailings area, and that fault has hydraulic connection to surrounding lakes. During operations this fault could conduct tailings contamination into the pits under the bottom of the tailings dike, and on closure into the rehabilitated lakes eitherthrough the dyke or through the bottom of the tailings due to the higher elevation of the tailings area (147m) in relation to lake level (132m).	KIA suggests that the proposed program by MMC to delineate and mitigate increased dike seepage should include the independent dike safety review committee, again with authority to recommend changes to rectify deficiencies.	AEM commits to establish an independent review panel under Dr Morgenstern's leadership to review all aspects of dewatering dike design, construction, operation and monitoring.
				KIA also suggests that a “worst case” plan be prepared for implementation if monitoring indicates the possibility of incomplete freezing of the tailings area on closure.	The fault will not influence seepage through the dike as stated. The fault will influence seepage beneath the dike. Grouting will be carried out to limit seepage and movement of tailings through the fault. Grouting is standard engineering practice for this type of situation. The dike design presented in Application Doc. 420 includes additional grouting of the foundation, including grouting to greater depth in the fault zone. Typically, the grouting is done to what the ground will take. In accordance to NIRB Conditions #18 to #20, Agnico-Eagle is committed to a pro-active tailings management strategy through active monitoring, inspection, and mitigation. The tailings management strategy will include the review and evaluation of any future changes to the rate of global warming, compliance with regulatory changes, and the ongoing review and evaluation of relevant technology developments, and will respond to studies conducted during the mine operation. Further details, including monitoring plans and contingencies measures can be found in Application documents 485 (Sections 4.2, 4.9, 6.1, 6.3), 375, 420 (Sections 5, 6), 425 (Section 2.1), 432, 450, 500 (Section 6), and 511 (Sections 7.3, 12.1, 14). A case study of a comparable tailings impoundment located in Rankin Inlet is provided in Doc. 383.
KIA-6	**ARD/ML**	2.3 ARD/ML in Waste Rock, Tailings & WQ Predicitions pg.4 (App A)	As part of MMC’s plan it will be necessary to closely monitor the thermal characteristics of the mine waste storage areas in order to evaluate the thermal modeling that predicts that the mine waste storage areas will freeze within two (2) years of placement (BGC, 2004). If this thermal modeling is deficient and the waste materials do not freeze then one of the potential consequences may be an inadequate prediction of the water quality. This could result in a negative effect on the perceived impacts and mitigation plans required for ARD/ML in waste rock and the overall water quality during mining operations and post-closure.	KIA suggests that rather than waiting 2 years that monitoring should for ARD, ML and non-metal constituents and re-evaluation of rock disposal practices commence immediately at start of operations.	The modelling was carried out to the level of information available at the time. Experience at other northern sites shows that in general, waste rock dumps freeze. NIRB Condition #15 stated that Agnico-Eagle shall within two (2) years of commencing operations re-evaluate the characterization of mine waste materials, including the Vault area, for acid generating potential, metal leaching and non metal constituents to confirm FEIS predictions, and re-evaluate rock disposal practices by conducting systematic sampling of the waste rock and tailings in order to incorporate preventive and control measures into the Waste Management Plan to enhance tailing management during operations and closure. **It is Agnico-Eagle's intention to commence monitoring for ARD, ML and non-metal constituents immediately at the start of operations, and to re-evaluate rock disposal practices on an ongoing basis based on the monitoring results.** Further details on the sampling plan are provided in Application Doc. 425.

Table 2e: AEM Response to Meadowbank Type A Water License Intervenor Comments - Kivalliq Inuit Association (KIA)

No.	Aspect	Technical Comment # Page Reference	Comment/Concern	Intervenor Recommendation	AEM Response
KIA-7	**Closure & Reclamation**	2.4 C&R	KIA feels MMC has put together a plausible outline of an abandonment plan based on current knowledge. With that said it is difficult, given the possible "adaptive engineering changes", to firmly define an abandonment plan at this time.	It is suggested that MMC should provide an annually revised abandonment plan during operational life. This plan would reflect the growing knowledge of the challenges abandonment will face.	The INAC Guidelines for preparation of mine closure plans indicate that at this phase in a mine development the Mine Closure Plan is to be referenced as a Preliminary Closure and Reclamation Plan. AEM commits to review the Meadowbank Mine Closure and Reclamation Plan as needed (at a minimum on an annual basis) and update the plan as required. It is expected that a formal update would be completed at five year intervals. The updated Mine Closure and Reclamation Plan will be made public and provided to the KIA, NWB, GN DoE, Hamlet of Baker Lake and INAC Water Resources. In accordance with the INAC Guidelines the Plan will not be finalized until several years before the projected date of mine closure so that the as built conditions are appropriately addressed. AEM commits to discuss closure planning with the KIA and other regulatory agencies perhaps under the umbrella of a working group hosted by either the KIA or the NWB. AEM does not agree with the concept of creating an independent review panel for closure planning. AEM does agree that the independent geotechnical review panel should review the long term closure and monitoring plans for the dewatering dikes and dams.
				These annual plans should then be reviewed by an independent committee, preferably made up of at least some members of the dike reviewing committee, as they will be familiar with the most important issues. This committee would have authority to direct further study into problematic issues and/or offer alternative solutions to these problems.	
KIA-8	**Landfill Disposal**	Landfill pg.3 KIA main doc	MMC proposes two (2) landfills for the disposal of non-salvageable, non-hazardous solid waste, plus the option of in-pit disposal for industrial metal waste (primary crusher, ore storage building, mill complex etc.) upon closure.	KIA is in agreement with the landfill disposal techniques for the life of the mine however at this time, KIA does not support the placement of industrial waste (primary crusher, ore storage building, mill complex etc.) in the excavated pits following decommissioning.	All buildings and equipment will be cleaned of potentially hazardous materials prior to demolition. All non-salvageable demolition debris and equipment will be placed permanently in the proposed demolition landfill to be constructed within the Portage RSF. AEM will not use the open pits to dispose of demolition debris or equipment. This commitment was recently communicated to NWB and NIRB in a letter.

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NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
OP-1	Level of effort for feasibility level open pit design - Goose and Portage Pits vs. Vault Pit.	Feasibility level open pit designs were developed by Golder Associates for the Portage and Goose Island Deposits (April 5, 2007) and the Vault pit (January 9, 2004).	Vault pit design is included in Appendix A of Meadowbank Gold Project - Mine Waste and Water Management.	Feasibility level open pit designs were developed by Golder Associates for the Portage and Goose Island Deposits appear to be to a higher level of effort than the open pit design for the Vault pit; however, many of the same technical issues still apply. Based on the references reviewed, it is unclear if any of the key recommendations in the Vault Pit Design Memo have been carried out.	A higher level of effort was used for the Portage and Goose Deposit areas due to the much greater structural complexity of these deposits, relative to the Vault Deposit area. The structure of the Vault Deposit is simple, consisting of a moderate to shallow eastward dipping stratigraphy and foliation. This east dipping stratigraphy is generally consistently oriented, with none of the complex folding and faulting seen in the Portage/Goose areas to the south. The dike that will be constructed to allow draining of Vault lake prior to pit development will be short, and through very shallow water, less than 2 m depth. The dike is located some 800 m to the northwest of the pit area, and so does not impact directly on the design or planned monitoring of the Vault pit slopes. The pit slopes in the Vault area will be largely in permafrost, except for the ultimate pit when only portions of the east wall and north wall may be within talik. Therefore, during development of the on-land portions of the pit, pore pressures will not be a contributing factor for slope instability. For the later stages of the pit, recall that the Vault Lake will be de-watered. Consequently, only the upper benches of limited portions of the pit wall will be within talik; the remainder will be within permafrost. For these reasons, the level of design effort for the Vault Pit is less than for the Portage and Goose pits.
OP-2	Level of site investigation between Goose and Portage open pits and water control dikes.	Geotechnical investigation borehole locations for the Portage Lake and Goose Island areas are shown in Figure 3.1 of the open pit design report.	Not addressed.	Borehole information is relatively limited between the open pits and the proposed dikes, in particular between the East Dike and the Portage Pit, and the Goose Island Dike and the Goose Island Pit. Is sufficient information available on the slope of the bedrock surface above the crest of the open pit to adequately address concerns about the overall stability of the dike and the overburden slope between the toe of the dike and the open pit?	The East Dike is some 200 to 250 metres to the east of the Portage Pit and is therefore sufficiently offset that interaction between the dike and the pit is not expected. In the area of the Bay Zone dike, borehole 03GT-BZ-1, an angled oriented borehole, and non-oriented geotechnical boreholes 03GT-BZ-2, -3, -5, and -6 were drilled in the in-field between the currently proposed pit crest and the dike toe. In the area of the Goose Island dike, non-oriented geotechnical boreholes 03GT-GI-2, 03GT-GI-3, 03GT-GI-4, 03GT-GI-5, 03GT-GI-6, and 03GT-GI-8 were drilled in the in-field between the currently proposed pit crest and the dike toe. The locations of these boreholes are shown on Figure 3.1 of Document 449, Pit Slope Design Criteria for the Portage and Goose Island Deposits (Golder, 2007). In addition to an internal review process, the report, and designs, were reviewed by an independent external review consultant, Peter Stacey of Stacey Mining Geotechnical Ltd. The results of this independent review were presented in a document titled "Independent Review of Pit Slope Design Criteria for the Portage and Goose Island Deposits". SMG concluded that the field investigations and design studies were appropriate to the current level of the project. Consequently, the opinion is that there is sufficient information for the current stage of the project relating to bedrock and overburden conditions in the in-field area between the dike toe and pit crest. As with any mining project, the geological and geotechnical models on which the pit designs have been based will continue to be updated as additional data are collected from further drilling programs, or from the planned geotechnical mapping and monitoring programmes once mining begins.
OP-3	Pit slope depressurization	Based on stability analyses, pit wall depressurization is required in the southeast walls of the Portage and Goose Pits, and the northeast wall of the Goose Pit Figure 13.1) to achieve an acceptable factor of safety. Unless it can be demonstrated that particular discontinuity sets that could contribute to instability have a sufficient amount of rock bridges to prevent that instability from occurring, the pit walls will have to be depressurized.	Adequate depressurization can be achieved from 90m long horizontal drainholes spaced 24m vertically and 15m horizontally.	This assumption is based entirely on packer testing results. No aquifer testing has been carried out to confirm the hydraulic conductivity of the rock. The hydraulic conductivities calculated from the packer testing are relatively low, indicating that if wells were to be installed that they would have to be on a relatively tight spacing, which may be impractical and cost prohibitive. However, it should be pointed out that the horizontal drains are a passive dewatering system that cannot be installed until the bench face is excavated and therefore depressurization cannot be achieved in advance of mining. It should be clarified in the report whether or not the delays in depressurization using this passive system will result in unacceptable slope movements.	As outlined in Section 7.5.5, results from pumping tests performed before dewatering of the portions of the lake overlying the proposed pit locations are not considered meaningful to the pit slope stability analyses. The horizontal depressurization drainholes are recommended to be installed at various elevations, as specified in Table 11.6. Drainholes can be installed at the elevations above pit bottom before the ultimate pit slope height is achieved and the sequencing of the installation with regards to excavation can be determined in detailed design. Performance of the drainholes at the specified spacing was verified with the hydrogeological numerical model. Interim pit slope modeling was not part of the feasibility designs. Only the stability of the ultimate pit slope was assessed for all sections because the maximum slope height is considered the most likely to experience instability.

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NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
OP -4	Pit wall design - Southeast wall of Portage Pit	Discontinuity sets determined from oriented core drilling have been selected for kinematic analysis to develop interramp slope designs, and have been incorporated into a stability analysis model for the overall slope.	Several discontinuity sets were picked for the kinematic analyses of Structural Domains TP-3 East and TP-3 West (Figures 5.9 and 5.10, respectively of Golder, 2007_).	Two relatively strong discontinuity sets were not included in the kinematic analyses conducted. These sets dip between 10 and 50 degrees to the southeast/east and could have a significant impact on the stability of the southeast pit wall beneath the Bay Zone Dike. Also, the discontinuity sets described in Section 11.6.5 which are described as "controlling the stability of the slope" do not appear to correspond with those shown in the stereonets in Figures 5.9 and 5.10.	The sets used in the analyses for the Southeast pit wall designs were determined using oriented structural data (from drillcore). The data shown in the lower figure in Figure 5.9 and 5.10 represent filtered data to display foliation and joints having a joint roughness coefficient, Jr, of less than or equal to 1.0, considered to be representative of the more continuous features along which potential sliding could occur. This methodology was described in Section 11.1.3, but it would have been useful to reiterate in Section 11.6.5. The data shown on the lower figure on Figures 5.9 and 5.10 were used in a cumulative frequency kinematic assessment for the purposes of bench design for the Southeast pit wall. The results of the analyses are contained in Appendix VI, and are presented in Table VI.15, for the East and Southeast pit wall. The results are plotted graphically on Figures VI-13 and VI-15 for the East and Southeast walls, respectively, and incorporate the discontinuity sets referred to by BGC. The results suggest that for bench face angles less than 65 degrees, the probability of instability based on kinematic analysis is between 23% and 26% for the East through Southeast end wall. For bench faces greater than 65 degrees, the probability of instability is greater than 30%. Consequently, the bench face angles were restricted to 65 degrees for the Southeast wall. It is interpreted that the intermediate dipping discontinuity of concern occurs as a dominant set when contoured partly as a result of holeorientation bias (drilled perpendicular to set), and this is why its true significance is diminished when considered by the Cumulative Frequency. It should also be noted, that the orientations used in the limit equilibrium stability assessment are the apparent dip of the identified sets projected onto the plane of the analysis sections.
OP-5	Pit wall stability and impacts on the Goose Island dike.	Displacements of the area between the pit crest and the dike toe in the southeast corner of the Goose Pit have been estimated using numerical modeling techniques. These displacements are important to quantify due to their potential impact on the dike performance, which prevents lake inflows to the open pit.	Displacements at the toe of the Goose Island dike are predicted to be less than about 2.5 cm, which is considered acceptable and non-threatening to dike integrity.	Accurate prediction of displacements can only be achieved with careful calibration of numerical models. This generally requires collecting actual slope performance and deformation information, which cannot be undertaken until mining begins. Also, relatively minor changes in the structural geology (i.e. structure location, dip and dip direction) can significantly change the predicted displacements. Therefore, predictions of displacements should be used with caution and contingencies should be developed for the dewatering methods and dike construction to account for potentially higher deformations.	Estimates used in determining the UDEC input parameters were considered sufficiently conservative for a feasibility level design. More specifically, a Disturbance Factor with a conservative value of 1.0 was used in determining the rock mass modulus and the joints were modelled using basic (i.e. residual) strength values determined in laboratory testing. As a result it is likely that the deformation estimates are also conservative although we concur that estimates can only be verified once mining begins. It is planned to monitor dike performance and pit wall performance during mining activities, and to recalibrate and revise estimates of dike and pit slope stability and deformations based on these monitoring programs.
OP-6	Pit wall stability and impacts on the Bay Zone dike.	Limit equilibrium modeling has been carried out for the southeast wall of the Portage Pit; however, deformation modeling, similar to that conducted for the Goose Island pit, has not.	Not addressed.	It is unclear why deformation modeling of the southeast wall of the Portage Pit has not been carried out, as this pit wall is just as critical as the southeast wall of the Goose Pit. Displacements may be of concern, particularly if discontinuity sets identified in OP-4 are incorporated into the stability analysis model.	The Southeast wall of the Goose Pit is the most critical wall because this is the area that the dike toe is closest to the Goose Pit, and the dike section is at its highest point with corresponding high hydraulic head (+20 m). By comparison the southeast wall of the Portage Pit is adjacent to a shallow section of dike, with water depths on the order of 6 m. Initial limit equilibrium analyses for the southeast Portage Pit wall indicated that with only a nominal amount of rock bridging (5%) an acceptable factor of safety was achievable, without slope depressurization. Conversely, for the southeast portion of the Goose Pit, initial LE analyses suggest that 20% rock bridging is required to achieve acceptable factor of safety without slope depressurization. The Southeast wall of the Goose Pit was identified as being the most critical and was thus chosen as the first target for deformation modeling. Since the analyses showed acceptable results, it was considered that a similar analysis of the Portage Pit at the feasibility level was not required.

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TSF -1	Central Dike Design for Foundation Conditions	Much of Central Dike is to be constructed in the dewatered Second Portage Lake, beneath which is a through talik. A grout curtain 25 m deep into the bedrock is proposed over most of the dike alignment.	Drawing 4000-09 shows Stage 2 grouting from ~ Stations 0+000 to 0+325 and from ~ Stations 0+925 to 1+125. From Drawing 4000-03, existing Second Portage Lake level is from ~ Stations 0+150 to 1+000.	Permafrost foundation expected between ~ 0+000 to 0+175 and from ~ 0+975 to 1+150. Grouting will likely be ineffective or having low take at the abutments. Therefore, barrier to seepage relies on liner keyed into permafrost. Thermal analyses are required to demonstrate that permafrost barrier will be maintained during operations and after closure. Contingency measures such as passive thermosyphons may be required.	Grouting of the bedrock is the preferred method of seepage control because it will remain effective much longer than a passive freezing process can remain functional. Grouting of the upper abutments will be to address the more fractured near surface rock. The construction schedule will be reviewed to determine the effort required to expose and grout these sections of the abutments either in 2009 during the main construction program or in 2010 while the bedrock remains largely unfrozen. For the upper part of the Central Dike abutments, where permafrost may now exist and grouting may not be effective, the seepage cutoff will be excavated to bedrock to remove any ice rich soils. The tailings deposition plan is designed to keep the reclaim pond at the northern end of the basin, so there will be no heat source near the dam abutments. The thermal conditions can be monitored, and if warming and seepage within the bedrock occurs, freezing can be promoted by covering with coarse waste rock or by using thermosyphons. Seepage in this area would be small because of the low hydraulic gradient that would exist.
TSF-2	Central Dike Construction Sequencing	Stage 1 construction is scheduled for Yr -2 & Yr -1. Stage 2 scheduled for Yr +2.	Thermal analyses of the dewatering dike till core show that after one year, the till is expected to freeze back from the surface to approximately 6 m depth. Drawing 4000-09 shows lakebed till expected to be generally less than 6 m thick.	Permafrost will start penetrating into the initially unfrozen till and bedrock foundation and could affect grout take during Stages 2 & 3 grout curtain installation. Thermal analyses may be required to ensure that a permafrost foundation will also effectively inhibit seepage through the foundation during operations and after closure. Contingency measures such as passive thermosyphons may be required.	Grouting of the bedrock is the preferred method of seepage control because it will remain effective much longer than a passive freezing process can remain functional. Grouting of the upper abutments will be to address the more fractured near surface rock. The construction schedule will be reviewed to determine the effort required to expose and grout these sections of the abutments either in 2009 during the main construction program or in 2010 while the bedrock remains largely unfrozen.
TSF-3	Central Dike Settlement Impacts	Settlement of the rockfill embankment and consolidation of the till foundation have been predicted.	Central Dike Design report Section 5.1.6, pp. 42-43: 0.4 m of rockfill settlement (1%) and 0.54 m of foundation till settlement have been predicted.	Have analyses been carried out to evaluate the effects of such displacments on liner integrity? Also, what are the effects of these displacements on the integrity of the proposed horizontal and upstream slope thermistor strings?	Manufacturer's specifications indicate breaking strain of the bituminous liner is on the order of 60 to 70%, with 70% stress relaxation within 3 hours. Upstream thermistors will be shortened, rather than stretched, by settlement of the rockfill and foundation. Horizontal strings move with the displacement.
TSF-4	Tailings Storage Facility Sizing	assumptions in tailings properties used to tailings storage facility	From Mine Waste & Water Management report, Table 6.1 on p. 6-1, volume of stored tailings based on no ice entrapment and moisture content of 40%. From Appendix C, Table C-7 of same report, water balance model assumptions presented for the TSF and indicate 20% ice bulking and lower void ratio but still 40% moisture content.	It is unclear from the report for what tailings properties the tailings storage facility was sized for and what allowance there is for possible ice entrainment. This should be clarified.	Sizing of the impoundment is based on tailings deposition at 1% beach slopes with an in situ density of 1.31 t/m3. This is based on an assumed settled void ratio of 1 and an allowance of 20% for ice inclusion.
TSF-5	Central Dike Constructability	Embankment side-slopes are 1.5H:1.0V for both upstream and downstream slopes.	(From Drawings 4000-07 and 4000-12 and Specifications 1000-02, Section 4.6): Design and specifications call for 0.5 m thick coarse filter and 0.3 m thick fine filter placed over the upstream slope, each compacted to minimum 95% Standard Proctor dry density.	Given how thin the filter layers are and how steep the side-slopes are, there is concern that equipment will not be able to work effectively and meet these specifications.	Central Dike design uses a 1 m wide zone for coarse filter, and a 1 m wide zone for fine filter. The 1.5H:1V will require specialized construction equipment for compaction. The contingency for compaction of the filter and transition on this face will be to increase the width of the zones. The filter, transition and rockfill will be raised concurrently, so equipment can work from the adjacent rockfill platform.

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TSF-6	South Saddle Dam Design	Drawing 4000-19 shows the liner in the key trench tied to the interface between the till and bedrock.	Central Dike Design, Section 5.3.1, p. 47: "The South Saddle Dam is intended to retain tailings and inhibit seepage".	There is no detail describing how the liner/upstream till will be keyed into the foundation, and whether or not a grout curtain is required. It is not clear from the design whether or not seepage through the foundation is permissible or not. As permafrost foundation is expected, thermal analyses should be carried out to demonstrate that the dam will satisfy design intent.	The cutoff trench will be excavated and conditions mapped. A field decision will be made based on conditions observed, and particularly on the amount of ice observed in the base of the trench, to deepen the trench. Once to depth, the cutoff will be filled with compacted till. The liner will be anchored within the till. Along most of the length of the South Saddle dam the ground rises above the dam, and seepage would pool and potentially freeze within the rockfill. The section of the Saddle Dam that closes the north-western end of the TSF requires seepage control. There is room downstream of this structure to collect the seepage and return it to the tailings impoundment. Note that the tailings pond does not rise to the level that could result in seepage until about the 4th year of operation.
TSF-7	Central Dike Fine Filter Gradation	Specifications 1000-02, Section 3.4, call for top size of 76.2 mm (processed rockfill).	Central Dike Design report Section 5.1.2, p. 34: "The fine filter gradation is based on the typical gradation of the Zone B material in concrete faced rockfill dams".	The fine filter also serves as bedding material for bituminous geomembrane liner. While this type of liner is more robust than thinner plastic liners, there is an increased risk of liner punctures and tears with such a coarse bedding material. A finer bedding gradation is recommended.	The bituminous geomembrane has been used on a number of dams in an Arctic environment. There is now 3 years of experience with installation of this material at the Diavik Diamond Mine. Tests on site have shown that the heavier grades of this material (ES3 and ES4) are not punctured by up to 200 mm minus crushed material if care is taken on covering the material.
TSF-8	Central Dike Liner Cover	Design is for uncompacted till placed directly over liner.	Specifications 1000-02, Section 3.5 and 4.6.1.	Glacial till specification is for a top size of 150 mm, which introduces a risk of damaging the liner during cover placement.	The bituminous geomembrane has been used on a number of dams in an Arctic environment. There is now 3 years of experience with installation of this material at the Diavik Diamond Mine. Tests on site have shown that the heavier grades of this material (ES3 and ES4) are not punctured by up to 200 mm minus crushed material if care is taken on covering the material.
TSF-9	Stormwater Dike Design	Drawing 4000-19 shows the liner in the key trench tied to the interface between the till and bedrock.	Central Dike Design report, Section 5.2.1, pp. 45-46: "The purpose of the Stormwater Dike is to isolate the tailings management area from the attenuation pond area for the first 4 years of ore processing...The Stormwater Dike will be a rockfill with an impermeable element keyed into the foundation till".	There is no detail describing how the liner/upstream till will be keyed into the foundation, and whether or not a grout curtain is required. It is not clear from the design whether or not seepage through the foundation is permissible or not. If not, will grout curtain be required to reduce permeability of foundation?	The Stormwater Dike is an internal structure used for the first 4 years of mining. Seepage from the attenuation pond towards the tailings pond is not an issue as water will be pumped from the attenuation pond to the tailings pond for reclaim to the process plant. After year 4, tailings will be deposited on both sides of the Stormwater Dike, and the structure no longer is required to function. Grouting would only be carried out if mapping of the cutoff trench base indicates highly permbeable conditions exist within the bedrock. Grouting equipment will be on site at that time.
TSF-10	Stormwater Dike/Saddle Dam Liner Option Detail	Lower portion of liner (near key trench) will be covered with till; the upper portion is exposed.		In such a harsh climate, there is risk of damage to the liner when left exposed for extended periods due to snow, ice, temperature extremes, frost. A protective cover over the liner would reduce such risk.	Exposed liner tests are being carried out at the Diavik Diamond Mine site. These started in early 2005, and after 3 years of exposure, all grades of the bituminous geomembrane (ES1, ES2 and ES3) show no degradation

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TSF-11	Saddle Dam Foundation	Available geotechnical data for foundation design of Saddle Dam.	No boreholes along alignment indicated on Drawing 4000-02.	Geotechnical investigation recommended to characterize foundation conditions and ensure that embankment design is appropriate. Overburden should be cored with chilled brine to preserve frozen condition and allow ground ice descriptions.	A geotechnical investigation will be carried out along the alignment and particularly at the low points.
TSF-12	Central Dike Liner Configuration	Width of liner at top of Stages 1 and 2 crests is 0.5 m.	See Drawing 4000-10.	Width is impractically narrow for seaming Stages 2 and 3 liners onto the existing liners. A wider crest width (1.0 to 1.5 m) is recommended.	Will review for constructability.
TSF-13	Dike/Dam Tie-Ins	Details about how the dikes will be tied together (e.g., Central Dike and Saddle Dam).	Central Dike Design report, Section 6.4.3: There are two impermeable element options being considered for the Stormwater Dike and Saddle Dam: a till layer on the upstream slope and a bituminous geomembrane liner.	Not clear from drawings how the dikes/dams will be tied together. Detailed design required prior to construction.	Agreed.
TSF-14	Central Dike Material Quantities	Construction quantities	Material quantities table on Drawing 4000-07.	For Stage 2, coarse & fine filter estimates are the each approximatey 8000 m^3 but liner area estimate is > 38,000 m^2. Given that coarse filter layer, is 0.5 m thick, the required volume should be just under half the required liner area (~19,000m^3) , not less than 25 percent the area.	All quantities are being reviewed as the construction documents are being finalized.
DD-1	Till Core Placement and Compaction	Till will be dumped on the rockfill platform near the advancing crest of the core fill and pushed by bulldozer into the water. The till will be compacted through a combination of self-weight loading and with a proposed surcharge load of 3 to 5 m thick rockfill.	Dewatering Dike Design report, Section 6.4.5, p. 67: "If the till core does not gain sufficient strength, defined by a friction angle of at least 32 degrees, determined by the geotechnical investigation, then the soil may be compacted by dynamic means, such as heavy tamping..." Dumas et al. (1994) was cited as a precedent for dynamic compaciton of saturated silty sand.	Dynamic compaction is generally effective to depths of up to 9 to 12 m (FHWA, 1995; USACE, 1999). Sections of Goose Island Dike will be constructed in water depths up to 20 m. Where the water table is close to the surface, as will be the case here, "cratering" may occur during compaction, even further reducing the effectiveess of dynamic compaction (FHWA, 1995). Dumas et al. (1994) included sand columns and horizontal drainage systems to enhance compaction and accelerate the dissipation of excess pore water pressure, so there are some uncertainties relying on dynamic compaction with essentially one-end drainage. Other means of ground improvement need to be considered.	The question of strength of the till backfill relates first to slurry trench construction. Cutoff sections in deep water are by jet grout, not slurry trench construction. Till performance will be determined during construction of the East Dike. Lake depth for this dike is typically less than 3 m with a maximum of about 5 m. A variety of methods will be effective for consolidating or densifying the core for the East Dike. Based on performance of the till in the East Dike, the design of the Goose Island Dike will be revised and refined.

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DD-2	Use of soil-bentonite as a cutoff barrier	Base of key trench detail.	Specifications 1000-07, Section 4.3: The anticipated construction sequence is to excavate the trench through the till core and foundation soil and 0.5 m into the bedrock or to refusal of the equipment.	There is some uncertainty as to how well the equipment can clean the base of the key trench, especially if it is irregular. This can lead to an improper seal between the soil-bentonite cutoff wall and the jet grout curtain and poses a risk to seepage and erosion of foundation materials. A more resistant barrier, such as soil-cement-bentonite backfill, can reduce the risk of erosion.	For the East Dike, the construction sequence that is being discussed with the mine and contractors is to complete the rockfill embankments completely, excavate to bedrock along the axis of the core, prepare the surface of the bedrock to produce a relatively regular surface, and then to place the filters and till. The cutoff wall would be excavated through the till core to bedrock. For the Goose Island Dike, jet grouting is proposed for the deepest sections of the dike. The jet grouting will extend into the bedrock. Contingency plans are also being developed for the East Dike Construction. The main contingency is to prepare a stockpile of crushed aggregate prior to construction of the core that can supplement or replace the till.
DD-3	Foundation preparation for lakebed sediments	From Mine Waste & Water Management report, Section 8.1, p. 8-1, "The lake bottoms are expected to consist of soft alke bottom sediments, referring to fine grained sediments that typically accumulate, underlain by till or other overburden materials, and then bedrock. The thickness of soft lake bottom sediments is expected to be variable, and may range from a few centimetres up to several meters, as suggested by geophysical surveys".	From the Type A Water Licence Application report, Section 3.2.1, p. 59, "The proposed construction methodology for the Dewatering Dikes does not include the removal of lake bottom sediments. These will be filled over with end-dumped rock fill material...The fine lake bottom sediments will be displaced or incorporated into the pore space of hte rockfill... Through the deepest section of the Goose Dike, along its southeast segment, dredging may be necessary". From the Dewatering Dikes Specifications, there is no description of foundation preparation for the dewatering dikes. From the Dewatering Dikes Design report, Section 6.4.3, p. 65, "5. The lakebed sediments and boulders will be removed from the footprint area of the coarse and fine filters prior to placement of filter materials".	No information has been provided for how the foundation will be prepared for the footprint areas of the filters and the deep section of Goose Dike, nor has there been any description of where the dredged lakebed sediments will be disposed. This should be clarified.	Goose Island Dike design will be revised following construction of the East Dike and Bay Zone Dike.
DD-4	Till from excavated Till Core will be mixed with bentonite slurry from cutoff slurry trench to form soil-bentonite backfill	Laboratory tests carried out on sample mixed with bentonite slurry for a bentonite content of 1.6%, indicating hydraulic conductivity ~2E-9 m/s . Also, bentonite content of 6% was tested, indicating hydraulic conductivity of ~ 5E-11 m/s.	Hydraulic conductivity of 1E-9 m/s used in design seepage calcuations (Section 5.3.2 in Dewatering Dike Design report, Table 5.6).	Laboratory consolidation test of till indicated a hydraulic conductivity of the till of 2E-9 m/s, i.e., the same as the low bentonite content test sample. It was not clear in the report what the gradations of the different till samples were. Specifications for the till are quite broad (15 to 50% fines fraction). Sample with 1.6% bentonite content was not fully saturated, so the measured permeability may be lower than if it were fully saturated. More tests are required to determine the minimum bentonite content required to satisfy design permeabilites independent of the gradation of the till.	Laboratory testing shows the till from the Third Portage Peninsula has a relatively low hydraulic conductivity - see Document 538. Testing will be carried out as one of the first activities of the slurry wall contractor to determine the bentonite content required for the range of till exposed in the borrow excavations.

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NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
DD-5	Abutment Design	Abutments will largely be on permafrost foundations.	From Section 6.4.6 "… the abutment cutoff does not rely on freezing. However a rockfill cover of 3 m will be placed over the abutments to minimize thaw of abutment soils and frost action on the cutoff wall. Grouting in rock at the abutment will be necessarily limited by the presence of frozen ground."	As proponent indicates, frozen ground will affect grout take and permafrost foundation may be providing intial barrier to seepage. Thermal analyses required to demonstrate that the permafrost foundation will impede seepage during operations and closure, including considerations for global warming.	The design of the abutments has excavation into bedrock and soil-cement-bentonite cutoff. Loss of permafrost in the abutment could result in an increase in seepage, but not internal erosion of the core or bedrock. Seepage will be limited by the low head situation at the abutment. The increased quantity of seepage would be handled in the pit dewatering system.
DD-6	Rockfill Cover over Till Core Cutoff	Themal analyses of dike sections were carried out to identify the depth of the active layer through the dike sections during the 8-year operation period.	Dewatering Dike Design report, Section 5.4.4, p. 49: "One metre of rock placed over the East Dike cutoff wall will prevent active layer penetration into the cutoff wall, as shown in Figure III-50."	Unclear what is concluded from the analyses: is 1 m thick rockfill cover recommended? If so, should it not be shown on design drawings?	A rockfill layer will be shown on the construction drawings as protection for the core and cutoff wall.
DD-7	Dike Tie-In	Goose Island Dike ties into Bay Zone Dike to seal off Third Portage Lake from Goose Island Pit.	Dewatering Dike Drawings	Not clear from design drawings how the Goose Island Dike cutoff will merge with Bay Zone Dike cutoff.	A 'Y' in the cutoff wall is built as part of the Bay Zone Dike. The 'Y' is tied into during Goose Island Dike construction. To be clarified for construction.
PF-1	Thermal Model Calibration	Thermal model has been calibrated to demonstrate the applicability of model to predict freeze-thaw effects on dewatering dikes and to predict the magnitude and rate of permafrost development in the tailings and central dike during operations and after closure.	Central Dike Design report, Appendix III: Thermal model was calibrated in Central Dike Design report by comparing generated ground surface temperaure history with measured soil temperatures at 0.3 m depth; and by comparing predicted and measured ground temperatures from deep ground temperature measurements beneath Second Portage Lake. No model calibration was carried out explicitly for the Dewatering Dikes design.	Generated ground surface temperature function used in Central Dike thermal analyses is different from that used in the dewatering dike design; summer ground surface temperatures used in Central Dike design are warmer than for the dewatering dike design (which is essentially the air temperature). Ground surface temperature function needs to be better rationalized, preferably against more ground temperature locations and greater depths. The thermal model should be able to reasonably match both active layer penetrations and ground temperature profile for various stratigraphic profiles and permafrost condition (i.e., warm and cold permafrost).	Thermal modelling was carried out to provide general information on the expected performance of the tailings and was consistent with the level of information available at the time. More detailed modelling is in progress and includes measured thermal properties of the tailings. The modelling will include a sensitivity analysis related to the quantity and distribution of ice within the tailings. Modelling indicates that tailings will tend to frozen state and that tailings deposition plan will influence the thermal conditions within the impoundment.
PF-2	Understanding of Thermal Regime of Tailings During Operations	Permafrost encapsulation of the tailings considered a key component of the closure plan.	From Preliminary Closure and Reclamation Plan, Section 7.3.2, "… If it is determined by monitoring during operations that the tailings are freezing at lower rates than predicted, then mitigative measures to enhance freezing would be implemented."	Thermal regime of tailings storage facility will be largely influenced by tailings deposition plan, thermal properties of the tailings, and climatic condtions. It is unclear from the available reports whether or not the proponent has sufficient information to predict with reasonable degree of certainty how the thermal tailings should behave to trigger the need for mitigative measures. Frozen/unfrozen thermal conductivities of the tailings recommended to better characterize the thermal properties of the tailings.	Thermal modelling was carried out to provide general information on the expected performance of the tailings and was consistent with the level of information available at the time. More detailed modelling is in progress and includes measured thermal properties of the tailings. The modelling will include a sensitivity analysis related to the quantity and distribution of ice within the tailings. The depostion plan has tailings placed in the southern area first, then in the northern area. This will allow sections of the tailings to be brought to final elevation and covers constructed, instrumented and monitored during the operationg period and adjustments to be made to the cover design.

Table 2f: AEM Response to Meadowbank Type A Water License Intervenor Comments - Nunavut Water Board (NWB)

NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
PF-3	Active Layer Variability	Active layer is strongly influenced by soil and ground surface conditions.	Mine Waste & Water Management Report, Section 2.4.2, p. 2-6: "The depth of the active layer ranges from about 1.3 m in areas with soils, up to about 4 m adjacent to lakes. The depth of permafrost and the active layer will vary based on proximity to lakes, soils thickness, vegetation, climate conditions, and slope direction".	Measured active layers not necessarily influenced by proximity to lakes. Deep active layer (3.8 m) at BH 02-GT09 can be attributed to rock outcrop. Warm ground temperature (-2.5C) and deep active layer at BH 02-GT03 can be explained by thick snow cover. Thin active layer may also be attributed to high ice content soils or vegetation/organic cover. It is not clear from available reports that the measure ground temperatures have effectively been used to rationalize material properties and boundary surface conditions for thermal design of tailings storage facility and dikes.	Thermal modelling was carried out to provide general information on the expected performance of the tailings and was consistent with the level of information available at the time. More detailed modelling is in progress and includes measured thermal properties of the tailings. The modelling will include a sensitivity analysis related to the quantity and distribution of ice within the tailings.
PF-4	Active Layer predictions	Active layer penetration into till was predicted for Saddle Dam and Dewatering Dikes design.	Central Dike Design report, Section 5.3.3, p. 49: Saddle Dam design predicted 1.9 m thaw penetration into till. Dewatering Dike Design report, Section 5.4 & Figure III-49 predicted ~ 1.3 m thaw penetration.	The results are inconsistent and the reasons for the difference should be explained.	Will review this aspect as part of the ongoing thermal modelling. This modelling is to be completed in July 2008. Both results are realistic, and differences are not critical to the design.
PF-5	Tailings Material Properties	Sensitivity analyses were carried out in the absence of measured thermal properties.	Central Dike Design report, Appendix III, Section 3.3, pp. III-9 to III-12: Effects of thermal conductivity and heat capacity were evaluated over a generalized soil profile and for a 1-year period. Results indicated that tailings froze back quicker with increasing thermal conductivity of the tailings but tailings temperatures appeared to be less sensitive to heat capacity.	Tailings freezeback will likely be more influenced by the moisture content (and associated latent heat) of the tailings. With increased moisture content (e.g., due to ice entrapment), the rate of tailings freezeback is expected to be lower. Sensitivity analyses should be carried out to determine the influence of increased moisture content (possibly due to ice entrapment).	Thermal modelling was carried out to provide general information on the expected performance of the tailings and was consistent with the level of information available at the time. More detailed modelling is in progress and includes measured thermal properties of the tailings. The modelling will include a sensitivity analysis related to the quantity and distribution of ice within the tailings.
PF-6	Sensitivity of active layer predictions to extreme climate scenarios	Sensitivity of extreme warm & cold years (+/- 3C compared to mean) investigated for dewatering dike design.	Dewatering dike design report, Section 5.4.4, p. 490: cold year increased depth of freeze-thaw by 0.1 m compared to mean. The warm year had no influence on freeze-thaw depth.	These results are not expected as one would have expected more variation in freeze-thaw depth for the 6C range in mean annual air temperatures.	Will review this aspect as part of the ongoing thermal modelling. This modelling is to be completed in July 2008. These results are not critical to the design.
PF-7	Thermal Influence of downstream flooding on Central Dike	Introduction of warm lake waters will saturate pores of unsaturated rockfill and warm rockfill temperatures to above 0C.	Central Dike design report, Appendix III: It is not clear whether or not the model has considered the thermal effects of saturating the rockfill voids.	Prior to downstream flooding, rockfill should be unsaturated. Furthermore, because the rockfill is fairly pervious (design hydraulic conductivity = 1E-2 m/s), it should be dry. The specific heat from the warm flood water is expected to warm all submerged rockfill to temperatures greater than 0C. As downstream flooding is expected to occur over several years, the initially frozen rockfill will thaw as it becomes submerged. The staged flooding should retard freezeback of the dike and affect tailings freeze-back near the upstream slope of the dike. Thermal analyses should consider the effects of the staged flooding.	See page 35 of Central Dike Design report - Document 420, which considers this aspect.

Table 2f: AEM Response to Meadowbank Type A Water License Intervenor Comments - Nunavut Water Board (NWB)

NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
PF-8	Ground ice conditions	Ground ice distribution will affect how the natural material behaves when thawed as well as how deep the surface layer can be stripped to access till for construction materials.	Mine water & waste management report, Section 2.4.2, p. 2-6: "Based on ground conductivity surveys and compilation of regional data, the ground ice content is expected to be low. Locally on land, ice lenses and ice wedges are present, as indicated by ground conductivity, and by permafrost features such as frost mounds. These areas of local ground ice are generally associated with low-lying areas of poor drainage."	Borehole logs from overland holes were not included among reports, so it is not clear from available data whether or not permafrost was preserved during drilling and if so, what were the ground ice characteristics. Ground ice descriptions would be useful for characterizing how much glacial till can be used for borrow, how it can be excavcated, and how workable it will be when thawed.	A test pit investigation was carried out in August 2007 in the Third Portage Peninsula area - results have been presented in Document 538. The till profile overlying bedrock was thawed in August, with no ground ice observed.
PF-9	Tailings Storage Facility Cover Thickness	Typical closure plan for tailings facilities in the north requires a layer of granular cover material to encourage permafrost encapsulation of the tailings and to limit the depth of thaw into the reactive tailings pile.	From Section 6.2 of Mine Waste & Water Management Report (MMC 2007), "… the tailings will be covered with a minimum 2 m thickness of non-acid generating ultramafic waste rock as a secondary preventive measure… based on thermistor data, which indicates the depth of thaw ... to be on the order of 1.5 m"	See Point PF-4; predicted active layer penetrations into the till range from about 1.3 m to 1.9 m. Active layer penetration into relatively dry granular rockfill expected to be greater than in moist till. Furthermore, active layer penetrations expected to increase with global warming. Cover configuration needs to be examined in further details for closure planning.	As the closure plan is developed and revised during the course of the mine life, additional thermal studies and models will be carried out.
PF-10	Tailings long-term freezeback model (Central Dike Design, vol. 1, 2007)	Sensitivity analyses were carried out to evaluate the short and long-term effects of the tailings deposition schedule.	Central Dike Design report, Appendix III, Section 3.6.1, pp. III-17-18: 1D tailings model assumed initially 14 m of till overlying 40 m of bedrock; long-term model ran for 100 years.	Possible that long-term solution was influenced by model geometry. It is suggested that the solution be verified with a thicker bedrock layer (90 m versus 40 m).	Will review this aspect as part of the ongoing thermal modelling. This modelling is to be completed in July 2008.
MISC -1	Constructability Using Natural Till	Glacial till is proposed to be used as core material for dewatering dikes and as possible impermeable element for Stormwater Dike and South Saddle Dam.	From Mine Waste & Water Management report, Section 8.2, p. 8-2: "till material stripped during pre-mining development will be used for the construction of the East and Bay Zone dikes... for planning purposes, it has been assumed that only 50 percent of this material will be suitable for use in the construction of the Dewatering and Central dikes". From Section 9, p. 9-1, "Based on current material balance calculations, sufficient quantities of suitable rockfill and till borrow materials will be available from pre-mining activities".	It is not clear how proponent has estimated available till materials for construction. Presence of oversize cobbles and boulders has not been fully characterized. Also, the amount of till that can be stripped and used during the short summer construction window (~ 4 months) will be limited (probably less than 2 m thick). Much of the till will likely be frozen and saturated. Till that may have been thawed and stockpiledduring the previous summer may have frozen and become unworkable. Quantity of usable till likely closer to 15-25 percent of the total available.	A investigation of the till borrow area on Third Portage Peninsula was carried out in August 2007, including confirmation of quantity available, and geotechnical characterization by laboratory testing - see Document 538. Further investigations are planned for other borrow sources.
MISC-2	Vault Dike Design	Typical section of Vault Dike has been presented in the Type A Water Licence Application (MMC, August 2007)	Type A Water Licence Application report, Section 3.2.4, p. 64: "The Vault Dike is intended to isolate Vault Lake from Wally Lake in preparation for Open Pit Mining and Vault attenuation storage…" Typical section presented in Figure 3.1.	No detailed design has been presented for this dike. No geotechnical investigation has been carried out along the proposed alignment. There are no details regarding the design criteria (e.g., freeboard requirements, cutoff requirements, etc.) for this structure. Further details of this structure recommended before construction.	Agreed that details will be provided prior to construction. Construction will be in 2013.

Table 2f: AEM Response to Meadowbank Type A Water License Intervenor Comments - Nunavut Water Board (NWB)

NO.	TECHNICAL ISSUE	BACKGROUND DESCRIPTION	PROPONENT'S PERSPECTIVE	COMMENTARY	AEM RESPONSE
MISC-3	South Camp Dike Design	Typical section of South Camp Dike has been presented in the Type A Water Licence Application (MMC, August 2007)	Type A Water Licence Applicaton report, Section 3.2.3, p. 63: "The South Camp Dike encloses the Goose Island area along with the Bay Zone Dike, Goose Island Dike, and nearby land, such that it can be isolated from Third Portage Lake." Typical section presented in Figure 3.1.	No detailed design has been presented for this dike. No geotechnical investigation has been carried out along the proposed alignment. There are no details regarding the design criteria (e.g., freeboard requirements, cutoff requirements, etc.) for this structure. Further details of this structure recommended before construction.	This will be a low head structure. Construction is planned for 2010 and details will be provided prior to construction.
MISC-4	till storage in rock storage facility.	storage area for till not used as construction material.	From Mine Waste & Water Management Report (MMC 2007), Section 8.2, p. 8-2, plan is to place some till in rock storage facility, either as separate stockpile for future use (e.g., reclamation) or to be mixed with waste rock.	To enhance convective cooling and permafrost development within waste rock pile, the waste rock should be as porous as possible, and overburden should not be mixed with the waste rock.	Placement of till on specific areas of the face of the waste dumps may enhance convective cooling. Till quantities are relatively minor compared with volume of waste rock to be stored.
MISC-5	Till core	Characterization of geotechnical behaviour of till core	From Type A Water License Application, Section 3.2.1, p. 60 "… a delineation and sampling program of till materials available at surface on site was completed in August 2007. Geotechnical labortory testing will be conducted on the till samples collected from this program... the results of this program testing and final review will be provided to the NWB prior to construction of the dike till cores."	Noted here only as item still outstanding.	A investigation of the till borrow area on Third Portage Peninsula was carried out in August 2007, including confirmation of quantity available, and geotechnical characterization by laboratory testing - see Document 538. Further investigations are planned for other borrow sources.

Appendix A (Table 1 – Items 5 and 6)

Proposed Water Quality Monitoring and Management Plan for
Dike Construction and Dewatering at the Meadowbank Mine

AGNICO-EAGLE MINES LTD.
Meadowbank Division

PROPOSED WATER QUALITY MONITORING AND MANAGEMENT PLAN FOR DIKE CONSTRUCTION AND DEWATERING AT THE MEADOWBANK MINE.

MARCH 2008

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SECTION 1 • INTRODUCTION

Agnico-Eagle Mines Ltd. (AEM) is pleased to submit this water quality monitoring and management plan for dike construction and dewatering at the Meadowbank mine site from mid-2008 to early 2009. The plan has been prepared on behalf of AEM by the Azimuth Consulting Group Inc. (Azimuth). The plan does not cover the complementary monitoring of limnological parameters in Second Portage Lake (which is contained in the Fish-Out Program) nor does it cover AEMP-related routine water quality monitoring of both Second and Third Portage lakes.

Water quality monitoring will include several parameters (e.g., nutrients and metals), but TSS (total suspended sediments) and turbidity[1] (as a surrogate for TSS) will be the major driver of management actions during construction and dewatering. The TSS/turbidity focus allows for direct monitoring of the major potential stressor in "real time", thus allowing timely identification and mitigation of potential issues related to dike construction or dewatering.

This memo includes the following components:

- Review of key literature regarding effects of suspended sediment (**Section 2**)
- Review and discussion of existing guidelines for suspended sediment (**Section 3)**
- Proposed suspended sediment triggers for protection of fish and fish habitat at Meadowbank **(Section 4 and Appendix A)**
- Water quality monitoring and management plan for dike construction (**Section 5**)
- Water quality monitoring and management plan for dewatering (**Section 6**)
- References (**Section 7**)

The monitoring and management plans are detailed and should serve as operating procedures for real-time actions in the field.

[1] The precise method that will be used to relate TSS and turbidity is explained in Section 4 of this memo.

SECTION 2 • REVIEW OF TSS/TURBIDITY EFFECTS

Suspended solids, and associated effects on water clarity, have the potential to affect fish and fish habitat in a variety of ways, including but not limited to:

- Smothering of deposited eggs or siltation of spawning habitats
- Smothering of benthic invertebrate communities
- Decreased productivity caused by reduced light penetration
- Reduced visibility, which may decrease feeding efficiency and/or increase predator avoidance
- Clogging and abrasion of gills

DFO has produced a report on effects of sediment on fish and their habitat (DFO 2000). That report is based primarily on a more detailed paper by Birtwell (1999). The review by Birtwell is in turn based on a few sources, the most recent and comprehensive of which was prepared by Caux et al. (1997). Birtwell (1999) notes that the TSS guidelines developed by the CCME (1999) and the BC Ministry of Environment, Lands and Parks (1998) are the most recent available, and that both are based in part on the review by Caux et al (1997). Not surprisingly, then, there is a high degree of consistency among past reviews of the effects of TSS. We did a literature review to find more recent articles specific to species of interest at the Meadowbank mine, but did not find any articles.

The general findings for effects of TSS on fish and fish habitat indicate the following:

- Effects of TSS depend on both concentration of TSS and duration of exposure.
- Effects of TSS can also be influenced by the size and shape of suspended particles.
- Concentrations of TSS that are lethal to fish over acute exposures (i.e., hours) range from hundreds to hundreds of thousands of mg/L.
- Sublethal effects on fish (e.g., reduced growth, changes in blood chemistry, histological changes) associated with chronic (weeks to months) exposures tend to be exhibited at TSS concentrations ranging from the tens to hundreds of mg/L.
- There is considerable uncertainty about potential effects of very low TSS concentrations (less than tens of mg/L) over very long time periods.
- Overall, the most sensitive group of aquatic organisms to TSS appears to be salmonids, and guidelines discussed below are designed to protect this group.
- Adult salmonids are generally more sensitive to short duration, high concentrations of suspended sediments than juvenile salmonids. However, both juvenile and adult fish have potential to avoid high concentrations of suspended sediments.
- Very low suspended sediment levels are known to cause egg mortality (40%) to rainbow trout at long durations (7mg/L at 48 days). Guidelines for long-term exposure reflect these findings.

SECTION 3 • EXISTING GUIDELINES FOR TSS AND TURBIDITY

Based on the findings regarding effects of suspended sediment, guidelines for TSS as well as turbidity have been put forth by various agencies.

TSS

In the case of TSS, CCME and BCMELP specify separate guidelines for TSS for clear flow and high flow periods. The guidelines are derived primarily from Caux et al. 1997, with application intended mainly for British Columbia streams. Caux et al. 1997 refer to clear flow periods and/or clear water. In the case of application to the Meadowbank Project Lakes, the clear flow or clear water guidelines would be most relevant – even during freshet we would not expect to see large natural fluctuations in TSS except in localized areas for short periods.

The guidelines put forth by CCME and BCMELP recognize that the severity of effects of suspended sediments is a function of both the concentration of suspended sediments and the duration of exposure. Guidelines are intended to protect the most sensitive taxonomic group (salmonids) and the most sensitive life history stages. The following table summarizes the available guidelines applicable to clear water (CCME and BCMELP) and to mine-related effluent discharges (MMER).

Source	Short-Term Exposure	Long-Term Exposure
CCME 1999	Anthropogenic activities should not increase suspended sediment concentrations by more than 25mg/L over background levels during any short-term exposure period (e.g., 24-hr)	For longer term exposure (e.g., 30 days or more), average suspended sediment concentrations should not be increased by more than 5mg/L over background levels
BCMELP 1998	Maximum increase over background of 25 mg/L during any 24 hour period (hourly sampling preferred).	Average sediment concentration should not exceed background by more than 5 mg/L for sediment inputs lasting between 24 hours and 30 days (daily sampling preferred).
MMER 2002	Maximum authorized concentration in a composite effluent sample = 22.5 mg/L. Maximum authorized concentration in a grab sample of effluent = 30 mg/L.	Maximum authorized monthly mean effluent concentration = 15 mg/L [2].

[2] For purposes of calculating monthly means, any values below detection limits are set at one-half of the detection limit.

The guidelines above are intended to be protective of the most sensitive taxonomic groups and life stages, and are based on hundreds of studies in different environments (see Caux et al. 1997). Some of the studies may not be particularly relevant to the case of suspended sediment associated with dike construction and dewatering in a lake environment. Consequently, it is worth considering whether all aspects of existing guidelines are applicable to dike construction and monitoring at the Meadowbank mine. There are two particular aspects that warrant discussion.

First, in relation to short-term exposure guidelines, it is important to note that guidance is based on findings for adults and juveniles (which are more sensitive than eggs and larvae over short durations), and that the guidance is based primarily on reviews looking at application to stream environments. In a stream environment, compared to a lake environment, it is difficult for fish to swim away from suspended sediments because the high degree of mixing in the water column facilitates higher uniformity in TSS concentrations. In contrast, in lakes, in particular for sediment plumes associated with construction activities or discharges, high TSS concentrations would generally be expected to be localized, with dilution over distance. In a lake situation, adult and juvenile fish (the most sensitive life stages to short-term exposure) should readily be able to swim away from a sediment plume.

Second, in relation to long-term exposure guidelines, it is important to note that guidance is heavily influenced by findings indicating the sensitivity of eggs to low-level exposure to TSS over long durations. Consequently, the long-term exposure guidelines would be rather conservative if applied during times when eggs are not present, or in areas of a lake or stream that are not spawning habitat.

In Section 4, we develop proposed site-specific TSS triggers for Meadowbank.

Turbidity

Turbidity guidelines put forth by CCME (1999) and BCMELP (1998) are based on extrapolation from the TSS guidance above, adjusted by a factor of about 3:1 (a typical average ratio for TSS: turbidity). In the case of turbidity for clear water, CCME (1999) recommends a maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period), and a maximum average increase of 2 NTUs from background levels for a longer term exposure (e.g., 30-d period). The BCMELP (1998) guidance is virtually identical to that of CCME.

It should be noted that DFO's report on effects of sediment on fish and their habitat (DFO 2000) endorses the guidelines for TSS put forth by BCMELP (1998) and CCME (1999), but does not recommend following guidelines for turbidity. Rather, turbidity may be used as a surrogate for suspended sediment only when the relationship between the two parameters is established for a particular waterbody. CCME (1999) provides an example regression calculation where the base 10 logarithm of turbidity is a function of the base 10 logarithm of TSS.

Existing guidance documents, as well as the Caux et al (1997) analysis which formed most of the basis for the guidance, recognize that in general, suspended sediments result in reduced light penetration which in turn results in reduced primary production (DFO 2000; CCME 1999). CCME (1999) notes, however, that in some cases short-term resuspension of sediments and nutrients in the water column can augment primary productivity, and in other cases changes in light penetration may be inconsequential if a system is limited by other factors such as nutrients. The Caux et al. (1997) study considered effects of suspended sediment not only on fish but also on algae and zooplankton.

In the end, the recommendations put forth by Caux et al. (1997) are based mainly on the most sensitive taxonomic group, which is salmonids.

Consistent with DFO (2000), we recommend the use of TSS guidelines (and not turbidity, except as a surrogate as discussed in Section 4 below) for protection of fish and fish habitat at Meadowbank, for the following reasons:

- Existing turbidity guidelines for protection of aquatic life are actually extrapolated from TSS guidelines, and are not specific to turbidity;
- Northern lakes tend to be nutrient-limited, so moderate changes in light penetration may have little impact on productivity. It is possible that suspension of sediments, with associated nutrients, will actually increase primary productivity;
- Any impacts of reduced light penetration on primary productivity will be relatively short-lived, completely reversible, and likely localized in scale;
- Short-term impacts of reduced primary production on fish should be relatively minor, since the biomass of fish in the lake is very large compared to the annual incremental change in biomass associated with lake productivity.

While the CCME guideline for turbidity is based on TSS and is meant to be protective of fish and fish habitat (i.e., including the food chain), research has shown that widespread, chronic turbidity can result in reductions of primary productivity (e.g., Lloyd et al., 1987). Consequently, water clarity is of concern at broader spatial scales and longer timeframes. For example, it would not be a concern for dike construction due to the expected localized nature and short duration of any sediment incursions past the turbidity barriers. For dewatering, however, there is the potential for discharges to occur throughout an open water season. The potential impacts of these discharges on primary productivity will be monitored as part of the core AEMP program. Turbidity data will be compared to CCME guidance and scientific literature relating productivity to turbidity, while direct measures of primary productivity will be assessed using spatial and temporal analyses as part of the AEMP.

SECTION 4 • RECEIVING ENVIRONMENT[3] SUSPENDED SEDIMENT TRIGGERS FOR PROTECTION OF FISH AND FISH HABITAT AT MEADOWBANK

The TSS guidelines reported above are based mainly on the analysis by Caux et al. (1997). That analysis was intended to support derivation of generic guidelines that would be protective of the most sensitive taxonomic groups and life stages, and that would be applicable to a wide range of water bodies. In addition, the methodology of Caux et al. evaluated the expected change in response associated with a given change in TSS concentration (i.e., the slope of the concentration-duration response curves). This approach using the slope is therefore based on *relative* changes in response, and is appropriate for a generic guideline because it can be applied to systems with varying baseline TSS concentrations and varying baseline response (if applicable). In the case of Meadowbank, however, we are less interested in *relative* changes in response than in the *absolute* responses at low TSS concentrations[4].

For these reasons, we re-evaluated the data to develop site-specific TSS thresholds for Meadowbank. The rationale and analysis are contained in Appendix A. Based on the analysis, we recommend the following TSS thresholds for the aquatic environments at Meadowbank:

Short Term Maximum – For durations up to and including 24 hours, we recommend a TSS threshold of 25mg/L, to be applied in areas where there is spawning habitat and at times when eggs or larvae would be expected to be present (i.e., this threshold of 25 mg/L will be applied to monitoring stations that are located closest to the high value shoal areas, starting 1 September 2008).
In all other areas and at times when eggs/larvae are not present, we recommend a TSS threshold of 50 mg/L. For impounded areas (e.g., northwest arm of Second Portage Lake), the threshold of 50 mg/L would apply at all times and in all areas, because any eggs deposited in impoundments will not survive dewatering.

Maximum Monthly Mean – For long-term exposure, we recommend a monthly mean TSS threshold of 6 mg/L, to be applied in areas where there is spawning habitat and at times when eggs or larvae would be expected to be present (i.e., this threshold of 6 mg/L will be applied to monitoring stations that are located closest to the high value shoal areas, starting 1 September 2008). In all other areas and at times when eggs/larvae are not present, we recommend a TSS threshold of 15 mg/L as a maximum monthly mean. For impounded areas (e.g., northwest arm of Second Portage Lake), the threshold of 15 mg/L would apply at all times and in all areas, because any eggs deposited in impoundments will not survive dewatering.

[3] TSS limits for dewatering impoundments are addressed in Section 6.
[4] Mean background TSS concentrations in baseline studies for Second Portage Lake ranged from <1 to 3 mg/L. The majority of the measured values were below the method detection limit of 1 mg/L. While existing guidance values are intended to be applied relative to background, we propose to initially ignore background concentrations and assume they are near zero (with a single exception for maximum monthly means as explained in Appendix A). This conservative assumption addresses uncertainties in actual TSS concentrations. Background TSS concentrations will be measured in Second Portage Lake (i.e., in an area outside the influence of construction activities, such as the south-eastern end of the lake) and considered if warranted.

As AEM is committed to proactive and efficient response to any potential TSS problems, the monitoring program must be designed to provide quick feedback. This is not possible using TSS as a direct measure, because of the time required to analyze TSS in the field. Consequently, and consistent with the recommendations of DFO (DFO 2000), we propose to develop a relationship between turbidity and TSS that will allow the use of turbidity as a surrogate for TSS. The relationship will be developed as soon as possible during the construction phase. In order to establish the relationship with some confidence, we will generate data across a range of TSS levels by sampling both inside and outside of silt curtains. Prior to development of a site-specific TSS-turbidity relationship, we propose to use turbidity thresholds that are exactly 1/3 of the recommended TSS thresholds. This is consistent with the rationale of a 3:1 ratio for TSS to turbidity used to develop existing turbidity guidelines. Once a statistically significant relationship between turbidity and TSS is established (i.e., statistical p value <0.10), we will use that relationship to relate the two parameters.

It should be noted that these TSS thresholds are intended for application to the aquatic receiving environments. TSS limits for dewatering discharges are discussed separately in Section 6.

SECTION 5 • WATER QUALITY MONITORING AND MANAGEMENT PLAN FOR DIKE CONSTRUCTION

During dike construction, the dike material itself as well as the disturbed material on the lake floor will both contribute to increases in concentrations of suspended sediments in the water column. In the absence of sediment control measures, suspended sediment plumes would be expected to migrate to the southeast with wind-driven (prevailing winds from the northwest) currents and the prevailing flow direction to the outlet at the southeast side of Second Portage Lake.

The key means for minimizing suspended sediment discharges from the dike construction zone during dike construction will be deployment of silt curtains to form a continuous barrier. The silt curtains will be placed as close as possible (i.e., approximately 5 to 10 m from the base of the dike) to the construction zone without risking direct incidental physical contact with construction materials (**Figure 1**), and will be suspended off of the lake floor to avoid resuspension of sediment associated with contact between the curtains and the bottom sediments. If there are no silt curtain failures, we do not expect any significant sediment plumes, although minor seepage of suspended sediments under silt curtains may result in localized elevated TSS concentrations outside the barrier. However, strong winds are not uncommon on the lake and will need to be addressed with sufficient anchoring of the silt curtains. Wind-related stresses on the silt curtains, and the related risk of curtain failure, will decrease significantly as the first rock wall portion of the dike is constructed. Notwithstanding, silt curtain integrity will be monitored closely throughout the construction period.

The proposed Standard Operating Procedure (SOP) for monitoring and management of suspended sediments during dike construction is shown in **Figure 2**. Importantly, the SOP strives for proactive prevention and mitigation of problems. Monitoring will be conducted during daylight hours when conditions are safe for small craft. Within these constraints, we will attempt to provide round-the-clock sampling by a two-person crew (a total of four people will be dedicated to this task – a day crew and a night crew). The monitoring crew will have dedicated access to a boat, and possibly to more than one boat in order to have access to both sides of dikes.

The SOP contains the following key elements:

1. Routine TSS monitoring will include four monitoring events per day (weather/logistics permitting), approximately every six hours. Each monitoring event will include (a) inspection of silt curtain integrity/deployment, and (b) measurement of TSS/turbidity at established stations.

2. Routine water quality sampling for nutrients and metals (total and dissolved) will also be conducted on a weekly basis[5].

[5] Water quality sampling parameters will include (a) physical parameters - hardness, pH, total dissolved solids, total suspended solids, (b) Anions and nutrients - ammonia, alkalinity – bicarbonate, alkalinity – carbonate, alkalinity – hydroxide, alkalinity – total, chloride, silicate, sulfate, nitrate, nitrite, total kjeldahl nitrogen, ortho phosphate, total phosphate; (c) Organic parameters: chlorophyll a, dissolved organic carbon, total organic carbon; (d) Total and dissolved metals

3. Stations for routine monitoring will be established at 100 meter intervals on the outside of silt curtains, at a distance of about 50 meters from the silt curtains (**Figure 1**). Not all stations would be sampled every event – for example, at the start of construction, stations that are located near the opposite side of the lake from the construction area might be sampled only periodically.

4. In addition, construction crews will be responsible for immediately reporting any obvious silt curtain problems if they observe problems before the monitoring crew.

5. If there is a silt curtain problem, it will be immediately fixed.

6. If TSS levels (or turbidity as a surrogate) in a single sample exceed the *Short Term Maximum* (see below), this will trigger a series of actions. First, the silt curtain will be inspected in more detail to identify any obvious problems. If there are no obvious problems, mitigative measures will be considered such as adjusting construction practices (e.g., more careful placement of materials), modification of silt curtain deployment, or deployment of additional silt curtains. Second, monitoring frequency for the affected area (the station of interest plus direct neighbour stations) will be increased (1 to 4 hour intervals depending on the magnitude). Third, any plumes will be delineated spatially using a grid of monitoring stations at 100-m intervals (perpendicular to the established stations along the outside of the silt curtains) and taking the maximum TSS (turbidity) concentration in the water column (based on depth profiling). The grid at 100-m intervals will be mapped before construction begins, so that each point has a name (letter and number combination) and a GPS coordinate and can be located easily while in the field. Field crews will carry a map showing the map grid with the names of each station and GPS coordinates.

7. As monitoring continues, a moving 24-hour average TSS concentration will be estimated at each monitoring station. If the 24-hour average exceeds the *Short Term Maximum*, construction will shut down while (a) mitigative measures are considered, (b) monitoring continues, (c) weather shifts (if weather is a factor), and (d) AEM provides a recommended course of action to regulators. Construction will resume once AEM is confident that the conditions that led to the elevated TSS levels have been addressed.

8. In addition to short-term effects of TSS, there is potential for long-term effects that occur at lower concentrations. For this, we propose to calculate a 7-day moving average TSS concentration and compare this to a *Maximum Monthly Mean*. If the 7-day moving average TSS concentration exceeds the maximum monthly mean, we will first determine if the average has been heavily influenced by one or more events that have been addressed. If not, we will consider mitigative options such as re-deployment of silt curtains, deployment of additional silt curtains, and possible adjustments to construction practices. If there is still a problem with the 7-day moving average TSS concentration, we will shutdown construction (until the TSS source has been identified and addressed) and provide an appropriate course of action to regulators.

9. Follow-up monitoring of the benthic community will be conducted if significant sediment plumes are identified. While it would be expected that any adverse effects from sediment deposition would not be permanent, plume deposition areas will be monitored in the year following construction (and the next year if significant adverse effects are found). A control-impact design will be used to test for differences in benthic community (e.g., abundance and

diversity) between the deposition area and an area (similar depth and substrate characteristics) unaffected by construction activities.

10. Three high value shoal areas were identified in close proximity to the construction area (**Figure 1**). While these areas will be subject to a higher level of protection (i.e., lower trigger values for TSS) than other areas during the fall spawning season, sediment deposition rates will also be monitored using sediment traps. Results will be compared across monitoring points and to existing literature on effects of deposited sediment[6].

[6] Caux et al. (1997) reviewed literature on effects of sediment deposition. Data are considered insufficient for development of guidance, but nevertheless a comparison of Meadowbank data to existing literature may be useful.

SECTION 6 • WATER QUALITY MONITORING AND MANAGEMENT PLAN FOR DEWATERING DISCHARGES

During dewatering, there is potential for sediment to become suspended as exposed substrates slump. Suspended sediment could then enter the water intake(s) and be discharged to 3PL. In addition, the discharge itself could disturb the bottom sediments in 3PL and lead to increased levels of suspended sediment. The following plans will mitigate against possible problems with suspended sediment during dewatering:

1. Intake barge(s) will be located at a sufficient distance from shore (minimum 10 meters) and, to the extent possible, in areas with highest water depth. As dewatering progresses, intakes can only be located in deep basins.

2. If necessary, silt curtains will be deployed around intake barge(s) in order to prevent silt-laden water from entering the intake.

3. The discharge will be located in an area of 3PL where there is deep, low-value habitat. In addition, the direction of the discharge pipe may be angled up, away from the lake bottom, to minimize any probability of sediment resuspension.

Monitoring of suspended sediments associated with dewatering will be two-fold, involving monitoring of intake water turbidity (as a surrogate for TSS once a relationship is established) and monitoring of turbidity in the receiving environment in 3PL.

Our proposed Standard Operating Procedure (SOP) for monitoring and management of suspended sediments during dewatering is shown in **Figure 3**. Importantly, the SOP strives for proactive prevention and mitigation of problems. Monitoring will be conducted under direction of AEM's environmental supervisor on-site. Senior biologists from Azimuth will become involved only if elevated levels of suspended sediments are detected at the barge intake.

The SOP contains the following key elements:

1. Routine monitoring will involve measuring TSS (turbidity as a surrogate) in the intake barge(s) once each day, and visually inspecting the impounded area for sediment slumps and/or resulting plumes. Turbidity can be measured by extracting a sample of water collected using a bucket inside the intake barge.

2. For monitoring TSS in the intake pipe during dewatering, we recommend the following TSS thresholds:

   Intake Short Term Maximum (ISTM) – We suggest a short-term maximum for TSS concentrations of 22.5 mg/L that applies for durations up to 24 hours. This is equivalent to the MMER limit for composite samples, and slightly lower than the MMER limit for individual grab samples (i.e., 25 mg/L).

Intake Maximum Monthly Mean (IMMM) – Consistent with MMER limits, we suggest a maximum monthly (30-day) mean TSS concentration of 15 mg/L be applied during dewatering.

3. Initial confirmation monitoring in the receiving environment to ensure that the discharge is not re-suspending sediment from the bottom of 3PL. From three days before dewatering begins until 5 days after dewatering begins, we will monitor TSS daily in the receiving environment (30 meters out) to ensure that TSS concentrations in the receiving environment are not being affected by the physical location of the discharge pipe.

4. Continuous monitoring in the receiving environment. Once ice-up begins, we plan to deploy a turbidity station and data logger through the ice, in the closest stable ice area but no closer than 30 meters from the end-of-pipe. The station will record turbidity hourly. As long as intake water meets the intake thresholds for TSS, the receiving environment turbidity data will be downloaded only periodically (e.g., weekly). This unit would be also be deployed during dewatering during the open water season.

5. If TSS levels in a single sample of the intake water exceed the ISTM, this will trigger a series of actions. First, visual inspections will try to identify any obvious source of slumping on the lake edges to determine if the source of sediment is likely to be short-term or more continuous. Second, monitoring frequency for the intake will be increased to hourly. Third, mitigative measures will be considered, such as deployment of silt curtains around the intake barge(s) or movement of the intake barge(s).

6. If the moving 24-hour average TSS concentration exceeds the ISTM, then dewatering will shut down while (a) mitigative measures are considered, (b) monitoring continues, (c) weather shifts (if weather is a factor), and (d) AEM provides an appropriate course of action to regulators. Dewatering will resume once the conditions that led to the elevated TSS levels have been addressed.

7. At the same time, whenever the moving 24-hour average TSS concentration in the intake exceeds the ISTM, we will attempt (if can be done safely) to delineate any plumes spatially. Before ice-up, this would involve sampling turbidity at 100-m intervals from the main receiving environment station, along a grid pattern until the plume is bounded. The grid at 100-m intervals will be mapped before construction begins, so that each point has a name (letter and number combination) and a GPS coordinate and can be located easily while in the field. After ice-up, monitoring will be more challenging. At the least, we will drill holes through the ice at two of the stations adjacent to the end-of-pipe receiving environment station. If elevated TSS concentrations are detected at these stations (based on maximum along the depth profile), we will try to move outwards along the 100-m grid, subject to safety concerns on the ice. All receiving environment TSS/turbidity values will be compared to the respective receiving environment triggers (see Section 4) for plume delineation.

8. A 14-day moving average will be used as an internal trigger to prompt consideration of mitigation measures in advance of the 30-day *Intake Maximum Monthly Mean* (IMMM). We will also determine if the average has been heavily influenced by one or more short-term events that are no longer relevant.

9. If the 30-day moving average *Intake Maximum Monthly Mean* is exceeded, then dewatering will shut down while (a) mitigative measures are considered, (b) monitoring continues, and (c)

AEM provides an appropriate course of action to regulators. Dewatering will resume once the conditions that led to the elevated TSS levels have been addressed.

10. Follow-up monitoring of the benthic community will be conducted if significant sediment plumes are identified. While it would be expected that any adverse effects from sediment deposition would not be permanent, plume deposition areas will be monitored in the year following construction (and the next year if significant adverse effects are found). A control-impact design will be used to test for differences in benthic community (e.g., abundance and diversity) between the deposition area and an area (similar depth and substrate characteristics) unaffected by construction activities.

SECTION 7 • REFERENCES

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TAILINGS STORAGE FACILITY

AIRSTRIP

PORTAGE PIT

EAST DIKE

TEARDROP LAKE

PLANT SITE

TEMPORARY CULVERT CROSSING

WEST CHANNEL DIKE

SECOND PORTAGE LAKE

BAY ZONE DIKE

7214500 N
7214000 N
7213500 N
7213000 N
637500 E
638000 E
638500 E
639000 E
639500 E
640000 E
640500 E
641000 E

0 50 100 150 200 250
Scale in Metres

LEGEND:

- LAND-BASED TOPOGRAPHIC MAJOR CONTOURS INTERVAL 10m
- LAND-BASED TOPOGRAPHIC MINOR CONTOURS INTERVAL 2m
- BATHYMETRIC MAJOR CONTOURS INTERVAL 10m
- BATHYMETRIC MINOR CONTOURS INTERVAL 2m
- SHORE LINE
- 2m DEPTH TURBIDITY BARRIER
- 5m DEPTH TURBIDITY BARRIER
- 7m DEPTH TURBIDITY BARRIER
- 2008 DIKE CONSTRUCTION
- 2009 DIKE CONSTRUCTION
- PIT FOOTPRINT

RELATIVE VALUE OF FISH HABITAT IN SECOND AND THIRD PORTAGE LAKES

- HIGH
- MODERATE
- LOW
- HIGH VALUE HABITAT MONITORING POINT
- ROUTINE MONITORING POINT

NOTES:

1) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2) ALL ELEVATIONS ARE IN METRES ABOVE SEA LEVEL (MASL), UNLESS OTHERWISE NOTED.
3) GRID REFERENCE: NAD 83, UTM ZONE 14
4) CONTOUR INFORMATION ON LAND SUPPLIED BY MEADOWBANK MINING CORPORATION.
5) CONTOURS BELOW LAKE SURFACE ARE BASED ON BATHYMETRIC AND SEISMIC SURVEYS BY GOLDER ASSOCIATES LTD., 2006.
6) LAKE CONTOURS ARE BASED ON SURVEYED LAKE SURFACE ELEVATIONS: 2ND PORTAGE LAKE = 133.1M, 3RD PORTAGE LAKE = 134.1M
7) NOMINAL OFFSET OF TURBIDITY BARRIER FROM DIKE TOE IS 5 M

PROJECT

AEM

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

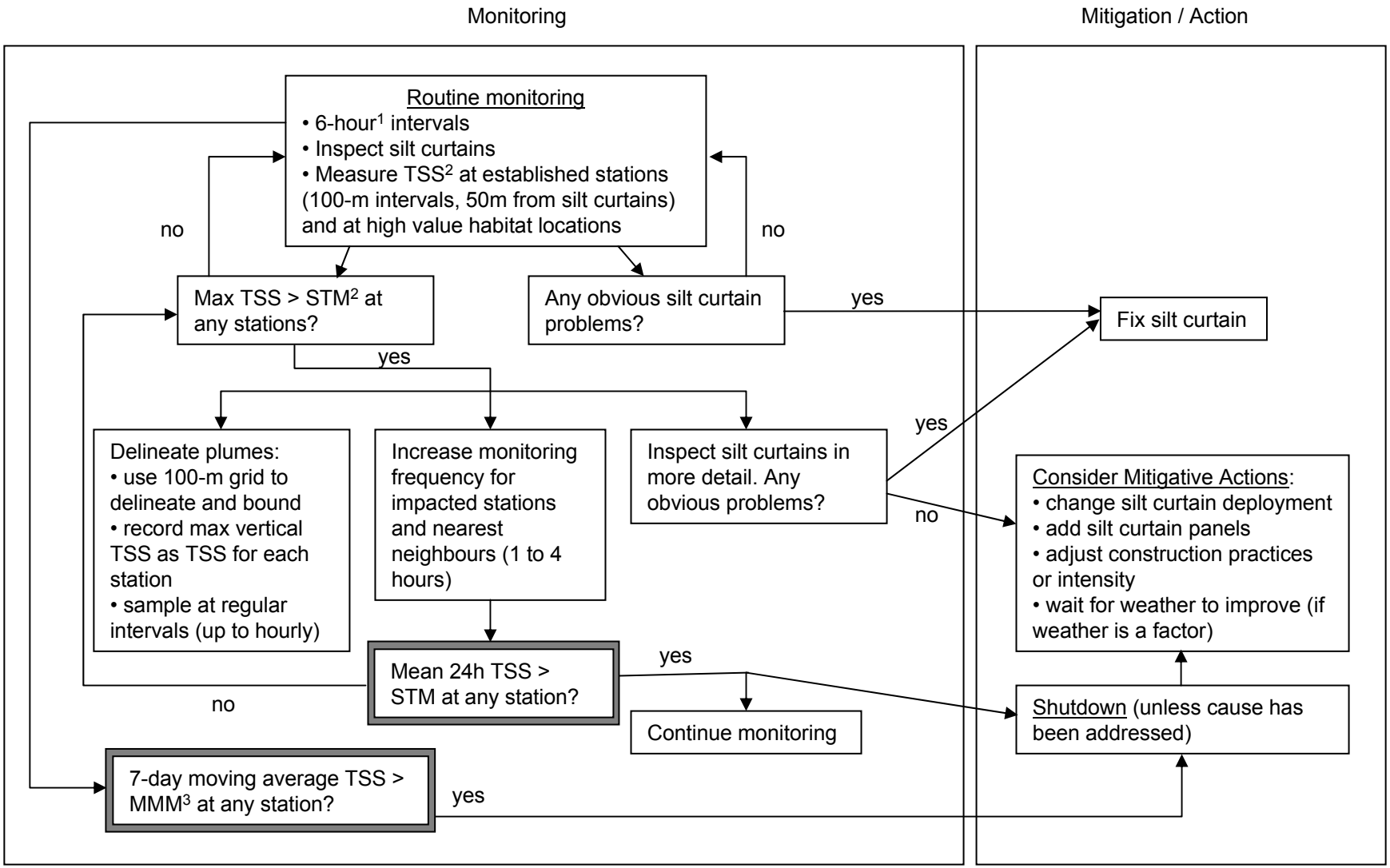
TITLE

MEADOWBANK GOLD PROJECT
EAST DIKE CONSTRUCTION
MONITORING LOCATIONS

PROJECT No.			FILE No.	
DESIGN			SCALE	REV.
CADD			**FIGURE 1**	
CHECK				
REVIEW				

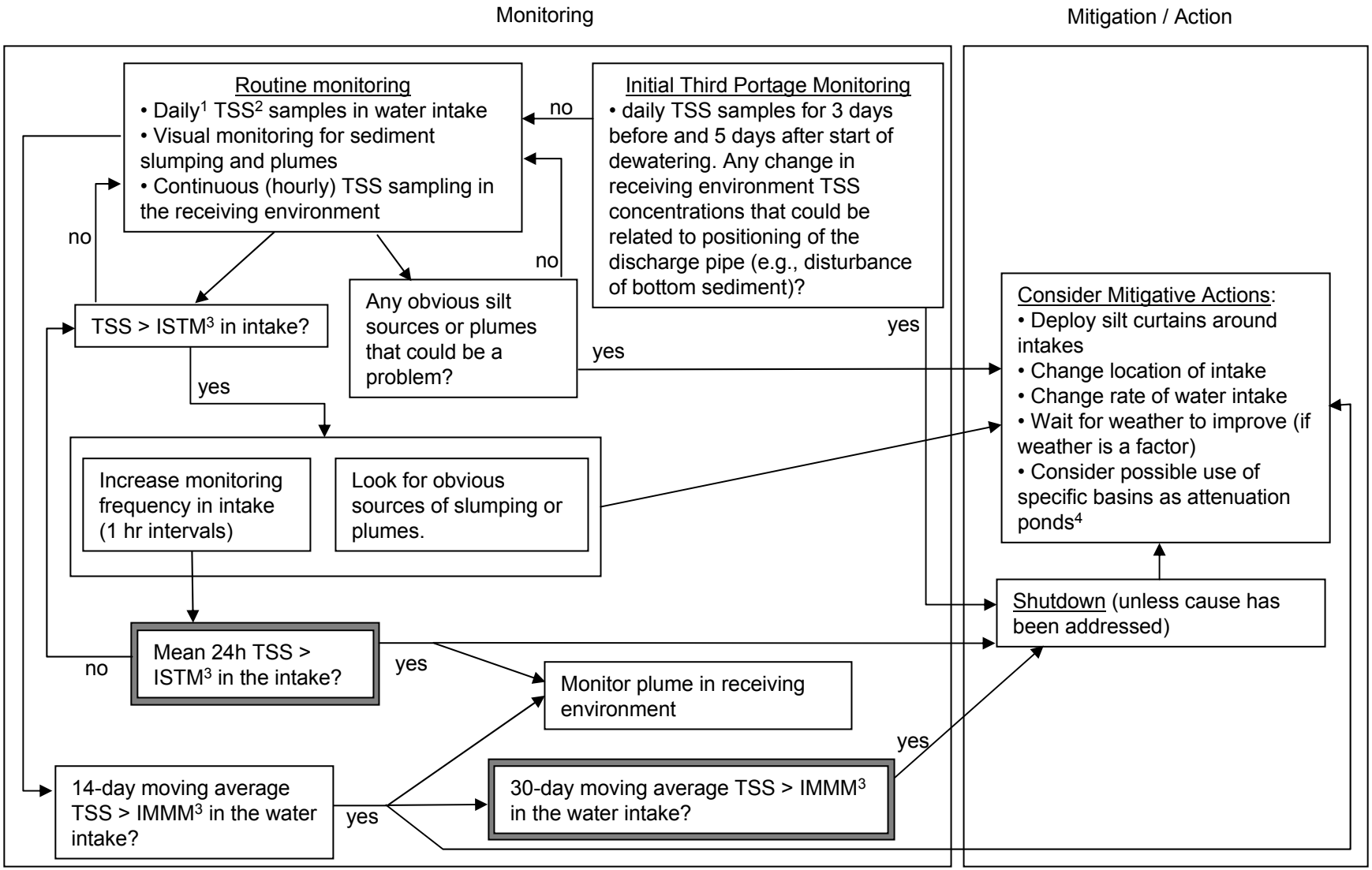
CADD FILE: N:\Bur-Graphics\Projects\2007_1413_07-1413-0119\Drafting\2100\07141301 19_A-FIG-01.1.dwg
By: eabello
REVISION DATE: 08/03/07 02:19PM

Figure 2. Standard Operating Procedures for Suspended Sediment Monitoring and Management During Dike Construction.



Notes: 1. During daylight hours and/or weather/logistics permitting. 2. TSS will be measured using turbidity as a surrogate once a relationship is established. 3. STM = short term maximum concentration of TSS. MMM = maximum monthly mean TSS concentration.

Figure 3. Standard Operating Procedures for Suspended Sediment Monitoring and Management During Lake Dewatering.



Notes: 1. Daily monitoring will be attempted; frequency will not be less than once every 6 days. 2. TSS will be measured using turbidity as a surrogate once a relationship is established. 3. ISTM = intake short term maximum concentration of TSS; IMMM = intake maximum monthly mean TSS concentration. 4. This option would require liaison with regulators and would require that the final fish removal has occurred in the specific basin.

APPENDIX A – ANALYSIS OF CAUX ET AL (1997) DATA FOR DERIVATION OF PROJECT-SPECIFIC TSS THRESHOLDS

Existing TSS guidelines are based mainly on a review and analysis conducted by Caux et al. (1997). That analysis was intended to support derivation of generic guidelines that would be protective of the most sensitive taxonomic groups and life stages, and that would be applicable to a wide range of water bodies. In addition, the methodology of Caux et al. evaluated the expected change in response associated with a given change in TSS concentration (i.e., the slope of the concentration-duration response curves). This approach using the slope is therefore based on *relative* changes in response, and is appropriate for a generic guideline because it can be applied to systems with varying baseline TSS concentrations and varying baseline response (if applicable). In the case of Meadowbank, however, we are less interested in *relative* changes in response than in the *absolute* responses at low TSS concentrations.

Appendix 1 of Caux et al. 1997 summarizes over 300 data points for fish that include TSS concentration, duration of exposure, and response. Response is estimated using a scale of 0 to 14 to indicate the "severity of ill effects" (SIE). SIE scores of 1 to 3 are behavioural responses such as alarm reaction, abandonment of cover or avoidance response. SIE scores from 4 to 8/9 indicate increasingly severe sub-lethal effects. SIE scores of 10 to 14 indicate mortality, ranging from 0 to 20% (for SIE score =10) to >80% (SIE score = 14). In order to make recommendations for generic TSS guidelines for fish, Caux et al. fit a curve to the dose-response data, and for the most sensitive sub-group (salmonids), they estimated the change in TSS concentration needed to change an SIE score by one point. In our case, however, we are not particularly interested in the *relative* change in SIE score, but rather the absolute SIE score. In the project lakes, TSS concentration is very close to zero except possibly in localized areas during freshet. Consequently, we can focus on absolute SIE score assuming a starting point of zero. Many of the data points in the Caux et al. data base apply to TSS concentrations that are quite high (e.g., close to half are in the thousands) and outside the range that will trigger management actions at Meadowbank. For example, the change in TSS concentration required to change an SIE score from 12 to 13 is not relevant at Meadowbank, because both SIE scores are clearly unacceptable when the starting point is zero.

We collated the Caux et al. (1997) data in order to evaluate them more carefully for application to dike construction and dewatering monitoring. Existing guidance on TSS is heavily influenced by a small number of data points indicating effects on eggs/larvae. Consequently, it is important to differentiate between those areas where there is spawning habitat (i.e., where there is potential exposure of eggs/larvae) and those areas where there is no spawning habitat, and it is equally important to differentiate between times when eggs/larvae may be present and times when they will not be present. As a result, we identified four different scenarios for which TSS thresholds were needed:

1. Short-term exposures in areas that include spawning habitat and occur during the time when eggs/larvae could be present

2. Short-term exposures in areas not used for spawning or during periods when eggs/larvae would not be present

3. Long-term exposures in areas that include spawning habitat and occur during the time when eggs/larvae could be present

4. Long-term exposures in areas not used for spawning or during periods when eggs/larvae would not be present

1. Short-term exposure scenario that includes spawning habitat and egg/larva windows

In the case of short-term exposure, we initially considered all data points except those that had duration greater than 24 hours. This resulted in a list of 116 data points. **Figure A-1** shows the severity of ill effects (SIE) score observed at various responses, for the 48 cases where TSS concentration was 300 mg/L or less. The remaining data points apply to concentrations ranging from 305 mg/L to 330,000 mg/L. **Figure A-1** shows that at TSS concentrations of less than 100 mg/L, most SIE scores are in the range of 1 to 4 (a score of 4 indicates a short-term reduction in feeding rates or feeding success, a score of 3 corresponds to avoidance response, a score of 2 corresponds to abandonment of cover, while a score of 1 refers to alarm reaction). All of these responses are short-term behavioural responses or extremely mild sub-lethal responses which are reversible and would not be expected to have important consequences. However, there are four data points with a higher SIE score than 4 at TSS concentrations below 100 mg/L. The most sensitive among these (SIE = 10, TSS concentration = 25 mg/L) is a study indicating a mortality rate of 5.7% for Arctic grayling sac-fry. Another data point (SIE = 10, TSS concentration = 65 mg/L) from the same study indicated a mortality rate of 15% for Arctic grayling sac-fry. The reference for that study is a personal communication so there is no report where we can look at the original data. The other two cases indicate mortality rate of 10% (SIE = 10) for adult silverside at a TSS concentration of 58 mg/L, and increased physiological stress (SIE = 6) for juvenile salmon at a TSS concentration of 54 mg/L. Based on these findings, and to be consistent with the findings of the study showing sensitivity of arctic grayling sac-fry, we would recommend a short-term (24 hour) TSS threshold of 25 mg/L.

2. Short-term exposure in areas without spawning habitat, or at times when eggs/larvae not present. This case applies also to the entire impounded NW arm of 2PL since any eggs deposited in 2008 will not survive.

For this case, we excluded data points that had duration greater than 24 hours and all data points that were specific to eggs or larvae. This resulted in a list of 102 data points – importantly, among the data points that are not applicable to this scenario are the data for Arctic grayling sac-fry highlighted above. **Figure A-2** shows the severity of ill effects (SIE) score observed at various responses, for the 41 cases where TSS concentration was 300 mg/L or less. **Figure A-2** shows that at TSS concentrations of less than 100 mg/L, SIE scores usually range from 1 to 4, indicating short-term responses which are reversible and would not be expected to have important consequences. However, there are two data points with a higher SIE score than 4 at TSS concentrations below 100 mg/L. In one case (SIE score = 6), a TSS concentration of 54 mg/L for 24 hours resulted in increased physiological stress in juvenile coho salmon. In the second case (SIE score = 10), a TSS concentration of 58 mg/L for 24h resulted in 10% mortality of adult Atlantic silverside. Silverside are a non-salmonid marine fish, whereas the fish that will be caught and sacrificed in the impoundment are freshwater fish and primarily salmonids (trout, char, and whitefish). Among our 102 data points, the lowest TSS concentration at which mortality in salmonids has been observed is 200 mg/L. In addition, in a lake situation fish are capable of avoiding high TSS concentrations by swimming away from the construction zone. Given all of these factors, we believe that a short-term (24 hour) TSS threshold of 100 mg/L would be protective of fish in areas where there is no spawning habitat or at times when

eggs/larvae are not present. However, to add an extra degree of conservatism, we recommend a 24-hr TSS threshold of 50 mg/L.

It should be noted that for impoundments, this threshold would apply to all areas, even spawning areas, because any eggs that are deposited will not survive dewatering.

3. Long-term exposure scenario that includes spawning habitat and egg/larva windows

In the case of long-term exposure, we initially considered all data points with duration greater than 24 hours. This resulted in a list of 187 data points. **Figure A-3** shows the severity of ill effects (SIE) score observed at various responses, for the 38 cases where TSS concentration was 100 mg/L or less. The remaining data points apply to concentrations ranging from 101 mg/L to 100,000 mg/L. It is important to note that the concentration-response curve in this case appears to be quite flat except at very low TSS concentrations – the mean SIE score for the data points shown in **Figure A-3** is 9.4, while the mean SIE score for the remaining data points (>100 mg/L TSS) is only slightly higher at 10.1. However, the SIE scale is not really linear, because direct measures of mortality apply only to SIE scores of 10 to 14.

Clearly there are variable, sometimes significant effects (e.g., mortality, SIE = 10 or more) that result from long-term exposure to TSS concentrations above around 15 mg/L. However, effects at concentrations of 12 mg/L or lower warrant a more detailed analysis. There are six data points where TSS concentrations are equal to or less than 12 mg/L. The details of these data points are as follows:

Species	Life Stage	TSS (mg/L)	Exposure Duration (days)	SIE Score	Response
Smelt	Adult	4	7	7	Increased vulnerability to predation
Lake Trout	Adult	4	7	3	Fish avoided turbid areas
Brook Trout	Adult	5	7	3	Fish more active and less dependent on cover
Chinook Salmon	Juv	6	60	9	Growth rate reduced
Rainbow Trout	Egg	7	48	11	Mortality rate 40%
Brook Trout	Fry	12	245	9	Growth rates declined

Among these cases, the most significant study and one that drives existing guidance, is the study showing 40% mortality of rainbow trout eggs at a TSS concentration of 7 mg/L. Since eggs are incapable of avoiding TSS, we believe that this study justifies application of the CCME (1999) and BCMELP (1999) guidance for long-term (e.g., 30-day) exposures. The guidance calls for up to 5 mg/L increase over background. Baseline TSS concentrations in 2PL range from <1 mg/L to about 3 mg/L. These baseline numbers are not insignificant relative to a change of 5 mg/L, therefore we suggest that for practical purposes, the long-term exposure threshold be set at 6 mg/L (a change of 5 mg/L applied to an assumed background TSS concentration of 1 mg/L).

4. Long-term exposure in areas without spawning habitat, or at times when eggs/larvae not present. This case applies also to the entire impounded NW arm of 2PL since any eggs deposited in 2008 will not survive.

For this case, we excluded data points that had duration less than or equal to 24 hours, and all data points that were specific to eggs or larvae. This resulted in a list of 158 data points. **Figure A-4** shows the severity of ill effects (SIE) score observed at various responses, for the 28 cases where TSS concentration was 100 mg/L or less. There are limited data at low TSS concentrations. The first five are shown in the table generated above (i.e., only the study showing effects of rainbow trout eggs is no longer relevant). None of the measured responses indicate mortality. At slightly higher TSS concentrations (18 mg/L) reduced abundance has been observed (SIE = 10, 30 day exposure for adult brown trout and rainbow trout). Mortality is first observed at 22 mg/L, but that data point involved a full year (365 days) of exposure and applies to a warmwater fish species. Beyond that, the next study showing mortality occurs at a TSS concentration of 90 mg/L (<20% mortality of rainbow trout under-yearlings exposed for 19 days). These data suggest that direct mortality may be quite unlikely at TSS concentrations < 20 mg/L. Nevertheless, reduced growth, which is observed at lower TSS concentrations, can be a significant sub-lethal effect.

A key consideration in deriving a long-term TSS threshold that excludes eggs and fry, is whether juveniles and adults would be able to swim to avoid turbid waters. The project lakes are large whereas construction zones are in particular areas, so we would not expect any suspended sediment plumes to impact large portions of the lake. This, coupled with the ability of fish to easily swim away from turbid waters over moderate to long time periods (i.e., days to months), means that it is unlikely that individual fish would be exposed continuously to high TSS concentrations.

Consequently, we recommend a long-term (i.e., 30-day average) TSS threshold of 15 mg/L in places or at times when eggs/larva are not a concern. This threshold is lower than the lowest TSS concentration at which reduced abundance or mortality has been observed for a long-term study; behavioural or reduced growth have been observed at lower TSS levels, but these are less significant than mortality and should be mitigated by the ability of fish to swim away from turbid waters.

Figure A-1: Fish Concentration-Response Data for Short-Term (max 24hr) Exposure to TSS (source: Caux et al. 1997; data for TSS concentrations > 300 mg/L not shown)

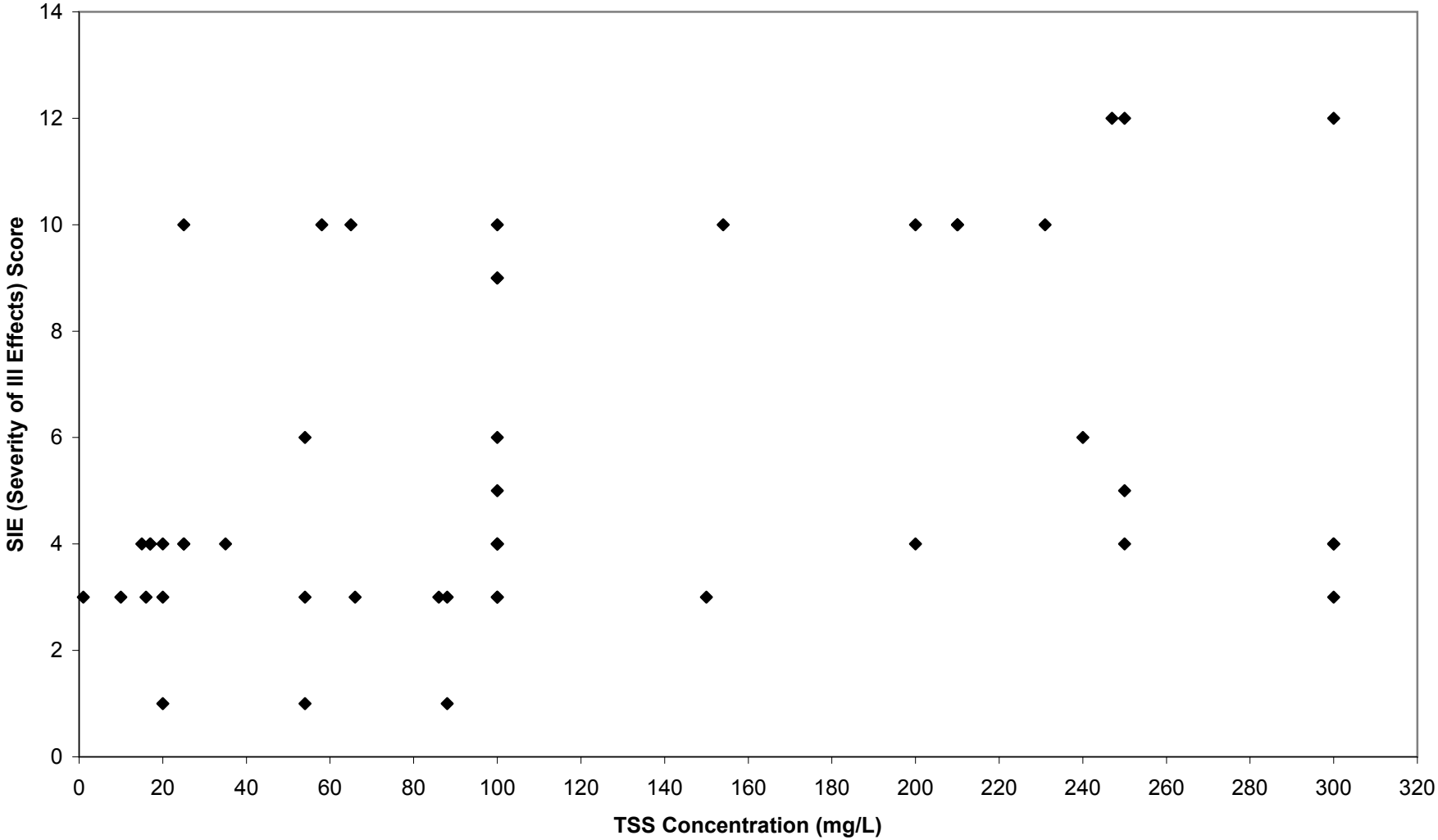


Figure A-2: Fish Concentration-Response Data for Short-Term (max 24hr) Exposure to TSS, Excluding Data Points for Eggs/Larvae (source: Caux et al. 1997; data for TSS concentrations > 300 mg/L not shown)

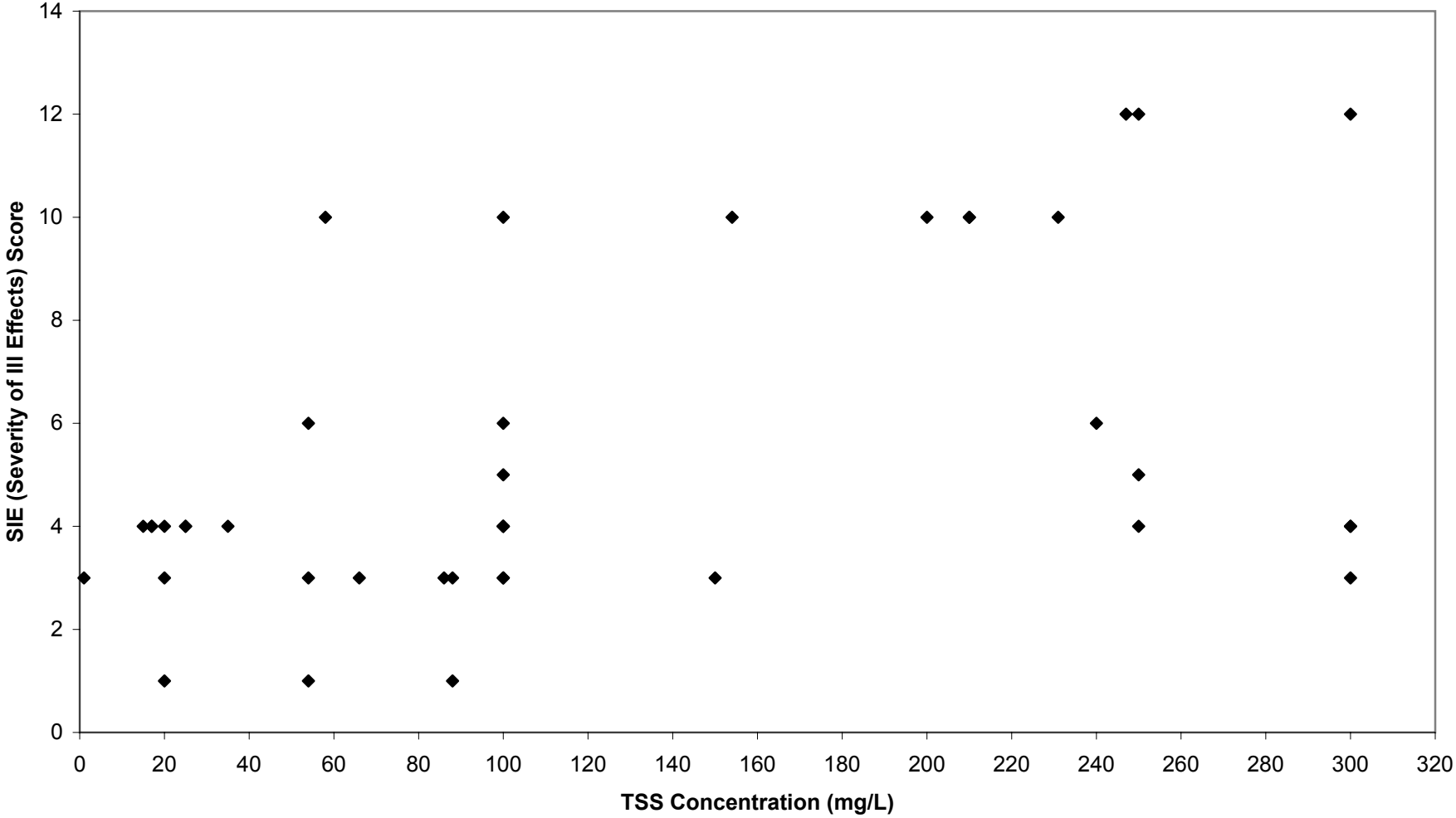


Figure A-3: Fish Concentration-Response Data for Long-Term (> 24hr) Exposure to TSS (source: Caux et al. 1997; data for TSS concentrations > 100 mg/L not shown)

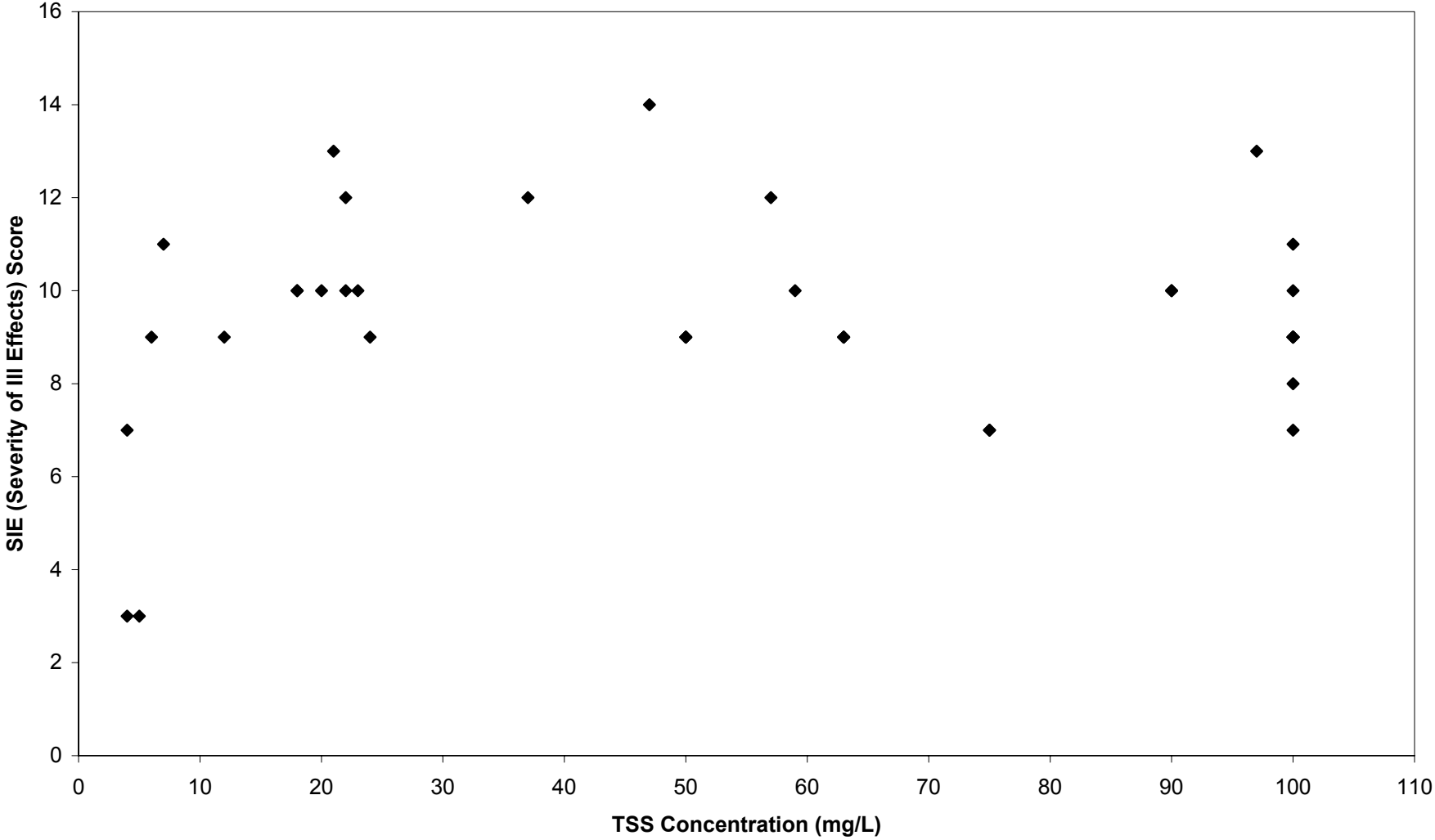
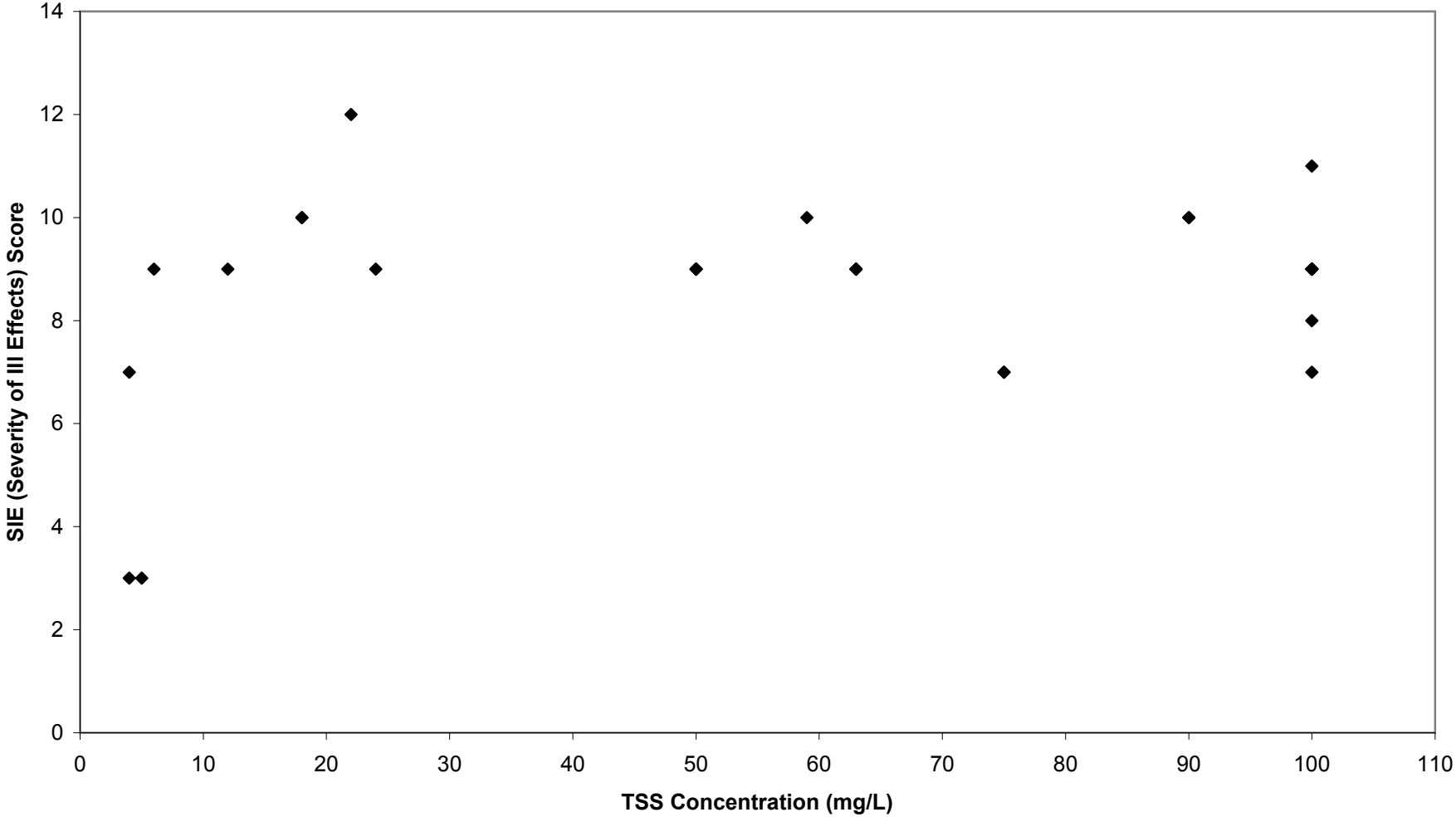


Figure A-4: Fish Concentration-Response Data for Long-Term (> 24hr) Exposure to TSS, Excluding Data Points for Eggs/Larvae (source: Caux et al. 1997; data for TSS concentrations > 100 mg/L not shown)



Appendix B (Table 1 – Item 8)

Dewatering Dike Dredge Disposal Options
Meadowbank Gold Project

TECHNICAL MEMORANDUM

Golder Associates Ltd.
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6

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Fax Access: 604-298-5253

TO:	Eric Lamontagne & Larry Connell	**DATE:**	March 6, 2008
FROM:	Ben Wickland & Terry Eldridge	**JOB NO:**	07-1413-0119/3000
EMAIL:	bwickland@golder.com teldridge@golder.com	**DOC NO:**	620
		VER:	0

RE: DEWATERING DIKE DREDGE DISPOSAL OPTIONS
MEADOWBANK GOLD PROJECT

This memo provides a response to requests during the Pre-Hearing Technical Conference in Baker Lake, NU on February 26-27, 2008 to review comments by BGC. The comments were originally forwarded in a BGC memorandum dated February 15, 2008, received February 22, 2008.

The comment from BGC:

- "Foundation preparation for lakebed sediments"

- "From Mine Waste & Water Management report, Section 8.1, p. 8-1, "The lake bottoms are expected to consist of soft lake bottom sediments, referring to fine grained sediments that typically accumulate, underlain by till or other overburden materials, and then bedrock. The thickness of soft lake bottom sediments is expected to be variable, and may range from a few centimetres up to several meters, as suggested by geophysical surveys".

- "From the Type A Water License Application report, Section 3.2.1, p. 59, "The proposed construction methodology for the Dewatering Dikes does not include the removal of lake bottom sediments. These will be filled over with end-dumped rock fill material...The fine lake bottom sediments will be displaced or incorporated into the pore space of the rockfill... Through the deepest section of the Goose Dike, along its southeast segment, dredging may be necessary". From the Dewatering Dikes Specifications, there is no description of foundation preparation for the dewatering dikes. From the Dewatering Dikes Design report, Section 6.4.3, p. 65, '5. The lakebed sediments and boulders will be removed from the footprint area of the coarse and fine filters prior to placement of filter materials.'"

- "No information has been provided for how the foundation will be prepared for the footprint areas of the filters and the deep section of Goose Dike, nor has there been any description of where the dredged lakebed sediments will be disposed. This should be clarified."

Additional investigations of the dike foundations are planned in March 2008 to provide information on lakebed materials to assist in construction equipment selection. The investigations will also provide additional information on the volume and type of material to be excavated.

With respect to requests for the plan for disposal of materials excavated from the lakebed along the East Dike, these will be placed on the crest of the 30 m wide rockfill embankment, allowed to drain, and then later be moved out of the potential traffic area to the central section of the dike. For any dredged sediments, a trench excavated in the crest of the rockfill embankment and lined with a coarse granular filter then a filter fabric (geotextile) will receive the material. The filter and fabric will retain the fine materials while allowing the material to drain.

Methods to remove boulders or lakebed soils from the lakebed between the two rockfills may include excavator, clamshell, or dredge depending on water depth and material type. Method for construction will be proposed by the contractor and approved by the engineer. For the East Dike, where the water depth is relatively shallow, use of an excavator is expected.

BEW/TLE/lw

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Appendix C (Table 1 – Item 9)

Meadowbank Gold Project Water Quality and Flow Monitoring Plan - Supplemental Information

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **MEADOWBANK GOLD PROJECT, *WATER QUALITY AND FLOW MONITORING PLAN* – SUPPLEMENTAL INFORMATION**

During the Pre-hearing conference of the Nunavut Water Board (Water Board) that took place February 26 and 27, 2008, the Water Board requested that Agnico-Eagle Mines Inc. (AEM) revise the data presented in tables within Meadowbank Water License Application Support Document 450, ***Meadowbank Gold Project, Water Quality and Flow Monitoring Plan***. A template was provided by the Water Board for the summary table with the intent to present the data in a more simplified format to aid the reader in understanding the monitoring program at the Meadowbank Gold Project.

The document that follows, provides supplemental information to replace the tables in Appendix A and figures in Section 2.2 of Document 450. As per recommendations of the Water Board, the attached table (Table A-1 revised) condenses the data found in the five tables of Appendix A, ***Monitoring Locations and Monitoring Program*** for the construction through post-closure monitoring plans into a single summary table. The monitored parameters for the non-contact water in the CM and IM monitoring sites have been revised to include: a) total suspended solids (TSS) during the construction phase and b) MMER parameters (total cyanide, arsenic, copper, lead, nickel, zinc, total suspended solids, pH), sulphate and turbidity (Schedule 5 in Table A-1 Revised) during the early operational, late operational and closure phases. In addition, Figures 2-1 (Early Operations Phase), 2-2 (Late Operations Phase), 2-3 (Closure Phase) and 2-4 (Post-Closure Phase) are attached and have been revised to include numeric identifiers for the Compliance Monitoring (CM) and the Internal Monitoring (IM) sites.

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Box 209, Two Bentall Centre
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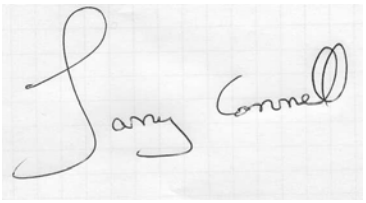
Baker Lake Office:
Baker Lake, Nunavut
X0C 0A0
Tel: 867-793-4610
Fax: 867-793-4611

We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned.

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Proposed Monitoring Program				
Monitoring Station # *	**Description of Station Location**	**Applicable Phase of Project**	**Parameters Monitored**	**Monitoring Frequency**
Cons-CM-#	To be determined	Construction	TSS	Monthly during open water season
Cons-IM-#	To be determined	Construction	TSS	Monthly during open water season
CM-1	Portage Area (east) diversion ditch	Early operation, late operation, closure	Schedule 5	Monthly during open water season
CM-2	Portage Area (west) diversion ditch	Early operation, late operation, closure	Schedule 5	Monthly during open water season
CM-3	Vault Area diversion ditch	Early operation, late operation, closure	Schedule 5	Monthly during open water season
CM-4	Third Portage Diffuser Discharge	Early operation	MMER	Weekly during discharge
CM-5	Wally Lake Diffuser Discharge	Late operation	MMER	Weekly during discharge
CM-6	Tailings Storage Facility	Post-closure	MMER	Annually during open water season
CM-7	Portage/Goose Pit lake discharge point	Post-closure	MMER	Annually during open water season
CM-8	Vault Pit Lake Discharge point	Post-closure	MMER	Annually during open water season
IM-1	Vault non-contact diversion ditch	Early Operation, late operation, closure	Schedule 5	Monthly during open water season
IM-2	Portage Rock Storage Facility	Early Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
		Late Operation	Schedule 2	Monthly during open water season
		Closure	schedule 3	Bi-annually during open water season
IM-3**	North Portage Pit Sump	Early Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
	Portage Pit Lake	Late Operation	Schedule 2	Monthly during open water season
		Closure	schedule 3	Bi-annually during open water season
IM-4	Portage Attenuation Pond	Early Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
IM-5**	Third Portage Pit Sump	Early Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
	Third Portage Pit Lake	Late Operation	Schedule 2	Monthly during open water season
IM-6	Goose Island Pit Sump	Early Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
	Goose Island Pit Lake	Late Operation	Schedule 2	Monthly during open water season
		Closure	schedule 3	Bi-annually during open water season
IM-7	Tailings Reclaim Pond	Early Operation (south of Central dike)	Schedule 3	Monthly during open water season
		Late Operation (north of Central dike)		Bi-annually during open water season
IM-8	Tailings Storage Facility	Late Operation	Schedule 3	Bi-annually during open water season
		Closure (drainage Run-Off)	Schedule 3	Bi-annually during open water season

Proposed Monitoring Program				
Monitoring Station # *	**Description of Station Location**	**Applicable Phase of Project**	**Parameters Monitored**	**Monitoring Frequency**
IM-9	Vault Pit Sump	Late Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
IM-10***	Vault Rock Storage Facility	Late operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
		Closure (east ditch) IM-10A	Schedule 3	Monthly during open water season
		Closure (west ditch) IM-10B	Schedule 3	Monthly during open water season
IM-11	Vault Attenuation Pond	Late Operation	Schedule 2 and 3	**Schedule 2:** monthly during open water; **Schedule 3:** bi-annually during open water season
IM-12	Vault Pit Lake	Closure	Schedule 2 and 3	**Schedule 2:** monthly during open water (flooding); **Schedule 3:** quarterly (fully flooded)
SSM Seep	To be determined	Construction	Schedule 3	Monthly during open water season
	To be determined	Early operation, late operation, closure	Schedule 1	Monthly or as found
SSM Ground water	all functioning wells	Construction, early operation, late operation, closure	Schedule 3	Annually
SSM Receiving (AEMP, Cumberland Resources 2005)	To be determined	Construction, early operation, late operation, closure	Schedule 4	Monthly During open water season all AEMP stations. Monthly throughout year at a smaller number of locations (through ice)
SSM Vault and Portage Effluent Outfall (2 locations)	To be determined	Operation	MMER	Weekly at open water season
EM	Per event	Per event	Per event	Per event

NOTES:

**IM-3 and IM-5 in Closure become one sampling point

***IM-10 During closure two contact water monitoring points will be assigned to the Vault Rock Storage Facility

Schedule 1: alkalinity, aluminum, ammonia, arsenic, barium, cadmium, chloride, chromium, copper, fluoride, iron, lead, manganese, mercury, molybdenum, nickel, nitrate, pH, selenium, silver, sulphate, thallium, zinc, turbidity and hardness

Schedule 2: alkalinity, ammonia, arsenic, copper, lead, nickel, zinc, pH, tubidity, total dissolved solids (TDS)

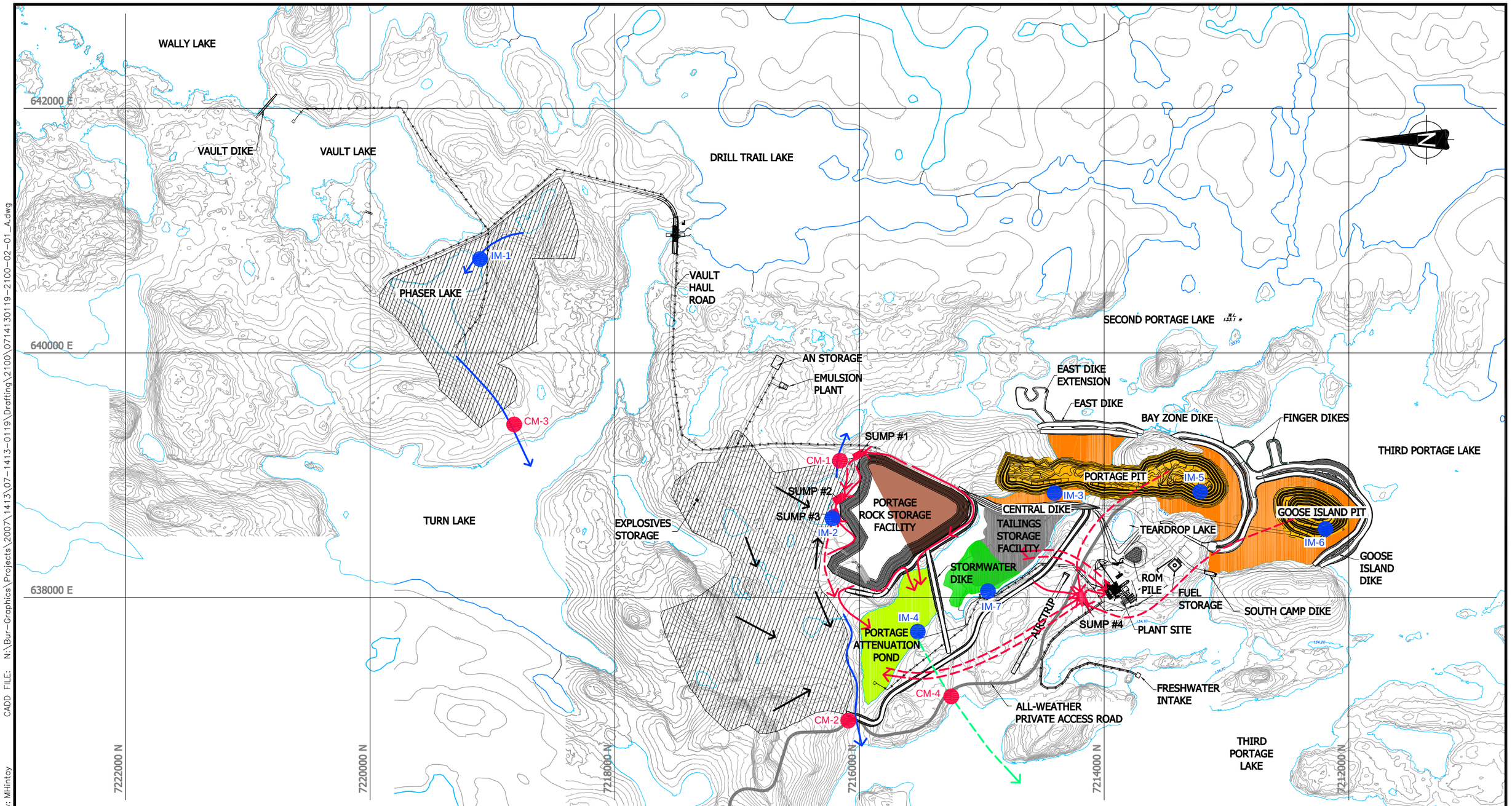
Schedule 3: pH, alkalinity, turbidity, hardness, ammonia nitrogen, nitrate, nitrite, chloride, fluoride, sulphate, TDS, **total and free cyanide for wells in groundwater flow path of the tailings storage facility**. Dissolved Metals: aluminum, arsenic, barium, cadmium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium and zinc.

Schedule 4: Total and Dissolved metals: aluminum, antimony, arsenic, boron, barium, beryllium, cadmium, copper, chromium, iron, lithium, manganese, mercury, molybdenum, nickel, lead, selenium, tin, strontium, titanium, thallium, uranium, vanadium and zinc; **Nutrients:** Ammonia-nitrogen, total kjeldahl nitrogen, nitrate nitrogen, nitrite-nitrogen, ortho-phosphate, total phosphorous, total organic carbon, total dissolved organic carbon and reactive silica; **Conventional Parameters:** bicarbonate alkalinity, chloride, carbonate alkalinity, conductivity, hardness, calcium, potassium, magnesium, sodium, sulphate, pH, total alkalinity, TDS, and TSS

Schedule 5: MMER parameters (total cyanide, arsenic, copper, lead, nickel, zinc, total suspended solids, pH), sulphate and turbidity

MMER: total cyanide, arsenic, copper, lead, nickel, zinc, total suspended solids, pH, effluent volumes and flow rate of discharge, acute toxicity, Daphnia Magna and environmental effects monitoring (EEM).

Yellow fill indicates changes in DOC 450 reported parameters



LEGEND

- TAILINGS
- WASTE ROCK
- RECLAIM POND
- ATTENUATION POND
- DEWATERED LAKE
- DIVERTED AREA
- OPEN PIT
- COMPLIANCE MONITORING POINT
- INTERNAL MONITORING POINT
- CONTACT WATER INTERCEPTION
- PUMPED CONTACT WATER
- NON-CONTACT WATER DIVERSION
- SURFACE RUNOFF
- ATTENUATION POND EFFLUENT DISCHARGE
- SUMP

0 300 600 900 1200 1500

Scale in Metres

MEADOWBANK
MINING CORPORATION

MEADOWBANK GOLD PROJECT

EARLY OPERATION PHASE | FIGURE 2-1

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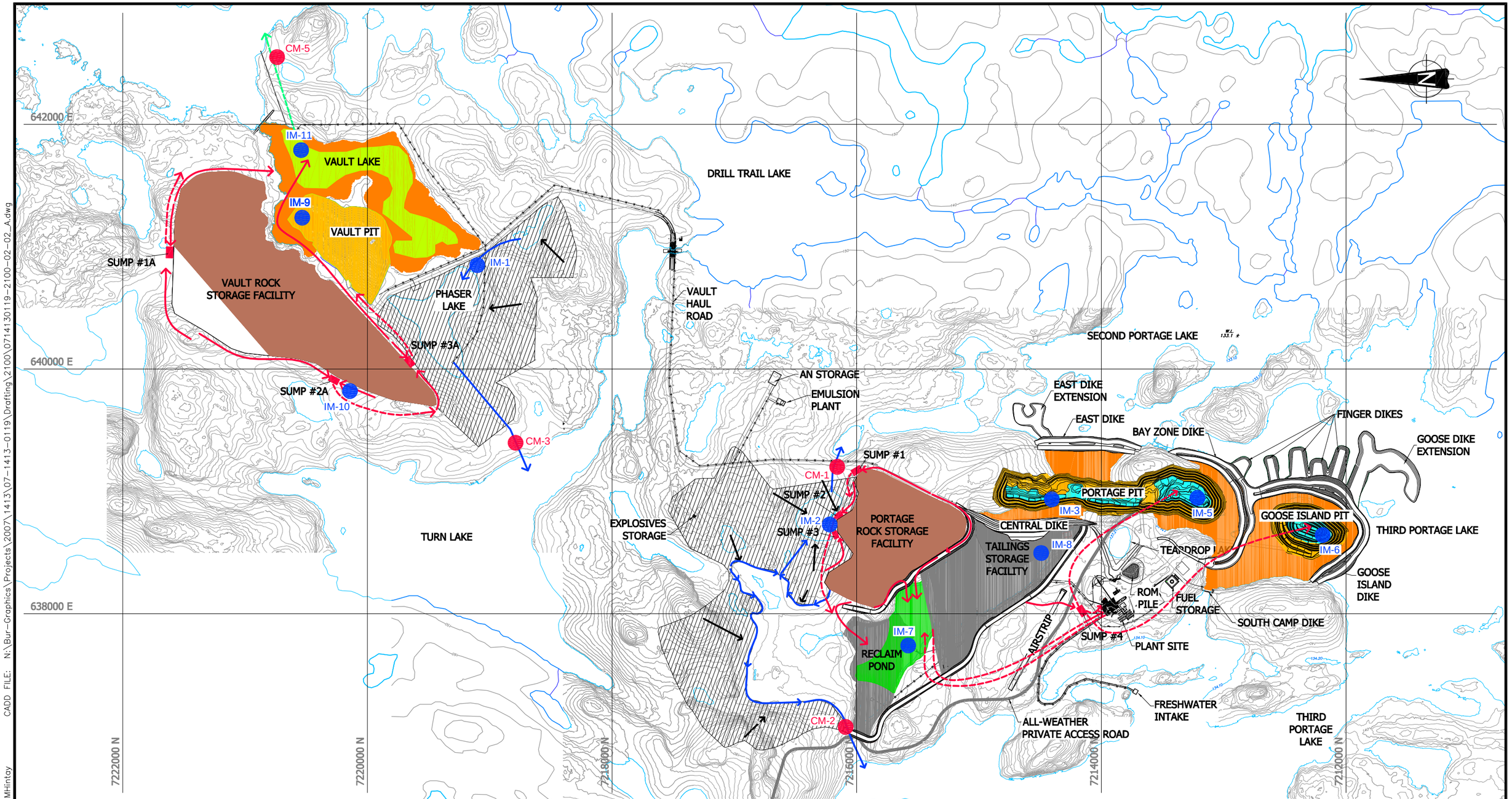

LEGEND:

- TAILINGS
- WASTE ROCK
- RECLAIM POND
- ATTENUATION POND
- DEWATERED LAKE
- DIVERTED AREA
- OPEN PIT
- PIT LAKE
- COMPLIANCE MONITORING POINT
- INTERNAL MONITORING POINT
- CONTACT WATER INTERCEPTION
- PUMPED CONTACT WATER
- NON-CONTACT WATER DIVERSION
- SURFACE RUNOFF
- ATTENUATION POND EFFLUENT DISCHARGE
- SUMP

0 300 600 900 1200 1500

Scale in Metres

MEADOWBANK
MINING CORPORATION

MEADOWBANK GOLD PROJECT

LATE OPERATION PHASE

FIGURE 2-2

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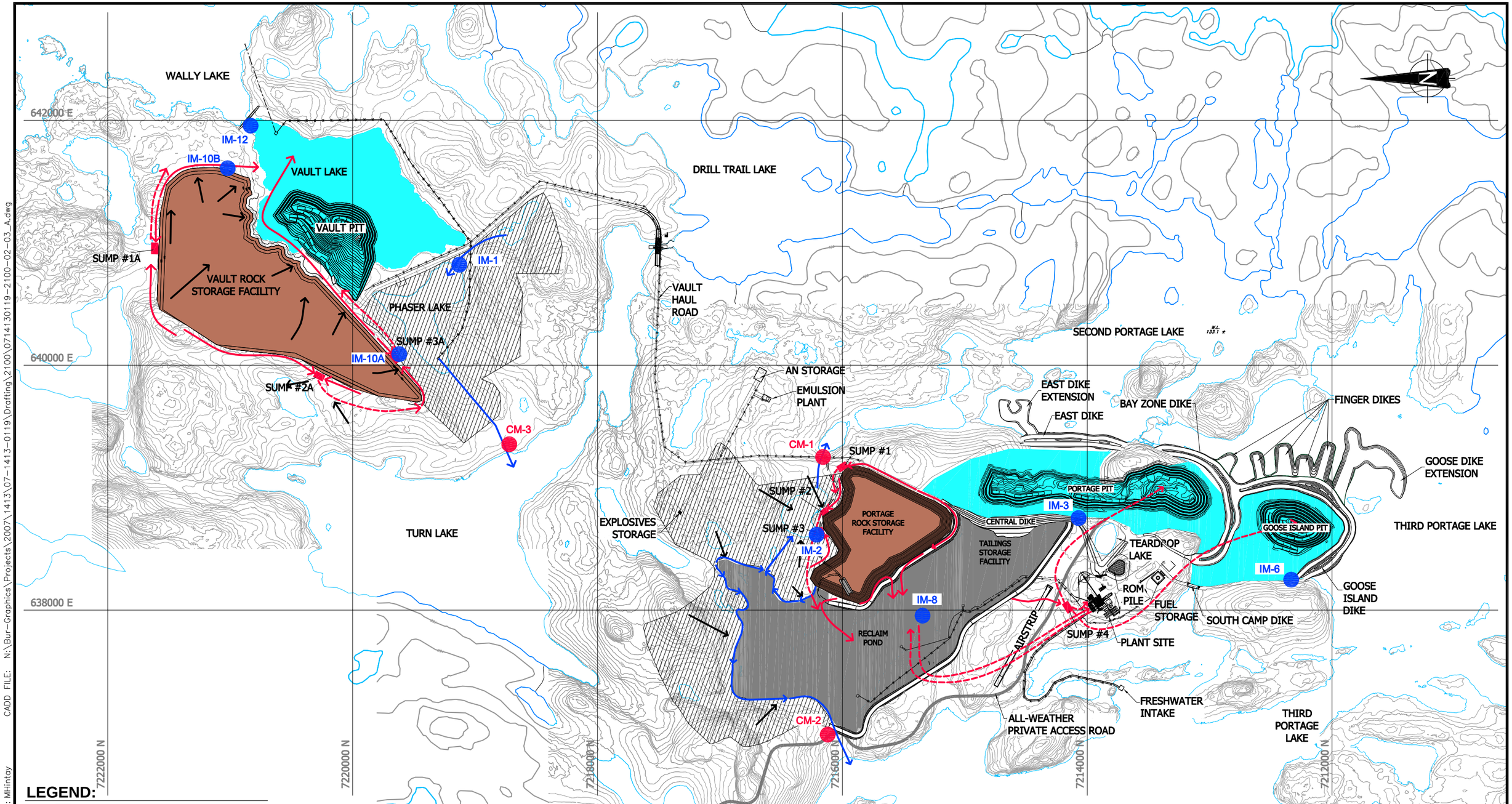

LEGEND:

- TAILINGS
- WASTE ROCK
- PIT LAKE
- DIVERTED AREA
- COMPLIANCE MONITORING POINT
- INTERNAL MONITORING POINT
- WATER DIVERSION DITCH
- SURFACE RUNOFF

0 300 600 900 1200 1500

Scale in Metres

MEADOWBANK
MINING CORPORATION

MEADOWBANK GOLD PROJECT

CLOSURE PHASE

FIGURE 2-3

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WALLY LAKE

CM-8

642000 E

VAULT PIT

VAULT ROCK STORAGE FACILITY

DRILL TRAIL LAKE

PHASER LAKE

640000 E

SECOND PORTAGE LAKE

EAST DIKE EXTENSION

EAST DIKE

BAY ZONE DIKE

FINGERS DIKES

GOOSE DIKE EXTENSION

PORTAGE PIT

THIRD PORTAGE LAKE

PORTAGE ROCK STORAGE FACILITY

CENTRAL DIKE

GOOSE ISLAND PIT

CM-7

GOOSE ISLAND DIKE

TURN LAKE

TAILINGS STORAGE FACILITY

TEARDROP LAKE

638000 E

SOUTH CAMP DIKE REVISED

CM-6

ROAD DECOMMISSIONED

THIRD PORTAGE LAKE

7222000 N

7220000 N

7218000 N

7216000 N

7214000 N

7212000 N

LEGEND:

- TAILINGS
- WASTE ROCK
- PIT LAKE
- DIVERTED AREA
- COMPLIANCE MONITORING POINT
- WATER DIVERSION DITCH
- SURFACE RUNOFF

0 300 600 900 1200 1500

Scale in Metres

MEADOWBANK
MINING CORPORATION

MEADOWBANK GOLD PROJECT

POST CLOSURE PHASE

FIGURE 2-4

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Appendix D (Table 1 – Item 10)

Preliminary Assessment of Potential Effects of Pit Lake Flooding On Third Portage and Wally Lakes, Meadowbank Gold Project, Nunavut

TECHNICAL MEMORANDUM

Golder Associates Ltd.
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Burnaby, British Columbia, Canada V5C 6C6
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Fax Access: 604-298-5253

TO:	Mr. Larry Connell, P.Eng.	**DATE:**	March 7, 2008
CC:	Gary Mann	**JOB NO:**	07-1413-0119 (2100)
FROM:	Paolo Chiaramello, Dan Walker, and John Hull	**DOC NO:**	632 Ver. 0
EMAIL:	pchiaramello@golder.com; drwalker@golder.com; jhull@golder.com		
RE:	**PRELIMINARY ASSESSMENT OF POTENTIAL EFFECTS OF PIT LAKE FLOODING ON THIRD PORTAGE AND WALLY LAKES, MEADOWBANK GOLD PROJECT, NUNAVUT**		

During the Pre-hearing Conference of the Nunavut Water Board that took place February 26 and 27, 2008 in Baker Lake, Nunavut, Fisheries and Oceans Canada (DFO) requested further information on the potential effects of pit flooding on lake levels and surface areas within Third Portage and Wally lakes.

The following summarizes a hydraulic analysis completed to assess the potential pit flooding effects on Third Portage and Wally lake levels and surface areas. This preliminary analysis was completed based on available bathymetric data for the lakes (see Doc. 485, Ver. 0, *Type A Water License Application*, *Meadowbank Gold Project,* MMC, 2007), and estimated lake levels and outlet and low-flow discharge relationships developed by AMEC (2003, 2005) and Golder (see Doc. 575, Ver. 0, *Third Portage Lake Outlet Capacity and Stability, Meadowbank Gold Project*, dated March 3, 2008).

This analysis was completed based on estimated low flow rates and outlet discharge relationships. Therefore, it is recommended that this analysis be reviewed and updated as necessary prior to the initiation of pit flooding based on additional lake water level and outlet flow data collected during mine operations.

1.0 BACKGROUND

The Meadowbank Project consists of several gold-bearing deposits within reasonably close proximity to one another. The four main deposits are: Vault, Portage (including the Third Portage deposit, and the Bay Zone, Connector and North Portage deposit), and Goose Island (MMC 2007).

The Third Portage deposit is located on a peninsula between Third Portage and Second Portage lakes, while the Connector Zone extends northward under Second Portage Lake and the Bay Zone southward under Third Portage Lake. The North Portage deposit is located on the northern shore of Second Portage Lake. The Third Portage deposit, Bay Zone, Connector Zone, and North Portage deposit will be mined from a single pit, termed the Portage pit, which will extend approximately 2 km in a north-south direction. The Goose Island deposit lies approximately 1 km to the south of the Third Portage deposit, and beneath Third Portage Lake. The Vault deposit is located adjacent to Vault Lake, approximately 6 km north from the Portage deposits.

Mining will be a truck-and-shovel open pit operation. A series of dewatering dikes will be required to isolate the mining activities from the lakes. Following completion of mining, the pits will be filled with water from Third Portage Lake (Goose and Portage pits) or Wally Lake (Vault Pit) over a period of several years. The Portage and Goose Island pits will be flooded (in the order of 45 Mm^3) over a roughly eight year period and eventually become part of Third Portage Lake. The Vault pit (21.5 Mm^3) will be flooded over a roughly five year period and will eventually become part of Vault Lake.

Since instantaneous breaching of the dikes would cause a significant drawdown of Third Portage and Wally lakes, flooding will be achieved by a combination of seepage, precipitation, and partial re-direction of annual freshet flows from Third Portage and Wally lakes in a controlled action over several years. The rate of discharge from Third Portage and Wally lakes will be controlled through engineered structures such as siphons, spillway structures, side decant structures, or other designs. Where possible, the water for flooding will be removed from deep areas of the source lakes to avoid the removal of oxygenated surface waters. Water intakes will be properly screened.

Following completion of flooding, the Goose Island, Bay Zone and Vault dikes will be breached and pit waters will be allowed to mix with adjacent water bodies provided that pit water quality is of sufficient quality and water levels between the pit and the adjacent lake are equal to maintain a water balance. Studies to examine water quality and effects on fish will be undertaken to demonstrate that no adverse effects will occur before the dikes are breached (Cumberland 2005).

2.0 PIT FLOODING CRITERIA

Table 1 summarizes the estimated time period required for flooding of the Vault, Portage and Goose Island deposit areas during closure in the absence of direct precipitation and surface water runoff reporting to the pits. The maximum allowable drawdown of the source lakes (Wally and Third) has been assumed to correspond to the water level

necessary to maintain a minimum flow equal to the average annual (1:2-year return period) 60-day low flow at the outlet of the lakes over the four summer months (June through September). The low flow rates were computed based on lake catchment area using regression curves developed by AMEC (2003). The lake catchment area for Third Portage and Wally (including Vault Lake) lakes are approximately 89 km^2 and 70 km^2, respectively (AMEC 2005).

TABLE 1: Estimate Pit Flooding Time Periods [a]

Deposit Area	60-Day Low Flow Criteria			
	Required Flood Volume (Mm^3)	Available Annual Flood Volume (Mm^3)	Time to Flood – Full Efficiency (Years)	Time to Flood – 50% Efficiency (Years)
Portage/Goose	44.8	5.3	***8.5***	17.0
Vault	21.5	4.2	***5.2***	10.3

[a]not including direct precipitation or catchment area runoff reporting to the pits
[b]assuming no waste rock will be placed within the dike perimeter

Table 2 summarizes the estimated annual flooding volume required from the source lakes based on results from the site water balance model assuming average year climate conditions and full flooding efficiency. The required flooding volumes and durations presented are less than those in Table 1 due to the inclusion of annual volumes of water reporting to the pit lakes from direct precipitation and contributing catchment area runoff (MMC, 2007).

TABLE 2: Estimated Annual Pit Flooding Requirments[a]

Deposit Area	Annual Flood Volume from Source Lakes[b] (Mm^3)	Pit Flooding Period (Years)
Portage/Goose	4.58	8
Vault	3.68	5

[a]MMC (2007). Accounts for additional volume reporting to the pits from direct precipitation and catchment area runoff.
[b]obtained over the summer months (June through September)

3.0 ANALYSIS OF POTENTIAL FLOODING IMPACT ON THIRD PORTAGE AND WALLY LAKES

A simple daily routing model was derived in order to evaluate the potential effects of pit flooding on lake water surface levels and areas. Inputs to the model included an assumed starting water surface elevation (AMEC 2005) and the equivalent daily runoff volume to Third Portage and Wally lakes (not including runoff volumes reporting to the pit lakes) in June through September assuming average annual climate conditions. In order to be conservative, direct precipitation to the lakes was not considered in the analysis.

Outputs to the routing model included the daily outlet discharge and pit flooding volume. The daily outlet discharge volumes were computed from the estimated outlet discharge relationships (AMEC 2005; Golder 2008) and the daily lake level (or stage). The daily pit flooding volumes were adjusted to obtain the annual flooding volumes presented in Table 2 while maintaining, as minimum, the average annual (1:2-year return period) 60-day low flow at the outlet of the lakes over the four summer months. The stage-storage-surface area curves used in the analysis for Third Portage and Wally lakes are provided in Figures 1 and 2, respectively.

It should be noted that the analysis results presented herein are for the case of full flooding efficiency (i.e., least flooding period). Actual flooding periods will depend upon on the efficiency of the flooding process and may take longer than is assumed in this analysis. A reduction in flooding efficiency would correspond to relatively greater volume of water released through the lake outlets on an annual basis during the pit flooding period.

3.1 Third Portage Lake

The routing model predicted daily lake runoff, outlet and pit flooding volumes, and water surface levels and areas for Third Portage Lake with and without pit flooding are summarized in Figures 3 to 5, and Table 3.

Pit flooding is concentrated in June and September when excess water is available due to increased lake runoff, with estimated peak withdrawal rates of approximately 2.2 m^3/s and 0.37 m^3/s, respectively (Figure 3). The overall effect on lake surface water levels and surface area are predicted to be minimal, with maximum drops in lake level of approximately 9 cm during pit flooding compared to natural conditions (Figure 4, Table 3). Lake surface areas are predicted to decrease by a maximum of 17.2 ha or approximately 0.5% of the overall lake area (Figure 5, Table 3).

TABLE 3: Third Portage Lake Routing Model Results

	June	July	August	September
Max. water level without pit flooding (masl)	134.00	134.00	133.94	133.94
Max. water level with pit flooding (masl)	133.91	133.91	133.86	133.85
Difference (m)	***-0.09***	***-0.09***	***-0.08***	***-0.09***
Min. water level without pit flooding (masl)	133.84	133.94	133.93	133.92
Max. water level with pit flooding (masl)	133.84	133.86	133.85	133.85
Difference (m)	***0.00***	***-0.08***	***-0.08***	***-0.07***
Max. water surface area without pit flooding (ha)	3,241.2	3,242.1	3,230.0	3,230.5
Max. water surface area with pit flooding (ha)	3,224.0	3,225.1	3,215.3	3,213.3
Difference (ha)	***-17.2 (-0.5%)***	***-17.0 (-0.5%)***	***-14.7 (-0.5%)***	***-17.2 (-0.5%)***
Min. water surface area without pit flooding (ha)	3,211.0	3,230.4	3,227.3	3,227.2
Min. water surface area with pit flooding (ha)	3,211.0	3,215.6	3,212.9	3,212.7
Difference (ha)	***0.0 (0%)***	***-14.8 (-0.5%)***	***-14.4 (-0.5%)***	***-14.5 (-0.5%)***

3.2 Wally Lake

The routing model predicted daily lake runoff, outlet and pit flooding volumes, and water surface levels and areas for Wally Lake with and without pit flooding are summarized in Figures 6 to 8, and Table 4.

As was the case for Third Portage Lake, Vault pit flooding is concentrated in June and September, with estimated peak withdrawal rates of approximately 1.5 m^3/s and 0.35 m^3/s, respectively (Figure 6). Once again, the overall effect on lake surface water levels and surface area are predicted to be minimal, with maximum drops in lake level of approximately 10 cm when compared to natural conditions without pit flooding (Figure 7, Table 4). Wally Lake surface areas are predicted to decrease by a maximum of 9.5 ha or approximately 1.7% of the overall lake area (Figure 8, Table 4).

TABLE 4: Wally Lake Routing Model Results

	June	July	August	September
Max. water level without pit flooding (masl)	139.19	139.19	139.01	139.07
Max. water level with pit flooding (masl)	139.09	139.11	139.01	139.01
Difference (m)	***-0.10***	***-0.08***	***0.00***	***-0.06***
Min. water level without pit flooding (masl)	138.86	138.95	138.95	139.01
Max. water level with pit flooding (masl)	138.86	138.94	138.94	139.00
Difference (m)	***0.00***	***-0.01***	***-0.01***	***-0.01***
Max. water surface area without pit flooding (ha)	559.5	559.5	542.1	547.8
Max. water surface area with pit flooding (ha)	550.0	551.8	541.9	541.9
Difference (ha)	***-9.5 (-1.7%)***	***-7.7 (-1.4%)***	***-0.2 (-0.03%)***	***-5.9 (-1.0%)***
Min. water surface area without pit flooding (ha)	527.9	536.3	536.1	542.1
Min. water surface area with pit flooding (ha)	527.9	535.6	535.4	541.5
Difference (ha)	***0.0 (0%)***	***-0.7 (-0.1%)***	***-0.7 (-0.1%)***	***-0.6 (-0.1%)***

4.0 CLOSURE

We trust the information contained in this document meets your requirements at this time. Should you have any questions relating to the above, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

Paolo Chiaramello, B. Sc (Eng)
Water Resources Specialist

ORIGINAL SIGNED BY

John A. Hull, P. Eng. (NWT/NU)
Principal

ORIGINAL SIGNED BY

Dan Walker, Ph.D., P.Eng. (BC)
Sr. Hydrotechnical/Water Resources Engineer

PC/DRW/JAH/lw
Attachment.
O:\FINAL\2007\1413\07-1413-0119\DOC 632 07MAR_08 TM PIT FLOODING ANALYSIS OF EFFECTS VER.0.DOC

REFERENCES

AMEC Earth & Environmental (AMEC), 2003. *Baseline Hydrology Study*. December 2003 with January 2004 errata sheets.

AMEC Earth & Environmental (AMEC), 2005. *Meadowbank Gold Project Mine Dewatering Analysis of Effects*. Report CW159306, dated November 2005.

Cumberland Resources Ltd. (Cumberland), 2005. Meadowbank *Gold Project, Aquatic Effects Management Program*. October 2005.

Meadowbank Mining Corporation (MMC), 2007. *Meadowbank Gold Project Mine Waste & Water Management*. Doc. 500 Ver. 0, dated August 24, 2007.

Golder Associates Ltd. (Golder), 2008. *Third Portage Lake Outlet Capacity and Stability, Meadowbank Gold Project*, Doc. 575 Ver. 0, dated March 3, 2008.

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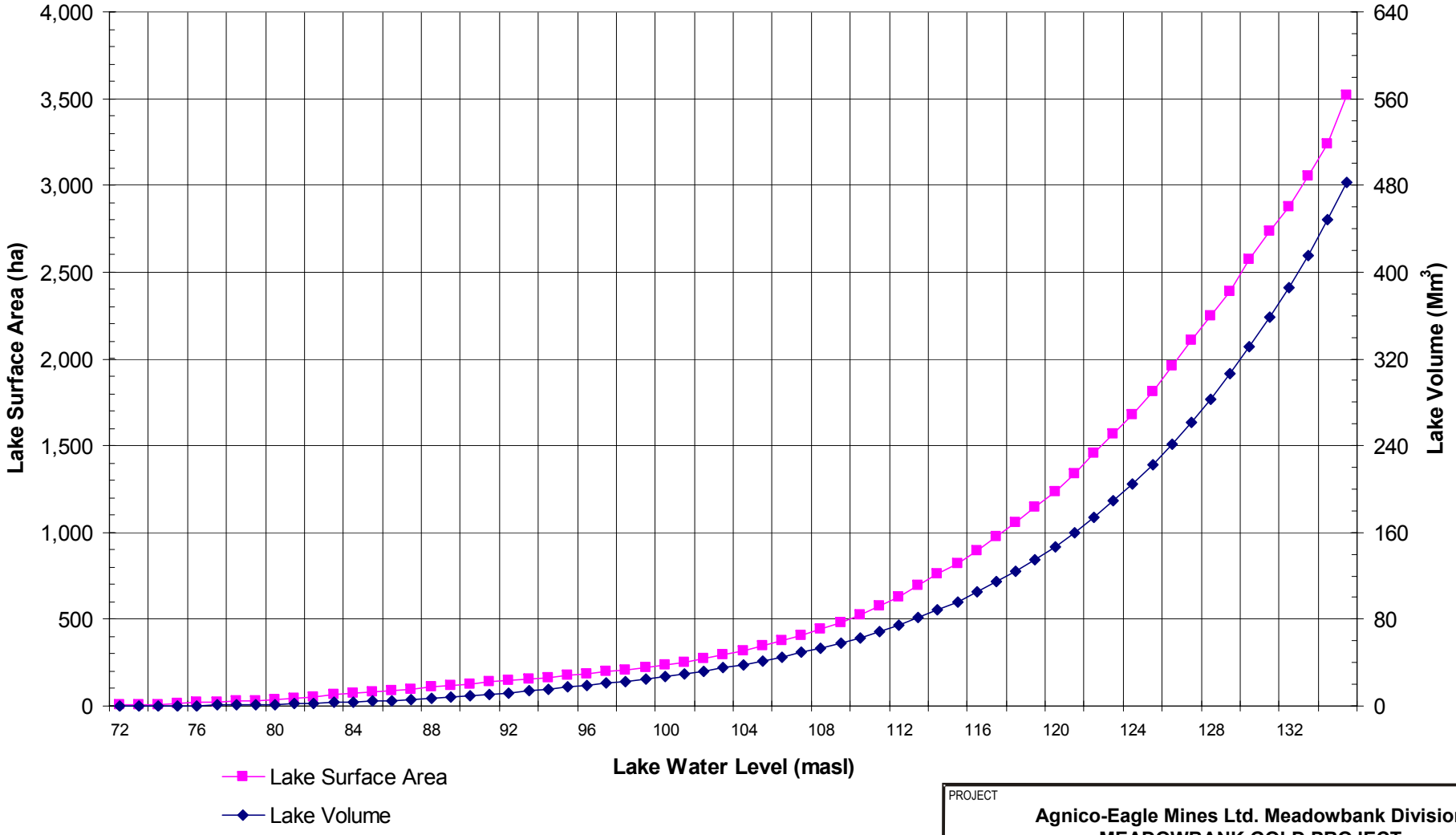

PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Stage-Storage-Surface Areas Curves Third Portage Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
DESIGN	--	07MAR08	SCALE NTS	REV.
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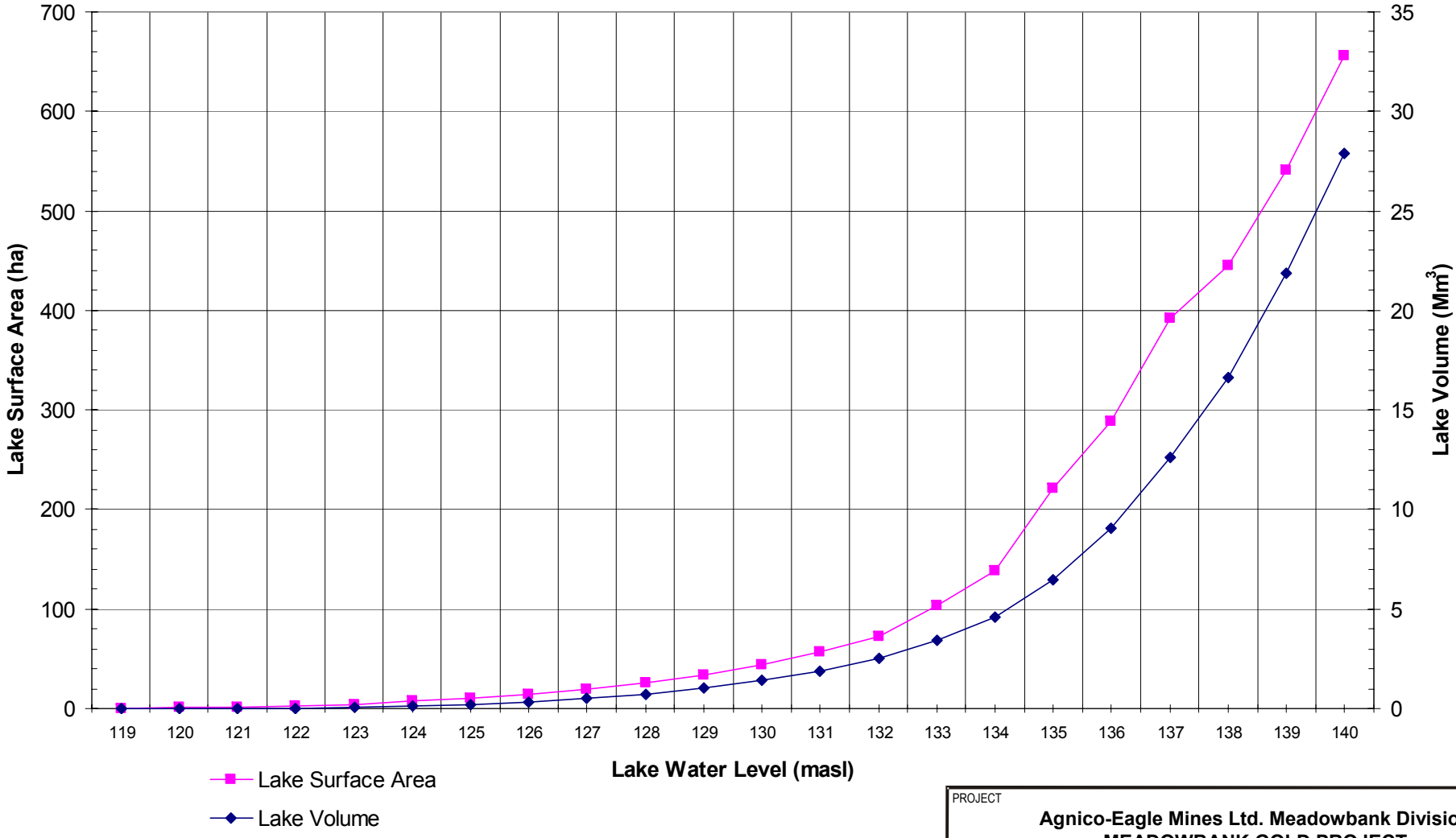
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Stage-Storage-Surface Areas Curves Wally Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
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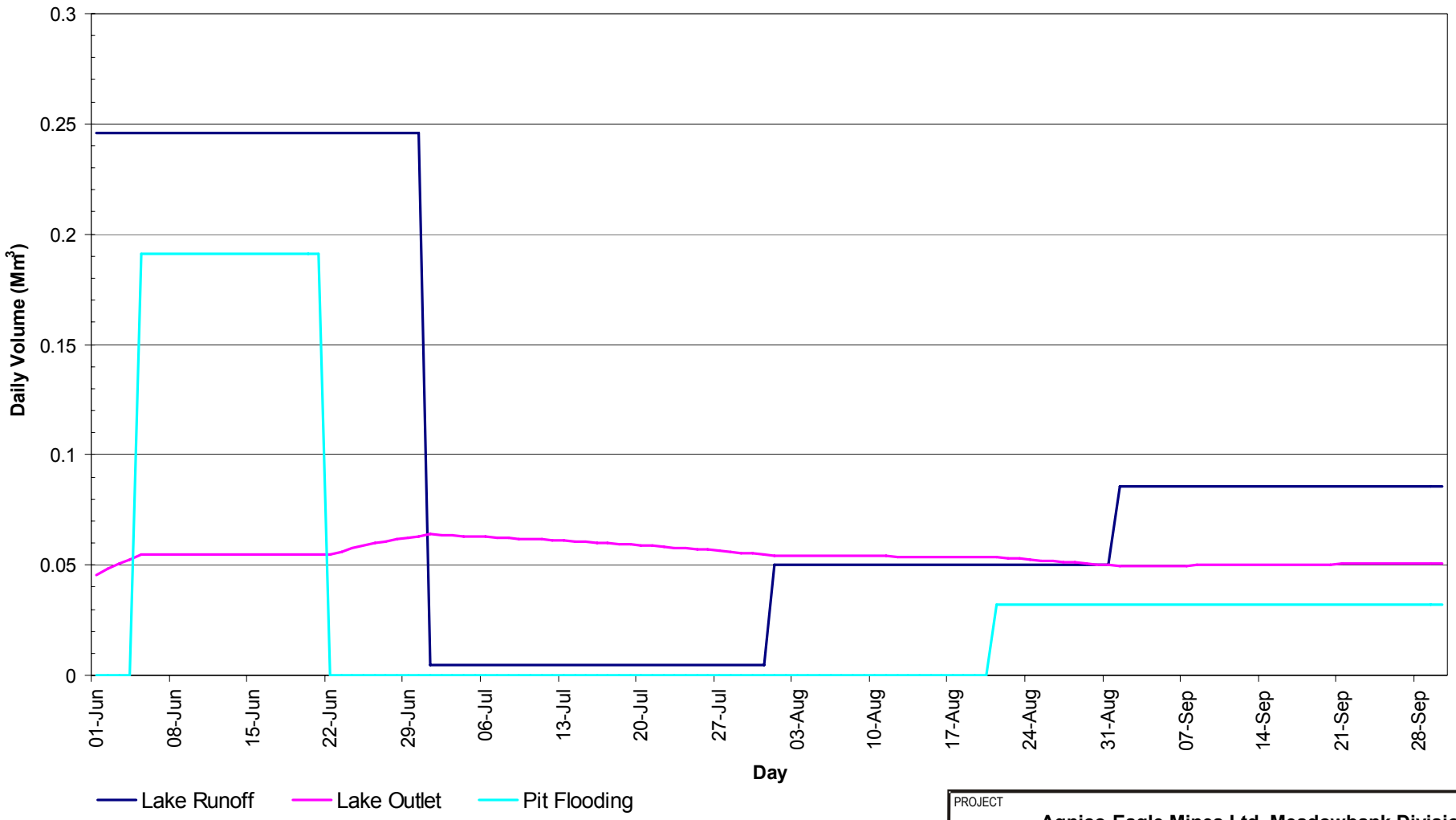
CHECK	--	07MAR08	**FIGURE 2**	
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Daily Runoff, Outlet and Pit Flooding Volumes, Third Portage Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No. 2100	
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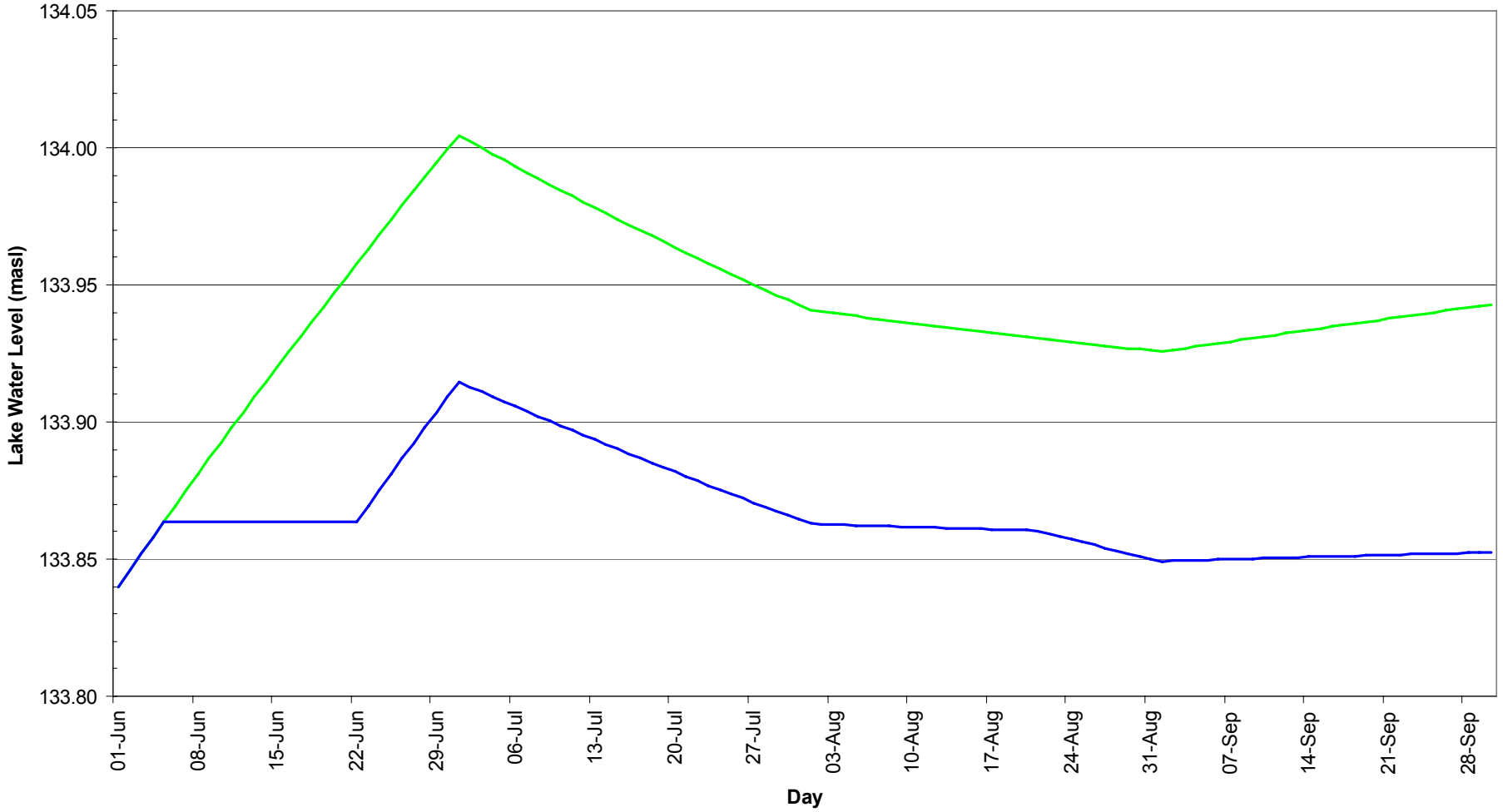
CHECK	--	07MAR08	**FIGURE 3**	
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Lake Water Level Third Portage Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
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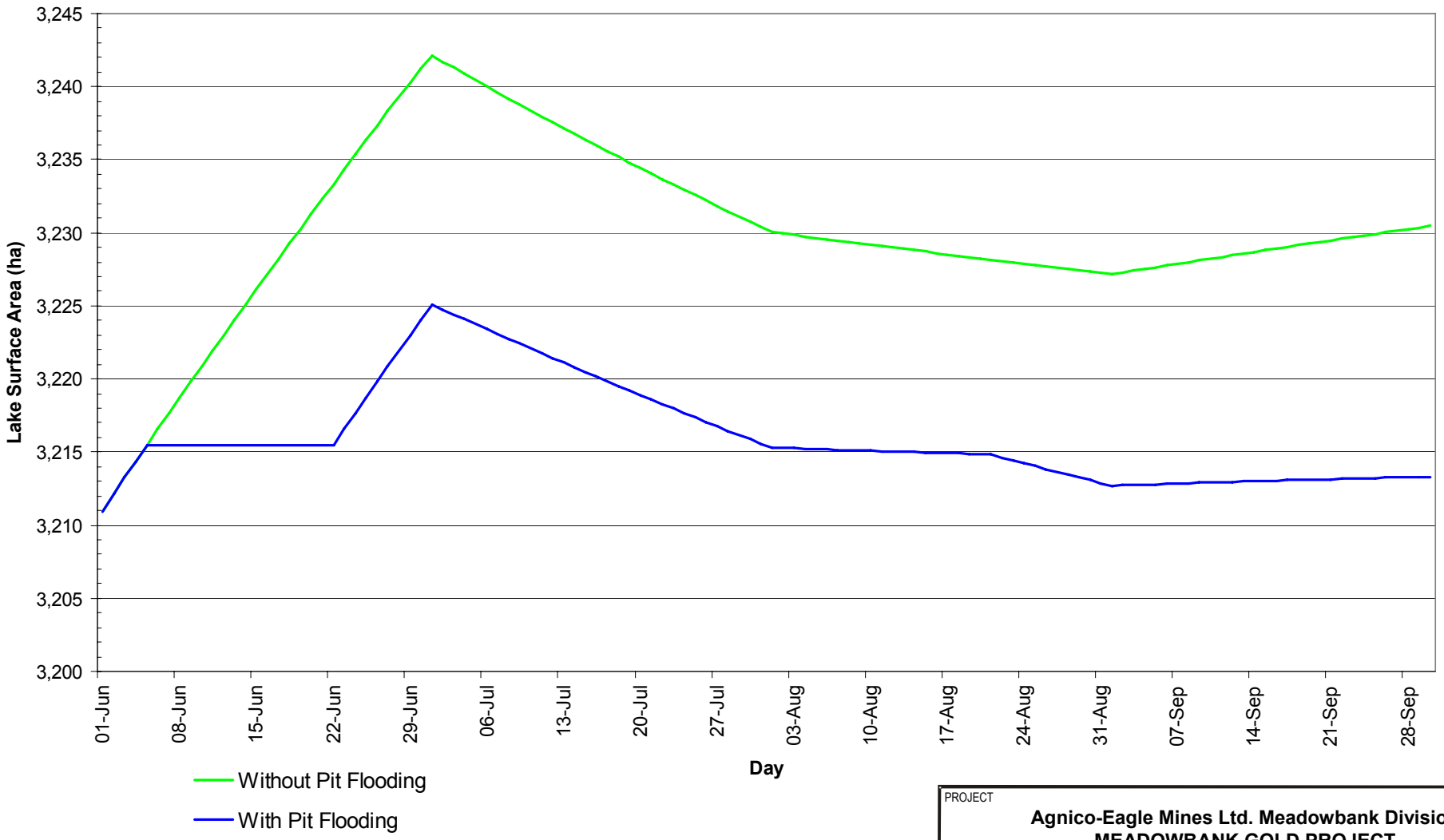
CHECK	--	07MAR08	**FIGURE 4**	
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Lake Surface Area Third Portage Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
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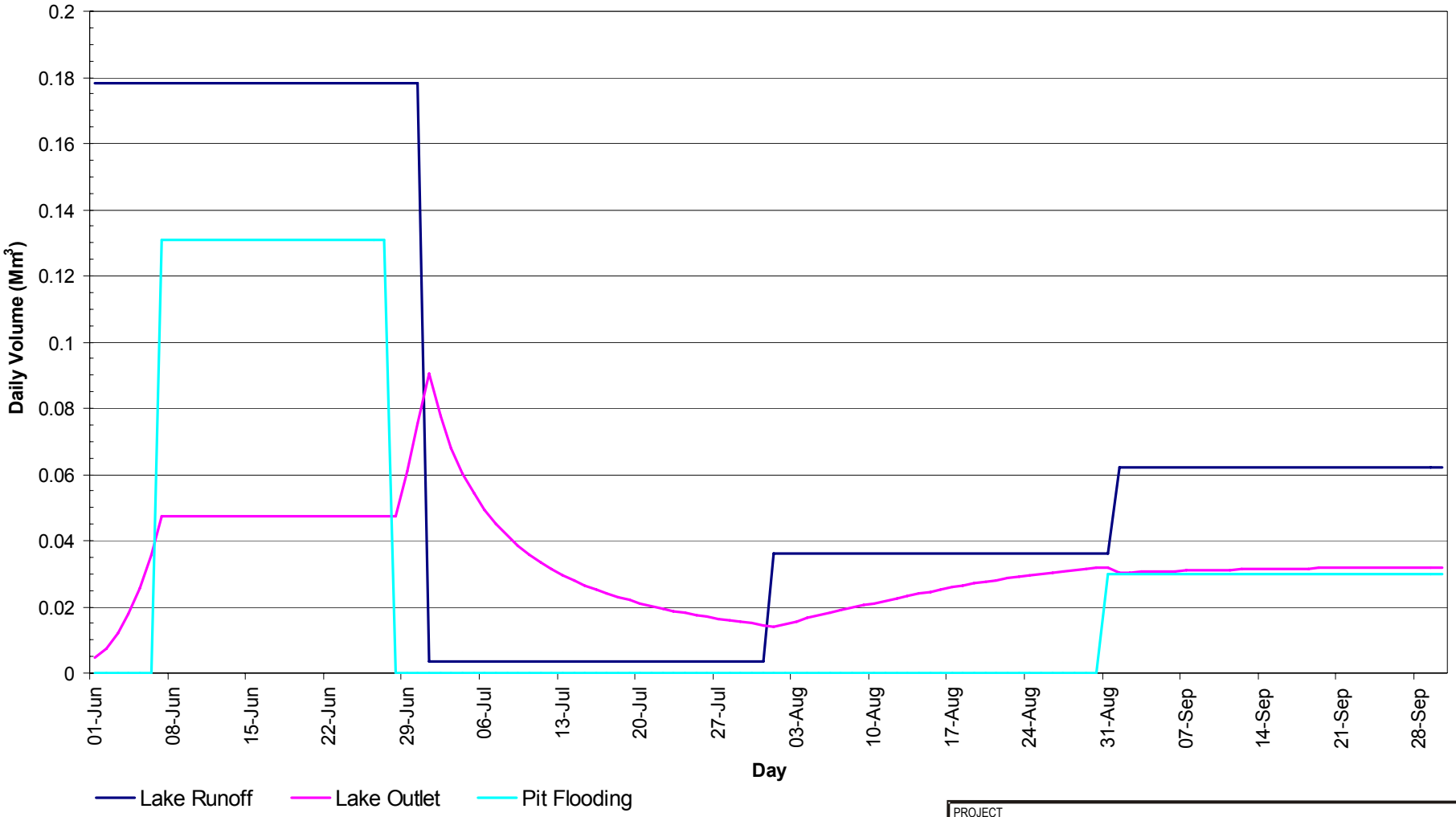
CADD	--	07MAR08		
CHECK	--	07MAR08	**FIGURE 5**	
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Daily Runoff, Outlet and Pit Flooding Volumes, Wally Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
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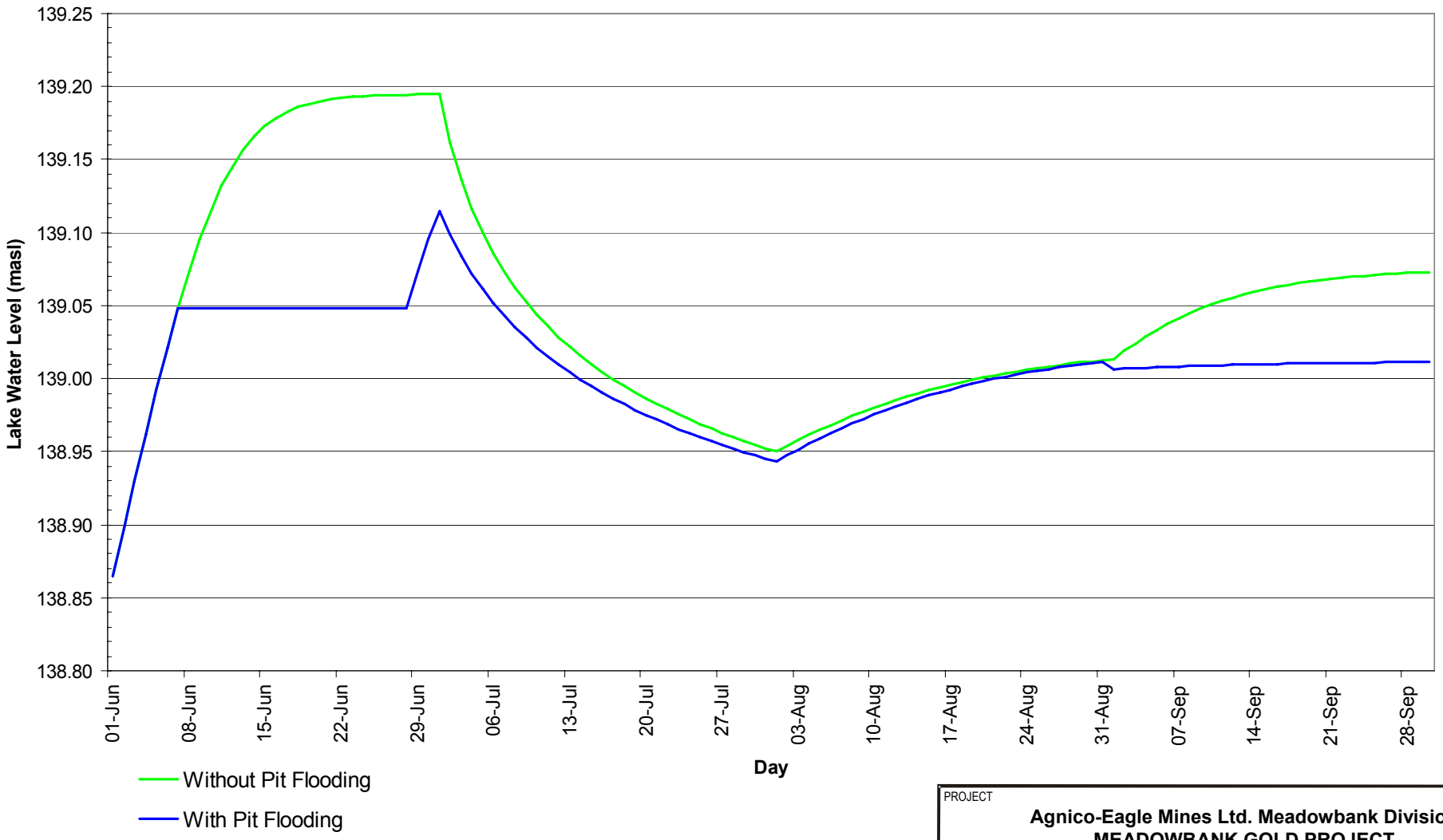
REVIEW				

REVISION DATE: BY: FILE:



PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Lake Water Level Wally Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
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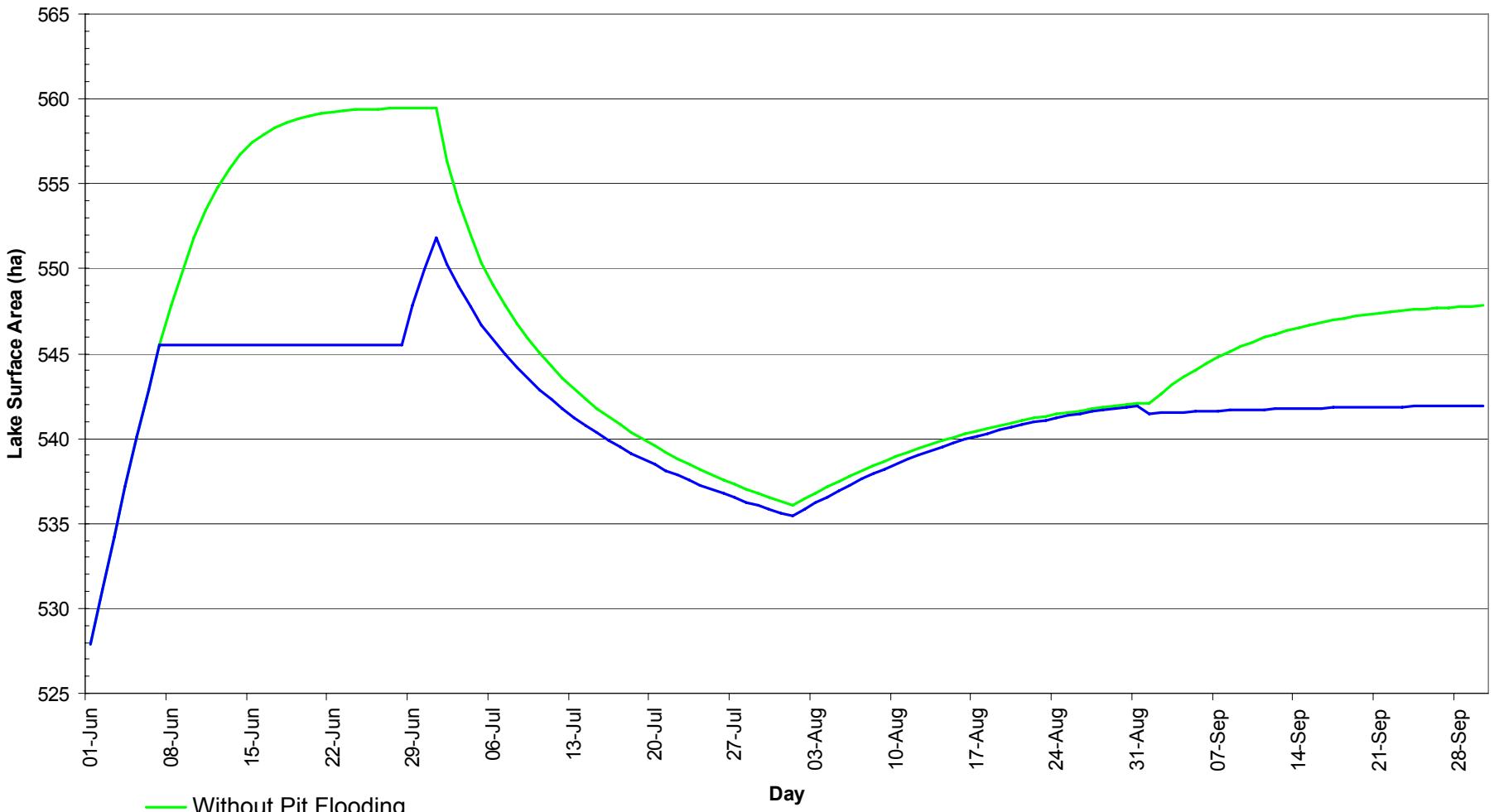

PROJECT

Agnico-Eagle Mines Ltd. Meadowbank Division
MEADOWBANK GOLD PROJECT

TITLE

Modelled Lake Surface Area Wally Lake

Golder Associates

PROJECT No.	07-1413-0119		PHASE / TASK No.	2100
DESIGN	--	07MAR08	SCALE NTS	REV.
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CHECK	--	07MAR08	**FIGURE 8**	
REVIEW				

Appendix E (Table 1 – Item 11)

Errata – Meadowbank Gold Project Preliminary Closure and Reclamation Plan

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **ERRATA – MEADOWBANK GOLD PROJECT**
PRELIMINARY CLOSURE AND RECLAMATION PLAN

During the Pre-hearing Conference of the Nunavut Water Board that took place February 26 and 27, 2008 in Baker Lake, Nunavut, the need for further clarification with respect to the water quality criteria that will be used to initiate breaching of the Goose Island and Vault dikes during closure was identified by Environment Canada (EC).

As indicated within the Type-A Water License Application and supporting documents (Docs. 485, 500 and 511), AEM commits to manage and monitor the water quality within the flooded Portage and Vault pit lakes until the water is of acceptable quality to be allowed to mix freely with the surrounding lake water, at which time the Goose Island and Vault dikes will be breached.

In accordance with the above, AEM proposes to breach the dikes only where water quality within the pit lakes meets CCME Aquatic Life Guidelines (CCME, 2006), background lake concentrations, or other risk based assessment criteria as determined through aquatic effects studies and/or an approvals process initiated through the Nunavut Water Board and KIA.

As pointed out by EC during the Pre-hearing Conference, however, Sections 7.1.5, 7.2.4 and 11.2 of Document 511 Ver. 0 ***Meadowbank Gold Project Preliminary Closure and Reclamation Plan***, incorrectly indicate that breaching will occur where pit lake water meets MMER and/or drinking water quality criteria.

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Baker Lake Office:
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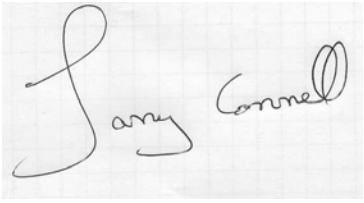
Tel: 867-793-4610
Fax: 867-793-4611

The purpose of this letter is to re-confirm AEM's intent to breach the dikes only where water quality within the pit lakes meets CCME Aquatic Life Guidelines, background lake concentrations, or other risk based assessment criteria as determined through aquatic effects studies and/or an approvals process. Subsequent versions to the Closure and Reclamation Plan for the Project will be updated to include this commitment.

AEM apologizes for any confusion that this may have caused. We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Appendix F (Table 1 – Item 12)

Clarification – Location and Volume of Freshwater Source for the Explosives Mixing Facility

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **CLARIFICATION – LOCATION AND VOLUME OF FRESHWATER SOURCE FOR THE EXPLOSIVES MIXING FACILITY**

During the Pre-hearing conference of the Nunavut Water Board (Water Board) that took place February 26 and 27, 2008, the Water Board requested that Agnico-Eagle Mines Inc. (AEM) provide additional information on the proposed source and volume of freshwater to be used at the proposed explosives emulsion mixing plant at the Meadowbank Project.

The explosives to be used at the Meadowbank Project will primarily be ANFO (Ammonium Nitrate Fuel Oil) with smaller amounts of other water resistant emulsions. The ANFO will be mixed on-site just prior to its delivery by emulsion truck to the open pit mine. The ANFO will be produced by mixing ammonium nitrate prills with diesel fuel to form ANFO. The mixing facility will be maintained and operated by the explosives supplier selected by Agnico-Eagle Mines Ltd. The on site storage facilities will be designed to house approximately 14 months supply of ammonium nitrate prills which will be shipped to site on the summer sealift in water proof plastic lined 1 tonne capacity tote bags.

The general arrangement and location of the explosives storage facilities and emulsion (ANFO) mixing plant at the Meadowbank Project site are shown in the general arrangement drawing attached to this letter as Figure 1 entitled “Plantsite Infrastructure Emulsion Plant Location and Finish Grading – Plan”.

The facility is to be located to the north of the main Meadowbank site to the southeast of Turn Lake. The facilities will be accessed via a spur road off of the AWPAR (all-weather private access road) and will be set back approximately 500 m from the AWPAR. The location in relation to the Meadowbank site is presented in Figure 2 attached to this letter entitled “Plantsite Infrastructure Overall Site Plan”.

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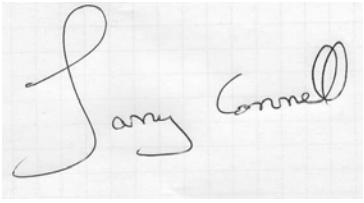
X0C 0A0
Tel: 867-793-4610
Fax: 867-793-4611

The emulsion mixing plant will be housed in a 64’ x 92’ building to be set on concrete pad. Water for use in the emulsion plant (for mixing and cleaning) will be obtained as and when needed by submersible pump from the small unnamed lake located 250 m to the east and held in a small head tank inside the plant. There will be no waste water from this facility as all wash water will be recycled and used in the production of ANFO. The intake pump will be a small electric submersible pump set on the lake bottom with a hose connection feeding into rigid a pipeline that will run from the shoreline to the emulsion plant. The pipeline will be heat traced and insulated. The installation will be similar to that used at the current Meadowbank Exploration camp. The maximum volume of water to be used is estimated to be 200 m^3/month (average use of 6.5 m^3/day).

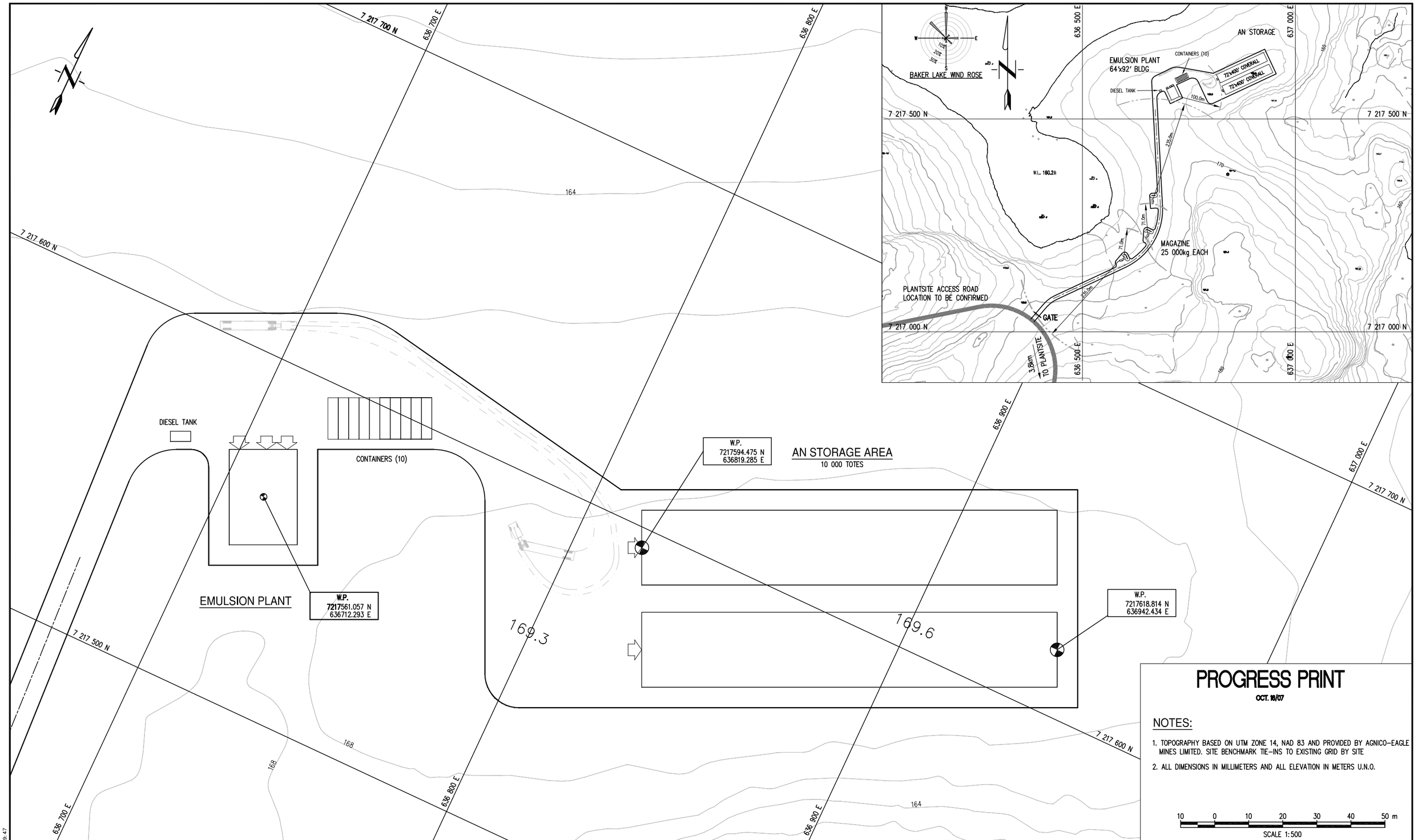
We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment



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OCT. 16/07

NOTES:

1. TOPOGRAPHY BASED ON UTM ZONE 14, NAD 83 AND PROVIDED BY AGNICO-EAGLE MINES LIMITED. SITE BENCHMARK TIE-INS TO EXISTING GRID BY SITE
2. ALL DIMENSIONS IN MILLIMETERS AND ALL ELEVATION IN METERS U.N.O.

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SCALE 1:500

DWG. NO. | REFERENCE DRAWINGS

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ISSUE

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REVISIONS

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SECTION:	CIVIL		
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DRAWN BY:	D.L.N.	MAR. 07	
CHECK. BY			
APP. BY:			

AEM AGNICO-EAGLE MINES LIMITED
NUNAVUT

HATCH™

TITLE: MEADOWBANK GOLD PROJECT

PLANTSITE INFRASTRUCTURE
EMULSION PLANT LOCATION AND
FINISH GRADING – PLAN

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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325174
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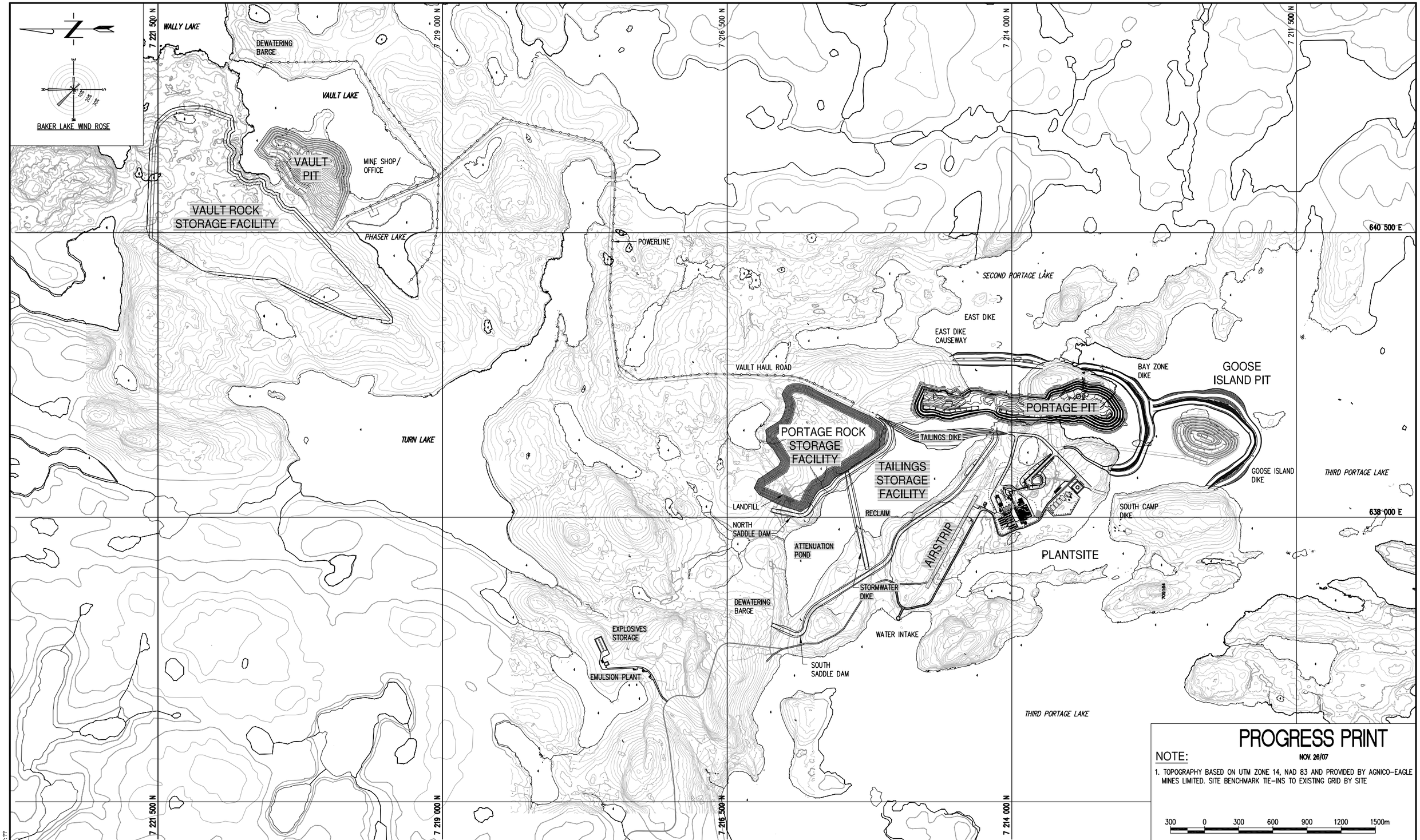

PROGRESS PRINT

NOV. 26/07

NOTE:

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300 0 300 600 900 1200 1500m

DWG. NO. | REFERENCE DRAWINGS

ISSUE

NO	DESCRIPTION	BY	DATE
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00	FOR REFERENCE	DLN	07/09/24
0A	ISSUED FOR APPROVAL	DLN	07/08/16

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REVISIONS

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DRAWN BY:	D.L.N.	FEB. 07
CHECK. BY	W.S.	SEPT. 07
APP. BY:	NE	SEPT. 07

AEM AGNICO-EAGLE MINES LIMITED
NUNAVUT

HATCH™

TITLE: MEADOWBANK GOLD PROJECT

PLANTSITE INFRASTRUCTURE OVERALL SITE PLAN

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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325174 600-C-0101-00 ??/??/??

Appendix G (Table 1 – Item 13)

Meadowbank Gold Project Proposed Discharge Water Quality Criteria

AGNICO-EAGLE MINES LTD.

MEADOWBANK DIVISION

MEADOWBANK GOLD PROJECT

PROPOSED DISCHARGE WATER QUALITY CRITERIA

MARCH 2008

TABLE OF CONTENTS

Contents of Proposed Discharge of Water Quality Criteria

LIST OF TABLES

LIST OF APPENDICES

SECTION 1 • INTRODUCTION

During the Pre-hearing conference of the Nunavut Water Board that took place February 26 and 27, 2008 in Baker Lake, Nunavut, Agnico-Eagle Mines Ltd. (AEM) presented proposed water quality criteria (see Tables A1 and A2 in Appendix A) for discharges from the Meadowbank Project. These criteria apply to end of pipe for discharges from the Vault and Portage attenuation ponds and supplement those presented in the Meadowbank Water License Application Support Document No. 515, which states the following:

> *Results of the Wally Lake and Third Portage Lake outfall diffuser CORMIX model simulations suggest that the diffuser design will dilute attenuation pond water to Nunavut drinking water guidelines at the boundary of a 30-m radius mixing zone from the center of the diffuser, and close to the CCME guidelines for aquatic life.*
>
> *Based upon these data, the discharge water quality criteria for both Vault and Portage area discharges are proposed to be MMER guidelines at the point of discharge from the outfall diffuser.*

The proposed end-of pipe criteria were reviewed by Environment Canada (EC) during the hearings and an alternative set of criteria was subsequently proposed by EC. Both sets of criteria were presented to the interveners at the hearings along with the method and rationale used to formulate the first set of criteria.

This document addresses a commitment by AEM to provide the water quality criteria proposed by AEM and EC and document the rationale and method used to derive the criteria.

SECTION 2 • CALCULATION METHOD FOR EFFLUENT DISCHARGE CRITERIA FROM ATTENUATION PONDS

Water in the Portage and Vault attenuation ponds will be discharged into Wally Lake (from Vault area) and into Third Portage Lake (from Portage area) as summarized in Table 1.

Table 1. Vault and Portage Attenuation Pond Discharges

Effluent	Discharge period	Estimated Total Volume to be Discharged (total mine life)
Vault Attenuation Pond	Year 5 to 8, open season	2.3 Mm^3
Portage Attenuation Pond	Year 1 to 4, open season	4.1 Mm^3

Attenuation pond effluent will be discharged through a diffuser which will enhance mixing of the effluent in the receiving environment. The proposed diffuser designs are predicted to achieve the dilution factors described in Table 2

Table 2. Diffuser Design Minimum Dilution Factors

Diffuser	Dilution Factor	Reference[1]
Wally Lake diffuser	24	Doc. 412
Portage Lake diffuser (site 1)	64	Doc. 536

The difference between the predicted dilutions is caused by factors that include depth of diffuser, density of the effluent, velocity of discharge and currents in the receiving environment.

The effluent water quality data used as input to diffuser dilution modelling are *Possible Poor-End* water quality predictions for Vault and Portage attenuation ponds see (Doc. 516 *Report on Water Quality Predictions, Meadowbank Gold Project, Nunavut*, Golder Associates Ltd., August 2007) which are monthly average dissolved constituent concentrations.

End-of-pipe water quality was estimated by applying the inverse of the dilution factor to CCME concentrations at the 30-meter radius, and adjusting (increasing) the resulting concentrations to account for the following:

- The contribution of chemical load from 15 mg/L of suspended solids (using same method as described in Doc. 516);

[1] Meadowbank Water Licence Support Document

- The order of magnitude accuracy of the water quality predictions;

- Short-term spikes in the concentration of some chemical constituents in the leachate water chemistry observed from kinetic testing of mine waste rock (long-term leaching rates were used as input to the water quality predictions); and,

- Background water quality in Wally and Portage lakes.

SECTION 3 • PROPOSED AEM AND EC DISCHARGE CRITERIA

The list of constituents AEM proposes be regulated include the parameters of most environmental interest at Meadowbank. Tables A-1 and A-2 in Appendix A present the set of criteria first proposed by AEM at the Pre-hearing conference.

The alternative criteria proposed by EC are presented in Tables 3 and 4 for effluent discharged from Vault and Portage Attenuation ponds, respectively. These tables also include EC-proposed criteria to be applied to lake water discharged from the diked area (to expose the deposits) into Wally, Third and Second Portage lakes.

As discussed during the Pre-hearing conference, AEM proposes that the water license set discharge criteria for surface runoff during the construction period similar to those set in the recently issued Doris North License (Part D Item 18) (Average TSS of 50 mg/L –Maximum of 100 mg/L) and for non-contact (diverted water) as follows: (Table 5)

Table 5. Proposed Criteria for Non-Contact Water

Project Period	Total suspended solids (TSS)
Construction	50 mg/L
Operation	15 mg/L

Table 3. Environment Canada Proposed Vault Discharge Criteria, Monthly Mean Concentrations

Parameter	Unit	Aquatic Life Guidelines*	Drinking Water Guidelines**	MMER***	**AEM Proposed**	**Environment Canada Proposed**
Vault Attenuation Pond Discharge						
pH	-	6.5-9.0	-	6.0 – 9.5	6.0 - 9.0	6.0 - 9.0
TDS	mg/L	-	500	-		1500 +
TSS	mg/L	-	-	15	15	15
turbidity	ntu	-	-	-		10 +
Al-T	mg/L	0.1	-	-	2	1.5
Al-D	mg/L	-	-	-		1.0
As	mg/L	0.005	0.05	0.5	0.1	0.1
Cd	mg/L	0.000017	0.01	-	0.002	0.002
Cr	mg/L	0.001	0.05	-	0.008	0.008 +
Cu	mg/L	0.002	1	0.3	0.1	0.1
Hg	mg/L	0.000026	-	-	0.0004	0.0004
Mo	mg/L	0.073	-	-	0.1	0.1
NH3-T	mg/L	2.04	-	-	26	20
Ni	mg/L	0.025	-	0.5	0.2	0.2
NO3_N	mg/L	13	45	-	60	28 +
Pb	mg/L	0.001	0.05	0.2	0.1	0.1
P	mg/L	-	-	-		1.5
Zn	mg/L	0.03	5	0.5	0.2	0.2
Vault Lake Dewatering discharge limits						
pH	-	6.5-9.0	-	6.0 – 9.5		6.0 - 9.0
TSS	mg/L	-	-	15		15
turbidity	ntu	-	-	-		10
Al-T	mg/L	0.1	-	-		1.5

***DFO, 2002 and 2006
** R.R.N.W.T, 1990
* CCME, 2006
+ AEM proposes different value

Table 4. Environment Canada Proposed Portage Discharge Criteria, Monthly Mean Concentrations

Parameter	Units	Aquatic Life Guidelines*	Drinking Water Guidelines**	MMER***	**AEM Proposed**	**Environment Canada Proposed**
Portage attenuation pond discharge						
pH	N/A	6.5-9.0	-	6.0 – 9.5	6.0 -9.0	6.0 -9.0
TDS	mg/L	-	500	-		1500 +
TSS	mg/L	-	-	15	15	15
turbidity	ntu	-	-	-		10 +
Al	mg/L	0.1	-	-	2	1.5
Al-D	mg/L	-	-	-		1.0
As	mg/L	0.005	0.05	0.5	0.3	0.3
Cd	mg/L	0.000017	0.01	-	0.002	0.002
CN-T	mg/L	-	-	1??		0.5
Cr	mg/L	0.001	0.05	-	0.005	0.005 +
Cu	mg/L	0.002	1	0.3	0.1	0.1
Hg	mg/L	0.000026	-	-	0.0004	0.0004
Mo	mg/L	0.073	-	-	0.05	0.05
NH3-T	mg/L	2.04	-	-	16	16
Ni	mg/L	0.025	-	0.5	0.2	0.2
NO3_N	mg/L	13	45	-	20	20
Pb	mg/L	0.001	0.05	0.2	0.1	0.1
P	mg/L	-	-	-	1	1.0
Zn	mg/L	0.03	5	0.5	0.4	0.4
TPH	mg/L					3
Second Portage Lake dewatering effluent criteria						
pH	N/A	6.5-9.0	-	6.0 – 9.0		6.0 -9.0
TSS	mg/L	-	-	15		15
turbidity	ntu	-	-	-		10
Al	mg/L	0.1	-	-		1.5
Third Portage Lake dewatering effluent criteria						
pH	N/A	6.5-9.0	-	6.0 – 9.0		6.0 -9.0
TSS	mg/L	-	-	15		15
turbidity	ntu	-	-	-		10
Al	mg/L	0.1	-	-		1.5
Treated sewage		Out of Teardrop Lake if going to receiving environment				
BOD	mg/L					25
TSS	mg/L					25
F. coli	CFU/dL					1000

***DFO, 2002 and 2006

** R.R.N.W.T, 1990

* CCME, 2006

+ AEM proposes different value

SECTION 4 • AEM PROPOSED REVISIONS TO EC CRITERIA

AEM largely agrees with EC's proposed list of parameters to be regulated and suggested monthly mean concentrations, with the exception of the following:

Turbidity: AEM proposes the monthly mean concentration of 10 N.T.U be set as an objective rather than a criterion, for the first term of the license. AEM does not necessarily disagree with this value but would prefer to have the opportunity to better understand the implication of this value on the Project. AEM will strive to meet the 10 NTU during the term of the first project water license (thru 2014), and commits to frequent monitoring of turbidity at the outflow pipe during this period to allow for an understanding of the site specific relationship between turbidity and total suspended solids. During the term of the first license, AEM commits to develop turbidity criteria to be incorporated in all subsequent license renewals by using site specific data and information on the effect of turbidity on the aquatic environment.

Total dissolved solids (TDS): A post-hearing review of predicted concentrations suggests that the value of 1,500 mg/L may not be achievable particularly toward the end of pit life at Portage, because of the contribution from upwelling of deep connate water into the pits. AEM proposes that chloride be regulated at both Vault and Portage effluents, rather than TDS.

Table 6. Proposed Chloride Criteria for Effluent, Instead of TDS

Effluent	Chloride Criteria
Vault attenuation pond	1,000 mg/L
Portage attenuation pond	2,000 mg/L

Nitrate: The proposed EC value (28 mg/L) for Vault effluent is the same as the predicted concentration making it difficult for AEM to remain in compliance at all times. AEM proposes that this criteria be increased to 50 mg/L to accommodate the potential factors described at the end of Section 2 to allow some room for upset conditions (AEM had originally proposed a discharge standard of 60 mg/L).

Chromium: Although the mine site rock is not a source of chromium, short-term water leaching tests[2] performed on area lake bed sediments show them to leach chromium at a level that is close to the proposed guideline. Consequently, to allow for possible short term spikes due to exposed lake bed sediments, AEM proposes the monthly average criteria for total chromium be set at 0.02 mg/L for

[2] Golder Associates Ltd. 2005. *Static Test Results for Overburden, Mine Site Infrastructure Rock, Pit Rock and Tailings, Meadowbank Gold Project, Nunavut*. September 2005.

Vault and Portage attenuation pond effluent (rather than 0.008 and 0.005 mg/L respectively). This total chromium criteria (0.02 mg/L) would be the same as that applied in the current water licenses for the Diavik, Ekati and Snap Lake mine projects.

SECTION 5 • PROPOSED LICENSED PERIOD

AEM proposes that the water license be issued for a period of 7 years (2 years of construction and 5 years of operation). The water quality criteria for Portage, Goose and Vault pit lakes will be developed prior to breaching the dikes and submitted for approval during this period, which will allow for consideration of actual site data.

APPENDIX A

CRITERIA PROPOSED BY AEM AND SOURCE INFORMATION ON WATER QUALITY PREDICTIONS

Table A-1. Proposed Vault effluent discharge criteria at end of pipe, monthly mean concentrations

Parameter	Unit	Aquatic Life Guidelines*	Drinking Water Guidelines**	MMER***	Predicted Effluent Discharge Concentration+	**Proposed Discharge WQ Criteria of Vault Effluent ++**	Proposed Discharge WQ Criteria of Vault Effluent ++		
							Min.	Median	Max.
pH	N/A	6.5-9.0	-	6.0 – 9.5	6.5	6.0 - 9.0	6.9	7.35	7.54
TSS	mg/L	-	-	15	-	15			
Al	mg/L	0.1	-	-	0.21	2	<0.005	0.005	0.01
As	mg/L	0.005	0.05	0.5	0.03	0.1	<0.0005	<0.0005	<0.0005
Cd	mg/L	0.000017	0.01	-	0.00002	0.002	<0.00005	<0.00005	0.00124
Cu	mg/L	0.002	1	0.3	0.005	0.1	<0.001	<0.001	0.003
Fe	mg/L	0.3	0.3	-	0.037	5	<0.03	<0.03	0.04
Hg	mg/L	0.000026	-	-	0.0004	0.0004	<0.00005	<0.00005	<0.00005
NH3-T	mg/L	2.04	-	-	26	26	<0.02	0.01	0.036
Ni	mg/L	0.025	-	0.5	0.003	0.2	<0.001	<0.001	0.003
NO3_N	mg/L	13	45	-	29	60	<0.005	0.014	0.095
Pb	mg/L	0.001	0.05	0.2	0.0004	0.1	<0.0005	<0.0005	0.0014
P	mg/L	-	-	-	0.15	1.0		0.015	
SO4	mg/L	-	250	-	13	250	3	4	7
Zn	mg/L	0.03	5	0.5	0.008	0.2	<0.005	0.005	0.02

Source: Adapted from Table A-1. Proposed Water Quality Discharge Criteria (Golder Doc 515, 2007)

***DFO, 2002 and 2006

** R.R.N.W.T, 1990

* CCME, 2006

+ Maximum concentrations from Possible Poor-End predictions (Golder Doc. 516, 2007), dissolved concentrations

++ Average monthly concentrations (total fraction).

Note:

Proposed concentrations result in a Lake water quality that is predicted to meet CCME-AL at 30 meters away from diffuser, except Cd (0.0001mg/L), Cu (0.006 mg/L) and Pb (0.005 mg/L), values highlighted in dark yellow.

Table A-2. Proposed Portage effluent discharge criteria at end of pipe, monthly mean concentrations

Parameter	Units	Aquatic Life Guidelines*	Drinking Water Guidelines**	MMER***	Predicted Effluent Discharge Concentration+	Proposed Discharge WQ Criteria of Portage Effluent ++	Measured Water Quality at Third Portage Lake (Azimuth 2003 and Cumberland 2005b)		
							Minimum	Median	Maximum
pH	N/A	6.5-9.0	-	6.0 – 9.5	6	6.0 -9.0	6.52	6.75	6.97
TSS	mg/L	-	-	15	-	15			
Al	mg/L	0.1	-	-	0.3	2	<0.005	0.006	0.012
As	mg/L	0.005	0.05	0.5	0.08	0.3	<0.0001	<0.0005	<0.0005
Cd	mg/L	0.000017	0.01	-	0.0002	0.002	<0.00005	<0.00005	<0.0002
Cl	mg/L	-	250	-	441	2000	0.5	0.5	0.8
Cu	mg/L	0.002	1	0.3	0.01	0.1	0.0004	<0.001	<0.001
Fe	mg/L	0.3	0.3	-	3.1	16	<0.01	<0.03	<0.03
Hg	mg/L	0.000026	-	-	0.00006	0.00004	<0.00005	<0.00005	<0.00005
NH3-T	mg/L	2.04	-	-	7.8	16	<0.005	<0.02	0.03
Ni	mg/L	0.025	-	0.5	0.08	0.2	0.0003	<0.001	0.002
NO3_N	mg/L	13	45	-	8.8	20	<0.005	<0.005	0.008
Pb	mg/L	0.001	0.05	0.2	0.005	0.1	<0.00005	<0.0005	<0.001
P	mg/L	-	-	-	0.05	1.5		0.015	
SO4	mg/L	-	250	-	33	400	<1	1	2
Zn	mg/L	0.03	5	0.5	0.09	0.4	0.001	<0.005	<0.005

Source: Adapted from Table A-1. Proposed Water Quality Discharge Criteria (Golder Doc 515, 2007)

***DFO, 2002 and 2006

** R.R.N.W.T, 1990

* CCME, 2006

+ Maximum concentrations from Possible Poor-End predictions (Golder Doc. 516, 2007), dissolved concentrations

++ Average monthly concentrations (total fraction).

Note:

Proposed concentrations result in a Lake water quality that is predicted to meet CCME-AL at 30 meters away from diffuser, except Cd (0.00003 mg/L) and Pb (0.0018mg/L), values highlighted in dark yellow.

Appendix H (Table 1 – Item 18)

Type A Water License Application Documents

TYPE A WATER LICENSE APPLICATION DOCUMENTS

Document Title	Document Number	Document Issue	Issue Date	Reference
Meadowbank Gold Project - 2006 Baseline Ground Water Quality	317	Rev. 1	16-Aug-07	Golder 2007o
Detailed Design of Dewatering Dikes Meadowbank Gold Project Volume 1	342	Ver. 0	13-Mar-07	Golder 2007c
Detailed Design of Dewatering Dikes Meadowbank Gold Project Volume 2	342	Ver. 0	13-Mar-07	
Detailed Design of Dewatering Dikes Meadowbank Gold Project Volume 3	342	Ver. 0	13-Mar-07	
Sewage Treatment System to be used at Meadowbank Gold Project, Nunavut	355	Rev. 1	13-Aug-07	Golder 2007k
Mitigative Measures for Potential Seepage from Tailings Facility	375	Rev. 1	23-Aug-07	Golder 2007f
Meadowbank Gold Project - Integrated Report on Evaluation of Tailings Management Alternatives	383	Ver. 0	2-Feb-07	Cumberland 2007
Conceptual Design of the Effluent Outfall Diffuser for Wally Lake	412	Ver. 0	25-Jul-07	Golder 2007g
Detailed Design of Central Dike Meadowbank Gold Project Volume 1	420	Ver. 0	16-Mar-07	Golder 2007a
Detailed Design of Central Dike Meadowbank Gold Project Volume 2	420	Ver. 0	16-Mar-07	
Detailed Design of Central Dike Meadowbank Gold Project Volume 3	420	Ver. 0	16-Mar-07	
Meadowbank Gold Project Operational ARD/ML Sampling and Testing Plan	425	Ver. 0	23-Aug-07	MMC 2007d
Meadowbank Gold Project Fault Testing and Monitoring Plan	432	Ver. 0	23-Aug-07	MMC 2007b
Pit Slope Design Criteria for the Portage and Goose Island Deposits Meadowbank Gold Project Volume 1	449	Ver. 0	5-Apr-07	Golder 2007d
Pit Slope Design Criteria for the Portage and Goose Island Deposits Meadowbank Gold Project Volume 2	449	Ver. 0	5-Apr-07	
Meadowbank Gold Project Water Quality and Flow Monitoring Plan	450	Ver. 0	27-Aug-07	MMC 2007c
Meadowbank Gold Project Hazardous Materials Management Plan	457	Ver. 0	24-Aug-07	MMC 2007e
Landfill Design and Management Plan Meadowbank Gold Project	458	Ver. 0	27-Aug-07	Golder 2007i
Proposed Water Treatment Methods Meadowbank Gold Project	467	Ver. 0	28-Aug-07	Golder 2007l
Meadowbank Gold Project Emergency Response Plan	482	Ver. 0	24-Aug-07	MMC 2007g
Meadowbank Gold Project Spill Contingency Plan	483	Ver. 0	27-Aug-07	MMC 2007f
Meadowbank Gold Project Type A Water License Application	485	Ver. 0	28-Aug-07	MMC 2007
Report Addendum Detailed Design of Dewatering Dikes Meadowbank Gold Project	492	Ver. 0	12-Jul-07	Golder 2007b
Assessment of Effluent Dilution Potential for the Third Portage Lake Diffuser	497	Ver. 0	22-Aug-07	Golder 2007h
Landfarm Option Analysis Meadowbank Gold Project	498	Ver. 0	23-Aug-07	Golder 2007j
Updated Predictions of Brackish Water Upwelling in Open Pits with Mining Rate of 8500 tpd, Meadowbank Project	499	Ver. 0	27-Jul-07	Golder 2007e
Meadowbank Gold Project Mine Waste & Water Management	500	Ver. 0	24-Aug-07	MMC 2007a
Meadowbank Gold Project Preliminary Closure & Reclamation Plan	511	Ver. 0	28-Aug-07	MMC 2007h
Proposed Discharge Water Quality Criteria for the Portage and Vault Attenuation Ponds	515	Ver. 0	27-Aug-07	Golder 2007n
Water Quality Predictions Meadowbank Gold Project	516	Ver. 0	28-Aug-07	Golder 2007m
Meadowbank Gold Project Type A Water License Application Curricula Vitae for Signing Professionals (559 Aug_07 Curricula Vitae for Signing Professionals Type A Water License.pdf)	559	Ver. 0	27-Aug-07	
Meadowbank Gold Project Aquatic Effects Management Program (AEMP Report_Final OCT2005.pdf)			October 2005	Cumberland 2005
Cumberland Meadowbank NNLP - Habitat Compensation Addendum (Azi TM NNLP Addendum v1.pdf)			7-Feb-07	Azimuth 2007
Meadowbank Gold Project No-Net-Loss Plan (NNLP (NNL_Revised Draft_Nov_2006v4_Final.pdf)			November 2006	Cumberland 2006
Independent Review of Pit Slope Design Criteria for the Portage and Goose Island Deposits (Review Letter LR01-07Final LH.pdf)			14-Apr-07	Stacey Mining 2007
Expert Review of Meadowbank Tailings and Dewatering Dike Designs - Draft (LetterReport.03-30-2007.pdf)			30-Mar-07	Morgenstern 2007

Supplemental Information*				
Bathymetric Surveys, Meadowbank Gold Project, Nunavut	309	Ver. 0	24-Nov-06	Golder 2006*
Design for the Third Portage Lake Effluent Outfall Diffuser, Meadowbank Gold Project, Nunavut	536	Ver. 0	27-Nov-07	Golder 2007p*
2007 Till Core Material Investigation and Laboratory Testing, Meadowbank Gold Project	538	Ver. 0	25-Jan-08	Golder 2008a*
Meadowbank Gold Project 2007 Baseline Groundwater Quality	548	Ver. 0	12-Dec-07	Golder 2007s*
Landfill Design and Management Plan, Supplementary Information, Meadowbank Gold Project, Nunavut	562	Ver. 0	27-Nov-07	Golder 2007q*
Landfarm Design and Management Plan, Meadowbank Gold Project	564	Ver. 0	27-Nov-07	Golder 2007r*
Third Portage Lake Outlet Capacity and Stability Assessment, Meadowbank Gold Project	575	Ver. 0	3-Mar-08	Golder 2008b*
Incineration Waste Management Plan, Meadowbank Gold Project	581	Ver. 0	19-Dec-07	Golder 2007t*
Type A-Water License Application Review Comments and Discussion - February 15, 2008 Conference Call	614	Ver. 0	20-Feb-08	Golder 2008c*
Type A-Water License Application Review Comments and Discussion - February 19, 2008 Conference Call	617	Ver. 0	22-Feb-08	Golder 2008d*
Dewatering Dike Dredge Disposal Options, Meadowbank Gold Project	620	Ver. 0	6-Mar-08	Golder 2008e*
Meadowbank Gold Project Proposed Discharge Water Quality Criteria	621	Ver. 0	March 2008	AEM 2008g*
Errata - Meadowbank Gold Project Preliminary Closure and Reclamation Plan	625	Ver. 0	6-Mar-08	AEM 2008h*
Meadowbank Gold Project, Water Quality and Flow Monitoring Plan - Supplemental Information	626	Ver. 0	6-Mar-08	AEM 2008i*
Clarification - Meadowbank Gold Project Landfill Design	627	Ver. 0	6-Mar-08	AEM 2008j*
Preliminary Assessment of Potential Effects of Pit Flooding on Third Portage and Wally Lakes, Meadowbank Gold Project, Nunavut	632	Ver. 0	7-Mar-08	Golder 2008f*
Response to Meadowbank Type A Water License Technical Review Intervenor Comments (AEM Response to Meadowbank Type A Water License Intervenor Comments.xls)			7-Mar-08	AEM 2008f*
Proposed Water Quality Monitoring and Management Plan for Dike Construction and Dewatering at the Meadowbank Mine			7-Mar-08	Azimuth 2008
Clarification - Meadowbank Sewage Treatment Plant Design (030608_LET_ Sewage Treatment Plant Design.pdf)			6-Mar-08	AEM 2008e*
Clarification - Status of Bulk Fuel Storage Facility Construction at Meadowbank Site Authorized Under Type B WL 2BC MEA-0507 (030608_LET_Status of Bulk Fuel Storage Tank.pdf)			6-Mar-08	AEM 2008d*
Clarification - Location and Volume of Freshwater Source for the Explosives Mixing Facility (030608_LET_Explosives Plant Water Use.pdf)			6-Mar-08	AEM 2008c*
Clarification - Freshwater Intake Pump Screens and Dewatering Discharge Pipeline Detail (030608_LET_Freshwater Intake and Dewatering Piping.pdf)			6-Mar-08	AEM 2008b*
2AM-MEA - Meadowbank Gold Project Water License Application Document 511 - Preliminary Closure and Reclamation Plan Point of Clarification (021808_Letter to NWB re Disposal of Non Hazardous waste at Closure.pdf)			18-Feb-08	AEM 2008a*
Meadowbank Plantsite Finish Grading & Location Plan Sheet 2 of 2 (600c0114.pdf)			13-Dec-07	Hatch 2007
2AM-MEA - Meadowbank Gold Project Water License Application Supplementary Information on Sewage Treatment (112607_Letter to NWB re sewage treatment plant.pdf + accompanying Meadowbank Sewage Treatment Plant Operations Manual.pdf and Figure 1)			26-Nov-07	AEM 2007a*
2AM-MEA - Meadowbank Gold Project Water License Application Supplementary Information on Explosives Storage Facilities (112607_Letter to NWB re explosives storage facilities.pdf + accompanying Figure 1)			26-Nov-07	AEM 2007b*
2AM-MEA - Meadowbank Gold Project Water License Application Supplementary Information on Ore Storage Facilities (112607_Letter to NWB re ore stockpiles.pdf + accompanying Figure 1 and Figure 2)			26-Nov-07	AEM 2007c*
Type "B" Water Use and Waste Disposal License Application for the Baker Lake Laydown and Fuel Storage Facilities (070408 8BC-MEA---- Supplementary Information-IMLE.pdf + supporting documents)			April 2007	MMC 2007i*
Water License Applicatiuon for the Tehek Lake Access Road (061025 8BC-TEH Detailed Project Description Final.pdf + supporting documents)			October 2006	Cumberland 2006b*
Item #85/85A Meaodwbank Gold Project Blasting Addendum (TM1006_05 Items 85 &amp.pdf)			6-Oct-05	Golder 2005*
Meadowbank Gold Project - Project Alternatives Report (Project Alternatives Report_FINAL_Oct2005.pdf)			October 2005	Cumberland 2005b*
Blasting Report Addendum (Ltr0525 - Blasting Report Addendum.pdf))			25-May-04	Golder 2004b*
Report on Blast Design, Meadowbank Gold Project, Nunavut (Rpt 0210 Blast Design.pdf)			10-Feb-04	Golder 2004a*

*support documents submitted to NWB as supplemental information to initial Application submissi
Golder - Golder Associates Ltd
Cumberland - Cumberland Resources Ltd
MMC - Meadowbank Mining Corporatior
AEM- Agnico-Eagle Mines Ltd. Meadowbank Divisio
Azimuth - Azimuth Consulting Group Inc
Stacey Mining - Stacey Mining Geotechnical Ltd
Morgenstern - Morgenstern, N

Appendix I – (Table 1 – Item 20)

Clarification – Meadowbank Gold Project Landfill Design

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **CLARIFICATION – MEADOWBANK GOLD PROJECT LANDFILL DESIGN**

During the Pre-hearing Conference of the Nunavut Water Board that took place February 26 and 27, 2008 in Baker Lake, Nunavut, further clarification was requested by Indian and Northern Affairs Canada (INAC) with respect to the proposed solid waste landfills at the Meadowbank Project, and specifically the nature of the proposed rock material surrounding the landfills.

AEM proposes to construct two solid waste landfills (Landfill #1 and Landfill #2) for the disposal of non-salvageable, non-hazardous solid wastes from mining activities at the Meadowbank Project that cannot be incinerated (Application Document 458, ***Final Report on Landfill Design and Management Plan, Meadowbank Gold Project***, Golder, August 27, 2007). Landfill #1 would be located at the proposed northwest toe of the Portage Rock Storage Facility (RSF) and would serve the mine for the first nine years.

Landfill #2 would be located near the top of the Portage RSF and would serve the mine for the last two years of the mine operation. Demolition waste from the plant site removal/reclamation would be disposed of in Landfill #2. The development of two landfills would minimize the area disturbed and the re-handling of waste.

As described in (Application Document 485, ***Type A Water License Application, Meadowbank Gold Project,*** MMC, 2007), the Portage Rock Storage Facility will also contain surplus quantities of waste rock from the Portage and Goose Island pits. A classification system will be used to identify the use and storage for all mine rock (Application Document 425, ***Operational ARD/ML Sampling and Testing Plan, Meadowbank Gold Project,*** MMC, 2007d). Specifically, this system will identify PAG or NPAG rock types, as well as those with the potential to leach metals.

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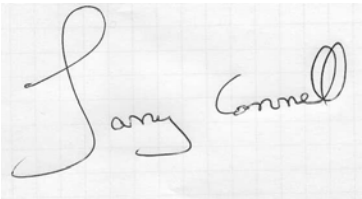
The Portage RSF will be constructed as a cell, or series of cells, such that the interior of each cell is composed of PAG and/or ML waste rock, and the exterior of each cell is composed of NPAG waste rock. Thus, PAG and/or ML waste rock within the RSF will be encapsulated within NPAG waste rock, thereby limiting its exposure to oxidizing agents such as air and water, and providing a buffer for any drainage from the interiors of the cells. It is expected that the material within the Portage RSF will freeze, which will limit internal drainage as infiltrating water becomes frozen. As a further ARD control measure, the Portage RSF will be capped with a minimum 2 m thick layer of coarse acid-buffering ultramafic rock at closure.

Owing to their placement within the Portage RSF, the proposed landfills will also become encapsulated within waste rock. Specifically, it is proposed that the slopes of the proposed landfills be covered with an advancing waste rock layer during operations such that the landfill would be covered by a minimum 0.3 to 1 m thickness of waste rock by the end of landfill operations. AEM proposes to use NPAG waste rock to surround and cover the landfills where ever practical. As noted above, a minimum 2 m thick layer of coarse acid-buffering ultramafic rock would also be placed over the landfill cover as part of planned closure activities for the Portage RSF.

Landfills at the selected locations within the Portage RSF would allow any leachate that may be generated to be collected with seepage and runoff water from the Portage RSF. The leachate from the proposed landfills is anticipated to be very low strength (dilute) due to controls on materials to be placed in the landfills. Contact water from Portage RSF will be managed and monitored in accordance with the proposed (Application Doc. 450, ***Water Quality and Flow Monitoring Plan, Meadowbank Gold Project***, MMC, 2007b).
We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.

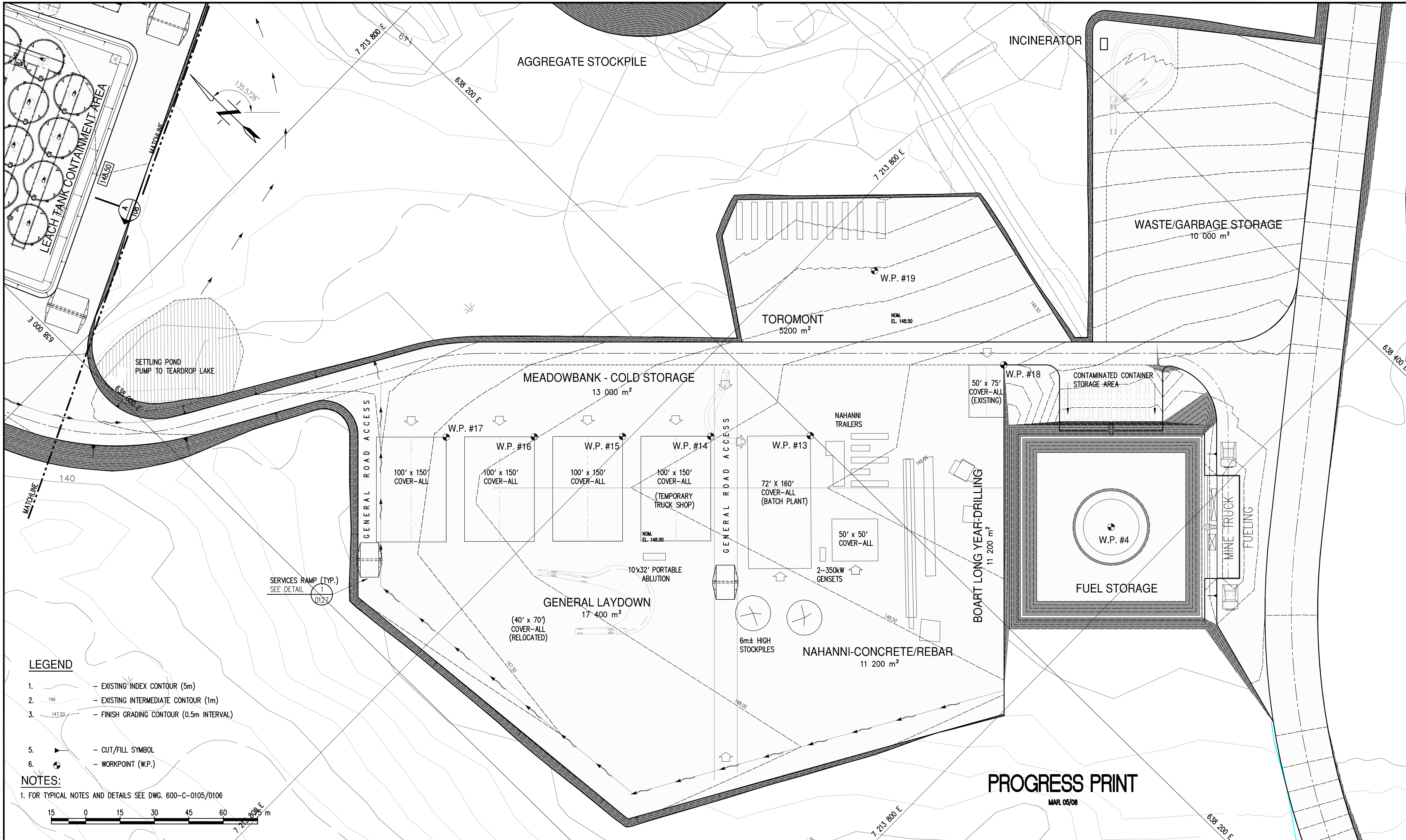


Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Appendix J (Table 1 – Item 21)

Figure - Meadowbank Plantsite Finish Grading & Location Plan



LEGEND

1. – EXISTING INDEX CONTOUR (5m)
2. 146 – EXISTING INTERMEDIATE CONTOUR (1m)
3. 147.50 – FINISH GRADING CONTOUR (0.5m INTERVAL)
5. – CUT/FILL SYMBOL
6. – WORKPOINT (W.P.)

NOTES:

1. FOR TYPICAL NOTES AND DETAILS SEE DWG. 600-C-0105/0106

15 0 15 30 45 60 75 m

THIS DRAWING HAS NOT BEEN PUBLISHED BUT RATHER HAS BEEN PREPARED BY HATCH FOR USE BY THE CLIENT NAMED IN THE TITLE BLOCK SOLELY IN RESPECT OF THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THE FACILITY NAMED IN THE TITLE BLOCK AND SHALL NOT BE USED FOR ANY OTHER PURPOSE OR FURNISHED TO ANY OTHER PARTY WITHOUT THE EXPRESS CONSENT OF HATCH

DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
0A	ISSUED FOR APPROVAL	DLN	07/12/13
	ISSUE		

NO	DESCRIPTION	BY	DATE
0A	ORIGINAL DRAWING	DLN	07/12/13
	REVISIONS		

SECTION:	CIVIL	
SCALE:	1:750	DATE
DESIGN. BY		
DRAWN BY:	D.L.N.	SEPT. 07
CHECK. BY		
APP. BY:		

AEM AGNICO-EAGLE MINES LIMITED

NUNAVUT

HATCH

TITLE: MEADOWBANK GOLD PROJECT

MEADOWBANK PLANTSITE FINISH GRADING & LOCATION PLAN SHEET 2 OF 2

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
600C0113/014	325174	600-C-0114	0A

Appendix K (Table 1 – Item 22)

Clarification – Meadowbank Sewage Treatment Plant Design

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
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Canada

REFERENCE: **CLARIFICATION – MEADOWBANK SEWAGE TREATMENT PLANT DESIGN**

During the Pre-hearing Conference of the Nunavut Water Board that took place February 26 and 27, 2008 in Baker Lake, Nunavut, further clarification was requested by Indian and Northern Affairs Canada (INAC) with respect to the proposed sewage treatment plant at the Meadowbank Project.

The proposed sewage treatment plant will be constructed over two phases and will consist of the following elements:

Phase 1

- A lift station and pump to transfer sewage from the camp to the sewage treatment plant which would be set up adjacent to the north end of the site airstrip (design capacity of 112.5 m^3/day);
- A 65 m^3 capacity equalization tank to attenuate the flow peaks entering the STP;
- A standard Seprotech Systems L-333 series rotary biological contactor with a primary settling tank, a standard RBC, and a final settling tank (see general arrangement drawing L333-163 in Appendix A;
- A lift station and pump to transfer treated overflow effluent from the final settling tank to Tear Drop Lake (design capacity of 112.5 m^3/day); and
- A plate filter press set up in an adjoining Seacan container with filter feed pump to filter sewage sludge drawn through sludge ports on the bottom of the primary settling tank on an as needed basis with the filtrate being recycled to the equalization tank and the sludge incinerated.

Seprotech Systems Ltd. of Ottawa Ontario (http://www.seprotech.com/) have advised AEM that the nominal capacity for this arrangement will be approximately 300 persons assuming a discharge standard at end of pipe as follows:

Parameter	Maximum Average Concentration (mg/L)	Maximum Allowable Grab Sample Concentration (mg/L)
pH	6-9	9
Total Suspended Solids (TSS)	100	100
BOD_5	80	80
Fecal Coliforms	10,000 CFU/ 100mL	10,000 CFU/ 100mL
Total Oil and Grease	5 and no visible sheen	10 and no visible sheen

Phase 2:

- Phase 2 will see the addition of one parallel Model B130 or two Model B70 RBC units from Sepriotech Systems Ltd. To increase total installed capacity to a nominal capacity of 500 persons.

Phase 1 will be complete by early April of 2008 while Phase 2 will be complete by the Fall of 2008. The permanent accommodation camp being constructed at the Meadowbank Project has 340 rooms. This allows for some doubling up during the peak of construction if required and provides some built in capacity redundancy.

The decision to potentially add two smaller Model B70 RBC units in Phase 2 is being considered by AEM as it would latter allow for one smaller unit to potentially be moved to the Regional Exploration Camp proposed for Km 100 in 2010.

All sewage and greywater from the camp and its associated facilities will be collected and drain by gravity pipelines to a lift station located at the camp. The lift station will then pump the untreated sewage and greywater through a heat traced insulated pipeline to the STP equalization tank. The STP will be located at the east end of the on-site airstrip (see Figure 1 – located at end of this document). It will be constructed on a rockfill prepared pad and will be insulated on the bottom and sides to prevent heat transfer into the underlying ground.

STP influent will enter the 65 m^3 capacity equalization tank. The equalization tank will attenuate the expected peak flows of influent both in the morning and evening as crews prepare and/or return from their respective worksites. It has been sized to accommodate the expected 12 hour flow volume. Untreated influent will flow from the equalization tank into the primary settling tank component of the RBC.

The Phase 1 STP is a Model L-333 Rotodisk aerobic wastewater treatment plant manufactured by Seprotech Systems Inc. of Ottawa Ontario. This wastewater treatment plant is a tertiary treatment plant designed to remove organic material and nutrients. It is comprised of a primary clarifier, a Rotary Biological Contactor and a final clarifier.

Untreated sewage and greywater is pumped into the primary clarifier. Settling separates heavy solids and the clarified water enters the aeration section through the inlet slot located at the bottom of the non drive end section of the biozone. This is the first section of four and contains two rotating assemblies. The second third and fourth stages each have one rotating assembly. This is the stage where most of the BOD reduction occurs. The succeeding 2^{nd}, 3^{rd} and 4^{th} stages are mounted on the second shaft. It is in the 2^{nd} stage that further BOD is reduced, and that nitrifying bacteria start to predominate. The 3^{rd} and 4^{th} stages are just for nitrification. The 4^{th} disk bank has recycle buckets. Partially treated water from the RBC now

enters the final clarifier. Spent biomass particulate settle in this chamber. Sludge is returned to the primary clarifier. A schematic of the flow through the RBC is presented in Figure 2.

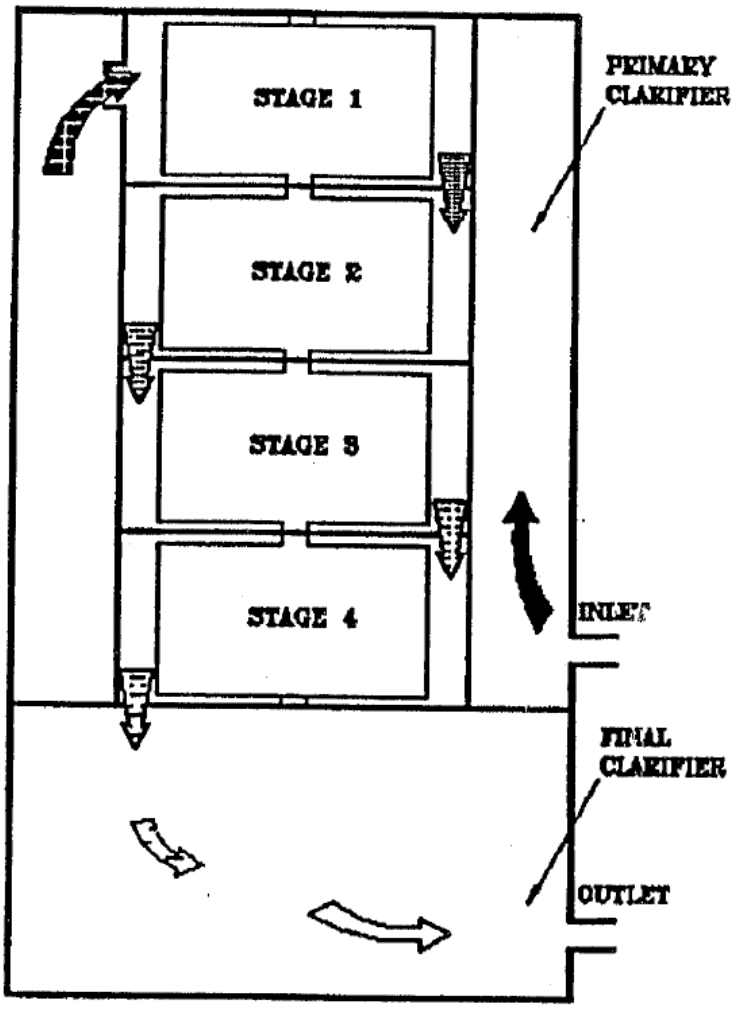


Figure 2 : Schematic Flow through the STP – RBC Unit

The following pictures show similar RBC units during assembly so that the internal structure is visible. The Meadowbank unit is housed within an insulated tank with an insulated cover and is equipped with immersion heaters to ensure efficient operation under Northern temperature conditions.

The treated effluent from the final clarifier will flow to a lift station and be pumped through a heat traced insulated pipeline into Tear Drop Lake (the proposed site Stormwater management pond) during the construction phase. In the operational phase all treated STP effluent and sludge will be co-disposed with the mill tailings into the Tailings Storage Facility.

This is a used RBC plant that was originally purchased by Voisey's Bay Nickel Company for use at the construction camp at this project. It was originally purchased in July of 2003. AEM has purchased a plate and frame filter press as an add-on package unit to allow sludge to be drawn as needed from the bottom of the primary clarifier and then filtered into storage bags. The filtrate will be returned to the primary equalization tank. In this way the build up of sludge can be bled from the system as needed to maintain operational efficiency. The dewatered bagged sludge will then be burned in the camp incinerator

The kitchen will be equipped with a grease trap to separate grease from the kitchen greywater to keep this material out of the sewage treatment plant influent. The grease trap will be manually cleaned and the recovered grease incinerated.

The camp rules and purchasing practices will prohibit anti-bacterial soap products from being used on site to keep these products out of the STP influent to protect the biological activity in the RBC unit.

In Phase 2 the second Model B130 or two Model B70 BC units would be installed in parallel with the Phase 1 Model L333 RBC unit. All of the parallel RBC units would be fed from the same equalization tank with the treated effluent reporting to a common discharge lift station.

Operation of Tear Drop Lake as a Stormwater Management Pond

Tear Drop Lake is a small non-fish bearing pond located in the immediate area proposed for the Meadowbank Gold Project mill and service facilities. It is a shallow pond that freezes to its bottom each winter. AEM proposes to build up the depth of this pond through construction of impervious walls constructed as part of the proposed roads that encircle this pond to allow the pond to act as a Stormwater management pond. During this phase the treated sewage from the STP would be pumped into this Stormwater management pond. Overflow from this pond would be pumped into the northwest arm of Second Portage Lake only after it met the following proposed discharge criteria:

Parameter	Average Concentration	Maximum Concentration of a Grab Sample
pH	6.0 to 9.5	6.0 to 9.5
TSS	25 mg/L	50 mg/L
Al	1.5 mg/L	3.0 mg/L
BOD	25 mg/L	50 mg/L
F.Coli	1000 CFU/dl	2000 CFU/dl

Contingency Measures

The following contingent measures can be applied by AEM in the event of an RBC malfunction at the Meadowbank Sewage Treatment Plant:

a) Cut back on allowable camp water until the malfunction is corrected and use the equalization tank to retard the peak flow to the remaining RBC unit;

b) Shut down the malfunctioning RBC unit until the malfunction is repaired and use only one of the two parallel units until repairs are completed;

c) Shut down all water use in the camp until the repairs are complete.

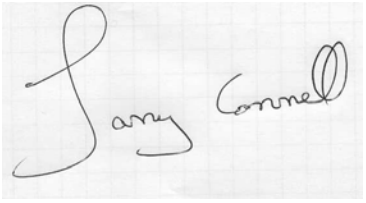
Other contingent measures that could be applied include:

- By passing untreated STP influent around the malfunctioning RBC unit and holding this untreated influent in a holding tank or lined pond on site until the repairs are complete. The untreated sewage would then be pumped back to the STP when the unit is repaired. This will require the coincidental restriction of water use to minimize the volume of untreated influent being bypassed.

No untreated sewage would be trucked to the Hamlet of Baker Lake for disposal in the Hamlet's sewage treatment lagoon without the written consent of the Hamlet Council. It is assumed that such consent would not be given without due consultation with the Hamlet and its elected representatives. Under winter conditions this is an unlikely option due to the 2 hour road distance between the Meadowbank site and the Hamlet of Baker Lake.

We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

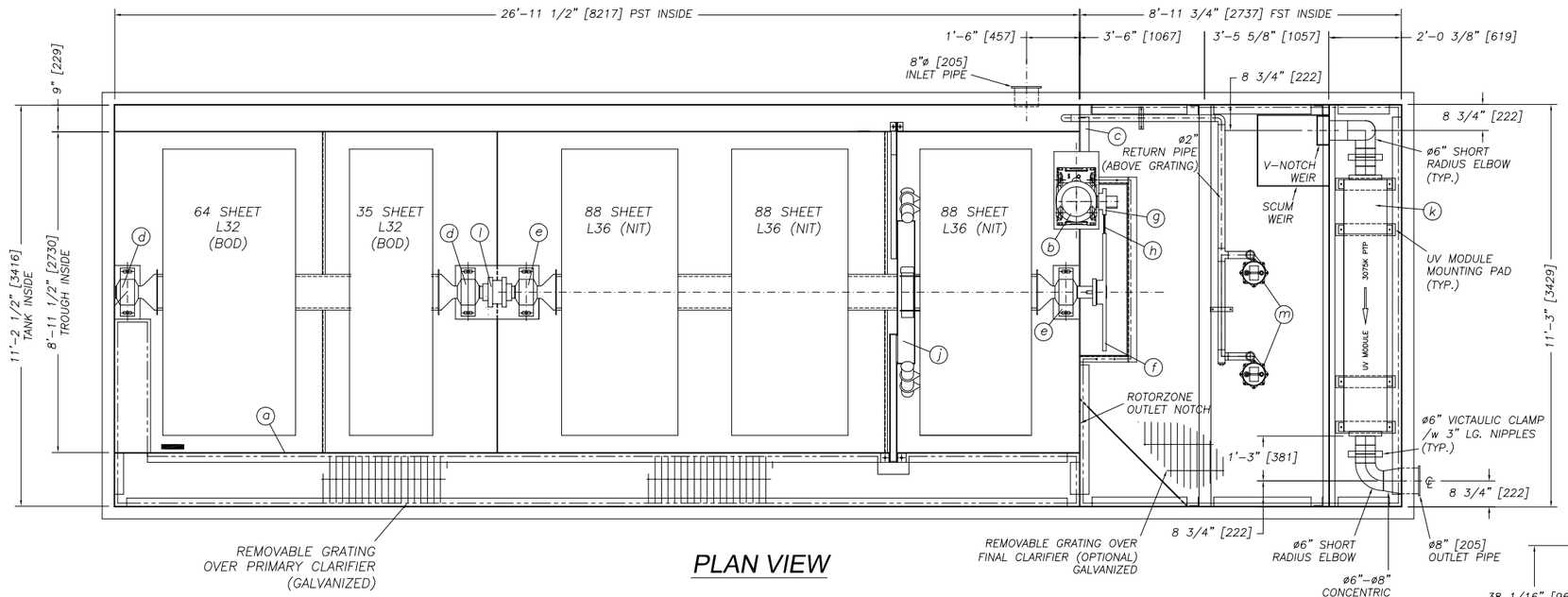
cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Appendix A

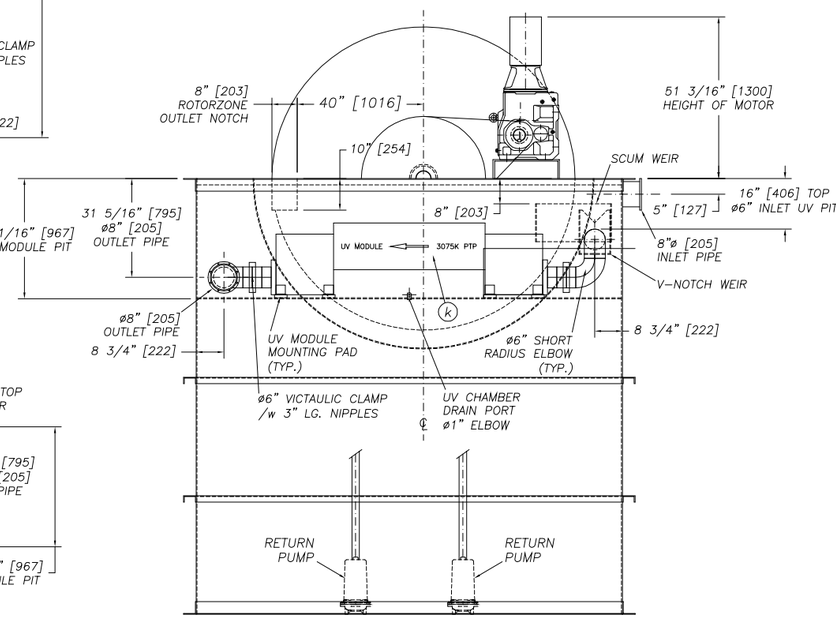
Seprotech General Arrangement Drawing L333-163 for Model L-333 RBC Unit

SHIPPING DETAILS		L 333
OVERALL LENGTH		36'-10" [11225]
OVERALL WIDTH		12'-1" [3685]
OVERALL HEIGHT		15'-6" [4275]
SHIPPING WEIGHT	(LBS)	42,000
	(KG)	19,000

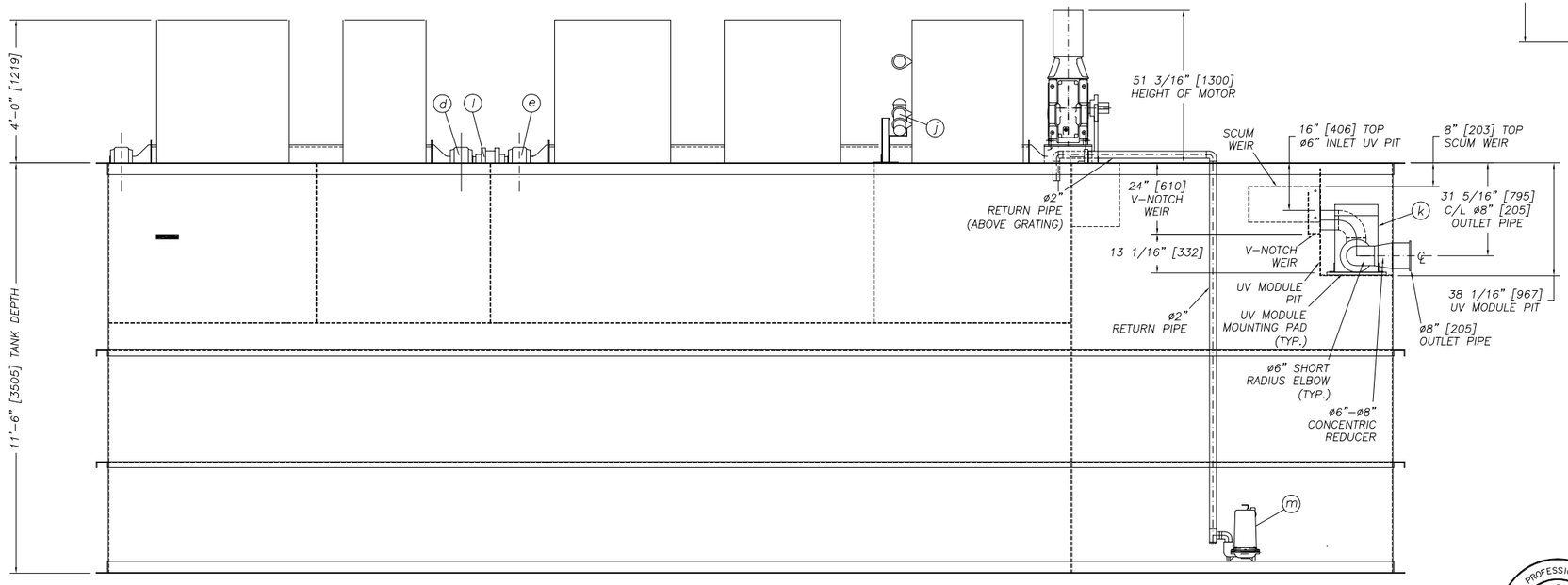
PROCESS DETAILS		L 333
HYDRAULIC LOADING	(USGPD)	27,738
	(L/DAY)	105,000
BIO SUPPORT MEDIA AREA	(SQ.FT)	36,490
	(SQ.M)	3,390
BIO SUPPORT MEDIA DIAMETER	(FT)	8
	(M)	2.44
PRIMARY CLARIFIER CAPACITY	(CU.FT)	2,581
	(CU.M)	73.09
FINAL CLARIFIER CAPACITY	(CU.FT)	873
	(CU.M)	24.72
ROTORZONE CAPACITY	(CU.FT)	640
	(CU.M)	18.12
SLUDGE STORAGE IN PRIMARY CLARIFIER	(CU.FT)	1,588
	(CU.M)	44.97
SLUDGE STORAGE IN FINAL CLARIFIER	(CU.FT)	233
	(CU.M)	6.60
T.W.L IN PRIMARY CLARIFIER	(FT)	10.58
	(M)	3.23
T.W.L IN FINAL CLARIFIER	(FT)	9.75
	(M)	2.97



PLAN VIEW



SIDE VIEW



ELEVATION VIEW

ITEM	DETAILS	MAT'L	QUANT
a	"ROTORZONE" TANK	M.S	1
b	REDUCER NORD GEAR, MODEL SK9062V-185TC		1
c	MOTOR TEFC 185TC FRAME, 3HP, 575V, 3PH, 60HZ		1
d	BEARING SKF, SNH22524, 4 3/16" DIA.		2
e	BEARING SKF, SNH22526, 4 7/16" DIA.		2
f	LARGE SPROCKET # 160 M60T c/w TAPER LOCK BUSHING		1
g	SMALL SPROCKET # 160 B12T		1
h	CHAIN # 160 COTTERED		1
j	D.O. RECIRCULATION DEVICE	M.S	1 SET
k	UV MODULE 3075K PTP		1
l	COUPLING		1
m	RETURN PUMP		2

P.O. # 334366-41-0005

AS BUILT DRAWING
RELEASED FOR FABRICATION

LICENSED PROFESSIONAL ENGINEER
B. KHORAL
PROVINCE OF ONTARIO
03/21/03

NOTES:

1. UNIT TO BE PLACED LEVEL ON CONCRETE PAD OR WELL COMPACTED GRAVEL.
2. ALL DIMENSIONS IN BRACKET ARE IN MILLIMETERS.
3. ALL STEEL SANDBLASTED AND PAINTED WITH DEVTAR 5A FINISH.
4. 3" THICK FOAM INSULATION ON OUTSIDE OF TANK AND INSIDE COVER (IF APPLICABLE).
5. TANK INTERIOR, FULLY WELDED SEAMS. EXTERIOR, STICH WELDED.

NOTES:

6. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES WITHOUT PRIOR APPROVAL OF SEPROTECH SYSTEMS INC.

REV	DESCRIPTION	DATE	BY
6	AS BUILT REVISIONS, SLUDGE PUMPS ADDED, NOTES REVISED	11MAR04	D.C.
5	STAMPED FOR CONSTRUCTION	21AUG03	B.K.
4	SNC LAVALIN REVIEW REVISIONS	20AUG03	D.C.
3	REVISED TITLEBLOCK & NOTE	17JUL03	D.C.
2	UV MODULE AND PIT ADDED, REDUCER ROTATED VERTICAL ORIENTATION	08JUL03	D.C.
1	DIMENSION ADDED, REDUCER MOTOR HEIGHT ABOVE TANK	26JUN03	D.C.
0	ISSUED FOR APPROVAL	20JUN03	D.C.

SEPROTECH SYSTEMS INC.
2378 HOLLY LANE OTTAWA, ONTARIO, CANADA K1V 7P1
TEL: (613) 523-1641 FAX: (613) 731-0851
Email: contact@seprotech.com Web: http://www.seprotech.com

DESCRIPTION
GENERAL ARRANGEMENT OF L333
ROTORDISK IN FULL STEEL TANKAGE

DRAWN	CHECKED	SIZE	SCALE	JOB NO.	DWG NO.	REV
D.C.	J.T.	D	N.T.S	60012	L333-163	6

PROJECT NAME: SNC LAVALIN (VOISEY'S BAY, NFLD) DATE 20JUNE03 SHEET 1 OF 1

N

PORTAGE ROCK STORAGE FACILITY

PORTAGE TAILINGS FACILITY

RECLAIM

STORMWATER DIKE

TAILS DIKE

CENTRAL DIKE

SOUTH SADDLE DAM

CULVERT

CULVERT

CULVERT

BASSIN #3

LAC #2

BASSIN #2

LAC #1

BASSIN #1

IF

ORE

IV

UM

OVERBURDEN

North starter Pit

SILT FENCE

SILT FENCE

Proposed Location of STP

Proposed Location of Camp Facilities

Proposed Location of Batch Concrete Plant

WATER INTAKE

PLANT SITE

LAKE

OVERBURDEN STORAGE

FUEL STORAGE

BAY ZC

7216500 N

7216000 N

7215500 N

7215000 N

7214500 N

7214000 N

7213500 N

7213000 N

637000 E

637500 E

638000 E

638500 E

639000 E

639500 E

Division Meadowbank

FIGURE 3.0

Appendix L (Table 1 – Item 33)

Clarification – Status of Bulk Fuel Storage Facility Construction
At Meadowbank Site Authorized Under
Type B WL 2BE-MEA0507

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **CLARIFICATION – STATUS OF BULK FUEL STORAGE FACILITY CONSTRUCTION AT MEADOWBANK SITE AUTHORIZED UNDER TYPE B WL 2BE MEA-0507**

During the Pre-hearing conference of the Nunavut Water Board (Water Board) that took place February 26 and 27, 2008, the Water Board requested that Agnico-Eagle Mines Inc. (AEM) provide an update on the status of construction of the 5.6 million litre bulk fuel storage tank at the Meadowbank Project site as was authorized under the Meadowbank Exploration Project Type B Water License 2BE-MEA0507.

Cumberland received approvals from the KIA and the NWB to construct a 5.6 million litre fuel tank at the Meadowbank site in 2006. During the summer of 2006 the gravel pad for the tank was partially constructed but the tank and associated facilities were not erected.

It is AEM's intent to complete construction of this bulk fuel storage tank, dispensing station and drainage control structure in 2008 in accordance with the Specification Report, Project No. 06-1413-009, prepared by Golder Associates, April 28, 2006, signed and stamped by the Golder Engineer. The facility will be constructed and operated in accordance with the following standards:

- Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products, 1994; CCME; and
- National Fire Code, 1995.

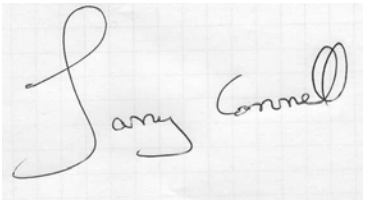
Vancouver Office:
555 Burrard, Suite 375
Box 209, Two Bentall Centre
Vancouver, British Columbia V7X 1M8
Tel: 604-608-2557 Fax: 604-608-2559

Baker Lake Office:
Baker Lake, Nunavut
X0C 0A0
Tel: 867-793-4610
Fax: 867-793-4611

AEM intends to complete the remaining work required on the pad and containment area for the tank in the first half of 2008. All of the construction equipment used during last year's operations is still on site and will be used for this year's work. It is anticipated that the steel for the tank will be erected during the spring and the fuel dispensing unit, stored in Baker Lake, will then be installed.

We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Appendix M (Table 1 – Item 34)

Clarification – Freshwater Intake Pump Screens and Dewatering Discharge Pipeline Detail

AGNICO-EAGLE MINES LTD.
Meadowbank Division

March 6, 2008

Mr. Richard Dyer, Licensing Administrator,
Nunavut Water Board
PO Box 119,
Gjoa Haven, NU,
X0B 1J0
Canada

REFERENCE: **CLARIFICATION – FRESHWATER INTAKE PUMP SCREENS AND DEWATERING DISCHARGE PIPELINE DETAIL**

During the Pre-hearing conference of the Nunavut Water Board (Water Board) that took place February 26 and 27, 2008, the Water Board requested that Agnico-Eagle Mines Inc. (AEM) provide additional information on the proposed freshwater pump intake and specifically the intake screens, and detail design information on the proposed Second Portage Lake Northwest Arm dewatering piping arrangement and outfall diffuser. Detailed information on the proposed design of the operational diffuser was previously provided with the Type A Water License application supporting materials, specifically in Document 536 entitled "Report on Design for the Third Portage Lake Effluent Outfall Diffuser – Meadowbank Gold Project, Nunavut" prepared by Golder Associates, dated November 27, 2007.

The proposed Freshwater and Reclaim Water Barges are pre-packaged floating water pump barges being fabricated and supplied by Chamco Industries Ltd. of Vancouver (http://www.chamco.com/). The hull dimensions for these floating barges are 30 feet by 20 feet with a depth of 7 feet. A general arrangement elevation view drawing is attached as Appendix A. Each barge is equipped with a centre wet wall that is allows water to flow through a set of inlet screens on each end of the barge into this centre wet well "tunnel". The vertical water pumps are mounted on the deck of the barge inside the pump house with the intake set inside the wet well. In this configuration the screens act to prevent fish entering the wet well and hence the pump intakes and the screen configuration reduces the incoming flow pressure across the screens thus preventing fish from being physically pulled into the and held against the outside of the intake screens. The intake screen systems on these barges comply with the "Freshwater Intake End-of-Pipe Fish Screen Guideline" published by Fisheries and Oceans Canada, 1995.

Vancouver Office:
555 Burrard, Suite 375
Box 209, Two Bentall Centre
Vancouver, British Columbia V7X 1M8
Tel: 604-608-2557 Fax: 604-608-2559

Baker Lake Office:
Baker Lake, Nunavut
X0C 0A0
Tel: 867-793-4610
Fax: 867-793-4611

Access to and from the pump house barges for both people and piping is along a rigid walkway bridge spanning between the barge and the shore.

The following series of photos were taken from the Chamco Industries website as typical representations of similar pre-packaged floating barge units:

Typical Floating Barge in Place

Pair of Floating Barges under winter conditions

Barge being moved into the water – Intake screen location is visible on the end of the hull

Barge being loaded for shipment – Note intake screens on end of hull

Barge prior to placement into the water – note wet well intake screen location on hull

Dewatering Pipeline Design Detail

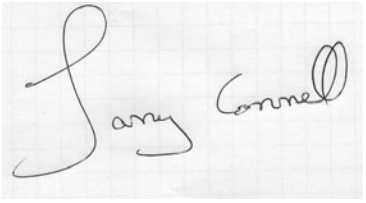
The dewatering of Second Portage Lake will be accomplished by pumping from two floating barge pump house units to be located initially on either side of the proposed Stormwater dike location in the Northwest Arm. The pump house units will be moved to the two deep water sections of this Northwest Arm as the lake level drops. The location of the pump house and the proposed dewatering pipeline alignment is shown in Hatch Drawings contained in Appendix A:

- Drawing 650-C-0102 Plantsite Infrastructure Dewatering Pipeline Plan and Profile
- Drawing 650-C-0105 Plantsite Infrastructure Barge Layout/Outlet Structure Plans and Sections

The dewatering pipeline between the Northwest Arm of Second Portage Lake and Third Portage Lake will consist of two 250 mm diameter HDPE pipelines. The discharge point in Third Portage Lake is to the west of the on-site airstrip (as shown on Hatch Dwg 650-C-0102) approximately 210 m off shore in a section of the lake that is approximately 14 m in depth. The discharge pipe outlet structure is shown on Hatch Dwg 650-C-0105 and will float on surface directing the outflow from a total of four discharge ports (2 on each pipeline).

We trust that the above information is sufficient for your needs at this time. Should you require further information, please do not hesitate to contact the undersigned

Regards,
Agnico-Eagle Mines Ltd.



Larry Connell, P. Eng.
Regional Manager of Environment, Social & Government Affairs

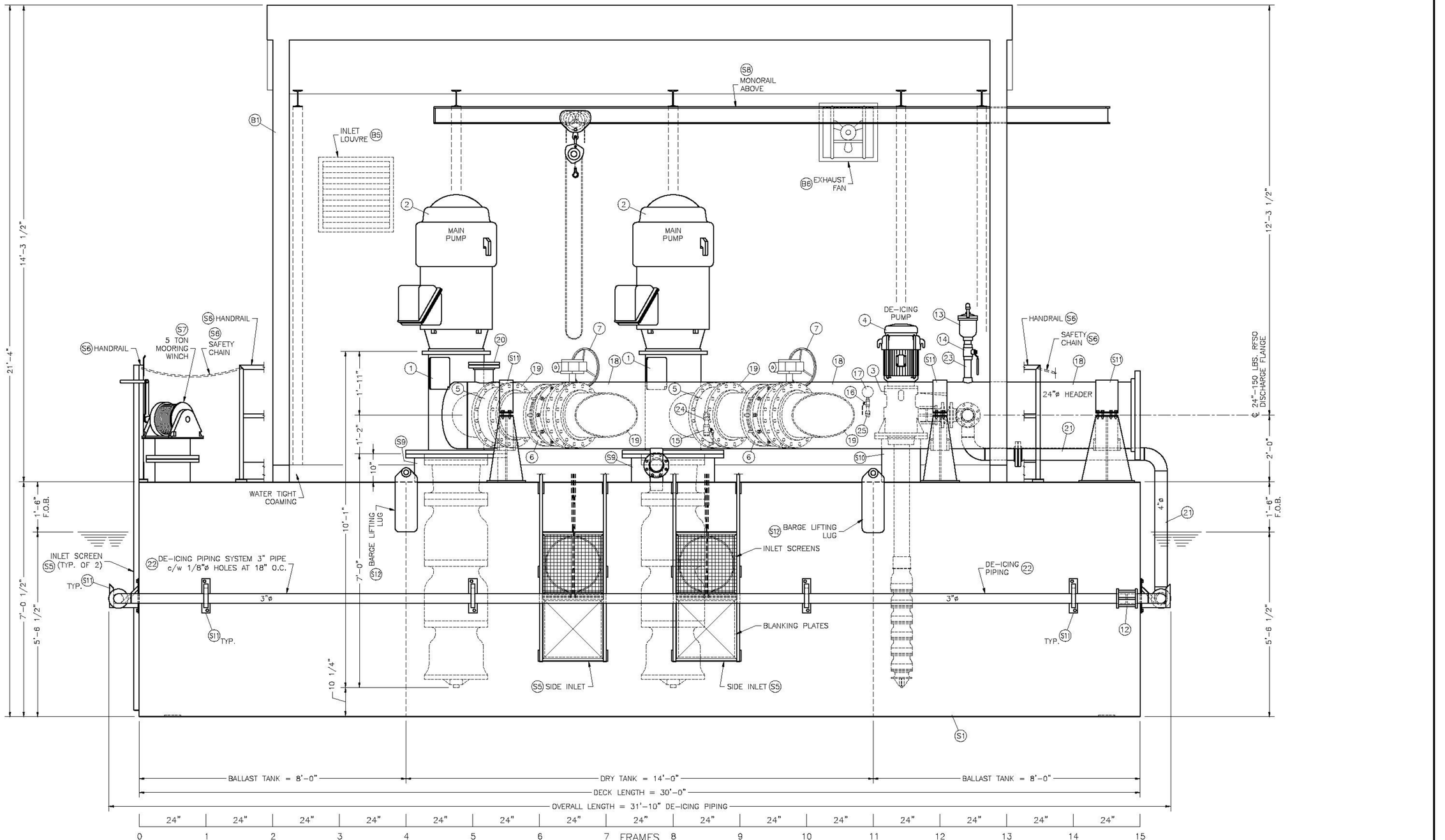
cc: Kivalliq Inuit Association
Environment Canada
INAC Water Resources Division
Fisheries and Oceans Canada
GN Department of Environment

Appendix A

Typical General Arrangement Drawing – Elevation View of a Floating Pump House Barge

Drawing 650-C-0102 Plantsite Infrastructure Dewatering Pipeline Plan and Profile

Drawing 650-C-0105 Plantsite Infrastructure Barge Layout/Outlet Structure Plans and Sections



ELEVATION VIEW (A A)
SCALE: 1 TO 35

PRELIMINARY
FOR APPROVAL
CHAMCO INDUSTRIES LTD.

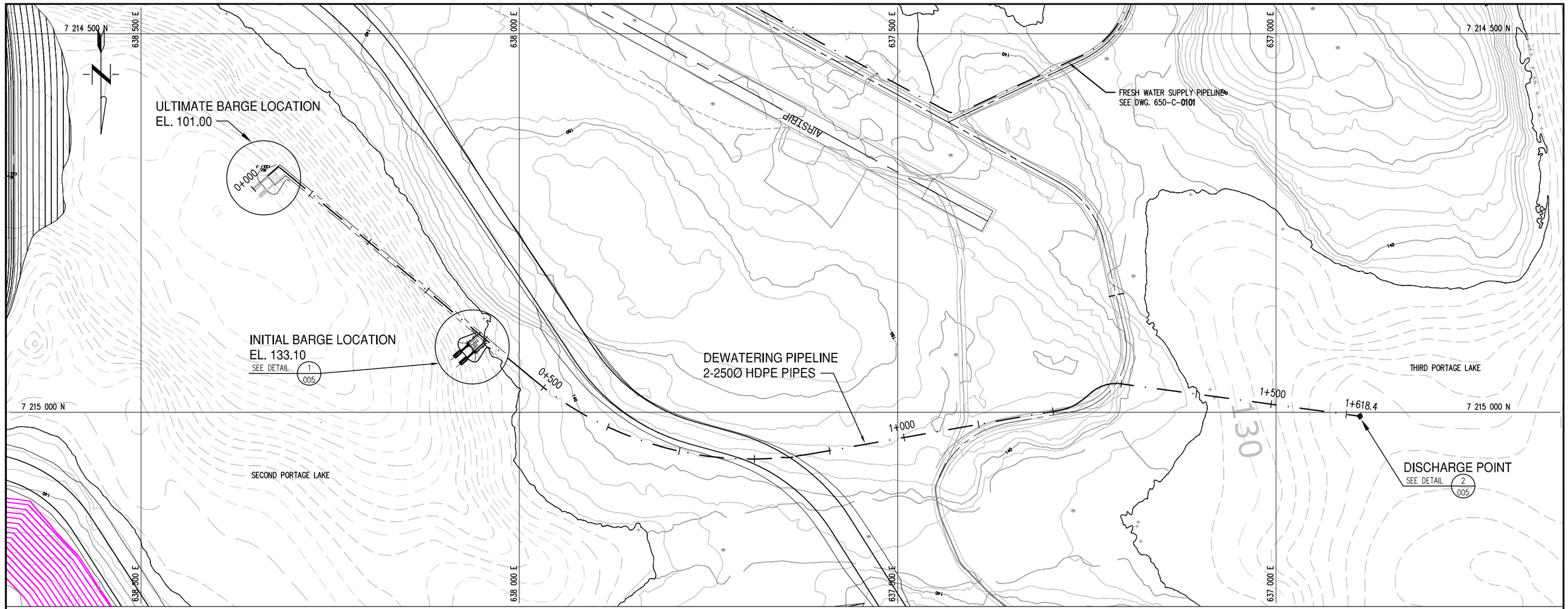
RFV.	DATE	BY	DESCRIPTION
1	27.06.05	MEC	PRELIMINARY FOR APPROVAL

CHAMCO
CHAMCO INDUSTRIES LTD.
VANCOUVER – CALGARY – EDMONTON – PRINCE GEORGE

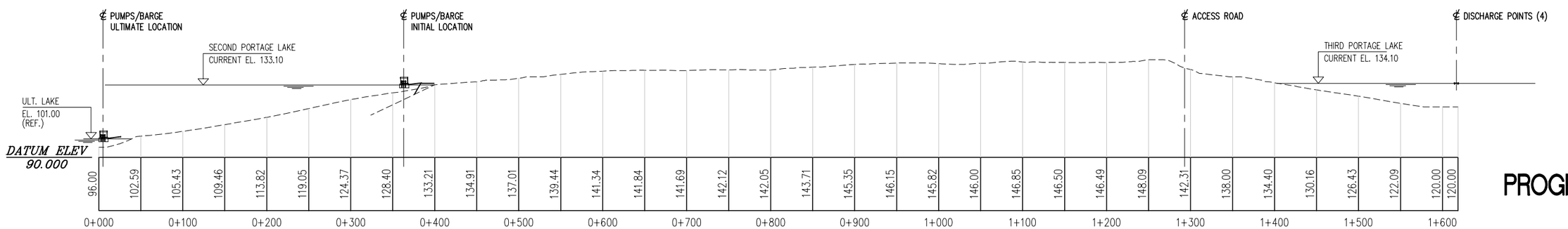
RECLAIM WATER BARGE
30'-0" x 20'-0" x 7'-0" HULL DIMENSIONS

ELEVATION VIEW A–A

DESIGNED BY	
DRAWN BY	
CHECKED BY	
JOB No.	
DATE	
SCALE	N.T.S.
DWG No.	
RFV.	



PLAN



FRESH WATER PIPELINE

SCALE – HORIZ. 1:2500
VERT. 1:1250

NOTES:

1. FOR TYPICAL NOTES AND DETAILS SEE 600-C-0105/0106

PROGRESS PRINT
MAR 04/08

50 0 50 100 150 200 250 m
SCALE 1:2500

DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
0A	PROGRESS PRINT		

ISSUE

NO	DESCRIPTION	BY	DATE
0A	ORIGINAL DRAWING		

REVISIONS

PROJECT PROCESS CIVIL MECH. STRUCT. PIPING SERVICES ELECT. INSTR.

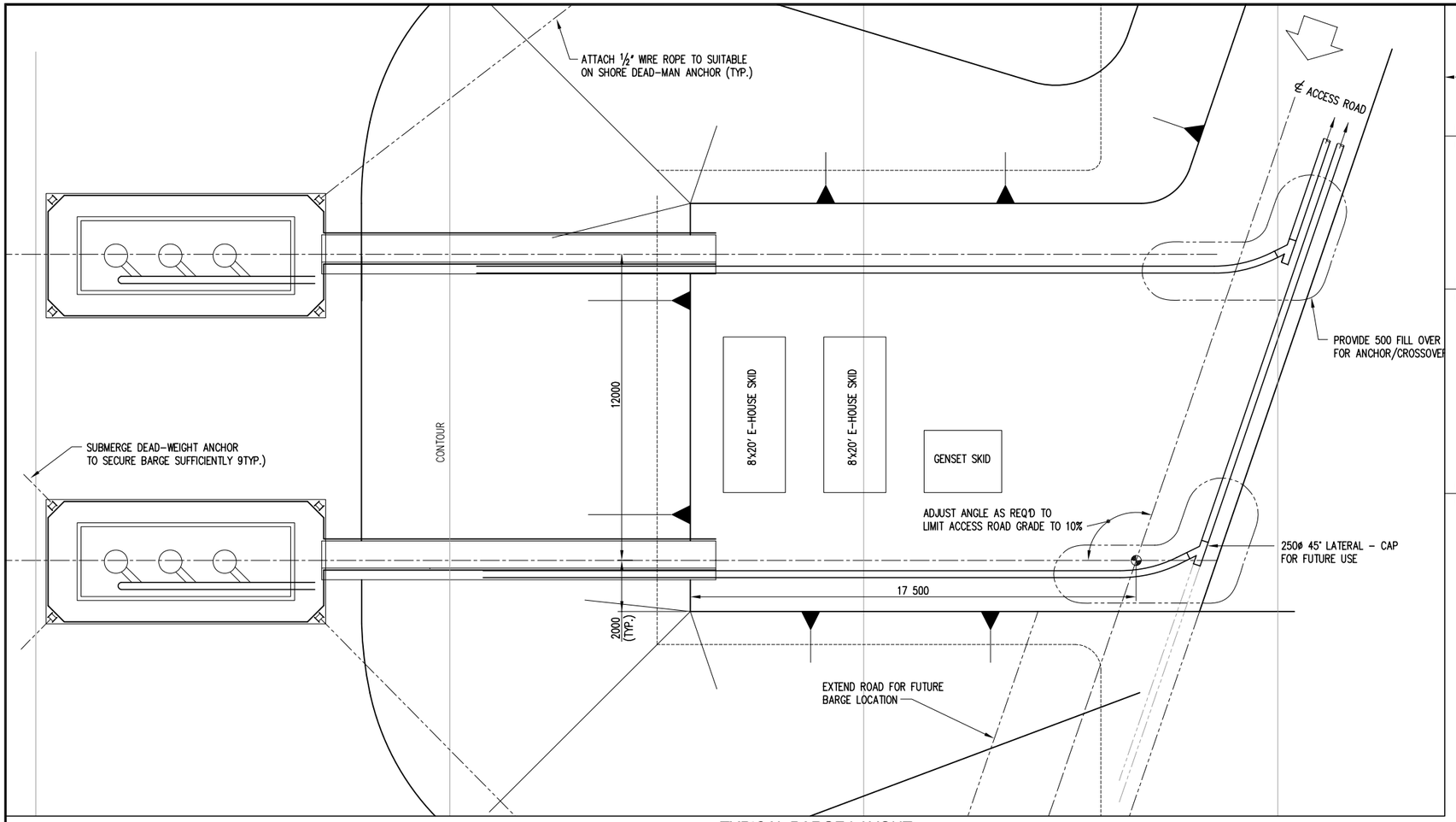
SECTION:	CIVIL	
SCALE:	AS SHOWN	DATE
DESIGN. BY		
DRAWN BY:	D.L.N.	FEB. 08
CHECK. BY		
APP. BY:		

AGNICO-EAGLE MINES LIMITED
NUNAVUT
HATCH™

TITLE: MEADOWBANK GOLD PROJECT
PLANTSITE INFRASTRUCTURE
DEWATERING PIPELINE
PLAN AND PROFILE

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
650C0102.DWG	325174	650-C-0102	0A

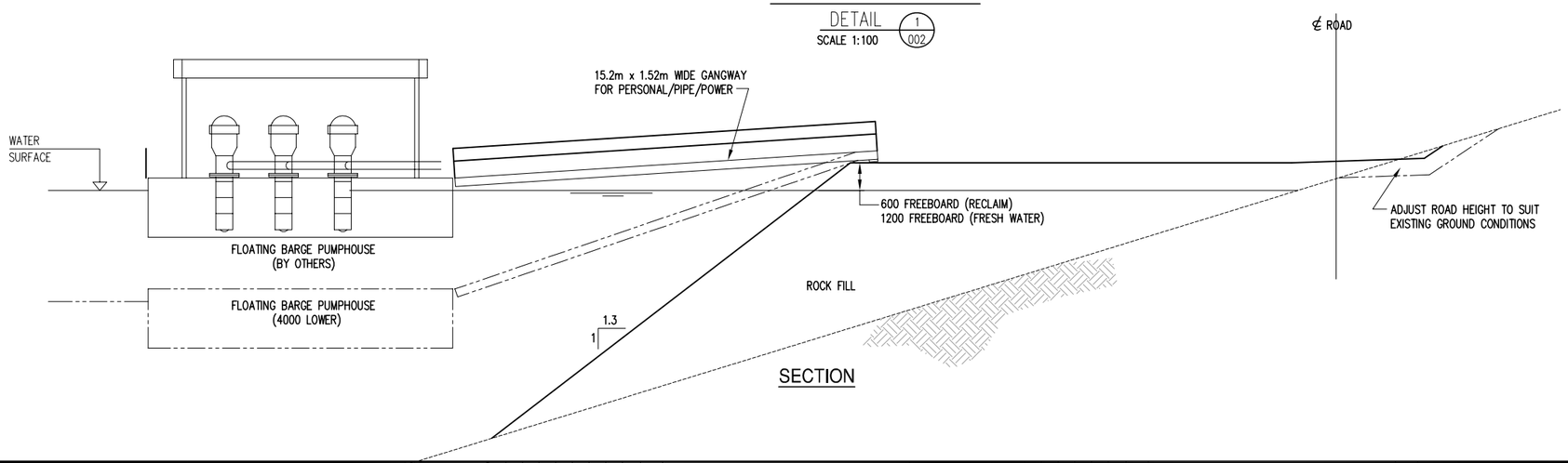
325174 650PAE-0 ??:?? ??/??/??



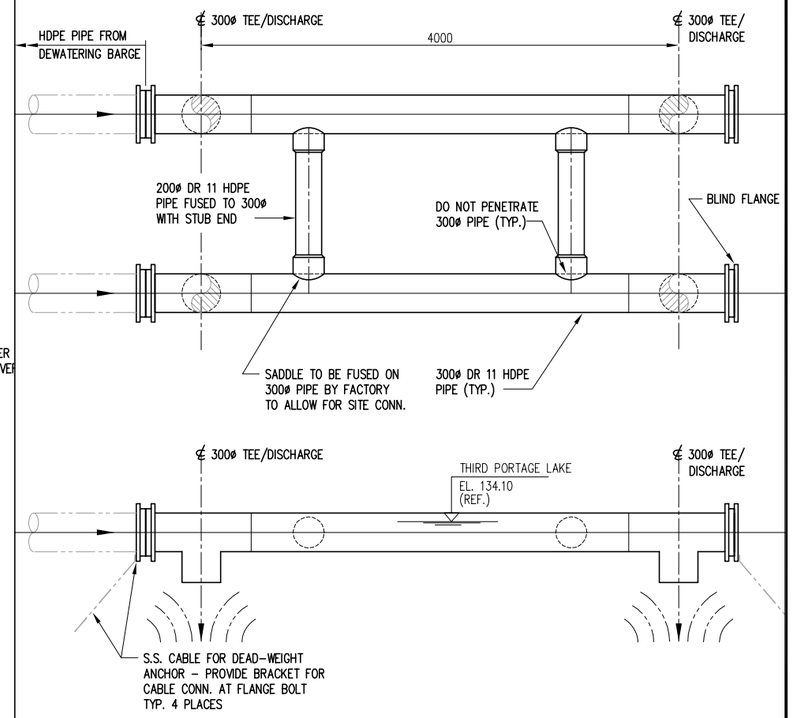
TYPICAL BARGE LAYOUT

DETAIL 1 / 002

SCALE 1:100



SECTION



DEWATERING OUTLET STRUCTURE

DETAIL 2 / 002

SCALE 1:25

PROGRESS PRINT

MAR. 05/08

NOTES:

1. FOR TYPICAL NOTES AND DETAILS SEE 600-C-0105/0106

2 0 2 4 6 8 10 m

SCALE 1:100

DWG. NO. | REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
0A	PROGRESS PRINT		

ISSUE

NO	DESCRIPTION	BY	DATE
0A	ORIGINAL DRAWING		

REVISIONS

PROJECT | PROCESS | CIVIL | MECH. | STRUCT. | PIPING | SERVICES | ELECT. | INSTR.

SECTION:	CIVIL	
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DESIGN. BY		
DRAWN BY:	D.L.N.	MAR. 08
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AEM AGNICO-EAGLE MINES LIMITED

NUNAVUT

HATCH™

TITLE: MEADOWBANK GOLD PROJECT

PLANTSITE INFRASTRUCTURE
BARGE LAYOUT/OUTLET STRUCTURE
PLANS AND SECTIONS

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
650C0105.DWG	325174	650-C-0105	0A

325174 650PRCT-0 ??/??/?? ??:??

Appendix N (Table 1 – Item 35)

Third Portage Lake Outlet Capacity and Stability Assessment, Meadowbank Gold Project

TECHNICAL MEMORANDUM

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TO:	Larry Connell	**DATE:**	March 03, 2008
CC:	Gary Mann	**JOB NO:**	07-1413-0047
FROM:	Mike Paget, Dan Walker, and John Hull	**DOC NO:**	575
EMAIL:	mpaget@golder.com drwalker@golder.com	**VERSION:**	0
RE:	**THIRD PORTAGE LAKE OUTLET CAPACITY AND STABILITY ASSESSMENT, MEADOWBANK GOLD PROJECT**		

Agnico-Eagle Mines Ltd. Meadowbank Division (AEM) [formerly Meadowbank Mining Corp. (MMC), formerly known as Cumberland Resources Ltd. (Cumberland)] is planning to develop the Meadowbank Gold Project (the Project); an open pit gold mine located on Inuit-owned land in the Kivalliq Region of Nunavut, approximately 70 km north of the hamlet of Baker Lake (refer to Figure 1).

A component of the Project will involve blocking off one of three existing channel outlets from Third Portage (3PL) to Second Portage (2PL) lakes through the construction of the Bay Zone Dike (refer to Figure 2). As a result, outflows from 3PL will be confined to the central and easternmost outlet channels during operations and post-closure (refer to Figure 3).

During the environmental impact review process for the Project, a commitment was made on behalf of AEM to maintain natural water levels within 3PL during lake dewatering, and mine operations and closure. Specifically, Cumberland proposed to increase the capacity of the easternmost channel, if necessary, in order to offset the outlet capacity loss of the westernmost channel.

Accordingly, Item 47 of Nunavut Impact Review Board (NIRB) requirements for a Type A Water License for the Project requires AEM to develop an adaptive approach to managing the water flow from 3PL, including:

- the consideration of alternatives to deepen the easternmost channel;
- submission of detailed design for easternmost channel modifications (if any);
- a monitoring program for channel erosion, verification of the maintenance of water levels in 3PL, and the success of fish habitat enhancements (if any); and
- contingencies in the event of channel failure.

The following summarizes field observations, and the hydraulic analysis and modelling results completed, to assess the stability and capacity of the existing channel outlets and to evaluate the potential impacts, if any, on 3PL water levels during dewatering and mine operations. Also included is a proposed monitoring plan for erosion and verification of lake levels, and design recommendations with respect to the capacity upgrade of the easternmost outlet channel.

1.0 SITE VISIT

A site visit was completed by Golder Associates (Golder) between July 20 and 21, 2007. The objectives of the site visit were to characterize the hydraulic conditions and capacity of the remaining two outlets from 3PL and to identify potential design options for outlet stability and capacity upgrade, if necessary.

A topographic survey of the central and easternmost channels was completed during the site visit to assist with hydraulic analysis of the capacity of the 3PL outlets (Figure 3). Due to time and access constraints, a topographic survey of the westernmost channel was not possible during the site visit, but was subsequently completed by AEM at the request of Golder. The topographic surveys were used during hydraulic analysis of the outlets to evaluate channel capacity and stability, and potential water levels within 3PL following blocking of the westernmost channel.

Limited pebble counts were also performed in the central and easternmost outlets during the site visit in order to assess the stability of the channels when subjected to increased outflow rates. The pebble counts consisted of measuring the b-axis diameter of random samples of outlet substrate materials. The data were used to develop a preliminary estimate of the gradation of the bed surface material. The pebble count results are summarized in Table 1, where D_x is the grain size at which x% of the sampled bed material is finer.

TABLE 1: Pebble Count Results[a]

Station	Sample Count	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{70} (mm)	D_{90} (mm)
Eastern	20	40	60	80	240	600
Central	20	80	200	250	350	690
Combined	40	60	80	200	320	690

[a]D_x – estimated diameter D at which x% of the bed material is finer

It should be noted that due to the limited number of bed material measurements collected, the gradations presented in Table 1 are approximate estimates of actual site conditions. Nevertheless, the bed material substrate measurements support observations made during the site visit indicating that the outlet bed materials are typically characterized by large cobbles and boulders (see field photos provided in Appendix I).

2.0 HYDRAULIC ASSESSMENT

Hydraulic analysis and modelling of the 3PL outlets was conducted to evaluate average hydraulic conditions within the outlets over a range of upstream lake levels. The modelling was completed using the topographic survey collected from site during the field survey and subsequently by AEM. This information, together with the field observations, was used to estimate the discharge capacity and stability of the existing outlets and evaluate the need for a capacity/stability upgrade to the easternmost outlet in order to maintain natural water levels within 3PL.

The hydraulic modelling was completed using HEC-RAS, a one-dimensional hydraulic modelling system developed by the US Army Corps for natural and constructed channels. Three model scenarios were evaluated:

1. existing conditions (i.e., three channel outlets; used for model calibration);

2. blocked conditions (i.e., central and easternmost outlets only; westernmost channel blocked); and;

3. blocked conditions during dewatering (i.e., central and easternmost channels only during dewatering of the northwestern arm of 2PL to 3PL).

For each scenario, five runoff conditions were modelled (100-yr wet through to 100-yr dry). AMEC Consultants (AMEC) provided maximum lake levels for the various runoff conditions based on lake routing model results (AMEC 2005). The HEC-RAS model results for each scenario are provided in Appendix II and are summarized below. In each

scenario, the outlets were modelled simultaneously (i.e., a combined total discharge from all operating outlets) rather than each outlet individually.

2.1 Natural Lake Level Variability

The increase in water elevation within 3PL is dependent on the existing lake volume, the rate of water added to the lake from runoff and dewatering, and the flow capacity of the lake outlets. As indicated in Table 2, the natural annual (spring to fall) variability of 3PL varies from approximately 32 cm for a 100-yr wet year to 17 cm for a 100-yr dry year (AMEC, 2005). The variability between the 100-yr dry fall water level and the 100-yr wet spring water level is approximately 37 cm, while the seasonal variability year-to-year is less dramatic with fall water levels varying by approximately 5 cm across the climate scenarios considered, and spring levels varying by approximately 20 cm.

TABLE 2: Seasonal Variations in 3PL's Water Elevation (Existing Outlet Conditions)

Runoff Condition	Spring Water Level (masl)[a,b]	Fall Water Level (masl)[a,b]	Natural Seasonal Variability (m)
100 yr wet	134.19	133.87	0.32
10 yr wet	134.14	133.85	0.29
Average	134.09	133.84	0.25
10 yr dry	134.03	133.83	0.20
100 yr dry	133.99	133.82	0.17

[a]masl: metres above sea level

[b]AMEC (2005)

2.2 Existing Outlet Conditions

Existing outlet conditions were modelled in order to calibrate the model for the remaining scenarios. A uniform Manning's channel roughness coefficient of 0.15 was assumed based on literature values for channels with similar channel characteristics (Hicks and Manson 1998). Model inputs defining flow roughness and ineffective flow areas were systematically adjusted until computed flow rates for the spring freshet period roughly equalled discharge rates computed using the stage-discharge relationship for the existing outlets reported by AMEC (2005). The estimated maximum (spring) water level in 3PL under each runoff condition was then compared to the model results. The final results of the model calibration process are summarized in Table 3.

TABLE 3: Hydraulic Model Calibration Results

Runoff Condition	Existing Conditions		
	Spring Water Level (masl)[a,b]	Model Predicted Discharge (m^3/s)	Discharge Relationship (m^3/s)[b]
100 yr wet	134.19	5.17	5.14
10 yr wet	134.14	3.68	3.64
Average	134.09	2.58	2.51
10 yr dry	134.03	1.51	1.55
100 yr dry	133.99	1.09	1.10

[a]masl: metres above sea level

[b]AMEC (2005)

2.3 Blocked Western Channel

In order to simulate lake and outlet conditions during mine operations (no dewatering), the westernmost channel was blocked within the calibrated HEC-RAS model and corresponding potential increases in 3PL water levels were evaluated for each of the spring runoff conditions.

The model results indicate relatively minor increases in water levels, on the order of 8 to 15 cm, would be expected during mine operations in the absence of dewatering (Table 4), and that the potential increases would be within the natural annual spring lake level variability for 3PL (Table 2).

TABLE 4: Hydraulic Model Results Blocked Western Channel

Runoff Condition	Spring Water Level Existing Conditions (masl)[a,b]	Model Predicted Discharge Existing Conditions (m^3/s)	Model Predicted Spring Lake Level Blocked Conditions (masl)[a,c]
100 yr wet	134.19	5.17	134.34(+0.15)
10 yr wet	134.14	3.68	134.27 (+0.13)
Average	134.09	2.58	134.22(+0.13)
10 yr dry	134.03	1.51	134.14 (+0.11)
100 yr dry	133.99	1.09	134.07(+0.08)

[a]masl: metres above sea level

[b]AMEC (2005)

[c]water elevation change in metres from existing spring conditions (Table 2) shown in brackets

2.4 Blocked Western Channel during Dewatering

A simple routing model was developed using a daily time step to determine the maximum discharge from 3PL during the dewatering process based on a predicted stage-discharge relationship for the combined central and easternmost outlets as derived from the model results for the blocked westernmost outlet with no dewatering scenario (Section 2.2). The spring lake levels listed in Table 3 were conservatively assumed to represent the initial conditions within the lake at the start of dewatering for the routing exercise.

A total dewatering/routing volume of 14.5 Mm^3 was conservatively assumed in the analysis. Based on available bathymetric data (Golder, 2006, Doc. 309), this represents the estimated total water volume within the East and Bay Zone dikes down to elevation 105 masl. Actual dewatering volumes may be less depending upon the requirement to maintain additional water within the northwest arm of 2PL to satisfy process water makeup requirements at the start of mine operations (MMC, 2007, Doc. 500).

For the purposes of the routing analysis, it was conservatively assumed that the total dewatering volume would occur over 100 days, approximately 3 months, starting during the freshet period (i.e., with peak spring lake levels in 3PL). It is understood that dewatering rates and periods are currently being evaluated by AEM, and that actual dewatering volumes, rates and timing may differ than what has been assumed. However, the above assumptions are considered to be conservative with respect to estimating potential 3PL water levels during dewatering.

The routing was completed assuming the surface area of 3PL would not increase significantly during the dewatering process. This assumption is considered reasonable given the relatively large surface area and volume of 3PL (approximately 33 km^2 and 446 Mm^3, respectively; Golder, 2006, Doc. 309).

The resulting combined peak discharges through the remaining two outlets (i.e., the central and easternmost outlets) and corresponding 3PL levels during dewatering are provided in Table 5. The routing analysis indicates that water levels within 3PL would return to pre-dewatering levels approximately 120 days after the start of dewatering, assuming a 100-day dewatering period (i.e., 20 days after the completion of dewatering).

The peak discharges were input within the calibrated HEC-RAS model to confirm estimated lake levels within 3PL during the dewatering process. The results indicate an estimated rise in the lake levels of approximately 17 cm to 18 cm for the runoff conditions modelled (Table 5). As was the case for the blocked westernmost outlet with

no dewatering scenario (Section 2.3), the model predicted increases shown in Table 5 are within the expected natural annual spring lake level variability for 3PL (see Table 2).

TABLE 5: Hydraulic Model Results with Blocked Western Channel during Dewatering

Runoff Condition	Peak Discharge (m^3/s)	Model Predicted Peak Lake Level (masl)[a,b]
100 yr wet	6.37	134.37 (+0.18)
10 yr wet	4.87	134.33 (+0.19)
Average	3.71	134.28 (+0.19)
10 yr dry	2.52	134.21 (+0.18)
100 yr dry	1.74	134.16 (+0.17)

[a]masl: metres above sea level

[b]water elevation change in metres from existing conditions (Table 2) shown in brackets

For comparison purposes, the routing model was also re-run in order to evaluate the potential effect of dewatering rate/duration on the predicted 3PL water levels. Specifically, the minimum dewatering duration that would result in a predicted water level equal to the peak spring water level for each runoff condition plus the natural spring annual variability (20 cm; see Table 2) was computed.

As indicated in Table 6, the resulting minimum dewatering periods ranged from 98 days during the average condition to 78 days during the 100 yr dry condition.

TABLE 6: Sensitivity of Third Portage Lake Levels to Dewatering Duration

Run off Condition	Peak Discharge (m^3/s)	Maximum Lake levels within Seasonal Variation Lake Level (masl)[a,b]	Minimum Dewatering Duration (days)
100 yr wet	6.84	134.39(+0.20)	90
10 yr wet	5.25	137.34(+0.20)	91
Average	3.78	134.29(+0.20)	98
10 yr dry	2.69	134.23(+0.20)	94
100 yr dry	2.23	134.19(+0.20)	78

[a]masl: metres above sea level

[b]water elevation change in metres from existing conditions (see Table 2) shown in brackets

2.5 Channel Stability

The HEC-RAS model results for each outlet condition and cross-section are presented in Appendices II to IV. It should be noted that the HEC-RAS predicted water velocities provided are cross-sectional averages only. It is expected that there will be localized areas of higher flow velocity within the outlets than the average values modelled.

With increased flows in the central and easternmost outlets resulting from the closure of the westernmost outlet, it is likely there will be regions of higher velocity flow than compared to existing conditions. Nevertheless, it is anticipated that the outlets will remain stable at the modelled flows and depths given the comparatively large size of the materials currently making up the bed and banks of the channels.

The increased flow through the easternmost channel may result initially in fine sediment release into 2PL as previously inactive portions of the channel become active. The easternmost channel is expected to more susceptible to this type of sediment release because of its less defined channel and banks (see field photos in Appendix I).

3.0 DESIGN RECOMMENDATIONS

Based on the results of the hydraulic assessment described above, an increase in the capacity of the easternmost channel is not considered necessary at this time. However, in order to minimize the potential for channel bank erosion and release of fine sediments from the easternmost outlet during high flow events, it is recommended that the vegetation on the banks of the easternmost outlet be removed to minimum of 300mm above the vegetation line and in locations having vegetation where higher flows are expected. Approximate rock placement locations have been provided in Figure 4 but will need to be confirmed in the field. The approximate locations are based on photographs taken during the July site visit and the survey data. The vegetation should be replaced with large sub-angular rock with gradation equal to that shown in Table 7 below for the combined outlets (refer to Figure 4). It is recommended that the rock be sourced from the westernmost channel outlet during construction of the western channel culvert crossing and West Channel Dike. The rock should be temporarily stockpiled for placement during the following winter period prior to dewatering. An estimated 6,600 m^3 of rock would be required assuming a rock layer thickness of 0.7 m.

TABLE 7: Pebble Count Combined Results[a]

Station	Sample Count	D_{10} (mm)	D_{30} (mm)	D_{50} (mm)	D_{70} (mm)	D_{90} (mm)
Combined	40	60	80	200	320	690

[a]D_x – estimated diameter D at which x% of the bed material is finer

It is further recommended that an adaptive management approach involving the monitoring of outlet flow conditions and 3PL lake levels during dewatering and mine operations be adopted. The adaptive management plan would need to allow for potential adjustments to the outlet channel capacity, if required, through select removal of large substrate or accumulated debris, and/or other suitable means, and would need to provide for potential contingencies in the event of outlet channel failure.

Recommended contingencies to be included within the adaptive management plan in the event of outlet channel failure include, but are not necessarily limited to:

- Upgrade to central and/or easternmost outlet channel capacity as required;
- Temporary suspension of dewatering operations until necessary repairs and capacity upgrades are complete;
- Temporary blocking of outlet channel with rock or sand bags and pumping outflow from 3PL to 2PL (may require outsourcing of additional pumps if insufficient number are available on site);
- Stockpiling of large rock and/or sand bags for emergency repairs to the channel bed and banks of existing outlets (additional suitable rock may be available from lake beds exposed during the dewatering process); and
- Construction of a separate outlet channel(s).

The potential impact on fisheries and fish migration of potential adaptive management alternatives or solutions would need to be assessed prior to initiation of any works within the outlets. It understood that monitoring of fish use and migration within the outlets during dewatering and mine operations would be completed under the Meadowbank Gold Project Aquatic Effects Management Program (Cumberland, 2005).

A proposed hydraulic monitoring plan for 3PL lake levels and outlet channel stability is provided in Section 4 below. A general erosion and sediment management plan in the event that monitoring indicates that outlet remediation and/or modification is required is provided in Section 5.

4.0 HYDRAULIC MONITORING PLAN

The following section presents a proposed hydraulic monitoring plan consisting of regular and event based visual inspections and measurements of the outlet channels and 3PL water levels. It is understood that the management and execution of the proposed monitoring plan would be the responsibility of AEM.

The proposed hydraulic monitoring plan has three main components:

- A lake level monitoring plan to monitor lake levels within 3PL and 2PL on a regular and event basis (Section 4.1);

- An outlet flow monitoring plan to monitor water flow within the outlets during the freshet and ice-free periods (Section 4.2); and

- An outlet erosion inspection plan to monitor outlet stability, including potential erosion and/or debris accumulation within the outlets, once the westernmost channel is blocked off (Section 4.3).

The data and observations collected from the hydraulic monitoring plan will be recorded and provided to the Nunavut Water Board (NWB) and Fisheries & Oceans Canada (DFO) annually as a component of the annual monitoring report for the Project. The results will also be used to confirm the model predictions and reassess the need for additional capacity within the outlets. Remediation of any detected problems and necessary repairs will be undertaken as soon as possible in consultation with the NWB and DFO.

As noted above, it is understood that monitoring of fish use and migration within the outlets during dewatering and mine operations would be completed under the Meadowbank Gold Project Aquatic Effects Management Program (Cumberland, 2005).

4.1 Lake Level Monitoring Plan

Lake levels will be monitored by visual inspection of a staff gauge located in both 3PL and 2PL. The staff gauges will be located at sufficient distance from the outlets to limit potential lake level drawdown effects, and will be surveyed in actual elevation to ensure

that the water elevation can be calculated from the reading. Consideration may also be given to the installation of a permanent GPS/pressure transducer and data logger system on the freshwater intake barge or piping in order to continuously record lake levels within 3PL.

The lake level monitoring plan will consist of:

- A regular lake level inspection program during the freshet and ice-free periods (Section 4.1.1); and

- An event based lake level inspection program following heavy rainfall or prolonged rainfall events (Section 4.2.2).

4.1.1 Regular Lake Level Inspection Program

The regular inspection program during the freshet and ice-free period will be based on scheduled visual readings of the staff gauge twice weekly during periods of high flow in freshet (mid-May to June) and weekly during the remainder of the ice free period prior to freeze up. Visual inspection and recording of lake levels within both 3PL and 2PL will be completed.

4.1.2 Event Based Lake Level Inspection Program

The event based lake level inspection program will take place following heavy rainfall or prolonged rainfall events as they occur.

4.2 Outlet Flow Monitoring Plan

Water flow within the outlets will be monitored through the development of a stage-discharge relationship(s) that is correlated to observe water levels within 3PL. A manual flow measurement program consisting of a defined measurement location within each outlet will be established in order to construct the stage-discharge relationship required to convert the measured 3PL lake levels to discharge rates. Potential manual flow measurement locations will be evaluated based on observed hydraulic conditions within the channels.

When safe to do so, the manual flow measurements will be completed using a hand-held velocity probe. Early in the mine life, more frequent manual flow measurements will be completed in order to cover the full range of anticipated flows within the channel and develop the stage-discharge relationships. Flow measurements by salt dilution or dye

tracer techniques will be considered during peak flow events when it is unsafe to wade the channels.

It is anticipated that manual flow measurement will be comparatively straightforward for the central outlet. The easternmost channel however, is characterized by relatively broad, shallow flow and emerging boulders and cobbles; conditions that are not conducive to establishing a suitable flow measurement station. It this case, salt dilution or dye tracer techniques may be necessary across the entire range of anticipated flows in order to develop a stage-discharge relationship for the channel.

The practicality of installing continuous flow monitoring station within each of the outlets is considered to be low given the existing channel characteristics and the significant set-up and maintenance requirements anticipated for an arctic environment. As noted in Section 4.1 however, consideration may be given to the installation of a permanent GPS/pressure transducer and data logger system on the freshwater intake barge or piping to continuously record lake levels within 3PL. If necessary, this data can be used in conjunction with the stage-discharge relationships described above to derive a corresponding continuous flow record for each of the outlets.

4.3 Outlet Erosion Inspection Plan

An erosion inspection plan for the central and easternmost outlets will be established to monitor outlet stability once the westernmost channel is blocked off. Specifically, the central and eastern outlets will be visually inspected to confirm that no significant erosion of the channel bed or channel banks, or accumulation of debris (including ice blocks), has occurred since the last inspection that warrants remediation, and that the channel capacity is adequate for the anticipated discharges.

The outlet erosion inspection program has two components:

- A regular inspection program to confirm that no significant erosion, sediment transport, or debris accumulation is occurring (Section 4.3.1); and

- An event inspection program to observe the impacts of large flows on erosion and outlet stability during the ice free period (Section 4.3.2).

4.3.1 Regular Erosion Inspection Program

The regular inspection program during the snowmelt and ice free period will be based on a schedule of visual inspections twice weekly during the freshet period (approximately mid-May to June) and minimum every two weeks during the remainder of the ice-free period prior to freeze up.

Significant debris accumulations observed within the outlets will be removed as soon as possible in order to minimize potential reductions in channel capacity.

4.3.2 Event based Erosion Inspection Program

Additional visual inspections of each outlet will be completed following heavy rainfall or prolonged rainfall events as they occur.

5.0 EROSION AND SEDIMENT CONTROL PLAN

The following preliminary sediment and erosion plan has been developed in the event that monitoring indicates that remediation or modification of the central and/or easternmost outlets is required. A task specific erosion and sediment control plan will be developed prior to the initiation of any construction works within the outlets. The plan will incorporate where feasible, best management practices for controlling the potential release of sediment and/or sediment-laden water during all site access and construction activities, and confirm that appropriate erosion control measures will be in place prior to commencement of any construction activities within or nearby the outlets.

The following general sediment and erosion control practices are applicable to the prevailing site conditions during equipment access and construction activities:

- Construction activities within the wetted channel will be kept to a minimum;
- Any required stockpiles of materials will be located away from watercourses and stabilized against erosion as soon as possible by temporarily covering with a geotextile or by placing of a perimeter sediment control structure;
- Disturbed areas will be minimized as much as possible;
- Silt fences will be installed to control the release of eroded sediments from the site during non-frozen conditions;

- Turbidity curtains (or suitable alternative) will be installed if appropriate upstream and downstream of site during the construction period;

- Additional erosion and sediment control structures to contain eroded sediments on site will be installed as required;

- Upon completion of construction all accumulated sediment, debris, and work-related material will be removed for proper disposal at approved locations; and

- Regular site inspections will be conducted during the construction activities to determine compliance with the above.

6.0 CLOSURE

We trust the information contained in this document meets your requirements at this time. Should you have any questions relating to the above, please do not hesitate to contact the undersigned.

The reader is referred to the "Important Information and Limitations of This Report" which follows the text but forms an integral part of this document.

GOLDER ASSOCIATES LTD.

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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

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The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, and safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

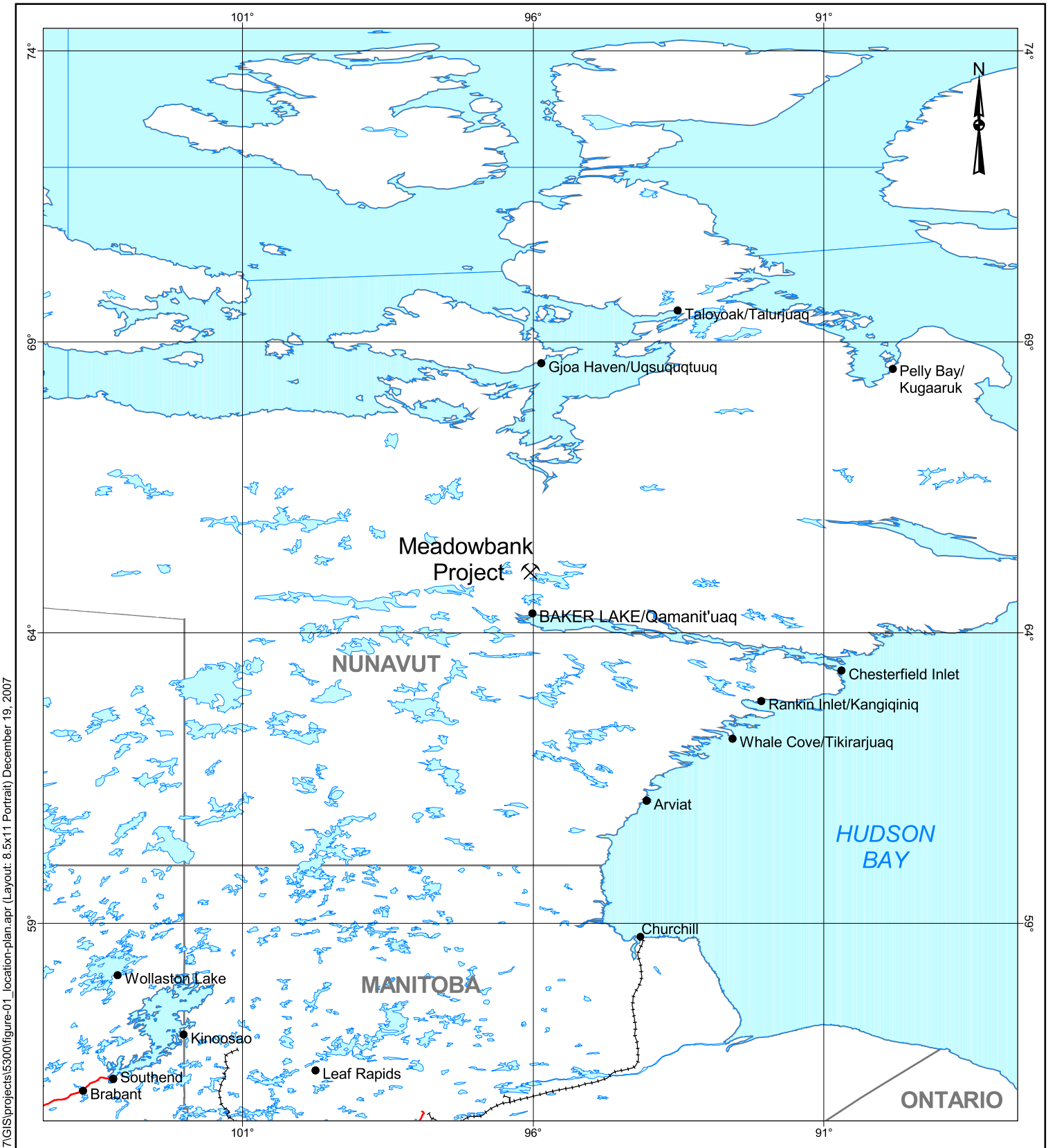
Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.



LEGEND

- Meadowbank Project
- Town/Village
- Provincial Border
- Water
- Primary Highway
- Railroad

200 0 200 Kilometers

Scale - 1:10,000,000

REFERENCE

Base digital data obtained from ESRI Inc.,
DATUM: WGS84 PROJECTION: Geographic

PROJECT

AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

MEADOWBANK PROJECT LOCATION PLAN

Golder Associates

PROJECT No. 07-1413-0047			SCALE AS SHOWN	REV. 0
DESIGN	DW	19 Dec. 2007		
GIS	CDB	19 Dec. 2007		
CHECK				
REVIEW				

FIGURE 1

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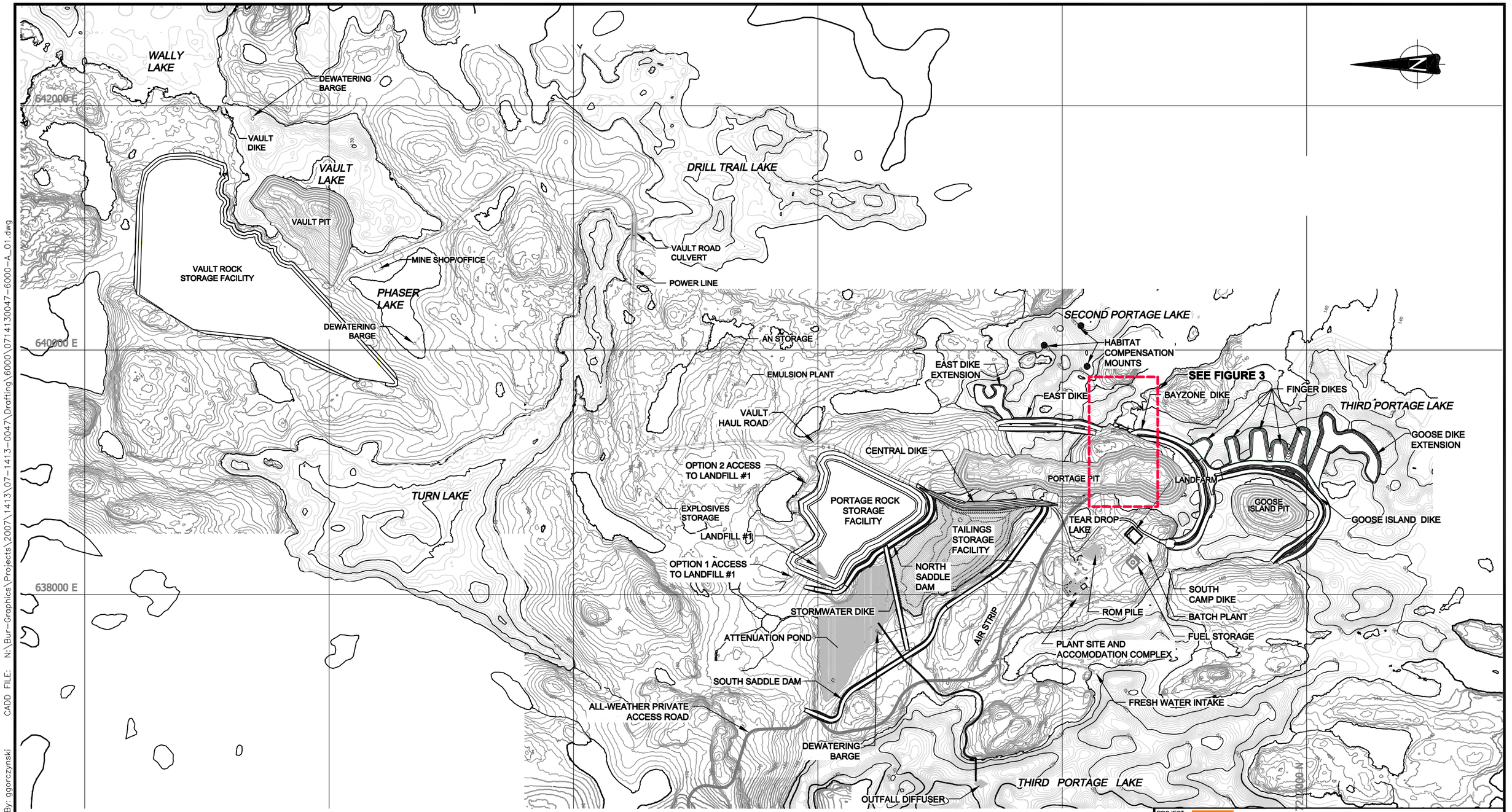


NOTES

1) ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2) ALL ELEVATIONS ARE IN METRES ABOVE SEA LEVEL (masl), UNLESS OTHERWISE NOTED.
3) GRID REFERENCE: NAD 83, UTM ZONE 14
4) CONTOUR INFORMATION ON LAND SUPPLIED BY MEADOWBANK MINING CORPORATION.
5) CONTOURS BELOW LAKE SURFACE ARE BASED ON BATHYMETRIC SURVEYS BY GOLDER ASSOCIATES LTD., 2002, 2003, 2006.
6) LAKE CONTOURS ARE BASED ON REGIONAL PLAN MAPS OF LAKE SURFACE ELEVATIONS:
   2ND PORTAGE LAKE = 133.1M,
   3RD PORTAGE LAKE = 134.1M
7) TOPOGRAPHIC CONTOUR INTERVAL 2M.
8) BATHYMETRIC CONTOUR INTERVAL 1M.

NOT FOR CONSTRUCTION

PROJECT

AEM AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

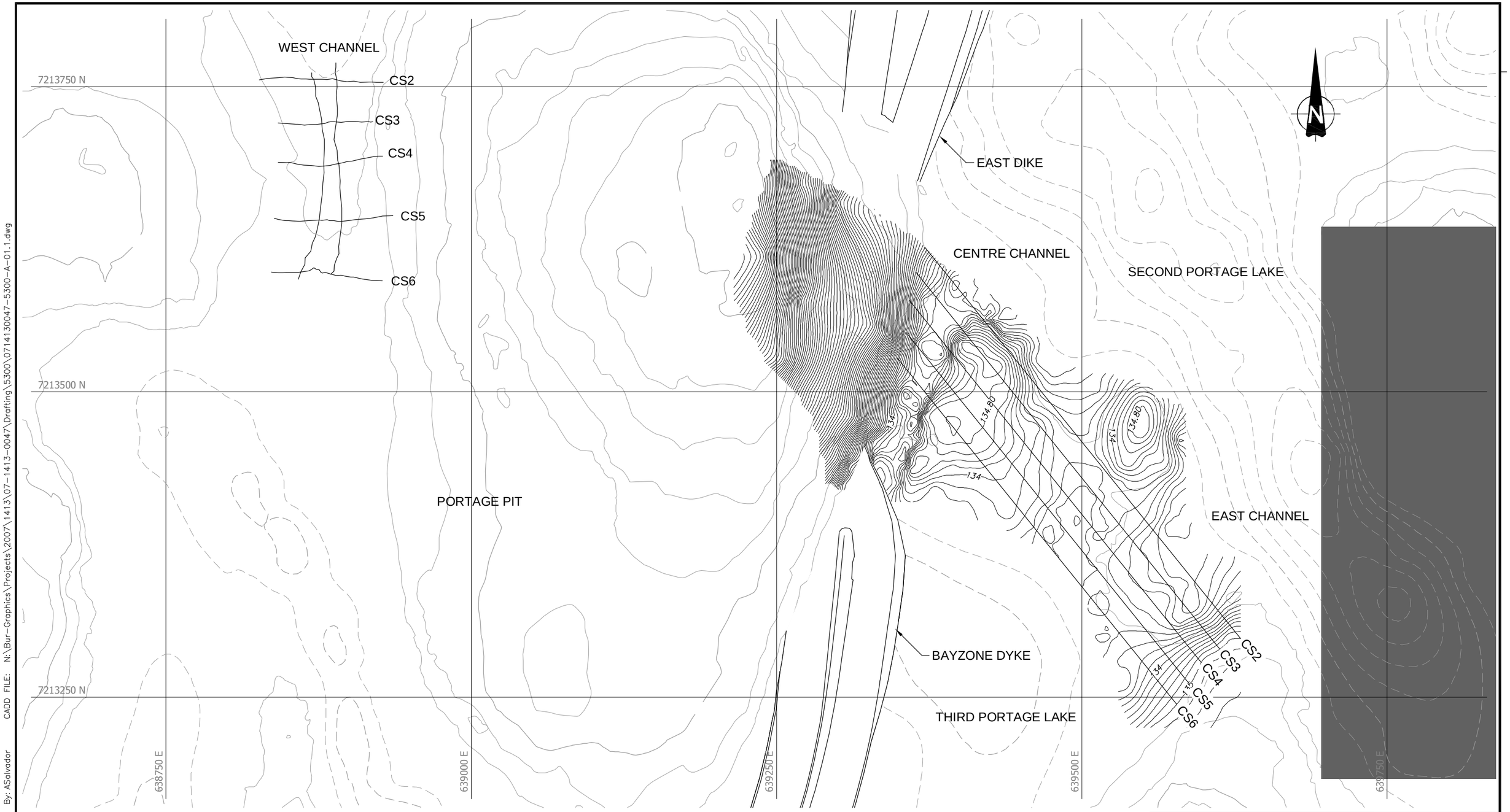
SITE PLAN

Golder Associates

PROJECT No. 07-1413-0047			FILE No.		
DESIGN	JV	27NOV07	SCALE AS SHOWN	REV.	–
CADD	SRR	27NOV07			
CHECK					
REVIEW					

FIGURE 2

REVISION DATE: 07/12/11 10:49AM By: ggorczynski CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\Drafting\6000\071413047-6000-A_01.dwg



0 30 60 90 120 150

Scale in Metres

NOTES

1) ALL DIMENSIONS AND ELEVATIONS IN METRES.
2) WEST CHANNEL SURVEY PROVIDED BY AEM 23 OCTOBER, 2007.
3) EAST AND CENTRAL CHANNEL SURVEY PERFORMED BY GOLDER 21 JULY, 2007.

NOT FOR CONSTRUCTION

PROJECT

AEM **AGNICO-EAGLE MINES LIMITED**
MEADOWBANK DIVISION

TITLE

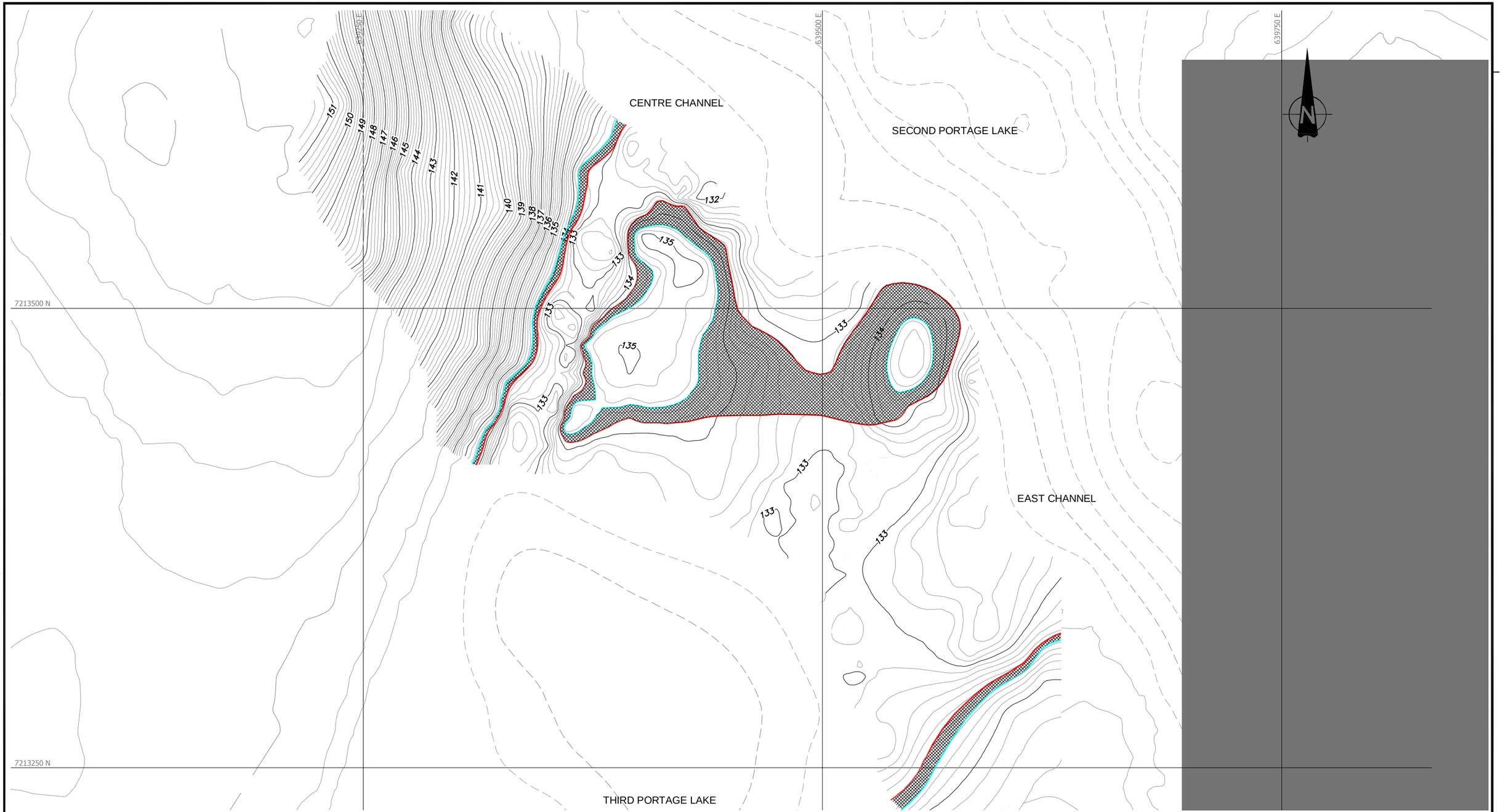
HEC-RAS SECTIONS IN PLAN

Golder Associates

PROJECT No.		07-1413-0047	FILE No.	
DESIGN	MP	18DEC07	SCALE AS SHOWN	REV.
CADD	EA	18DEC07		
CHECK				
REVIEW				

FIGURE 3

REVISION DATE: 08/01/10 11:10AM By: ASalvador CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\Drafting\5300\0714130047-5300-A-01.1.dwg



CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0047\Drafting\5300\0714130047-5300-A-04.dwg

REVISION DATE: 08/03/06 02:20PM By: eabella

LEGEND

- LOWER ROCK PLACEMENT LIMIT
- UPPER ROCK PLACEMENT LIMIT
- ROCK PLACEMENT AREA (TO BE CONFIRMED IN FIELD BASED ON OBSERVED GROUND CONDITIONS)

NOTES

1) ALL DIMENSIONS AND ELEVATIONS IN METRES.
2) EAST AND CENTRAL CHANNEL SURVEY PERFORMED BY GOLDER 21 JULY, 2007.

0 20 40 60 80 100

Scale in Metres

NOT FOR CONSTRUCTION

PROJECT

AEM AGNICO-EAGLE MINES LIMITED
MEADOWBANK DIVISION

TITLE

ROCK PLACEMENT LOCATION

Golder Associates

PROJECT No.		07-1413-0047	FILE No.	
DESIGN	MP	18DEC07	SCALE AS SHOWN	REV.
CADD	EA	18DEC07		
CHECK				
REVIEW				

FIGURE 4

APPENDIX I

SITE VISIT PHOTOGRAPHS – JULY 20 AND 21, 2007

REVISION DATE: BY: FILE:

Outlet Substrates

Eastern Outlet

PROJECT	**MEADOWBANK MINING CORPORATION** **MEADOWBANK GOLD PROJECT** **THIRD PORTAGE LAKE OUTLETS**
TITLE	**Outlet Substrate**

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--		**FIGURE I-1**	
CHECK	--			
REVIEW				

REVISION DATE: BY: FILE:

Looking South and Southeast with a View of the Easternmost Outlet and Third Portage Lake

Eastern Outlet

PROJECT	**MEADOWBANK MINING CORPORATION** **MEADOWBANK GOLD PROJECT** **THIRD PORTAGE LAKE OUTLETS**				
TITLE	**Easternmost Outlet**				
Golder Associates	PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
	DESIGN	--	11DEC07	SCALE NTS	REV.
	CADD	--		**FIGURE I-2**	
	CHECK	--			
	REVIEW				

REVISION DATE: BY: FILE:

Looking to the East towards Central and Easternmost Outlets

Central Outlet

Central Outlet

PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

View East with Central Outlets

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--			
REVIEW				

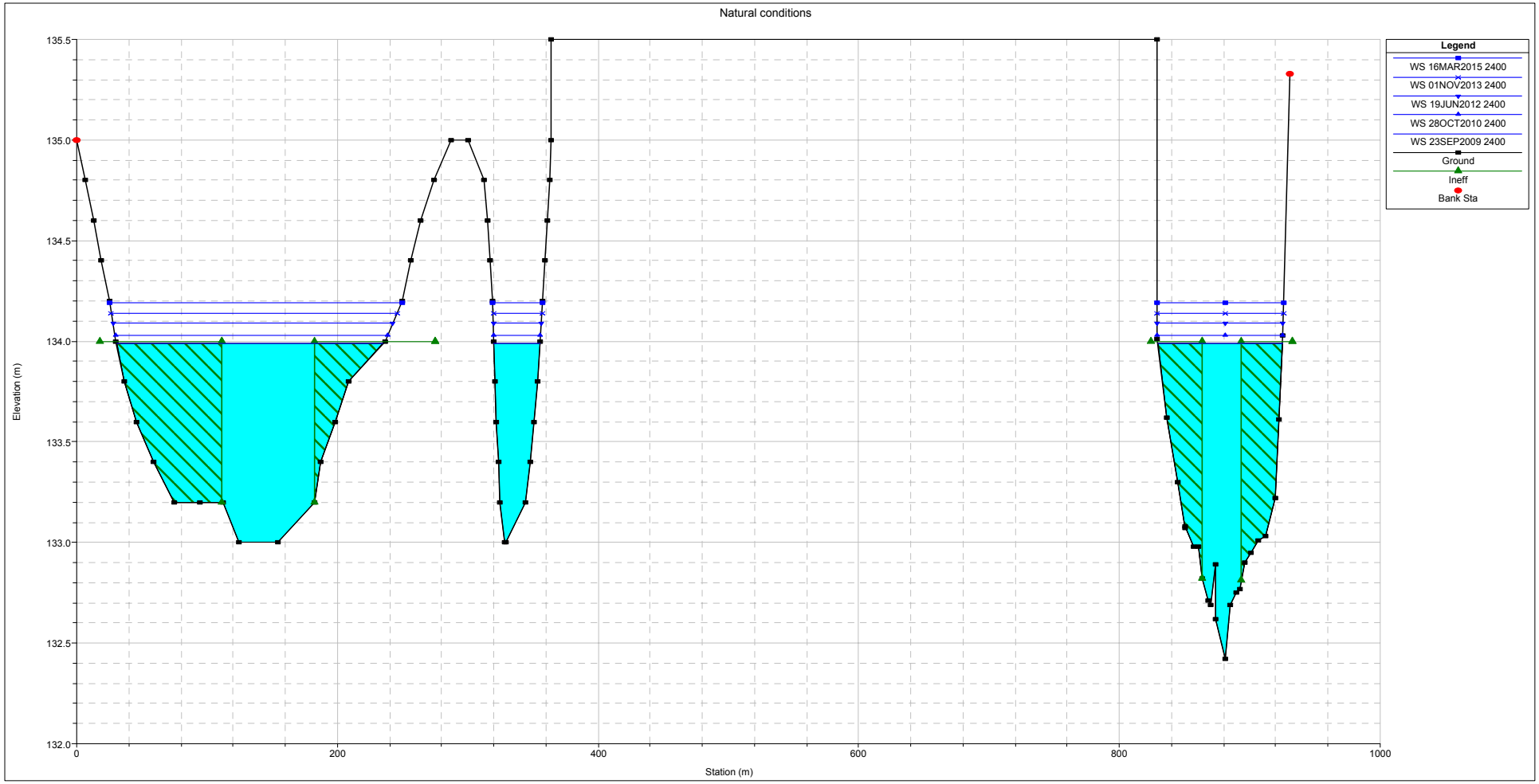
FIGURE I-3

APPENDIX II

HEC-RAS MODEL RESULTS
EXISTING OUTLET CONDITIONS

REVISION DATE: BY: FILE:

Natural Conditions
Water Elevations: 134.19m, 134.14m, 134.09m, 134.03m, 133.99m



PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Natural Conditions
Cross Section 6 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE II-1**	
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.98	132.42	1.55	133.97	133.97	0.0056	0.01	127.85	330.52	0.00
	1.02	132.42	1.56	133.98	133.98	0.0058	0.01	129.22	332.64	0.00
100 yr Dry Channel	1.09	132.42	1.57	133.99	133.99	0.0061	0.01	130.60	334.76	0.00
	1.18	132.42	1.58	134.00	134.00	0.0065	0.01	131.98	336.88	0.00
	1.28	132.42	1.59	134.01	134.01	0.0028	0.01	251.00	338.23	0.00
	1.39	132.42	1.60	134.02	134.02	0.0029	0.01	254.40	339.44	0.00
10 Yr Dry Channel	1.51	132.42	1.61	134.03	134.03	0.0030	0.01	257.82	340.65	0.00
	1.67	132.42	1.62	134.04	134.04	0.0031	0.01	261.26	341.82	0.00
	2.00	132.42	1.63	134.05	134.05	0.0032	0.01	264.70	342.99	0.00
	2.13	132.42	1.64	134.06	134.06	0.0033	0.01	268.05	344.12	0.00
	2.27	132.42	1.65	134.07	134.07	0.0034	0.01	271.52	345.29	0.00
	2.44	132.42	1.66	134.08	134.08	0.0034	0.01	275.00	346.46	0.00
Average Channel	2.58	132.42	1.67	134.09	134.09	0.0035	0.01	278.49	347.63	0.00
	2.70	132.42	1.68	134.10	134.10	0.0035	0.01	281.99	348.80	0.00
	2.83	132.42	1.69	134.11	134.11	0.0036	0.01	285.40	349.93	0.00
	2.98	132.42	1.70	134.12	134.12	0.0036	0.01	288.93	351.10	0.00
	3.60	132.42	1.71	134.13	134.13	0.0037	0.01	292.46	352.27	0.00
10 Yr Wet Channel	3.68	132.42	1.72	134.14	134.14	0.0037	0.01	296.01	353.44	0.00
	3.77	132.42	1.73	134.15	134.15	0.0038	0.01	299.57	354.61	0.00
	3.86	132.42	1.74	134.16	134.16	0.0038	0.01	303.14	355.78	0.00
	3.95	132.42	1.75	134.17	134.17	0.0038	0.01	306.62	356.91	0.00
	4.52	132.42	1.76	134.18	134.18	0.0039	0.01	310.22	358.08	0.01
100Yr Wet Channel	5.17	132.42	1.77	134.19	134.19	0.0039	0.02	313.83	359.25	0.01
	5.39	132.42	1.78	134.20	134.20	0.0040	0.02	317.44	360.42	0.01
	6.26	132.42	1.79	134.21	134.21	0.0040	0.02	321.07	361.25	0.01

PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE
NATURAL HEC-RAS MODEL RESULTS FOR CROSS SECTION 6

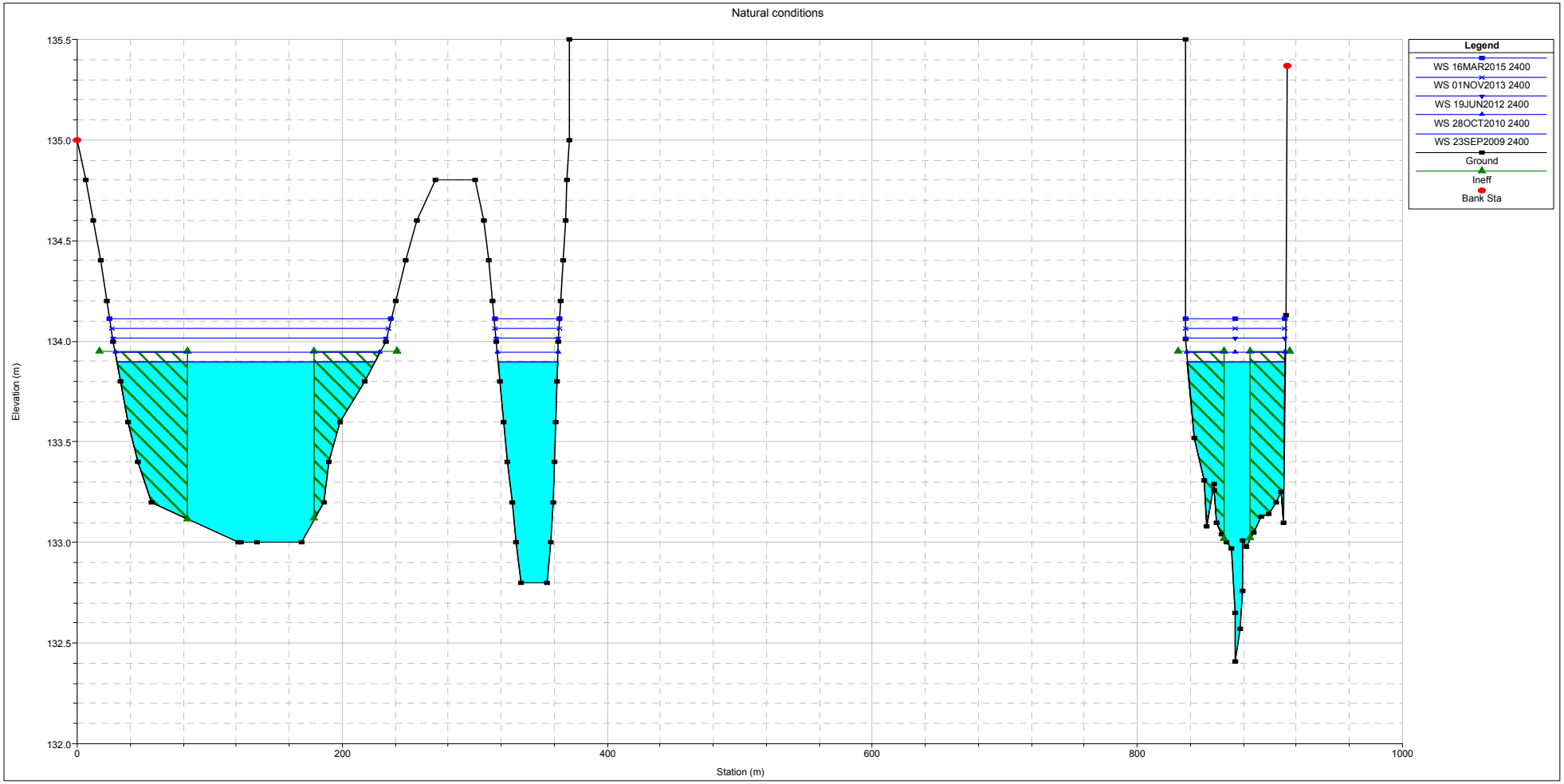
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS / REV.
CADD	--		FIGURE II-2
CHECK	--		
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Natural Conditions
Water Elevations: 134.19m, 134.14m, 134.09m, 134.03m, 133.99m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Natural Conditions
Cross Section 5 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--			
REVIEW				

FIGURE II-3

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	0.98	132.41	1.47	133.88	133.88	0.0053	0.01	138.21	310.90	0.00
	1.02	132.41	1.48	133.89	133.89	0.0055	0.01	139.42	311.95	0.00
100 yr Dry Channel	1.09	132.41	1.49	133.90	133.90	0.0058	0.01	140.89	313.22	0.00
	1.18	132.41	1.50	133.91	133.91	0.0062	0.01	142.84	314.90	0.00
	1.28	132.41	1.51	133.92	133.92	0.0065	0.01	144.75	316.54	0.00
	1.39	132.41	1.52	133.93	133.93	0.0067	0.01	146.71	318.22	0.00
10 Yr Dry Channel	1.51	132.41	1.54	133.95	133.95	0.0070	0.01	148.68	319.91	0.00
	1.67	132.41	1.55	133.96	133.96	0.0038	0.01	241.28	321.54	0.00
	2.00	132.41	1.56	133.97	133.97	0.0038	0.01	245.21	323.23	0.00
	2.13	132.41	1.57	133.98	133.98	0.0039	0.01	248.77	324.74	0.00
	2.27	132.41	1.58	133.99	133.99	0.0040	0.01	252.34	326.26	0.00
	2.44	132.41	1.59	134.00	134.00	0.0040	0.01	256.03	327.66	0.00
Average Channel	2.58	132.41	1.61	134.02	134.02	0.0041	0.01	259.53	328.67	0.00
	2.70	132.41	1.62	134.03	134.03	0.0041	0.01	263.14	329.63	0.00
	2.83	132.41	1.63	134.04	134.04	0.0042	0.01	266.56	330.54	0.00
	2.98	132.41	1.64	134.05	134.05	0.0042	0.01	269.99	331.45	0.00
	3.60	132.41	1.65	134.06	134.06	0.0043	0.01	273.33	332.33	0.00
10 Yr Wet Channel	3.68	132.41	1.66	134.07	134.07	0.0043	0.01	276.37	333.13	0.00
	3.77	132.41	1.67	134.08	134.08	0.0044	0.01	279.42	333.93	0.00
	3.86	132.41	1.67	134.08	134.08	0.0044	0.01	282.48	334.73	0.00
	3.95	132.41	1.68	134.09	134.09	0.0045	0.01	285.44	335.50	0.00
	4.52	132.41	1.69	134.10	134.10	0.0046	0.02	288.51	336.30	0.01
100Yr Wet Channel	5.17	132.41	1.70	134.11	134.11	0.0046	0.02	291.59	337.11	0.01
	5.39	132.41	1.71	134.12	134.12	0.0047	0.02	294.68	337.91	0.01
	6.26	132.41	1.72	134.13	134.13	0.0047	0.02	297.77	338.71	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

NATURAL HEC-RAS MODEL RESULTS FOR CROSS SECTION 5

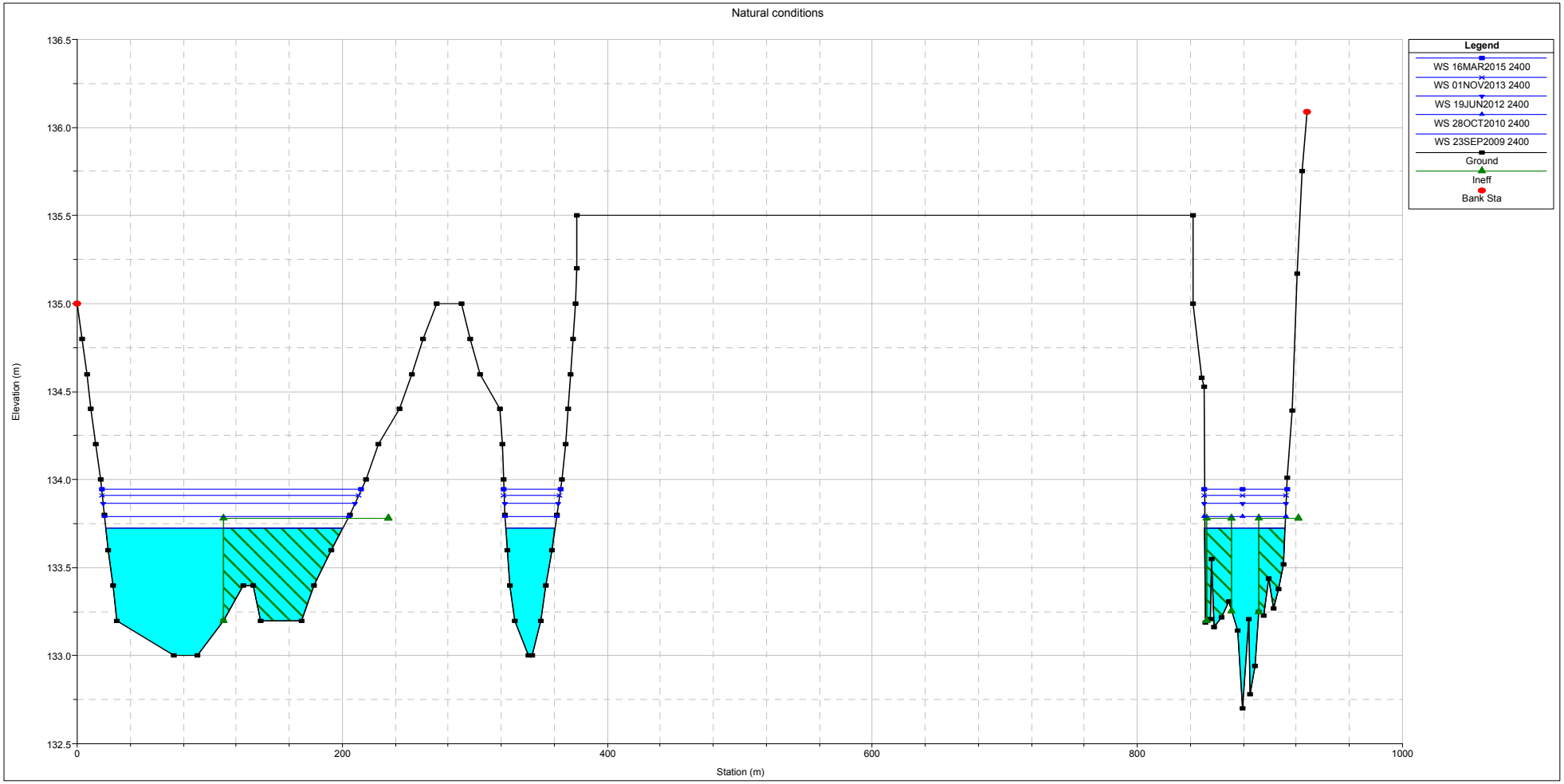
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		FIGURE II-4
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Natural Conditions
Water Elevations: 134.19m, 134.14m, 134.09m, 134.03m, 133.99m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Natural Conditions
Cross Section 4 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE II-5**	
REVIEW				

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	0.98	132.70	1.00	133.70	133.70	0.0256	0.01	83.19	273.35	0.00
	1.02	132.70	1.01	133.71	133.71	0.0260	0.01	84.85	274.64	0.01
100 yr Dry Channel	1.09	132.70	1.02	133.72	133.72	0.0263	0.01	86.78	276.14	0.01
	1.18	132.70	1.04	133.74	133.74	0.0266	0.01	89.30	278.09	0.01
	1.28	132.70	1.06	133.76	133.76	0.0268	0.01	91.70	279.94	0.01
	1.39	132.70	1.07	133.77	133.77	0.0268	0.01	94.15	281.83	0.01
10 Yr Dry Channel	1.51	132.70	1.09	133.79	133.79	0.0127	0.01	155.89	283.64	0.00
	1.67	132.70	1.10	133.80	133.80	0.0125	0.01	160.31	285.40	0.00
	2.00	132.70	1.12	133.82	133.82	0.0123	0.01	164.67	287.03	0.01
	2.13	132.70	1.13	133.83	133.83	0.0124	0.01	167.92	288.23	0.01
	2.27	132.70	1.14	133.84	133.84	0.0124	0.01	171.08	289.40	0.01
	2.44	132.70	1.15	133.85	133.85	0.0124	0.01	174.36	290.61	0.01
Average Channel	2.58	132.70	1.16	133.86	133.86	0.0124	0.01	177.55	291.78	0.01
	2.70	132.70	1.17	133.87	133.87	0.0123	0.01	180.85	292.99	0.01
	2.83	132.70	1.18	133.88	133.88	0.0123	0.02	183.98	294.13	0.01
	2.98	132.70	1.19	133.89	133.89	0.0124	0.02	186.67	295.10	0.01
	3.60	132.70	1.20	133.90	133.90	0.0125	0.02	188.93	295.92	0.01
10 Yr Wet Channel	3.68	132.70	1.21	133.91	133.91	0.0127	0.02	191.00	296.67	0.01
	3.77	132.70	1.22	133.92	133.92	0.0129	0.02	193.18	297.45	0.01
	3.86	132.70	1.22	133.92	133.92	0.0130	0.02	195.36	298.23	0.01
	3.95	132.70	1.23	133.93	133.93	0.0132	0.02	197.63	299.05	0.01
	4.52	132.70	1.24	133.94	133.94	0.0133	0.02	199.91	299.86	0.01
100Yr Wet Channel	5.17	132.70	1.25	133.95	133.95	0.0134	0.03	202.29	300.71	0.01
	5.39	132.70	1.25	133.95	133.95	0.0135	0.03	204.77	301.59	0.01
	6.26	132.70	1.26	133.96	133.96	0.0136	0.03	207.25	302.46	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

NATURAL HEC-RAS MODEL RESULTS FOR CROSS SECTION 4

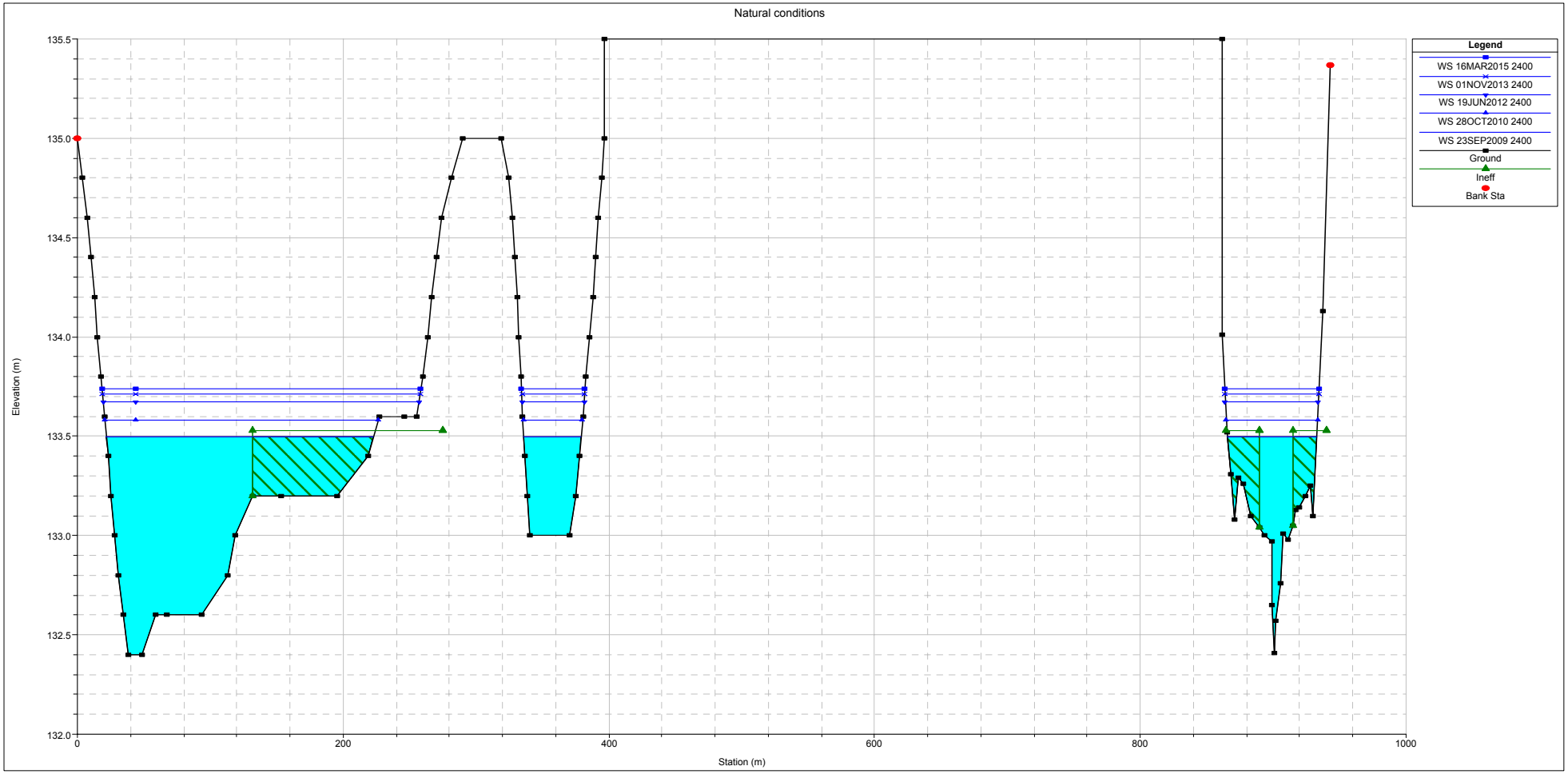
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS / REV.
CADD	--		FIGURE II-6
CHECK	--		
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Natural Conditions
Water Elevations: 134.19m, 134.14m, 134.09m, 134.03m, 133.99m



PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Natural Conditions
Cross Section 3 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--		**FIGURE II-7**	
CHECK	--			
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.98	132.40	1.07	133.47	133.47	0.0113	0.01	114.79	308.55	0.00
	1.02	132.40	1.08	133.48	133.48	0.0112	0.01	117.55	310.06	0.00
100 yr Dry Channel	1.09	132.40	1.10	133.50	133.50	0.0112	0.01	120.75	311.81	0.00
	1.18	132.40	1.12	133.52	133.52	0.0112	0.01	124.78	313.99	0.00
	1.28	132.40	1.14	133.54	133.54	0.0090	0.01	171.37	315.84	0.00
	1.39	132.40	1.16	133.56	133.56	0.0087	0.01	177.94	317.70	0.00
10 Yr Dry Channel	1.51	132.40	1.18	133.58	133.58	0.0085	0.01	184.15	319.44	0.00
	1.67	132.40	1.20	133.60	133.60	0.0092	0.01	190.24	349.41	0.00
	2.00	132.40	1.22	133.62	133.62	0.0089	0.01	196.53	350.61	0.00
	2.13	132.40	1.23	133.63	133.63	0.0088	0.01	201.56	351.57	0.00
	2.27	132.40	1.25	133.65	133.65	0.0086	0.01	206.39	352.49	0.00
	2.44	132.40	1.26	133.66	133.66	0.0085	0.01	211.23	353.41	0.00
Average Channel	2.58	132.40	1.27	133.67	133.67	0.0083	0.01	216.08	354.32	0.00
	2.70	132.40	1.29	133.69	133.69	0.0082	0.01	220.73	355.20	0.00
	2.83	132.40	1.30	133.70	133.70	0.0080	0.01	225.29	356.06	0.01
	2.98	132.40	1.31	133.71	133.71	0.0082	0.01	227.89	356.55	0.01
	3.60	132.40	1.31	133.71	133.71	0.0084	0.02	229.20	356.79	0.01
10 Yr Wet Channel	3.68	132.40	1.31	133.71	133.71	0.0087	0.02	230.29	357.00	0.01
	3.77	132.40	1.32	133.72	133.72	0.0090	0.02	231.59	357.24	0.01
	3.86	132.40	1.32	133.72	133.72	0.0092	0.02	233.22	357.55	0.01
	3.95	132.40	1.33	133.73	133.73	0.0094	0.02	234.97	357.88	0.01
	4.52	132.40	1.33	133.73	133.73	0.0095	0.02	237.04	358.26	0.01
100Yr Wet Channel	5.17	132.40	1.34	133.74	133.74	0.0097	0.02	239.12	358.65	0.01
	5.39	132.40	1.35	133.75	133.75	0.0098	0.02	241.42	359.08	0.01
	6.26	132.40	1.35	133.75	133.75	0.0100	0.03	243.83	359.53	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

NATURAL HEC-RAS MODEL RESULTS FOR CROSS SECTION 3

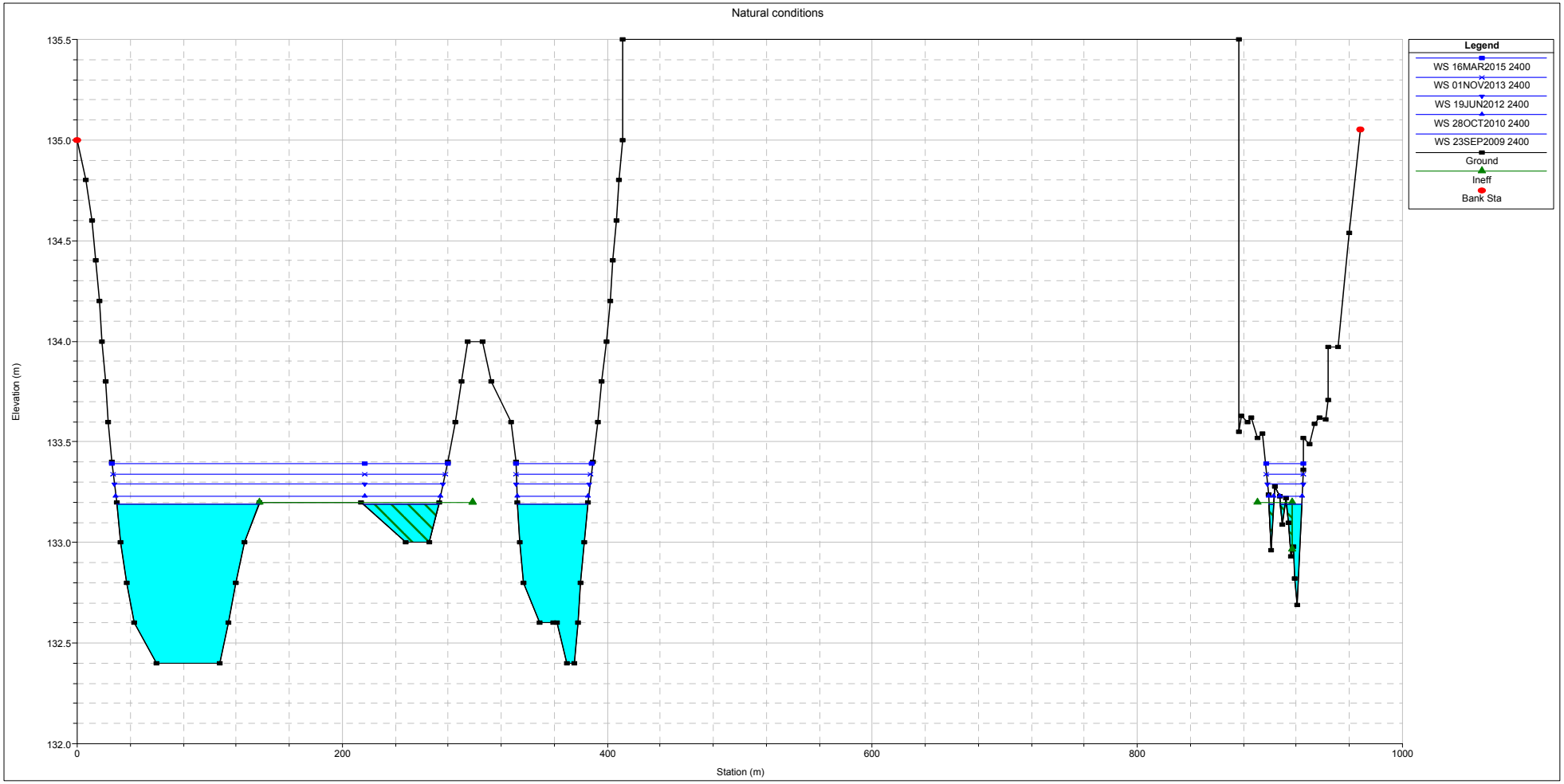
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS / REV.
CADD	--		FIGURE II-8
CHECK	--		
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Natural Conditions
Water Elevations: 134.19m, 134.14m, 134.09m, 134.03m, 133.99m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Natural Conditions
Cross Section 2 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--			
REVIEW				

FIGURE II-9

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	0.98	132.40	0.77	133.17	133.17	0.0224	0.01	90.78	228.68	0.00
	1.02	132.40	0.78	133.18	133.18	0.0229	0.01	92.45	232.47	0.00
100 yr Dry Channel	1.09	132.40	0.79	133.19	133.19	0.0236	0.01	94.13	236.26	0.00
	1.18	132.40	0.80	133.20	133.20	0.0248	0.01	95.82	240.05	0.01
	1.28	132.40	0.81	133.21	133.21	0.0423	0.01	108.12	318.07	0.01
	1.39	132.40	0.82	133.22	133.22	0.0421	0.01	111.23	319.44	0.01
10 Yr Dry Channel	1.51	132.40	0.83	133.23	133.23	0.0416	0.01	114.44	320.49	0.01
	1.67	132.40	0.84	133.24	133.24	0.0411	0.01	117.68	322.19	0.01
	2.00	132.40	0.85	133.25	133.25	0.0405	0.02	120.93	323.96	0.01
	2.13	132.40	0.86	133.26	133.26	0.0397	0.02	124.19	325.73	0.01
	2.27	132.40	0.87	133.27	133.27	0.0388	0.02	127.48	327.50	0.01
	2.44	132.40	0.88	133.28	133.28	0.0381	0.02	130.68	329.22	0.01
Average Channel	2.58	132.40	0.89	133.29	133.29	0.0371	0.02	134.00	330.14	0.01
	2.70	132.40	0.90	133.30	133.30	0.0361	0.02	137.32	331.06	0.01
	2.83	132.40	0.91	133.31	133.31	0.0351	0.02	140.66	331.97	0.01
	2.98	132.40	0.92	133.32	133.32	0.0343	0.02	144.00	332.90	0.01
	3.60	132.40	0.93	133.33	133.33	0.0337	0.02	147.25	333.79	0.01
10 Yr Wet Channel	3.68	132.40	0.94	133.34	133.34	0.0329	0.02	150.62	334.71	0.01
	3.77	132.40	0.95	133.35	133.35	0.0321	0.02	153.99	335.63	0.01
	3.86	132.40	0.96	133.36	133.36	0.0314	0.02	157.36	336.55	0.01
	3.95	132.40	0.97	133.37	133.37	0.0307	0.02	160.76	337.41	0.01
	4.52	132.40	0.98	133.38	133.38	0.0301	0.03	164.05	338.24	0.01
100Yr Wet Channel	5.17	132.40	0.99	133.39	133.39	0.0295	0.03	167.46	339.10	0.01
	5.39	132.40	1.00	133.40	133.40	0.0289	0.03	170.87	339.97	0.01
	6.26	132.40	1.01	133.41	133.41	0.0284	0.04	174.30	340.87	0.02

PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE
NATURAL HEC-RAS MODEL RESULTS FOR CROSS SECTION 2

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS / REV.
CADD	--		**FIGURE II-10**
CHECK	--		
REVIEW			

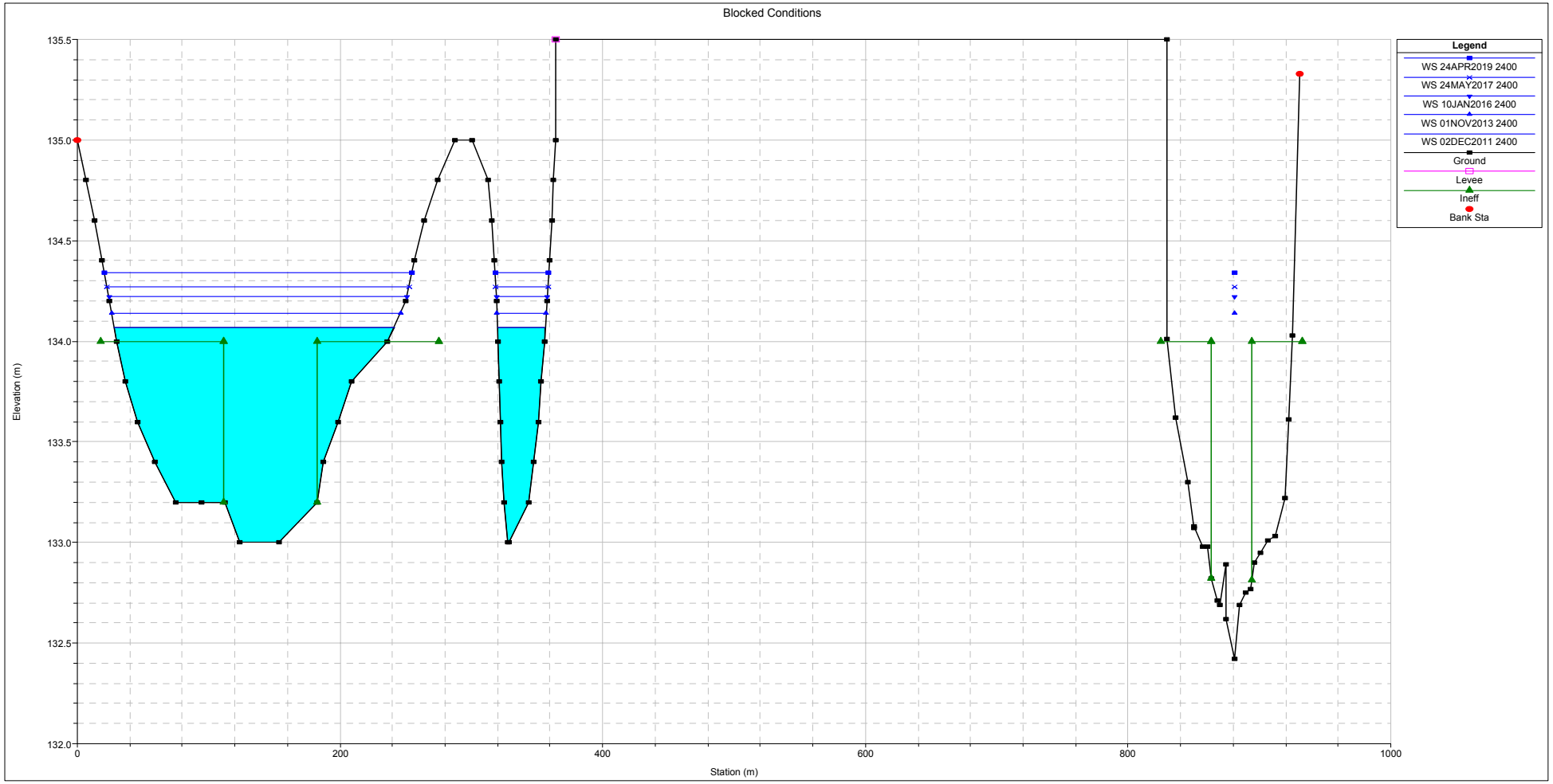
REVISION DATE: BY: FILE:

APPENDIX III

HEC-RAS MODEL RESULTS
BLOCKED WESTERNMOST CHANNEL (NO DEWATERING)

REVISION DATE: BY: FILE:

Blocked Conditions
Water Elevations: 134.34m, 134.27m, 134.22m, 134.14m, 133.07m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions
Cross Section 6 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--		**FIGURE III-1**	
CHECK	--			
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.99	132.42	1.63	134.05	134.05	0.00	0.01	168.66	246.80	0.00
	1.03	132.42	1.64	134.06	134.06	0.01	0.01	171.08	247.89	0.00
100 yr Dry Blocked Channel	1.09	132.42	1.65	134.07	134.07	0.01	0.01	173.58	249.02	0.00
	1.14	132.42	1.66	134.08	134.08	0.01	0.01	176.09	250.15	0.00
	1.20	132.42	1.67	134.09	134.09	0.01	0.01	178.61	251.27	0.00
	1.26	132.42	1.68	134.10	134.10	0.01	0.01	181.14	252.40	0.00
	1.32	132.42	1.69	134.11	134.11	0.01	0.01	183.61	253.49	0.00
	1.39	132.42	1.70	134.12	134.12	0.01	0.01	186.16	254.62	0.00
	1.47	132.42	1.71	134.13	134.13	0.01	0.01	188.73	255.75	0.00
10 Yr Dry Blocked Channel	1.55	132.42	1.72	134.14	134.14	0.01	0.01	191.31	256.87	0.00
	1.66	132.42	1.73	134.15	134.15	0.01	0.01	193.90	258.00	0.00
	1.81	132.42	1.74	134.16	134.16	0.01	0.01	196.50	259.13	0.00
	2.03	132.42	1.75	134.17	134.17	0.01	0.01	199.03	260.22	0.00
	2.12	132.42	1.76	134.18	134.18	0.01	0.01	201.65	261.35	0.00
	2.23	132.42	1.77	134.19	134.19	0.01	0.01	204.29	262.47	0.00
	2.34	132.42	1.78	134.20	134.20	0.01	0.01	206.94	263.60	0.00
	2.48	132.42	1.79	134.21	134.21	0.01	0.01	209.59	264.39	0.00
Average Blocked Channel	2.58	132.42	1.80	134.22	134.22	0.01	0.01	212.17	265.16	0.00
	2.69	132.42	1.81	134.23	134.23	0.01	0.01	214.84	265.95	0.00
	2.80	132.42	1.82	134.24	134.24	0.01	0.01	217.52	266.74	0.00
	2.92	132.42	1.83	134.25	134.25	0.01	0.01	220.21	267.52	0.00
	3.55	132.42	1.84	134.26	134.26	0.01	0.02	222.90	268.31	0.01
10 Yr Wet Blocked Channel	3.62	132.42	1.85	134.27	134.27	0.01	0.02	225.53	269.08	0.01
	3.70	132.42	1.86	134.28	134.28	0.01	0.02	228.24	269.87	0.01
	3.78	132.42	1.87	134.29	134.29	0.01	0.02	230.96	270.66	0.01
	3.85	132.42	1.88	134.30	134.30	0.01	0.02	233.68	271.45	0.01
	3.93	132.42	1.89	134.31	134.31	0.01	0.02	236.41	272.24	0.01
	4.04	132.42	1.90	134.32	134.32	0.01	0.02	239.07	273.01	0.01
	5.07	132.42	1.91	134.33	134.33	0.01	0.02	241.82	273.80	0.01
100Yr Wet Blocked Channel	5.25	132.42	1.92	134.34	134.34	0.01	0.02	244.58	274.58	0.01
	5.44	132.42	1.93	134.35	134.35	0.01	0.02	247.35	275.37	0.01
	6.26	132.42	1.94	134.36	134.36	0.01	0.03	250.12	276.16	0.01
	6.37	132.42	1.95	134.37	134.37	0.01	0.03	252.82	276.93	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED HEC-RAS MODEL RESULTS FOR CROSS SECTION 6

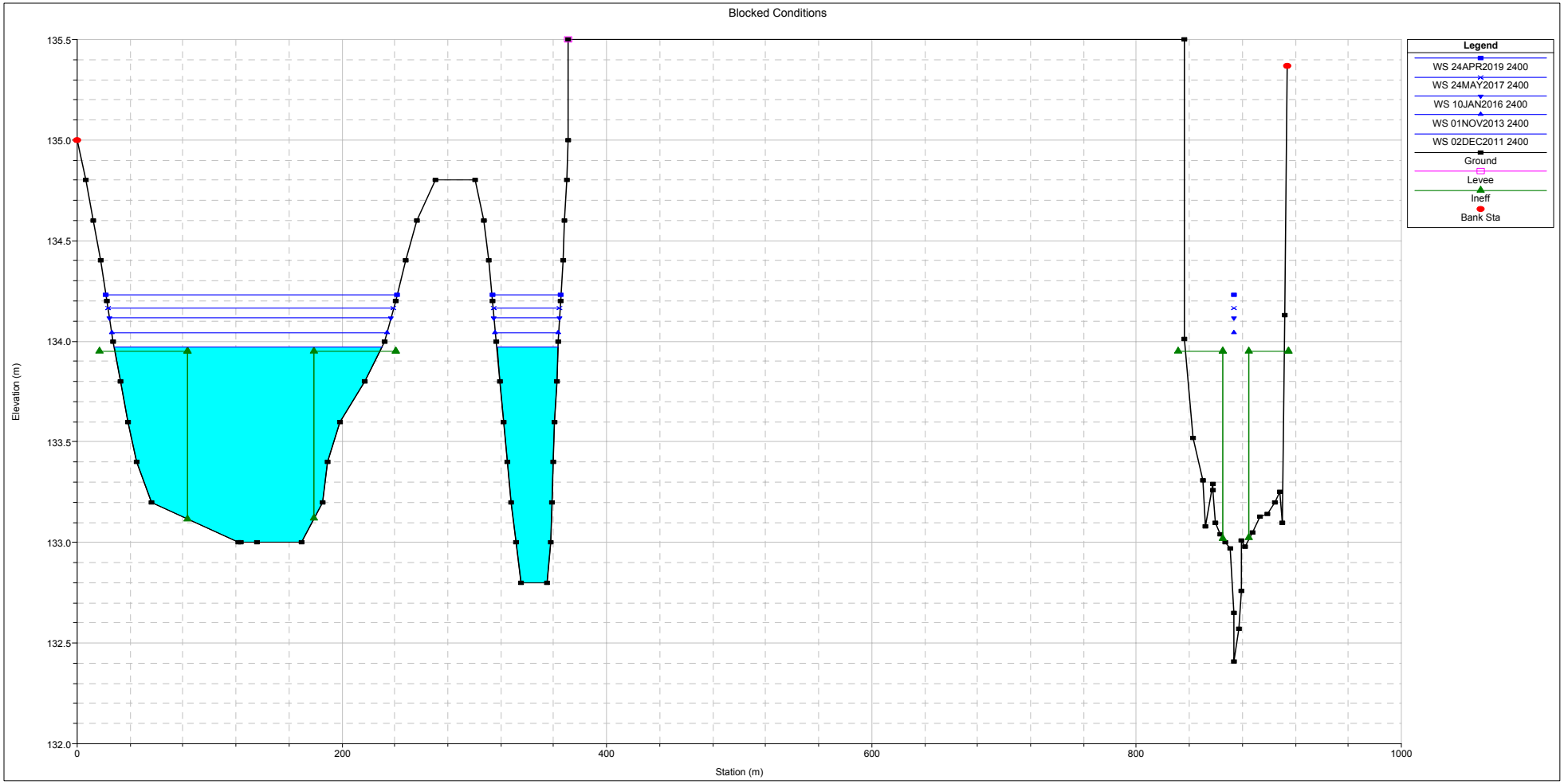
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		FIGURE III-2
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions
Water Elevations: 134.34m, 134.27m, 134.22m, 134.14m, 133.07m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE **Blocked Conditions**
Cross Section 5 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE III-3**	
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.99	132.41	1.54	133.95	133.95	0.00	0.01	178.28	245.80	0.00
	1.03	132.41	1.55	133.96	133.96	0.00	0.01	180.83	247.07	0.00
100 yr Dry Blocked Channel	1.09	132.41	1.56	133.97	133.97	0.00	0.01	183.55	248.42	0.00
	1.14	132.41	1.57	133.98	133.98	0.00	0.01	186.21	249.73	0.00
	1.20	132.41	1.58	133.99	133.99	0.00	0.01	188.88	251.04	0.00
	1.26	132.41	1.59	134.00	134.00	0.00	0.01	191.57	252.22	0.00
	1.32	132.41	1.60	134.01	134.01	0.00	0.01	194.11	253.09	0.00
	1.39	132.41	1.61	134.02	134.02	0.00	0.01	196.81	254.01	0.00
	1.47	132.41	1.62	134.03	134.03	0.00	0.01	199.37	254.88	0.00
10 Yr Dry Blocked Channel	1.55	132.41	1.63	134.04	134.04	0.00	0.01	201.78	255.70	0.00
	1.66	132.41	1.64	134.05	134.05	0.00	0.01	204.13	256.49	0.00
	1.81	132.41	1.65	134.06	134.06	0.00	0.01	206.55	257.31	0.00
	2.03	132.41	1.66	134.07	134.07	0.00	0.01	208.83	258.07	0.00
	2.12	132.41	1.67	134.08	134.08	0.00	0.01	211.27	258.89	0.00
	2.23	132.41	1.68	134.09	134.09	0.01	0.01	213.64	259.68	0.00
	2.34	132.41	1.69	134.10	134.10	0.01	0.01	216.10	260.50	0.00
	2.48	132.41	1.70	134.11	134.11	0.01	0.01	218.49	261.29	0.00
Average Blocked Channel	2.58	132.41	1.71	134.12	134.12	0.01	0.01	220.80	262.05	0.00
	2.69	132.41	1.72	134.13	134.13	0.01	0.01	223.12	262.82	0.00
	2.80	132.41	1.73	134.14	134.14	0.01	0.01	225.53	263.61	0.00
	2.92	132.41	1.73	134.14	134.14	0.01	0.01	227.86	264.37	0.00
	3.55	132.41	1.74	134.15	134.15	0.01	0.02	230.28	265.16	0.01
10 Yr Wet Blocked Channel	3.62	132.41	1.75	134.16	134.16	0.01	0.02	232.63	265.93	0.01
	3.70	132.41	1.76	134.17	134.17	0.01	0.02	235.06	266.72	0.01
	3.78	132.41	1.77	134.18	134.18	0.01	0.02	237.59	267.54	0.01
	3.85	132.41	1.78	134.19	134.19	0.01	0.02	240.04	268.33	0.01
	3.93	132.41	1.79	134.20	134.20	0.01	0.02	242.58	269.15	0.01
	4.04	132.41	1.80	134.21	134.21	0.01	0.02	244.96	269.91	0.01
	5.07	132.41	1.81	134.22	134.22	0.01	0.02	247.51	270.72	0.01
100Yr Wet Blocked Channel	5.25	132.41	1.82	134.23	134.23	0.01	0.02	250.07	271.53	0.01
	5.44	132.41	1.83	134.24	134.24	0.01	0.02	252.64	272.35	0.01
	6.26	132.41	1.84	134.25	134.25	0.01	0.02	255.14	273.13	0.01
	6.37	132.41	1.84	134.25	134.26	0.01	0.02	257.64	273.92	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED HEC-RAS MODEL RESULTS FOR CROSS SECTION 5

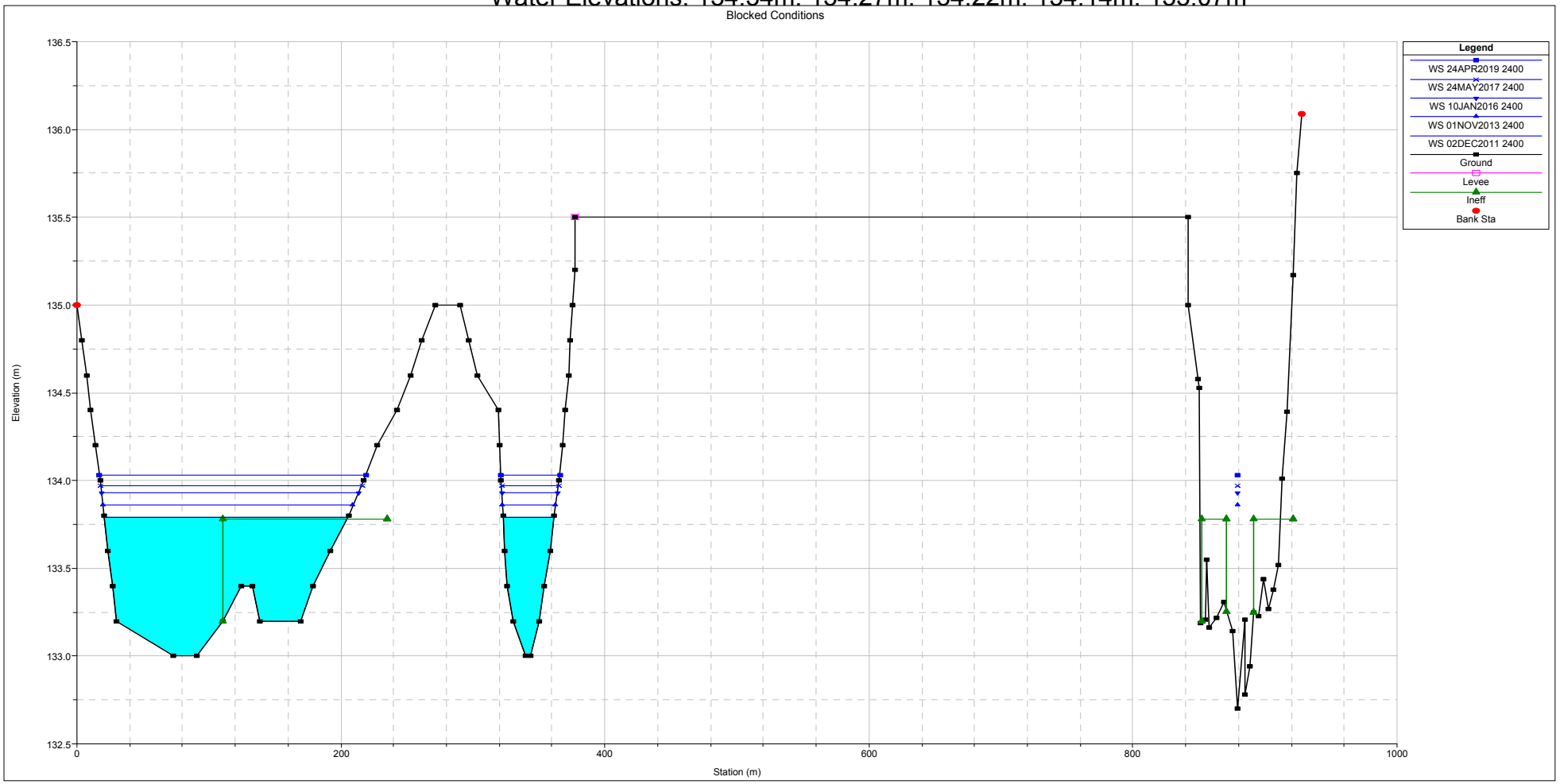
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		**FIGURE III-4**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions
Water Elevations: 134.34m, 134.27m, 134.22m, 134.14m, 133.07m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions
Cross Section 4 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--		**FIGURE III-5**	
CHECK	--			
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.99	132.70	1.06	133.76	133.76	0.03	0.01	76.12	219.63	0.01
	1.03	132.70	1.07	133.77	133.77	0.03	0.01	77.75	221.00	0.01
100 yr Dry Blocked Channel	1.09	132.70	1.09	133.79	133.79	0.02	0.01	119.90	222.40	0.00
	1.14	132.70	1.10	133.80	133.80	0.02	0.01	122.69	223.74	0.00
	1.20	132.70	1.11	133.81	133.81	0.02	0.01	125.42	224.96	0.00
	1.26	132.70	1.12	133.82	133.82	0.01	0.01	128.17	226.17	0.00
	1.32	132.70	1.13	133.83	133.83	0.01	0.01	130.87	227.35	0.00
	1.39	132.70	1.15	133.85	133.85	0.01	0.01	133.30	228.41	0.00
	1.47	132.70	1.16	133.86	133.86	0.01	0.01	135.53	229.38	0.00
10 Yr Dry Blocked Channel	1.55	132.70	1.16	133.86	133.86	0.01	0.01	137.56	230.26	0.00
	1.66	132.70	1.17	133.87	133.87	0.01	0.01	139.39	231.05	0.00
	1.81	132.70	1.18	133.88	133.88	0.02	0.01	141.23	231.84	0.01
	2.03	132.70	1.19	133.89	133.89	0.02	0.01	143.00	232.59	0.01
	2.12	132.70	1.20	133.90	133.90	0.02	0.01	144.77	233.35	0.01
	2.23	132.70	1.20	133.90	133.90	0.02	0.02	146.62	234.14	0.01
	2.34	132.70	1.21	133.91	133.91	0.02	0.02	148.48	234.93	0.01
	2.48	132.70	1.22	133.92	133.92	0.02	0.02	150.42	235.74	0.01
Average Blocked Channel	2.58	132.70	1.23	133.93	133.93	0.02	0.02	152.22	236.50	0.01
	2.69	132.70	1.23	133.93	133.93	0.02	0.02	154.17	237.32	0.01
	2.80	132.70	1.24	133.94	133.94	0.02	0.02	156.12	238.14	0.01
	2.92	132.70	1.25	133.95	133.95	0.02	0.02	158.16	238.98	0.01
	3.55	132.70	1.26	133.96	133.96	0.02	0.02	160.13	239.80	0.01
10 Yr Wet Blocked Channel	3.62	132.70	1.27	133.97	133.97	0.02	0.02	162.11	240.62	0.01
	3.70	132.70	1.28	133.98	133.98	0.02	0.02	164.16	241.47	0.01
	3.78	132.70	1.29	133.99	133.99	0.02	0.02	166.30	242.35	0.01
	3.85	132.70	1.29	133.99	133.99	0.02	0.02	168.45	243.23	0.01
	3.93	132.70	1.30	134.00	134.00	0.02	0.02	170.53	244.03	0.01
	4.04	132.70	1.31	134.01	134.01	0.02	0.02	172.61	244.77	0.01
	5.07	132.70	1.32	134.02	134.02	0.02	0.03	174.78	245.52	0.01
100Yr Wet Blocked Channel	5.25	132.70	1.33	134.03	134.03	0.02	0.03	176.95	246.28	0.01
	5.44	132.70	1.34	134.04	134.04	0.02	0.03	179.13	247.03	0.01
	6.26	132.70	1.35	134.05	134.05	0.02	0.03	181.32	247.79	0.01
	6.37	132.70	1.36	134.06	134.06	0.02	0.03	183.51	248.54	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED HEC-RAS MODEL RESULTS FOR CROSS SECTION 4

Golder Associates

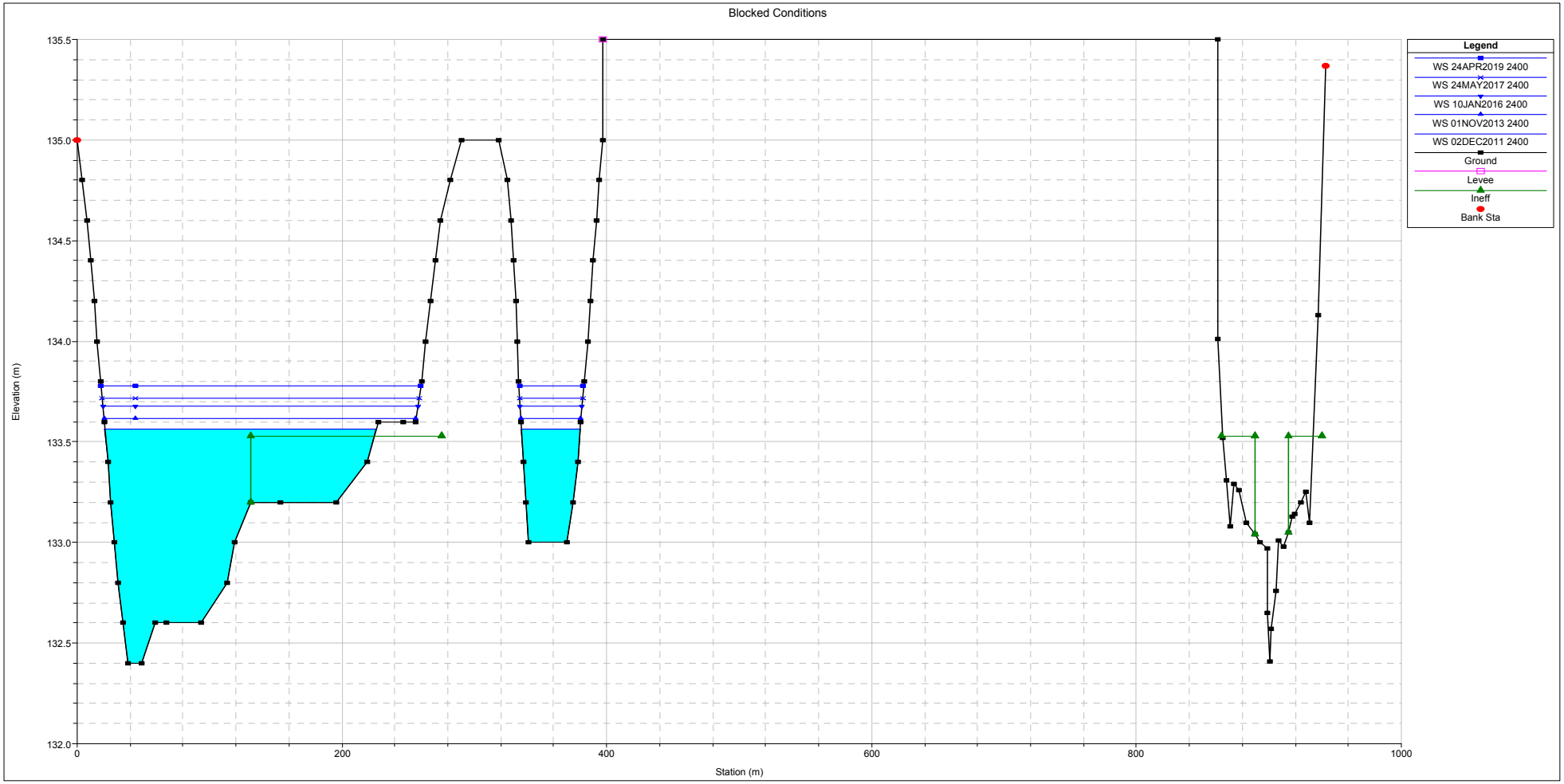
PROJECT No. 07-1413-0047			PHASE / TASK No. 5300		
DESIGN	--		SCALE NTS	REV.	
CADD	--				
CHECK	--				
REVIEW					

FIGURE III-6

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions
Water Elevations: 134.34m, 134.27m, 134.22m, 134.14m, 133.07m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions
Cross Section 3 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--			
REVIEW				

FIGURE III-7

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.99	132.40	1.11	133.51	133.51	0.01	0.01	106.64	244.88	0.00
	1.03	132.40	1.12	133.52	133.52	0.01	0.01	108.97	246.05	0.00
100 yr Dry Blocked Channel	1.09	132.40	1.14	133.54	133.54	0.01	0.01	138.98	247.21	0.00
	1.14	132.40	1.15	133.55	133.55	0.01	0.01	142.61	248.33	0.00
	1.20	132.40	1.17	133.57	133.57	0.01	0.01	146.17	249.43	0.00
	1.26	132.40	1.18	133.58	133.58	0.01	0.01	149.68	250.50	0.00
	1.32	132.40	1.20	133.60	133.60	0.01	0.01	153.04	251.53	0.00
	1.39	132.40	1.20	133.60	133.60	0.01	0.01	155.64	280.46	0.00
	1.47	132.40	1.21	133.61	133.61	0.01	0.01	157.61	280.84	0.00
10 Yr Dry Blocked Channel	1.55	132.40	1.22	133.62	133.62	0.01	0.01	159.49	281.20	0.00
	1.66	132.40	1.22	133.62	133.62	0.01	0.01	161.12	281.52	0.00
	1.81	132.40	1.23	133.63	133.63	0.01	0.01	162.84	281.85	0.00
	2.03	132.40	1.24	133.64	133.64	0.01	0.01	164.56	282.18	0.01
	2.12	132.40	1.24	133.64	133.64	0.01	0.01	166.45	282.54	0.01
	2.23	132.40	1.25	133.65	133.65	0.01	0.01	168.35	282.90	0.01
	2.34	132.40	1.26	133.66	133.66	0.01	0.01	170.33	283.28	0.01
	2.48	132.40	1.26	133.66	133.66	0.01	0.01	172.32	283.66	0.01
Average Blocked Channel	2.58	132.40	1.27	133.67	133.67	0.01	0.01	174.48	284.07	0.01
	2.69	132.40	1.28	133.68	133.68	0.01	0.02	176.73	284.50	0.01
	2.80	132.40	1.29	133.69	133.69	0.01	0.02	179.08	284.94	0.01
	2.92	132.40	1.30	133.70	133.70	0.01	0.02	181.42	285.39	0.01
	3.55	132.40	1.30	133.70	133.70	0.01	0.02	183.86	285.85	0.01
10 Yr Wet Blocked Channel	3.62	132.40	1.31	133.71	133.71	0.01	0.02	186.22	286.29	0.01
	3.70	132.40	1.32	133.72	133.72	0.01	0.02	188.66	286.75	0.01
	3.78	132.40	1.33	133.73	133.73	0.01	0.02	191.20	287.23	0.01
	3.85	132.40	1.34	133.74	133.74	0.01	0.02	193.74	287.71	0.01
	3.93	132.40	1.35	133.75	133.75	0.01	0.02	196.28	288.18	0.01
	4.04	132.40	1.36	133.76	133.76	0.01	0.02	198.83	288.66	0.01
	5.07	132.40	1.37	133.77	133.77	0.01	0.03	201.39	289.14	0.01
100Yr Wet Blocked Channel	5.25	132.40	1.37	133.77	133.77	0.01	0.03	203.94	289.62	0.01
	5.44	132.40	1.38	133.78	133.78	0.01	0.03	206.60	290.11	0.01
	6.26	132.40	1.39	133.79	133.79	0.01	0.03	209.25	290.60	0.01
	6.37	132.40	1.40	133.80	133.80	0.01	0.03	211.82	291.08	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED HEC-RAS MODEL RESULTS FOR CROSS SECTION 3

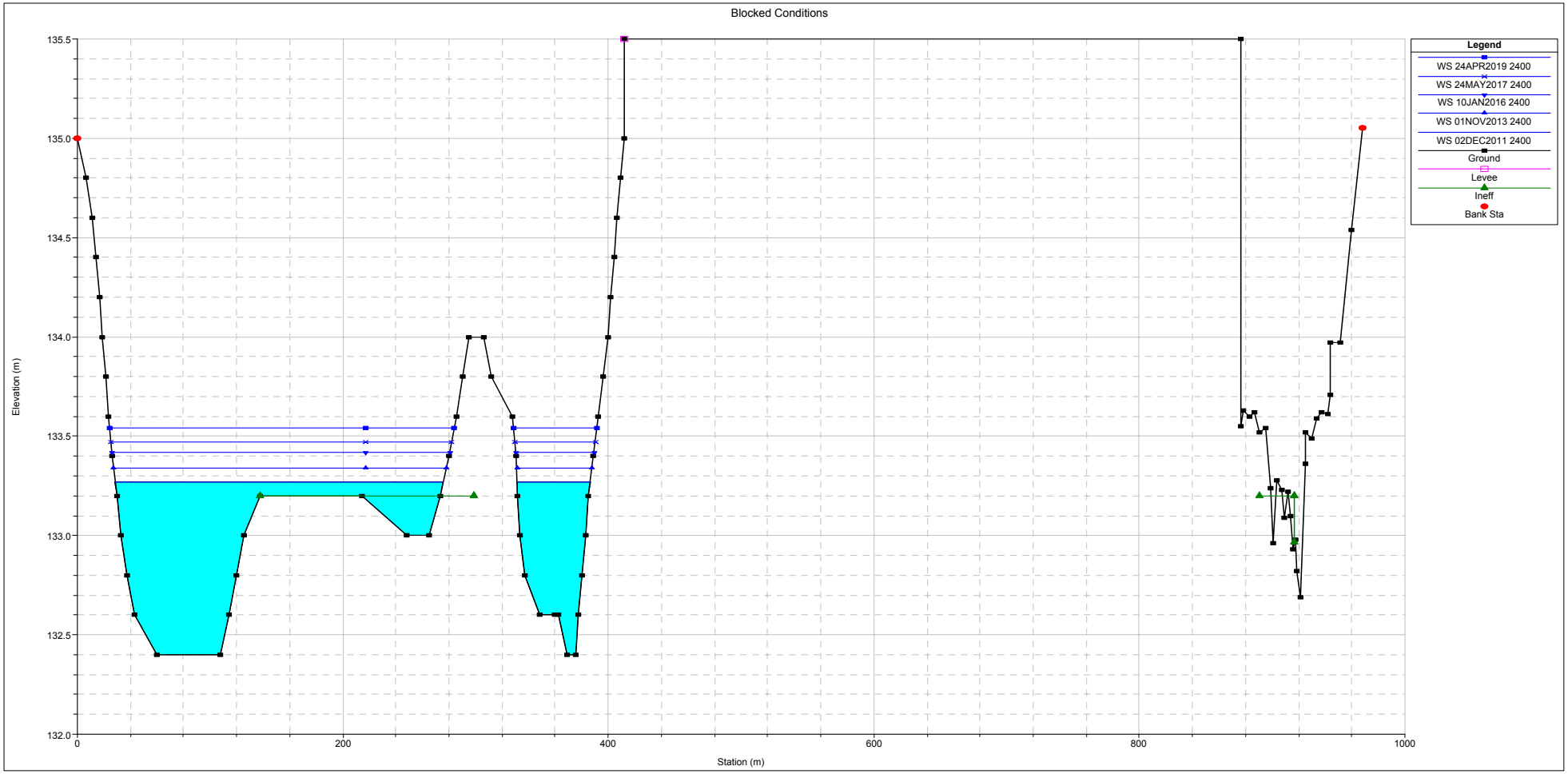
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS / REV.
CADD	--		
CHECK	--		**FIGURE III-8**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions
Water Elevations: 134.34m, 134.27m, 134.22m, 134.14m, 133.07m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions
Cross Section 2 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--		**FIGURE III-9**	
CHECK	--			
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	0.99	132.40	1.11	133.51	133.51	0.01	0.01	106.64	244.88	0.00
	1.03	132.40	1.12	133.52	133.52	0.01	0.01	108.97	246.05	0.00
100 yr Dry Blocked Channel	1.09	132.40	1.14	133.54	133.54	0.01	0.01	138.98	247.21	0.00
	1.14	132.40	1.15	133.55	133.55	0.01	0.01	142.61	248.33	0.00
	1.20	132.40	1.17	133.57	133.57	0.01	0.01	146.17	249.43	0.00
	1.26	132.40	1.18	133.58	133.58	0.01	0.01	149.68	250.50	0.00
	1.32	132.40	1.20	133.60	133.60	0.01	0.01	153.04	251.53	0.00
	1.39	132.40	1.20	133.60	133.60	0.01	0.01	155.64	280.46	0.00
	1.47	132.40	1.21	133.61	133.61	0.01	0.01	157.61	280.84	0.00
10 Yr Dry Blocked Channel	1.55	132.40	1.22	133.62	133.62	0.01	0.01	159.49	281.20	0.00
	1.66	132.40	1.22	133.62	133.62	0.01	0.01	161.12	281.52	0.00
	1.81	132.40	1.23	133.63	133.63	0.01	0.01	162.84	281.85	0.00
	2.03	132.40	1.24	133.64	133.64	0.01	0.01	164.56	282.18	0.01
	2.12	132.40	1.24	133.64	133.64	0.01	0.01	166.45	282.54	0.01
	2.23	132.40	1.25	133.65	133.65	0.01	0.01	168.35	282.90	0.01
	2.34	132.40	1.26	133.66	133.66	0.01	0.01	170.33	283.28	0.01
	2.48	132.40	1.26	133.66	133.66	0.01	0.01	172.32	283.66	0.01
Average Blocked Channel	2.58	132.40	1.27	133.67	133.67	0.01	0.01	174.48	284.07	0.01
	2.69	132.40	1.28	133.68	133.68	0.01	0.02	176.73	284.50	0.01
	2.80	132.40	1.29	133.69	133.69	0.01	0.02	179.08	284.94	0.01
	2.92	132.40	1.30	133.70	133.70	0.01	0.02	181.42	285.39	0.01
	3.55	132.40	1.30	133.70	133.70	0.01	0.02	183.86	285.85	0.01
10 Yr Wet Blocked Channel	3.62	132.40	1.31	133.71	133.71	0.01	0.02	186.22	286.29	0.01
	3.70	132.40	1.32	133.72	133.72	0.01	0.02	188.66	286.75	0.01
	3.78	132.40	1.33	133.73	133.73	0.01	0.02	191.20	287.23	0.01
	3.85	132.40	1.34	133.74	133.74	0.01	0.02	193.74	287.71	0.01
	3.93	132.40	1.35	133.75	133.75	0.01	0.02	196.28	288.18	0.01
	4.04	132.40	1.36	133.76	133.76	0.01	0.02	198.83	288.66	0.01
	5.07	132.40	1.37	133.77	133.77	0.01	0.03	201.39	289.14	0.01
100Yr Wet Blocked Channel	5.25	132.40	1.37	133.77	133.77	0.01	0.03	203.94	289.62	0.01
	5.44	132.40	1.38	133.78	133.78	0.01	0.03	206.60	290.11	0.01
	6.26	132.40	1.39	133.79	133.79	0.01	0.03	209.25	290.60	0.01
	6.37	132.40	1.40	133.80	133.80	0.01	0.03	211.82	291.08	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED HEC-RAS MODEL RESULTS FOR CROSS SECTION 2

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		**FIGURE III-10**
CHECK	--		
REVIEW			

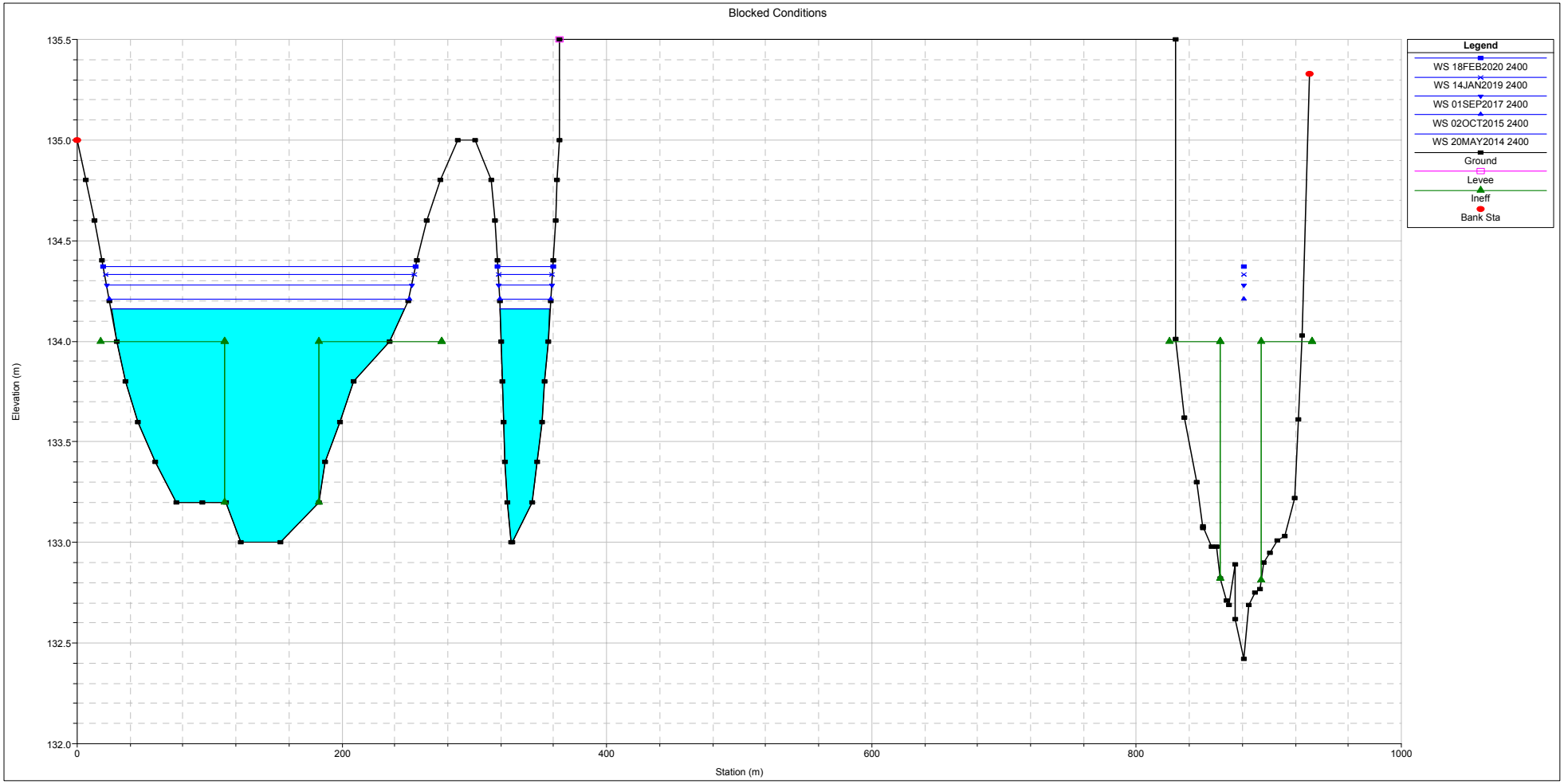
REVISION DATE: BY: FILE:

APPENDIX IV

HEC-RAS MODEL RESULTS
BLOCKED WESTERNMOST CHANNEL WITH DEWATERING

REVISION DATE: BY: FILE:

Blocked Conditions With Dewatering
Water Elevations: 134.37m, 134.33m, 134.28m, 134.21m, 133.16m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions With Dewatering
Cross Section 6 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE IV-1**	
REVIEW				

Runoff Condition	Q Total (m3/s)	Min Ch Elevation (m)	Max Depth (m)	W.S. Elevation (m)	E.G. Elevation (m)	E.G. Slope (m/m)	Velocity Channel (m/s)	Flow Area (m2)	Top Width (m)	Froude #
	1.14	132.42	1.66	134.08	134.08	0.0053	0.01	176.09	250.15	0.00
	1.20	132.42	1.67	134.09	134.09	0.0054	0.01	178.61	251.27	0.00
	1.26	132.42	1.68	134.10	134.10	0.0055	0.01	181.14	252.40	0.00
	1.32	132.42	1.69	134.11	134.11	0.0055	0.01	183.61	253.49	0.00
	1.39	132.42	1.70	134.12	134.12	0.0056	0.01	186.16	254.62	0.00
	1.47	132.42	1.71	134.13	134.13	0.0057	0.01	188.73	255.75	0.00
	1.55	132.42	1.72	134.14	134.14	0.0057	0.01	191.31	256.87	0.00
	1.66	132.42	1.73	134.15	134.15	0.0058	0.01	193.90	258.00	0.00
100 yr Dry Blocked Channel	1.81	132.42	1.74	134.16	134.16	0.0058	0.01	196.50	259.13	0.00
	2.03	132.42	1.75	134.17	134.17	0.0058	0.01	199.03	260.22	0.00
	2.12	132.42	1.76	134.18	134.18	0.0059	0.01	201.65	261.35	0.00
	2.23	132.42	1.77	134.19	134.19	0.0059	0.01	204.29	262.47	0.00
	2.34	132.42	1.78	134.20	134.20	0.0059	0.01	206.94	263.60	0.00
10 Yr Dry Blocked Channel	2.48	132.42	1.79	134.21	134.21	0.0059	0.01	209.59	264.39	0.00
	2.58	132.42	1.80	134.22	134.22	0.0060	0.01	212.17	265.16	0.00
	2.69	132.42	1.81	134.23	134.23	0.0060	0.01	214.84	265.95	0.00
	2.80	132.42	1.82	134.24	134.24	0.0061	0.01	217.52	266.74	0.00
	2.92	132.42	1.83	134.25	134.25	0.0061	0.01	220.21	267.52	0.00
	3.55	132.42	1.84	134.26	134.26	0.0061	0.02	222.90	268.31	0.01
	3.62	132.42	1.85	134.27	134.27	0.0062	0.02	225.53	269.08	0.01
Average Blocked Channel	3.70	132.42	1.86	134.28	134.28	0.0062	0.02	228.24	269.87	0.01
	3.78	132.42	1.87	134.29	134.29	0.0063	0.02	230.96	270.66	0.01
	3.85	132.42	1.88	134.30	134.30	0.0063	0.02	233.68	271.45	0.01
	3.93	132.42	1.89	134.31	134.31	0.0063	0.02	236.41	272.24	0.01
	4.04	132.42	1.90	134.32	134.32	0.0064	0.02	239.07	273.01	0.01
10 Yr Wet Blocked Channel	5.07	132.42	1.91	134.33	134.33	0.0064	0.02	241.82	273.80	0.01
	5.25	132.42	1.92	134.34	134.34	0.0064	0.02	244.58	274.58	0.01
	5.44	132.42	1.93	134.35	134.35	0.0064	0.02	247.35	275.37	0.01
	6.26	132.42	1.94	134.36	134.36	0.0064	0.03	250.12	276.16	0.01
100Yr Wet Blocked Channel	6.37	132.42	1.95	134.37	134.37	0.0065	0.03	252.82	276.93	0.01
	6.49	132.42	1.96	134.38	134.38	0.0065	0.03	255.61	277.72	0.01
	6.84	132.42	1.97	134.39	134.39	0.0065	0.03	258.40	278.51	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED WITH DEWATERING HEC-RAS MODEL RESULTS FOR CROSS SECTION 6

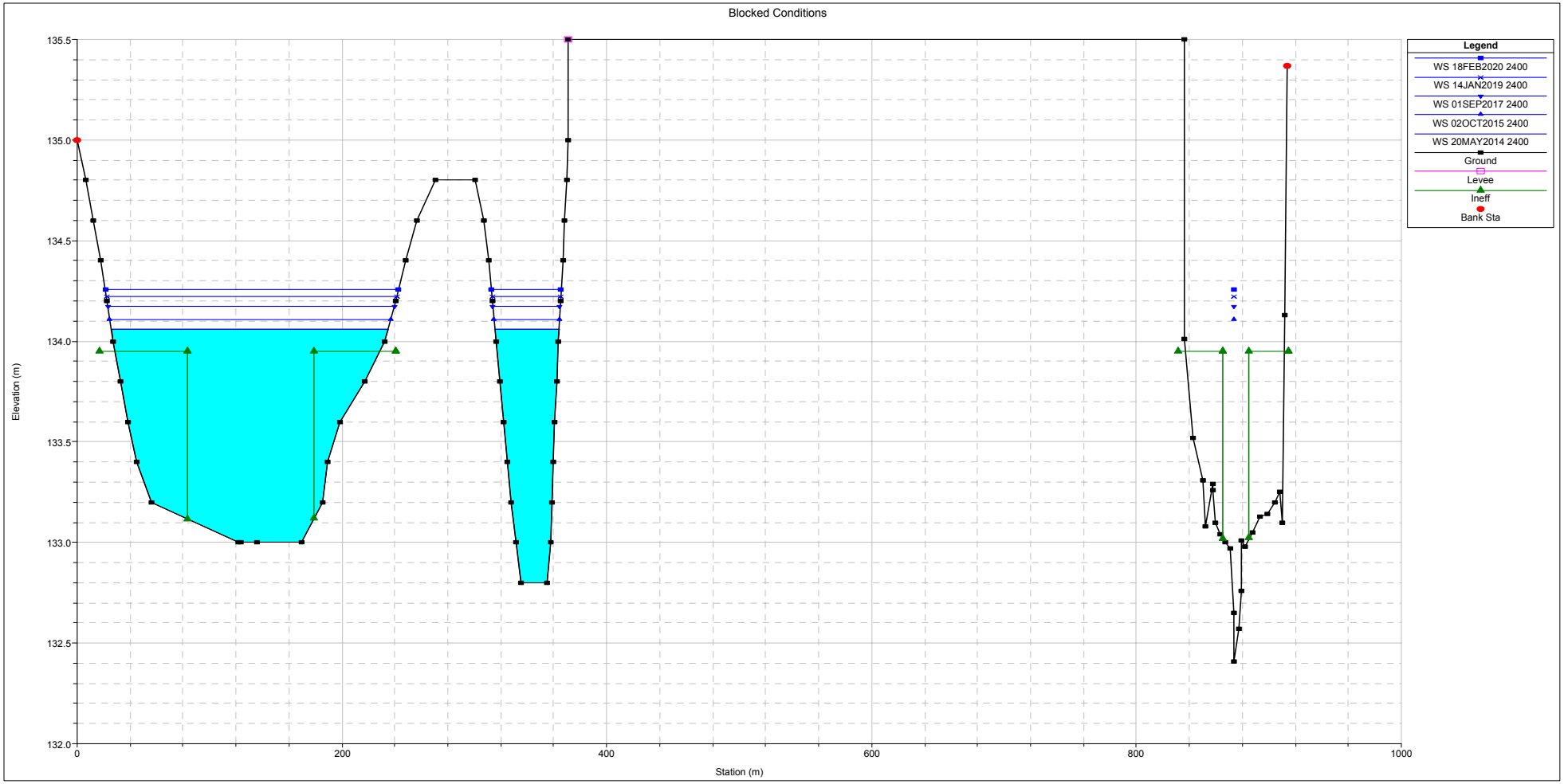
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		**FIGURE IV-2**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions With Dewatering
Water Elevations: 134.37m, 134.33m, 134.28m, 134.21m, 133.16m



PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE
Blocked Conditions With Dewatering
Cross Section 5 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE IV-3**	
REVIEW				

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	1.14	132.41	1.57	133.98	133.98	0.0044	0.01	186.21	249.73	0.00
	1.20	132.41	1.58	133.99	133.99	0.0045	0.01	188.88	251.04	0.00
	1.26	132.41	1.59	134.00	134.00	0.0045	0.01	191.57	252.22	0.00
	1.32	132.41	1.60	134.01	134.01	0.0046	0.01	194.11	253.09	0.00
	1.39	132.41	1.61	134.02	134.02	0.0046	0.01	196.81	254.01	0.00
	1.47	132.41	1.62	134.03	134.03	0.0047	0.01	199.37	254.88	0.00
	1.55	132.41	1.63	134.04	134.04	0.0048	0.01	201.78	255.70	0.00
	1.66	132.41	1.64	134.05	134.05	0.0048	0.01	204.13	256.49	0.00
100 yr Dry Blocked Channel	1.81	132.41	1.65	134.06	134.06	0.0049	0.01	206.55	257.31	0.00
	2.03	132.41	1.66	134.07	134.07	0.0049	0.01	208.83	258.07	0.00
	2.12	132.41	1.67	134.08	134.08	0.0050	0.01	211.27	258.89	0.00
	2.23	132.41	1.68	134.09	134.09	0.0050	0.01	213.64	259.68	0.00
	2.34	132.41	1.69	134.10	134.10	0.0051	0.01	216.10	260.50	0.00
10 Yr Dry Blocked Channel	2.48	132.41	1.70	134.11	134.11	0.0051	0.01	218.49	261.29	0.00
	2.58	132.41	1.71	134.12	134.12	0.0052	0.01	220.80	262.05	0.00
	2.69	132.41	1.72	134.13	134.13	0.0052	0.01	223.12	262.82	0.00
	2.80	132.41	1.73	134.14	134.14	0.0053	0.01	225.53	263.61	0.00
	2.92	132.41	1.73	134.14	134.14	0.0054	0.01	227.86	264.37	0.00
	3.55	132.41	1.74	134.15	134.15	0.0054	0.02	230.28	265.16	0.01
	3.62	132.41	1.75	134.16	134.16	0.0055	0.02	232.63	265.93	0.01
Average Blocked Channel	3.70	132.41	1.76	134.17	134.17	0.0056	0.02	235.06	266.72	0.01
	3.78	132.41	1.77	134.18	134.18	0.0056	0.02	237.59	267.54	0.01
	3.85	132.41	1.78	134.19	134.19	0.0057	0.02	240.04	268.33	0.01
	3.93	132.41	1.79	134.20	134.20	0.0057	0.02	242.58	269.15	0.01
	4.04	132.41	1.80	134.21	134.21	0.0058	0.02	244.96	269.91	0.01
10 Yr Wet Blocked Channel	5.07	132.41	1.81	134.22	134.22	0.0058	0.02	247.51	270.72	0.01
	5.25	132.41	1.82	134.23	134.23	0.0059	0.02	250.07	271.53	0.01
	5.44	132.41	1.83	134.24	134.24	0.0059	0.02	252.64	272.35	0.01
	6.26	132.41	1.84	134.25	134.25	0.0059	0.02	255.14	273.13	0.01
100Yr Wet Blocked Channel	6.37	132.41	1.84	134.25	134.26	0.0060	0.02	257.64	273.92	0.01
	6.49	132.41	1.85	134.26	134.26	0.0060	0.02	260.23	274.73	0.01
	6.84	132.41	1.86	134.27	134.27	0.0061	0.03	262.83	275.55	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED WITH DEWATERING HEC-RAS MODEL RESULTS FOR CROSS SECTION 5

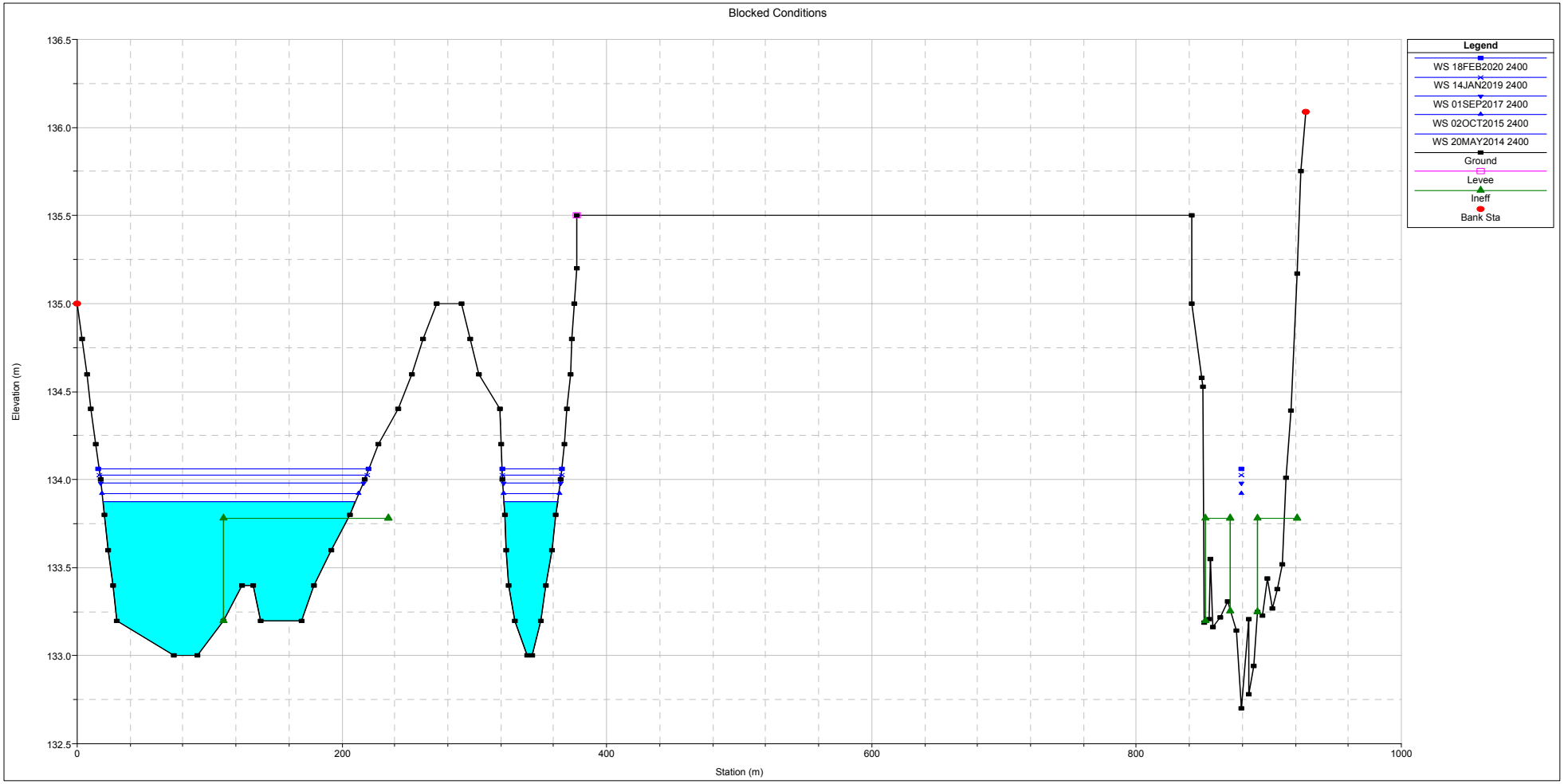
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		**FIGURE IV-4**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions With Dewatering
Water Elevations: 134.37m, 134.33m, 134.28m, 134.21m, 133.16m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions With Dewatering
Cross Section 4 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE IV-5**	
REVIEW				

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	1.14	132.70	1.10	133.80	133.80	0.0152	0.01	122.69	223.74	0.00
	1.20	132.70	1.11	133.81	133.81	0.0151	0.01	125.42	224.96	0.00
	1.26	132.70	1.12	133.82	133.82	0.0150	0.01	128.17	226.17	0.00
	1.32	132.70	1.13	133.83	133.83	0.0148	0.01	130.87	227.35	0.00
	1.39	132.70	1.15	133.85	133.85	0.0148	0.01	133.30	228.41	0.00
	1.47	132.70	1.16	133.86	133.86	0.0148	0.01	135.53	229.38	0.00
	1.55	132.70	1.16	133.86	133.86	0.0148	0.01	137.56	230.26	0.00
	1.66	132.70	1.17	133.87	133.87	0.0149	0.01	139.39	231.05	0.00
100 yr Dry Blocked Channel	1.81	132.70	1.18	133.88	133.88	0.0150	0.01	141.23	231.84	0.01
	2.03	132.70	1.19	133.89	133.89	0.0151	0.01	143.00	232.59	0.01
	2.12	132.70	1.20	133.90	133.90	0.0152	0.01	144.77	233.35	0.01
	2.23	132.70	1.20	133.90	133.90	0.0153	0.02	146.62	234.14	0.01
	2.34	132.70	1.21	133.91	133.91	0.0154	0.02	148.48	234.93	0.01
10 Yr Dry Blocked Channel	2.48	132.70	1.22	133.92	133.92	0.0154	0.02	150.42	235.74	0.01
	2.58	132.70	1.23	133.93	133.93	0.0155	0.02	152.22	236.50	0.01
	2.69	132.70	1.23	133.93	133.93	0.0157	0.02	154.17	237.32	0.01
	2.80	132.70	1.24	133.94	133.94	0.0158	0.02	156.12	238.14	0.01
	2.92	132.70	1.25	133.95	133.95	0.0158	0.02	158.16	238.98	0.01
	3.55	132.70	1.26	133.96	133.96	0.0159	0.02	160.13	239.80	0.01
	3.62	132.70	1.27	133.97	133.97	0.0160	0.02	162.11	240.62	0.01
Average Blocked Channel	3.70	132.70	1.28	133.98	133.98	0.0161	0.02	164.16	241.47	0.01
	3.78	132.70	1.29	133.99	133.99	0.0161	0.02	166.30	242.35	0.01
	3.85	132.70	1.29	133.99	133.99	0.0162	0.02	168.45	243.23	0.01
	3.93	132.70	1.30	134.00	134.00	0.0162	0.02	170.53	244.03	0.01
	4.04	132.70	1.31	134.01	134.01	0.0163	0.02	172.61	244.77	0.01
10 Yr Wet Blocked Channel	5.07	132.70	1.32	134.02	134.02	0.0163	0.03	174.78	245.52	0.01
	5.25	132.70	1.33	134.03	134.03	0.0163	0.03	176.95	246.28	0.01
	5.44	132.70	1.34	134.04	134.04	0.0163	0.03	179.13	247.03	0.01
	6.26	132.70	1.35	134.05	134.05	0.0163	0.03	181.32	247.79	0.01
100Yr Wet Blocked Channel	6.37	132.70	1.36	134.06	134.06	0.0163	0.03	183.51	248.54	0.01
	6.49	132.70	1.36	134.06	134.06	0.0163	0.03	185.79	249.33	0.01
	6.84	132.70	1.37	134.07	134.07	0.0163	0.04	188.07	250.11	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED WITH DEWATERING HEC-RAS MODEL RESULTS FOR CROSS SECTION 4

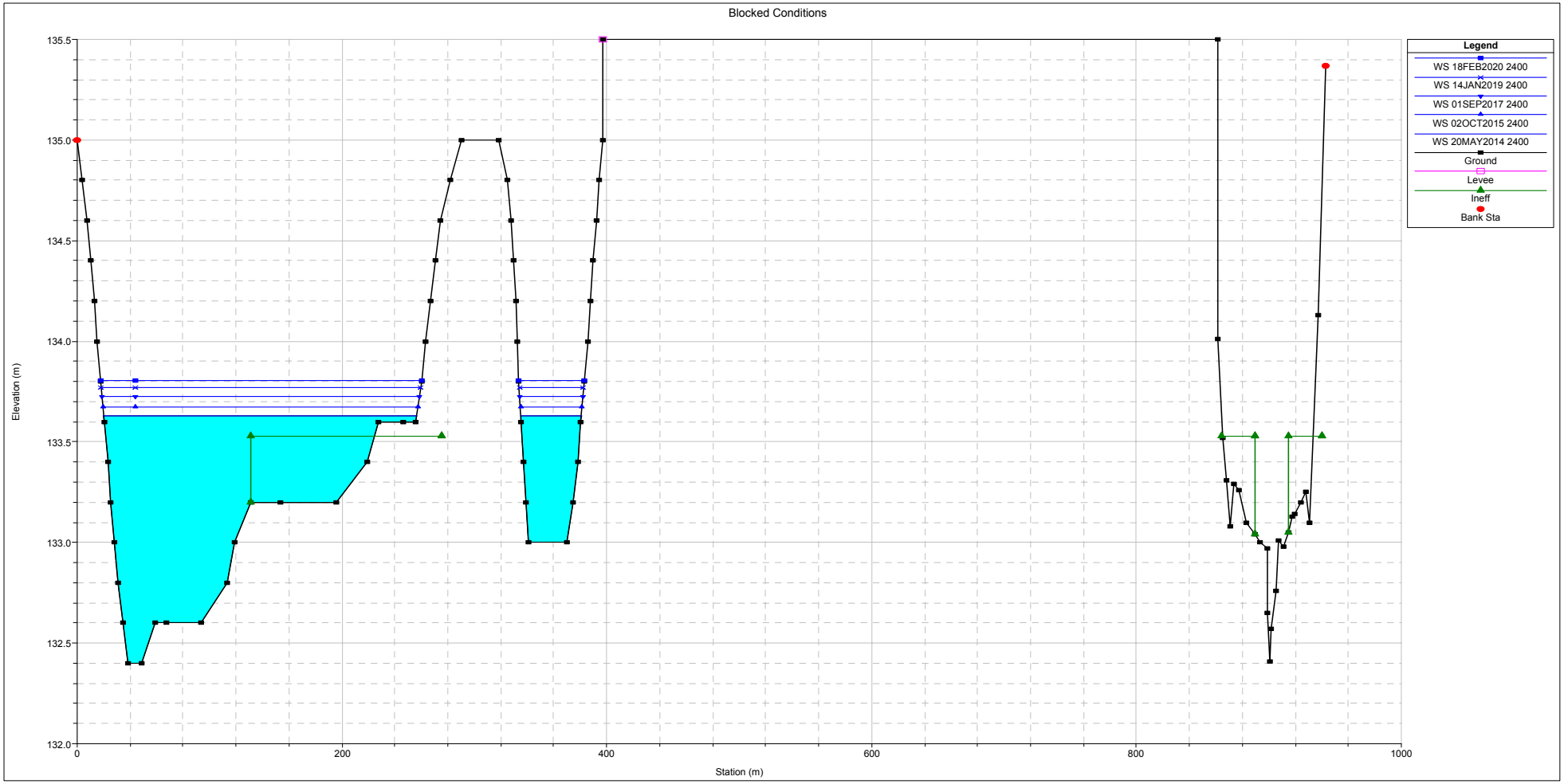
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		**FIGURE IV-6**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions With Dewatering
Water Elevations: 134.37m, 134.33m, 134.28m, 134.21m, 133.16m



PROJECT
MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE
Blocked Conditions With Dewatering
Cross Section 3 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE IV-7**	
REVIEW				

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	1.14	132.40	1.15	133.55	133.55	0.0106	0.01	142.61	248.33	0.00
	1.20	132.40	1.17	133.57	133.57	0.0104	0.01	146.17	249.43	0.00
	1.26	132.40	1.18	133.58	133.58	0.0102	0.01	149.68	250.50	0.00
	1.32	132.40	1.20	133.60	133.60	0.0101	0.01	153.04	251.53	0.00
	1.39	132.40	1.20	133.60	133.60	0.0116	0.01	155.64	280.46	0.00
	1.47	132.40	1.21	133.61	133.61	0.0117	0.01	157.61	280.84	0.00
	1.55	132.40	1.22	133.62	133.62	0.0118	0.01	159.49	281.20	0.00
	1.66	132.40	1.22	133.62	133.62	0.0120	0.01	161.12	281.52	0.00
100 yr Dry Blocked Channel	1.81	132.40	1.23	133.63	133.63	0.0121	0.01	162.84	281.85	0.00
	2.03	132.40	1.24	133.64	133.64	0.0122	0.01	164.56	282.18	0.01
	2.12	132.40	1.24	133.64	133.64	0.0123	0.01	166.45	282.54	0.01
	2.23	132.40	1.25	133.65	133.65	0.0124	0.01	168.35	282.90	0.01
	2.34	132.40	1.26	133.66	133.66	0.0125	0.01	170.33	283.28	0.01
10 Yr Dry Blocked Channel	2.48	132.40	1.26	133.66	133.66	0.0125	0.01	172.32	283.66	0.01
	2.58	132.40	1.27	133.67	133.67	0.0126	0.01	174.48	284.07	0.01
	2.69	132.40	1.28	133.68	133.68	0.0126	0.02	176.73	284.50	0.01
	2.80	132.40	1.29	133.69	133.69	0.0127	0.02	179.08	284.94	0.01
	2.92	132.40	1.30	133.70	133.70	0.0127	0.02	181.42	285.39	0.01
	3.55	132.40	1.30	133.70	133.70	0.0127	0.02	183.86	285.85	0.01
	3.62	132.40	1.31	133.71	133.71	0.0127	0.02	186.22	286.29	0.01
Average Blocked Channel	3.70	132.40	1.32	133.72	133.72	0.0127	0.02	188.66	286.75	0.01
	3.78	132.40	1.33	133.73	133.73	0.0127	0.02	191.20	287.23	0.01
	3.85	132.40	1.34	133.74	133.74	0.0127	0.02	193.74	287.71	0.01
	3.93	132.40	1.35	133.75	133.75	0.0127	0.02	196.28	288.18	0.01
	4.04	132.40	1.36	133.76	133.76	0.0126	0.02	198.83	288.66	0.01
10 Yr Wet Blocked Channel	5.07	132.40	1.37	133.77	133.77	0.0126	0.03	201.39	289.14	0.01
	5.25	132.40	1.37	133.77	133.77	0.0126	0.03	203.94	289.62	0.01
	5.44	132.40	1.38	133.78	133.78	0.0126	0.03	206.60	290.11	0.01
	6.26	132.40	1.39	133.79	133.79	0.0125	0.03	209.25	290.60	0.01
100Yr Wet Blocked Channel	6.37	132.40	1.40	133.80	133.80	0.0125	0.03	211.82	291.08	0.01
	6.49	132.40	1.41	133.81	133.81	0.0124	0.03	214.57	291.54	0.01
	6.84	132.40	1.42	133.82	133.82	0.0124	0.03	217.24	291.99	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED WITH DEWATERING HEC-RAS MODEL RESULTS FOR CROSS SECTION 3

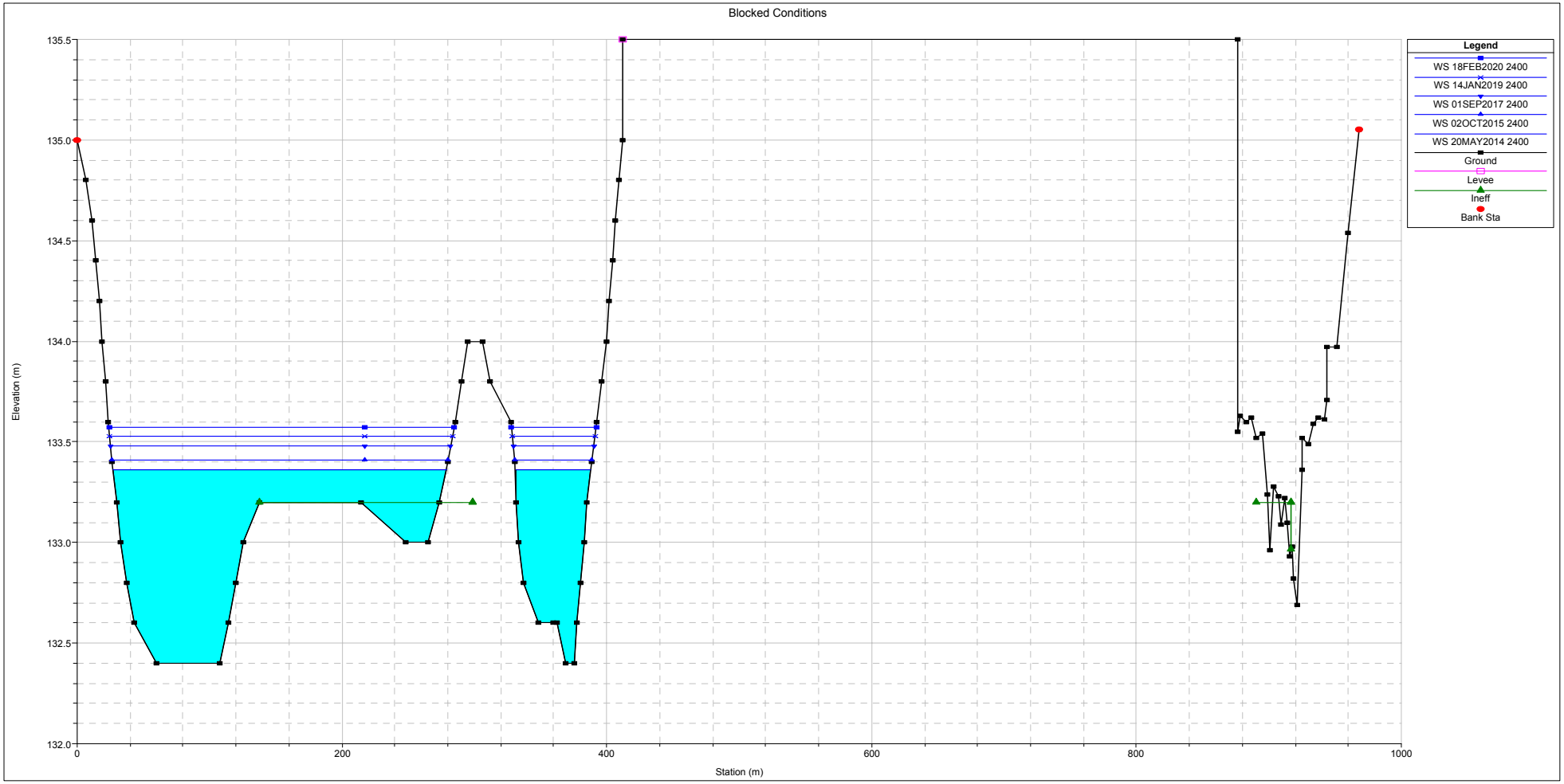
Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		
CHECK	--		**FIGURE IV-8**
REVIEW			

REVISION DATE: BY: FILE:

REVISION DATE: BY: FILE:

Blocked Conditions With Dewatering
Water Elevations: 134.37m, 134.33m, 134.28m, 134.21m, 133.16m



PROJECT **MEADOWBANK MINING CORPORATION**
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

Blocked Conditions With Dewatering
Cross Section 2 Profile

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300	
DESIGN	--	11DEC07	SCALE NTS	REV.
CADD	--			
CHECK	--		**FIGURE IV-9**	
REVIEW				

Runoff Condition	Q Total	Min Ch Elevation	Max Depth	W.S. Elevation	E.G. Elevation	E.G. Slope	Velocity Channel	Flow Area	Top Width	Froude #
	(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
	1.14	132.40	0.88	133.28	133.28	0.0213	0.01	125.13	302.87	0.00
	1.20	132.40	0.89	133.29	133.29	0.0209	0.01	128.18	303.59	0.00
	1.26	132.40	0.90	133.30	133.30	0.0205	0.01	131.24	304.30	0.00
	1.32	132.40	0.91	133.31	133.31	0.0201	0.01	134.30	305.01	0.00
	1.39	132.40	0.92	133.32	133.32	0.0197	0.01	137.37	305.73	0.00
	1.47	132.40	0.93	133.33	133.33	0.0194	0.01	140.36	306.42	0.00
	1.55	132.40	0.94	133.34	133.34	0.0189	0.01	143.44	307.14	0.01
	1.66	132.40	0.95	133.35	133.35	0.0185	0.01	146.54	307.85	0.01
100 yr Dry Blocked Channel	1.81	132.40	0.96	133.36	133.36	0.0181	0.01	149.64	308.56	0.01
	2.03	132.40	0.97	133.37	133.37	0.0177	0.01	152.74	309.28	0.01
	2.12	132.40	0.98	133.38	133.38	0.0174	0.01	155.76	309.97	0.01
	2.23	132.40	0.99	133.39	133.39	0.0171	0.01	158.89	310.69	0.01
	2.34	132.40	1.00	133.40	133.40	0.0167	0.01	162.01	311.40	0.01
10 Yr Dry Blocked Channel	2.48	132.40	1.01	133.41	133.41	0.0164	0.02	165.15	312.15	0.01
	2.58	132.40	1.02	133.42	133.42	0.0162	0.02	168.29	312.91	0.01
	2.69	132.40	1.03	133.43	133.43	0.0160	0.02	171.35	313.64	0.01
	2.80	132.40	1.04	133.44	133.44	0.0158	0.02	174.51	314.40	0.01
	2.92	132.40	1.05	133.45	133.45	0.0155	0.02	177.67	315.15	0.01
	3.55	132.40	1.06	133.46	133.46	0.0153	0.02	180.85	315.90	0.01
	3.62	132.40	1.07	133.47	133.47	0.0151	0.02	184.03	316.66	0.01
Average Blocked Channel	3.70	132.40	1.08	133.48	133.48	0.0150	0.02	187.12	317.39	0.01
	3.78	132.40	1.09	133.49	133.49	0.0148	0.02	190.32	318.15	0.01
	3.85	132.40	1.10	133.50	133.50	0.0146	0.02	193.52	318.90	0.01
	3.93	132.40	1.11	133.51	133.51	0.0144	0.02	196.73	319.65	0.01
	4.04	132.40	1.12	133.52	133.52	0.0143	0.02	199.95	320.41	0.01
10 Yr Wet Blocked Channel	5.07	132.40	1.13	133.53	133.53	0.0141	0.02	203.18	321.16	0.01
	5.25	132.40	1.14	133.54	133.54	0.0140	0.03	206.31	321.90	0.01
	5.44	132.40	1.15	133.55	133.55	0.0138	0.03	209.56	322.65	0.01
	6.26	132.40	1.16	133.56	133.56	0.0136	0.03	212.80	323.40	0.01
100 yr Wet Blocked Channel	6.37	132.40	1.17	133.57	133.57	0.0135	0.03	216.06	324.16	0.01
	6.49	132.40	1.18	133.58	133.58	0.0133	0.03	219.33	324.91	0.01
	6.84	132.40	1.19	133.59	133.59	0.0132	0.03	222.50	325.65	0.01

PROJECT

MEADOWBANK MINING CORPORATION
MEADOWBANK GOLD PROJECT
THIRD PORTAGE LAKE OUTLETS

TITLE

BLOCKED WITH DEWATERING HEC-RAS MODEL RESULTS FOR CROSS SECTION 2

Golder Associates

PROJECT No. 07-1413-0047			PHASE / TASK No. 5300
DESIGN	--		SCALE NTS REV.
CADD	--		**FIGURE IV-10**
CHECK	--		
REVIEW			

REVISION DATE: BY: FILE: