Sabina
GOLD & SILVER CORP.

October 17, 2014

Phyllis Beaulieu, Manager of Licensing
Nunavut Water Board
PO Box 119
Gjoa Haven, NU
X0B 1J0

RE: Application for Site Preparation Water Licence at the Back River Project

Dear Ms. Beaulieu,

Sabina Gold & Silver Corp (Sabina) is focused on development of its 100%-owned Back River Gold Project located in the Kitikmeot Region of Nunavut. This letter is submitted concurrent to the review of the Draft Environmental Impact Statement to the Nunavut Impact Review Board (NIRB; file no. 12MN036) in order to initiate the application processes for authorizations needed for initial site preparation activities Sabina proposes to undertake in 2015.

Project development is approached in a phased manner with site preparation activities occurring first. Sabina proposes to undertake Site Preparation during 2015 including:

- Construction and use of an all-weather road, and associated water crossings, from Goose Camp to the existing airstrip and quarry
- Expansion of the existing all-weather airstrip and associated realignment of Rascal Stream
- Expansion of the existing Goose quarry and development of the proposed Umwelt quarry
- Development of an ice-road for access to the quarries during the winter season before the all-weather road is completed
- Staging of a temporary laydown area at the Marine Laydown Area to store equipment, materials and fuel for 2016 construction activities (note: 2016 activities are not included in the scope of this application).

These activities will be supported by the existing camp and infrastructure (authorized under Water License 2BE-GOO1015) and are needed to ensure a timely and efficient construction and operation of the Back River Gold Project. Plain language summaries (English, Inuktitut, and Inuinnaqtun) of the proposed activities are provided in Appendix B.

The following documents are included as appendices to the application:

- Appendix A Sub-Surface and Surface Tenure Held By Sabina

- Appendix B Sabina Back River Project Pre-development Activities Project Description/Environmental Screening Assessment
- Appendix C Comprehensive Spill Contingency and Emergency Response Plan
- Appendix D Comprehensive Waste Management Plan
- Appendix E Comprehensive Hazardous Materials Management Plan
- Appendix F Comprehensive Quarry Management Plan
- Appendix G Comprehensive Transportation Management Plan
- Appendix H Abandonment and Restoration Plan
- Appendix I Oil Pollution Emergency Plan
- Appendix J Geochemical Characterization of the Umwelt Quarry
- Appendix K Fisheries Assessment of Rascal Stream Realignment
- Appendix L Project Consultation Log
- Appendix M Financial and Corporate Information.

The application form requires submission of a $30.00 application fee plus a water use fee deposit of $30.00. A cheque for $60.00 addressed to the Receiver General for Canada has been forwarded to the Nunavut Water Board office in Gjoa Haven.

Should you have any questions, concerns, or need any additional information, please do not hesitate to contact me by email at mpickard@sabinagoldsilver.com or by telephone at 604-998-4175.

Yours truly,

Matthew Pickard B.Sc., MBA, P.Geo, CRSP, EP
Vice President, Environment & Sustainability
Sabina Gold & Silver Corp.

930 West 1st Street, Suite 202
North Vancouver, BC V7P 3N4
Tel (Vancouver): 604.998.4190/888.648.4218
Fax (Vancouver): 604.998.1051
Email: mpickard@sabinagoldsilver.com

General Water Licence Application
(Application for a new Water Licence)

Document Date: April 2013

Application Submission Date: <u>October/17/2014</u>
Month/Day/Year

P.O. BOX 119
GJOA HAVEN, NUNAVUT
XOB 1J0
TEL: (867) 360-6338
FAX: (867) 360-6369

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NUNAVUT IMALIRIYIN KATIMAYIT
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

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kNK5 wmoEp5 vtmp5
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYIT
OFFICE DES EAUX DU NUNAVUT

GENERAL WATER LICENCE APPLICATION
(APPLICATION FOR NEW WATER LICENCE)

The applicant is referred to the NWB's Guide 4: *Guide to Completing and Submitting a Water Licence Application for a New Licence* for more information about this application form.

LICENCE NO:
(for NWB use only)

1. APPLICANT (PROPOSED LICENSEE) CONTACT INFORMATION (name, address)

Sabina Gold & Silver Corp.
202 - 930 West First Street
North Vancouver, BC
V7P 3N4

Contact: Matthew Pickard

Phone: (604) 998 4175
Fax: (604) 998.1051
e-mail: mpickard@sabinagoldsilver.com

2. APPLICANT REPRESENTATIVE CONTACT INFORMATION if different from Block 1 (name, address)

Same as Block 1

3. NAME OF PROJECT (including the name of the project location)

Sabina Gold & Silver Corp – Back River Project – 2015 Site Preparation Activities

4. LOCATION OF UNDERTAKING

Project Extents

NW Lat	NE Lat	SE Lat	SW Lat
66° 39' 14.4108"	66° 41' 47.0472"	65° 32' 9.6828"	65° 29' 44.412"
NW Long	NE Long	SE Long	SW Long
-107° 44' 7.1088"	-107° 28' 9.8256"	-106° 21' 32.7492"	-106° 36' 54.4206"

Camp Location(s)
Goose Camp Location
Latitude: 65°32'40"N, Longitude: 106°25'41"W

MLA Location (no camp)

Latitude: 66° 38' 52.8108", Longitude -107° 41' 18.2544"

5. **MAP** - Attach a topographical map, indicating the main components of the undertaking.

Figure 1 shows the location of the proposed Site Preparation Activities.

Figure 2 shows the site layout for the proposed activities to be undertaken at the Goose Property including the location of the camp, existing rock quarry, proposed Umwelt quarry, fuel storage, existing airstrip and proposed extension, and the alignment of the all-weather and ice roads.

Figure 3 shows the general layout of the Marine Laydown Area (MLA) and location of the proposed Temporary Laydown Area (TLA).

NTS Map Sheet No.: 076J02, 076J03, 076J05, 076J06, 076J11, 076J12, 076G09, 076G10, 076G15
Map Name: Tinney Hills and Beechy Lake Map Scale: 1/250,000

6. **NATURE OF INTEREST IN THE LAND** - Check any of the following that are applicable to the proposed undertaking (at least one box under the 'Surface' header must be checked).

Sub-surface

☐ Mineral Lease from Nunavut Tunngavik Incorporated (NTI)
Date (expected date) of issuance: ____________ Date of expiry: ____________________

X Mineral Lease from Indian and Northern Affairs Canada (INAC)
Date of issuance: varies Date of expiry: varies

Surface

X Crown Land Use Authorization from Indian and Northern Affairs Canada (INAC)
Date of issuance: 2010-10-31 Date of expiry: 2014-10-31

X Inuit Owned Land (IOL) Authorization from Kitikmeot Inuit Association (KIA)
Date of issuance: December 12, 2013 Date of expiry: December 13, 2014

☐ IOL Authorization from Kivalliq Inuit Association (KivIA)
Date (expected date) of issuance: ____________ Date of expiry: ____________________

☐ IOL Authorization from Qikiqtani Inuit Association (QIA)
Date (expected date) of issuance: ____________ Date of expiry: ____________________

☐ Commissioner's Land Use Authorization
Date (expected date) of issuance: ____________ Date of expiry: ____________________

☐ Other: ____
Date (expected date) of issuance: ____________ Date of expiry: ____________________

Name of entity(s) holding authorizations: Sabina Gold & Silver Corp.

Appendix A lists Sabina's current sub-surface and surface tenure as well as current permits and authorizations.

7. NUNAVUT PLANNING COMMISSION (NPC) DETERMINATION

Indicate the land use planning area in which the project is located.

- [ ] North Baffin
- [ ] South Baffin
- [ ] Akunniq
- [ ] Keewatin
- [ ] Sanikiluaq
- X **West Kitikmeot**

Is a land use plan conformity determination required?

- [ ] Yes
- X **No**

If Yes, indicate date issued and attach copy ______________________
If No, provide written confirmation from NPC confirming that a land use plan conformity review is not required.

NPC conformity review is not required (NIRB, Notice of Decision December 17, 2012, File 12MN036). NPC has indicated in previous applications and amendment requests for various Water Licences that there is not an approved land use plan for the West Kitikmeot Region and conformity is not required; email dated January 8, 2010 available upon request.

8. NUNAVUT IMPACT REVIEW BOARD (NIRB) DETERMINATION

Is an Article 12 Part 4 screening determination required?

X Yes   No

9. DESCRIPTION OF UNDERTAKING – List and attach plans and drawings or project proposal.

Sabina proposes to undertake Site Preparation activities at the Back River Project during 2015 including; development of an all-weather road from Goose Camp to the existing airstrip and quarry as well as to the proposed Umwelt Quarry, and development of an ice-road for access to the quarries during the winter season before the all-weather road is completed. The existing all-weather airstrip will be extended to approximately 1,524m long using material from the exiting Goose Quarry and the proposed Umwelt Quarry. A temporary laydown area will be staged at the Marine Laydown Area to store equipment, materials and fuel for 2016 construction activities (note: 2016 activities are not included in the scope of this application).

The “Sabina Back River Project 2015 Site Preparation Activities Project Description/Environmental Screening Report” presented in **Appendix B** provides a detailed description of the proposed activities along with layout figures.

10. OPTIONS – Provide a brief explanation of the alternative methods or locations that were considered to carry out the project.

An explanation of alternatives is provided in Appendix B, Section 6.

11. CLASSIFICATION OF PRIMARY UNDERTAKING - Indicate the primary classification of undertaking by checking one of the following boxes.

- [ ] Industrial
- [ ] Agricultural
- X **Mining and Milling (includes exploration/drilling/exploration camps)**
- [ ] Conservation
- [ ] Municipal (includes camps/lodges)
- [ ] Recreational
- [ ] Power
- [ ] Miscellaneous (describe below):

See Schedule II of *Northwest Territories Waters Regulations* for Description of Undertakings.

Information in accordance with applicable Supplemental Information Guidelines (SIG) must be submitted with a New Water Licence Application. Indicate which SIG(s) are applicable to your application.

- ☐ Hydrostatic Testing
- ☐ Tannery
- ☐ Tourist / Remote Camp
- ☐ Landfarm & On-Site Storage of Hydrocarbon Contaminated Soil
- ☐ Onshore Oil and Gas Exploration Drilling
- **X Mineral Exploration / Remote Camp**
- ☐ Advanced Exploration
- ☐ Mine Development
- ☐ Municipal
- ☐ General Water Works
- ☐ Power

The Supplementary Questionnaire is attached to this application.

12. WATER USE - Check the appropriate box(s) to indicate the type(s) of water use(s) being applied for.

- ☐ To obtain water for camp/ municipal purposes
- ☐ To obtain water for industrial purposes
- **X To divert a watercourse**
- **X To cross a watercourse**
- **X To modify the bed or bank of a watercourse**
- **X To alter the flow of, or store water**
- ☐ Flood control
- **X Other: Ice road construction, dust suppression**

13. QUANTITY AND QUALITY OF WATER INVOLVED - For each type of water use indicated in Block 12, provide the source of water, the quality of the water source and available capacity, the estimated quantity to be used in cubic meters per day, method of extraction, as well as the quantities and qualities of water to be returned to source.

Name of water source(s) (show location(s) on map):
Water to be used for ice road construction, dust suppression and compaction will be sourced from Goose Lake (shown on Figure 2).

Water crossings associated with the all-weather road are shown on Figure 2.

A section of Rascal Stream will be re-aligned as part of the proposed activities. The flow of this section, Rascal Stream East, which currently flows from Rascal Lake to Goose Lake, will be permanently diverted to an adjacent stream flowing northwest to Goose Lake (Rascal Stream West).

Describe the quality of the water source(s) and the available capacity:

Lake water quality in the Goose Property is generally slightly acidic, and lakes tend to be more acidic in the open water season. pH levels below the CCME guideline range of 6.5 to 9.0 were periodically observed in Goose Lake. A summary of lake water chemistry in the Goose Property area, including Goose Lake, is provided below.

Parameter	n	Min	Mean	Max
pH	98	4.8	6.9	8.1
Total alkalinity (mg/L $CaCO_3$)	95	2.3	6.4	32.5
Hardness (mg $CaCO_3$/L)	98	3.6	15.3	81.5
Conductivity (µS/cm)	98	11	39.5	174
Total dissolved solids (mg/L)	98	4	30	128
Total suspended solids (mg/L)	98	0.5*	1.63	7.0
Turbidity (NTU)				

** The minimum value shown is calculated as ½ the lowest detection limit*

The Draft Environmental Impact Statement (DEIS; Volume 2) states that the maximum water volume that can be withdrawn from Goose Lake without incurring a significant effect is in the range of 1,000 m^3/day year round and 2,000 m^3/day during the freshet period (June).

Streams in the Goose Property area, such as Rascal Stream, are largely circum-neutral, with pH levels ranging from 5.6 to 8.2. Most streams had their lowest pH in June and highest pH in August, with the seasonal differences likely due to seasonal variation in runoff (highest in June) and photosynthesis and biogeochemical cycling (higher in August). Other parameters recorded for streams in the Goose Property area shown below.

Parameter	n	Min	Mean	Max
pH	109	5.6	6.7	7.5
Total alkalinity (mg/L $CaCO_3$)	104	1.8	5.0	17
Hardness (mg $CaCO_3$/L)	109	0.5*	16	133
Conductivity (µS/cm)	109	10.5	40	334
Total dissolved solids (mg/L)	109	1*	36	403
Total suspended solids (mg/L)	109	0.5*	1.8	11
Turbidity (NTU)	101	0.14	0.63	2.4

** The minimum value shown is calculated as ½ the lowest detection limit*

Provide the overall estimated quantity of water to be used: 120 m^3/day

Provide the estimated quantity(s) of water to be used from each source:
It is estimated that a maximum of 120m^3/day of water will be sourced from Goose Lake.

Indicate the estimated quantities to be used for each purpose (camp, drilling, etc.)
Up to 120m^3/day of water will be required for the Site Preparation activities. Water will be used to build and maintain the ice road during winter, and for dust suppression and compaction of placed construction materials during the open water season.

Describe the method of extraction(s):
Extraction from Goose lake will come from the current intake infrastructure. Extraction will be undertaken in accordance with DFO's Protocol for Winter Withdrawals from Ice-covered Waterbodies.

Estimated quantity(s) of water returned to source(s): All water to be used for Site Preparation activities will be indirectly returned to Goose Lake as meltwater runoff from the ice-road, and runoff associated with dust suppression usage.

Describe the quality of water(s) returned to source(s):
The quality of water diverted from Rascal Stream East to Rascal Stream West (as per Appendix B) will not be significantly altered from that currently entering Goose Lake directly from to Rascal Stream East.

14. **WASTE** – Check the appropriate box(s) to indicate the types of waste(s) generated and deposited.

- ☐ Sewage
- X **Solid Waste**
- X **Hazardous**
- X **Bulky Items/Scrap Metal**
- ☐ Animal Waste
- ☐ Other (describe):
- X **Waste oil**
- ☐ Greywater
- ☐ Sludges
- X **Contaminated soil and/or water**

It should be noted that the Goose Camp is permitted under NWB authorization 2BE-GOO1015 which includes waste types and quantities also linked to the 2015 Site Preparation Activities (i.e. sewage, domestic refuse from camp, greywater).

15. **QUANTITY AND QUALITY OF WASTE INVOLVED** – For each type of waste indicated in Block 14, describe its composition, quantity in cubic meters/day, method of treatment and method of disposal.

Type of Waste	Composition	Quantity Generated	Treatment Method	Disposal Method
Hazardous wastes	Petroleum Products and Lubricants – diesel fuel, oils, greases, anti-freeze, and solvents	Up to $0.02m^3$/day	Sorted and temporarily stored on site in a designated area.	Backhauled and disposed of at an appropriate facility.
Waste Oil	Waste oil from construction equipment	Up to $0.01m^3$/day	-	Where possible, waste oil will be used as fuel in waste oil burners. Otherwise, used oil products will be collected in tanks or drums marked "Waste Oil" and disposed of at

				an approved facility.
Contaminated soil/water	Soil/water contaminated with hydrocarbons	Up to $0.05m^3$/day	Treated by a 3rd party offsite	Backhauled to offsite facility for treatment/disposal
Scrap metal	Scrap metal	Up to $0.11m^3$/day	Separated, sorted and stored temporarily on site.	Backhauled to Yellowknife and included in scrap metal recycling program.

16. OTHER AUTHORIZATIONS – In addition to the sub-surface and surface land use authorizations provided in Block 6, indicate any other authorizations required in relation to the proposed undertaking. For each provide the following:

In addition to Sabina's existing permits and authorizations, the following applications have been submitted in relation to the proposed 2015 Site Preparation Activities.

Authorization: Renewal of KTL304C017
Administering Agency: Kitikmeot Inuit Association
Project Activity: Amendment to existing permit.
Date (expected date) of issuance: 13 December 2014
Date of expiry: 13 December 2016

Authorization: Application for Access to Inuit Owned Land
Administering Agency: Kitikmeot Inuit Association
Project Activity: Site Preparation activities and the Goose Property including construction of all-weather road, airstrip extension, and ice road and airstrip for the 2015 winter season.
Date (expected date) of issuance: 01 February 2015
Date of expiry: 01 February 2017

Authorization: Application for Access to Inuit Owned Land
Administering Agency: Kitikmeot Inuit Association
Project Activity: Staging of a temporary laydown area at the Marine Laydown Area to store equipment, materials and fuel.
Date (expected date) of issuance: 01 February 2015
Date of expiry: 01 February 2017

Authorization: Amendment to KTP11Q001
Administering Agency: Kitikmeot Inuit Association
Project Activity: Expansion of the existing Goose Quarry to provide construction material for the all-weather road and all-weather airstrip expansion
Date (expected date) of issuance: 13 December 2014
Date of expiry: 13 December 2016

Authorization: Quarry Permit
Administering Agency: Kitikmeot Inuit Association
Project Activity: Development of the Umwelt Quarry to provide construction material for the all-weather road and all-weather airstrip expansion
Date (expected date) of issuance: 01 February 2015
Date of expiry: 01 February 2017

17. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED

MITIGATION MEASURES - Describe direct, indirect, and cumulative impacts related to water and waste.

See Appendix B.

18. WATER RIGHTS OF EXISTING AND OTHER USERS OF WATER

Provide the names, addresses and nature of use for any known persons or properties that may be adversely affected by the proposed undertaking, including those that hold licences for water use in precedent to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature.

Advise the Board if compensation has been paid and/or agreement(s) for compensation have been reached with any existing or other users.

None identified.

19. INUIT WATER RIGHTS

Advise the Board of any substantial affect of the quality, quantity or flow of waters flowing through Inuit Owned Land (IOL), and advise the Board if negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more Designated Inuit Organization (DIO).

No significant effects to water quality, quantity or flow are expected to result from the proposed site preparation activities. Therefore, negotiations or compensation agreements are not expected to be required.

20. CONSULTATION – Provide a summary of any consultation meetings including when the meetings were held, where and with whom. Include a list of concerns expressed and measures to address concerns.

Sabina maintains a community and government engagement program to discuss our current exploration programs and the development of the Back River Project. Most of our community discussions on water use and waste deposition have been of a general nature, with potential effects on water quality and quantity and potential accidental spills. In response, Sabina has implemented a Transportation Management Plan and Spill Contingency Plan that incorporate regulatory requirements, best management practices, Traditional Knowledge, and community consultation commitments.

21. SECURITY INFORMATION

Provide an estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking. Estimates of reclamation costs must be based on the cost of having the necessary reclamation work done by a third party contractor if the operator defaults. The estimate must also include contingency factors appropriate to the particular work to be undertaken.

Where applicable, the financial security assessment should be prepared in a manner consistent with the principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut,* Indian and Northern Affairs Canada, 2002.

See Appendix H – Abandonment and Restoration Plan.

22. FINANCIAL INFORMATION

Provide a statement of financial responsibility.
See Appendix M.

If the applicant is a business entity, provide a list of the officers of the company.

Rob Pease, President & CEO
Elaine Bennett, VP, Finance & CFO
Nicole Hoeller, VP, Communication & Corporate Secretary
Wes Carson, VP, Project Development
Angus Campbell, VP, Exploration
Matthew Pickard, VP, Environment & Sustainability

If the applicant is a business entity attach a copy of the Certificate of Incorporation or evidence of registration of the company name.

See Appendix M.

23. STUDIES UNDERTAKEN TO DATE - List and attach copies of studies, reports, research, etc.

Applicable studies pertaining to this application are:

2014 Draft EIS (DEIS)
2014 Baseline Studies
2013 Prefeasibility Report
2012 Ecosystems and Vegetation Baseline Report
2012 Hydrology Baseline Report
2011 Freshwater Baseline Report
2011 Back River Airstrip Fish and Fish Habitat Assessment
2012 Wildlife Baseline Report
2012 Archaeological Baseline Report
2012 Naonaiyaotit Traditional Knowledge Project (NTKP) – Back River (Hannigayok) Project

The pertinent results of these studies have been summarized in **Appendix B**. Complete copies of the baseline reports can be provided if requested.

24. PROPOSED TIME SCHEDULE – Indicate the proposed start and completion dates for each applicable phase of development (construction, operation, closure, and post closure).

Construction
Proposed Start Date: February 2015 (month/year) Proposed Completion Date: August 2015 (month/year)

Operation
Proposed Start Date: February 2015 (month/year) Proposed Completion Date: August 2015 (month/year)

Closure
Proposed Start Date: NA (month/year) Proposed Completion Date:

Post - Closure
Proposed Start Date: NA (month/year) Proposed Completion Date:

For each applicable phase of development indicate which season(s) activities occur.

Construction
X Winter **X Spring** **X Summer** ☐ Fall ☐ All season

Operation
☐ Winter ☐ Spring ☐ Summer ☐ Fall **X All season**

Closure
☐ Winter ☐ Spring ☐ Summer ☐ Fall **X All season**

Post - Closure
☐ Winter ☐ Spring ☐ Summer ☐ Fall **X All season**

25. PROPOSED TERM OF LICENCE

Number of years (maximum of 25 years): Two (2) years

Requested Date of Issuance: February 2015 (month/year) Requested Expiry Date: February 2017 (month/year)

(The requested date of issuance must be at least three (3) months from the date of application for a type B water licence and at least one (1) year from the date of application for a type A water licence, to allow for processing of the water licence application. These timeframes are approximate and do not account for the time to complete any pre-licensing land use planning or development impact requirements, time for the applicant to prepare and submit a water licence application in accordance with any project specific guidelines issued by the NWB, or the time for the applicant to respond to requests for additional information. See the NWB's *Guide 5: Processing Water Licence Applications* for more information)

26. ANNUAL REPORTING – If not using the NWB's *Standardized Form for Annual Reporting***,** provide details regarding the content of annual reports and a proposed outline or template of the annual report.

The NWB standard form for annual reporting will be used by Sabina with refinements as determined.

27. CHECKLIST – The following must be included with the application for the water licensing process to begin.

Written confirmation from the NPC confirming that NPC's requirements regarding land use plan conformity have been addressed.

X Yes ☐ No If no, date expected ________________________

Written confirmation from the NIRB confirming that NIRB's requirements regarding development impact assessment have been addressed.

☐ Yes X No If no, date expected ________________________

Completed General Water Licence Application form.

X Yes ☐ No If no, date expected ________________________

Information addressing Supplemental Information Guideline (SIG) , where applicable (see Block 11)

X Yes ☐ No If no, date expected ____________________

English Summary of Application.

X Yes ☐ No If no, date expected ____________________

Inuktitut and/or Inuinnaqtun Summary of Application.

X Yes ☐ No If no, date expected ____________________

Application Fee of $30.00 CDN (Payee Receiver General for Canada).

X Yes ☐ No If no, date expected ____________________

Water Use Fee Deposit of $30.00 CDN (Payee Receiver General for Canada). The actual water use fee will be calculated by the NWB based upon the amount of water authorized for use in accordance with the Regulations at the time of issuance of the licence.

X Yes ☐ No If no, date expected ____________________

28. SIGNATURE

Name (Print)	Title (Print)	Signature	Date
Matthew Pickard	Vice President, Environment & Sustainability Sabina Gold & Silver Corp.		October 17, 2014

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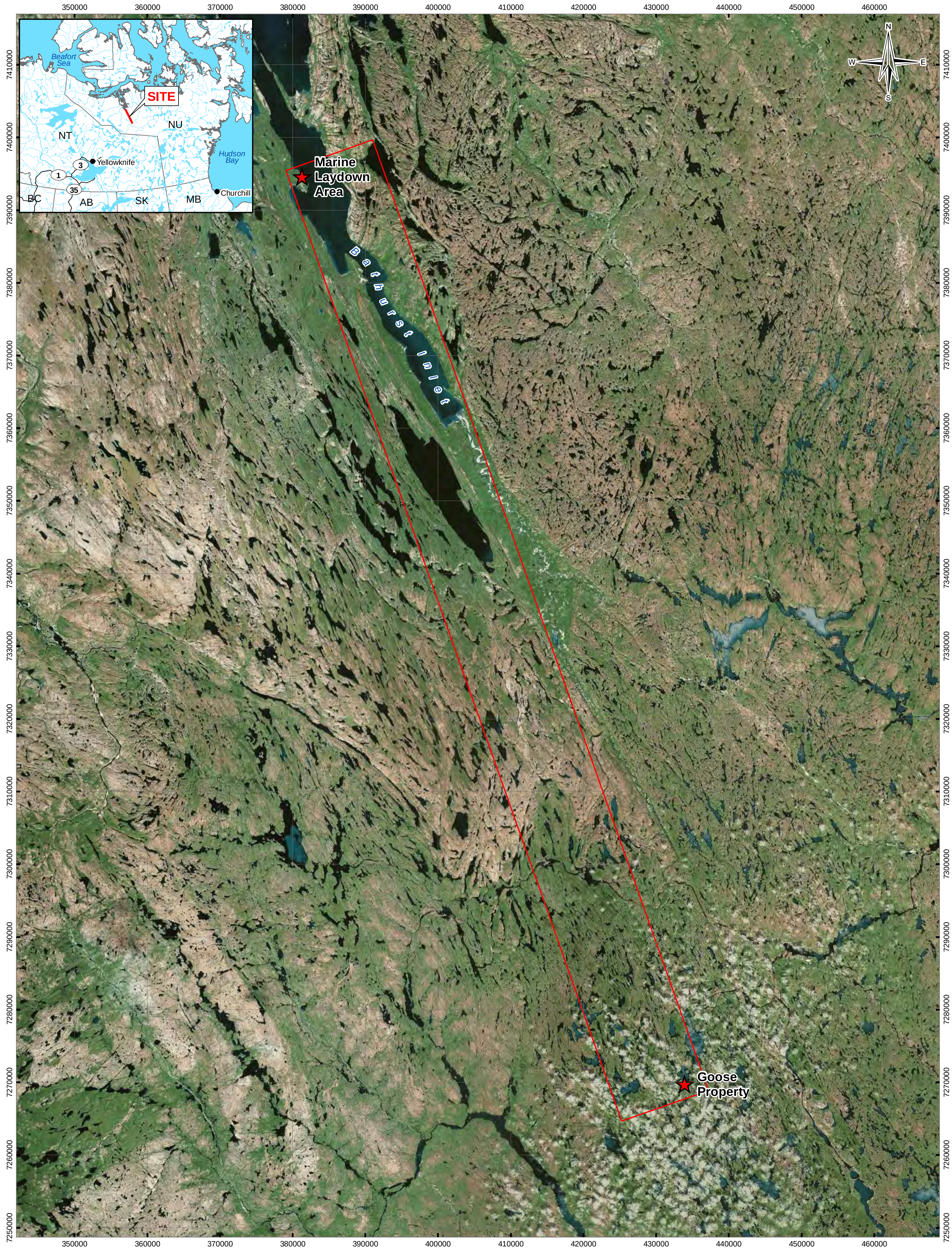


LEGEND

Proposed Site Preparation Activity Location

Proposed Site Preparation Area Extent

NOTES
Base data source:
Imagery from ESRI Basemaps (1999)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Location of Proposed Site Preparation Activities

PROJECTION	DATUM	CLIENT
UTM Zone 13	NAD83	Sabina

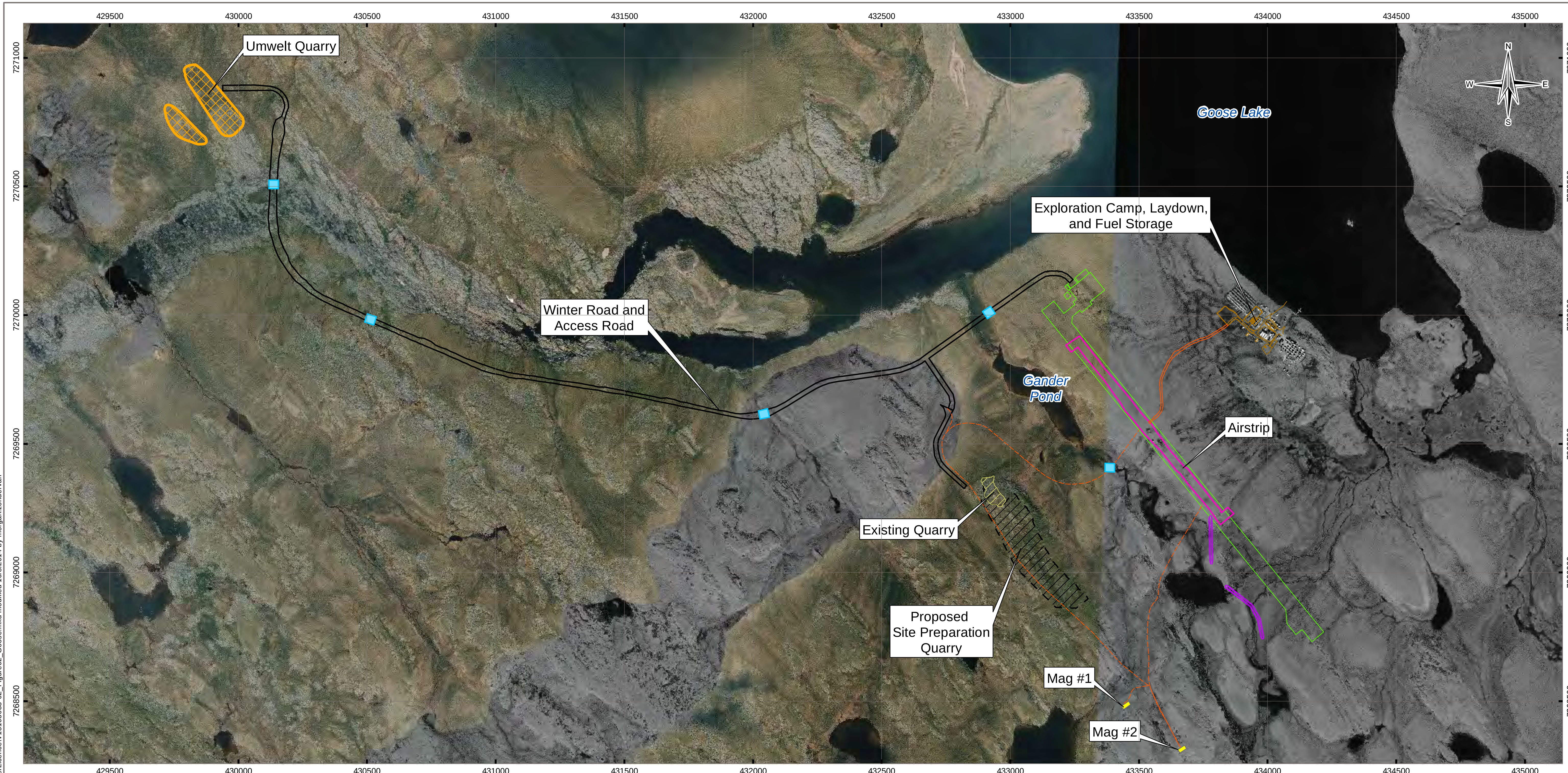
Scale: 1:500,000
10 5 0 10
Kilometres

FILE NO.
V15103033-02_Figure01_Activity.mxd

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	AR	0

OFFICE	DATE
Tt EBA-VANC	October 7, 2014

Figure 1



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LEGEND

- Proposed Access Road
- Rascal Stream Realignment Berm
- Proposed Airstrip Extension
- Proposed Umwelt Quarry
- Proposed Site Preparation Quarry
- Water Crossing / Culvert Location
- Winter Road
- Airstrip Access Road
- Laydown Area / Existing Camp / Fuel Storage
- Explosive Magazine Location
- Existing Quarry
- Existing Airstrip

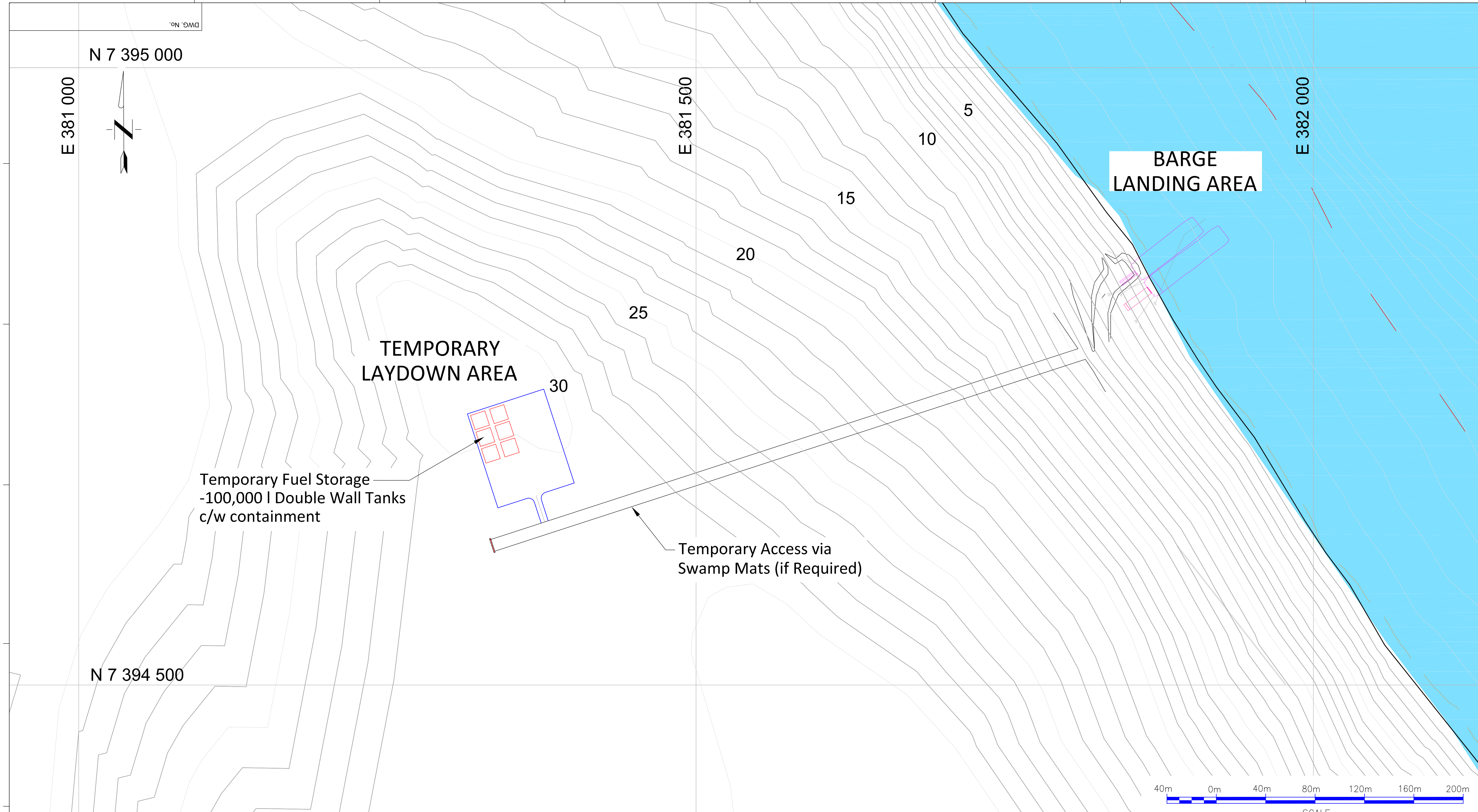
NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)

SABINA BACK RIVER PROJECT, NUNAVUT

Proposed Activities to be Undertaken at the Goose Property

PROJECTION UTM Zone 13	DATUM NAD83				CLIENT Sabina
Scale: 1:15,000 200 100 0 200 Metres					
FILE NO. V15103033-02_Figure02_Goose.mxd					
PROJECT NO. V15103033-02	DWN MEZ	CKD SL	APVD AR	REV 0	Figure 2
OFFICE Tt EBA-VANC	DATE October 8, 2014				

STATUS
ISSUED FOR REVIEW



JDS Energy & Mining Inc.

Sabina

BACK RIVER FEASIBILITY STUDY

PORT SITE PRE-DEVELOPMENT LAYDOWN AREA PLAN

DRAWING No.	DRAWING TITLE
REFERENCE DRAWINGS	

REGISTERED PROFESSIONAL

No.	DESCRIPTION	BY	CHK'D	DATE
REVISIONS				

ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON			
DESIGNER			
CHECKER			
DESIGN COORD.			
RESP. ENG.			
LEAD DISC. ENG.			
ENG. MANAGER			
PROJ. MANAGER			
DRAWING APPROVAL STATUS:			

SCALE	DWG. No.	REV
1:18000 OR AS NOTED	10-10-201	

$USERNAME$

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

EXPLORATION/ REMOTE CAMP SUPPLEMENTARY QUESTIONNAIRE

Applicant: Sabina Gold & Silver Corp._____Licence No: ______________________________
(For NWB Use Only)

ADMINISTRATIVE INFORMATION

1. Environment Manager: Matthew Pickard Tel: 604-998-4175 ___Fax: 604-998-1051 E-mail: mpickard@sabinagoldsilver.com

2. Project Manager: John Laitin Tel: 604-998-4175 ___Fax: 604-998-1051 E-mail: jlaitin@sabinagoldsilver.com

3. Does the applicant hold the necessary property rights?

Sabina Gold & Silver Corp. acquired a 100% interest in the Back River Properties from Dundee Precious Metals in 2009. Currently operates under water license NWBGOO1015 and NWBGEO0210 for the Goose and George Projects respectively.

4. Is the applicant an 'operator' for another company (i.e., the holder of the property rights)? If so, please provide letter of authorization.
N/A

5. Duration of the Project

X One year or less Start and completion dates: February – August 2015
☐ Multi Year:

If Multi-Year indicate proposed schedule of on site activities
Start: Completion:

CAMP CLASSIFICATION

Sections 6, 7 – 9, and 14 of this form are not applicable as camp use is not included in the scope of the 2015 Site Preparation Activities. Camp activities are covered under the existing Goose Water Licence 2BE-GOO1015.

6. Type of Camp
Not applicable

☐ Mobile (self-propelled)
☐ Temporary

☐ Seasonally Occupied:
☐ Permanent
☐ Other:________________________________

What is the design, maximum and expected average population of the camp?

Not applicable.

7. Provide history of the site if it has been used in the past.

Goose Activities: Exploration for precious metals has occurred in this area of the Kitikmeot Region since the 1980's under various operators, including Back River Joint Venture, Homestake, Araurco, Kit Resources, Kinross, Miramar, and Dundee Precious Metals. Sabina acquired the Back River Properties in 2009 and has used it every year since that time to support ongoing exploration and baseline data collection.

MLA Activities: The MLA area has not been used for exploration or development works in the past.

CAMP LOCATION

8. Please describe proposed camp location in relation to biogeographical and geomorphological features, and water bodies.

Not applicable.

9. How was the location of the camp selected? Was the site previously used? Was assistance from the Regional Inuit Association Land Manager sought? Include maps and/or aerial photographs.

Not applicable.

10. Is the camp or any aspect of the project located on:

[X] Crown Lands   Permit Number (s)/Expiry Date: Oct 31, 2014
Land Use Permit N2010C016

[ ] Commissioners Lands
Permit Number (s)/Expiry Date: ______N/A_____________

[X] Inuit Owned Lands   Permit Number (s)/Expiry Date: Dec 13, 2014
License No. KTL304C017

11. Closest Communities (direction and distance in km):
The Goose property area is located approximately 400 km south of Cambridge Bay and 160 km south of the hamlet of Bathurst Inlet.
The MLA is located approximately 15km from the hamlet of Bathurst Inlet.

12. Has the proponent notified and consulted the nearby communities and potentially interested parties about the proposed work?

Sabina maintains a community and government engagement program to discuss our current exploration programs and the development of the Back River Project. Most of our community discussions on water use and waste deposition have been of a general nature, with potential effects on water quality and quantity and potential accidental spills. In response, Sabina has implemented a Transportation Management Plan and Spill Contingency Plan that incorporate regulatory requirements, best management practices, Traditional Knowledge, and community consultation commitments.

13. Will the project have impacts on traditional water use areas used by the nearby communities? Will the project have impacts on local fish and wildlife habitats?

The project is expected to have no impact on traditional water use areas by nearby communities. Precautions are taken to minimize impact on the local environment, and best management practices are employed to handle waste and cuttings. Should any concerns arise over traditional water use areas, Sabina will work with the affected parties to address them.

The project is expected to have no or minimal impact on local fish and wildlife habitat. Encounters with wildlife will be kept to a minimum through a policy of camp and work site cleanliness, no hunting or fishing from camp except with a valid permit from the Government of Nunavut, and no feeding of the animals. Hand-held air horns will be available to warn off bears and, if necessary, pepper spray will be used for self-protection rather than firearms. Camp personnel will be encouraged to report wildlife encounters and record the location any critical wildlife habitat that may be discovered, such as dens or nesting or spawning sites so as to avoid them in the future.

PURPOSE OF THE CAMP

14.
- ☐ Mining (includes exploration drilling)
- ☐ Tourism (hunting, fishing, wildlife observation, adventure/expedition, etc.) (Omit questions # 16 to 21)
- ☐ Other

Not applicable.

15. Activities (check all applicable)
- ☐ Preliminary site visit
- ☐ Prospecting
- ☐ Geological mapping
- ☐ Geophysical survey
- ☐ Diamond drilling
- ☐ Reverse circulation drilling
- ☐ Evaluation Drilling/Bulk Sampling (also complete separate questionnaire)
- X Other: Site preparation

16. Type of deposit (exploration focus):

- **X** Lead, Zinc
- Diamond
- **X** Gold
- ☐ Uranium
- **X** Other: Copper, Silver

DRILLING INFORMATION

Not applicable

17. Drilling Activities
   - ☐ Land Based drilling
   - ☐ Drilling on ice

18. Describe what will be done with drill cuttings?

19. Describe what will be done with drill water?

20. List the brand names and constituents of the drill additives to be used? Includes MSDS sheets and provide confirmation that the additives are non-toxic and biodegradable.

21. Will any core testing be done on site? Describe.

SPILL CONTINGENCY PLANNING

22. The proponent is required to have a site specific Spill Contingency Plan prepared and submitted with the application This Plan should be prepared in accordance with the *NWT Environmental Protection Act, Spill Contingency Planning and Reporting Regulations, July 22, 1998* and *A Guide to the Spill Contingency Planning and Reporting Regulations, June 2002*. Please include for review.

A Spill Contingency/ Emergency Response Plan and an Oil Pollution Emergency Plan are included in the appendices of this Water Licence Application.

23. How many spill kits will be on site and where will they be located?

Goose: Numerous spill kits will be located throughout the camp as outlined in the Spill Contingency Plan. At a minimum, spill kits will be located adjacent to areas where fuel or other hydrocarbons are involved (i.e. tank farm, helipads, generator shack, incinerator, dock, drummed fuel storage).

MLA Location: A spill kit will be located at the fuel storage area of the Temporary Laydown Area.

24. Please describe the types, quantities, and method of storage of fuel and chemicals on site, and provide MSDS sheets.

Goose:
Diesel fuel will be stored at the Goose Camp in the double-walled Envirotanks located within the lined, bermed tank farm. Up to 500,000L of fuel will be stored in an already approved facility at the existing Goose fuel storage area for use in the 2015 Site Preparation Activities.

A variety of substances are used in the day to day operation of the camp. Hydraulic fluid, motor oil and various lubricants are required for maintenance of vehicles and heavy equipment on site. These materials are currently stored in the former generator shed near the office complex which has been retrofitted with plastic sheeting and enviromat in the floor to serve as a secondary containment facility.

A number of products are used for cleaning and personal hygiene throughout the camp such as dish soap, laundry detergent, shampoo, and household cleaner. These materials are stored throughout the camp where needed, and are in containers typically not exceeding 1 L in volume. As such, any spill will be contained simply by the building within which the spill occurs and can be readily cleaned up, eliminating the need for any special storage requirements. The actual products may change depending on availability.

Sabina maintains a database of MSDS sheets for a large number of products which can be viewed by an inspector upon request.

MLA:
Up to 600,000L of diesel fuel will be stored in the temporary laydown area at the Marine Laydown Area in 100,000L double-walled Envirotanks. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

WATER SUPPLY AND TREATMENT

25. Describe the location of water sources.

Goose Lake will be the source of water to be used for the 2015 Site Preparation Activities.

Water to be used at the MLA will be brought in each day with the Site Preparation workforce from Goose.

26. Estimated water use (in cubic metres/day):

It is estimated that a maximum of 120m^3/day of water will be sourced from Goose Lake.

27. Describe water intake for camp operations? Is the water intake equipped with a mesh screen to prevent entrapment of fish? (see *DFO 1995, Freshwater Intake End-of-Pipe Fish Screen Guideline*) Describe:

Camp activities are covered under the existing Goose Water Licence 2BE-GOO1015.

For Site Preparation activities (winter access, dust suppression and compaction), the water intake will be the same as that used for camp operations . This is located adjacent to the dock at the Goose camp. It is equipped with a screen to prevent entrapment of fish.

28. Will drinking water quality be monitored? What parameters will be analyzed and at what frequency?

It should be noted that potable water use is not included in the scope of the 2015 Site Preparation Activities application as this water is covered under the existing Goose Water Licence 2BE-GOO1015.

Drinking water samples are collected weekly and submitted to Stanton Hospital for testing for pathogens (E. Coli.).

29. Will drinking water be treated? How?

It should be noted that potable water use is not included in the scope of the 2015 Site Preparation Activities application as this water is covered under the existing Goose Water Licence 2BE-GOO1015.

Drinking water is pumped into a holding pool located in a heated shed adjacent to the kitchen and dry facility. Any larger particles will settle to the bottom of the pool. Filtration is then used to remove smaller suspended material. Final treatment consists of UV and chlorination.

30. Will water be stored on site?

Water storage is not required for the 2015 Site Preparation Activities.

WASTE TREATMENT AND DISPOSAL

31. Describe the characteristics, quantities, treatment and disposal methods for:

It should be noted that the Goose Camp is permitted under NWB authorization 2BE-GOO1015 which includes waste types and quantities also linked to the 2015 Site Preparation Activities (i.e. sewage, domestic refuse from camp, greywater).

Solid Waste

The disposal method for combustible solid waste such as paper, cardboard, plastic, wood, burlap cloth, fuel or oil-soaked absorbent material, semi-solid waste from Pacto toilets and food preparation waste would be by burning in the camp incinerator. Any remaining ashes and unburned residue would be collected in cleaned 205 L drums, sealed for transport, and flown out for disposal at a suitable waste management facility.

Bulky Items/Scrap Metal

Empty drums are drained of residual fuel, crushed and strapped together for removal to Yellowknife and subsequent disposal at an approved facility or recycling as scrap metal. Larger items are packaged either in empty drums or on pallets and removed to Yellowknife for disposal at an appropriate facility, landfill or for recycling.

Waste Oil/Hazardous Waste

Waste oil and residual fuel is diluted with diesel and burned in the new waste oil furnace installed to provide heat for the Quonset.

Hazardous waste (as outlined in the Government of Nunavut Environmental Guideline For General Management of Hazardous Waste) will be packaged appropriately, labeled, and backhauled to Yellowknife for disposal at an appropriate facility.

Empty Barrels/Fuel Drums

Empty drums are drained of residual fuel (stored for use in the waste oil furnace), crushed and strapped together for removal to Yellowknife and subsequent disposal at an approved facility or recycling as scrap metal.

☐ Other:

32. Please describe incineration system if used on site. What types of wastes will be incinerated?

A forced air – dual stage, diesel fueled incinerator system is used on site. Burnable solid waste such as paper, cardboard, plastic, wood, burlap cloth, fuel or oil soaked absorbent material, semi-solid waste from Pacto toilets and food preparation waste is disposed of by burning in the incinerator.

33. Where and how will non-combustible waste be disposed of? If in a municipality in Nunavut, has authorization been granted?

Current waste management practices at the goose Camp will be maintained during the 2015 Site Preparation Activities:

Any remaining ashes and unburned residue from the incinerator are flown out for disposal or recycling at the Yellowknife landfill site. Drums of mixed hydrocarbons and water have also been trucked to a waste recycling and treatment site near Edmonton Alberta. Aluminum pop cans, and non-dairy, food grade plastic containers are collected and shipped to Yellowknife for recycling. Remaining non-combustible waste is bagged and shipped to the municipal landfill in Yellowknife.

34. Describe location (relative to water bodies and camp facilities) dimensions and volume, and freeboard for all sumps (if applicable).

Not applicable for this application.

35. Will leachate monitoring be done? What parameters will be sampled and analyzed, and at what frequency?

Not applicable for this application.

OPERATION AND MAINTENANCE

36. Have the water supply and waste treatment and disposal methods been used and proven in cold climate? What known O&M problems may occur? What contingency plans are in place?

Not applicable. Camp activities are covered under the existing Goose Water Licence 2BE-GOO1015.

ABANDONMENT AND RESTORATION

37. Provide a detailed description of progressive and final abandonment and restoration activities at the site.

An Abandonment and Restoration Plan is included as Appendix H to this application.

BASELINE DATA

38. Has or will any baseline information be collected as part of this project?

- **X** Physical Environment (Landscape and Terrain, Air, Water, etc.)
- **X** Biological Environment (Vegetation, Wildlife, Birds, Fish and Other Aquatic Organisms, etc.)
- **X** Socio-Economic Environment (Archaeology, Land and Resources Use,
- **X** Demographics, Social and Culture Patterns, etc.)
- **X** Other: Geochemical characterization, Engineering Studies.

REGULATORY INFORMATION

39. At a minimum, you should ensure you have a copy of and consult the documents below for compliance with existing regulatory requirements:

- ✓ ARTICLE 13 – *NCLA -Nunavut Land Claims Agreement*
- ✓ NWNSRTA – *The Nunavut Waters and Nunavut Surface Rights Tribunal Act, 2002*
- ✓ *Northwest Territories Waters Regulations, 1993*
- ✓ NWB - Water Licensing in Nunavut - Interim Procedures and Information Guide for Applicants
- ✓ NWB - Interim Rules of Practice and Procedure for Public Hearings
- ✓ RWED – *Environmental Protection Act, R-068-93- Spill Contingency Planning and Reporting Regulations, 1993*
- ✓ RWED A Guide to the Spill Contingency Planning and Reporting Regulations, 2002
- ✓ NWTWB - Guidelines for Contingency Planning
- ✓ *Canadian Environmental Protection Act, 1999 (CEPA)*
- ✓ *Fisheries Act, RS 1985* - s.34, 35, 36 and 37

- ✓ DFO - Freshwater Intake End of Pipe Fish Screen Guideline
- ✓ NWTWB - Guidelines for the Discharge of Treated Municipal Wastewater in the NWT
- ✓ Canadian Council for Ministers of the Environment (CCME); Canadian Drinking Water Quality Guidelines, 1987
- ✓ Public Health Act - Camp Sanitation Regulations
- ✓ Public Health Act - Water Supply Regulations
- ✓ *Territorial Lands Act* and *Territorial Land Use Regulations*; Updated 2000

APPENDIX A

SUB-SURFACE AND SURFACE TENURE HELD BY SABINA

Land Status (as of October 6, 2014)

Project/ Prospects	Tenure Name	Hectares (HA)	Tenure Type	Registered Ownership as of October 6, 2014	Expiry / Renewal Date
Goose	3694	417.92	Federal Mining Leases (7)	100% in good standing	16-Oct-2015
	3695	410.27			16-Oct-2015
	3696	1077.71			16-Oct-2015
	3697	1101.80			16-Oct-2015
	3698	1073.66			16-Oct-2015
	3699	1004.00			16-Oct-2015
	3700	1084.59			16-Oct-2015
	K12025	920.36	Federal Mining Claims (2)	100% in good standing	19-May-2017
	K12026	662.42			19-May-2017
George	3562	69.48	Federal Mining Leases (19)	100% in good standing	9-Nov-2014
	3598	394.16			28-Dec-2014
	3599	821.11			28-Dec-2014
	3600	1008.88			28-Dec-2014
	3601	1097.91			28-Dec-2014
	3602	1027.90			28-Dec-2014
	3603	1078.08			28-Dec-2014
	3604	450.01			28-Dec-2014
	3605	1036.81			19-Dec-2014
	3606	1074.04			19-Dec-2014
	3607	1033.97			19-Dec-2014
	3608	1057.61			19-Dec-2014
	3649	1046.92			19-Dec-2014
	3650	200.08			28-Dec-2014
	3651	1042.07			28-Dec-2014
	3653	1074.85			19-Dec-2014
	3677	536.53			16-Oct-2015
	3729	111.01			16-Oct-2015
	3730	749.88			16-Oct-2015
	F98491	998.04	Federal Mining Claims (2)	100%	25-Nov-2015

Project/ Prospects	Tenure Name	Hectares (HA)	Tenure Type	Registered Ownership as of October 6, 2014	Expiry / Renewal Date
	F98492	888.29		in good standing	25-Nov-2015
Boot	3552	1,029.92	Federal Mining Leases (10)	100% in good standing	30-Dec-2014
	3553	1,036.80			30-Dec-2014
	3554	1,093.50			30-Dec-2014
	3555	1,015.17			30-Dec-2014
	3609	1,082.16			30-Dec-2014
	3612	1,080.54			30-Dec-2014
	3613	1,025.06			30-Dec-2014
Boot	3678	1,061.51			16-Oct-2015
	3679	1,002.38			16-Oct-2015
	3724	541.89			16-Oct-2015
Boulder	3466	300.51	Federal Mining Leases (8)	100% in good standing	18-Nov-2014
	3557	1,012.91			30-Dec-2014
	3558	1,052.19			30-Dec-2014
	3559	1,049.36			30-Dec-2014
	3560	1,100.39			30-Dec-2014
	3691	260.01			16-Oct-2015
	3692	456.84			16-Oct-2015
	3693	671.09			16-Oct-2015
	K12027	903.96	Federal Mining Claims (6)	100% in good standing	4-Oct-2022
	K12028	1,008.86			4-Oct-2022
	K12029	949.73			4-Oct-2022
	K12030	938.79			4-Oct-2022
	K12033	290.79			4-Oct-2022
	K12034	734.27			4-Oct-2022
Bath	5152	983.1375	Federal Mining Leases (1)	100% in good standing	10-Mar-2015
Del	K10862	966.74	Federal Mining Claims (6)	100% in good standing	12-Sep-2017
	K10863	966.74			12-Sep-2016
	K10866	966.74			12-Sep-2018
	K10867	966.74			12-Sep-2018

Project/ Prospects	Tenure Name	Hectares (HA)	Tenure Type	Registered Ownership as of October 6, 2014	Expiry / Renewal Date
	K10869	965.52			12-Sep-2017
	K10870	976.46			12-Sep-2017

Current Permits, Licences and Authorizations

Permit No.	Permit Name	Expiry	Issuing Agency
KTL304C017	Goose Lake Exploration	2014-12-13	KIA
KTP11Q001	Goose Lake Rock Quarry	2014-12-13	KIA
KTP12Q001	Goose Lake Airstrip borrow area	2014-12-13	KIA
N2010C0016	Back River Mineral Exploration	2014-10-31	AANDC
2BE-GOO1015	Goose Lake Water License	2015-03-31	NWB
KTL204C012	Boulder exploration	2014-12-13	KIA
KTL204C020	Boot exploration	2014-12-13	KIA
KTL312C004	Wishbone-Malley Exploration	2014-12-13	KIA
N2012C0003	Wishbone-Malley Mineral Exploration	2015-02-06	AANDC
2BE-MLL1217	Wishbone-Malley Water License	2017-03-26	NWB
KTL304F049	Winter road – Bathurst Inlet to Goose and George Lake	2014-12-13	KIA
N2011F0029	Winter road – Goose Lake to George Lake	2014-12-13	AANDC
N2010F0017	Winter road – Bathurst Inlet to Back River Project	2014-09-16	AANDC
KTL304C018	George Lake Exploration	2014-12-13	KIA
KTP12Q002	George Lake Borrow Quarry	2014-12-13	KIA
2BE-GEO1015	George Lake Water License	2015-06-15	NWB

APPENDIX B

SABINA BACK RIVER PROJECT SITE PREPARATION ACTIVITIES PROJECT DESCRIPTION / ENVIRONMENTAL SCREENING REPORT

Sabina
GOLD & SILVER CORP.

SABINA BACK RIVER PROJECT

2015 SITE PREPARATION ACTIVITIES PROJECT DESCRIPTION / ENVIRONMENTAL SCREENING REPORT

NON-TECHNICAL SUMMARY

Sabina Gold & Silver Corp.'s (Sabina) Back River Gold Project (the Project) is an advanced exploration gold project located in the West Kitikmeot region of Nunavut, at approximately 65° to 66° north latitude, and 106° to 107° west longitude. Since 2009, nearly all exploration has been confined to the Goose Property Area, focused on finding new gold mineralization away from the existing Goose deposit.

The proposed Project includes the development of open pits at the Goose Property (Goose, Umwelt and Llama), an underground mine at the Goose Property (Umwelt) and open pits at the George Property (Locale 1, Locale 2, and LCP North). Ore would be mined and trucked to a conventional processing plant at the Goose Property to produce gold. The processing of the ore to recover gold would include crushing and grinding of the ore, followed by gravity and flotation concentration, and leaching of the concentrate. Waste material from the mine operations would be placed on the land in certain areas and tailings would be deposited in a nearby impoundment.

The Project is currently under review with the Nunavut Impact Review Board (NIRB); however, Sabina is seeking approvals for the staging of equipment and materials, and site preparation works, for the Project prior to completion of the NIRB review and issuance of the Type A water licence and surface leases. In April, 2012 the NIRB released Guide 9 - Draft Guide to Exceptions from the Review Process (the Guide). As per the Guide there are limited circumstances where the NIRB may determine that exploration and/or development activities can be allowed to proceed while a related project is undergoing review, including supporting research, extension and amendments to previously approved activities, construction and support of infrastructure required for research and exploration, and storage of fuel, equipment and materials associated with the Project under review.

Proposed site preparation activities for which an exception is being applied for include the following:

- Umwelt quarry construction and operation;
- Goose quarry expansion and operation;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of an all –weather road and associated crossings;
- Ice road and water use; and
- Staging of a Temporary Laydown Area (TLA) at the site of the proposed Marine Laydown Area (MLA) for the Project.

The quarries, airstrip extension, Rascal Lake outflow stream realignment, all-weather road, winter road and staging of the TLA are considered new activities, and are subject to an assessment of effects carried out in this report. All other activities are ongoing and are authorized under Sabina's existing permits and licences.

The existing Goose exploration camp operates seasonally from approximately January to October, Sabina proposes to continue this seasonal operation during 2015. Subject to obtaining the necessary Project authorizations, Sabina plans to commence the site preparation activities in February 2015 and estimate works will be completed by August 2015. Staging of the TLA is expected to take 25 days and will be completed during the open water season, likely August 2015.

Site preparation activities will take place within the Goose Property and Marine Laydown Area. The Goose Property area is characterized by mesic and moist tundra, with isolated rocky outcrops. The MLA, located at the south end of Bathurst Inlet, occurs on dry and mesic tundra, surrounded by a mosaic of ecosystems derived from marine and fluvial sediments. Valued Ecosystem Components (VECs) identified within these two areas include those associated with the Atmospheric Environment (Air Quality, Noise and Vibration), Terrestrial Environment (Vegetation, Caribou, Grizzly Bear, Muskox, Wolverine/Furbearers, Migratory Birds, and Raptors), Freshwater and Marine Environment (Hydrology/ Limnology, Groundwater, Water Quality, Sediment Quality, and Fish/Aquatic Habitat) and the Human Environment (Archaeological and Cultural Historic Sites).

Environmental effects associated with site preparation activities include localized loss and alteration of vegetation and wildlife habitat, low levels of wildlife disturbance and avoidance due to noise from construction and operation of quarries, the all-weather road, and airstrip, potential spills of deleterious substances onto the land or in water, and the effects on fish habitat due to the realignment of Rascal Stream East. These effects will be minor in extent, when mitigated by following the relevant environmental management plans including the Spill Contingency Plan, and Waste Management Plan, as well as others that may apply. Losses to fish habitat at Rascal Stream East due to stream realignment will be compensated for within the realignment. This will provide newly available spawning, rearing and foraging habitat for Arctic Grayling at approximately six times the area lost and will maintain the migratory corridor between Goose and Wolf Watersheds.   This will equal a habitat area gain to loss ratio of 5.9 to 1 and habitat value ratio of 2.3 to 1.

As a result, with proposed mitigation and habitat compensation in place, no significant adverse effects are expected to result from these site preparation activities.

NON-TECHNICAL SUMMARY – INUINNAQTUN

Sabina-kun Hanigayuqmi Kulmik Uyaraktaqvik (Havaaq) navlvaqhiuqviukhaaqtuq kulmik uyaraqtaqvikhaq iniqatuq Ualiqhiani Kitiqmiuni Nunavumi, qanituani 65° uvuga 66° ukiuqtaqtuani haniliriini qunmugayuni, unalu 106° uvuga 107° ualiqhiani hanimun avatiknuraqtuni.

2009-min, tamaitavyak nalvaqhiuqnigin Goose-miluaq igluqpaqaqvikmi pihimayun, nanihinahuaqhutik nutaanik kulmik uyaraqtaakhanik ahivani taja Goose-mi uyaraqtaakhan. Atulirumayaan Havaaq ilaqaqtuq pivalianiganik nunam qaaganin anmun uyaraqtaqvikmik Goose-mi Igluqpaqaqvikmi (Goose-mi, Umwelt-mi, Liama-milu), nunami hitiliuqlutik uyaraqtaqvikhaq Goose-mi Igluqpaqaqvikmi (Goose-mi Umwelt-milu) George-milu Igluqpaqaqvikmi (Locale 1-mi, Locale 2-mi, Lone Cow-mi, GH-mi, Slave-milu). Uyaraqtaakhan ahivaqtigauniaqtun akhalutikulu akyaqtaulutik uyaqiqivikmun Goose-mi Iglukpaqaqvikmi kul ahivagauyaagani. Uyaqiqiyutin ahivariagani kul ilaqaqtuk hiquptiqniginik uyaraqtaan, kiviyaaqniginiklu puktalaaqniganiklu akutauyun, ahivaiyutilu kulqaqniganik uyaraqtaan. Iqagun uyaraqtaqvikmin iliyauniaqtun maniqamun humiliqaa ihuaqhaqhimayuni atakulu iliyauniaqtun haniani ataguuqvikmun.

Havaaq taja ihivriuqtauliqtuq Nunavumi Avatiliqiyin Katimayinin (NIRB), kihiani, Sabina-kun qiniqhiayun agirutinik akyariagani piqutinik hanayakhaniklu, igluqpaqaqvikhaqlu ihuaqhaqluguj, Hanigayuqmi Havaami iniqtautinagu NIRB-kun ihivgiuqniga tuniyaunigalu Qanuriniganik A-mik imaqmik aturiagani laisimik nunalu qaaginik atuqnigagun. April-mi 2012-mi NIRB-kun tunihiyun Maliruakhaq 9 – Titiraaqaqniga Maliruakhaq Aturiaqaginiginik Ihivgiuqnikun Aulaniganik (Maliruaq). Atuqan Maliruaq ikitun qanurinigin NIRB-kun ihumaliurutigilaaqtain nalvaqhiuqniq pivalianikuluniin havaan atulaaqmagaa ilagiyaa havaam Ihivriuqtauhimaqtilugu, ukualu ikayutin ilituqhautin, iliagiarutin nutaaguqtiqniginiklu agiqtautaaqhimayun havaakhan, hanayakhan ikayuqtuqniginiklu napaqtigauyun ihariagiyauyun ilituqhainikmi nalvaqhiuqniqmilu, tutquqtiqnigilu uqhukhan, piqutin hanaugakhalu ilagiyain havaam ihivriugauyum.

Atuqtauyumayun igluqpaqaqvikmi huliyutikhan aturiaqaqinigagun piyutauyunik tukhigauyunik ukunigalu:

- Goose-mi Igluqpaqaqvikmi aulanigin;
- Nalvaaqhiuqnik ikayutilu hulilugaarutin;
- Uyaraqhaqvikhan hananigagun atuqnigagulu;
- Ukiuraaluq milvik ilagiaqniga;
- Rascal Lake-mi talvanga kuuknigin nalguhitiaqnigin;
- Ukiuraaluq apqun ilaginilu akaariarutin;
- Hikumi apqun imaqniklu atuqnigagun;
- Hikumi Milvikhaq; unalu
- Hananiga atuqnigalu Uhiiyaqvikhalak Tamayanik (TLA) Taqyum Hinaani Uhiiyaqvikhamik.

Atuqhimaqtun Goose-mi nalvaaqhiuqtin igluqpaqaqvian atuqtuq ilainaanik ukium qanituani January-min October-mun, Sabina-kun atuqhimarumainaqtun ukium ilainaani aulaniganik atuliqan 2015 ukiuq. Piniqata piyariaqaqtun Havaami agirutin, Sabina-kun upalugaiyaqtun igluqpaqaqvikhaq ihuaqhariagani February-mi 2015-mi havaaqlu iniqniaqnahugiyaan August-mi 2015-mi. Ihuaqhaqniga TLA nahuriyauyuq qulinin 14-nun uubluni hivituniaqtuq iniqtaulunilu auyautilugu, August-mi ahu 2015-mi.

Igluqpaqaqvikhami ihuaqhaqnigin havaariyauliqniaqtun Goose-mi Igluqpaqaqvikhami Taqyumilu Uhiiyaqvikhaq. Goose-mi Igluqpaqaqvikhaq nunainaq kinipavlunilu, qaiqtuvaluqaqhunilu. Umiyanin Uhiiyaqvikhaq hivuraani Qigaum, pamiumayuq maniraaq, nautiavaluqaqhuni taqyum hanianiitpaktunik kuuvaluknilu hiuralianik. Atuqniqaqtun Avatauyumi Hunaunigin (VEC) naunaiqtauyun ukunani malrukni nunakni ukualu ilauyuni Qilainaum Kanuriniga (VEC) tikuaqtauyun ukunani nunani ukualu piyutiqaqtun Kilainaqmi Avatauyumik (Halumaniga, Nipaaqniga, Nayaqhakpaknigalu), Maniqami Avatauyuq (Nautian, Tuktun, Akhain, Umikmain, Qalviin/Amilgin Umayun, Tikmiyan Kaalaan/Kilgaviin), Imiqtaqvikhan Taqyumilu Avatauyun (Imavaluqaqnigin/Tatilu, Nunam Iluani Imavaluin, Imariknigin, Hiuqan Halumanigin, Iqaluin/Imaqmiutalu Nunagiyain) Inuilu Avatigiyaan (Inituqliin Ilitquhiqmi Atuqniqaqtun Inituqliin).

Atuqniqaqluaqtun avatauyumik aktuqniginik piyutiqaqtun igluqpaqaqvikhak ihuaqhaqnigagun havaanin talvanilu ahiuniganik aalaguqtiqniganiklu nautian umayulu nunagiyain, umayunik pivalaaginiga nunagiyaani qaniklitailiniqlu ila nipaaqniganin hanayun atuqniginiklu uyaraqtaqviuyun, ukiuraaluklu apqutauyuq, milviklu, kuvilaaqnigilu hurautaulaqtunik kuviyaaqtunik manikamun imaqmiluniin, aktuqnigilu iqaluin nunagiyainik ihuaqhaqnigagun Rascal-mi Kuunuami Kivalikhiani. Ukua aktuqnigin Ihuaqhiniaqun maliguatiaqlugin atuqniqaqtun avatauyumik munarinigagun upalugaiyautinik ukualu Kuviyuqaqan Upigiarutikhanun Upalugaiyaun, Anaguniklu Munariyutinun Upalugaiyaun, ukualu ahiin atulaaqtun. Ahiunigin iqaluin nunagiyainik Rascal-mi Kuunuami Kivaliqhiani kuum ihuaqhaqniganin himauhiqtauniaquq talvani ihuaqhaqnigani. Una piyutauniaqtuq nutaanik igliqaqvikhanik, iqalugaqaqvikhanik niriniaqvikhainiklu Hulukpaugan ila siksinik agiklivaaliriaqlugu inigiyauyugaaluaq pihimainaqlugulu aulanigin iqaluin Goose-min Wolf-mulu Imaqaqnigani. Una ajikutariniaraa nunagiyauyum agikligiaqniganik mikhigiaqniganikluniin ima 5.9, atutimi nunagiyauyulu amigainigin immaa 1.7, atautimi.

Taimaitilugu, atulirumayauyuq ihuaqhaun nunagiyauyulu himautikhainik atuqtun, agiyunik ihiulijutinik aktuqniganin nahurigiyun ukunanga igluqpaqaqvikhamik ihuaqhaqnigagun havaanin.

NON-TECHNICAL SUMMARY – INUKTITUT

ᓴᐋᓇᒃᑯᑦ ᓴᓐᓂᖓᕙᖕᒥ ᒨᓗᓯᐅᕐᓂᕐᒧᑦ ᐱᓕᕆᐊᒃᓴᕆᔭᖓᑦ (ᐱᓕᕆᐊᖅ) ᐅᖓᕙᖅᐹᓪᓕᖅᓯᒪᓂᐅᓪᓗᓂ ᒨᓗᓯᐅᕐᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᕗᖅ ᕿᑎᕐᒥᐅᓂ ᓄᓇᕗᒻᒥ, ᖃᓂᒌᔭᓂ 65°–ᒥᑦ 66°–ᒧᑦ ᓄᓇᐅᑉ ᖁᒻᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᖏᑎᒍᑦ, ᐊᒻᒪ 106°–ᒥᑦ 107°–ᒧᑦ ᓄᓇᐅᑉ ᑐᑭᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᖏᑎᒍᑦ. ᑕᐃᒪᙵᓂᑦ 2009-ᖑᓚᐅᖅᑎᓪᓗᒍ, ᑕᒪᕐᒥᓗᒃᑖᒃᓴᒃ ᕿᓂᖅᓴᕐᓂᐅᔪᑦ ᑲᖑᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖓᓂ, ᑐᕌᕆᔭᐅᓪᓗᓂ ᓇᓂᓯᓂᖅ ᓄᑖᒥᒃ ᒨᓗᒥᒃ ᐅᔭᕋᖕᓂᐊᕐᒐᒃᓴᕈᕐᓂᑯᓂᒃ ᐅᖓᓯᖕᓂᖅᓴᒥᑦ ᒦᓐᓇᐅᔪᖅ ᐱᑕᕐᑲᖅᑐᒥᑦ ᑲᖑᖅ ᐅᔭᕋᖕᓂᐊᖅᑕᕐᕕᖕᒥᑦ.

ᑖᒃᑯᐊ ᐱᓕᕆᐊᖑᔪᒪᔪᑦ ᐃᓚᕐᑲᖅᐳᑦ ᓴᓇᔭᐅᓂᖏᓐᓂ ᓄᓇᐅᑉ ᖃᖓᓂ ᓄᓇᒥᒃ ᐅᑭᑎᕆᕚᒃ ᑲᖑᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖓᓂ (ᑲᖑᖅ, ᐊᒻᐅᐃᓪᓪ ᐊᒻᒪ ᓚᐃᒪ), ᓄᓇᐅᓪᓗ ᐃᓗᐊᓂ ᐅᔭᕋᖕᓂᐊᕐᓂᕚᒃ ᑲᖑᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖓᓂ (ᑲᖑᖅ ᐊᒻᒪ ᐊᒻᐅᐃᓪᕐ) ᐊᒻᒪ ᔪᐊᔾ ᐅᔭᕋᖕᓂᐊᕐᕕᖓᓂ (ᐃᓂᒋᔭᖅ 1, ᐃᓂᒋᔭᖅ 2, ᐃᓄᑐᐊᖅ ᐃᒻᒧᒃᓯᐅᒐᖅ, ᔨH, ᐊᒻᒪ ᓯᐊᑹᖅ). ᐅᔭᕋᖕᓂᐊᖅᑕᐅᔪᖅ ᓄᓇᒃᑰᕈᑎᒃᑯᑦ ᓄᒃᑎᑕᐅᓂᐊᖅᐳᖅ ᐊᑐᖅᑕᐅᕙᒃᓯᒪᔪᒥᒃ ᐃᓕᖅᑯᓯᖅᑲᕐᓗᑎᒃ ᓯᖃᓪᓕᑎᕆᕚᖓᒧᑦ ᑲᖑᑉ ᐅᔭᕋᖕᓂᐊᕐᕙᖓᓂ ᒨᓗᒥᒃ ᓴᖅᑭᑦᑎᔪᒪᒧᑦ. ᐅᔭᕋᖕᓂᐊᕐᓂᖅ ᒨᓗᒥᒃ ᐋᔭᐃᓇᓱᒻᓗᑎᒃ ᐃᓚᕐᑲᕐᑲᓯᐅᔾᔨᓇᔭᖅᐳᖅ ᐅᔭᕋᖕᓂᐊᖅᑕᒥᒃ ᓯᖃᓪᓕᑎᕆᓗᑎᒃ ᐊᕐᔭᒃᓴᐅᔭᙱᖅᑎᕆᓗᒍᓗ, ᑭᖑᓂᖓᒍᑦ ᑭᕙᔭᓐᓂᒃᑯᓪᓗ ᐳᒃᑕᔭᓐᓂᒃᑯᓪᓗ ᐊᕙᒃᑐᖅᑐᑦ ᑲᑎᖅᓱᖅᑕᐅᓂᕆᔭᖏᓐᓂᒃ. ᓱᕈᑐᐃᓐᓇᐅᔪᑦ ᓄᓇᒧᑦ ᐃᓕᐅᕐᖅᑕᐅᓂᐊᖅᐳᑦ ᑲᑎᖅᓱᖅᓯᒪᓗᑎᒃ ᐊᒻᒪ ᒨᓗᓕᐅᕐᓂᕐᒧᑦ ᓱᕈᔫᒃᓯᒪᒍᔪᖅ ᑲᑎᖅᓱᖅᑕᐅᓂᐊᖅᐳᖅ ᐊᓂᐊᕆᕚᐅᔪᓐᓇᙱᑎᑕᒧᑦ ᓯᖃᓕᑎᓲᕚᐅᑉ ᖃᓂᒋᔮᓂᑦᑐᒧᑦ.

ᐱᓕᕆᐊᖅ ᒦᓐᓇ ᕿᒥᕐᕈᐊᖅᑕᐅᔪᖅ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᑭᓯᐊᓂ, ᓴᐱᓇ ᐊᖏᖅᑕᐅᓇᓱᒃᑐᖅ ᐊᐅᓪᓚᖅᑎᑕᐅᕙᒌᕐᓂᖏᓐᓄᑦ ᓴᓇᕐᕈᑎᑦ ᐱᓇᓱᒍᒃᓴᓪᓗ, ᐸᕐᓇᒃᐅᑕᐅᕙᓪᓕᐊᓕᕐᓂᖓᓄᓪᓗ ᐅᔭᕋᖕᓂᐊᕐᕕᒃ, ᐱᓕᕆᐊᖅ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᕿᒥᕐᕈᐊᕋᓂᓚᐅᖅᑎᓐᓇᓕᑦ ᑐᓂᓯᓚᐅᖅᑎᓐᓇᓕᓪᓗ ᐃᒪᕐᒧᑦ ᐱᔪᓐᓇᐅᑎ ᐃ–ᒥᒃ ᓄᓇᐅᑉ ᖄᖓᓂᒃ ᐊᑐᖅᑕᐊᕈᓐᓇᐅᑎᒥᒡᓗ. ᐄᐳᓪ, 2012–ᒥ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᓴᖅᑭᑦᑎᓚᐅᖅᑐᑦ ᒪᓕᒃᑕᐅᔪᒃᓴᖅ 9 - ᑎᑎᕋᖅᑕᐅᖓᓚᖅᑐᖅ ᒪᓕᒃᑕᐅᔪᒃᓴᒥᒃ ᕿᒥᕐᕈᐊᕐᓂᕐᒥ ᐃᓚᐅᔭᕆᐊᖅᑲᙱᑦᑐᓂᒃ (ᒪᓕᒃᑕᐅᔪᒃᓴᖅ). ᐊᑐᖅᓱᒍ ᒪᓕᒃᑕᐅᔪᒃᓴᖅ ᐃᓚᐃᓐᓇᖏᓐᓄ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓱᒪᓕᐅᕈᓐᓇᖅᑐᑦ ᐅᔭᖃᒃᓯᐅᖅᑐᖅᑲᕈᓐᓇᖅᑐᖅ ᐊᒻᒪ/ᐅᕝᕙᓘᓐᓃᑦ ᐅᔭᕋᕐᓂᐊᕐᕕᐅᔪᖃᕈᓐᓇᖅᑐᖅ ᐱᓕᕆᐊᖅ ᕿᒥᕐᕈᐊᖅᑕᐅᕙᓪᓕᐊᑎᓪᓗᒍ, ᐃᓚᐅᓪᓗᑎᒃ ᐃᑲᔪᖅᓱᖅᑕᐅᓂᖓ ᖃᐅᔨᓴᕐᓂᖅ, ᐊᖏᕐᓕᕆᐊᖅᑎᑕᐅᓂᖏᑦ ᐋᖅᑭᐊᖅᑎᑕᐅᓂᖏᓪᓗ ᐊᖏᖅᑕᐅᓯᒫᓂᒃᑐᑦ, ᓴᓇᔭᐅᓂᕆᔭᖏᑦ ᐃᑲᔪᖅᓱᖅᑕᒃᓴᓕᐊᖑᓂᖏᓪᓗ ᐊᑐᕈᓐᓇᐅᑎᒋᔭᐅᓇᔭᖅᑐᖅ ᖃᐅᔨᓴᕐᓂᕐᒧᑦ ᕿᓂᕐᓂᕐᒧᓪᓗ, ᐊᒻᒪ ᑐᖅᑯᖅᑕᐅᓂᖏᑦ ᕿᔪᒃᑑᑎᒋᔭᐅᓇᔭᖅᑐᑦ, ᓴᓇᕐᕈᑎᑦ ᐱᓇᓱᒐᒃᓴᓪᓗ ᐊᒃᑐᐊᔪᑦ ᕿᒥᕐᕈᐊᖅᑕᐅᔪᒧᑦ ᐱᓕᕆᐊᕐᒧᑦ.

ᐃᓂᒋᔭᒥᒃ ᐸᕐᓇᐃᕝᕓᓪᓕᐊᓂᕆᔭᐅᔪᒪᓯᒪᔪᑦ ᐊᔾᔨᒋᔭᐅᙳᕆᑦᑐᑎᑐᑦ ᑕᐅᑐᒃᑕᐅᓂᖅᑲᕕᐳᔪᒪᓪᓗᑎᒃ ᑐᒃᓯᕋᕈᑕᐅᓯᒪᓕᖅ ᒪᑯᓂᖓ ᐃᓚᕐᑲᖅᐳᑦ:

- ᑲᖑᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒥ ᐊᐅᓚᓐᓂᕆᔭᑦ;
- ᕿᓂᖅᑕᕐᑲᕐᓂᖅ ᐃᑲᔪᖅᓲᑕᐅᓂᕐᒧᓪᓗ ᖃᓄᐃᓕᐅᕐᓂᕆᔭᑦ;
- ᐅᔭᖃᒃᑕᕐᕕᐅᑉ ᓴᓇᔭᐅᓂᖓ ᐊᑐᖅᑕᐅᓕᕐᓂᖓᓗ;
- ᖃᖓᑐᐃᓐᓇᒃᑯᑦ ᐊᑐᖅᑕᐅᔪᒃᓴᐅᑎᐅᑉ ᒥᕝᕕᐅᑉ ᐅᐃᒍᔭᐅᓂᖓ;
- ᐅᓛᔅᑰᑉ ᑰᕋᓛᖓᑕ ᐊᓯᐊᒨᓕᖅᑎᑕᐅᓂᖓ;
- ᐊᕐᕌᒍᓕᒫᒥ ᐊᑐᖅᑕᐅᔪᒃᓴᖅ ᐊᖅᑯᑦ ᐃᑳᖅᑕᕐᑲᑦᑕᕕᐅᔪᒃᓴᓪᓗ;
- ᓯᑯᒃᑯᑦ ᐊᖅᑯᑎ ᐃᒪᐅᓪᓗ ᐊᑐᖅᑕᐅᕐᑲᑦᑕᕐᓂᖓ;
- ᓯᑯᒥ ᒥᑦᑕᕕᒃ; ᐊᒻᒪ
- ᓴᓇᔭᐅᓂᖓ ᐊᑐᖅᑕᐅᓕᕐᓂᖓᓗ ᐃᓂᒋᔭᖅ ᑐᙵᕕᒋᔭᐅᓚᐅᑲᖕᓂᐊᖅᑐᖅ ᐊᒻᒪ ᐃᓂᕆᕐᑯᔭᐅᓂᖅᓯᒪᔭᒥ ᐃᒪᕐᒥ ᐃᓂᒋᔭᖅ ᑐᙵᕕᒋᔭᐅᓛᖅᑐᖅ;

ᒫᓐᓇᐅᔪᖅ ᑲᖑᖅ ᒨᓗᕐᓂᐊᕐᕕᒃ ᐊᐅᓚᑕᐅᕚᒃᑐᖅ ᐊᕐᕌᒍᑕᓖᑦ ᐱᒋᐊᖅᐸᒃᓗᑎᒃ ᔫᓄᐊᕆᒥᐸᓗᒃ ᐊᒃᑑᐸᒥ ᐃᓱᓕᑉᐸᒃᓗᑎᒃ, ᓴᐱᓇᒃᑯᓪᓗ ᑕᐃᒪᓐᓇᑦᑕᐃᓐᓇᖅ ᑲᔪᓰᕈᒪᓪᓗᑎᒃ 2015–ᒥ. ᐱᓕᕆᐊᕐᒧᑦ ᐊᖏᕈᑕᐅᔭᕆᐊᖅᑲᖅᑐᓄᑦ ᐊᖏᖅᑕᐅᒃᐸᑕ, ᓴᐹᓇᒃᑯᑦ ᐱᒋᐊᖅᑎᑦᑎᔪᒪᕗᑦ ᐃᓂᒋᔭᐅᓂᐊᖅᑐᒥᒃ ᐸᕐᓇᐃᕙᓪᓕᐊᓯᔪᒪᓕᖅᓗᑎᒃ ᕕᕗᐊᕆ 2015ᒥ ᐃᓱᒪᒋᔭᕐᑲᖅᓗᑎᒡᓗ ᐃᓂᖅᓯᓛᕋᔭᕆᐊᒃᓴᖅ ᐋᓚᓯ 2015ᒥ. ᐋᖅᑭᒃᑕᐅᓂᖓ ᐃᓂᒋᔭᖅ ᑐᙵᕕᒋᔭᐅᓚᐅᑲᖕᓂᐊᖅᑐᖅ ᐊᑯᓂᐅᓂᖅᑲᓖᕋᓯᒋᔭᐅᔪᖅ ᐅᓪᓗᕐᓂᒃ 10-ᓂᑦ 14-ᓄᑦ ᐱᐊᓂᒃᑕᐅᓛᖅᓗᓂ ᓯᑯᑦᑲᕈᓐᓃᖅᐸᑦ, ᐋᓚᓯᒥᐅᓛᖅᑐᒃᓴᐅᓪᓗᓂ 2015-ᒥ.

ᐃᓂᒋᔭᒃᓴᒥᒃ ᐸᕐᓇᐃᓯᒪᕙᓪᓕᐊᓂᕆᔭᑦ ᑲᖑᒎᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒐᓂ ᐃᒪᕐᒥ ᐃᓂᒋᔭᖅ ᑐᙵᕕᒋᔭᐅᓛᖅᑐᒥ. ᑲᖑᒎᑉ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒐᓃᓐᓂᐊᖅᐳᖅ ᑕᒪᓐᓇᓗ ᓄᓇᖓ ᐅᔭᕋᓚᐈᖑᓂᐅᕗᖅ ᒪᖅᓴᐅᓪᓗᓂᓗ, ᖃᓂᒋᔭᖅᑲᙱᖅᓗᑎᒃ ᖃᐃᖅᑐᖅᔪᐊᑦ ᖃᐃᖅᓯᓖᑦ. ᐃᒪᕐᒥ ᐃᓂᒋᔭᖅ ᑐᙵᕕᒋᔭᐅᓛᖅᑐᖅ, ᕿᖓᓗᐅᑉ ᑲᖏᖅᓗᐊᑕ ᓂᒋᖅᐸᓯᐊᓃᑉᐳᖅ, ᓄᓇᖅᑲᖅᓗᓂ ᐅᔭᕋᓚᐈᖑᓂᖅᒥᒃ ᒪᖅᓴᐅᔪᒥᒡᓗ, ᐊᕙᓗᐊᓂ ᐆᒪᔪᓂ ᓇᔪᖅᑲᑎᒌᖕᓂᖅᓴᐅᓪᓗᑎᒃ ᐆᒪᔪᓂ ᓇᔪᖅᑲᑎᒌᖕᓂᖅᓴᐅᓪᓗᑎᒡᓗ ᐃᒪᐅᑉ ᕿᒪᒃᑯᓐᓂᙳᖅᑐᓂᒃ. ᐱᒻᒪᕆᐅᔪᑦ ᐆᒪᔪᓂ ᓇᔪᖅᑲᑎᒌᖕᓂᒧᖅ ᓯᓚᖅᑎᒌᖕᓂᕐᒧᓪᓗ ᐃᓚᐅᔪᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ ᑖᒃᑯᓇᓂ ᒪᕐᕉᖕᓂ ᐃᓚᐅᔪᑦ ᑕᐃᒃᑯᐊ ᐃᓚᖅᑲᖅᑐᑦ ᐊᓂᕐᓂᖅᑲᕐᓇᖅᑑᑉ ᐊᕙᑎᖕᒐᓄᑦ (ᐊᓂᖅᒃᓵᕐᓇᖅᑑᑉ ᐱᐅᑎᒋᓂᖕᒐ, ᓂᓪᓕᐊᔪᑦ ᐊᒻᒪ ᓴᔪᖕᓂᖅ), ᓄᓇᐅᑉ ᐊᕙᑎᖕᒐ (ᐱᕈᖅᑐᑦ, ᑐᒃᑐᑦ, ᐊᒃᓵᑦ, ᐅᒥᖕᒪᐃᑦ, ᖃᒡᕚᖅ/ᒥᖅᑯᖏᑦ, ᑎᖕᒥᐊᑦ ᐊᐅᓪᓚᔩᑦ, ᐊᒻᒪ ᓂᕿᑐᖅᑎᑦ), ᐃᒪᑦᑎᐊᕙᐅᑉ ᑕᓇᐅᓪᓗ ᐊᕙᑎᖏᑦ (ᐃᒪᓕᓇᓂᖅ/ ᑕᓯᓕᓇᓂᖅ ᑕᓯᕐᒥᐅᑕᓕᓇᓂᕐᓗ, ᓄᓇᒥ ᐃᒪᖅ, ᐃᒪᐅᑉ ᐱᐅᑎᒋᓂᖕᒐ, ᕿᒪᒃᑯᑦ ᐱᐅᑎᒋᓂᖕᒐ, ᐊᒻᒪ ᐃᖃᓗᐃᑦ /ᐃᒪᕐᒪᐅᑕᐃᑦ ᓇᔪᕐᕕᒋᖃᑦᑕᖅᑕᖏᑦ) ᐊᒻᒪ ᐃᓄᑐᐃᓐᓇᕐᓄᑦ ᐊᕙᑎᑦ (ᐃᑦᑕᕐᓂᓕᓴᐃᑦ ᐊᒻᒪ ᐃᓕᖅᑯᓯᑐᖃᒃᑯᑦ ᐊᑐᖅᑕᐅᕙᖕᓂᑯᑦ).

ᐱᒻᒪᕆᐅᓛᖑᔪᓂ ᐊᕙᑎᒧᑦ ᐊᒃᑐᐊᔪᓐᓇᖅᑐᓂᒃ ᐅᔭᕋᖕᓂᐊᕐᕕᒃᓴᖅ ᐸᕐᓇᒃᑕᐅᕙᓪᓕᐊᓂᖓᓄᑦ ᐃᓚᐅᔪᑦ ᑕᕝᕙᓂᑦᑕᐃᓐᓇᖅ ᔭᒐᑦᑐᖅᑲᕐᓂᖓ ᐊᓯᔾᔨᕐᓂᖏᓪᓗ ᐱᕈᖅᑐᑦ ᐆᒪᔪᓪᓗ ᓇᔪᖅᑲᕐᕕᖏᑦ, ᐆᒪᔪᑦ ᐅᐃᓪᒪᒃᑎᑕᐅᓯᒪᓂᕿᓪᓗᑎᒃ ᐊᒻᒪ ᖃᒡᓕᑦᑕᐃᓕᓂᖅ ᓂᓪᓕᐊᔪᓄᑦ ᓴᓇᔪᓂᑦ ᐊᒻᒪ ᐅᔭᖅᑲᑦᕕᐅᔪᑦ ᐊᐅᓚᓐᓂᕆᔭᖏᑦ, ᐊᕐᕌᒍᓕᒪᖅ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᖅ ᐊᖅᑯᖅ, ᐊᒻᒪ ᒦᕕᒃ, ᑯᕕᑐᐃᓐᓇᓇᖅᑲᐅᑦ ᒪᕐᕋᓚᐅᔭᐃᑦ ᓄᓇᒧᑦ ᐃᒪᕐᒧᓪᓘᓐᓃᑦ, ᐊᒃᑐᐊᔭᐅᔪᓪᓗ ᐃᖃᓗᐃᑦ ᓇᔪᕐᕕᖏᓐᓄᑦ ᓅᑕᐅᓂᖓᓄᒃ ᐅᓛᓐᑯᑉ ᑯᕋᓛᖓ. ᑕᒪᒃᑯᐊ ᖃᓄᐃᑉᐸᓪᓕᐊᓂᕋᔭᖏᑦ ᒥᑭᓪᓕᑎᖅᑕᐅᓯᒪᓂᐊᖅᐳᑦ ᒪᓕᒃᑕᐅᓗᑎᒃ ᐊᕙᑎᒥᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᐸᕐᓇᐅᑏᑦ ᐃᓚᐅᓪᓗᑎᒃ ᑯᕕᔪᖅᑲᓂᖅᐸᑦ ᐸᕐᓇᐅᑎ, ᓯᐳᖅᓯᒪᓕᖅᑎᑦ ᒥᐊᓂᖅᓯᓂᕐᒧᑦ ᐊᒃᑕᖅᑕᐅᓂᒃᓴᖏᓐᓄᑦ ᐸᕐᓇᐅᑎ, ᐊᓯᖏᓪᓗ ᒪᓕᒃᑕᐅᔭᕆᐊᖅᑲᖅᑐᑦ. ᐃᖃᓗᐃᑦ ᓇᔪᕐᕕᖏᑦ ᐱᑕᖅᑲᕈᓐᓃᖅᑐᑦ ᐅᓛᓐᑯᑉ ᑯᕋᓛᖓ ᓅᑕᐅᓂᖓᓄᑦ ᐱᑕᖅᑲᓕᒃᑲᓐᓂᕋᔭᖅᑐᑦ ᓅᑕᐅᓯᒫᓂᓕᖅᐸᑦ. ᑖᓐᓇ ᓄᑖᒥᒃ ᓯᕕᐊᔭᖅᑐᕐᕕᖅᑲᖅᑎᑦᑎᓛᖅᑐᖅ, ᐱᕈᖅᓴᐃᕝᕕᖅᑲᖅᑎᑦᑎᓛᖅᑐᖅ ᓂᕿᑖᕐᕕᒃᓴᖅᑲᖅᑎᑦᑎᓛᖅᑐᕐᓗ ᓱᓗᒃᐸᐅᓚᕐᓄᑦ ᐱᖓᓱᐃᖅᓯᐃᖅᑐᕐᓗᒍ ᐊᑐᖅᑕᐅᔪᓐᓃᖅᑑᑉ ᐊᖏᑎᒋᓂᖓ ᐱᑕᖅᐃᓐᓇᕐᓂᐊᖅᓗᓂᓗ ᐊᖅᑯᑎᒋᔭᐅᕚᒃᑐᖅ ᑲᖑᒎᑉ ᑰᖓᑕ ᐊᒪᕈᐸ ᑰᖓᑕᓗ ᐊᑯᓐᓂᖓᓂ. ᑕᒪᓐᓇ ᑐᑭᖅᑲᖅᐳᖅ ᓇᔪᖅᑲᕐᕕᒋᔭᖏᑦ ᐊᖏᓂᖅᓴᐅᓕᕐᓂᖓᑦ ᓇᔪᖅᑲᕐᕕᒋᓚᐅᖅᑕᖏᓐᓂᑦ 5.9-ᒥᑦ 1-ᒨᑦᓇᔭᖅᑐᖅ ᐊᒻᒪ ᓇᔪᖅᑲᕐᕕᖏᑦ ᐊᑐᕐᕕᒃᓴᐅᓂᖓ 1.7-ᒥᑦ 1-ᒧᑦ.

ᑕᐃᒪᐃᒻᒪᑦ, ᐋᖅᑭᒃᓱᖅᑕᐅᓯᒪᖕᒪᑕ ᓱᖅᑲᑕᐅᑦᑕᐃᓕᑎᑦᑎᓃᑦ ᓇᔪᓚᓇᔭᐅᔪᓂᒡᓗ ᐅᑎᖅᑎᑦᑎᓃᑦ, ᓂᓇᐅᒋᔭᐅᙳᕆᑦᑐᖅ ᓴᖅᑭᑦᑐᖅᑲᖅᓴᖅᓂᖓ ᐱᐅᙳᕆᑐᒥᒃ ᑳᒃᑯᓇᙵᑦ ᐅᔭᕋᖕᓂᐊᕐᕕᒃᓴᖅᒥᒃ ᐸᕐᓇᐅᑕᐅᓯᒪᔪᓂᑦ.

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1.0 INTRODUCTION

Sabina Gold & Silver Corp. (Sabina) is actively developing the Back River Property (The Property) approximately 75 km south of Bathurst Inlet, in the Kitikmeot Region, Nunavut (NU). The Back River Gold Project (the Project) is currently under review with the Nunavut Impact Review Board (NIRB). Sabina is seeking approvals for the staging of equipment and materials, and the preparation of construction, for the Project prior to completion of the NIRB review and issuance of the construction and operations licence and surface leases. Together, all of these activities are referred to as site preparation activities. Sabina is formally requesting exceptions to proceed with the site preparation work pursuant to Section 12.10.2(b) of the Nunavut Land Claims Agreement (NLCA; INAC 2010) to allow for the required approvals and licences to be granted.

Section 12.10.2 of the NLCA provides that activities related to a Project may be approved pending a Part 5 review where certain conditions are met:

> *12.10.2 Notwithstanding Section 12.10.1, where a Project proposal has been referred for review pursuant to Part 5 or 6, approvals or licences for exploration or development activities related to that Project may be issued if:*
>
> *a) the activity falls within Schedule 12-1; or*
>
> *b) the activity can, in the judgment of NIRB, proceed without such a review.*

Schedule 12-1 lists activities that are exempt from the requirement for screening by the NIRB. Activities exempt from screening under Schedule 12-1 include:

- Land use activities not requiring a permit or authorization from the Government of Canada or Territorial Government.
- Land use activities requiring only a Class B permit under the Territorial Land Use Regulations (SOR/77-210 4 March 1977).
- Water uses that do not require a public hearing under Section 13.7.3.

Approvals or licences for exploration or development activities not listed on Schedule 12-1 may be approved under Section 12.10.2(b) if the activities can, in the judgment of NIRB, proceed without a review.

Sabina is seeking either exemption or “exception from review” be granted for activities required during two years of site preparation. These activities include access to Inuit-Owned Lands under land use permits and water licences for the purpose of carrying out activities related to facilitating future development.

The transportation and storage of equipment, fuel, and materials during site preparation is essential to the development of the Back River Project as it will allow Sabina to progress into timely construction of the Project. These temporary and/or seasonal components would also support advanced exploration and environmental baseline activities in the area and improve safety and environmental protection.

Additional activities may be required in 2016, as the mine schedule progresses. However, additional activities will only be pursued once the Mine Feasibility Study is completed and financing is available.

2.0 RATIONALE FOR APPLICATION FOR EXCEPTIONS

In April 2012, the NIRB released "Guide 9 - Draft Guide to Exceptions from the Review Process" (the Guide). This Guide is provided as a convenient reference for project proponents, parties and members of the public to explain, in general, the process undertaken by the NIRB when considering section 12.10.2(b) exception applications. Although this Guide remains as a draft Sabina has chosen to use its requirements as a basis for discussion.

As per the Guide there are limited circumstances where the NIRB may determine that exploration and/or development activities can be allowed to proceed while a related project is undergoing Review:

- Research carried out within the defined project area and/or research with the primary purpose of supporting the ongoing Review of the related project;
- The extension, renewal or minor amendment of previously approved exploration and/or activities associated with the project undergoing Review;
- Transport of fuel, equipment and materials associated with the related project undergoing Review, including the related construction and operation of winter roads/trails, temporary airstrips and temporary onshore offloading facilities; and/or
- Short term storage of fuel, equipment and materials associated with the related project undergoing Review, including establishment of storage facilities and related use of existing or new quarry and borrow sources.

3.0 OVERALL PROJECT DESCRIPTION

Sabina's Back River Project is an advanced exploration gold project located in the West Kitikmeot region of Nunavut at approximately 65° to 66° north latitude, and 106° to 107° west longitude (Figure 5.0-1). Sabina acquired the Project from Dundee Precious Metals (DPM) on June 9, 2009. Since acquisition, nearly all exploration has been confined to the Goose Property and all exploration has focused on finding new gold mineralization away from the existing Goose deposit.

The proposed Project includes the development of open pits at the and underground mines at the Goose Property and the George Property area (Locale 1, Locale 2, and LCP North). Ore would be mined and trucked to a conventional processing plant at the Goose Property to produce gold. The processing of the ore to recover gold would include crushing and grinding of the ore, followed by gravity and flotation concentration, and leaching of the concentrate. Waste material from the mine operations would be placed on the land in certain areas and tailings would be deposited in a nearby impoundment.

The Project life is up to 22 years – two years of initial construction, 10 to 15 years of production and up to five years closure and past-closure monitoring. The mine and mineral processing plant would operate for up to 15 years and employ up to 700 people, About half of these employees would be on site at any one time because of the fly in/fly out rotational schedule.

Access to the mine will be year round by air. Sea access will only be available during open water season. The Marine Laydown Area (MLA) in southern Bathurst Inlet will be used for annual resupply during the life of the mine and mobilize equipment for construction and demobilize during closure. Sabina will also build winter access roads to connect all the Properties.

The Project would also include a camp, storage areas, maintenance and mechanical repair warehouses, fuel tanks, tailings impoundment, waste rock piles, airstrip, and local site roads. Sabina would have a small camp, fuel storage, and laydown area at the MLA on Bathurst Inlet. Most of these facilities would be removed at the end of the mine life. Roads, airstrips, the tailings impoundment, and waste rock piles cannot be removed and would be returned to the land use agreed upon at that time. This will be determined with regulators and stakeholders.

4.0 SUMMARY OF THE ENVIRONMENT

Regionally, the Project area lies within the Takijuq Lake Uplands ecoregion, which covers the south central portion of the West Kitikmeot region. This area is made up of broad, sloping uplands, plateaus, and lowlands. Much of the area is largely composed of lichen dominated rock outcrops and boulder fields. The Project lies within two geological provinces; the Slave Province and the Bear Province. The Slave Geological Province is underlain by granite and related gneisses, as well as by sedimentary and volcanic rocks (more than 2.5 billion years old). The Bear Geological Province contains mainly volcanic and sedimentary rocks approximating two billion years in age.

The climate, soils, and vegetation of the area are arctic in character. Plant cover is characteristic of the Arctic Tundra community. Shrubs are sparsely distributed on the mesic sites near the rivers and lakes. On the interfluves are found low-growing perennials; grasses and sedges and some flowering species. The eskers support very little plant cover, especially on the windward side and crests, although the base of eskers can support relatively vigorous plant communities.

In general, lakes in the area contain extremely clear, low nutrient, low metal water, indicative of pristine high Arctic lakes. Most lakes have near-neutral waters, with very low hardness and alkalinity. However, naturally high metal concentrations are present in some lakes, indicating their proximity to surface mineralized areas.

The area is in the continuous permafrost zone, with a depth of approximately 500 m. The active layer ranges from approximately 1 to 2 m, and occasionally much deeper in areas where there is loose, sandy soil at the edges of lakes or ponds. Permafrost processes within the active layer can result in unique landforms, such as ice wedges, pingos, palsas, ice lenses, and thermokarst. Talik features are potentially present under larger lakes.

Initial site preparation actives will take place in and around Goose Camp and Bathurst Inlet, where the Temporary Laydown Area (TLA) will be located. The Goose exploration camp is located on the slope of the western bank of Goose Lake and consists of a 120-person camp constructed for support services directed towards exploration activities. The lakeshore is approximately 50 m toward the north and the regional topographical gradient surrounding the camp ranges from 2 to 6% towards the north. The camp is approximately 300 m in length from east to west and 100 m wide from north to south, covering an area of 30,000 m^2. A small but visible creek runs east northeast on the eastern side of the camp.

The Goose Property is characterized as gentle to moderately sloped, undulating or rolling plains. Elevation ranges between 249 and 392 masl. While slopes range between 0 and 26%, only less than 1% of the Goose Property has uneven relief and slopes in excess of 16%. Approximately 60% of the Goose Property area land is covered by plains and the rest is covered by gentle slopes. Open waterbodies cover about 13% of the immediate area.

Bathurst Inlet is a deep inlet located along the northern coast of the Canadian mainland, within the territory of Nunavut. The entrance to the inlet is between Cape Barrow (68° 01' N, 110° 06' W) and Cape Flinders (68° 17' N, 108° 35' W), and the body extends for over 200 km southwest into the mainland, past the Arctic Circle. The navigable corridor within Bathurst Inlet is generally very deep, with depths between 100 and 200 m depth for most of the inlet. Consolidated first-year sea ice (1.5 to 2 m average thickness) usually covers Bathurst Inlet from October to June, and ice break-up usually occurs in the first few weeks of July. Tidal elevations are very weak in the region, with maximum amplitudes below 0.5 m.

The deeply indented, rocky shoreline of Bathurst Inlet is surrounded by rugged ridges of massive granite rocks that reach about 600 m about the ocean. Over half of the area is covered by gentle slopes composed of marine and morainal deposits. Marine deposits consist mainly of coarse sands with low proportion of coarse mineral fragments. Morainal deposits have variable textures and coarse fragment content.

Bathurst Inlet is the historic location of the Bathurst Herd Caribou calving grounds. Other wildlife that occur in the area include grizzly bear, wolf, muskox, various species of birds, and, occasionally, moose.

5.0 ONGOING AND PROPOSED SITE PREPARATION ACTIVITIES

In the DEIS submitted to the NIRB in January 2014, Sabina provided information and respective applications for proposed activities. This included ongoing exploration, continued studies, site preparation, construction, operations, and closure phases. Sabina has since modified the scope of the proposed site preparation works and the following will replace the description(s) captured in the DEIS, Volume 12.

As presented in Section 3 of the Guide, the NIRB has established eight information requirements which must be provided in order to consider an exception request. Each of these eight requirements is considered in this section and is directly tied to the Summary of Proposed Activities as provided in Section 4. Activities are divided into two groups, ongoing activities and proposed activities. Figure 5.0-1 shows the proposed location of the TLA and the Goose Property.

Figure 5.0-2 shows the site preparation activities at the Goose Property, while Figure 5.0-3 shows the details regarding the TLA.

5.1 Description of Ongoing Activities

Ongoing activities include:

- Goose Camp operations;
- Exploration and support activities; and
- Ice-based airstrip.

5.1.1 Goose Exploration Camp

During site preparation activities for the Property, it is anticipated that the existing Goose Exploration Camp (Goose Camp) will be used for ongoing exploration, engineering and baseline studies, and other site preparation activities.

5.1.1.1 Operation of Goose Camp

The Goose Camp will be utilized as a base for the aforementioned activities. No changes to the current camp accommodations are proposed.

5.1.1.2 Resupply of Goose Camp

The resupply of the Goose Camp and associated activities will take place utilizing all-weather and/or ice-based airstrips. No changes to the current resupply methodology are proposed.

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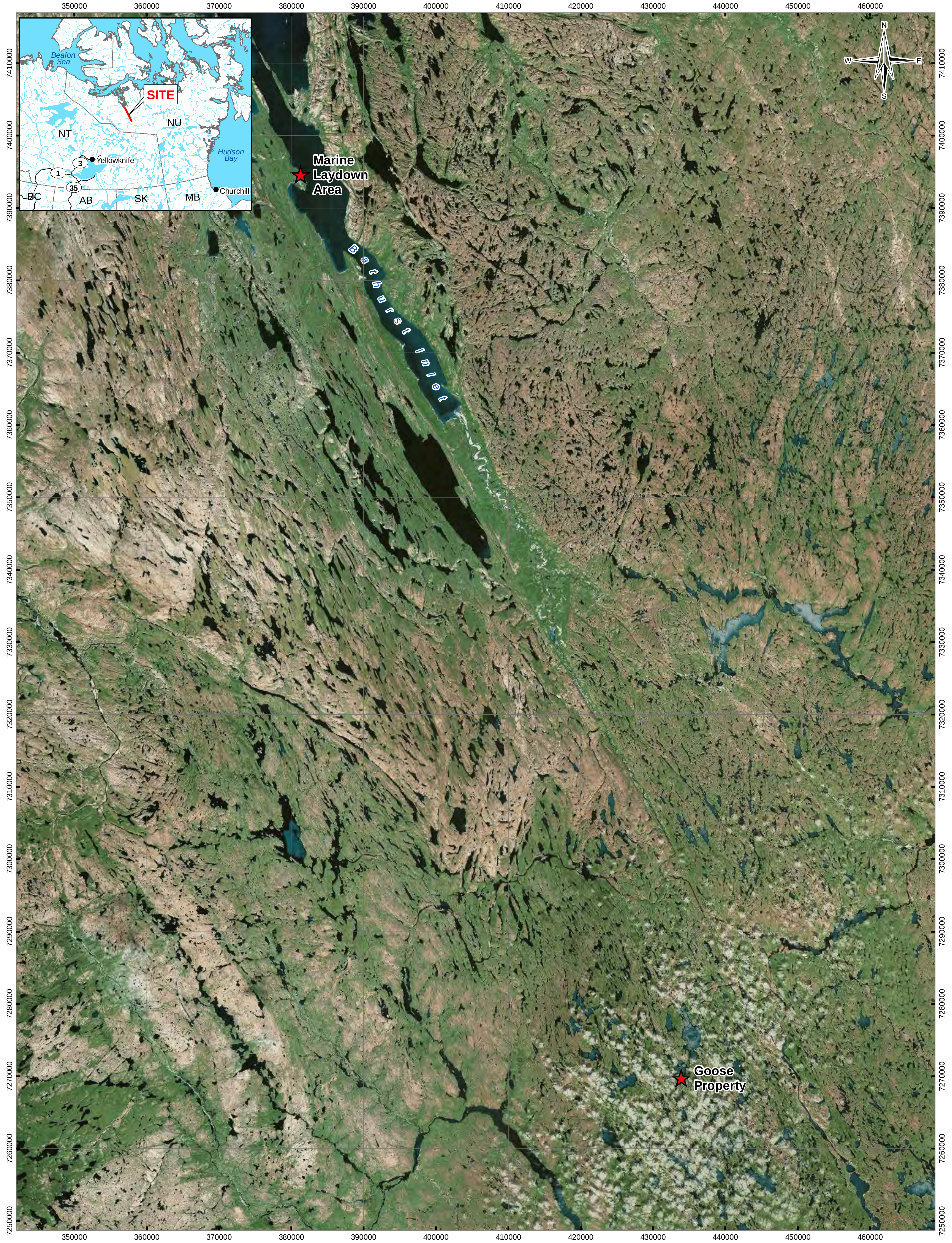


LEGEND

★ Proposed Site Preparation Activity Location

NOTES
Base data source:
Imagery from ESRI Basemaps (1999)

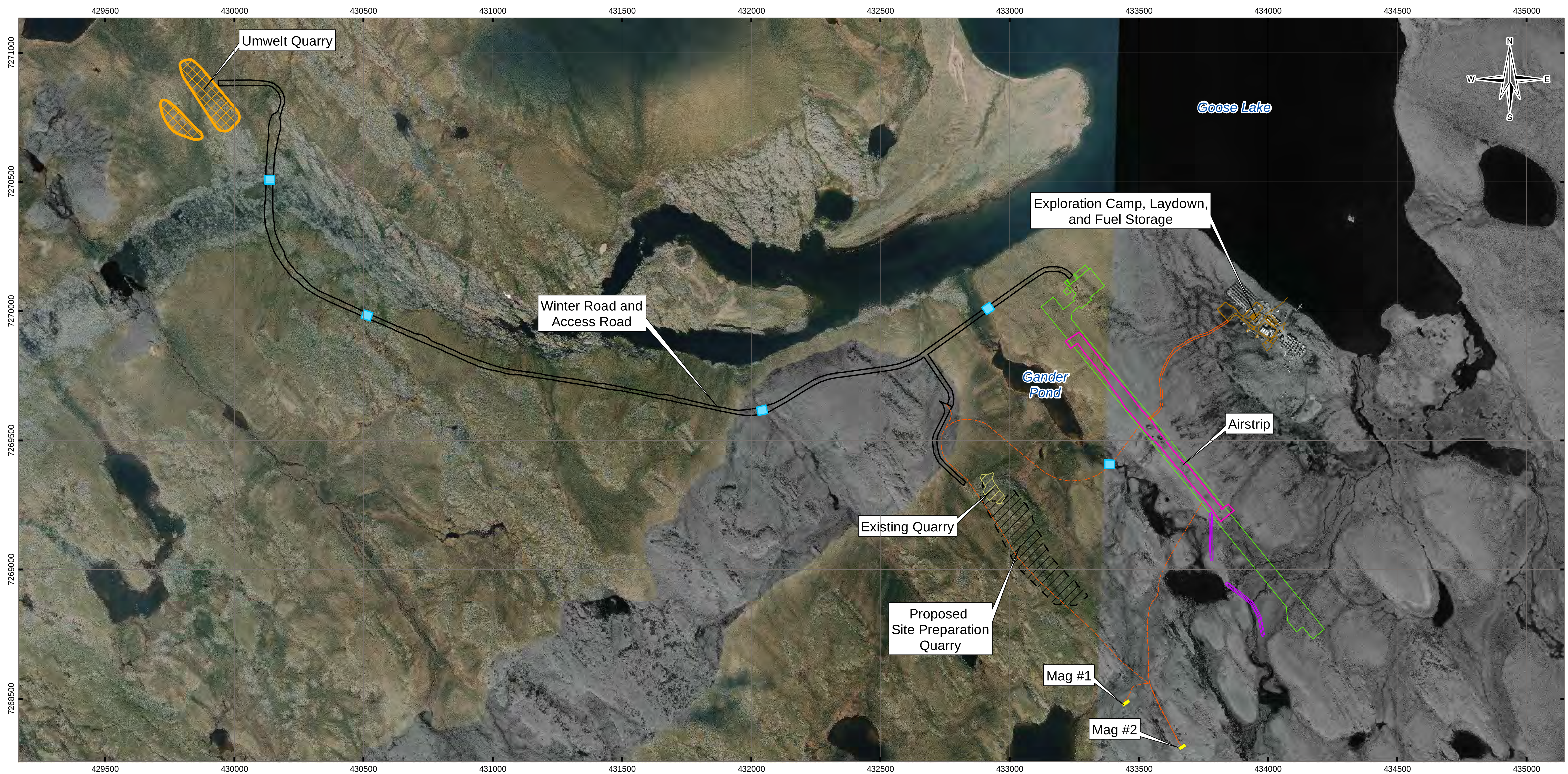
STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Overview of Area Subject to Site Preparation Activities

PROJECTION UTM Zone 13			DATUM NAD83	CLIENT Sabina GOLD & SILVER CORP
Scale: 1:500,000 10 5 0 10 Kilometres				
FILE NO. V15103033-02_Figure5-0-1_Overview.mxd				
PROJECT NO. V15103033-02	DWN MEZ	CKD SL	APVD AR	REV 0
OFFICE Tt EBA-VANC	DATE October 7, 2014			

Figure 5.0-1



LEGEND

- Proposed Access Road
- Rascal Stream Realignment Berm
- Proposed Airstrip Extension
- Proposed Umwelt Quarry
- Proposed Site Preparation Quarry
- Water Crossing / Culvert Location
- Winter Road
- Airstrip Access Road
- Laydown Area / Existing Camp / Fuel Storage
- Explosive Magazine Location
- Existing Quarry
- Existing Airstrip

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)

SABINA BACK RIVER PROJECT, NUNAVUT

Goose Property
Site Preparation Plan

PROJECTION UTM Zone 13			DATUM NAD83	CLIENT Sabina
Scale: 1:15,000 200 100 0 200 Metres				
FILE NO. V15103033-02_Figure5-0-2_Goose.mxd				
PROJECT NO. V15103033-02	DWN MEZ	CKD SL	APVD AR	REV 0
OFFICE Tt EBA-VANC	DATE October 7, 2014			**Figure 5.0-2**

STATUS
ISSUED FOR REVIEW

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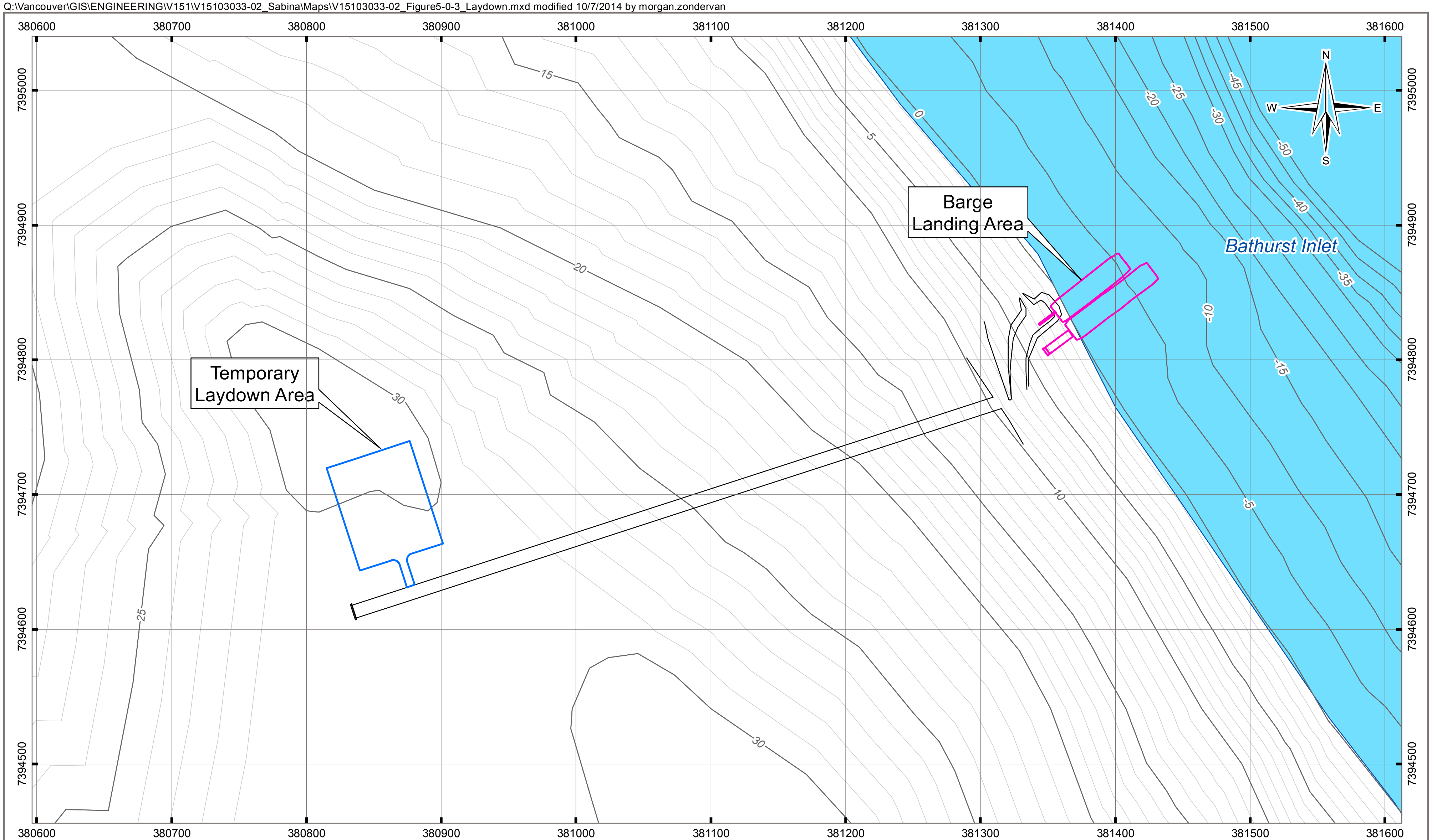


LEGEND

- Temporary Laydown Area
- Barge Landing Area
- Road
- Major Contour (5 m)
- Minor Contour (1 m)
- Waterbody

NOTES
Base data source:
MLA Plan provided by JDS Energy & Mining Inc. (2014)
CanVec sheet 076J12

STATUS
ISSUED FOR REVIEW

Scale: 1:4,000
50 25 0 50
Metres

PROJECTION	DATUM
UTM Zone 13	NAD83

FILE NO.
V15103033-02_Figure5-0-3_Laydown.mxd

CLIENT
Sabina
GOLD & SILVER CORP.

SABINA BACK RIVER PROJECT, NUNAVUT

Temporary Laydown Area Site Preparation Plan

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	AR	0

OFFICE	DATE
Tt EBA-VANC	October 7, 2014

Figure 5.0-3

5.1.2 Diesel Fuel Resupply and Storage

Additional fuel may be required for the proposed site preparation activities; this fuel will be supplied via aircraft and stored in the existing Goose Camp fuel storage area.

Arctic-grade diesel fuel will be used by motor vehicles and mining equipment on the site. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery. All fuel to be used during the 2015 site preparation activities will be stored within the existing 75,000 L tanks, within secondary containment. The Goose Camp fuel storage currently includes six 75,000 L tanks in tertiary containment and seven 75,000 L tanks that will require installation of a lined containment area, if used in 2015.

5.1.3 Explosives and Ammonium Nitrate Storage

Prepackaged explosives will continue to be delivered by air transport, sited and stored in accordance with legislative requirements and best management practices. Two magazines are currently located at Goose Camp; it is anticipated that additional magazines may be required.

5.1.4 Exploration and Study Support

Ongoing exploration and scientific studies to support the permitting and engineering phases will continue onsite. These may include geological mapping, drilling, geophysics, environmental baseline studies, and engineering studies. These activities, although based out of Goose Camp, may occur over the entire Project area.

5.1.5 Ice-based Airstrip

An ice-based airstrip on Goose Lake will be required for the delivery of equipment and materials necessary for site preparation activities. The ice-strip, which has been constructed in previous seasons on Goose Lake, will be built to Transportation Canada regulations and standards. No additional water use is currently anticipated for this activity.

5.2 Description of Proposed Site Preparation Activities

Proposed site preparation activities include:

- Ice road and associated water use;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of a 6km all –weather road and associated crossings; and
- Quarry development and operation; and
- Staging of a TLA at the site of the proposed MLA.

5.2.1 Ice Roads and Water Use

Ice roads, totalling approximately 6 km in length, will be required to connect and access the proposed quarries and explosives storage locations at the Goose Property. To support this work, water for construction will be necessary. Up to 120m^3/day of water will be required to build and maintain the ice road during winter, and for dust suppression and compaction of placed construction materials during the open water season.

5.2.2 Quarries

A total estimated volume of 550,000 m^3 of quarried material will be required to complete the outlined site preparation activities. Two quarries have been identified for use: the existing quarry next to the airstrip and a new quarry located within the footprint of the future Umwelt open pit (Figure 5.0-2). Up to 550,000 m^3 of rock will be required to support site preparation activities, and this material will be extracted from one or both of these quarries. As such, Sabina is seeking approval to extract up to 550,000 m^3 of rock from each of the existing quarry and the proposed Umwelt quarry. The total volume of rock extracted from one or both quarries, however, will not exceed 550,000 m^3.

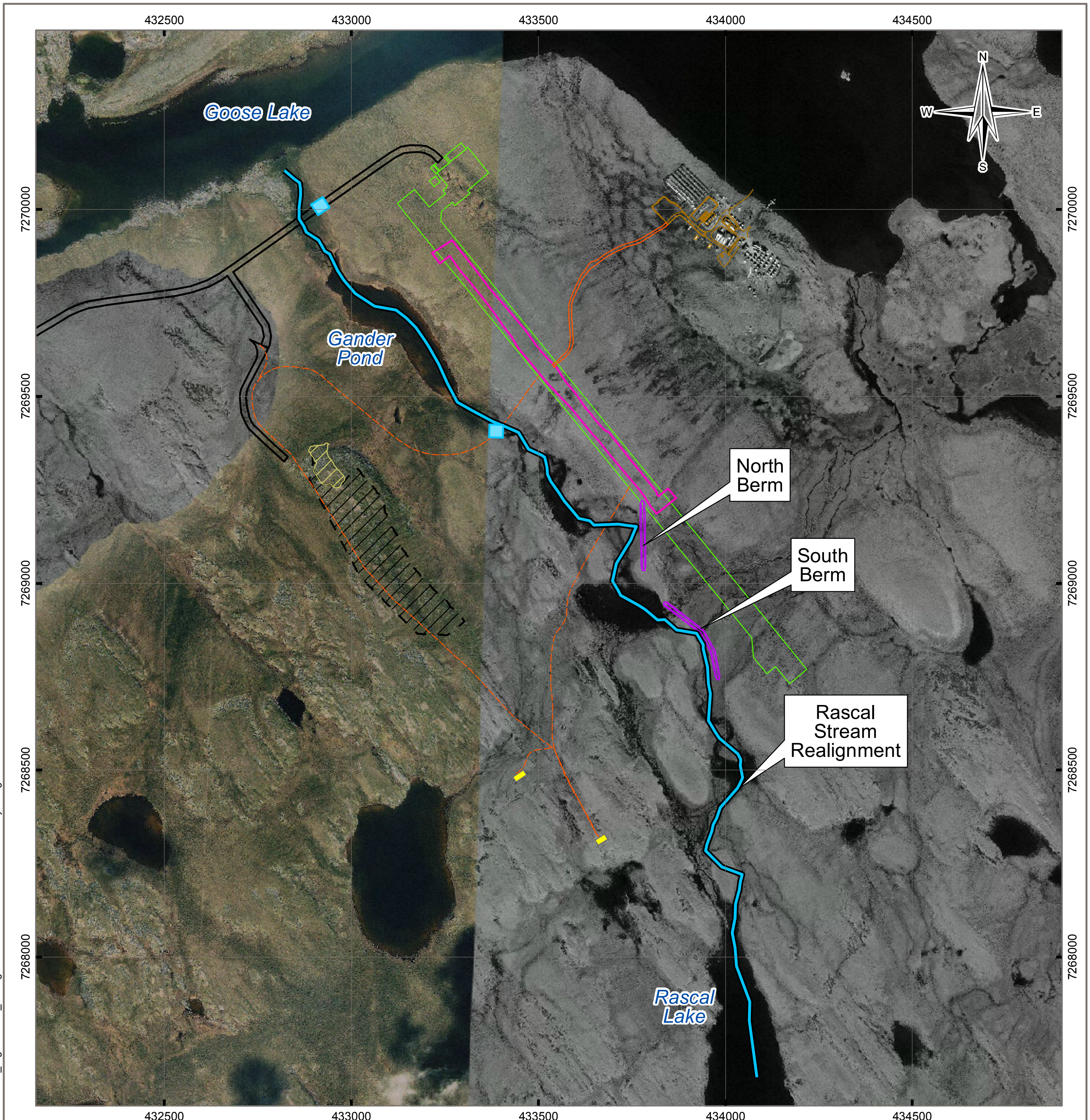
Only geochemically and physically suitable material will be developed, and handled per current quarry management plans.

5.2.3 All-weather Airstrip Extension

The current airstrip will be extended to allow for servicing passenger and cargo aircraft. This airstrip will serve as the main air access to the Goose Property throughout the life of the Project. The all-weather airstrip will be designed to Transport Canada standard TP 312 Aerodrome Standards and Recommended Practices (2005). The airstrip will be approximately 1,524 m long and 45 m wide.

5.2.4 Rascal Lake Outflow Stream Realignment

One of the Rascal Lake outflows currently intersects the extended airstrip footprint. A realignment of the natural watercourse will be required to divert the water currently flowing from Rascal Lake directly to Goose Lake, to flow via Gander Pond to Goose Lake. This realignment will require the construction of two berms to divert 100% of the flow from Rascal Lake through Gander Pond to discharge into a nearby area of Goose Lake. Berm construction material will be sourced from an approved quarry source. An overview of the realignment plan is shown on Figure 5.2-1. Details of the Rascal Lake Outflow Stream Realignment are described in Appendix K, Fisheries Assessment of Rascal Stream Realignment.



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LEGEND

- Rascal Stream Realignment
- Rascal Stream Realignment Berm
- Water Crossing / Culvert Location
- Proposed Access Road
- Proposed Airstrip Extension
- Proposed Site Preparation Quarry
- Winter Road
- Airstrip Access Road
- Laydown Area / Existing Camp / Fuel Storage
- Explosive Magazine Location
- Existing Quarry
- Existing Airstrip

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)
Realignment from SRK Consulting (2014)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Rascal Lake Outflow Realignment

PROJECTION	DATUM	CLIENT
UTM Zone 13	NAD83	Sabina GOLD & SILVER CORP.

Scale: 1:15,000
200 100 0 200
Metres

FILE NO.
V15103033-02_Figure5-2-1_Realignment.mxd

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	DM	0

OFFICE	DATE
Tt EBA-VANC	October 8, 2014

Figure 5.2-1

5.2.5 All-weather Road and Associated Water Crossings

The proposed road alignment at the Goose Property will be constructed as an all-weather road. This road alignment, totaling approximately 5 km in length, is required to access the existing rock quarry, the new Umwelt quarry, and the extended all-weather airstrip.

The all-weather road will be constructed with run-of-quarry rock placed directly onto the tundra to preserve the permafrost. A layer of graded surfacing material will be placed to provide a protective trafficking layer. Construction materials will consist of geochemically suitable rock sourced from the existing quarry and/or Umwelt quarry.

Stream flow through the road alignment will be conveyed using appropriately sized culverts. Proposed water crossings are illustrated on Figure 5.0-2. A schematic of the road construction profile is presented in Figure 5.2-2.

Some of the key, common design criteria for all-weather access roads are:

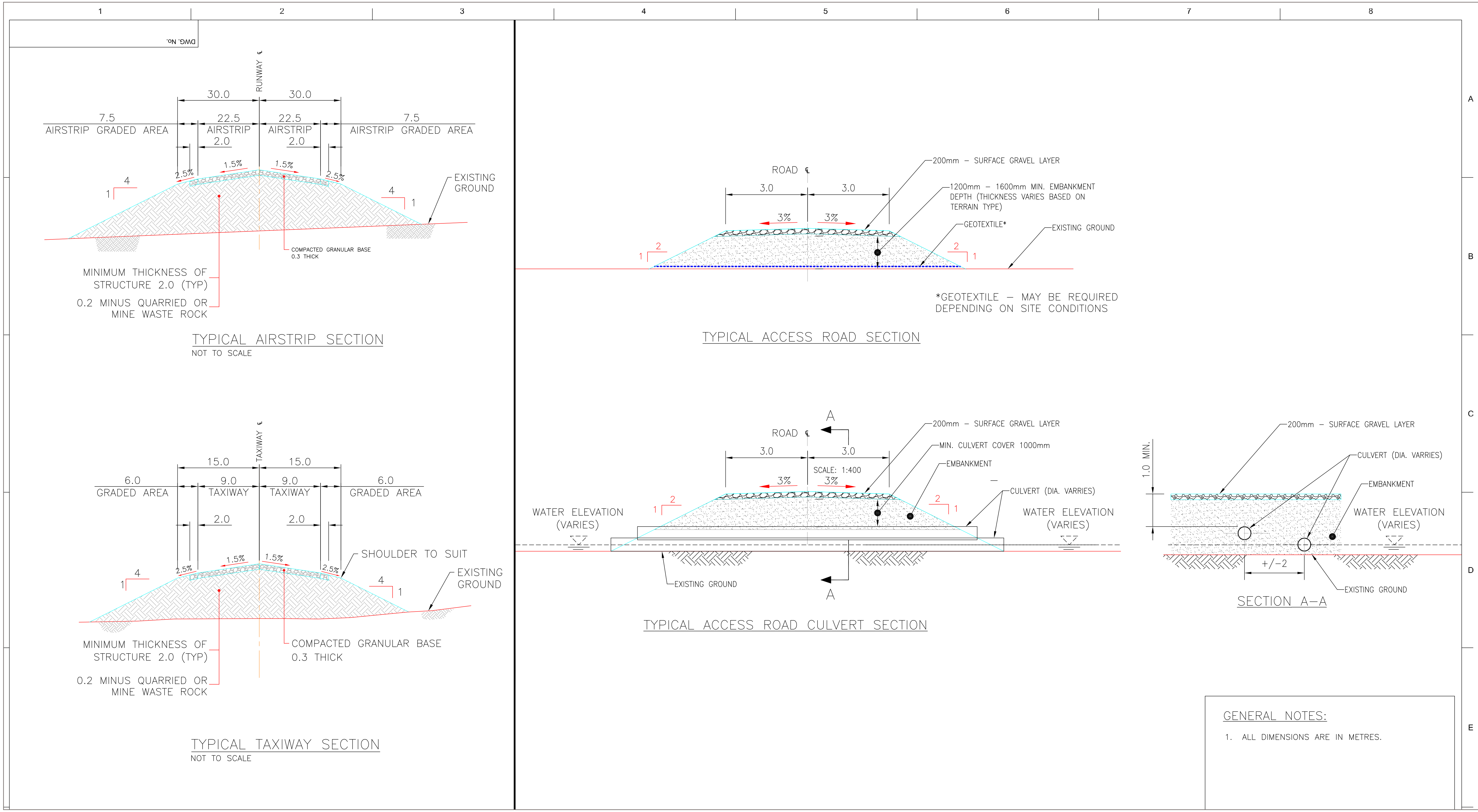
- Design speed: 50 km/h;
- Maximum super-elevation: 4%;
- Side slopes: 2:1;
- Maximum grade: 10% for short lengths, 6% normal;
- Minimum horizontal curve radius: 100 m;
- Drainage: major culverts to be designed to a 1-in-20-year return period;
- Design vehicle: B-train;
- Travelling surface: 6 m for site preparation; and
- Safety berms: where required.

Due to safety considerations, all site road networks within the Goose Property will be restricted to Sabina's use. Visitors (hunters arriving by snowmobile) to the site will be asked to register their presence at the camp's administration centre. Sabina's community engagement activities will emphasize this requirement.

5.3 Temporary Laydown Area

A TLA will be staged at the site of the future MLA location. Activities will include the offloading of two barges containing materials, equipment, and fuel for future use; these materials will be stored at the TLA. Explosives magazines will also be offloaded to the TLA and stored empty for 2015.

Arrival and offloading of the barges and staging of the TLA will occur in the open-water season of 2015 over a period of approximately 25 days. The barges will come from a western route, either from the Lower Mainland or from Hay River.



LEGEND

NOTES

Source: JDS Energy & Mining Inc. (2014)

STATUS

ISSUED FOR REVIEW

CLIENT

Sabina GOLD & SILVER CORP.

SABINA BACK RIVER PROJECT, NUNAVUT

Typical Sections

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	DM	0

OFFICE	DATE
Tt EBA-VANC	October 8, 2014

Figure 5.2-2

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5.3.1 Temporary Laydown Area and Material Storage

An estimated laydown area of up to 1 ha will be required to store equipment, materials and fuel for future Project works. With the exception of large preassembly and modular equipment, materials arriving at the TLA will be housed in sea containers. The equipment and materials will be placed on dunnage or swamp mats to protect the permafrost.

The following equipment and materials will be stored at the TLA.

Table 5.3-1. Temporary Laydown Area Inventory

Equipment / Material	Quantity
Excavator - Cat 349F	1
Articulated Trucks - Cat 740B	2
Dozer - Cat D6T	1
Grader - Cat 140M	1
Drill - Cat MD5075	1
IT Loader - Cat 930K	1
Packer - Cat CS56B	1
65RT Crane	1
Mobile Crusher	1
Mobile Screener	1
Fuel Truck	1
Mechanic Truck	1
Water Truck	1
Tractor / Trailer	1
1-Ton Pickup Truck	2
Camp Genset - 125kw	2
Camp Modules	15
Double Wall Fuel Tanks - 100,000 L	6
Fuel Berms (136,000 l capacity)	6
Explosive Magazine - 40ft	1
Explosive Magazine - 20ft	1
Steel for 10 M litre Fuel Tank	1
Swamp Mats (8'x14')	550
Portable Shop	1

The TLA will be accessed from the barge landing area using swamp mats provisionally placed directly onto the tundra to preserve the permafrost. Once the equipment and fuel are stored, the swamp mats along this corridor will be removed and transported offsite with the outgoing barges.

To facilitate these efforts, personnel (10-14 staff) will be shuttled on a daily basis from the Goose Camp to the TLA. Minimal temporary structures (e.g. tents) will be used at the TLA site; these may include a first aid room, lunch room, and restrooms (pactos). Food, water, and waste will be temporarily stored and removed periodically. Local measures will be implemented to minimize wildlife attraction to the TLA.

5.3.2 Diesel Fuel Supply and Storage

Sabina will require 600,000 L of diesel fuel for future site preparation; this fuel will be shipped to the MLA (via barge) and stored in land-based steel tanks at the TLA. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

The capacity of each berm will be equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greater. In calculating the volume, the footprint of the smaller tanks is subtracted. The above basis is consistent with the document entitled *Design Rationale for Fuel Storage and Distribution Facilities* published by the Department of Public Works of the Northwest Territories (GNWT 2006; refer to Section 4.6 of these guidelines). The design of these containment products will be based on Arctic installation and industry storage standards. Fuel transfer will incorporate hoses and pumps within tertiary containment. Transfer methodology is described in the attached Oil Pollution Emergency Plan (OPEP), Appendix I of the Site Preparation Activities Application Package.

5.4 Goose Property Equipment Usage

Equipment to be used at the Goose Property during the 2015 site preparation activities is listed in Table 5.4-1. Additional equipment which is currently at site and predominately used for ongoing exploration activities may also be used to support the 2015 site preparation activities. These items include the fuel truck, water truck, and IT 28 Loader.

Table 5.4-1: Site Preparation Equipment Requirements

Equipment / Material	Quantity	Weight (tonnes)	Ground Pressure (N/M^2)
Excavator - Cat 320E	1	24.7	55,370
Loader - Cat 966H	1	23.7	225,105
Articulated Trucks - Cat 730C	3	24.1	338,541
Dozer - Cat D6M	1	16.5	37,000
Grader - Cat 140M	1	19.9	94,618
Drill - Cat MD5075	1	20.4	82,737
Packer - Cat CS56B	1	11.5	218,474
Mobile Crusher/Screener	1	71.0	60,000

5.5 Site Preparation Construction Schedule

The proposed site preparation works which, subject to securing necessary permits and approvals, will be undertaken at the Goose Property and MLA over a period of approximately 180 days, from February to August, 2015.

The following construction order is proposed for site preparation activities at the Goose Property. The majority of steps will be completed pre-thaw; however construction of the all-weather airstrip extension and secondary all-weather road construction can be completed post-thaw.

- After mobilizing site preparation personnel to site, the first activity to be undertaken will be construction of the ice-based airstrip on Goose Lake;

- The ice-road(s) will then be constructed from the existing airstrip to the Goose and Umwelt quarries, as well as to the two explosives magazines and to the diversion berm location;
- Once accessible by ice-road, the quarries will be developed using a drill-blast-crush-haul methodology;
- In-stream works and site preparation for the diversion berm will commence. Berm material, sourced from either the existing stockpile or 2015 quarry operations, will be placed at the proposed Rascal Lake outflow realignment;
- Sediment and erosions controls will be established for site preparation activities, as required;
- Initial construction of the all-weather road:
  - If Goose quarry is selected as the primary source of material, initial construction will connect the Goose quarry to the existing all-weather airstrip;
  - Alternatively, if the Umwelt quarry is selected as the primary source of material initial construction will focus on connecting the Umwelt quarry to the all-weather airstrip;
  - During initial construction, the crusher pad will be established;
- Concurrent with initial all-weather road construction, the main Rascal Lake outflow realignment will be constructed;
- Construction of the all-weather airstrip extension will then commence; and
- If Goose quarry is selected as the primary source of material for initial all-weather road construction, secondary construction will extend the all-weather road to Umwelt quarry. Concurrent to secondary all-weather road construction, the crossings for ephemeral watercourses will be built as the road reaches each crossing location.

The following activities will be completed over a period of approximately 25 days during the open-water season at the MLA:

- Two barges will arrive from a western route, either from the Lower Mainland or from Hay River and will land at the MLA;
- Swamp mats will be laid out along the access trail from the barge landing area to the TLA;
- Temporary structures, such as a lunch room (tent) and sanitary facilities, will be erected at the TLA;
- Swamp mats will be placed as a foundation to the TLA;
- Tertiary containment for the TLA fuel storage area will be erected;
- Barges will then be offloaded with seacans, bulk materials and equipment placed at the TLA first;
- Steel fuel storage tanks will then be offloaded and placed at the TLA within the tertiary containment;
- Fuel storage tanks will then be filled from the barge (details in Appendix I, OPEP); and
- Once all fuel, materials, and equipment have been placed at the TLA, the swamp mats along the access trail will be removed and loaded back onto the barges, which will then depart.

5.6 Site Preparation Workforce

It is estimated that approximately 45 personnel will be required for a period of approximately 180 days to complete the proposed activities. The work will be carried out by Sabina employees and contractors whose northern and Inuit employment and training policies will be applied. Sabina will put emphasis on the importance of these policies in the selection of contractors and it is estimated that the workforce will be approximately one third Inuit.

The total cost of the 2015 site preparation activities is estimated to be approximately $10 million.

6.0 ALTERNATIVES

Alternatives within the Project have been evaluated according to the following criteria:

- Technical feasibility;
- Cost implication in terms of implementation;
- Potential impacts to the environment;
- Amenability to reclamation, and
- Results of community engagement.

The following sections outline alternatives that were assessed for each component of the site preparation activities.

6.1 All-weather Road

The all-weather road is required as it links the Goose Property with the proposed Umwelt quarry. Its layout reflects best practices for avoiding sensitive areas, such as archaeology sites, rare plants and lichens, special landscape features, and wildlife habitat features such as nesting sites and dens. The road reflects the most efficient approach to the Umwelt quarry, and does not traverse land, so that it can be used outside of winter. During site preparation, it will be used to access the Umwelt quarry, in order to supply aggregate for site preparation activities, including the all-weather airstrip. During the construction phase of the Project, it will serve a similar purpose.

6.2 All-weather Airstrip Extension

Due to the remoteness and isolation of the Goose Property, air transportation is an essential component of the Project development. The air transportation alternatives considered for access include:

- Ice airstrips and open water float access using Goose lakes;
- All-weather airstrips up to 1,800 m to support year round access with up to Hercules, or equivalent sized, aircraft; and
- All-weather airstrips up to 2,800 m to support year round access with up to Boeing 767, or equivalent, and larger-sized aircraft.

The second option was selected based upon technical feasibility, project logistical demands and cost. Ice airstrips and open water float access alone do not provide enough capacity to service site preparation activities. As well, there is period of time between open water season and freeze-up when the lake cannot be used for landing.

The construction of an airstrip up to 2,800 m to accommodate Boeing 767 or equivalent was deemed as not necessary for site preparation activities. In addition, the locating of suitable characteristics (non-PAG material, subdued topography with appropriate length of approach) within proximity to the Goose Property was problematic.

Four locations were considered for the airstrip up to 1,800 m. Factors taken into consideration were:

- Distance from existing and planned facilities;
- Ground topography;
- Approach obstructions;
- Impact on waterbodies and watercourses;
- Available construction materials and proximity to sources;
- Direction of prevailing wind; and
- Character of superficial materials with particular reference to permafrost

Based on the technical and cost considerations the preferred option is to extend the existing 915 m airstrip to 1,524 m. This airstrip will be in service for the life of the Project.

6.3 Rascal Lake Outflow Stream Alignment

In order to construct a geotechnically stable airstrip extension on permafrost, a realignment of Rascal Stream East is required. This work will require that Sabina place a berm on the Rascal Stream East (RSE), realigning it to augment flows along the Rascal Stream West (RSW) watercourse. With the construction of a series of berms, RSE will be realigned towards an existing smaller catchment flowing into Gander Pond. The realigned RSW will generate increased flows into Gander Pond and create new fish habitat to mitigate the loss of habitat from RSE.

Based on available topography and flow model results, the location of the berms were generated in an iterative process to minimize the length of berm, while ensuring that no water shall impinge on the airstrip during the design events. The culvert location was selected based on stream slope and cross-sectional topography to minimize the fill required for the road crossing.

The Rascal Lake outflow stream alignment will be in place for the life of the Project. Culverts will be removed during closure.

6.4 Quarry Construction and Operation

Options for quarry material include:

- Local esker;
- Local bedrock locations – new areas; and
- Local bedrock locations – existing operations.

For environmental reasons, Sabina has selected to avoid extraction of esker material and have considered bedrock locations only. Suitable material needs to have the physical and geochemical stability to be used, and be accessible, minimize transport distance, and avoid culturally and environmentally sensitive areas.

The site preparation work will require a total of 550,000 m^3 of quarry rock, which would be obtained from the current quarry west of the Goose Camp and/or the proposed Umwelt quarry. Expansion of the existing quarry is proposed as the site is already operational, thus much of the disturbance activity has already occurred. The location of the Umwelt quarry was selected as it was the closest source of suitable material to the site preparation activities. Geochemical characterization indicates that the majority of the upper greywacke samples representing the proposed quarry areas within the Umwelt pit are classified as non-PAG or low S material with a limited potential for acid rock generation. Additionally, based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue.

The quarries will be in use through the construction phase of the Project.

6.5 Operation of a Temporary Laydown Area

The TLA occupies the same area (but with a smaller footprint) where the Project MLA is proposed. Thus, selection criteria for the TLA are the same as for the MLA.

In total, five potential Marine Laydown areas were considered for the Project. All were located on the southwest shore of Bathurst Inlet. Selection criteria were:

- Distance from Goose site;
- Shoreline topography for port construction;
- Land topography for road construction;
- Steepness of sea bed immediately offshore;
- Exposure to wind and sea ice;
- Nature of superficial material on shore;
- Stability of sea bed materials;
- Depth to bedrock; and
- Unavailability of sites due to conflicting permitting (BIPAR).

Taking all these factors into consideration resulted in the selection of the MLA and therefore the TLA. The TLA will be decommissioned following completion of construction.

7.0 LIFECYCLE

Table 7.0-1: Lifecycle of Proposed Site Preparation Activities

Equipment / Material	Classification	Rational
Quarry construction and operation	Permanent	To be used throughout the Project lifecycle
All-weather airstrip extension	Permanent	To be used throughout the Project lifecycle
Rascal Lake outflow stream realignment	Permanent	Permanent realignment of creek
Ice road and water use	Temporary	To be used in winter prior to commissioning of all-weather road
Construction and operation of an all-weather road	Permanent	To be used throughout the Project lifecycle
Construction and operation of a TLA)	Temporary	To be decommissioned at the end of the exploration phase of the Project

8.0 POTENTIAL IMPACTS

8.1 Valued Components

Potential impacts associated with site preparation activities were assessed for Valued Ecosystem Components (VECs), Valued Socioeconomic Components (VSECs), and Subjects of Note. The scoping involved Sabina-led public consultations, the use of Traditional Knowledge (TK), regulator consultations and regulatory considerations, and recommendations presented in the NIRB EIS guidelines (NIRB 2013). The *Inuit Traditional Knowledge of Sabina Gold & Silver Corp., Back River (Hannigayok) Project, Naonaiyaotit Traditional Knowledge Project* report (KIA 2012) was consulted extensively for TK information.

A screening analysis was carried out to determine which of these VECs, VSECs and subjects of note could potentially interact with the site preparation activities (in this report, these are collectively called VECs). These are presented in Table 8.1-1.

Table 8.1-1: Summary of VEC interactions with Site Preparation Activities

	PROJECT ACTIVITIES - Exploration and Site Preparation	Atmospheric Environment	Air Quality	Noise and Vibration	Climate and Meteorology	Terrestrial Environment	Surface and Bedrock Geology	Permafrost	Eskers and Other Unique or Fragile Landscapes	Vegetation	Caribou, including Habitat and Migration Patterns	Grizzly Bear, including Habitat and Migration Patterns	Muskox, including Habitat and Migration Patterns	Wolverine/Furbearers, including Habitat and Migration Patterns	Birds, Including Habitat and Migration Raptors	Raptors	Freshwater Environment	Hydrology/ Limnology	Groundwater	Limnology and Bathymetry	Water Quality	Sediment Quality	Fish/Aquatic Habitat	Fish Community (lake trout, Arctic grayling)	Marine Environment	Physical Processes	Water Quality	Sediment Quality	Fish/Aquatic Habitat	Fish Community (Arctic char)	Seabirds/Seaducks	Ringed Seals	Human Environment	Archaeological and Cultural Historic Sites	Paleontological	Non-traditional Land and Resource Use	Socio-ec: Business and Economic Development	Socio-ec: Employment	Health, Safety and Community Well-being	Subsistence Economy and Land Use	Country Foods/Human Health
Goose Exploration Camp	Camp Operations		M	M				M		M	M	M	M	M	M						M	M	M														P	P	P		
	Resupply of Goose Camp		M	M							M	M	M	M	M																						P				
	Desiel fuel resupply and storage									M									M		M		M																		
	Machinery and Vehicle Refueling/Fuel Storage and Handling									M											M	M																			
	Explosive and ammonium nitrate storage									M											M	M	M	M												P	P				
Quarries Construction and Operation	Umwelt Quarry (cut and fill): Stripping, Drilling, Blasting, Excavation		M	M				M		M	M	M	M	M	M	M		M			M	M												M		M	P	P		M	
	Goose Quarry (cut and fill): Stripping, Drilling, Blasting, Excavation		M	M				M		M	M	M	M	M	M	M		M			M	M																P			
	Machinery and Vehicle Refueling/Fuel Storage and Handling									M											M	M																			
	Machinery and Vehicle Emissions		M		M					M																															
	Chemicals , Hazardous Material Transport, Storage and Handling									M											M	M																			M
	Explosive and ammonium nitrate storage									M											M	M	M	M					M	M											
All-weather Airstrip Extension	Stripping, Drilling, Blasting, Excavation		M	M				M		M	M	M	M	M	M	M		M			M	M																P			
	Machinery and Vehicle Refueling/Fuel Storage and Handling									M											M	M																			
	Machinery and Vehicle Emissions		M		M					M																															
	Explosive and ammonium nitrate storage																				M	M	M	M					M	M											
Rascal Lake Outflow Stream Realignment	Excavation and construction		M	M						M	M	M	M	M	M	M		M			M	M												M		M	P	P		M	
	Machinery and Vehicle Refueling/Fuel Storage and Handling																				M	M																			
	Machinery and Vehicle Emissions		M		M																																				
All-weather Road	Stripping, Drilling, Blasting, Excavation		M	M				M		M	M	M	M	M	M	M		M			M	M																P			
	Machinery and Vehicle Refueling/Fuel Storage and Handling									M											M	M																			
	Machinery and Vehicle Emissions		M		M					M																															
	Chemicals , Hazardous Material Transport, Storage and Handling									M											M	M																			M
	Explosive and ammonium nitrate storage									M											M	M	M	M					M	M											
Ice Roads and Airstrip	Water use for Winter Road construction and maintenance																																	M		M	P	P		M	
	Winter Road construction and use		M	M														M			M	M																P			
	Machinery and Vehicle Refueling/Fuel Storage and Handling									M											M	M																			
	Machinery and Vehicle Emissions		M		M																																				
Marine Laydown Area	Machinery and Vehicle Emissions		M		M					M																															
	Chemicals , Hazardous Material Transport, Storage and Handling									M											M	M																			M
	Marine Transport of Goods		N	N	N															M	M	M	M	M		M	M	M	M	M	M					P	P			M	

Please indicate in the matrix cells whether the interaction causes an impact and whether the impact is:

P: Positive

N: Negative and non-mitigatable

M: Negative and mitigatable

U: Unknown

If no impact is expected then please leave the cell blank

8.2 Atmospheric Environment

Atmospheric Environment VECs that could potentially interact with site preparation activities include Air Quality and Noise and Vibration. Air quality could be affected by construction and operation of the all-weather road, quarry operations, and Air Strip Extension, primarily through dust from blasting and vehicle operation, as well as vehicular emissions. Noise and Vibration quality can be affected by these same project-related activities. The assessed project activities are not anticipated to affect climate and meteorology, as these effects are local rather than regional in scale, and therefore will not be discussed further in this document.

8.2.1 Air Quality

8.2.1.1 Baseline Air Quality

The air quality in the West Kitikmeot of Nunavut can generally be classified as pristine. Local emissions are limited to stationary (power generation and heating) and mobile sources (trucks, snowmobiles, all-terrain vehicles, etc.) operated by local residents in the few communities within the West Kitikmeot region. Mines operating in Nunavut and the Northwest Territories (NWT) outside of the West Kitikmeot region represent the only major industrial emission sources. Because of the limited local emission sources, long-range transport of air contaminants is the main influence on ambient air quality. The atmospheric boundary layer in the Arctic is generally very stable and surface inversions occur frequently. As a result, dispersion of air contaminants can be less effective in the Arctic than in other regions.

Comprehensive baseline field programs were conducted to support the assessment of the Project, with the objectives being to:

- Understand existing conditions in the local and regional study areas of the Project;
- To provide a benchmark for evaluating the potential future effects of the Project and to characterize pre-disturbance conditions for the purpose of reclamation activities; and
- To support predictive modelling for effect analysis.

8.2.1.2 Potential Effects

Air quality is an important environmental factor in ensuring the conservation of local vegetation, wildlife, and human health values. The activities associated with the vehicle emissions, generated during road construction activities, quarrying, ice road construction and goods and personnel movement have the potential to generate emissions of criteria air contaminants (CACs) and also lead to dust and acid deposition. To assess the potential impact of these emissions, an air quality modelling study was conducted; Table 8.2-1 presents the contaminants assessed as part of the model.

Table 8.2-1: Air Contaminants included in the Air Quality Modelling Study

Species	Description
Criteria Air Contaminants (CACs)	
Sulphur dioxide (SO_2)	Fossil fuels contain a small amount of organic sulphur compounds. During fuel combustion, the sulphur is oxidized and emitted as SO_2 gas with the engine exhaust. In the atmosphere, SO_2 can further oxidize to sulphate particles, which contribute to acid deposition.
Oxides of nitrogen (NO_x)	NO_x gas primarily consists of nitrogen oxide (NO) and nitrogen dioxide (NO_2). The gasses are emitted with exhaust from combustion engines and products from blasting operations. NO_x can be converted to nitric acid in the atmosphere and thus contribute to acid deposition.
Carbon monoxide (CO)	Carbon monoxide is formed as a result of incomplete combustion of fossil fuels. The gas prevents oxygen from attaching to red blood cells and is therefore toxic at high concentrations.
Total suspended particulates (TSP) matter	TSP are airborne particles that have a diameter of 100 µm or less. Sources of TSP include vehicle and engine exhaust and fugitive dust. Most particles with diameters between 2 and 100 µm are a result of fugitive dust. Fugitive dust is derived from the mechanical disturbance of granular material exposed to the air. Common sources of fugitive dust include unpaved roads, aggregate storage piles and construction operations. Particles can be composed of a wide range of materials, including minerals (sand, rock dust), engine soot, organic materials or salt.
Particulate matter (PM_{10})	PM_{10} particles are a subset of TSP and are defined as particles with a diameter less than 10 µm.
Respirable particulate matter ($PM_{2.5}$)	$PM_{2.5}$ particles are a subset of TSP and are defined as particles with a diameter less than 2.5 µm. These particles are small enough to enter deep into the respiratory system. The majority of particulate matter emitted with diesel engine exhaust is $PM_{2.5}$.
Deposition	
Dust deposition	Small, dry, solid particles projected into the air by natural forces, such as wind or by man-made processes. Dust particles are usually in the size range from about 1 to 100 µm in diameter. They settle slowly under the influence of gravity and are deposited on the soil and vegetation.
Acid deposition	Acid deposition primarily occurs as a result of atmospheric oxidation of sulphur dioxide to sulphate (sulphuric acid) and oxidation of nitrogen dioxide to nitrate (nitric acid), which is then deposited on the soil and vegetation. Acid deposition can be quantified as potential acid input, which is a measure of the combined input of sulphur and nitrogen derived acid species.

Canada's national, provincial, and territorial governments have established ambient air quality thresholds for CACs that are intended to ensure long-term protection of public health and the environment. Table 8.2-2 summarizes the ambient air quality standards applicable to the Project.

Table 8.2-2. Federal, Provincial, and Territorial Ambient Air Quality Standards and Objectives

Contaminant	Averaging Period	Nunavut Ambient Air Quality Standards[a]	Dust and Acid Deposition Provincial Guideline Values	Canadian Ambient Air Quality Standards (2020)	National Ambient Air Quality Objectives[b]	
					Maximum Desirable	Maximum Acceptable
Sulphur dioxide (SO_2) (µg/m^3)	1-hour	450	-		450	900
	24-hour	150	-		150	300
	Annual	30	-		30	60
Nitrogen dioxide (NO_2) (µg/m^3)	1-hour	400	-		-	400
	24-hour	200	-		-	200
	Annual	60	-		60	100
Carbon monoxide (CO) (µg/m^3)	1-hour	-	-		15,000	35,000
	8-hour	-	-		6,000	15,000
Total suspended particulate (TSP) (µg/m^3)	24-hour	120	-		-	120
	Annual[c]	60	-		60	70
PM_{10} (µg/m^3)	24-hour		50[d]			
$PM_{2.5}$ (µg/m^3)	24-hour	30	-	27[e]	-	-
	Annual			8.8		
Dust deposition (mg/dm^2/day)	30-day	-	1.7[f]		-	-
Acid deposition (eq/ha/yr)	Annual	-	250 [g]		-	-

Notes:
[a] Government of Nunavut (2011)
[b] CCME (1999)
[c] Geometric mean: the average of the logarithmic values of a data set converted back to a base 10 number
[d] BC MOE (2009)
[e] The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.
[f] Most stringent provincial guideline (BC MOE 1979).
[g] The critical load guideline recommended for acidic, coarse parent materials (WHO 1999).

8.2.1.3 Potential Interactions with Project and Characterization

Potential interactions were identified using professional judgement and experience at other similar projects in Nunavut and the NWT. Table 8.2-3 presents the site preparation activities along with the nature of the potential interaction with each of the eight indicators. The identified interactions are characterized below.

Table 8.2-3. Potential Project Interaction with the VEC Air Quality

Project Activities: Site Preparation	NO_2	SO_2	CO	TSP	PM_{10}	$PM_{2.5}$	Dust Deposition	Acid Deposition
All-weather Road	X	X	X	X	X	X	X	X
Quarries	X	X	X	X	X	X	X	X
All-weather Airstrip Extension	X	X	X	X	X	X	X	X
Ice Road	X	X	X	X	X	X		X
Temporary Laydown Area								

Air Quality is potentially affected by all-weather road construction and use, the existing and new Umwelt quarry operations, and the airstrip extension construction and use. These Project components could interact with all eight air quality indicators. The TLA was not considered to affects air quality as the operation of equipment in the area will be very brief, to unload two barges. Dispersal due to high winds is also effective around the TLA. The emissions associated with the site preparation activities are expected to be less than those generated during the year with the highest emissions, which would occur during mine operations. The following sections characterize the potential effects of the site preparation activities on air quality due to each of the pollutants.

SO_2

Predicted maximum 1-hour, 24-hour and annual average SO_2 concentrations were all well below the Nunavut standards at all locations modelled. Since the results are predicted to be below the criteria, there are no anticipated residual effects.

NO_2

Predicted maximum 1-hour and 24-hour average NO_2 concentrations were below the Nunavut objective. Since the results are predicted to be below the criteria, there are no anticipated residual effects.

CO

Predicted maximum 1-hour and 8-hour average CO concentrations were all well below the Nunavut standards at all locations modelled. Since the results are predicted to be below the criteria, there are no anticipated residual effects.

TSP and PM_{10} and $PM_{2.5}$

The model was run for fugitive and non-fugitive sources separately and therefore the contribution from different sources could be assessed. Exceedances were identified during operations at Goose Camp, but not for site preparation. These exceedances can be attributed to emissions of dust from open pit quarry activities and unpaved road dust generated on onsite. The model has been run assuming no anthropogenic dust control. However, mitigation measures such as road watering will be implemented to reduce the amount of unpaved road dust.

Dust Deposition

Dust deposition rates were predicted to be below the referenced objectives at all locations modelled.

Acid Deposition

For site preparation, there are no exceedances of WHO critical load guidelines for acid deposition.

8.2.2 Identification of Mitigation and Management Measures

Mitigation measures involve taking a tangible action to avoid, minimize, restore on-site or offset Project effects. Mitigation measures that are recommended to reduce an adverse effect are technically, environmentally, and economically feasible and aim to avoid, reduce, control, eliminate, offset, or compensate potential project effects.

There are two main types of mitigation and management measures that will be put in place in order to reduce air quality impacts associated with site preparation activities: emission reduction measures and fugitive dust reduction measures. Emission reduction methods include ensuring proper equipment maintenance, and implementing a recycling program to reduce the amount of incinerated waste, as detailed in the Waste Management Plan (Appendix D of the Site Preparation Activities Application Package). Fugitive dust suppression measures include wetting work areas, roads, and storage piles, installing covers to equipment and loads carried by vehicles, installing windbreaks or fences, and using dust hoods and shields.

8.3 Noise and Vibration

8.3.1 Baseline Summary

Noise is an important environmental factor because a change in the noise environment may adversely affect wildlife, workers and local residents. Noise is defined as any undesirable sound that may irritate people, disturb rest or sleep, cause loss of hearing, or otherwise affect the quality of life of affected individuals. Noise can result in psychological and physiological effects (e.g., stress), mental health effects, and effects on residential behaviour (World Health Organization [WHO] 1999).

Vibration may be in the form of ground vibration or blasting overpressures, i.e., pressure waves in the atmosphere. These ground-borne or airborne vibrations can cause cosmetic and structural damage to buildings as well as disturbances to local residents, workers, and wildlife.

Aside from mine exploration activities, the noise environment in the Project area is pristine. There are no additional industrial sites or human settlements close enough to the Project to be audible; consequently, only natural sources such as wind, precipitation, and wildlife will contribute to background noise levels.

8.3.2 Potential Effects

Site Preparation work will introduce noise and vibration sources largely in the form of construction equipment, haul vehicles, blasting and vehicle and aircraft traffic. A review of the potential Project interactions with noise and vibration identified nine potential effects that may occur; seven potential effects on humans and two potential effects on wildlife. These nine potential effects are: sleep disturbance (humans), interference with speech communications (humans), complaints (humans), high annoyance (humans), noise-induced rattling (humans), noise-induced hearing loss (humans), cosmetic and structural damage of buildings (humans), loss of habitat (wildlife) and disturbance (wildlife). These are presented in Table 8.3-1.

Table 8.3-1. Potential Project Interactions with the VEC Noise and Vibration

Project Activities		Noise and Vibration Indicators								
		Effects on Humans							Effects on Wildlife	
		Sleep disturbance	Interference with speech communication	Complaints	High annoyance	Noise induced rattling	Noise induced hearing loss	Cosmetic and structural damage to buildings	Loss of wildlife habitat	Disturbance to wildlife
Site Preparation and Construction	All-weather Road	x	x	x	x				x	x
	Quarries	x	x	x	x				x	x
	Ice Road	x	x	x	x				x	x
	All-weather Airstrip Extension	x	x	x	x				x	x
	Temporary Laydown Area									

Quantitative noise modelling for the peak activity year at the Goose Property show that predicted noise levels are below the criteria for interference with speech communications (humans), complaints (humans), high annoyance (humans), noise induced rattling (humans) and noise induced hearing loss (humans). Similarly, there are not expected to be any cosmetic and structural damage of buildings (humans) effects from Project-generated vibration. However, during peak years noise levels are predicted to exceed relevant criteria for loss of habitat (wildlife) and disturbance (wildlife) at various identified receptors due to construction and operation activities, blasting, road traffic and aircraft movements.

Since only peak years are associated with any exceedance of noise level and vibration guidelines, it is not anticipated that site preparation activities will result in any ongoing deleterious effects.

8.3.3 Mitigation and Management

Noise control during the site preparation activities will be focused on material handling and transportation sources. Based on experience from other mine projects the following noise controls are being considered:

- Ensuring equipment is fitted with appropriate mufflers and silencers;
- Using enclosures, berms, acoustic screening and shrouding where stationary sources requiring control are identified; and
- Ensuring equipment is well maintained.

8.4 Terrestrial Environment

Terrestrial Environment VECs that could potentially interact with site preparation activities include Permafrost, Vegetation, Caribou including Habitat and Migration Pathways, Grizzly Bear including Habitat and Migration Pathways, Muskox including Habitat and Migration Pathways, Wolverine and furbearers including Habitat and Migration Pathways Birds including Habitat and Migration Pathways, and Raptors.

Mitigation and management for wildlife is presented at the end of the wildlife section, as much of the mitigation and management will be the same from species to species.

8.4.1 Permafrost

8.4.1.1 Baseline Summary

The Project is located within the continuous permafrost region of western Nunavut. A seasonally thawed active layer is present immediately beneath ground surface, with a mean maximum depth of approximately 2 m. Subsurface temperatures are perennially below 0 ^{o}C at depths up to approximately 500 m below ground surface, except beneath some surface waterbodies. Open taliks are present beneath surface waterbodies with depths exceeding 1.3 m. Through taliks that connect to the deep groundwater are inferred to be present beneath waterbodies with widths greater than 200 m at the Goose Property. Cryopegs are inferred to be present at the base of the permafrost and adjacent to deep talik, as the groundwater beneath the permafrost has been shown to be hyper-saline. The basal cryopeg located within the Goose Property is estimated to be 100 m thick.

8.4.1.2 Potential Effects

Areas supporting permafrost are very sensitive to changes in air and surface temperatures. Construction activities in permafrost areas can result in a thickening of the active layer, thaw settlement and subsidence, and can lead to localized terrain instability due to the loss of bearing capacity associated with permafrost degradation.

The quarries will cut into the permafrost, but not the access road or the airstrip. However, the depth will not exceed the depth of permafrost, thus no interaction with groundwater is expected.

Permafrost is also present at the TLA. However, no construction activity is proposed in this area, thus permafrost will not be compromised.

Site Development Activity	Effects on Permafrost
All-weather Road	
Quarries	X
All-weather Airstrip Extension	
Ice Road	
Temporary Laydown Area	

8.4.1.3 Mitigation and Management

The basic principle for mitigating alterations to permafrost is to maintain the integrity of the embankments and the structural core. This can be achieved through surface preservation, and avoiding cuts in fine-textured areas (which are more sensitive to thaw and solifluction).Control of erosion and sedimentation is critical; poor drainage over permafrost areas can cause surface water ponding, thermal erosion, thermokarst and/ or the formation of ice. These can all have a deleterious impact on environment, traffic, and overall life of the structure.

Permafrost will be protected at the TLA by placing all equipment and materials on dunnage or swamp mats and accessing the area from the barge landing area using swamp mats provisionally placed directly onto the tundra to preserve the permafrost.

8.4.2 Vegetation

8.4.2.1 Baseline Summary

Terrestrial ecosystem mapping (TEM) and rare plant surveys were conducted in 2012 within the vicinity of Goose Camp and the MLA. Vegetated ecosystems are dominated by mesic tundra, dry-sparse tundra, and moist shrub-dominated tundra. The mesic tundra association is characterized by extensive areas dominated by dwarf woody shrub species, with a highly variable component of herbs, graminoids, mosses, and lichens. Sparsely-vegetated ecosystems typically occur on thin morainal veneers or exposed bedrock, windswept esker crests, blocky tundra, marine beaches and other barren sites that limit vegetation establishment. Non-vegetated ecosystems dominated by freshwater lakes and ponds. Special landscape features, identified for their importance as wildlife habitat or potential to support rare plant species, include esker complexes, cliffs, bedrock outcrop and lichen-dominated ecosystems, riparian ecosystems, wetland ecosystems, and marine beaches and old beach heads.

A total of 890 plant species identifications were made during field surveys. The largest species group in the identified flora is that of the vascular plants, followed by the macro-lichens. Ninety rare plant and lichen species were identified and were mainly found close to the shoreline of Bathurst Inlet. Plants defined as rare included those having conservation-priority S-ranking (subnational conservation ranking), General Status ranking by the National General Status Working Group (NGSWG 2010), or others for which there is evidence of significant rarity. No species having status under the Species at Risk Act (SARA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) were deemed to have habitat in the project area, or to be in geographical proximity that would allow for any significant chance of discovery during the surveys.

8.4.2.2 Potential Effects

The construction of the proposed infrastructure will result in the unavoidable disturbance of terrain, ecosystems, and vegetation within the immediate road footprint. The road alignment traverses an area that is dominated by terrain and ecosystems commonly found throughout the Arctic.

The proposed Goose Property Infrastructure will disturb existing ecosystems and vegetation, primarily through removal and burial during construction. Equipment and supplies will be placed on swamp mats to reduce the effects on vegetation and permafrost. However, some vegetation disturbance will occur. Additional alteration to ecosystems and vegetation adjacent to the all-weather road and quarries could potentially occur from dust deposition, the potential introduction and spread of invasive or non-native plant species into the area, and changes to local surface hydrology. These potential effects may occur during operation of the road during the summer months and can directly or indirectly affect the function and health of the plant species and ecosystems present.

A summary of ecosystems to be lost and degraded due to the construction and operation of the proposed Goose Property Infrastructure are presented in Tables 8.4-1 and 8.4-2, respectively. A total of 31.9 ha will be lost, with 90% of the ecosystems being represented by moist and mesic tundra associations. These ecosystems are the most common within the area. An additional 121.2 ha have the potential to be altered due to effects such as dust from road construction and use, quarry construction and use, and airstrip construction and use.

Table 8.4-1. Summary of Ecosystems Lost due to Construction of Infrastructure around Goose Property

Vegetation Association	Row Labels	Description	Sum of Area (ha)
Bedrock Lichen Veneer	BL	Sparse lichen and dwarf shrub community that occurs on skeletal soils on bedrock outcrops.	1.4
Bedrock outcrop	BR	A gentle to steep, bedrock escarpment or outcropping, with little soil development and sparse vegetative cover.	0.9
Mesic dwarf-shrub tundra	TL	Typical tundra that is dominated by dwarf shrubs. Occurs across extensive areas, normally gently sloping tills, and contains a substantial cover of shrub, herb, moss and lichen.	13.6
Shrubby tundra	TS	Moist (less commonly mesic) tundra that is dominated by thick dwarf birch. Typically occurs in water receiving slope positions and often has evidence of surface or subsurface water movement.	15.1
Raised bog complex	WB	Variable complex that contains severely mounded raised bogs with various other wetlands types in the inter-mound depressions. Low pH and little water movement.	0.8
Willow-sedge fen	WS	Fen association that is dominated by sedges and willow that typically occurs near moving water. Organic soils distinguish it from riparian associations	0.0
Grand Total			**31.9**

Table 8.4-2. Summary of Ecosystems Potentially Altered due to Construction of Infrastructure around Goose Property

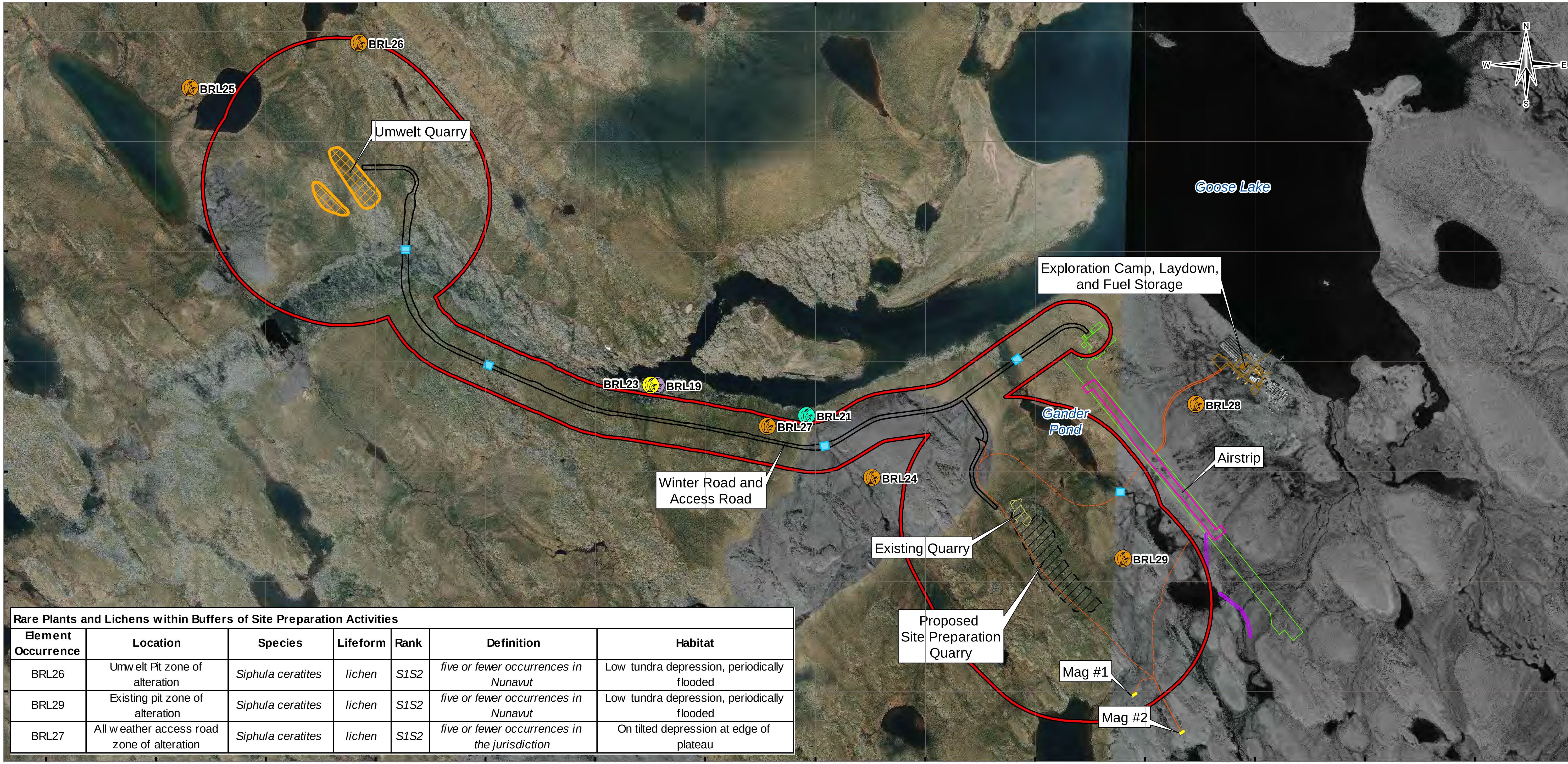
Vegetation Association	Code	Description	Sum of Area (ha)
Bedrock Lichen Veneer	BL	Sparse lichen and dwarf shrub community that occurs on skeletal soils on bedrock outcrops.	2.8
Bedrock outcrop	BR	A gentle to steep, bedrock escarpment or outcropping, with little soil development and sparse vegetative cover.	7.1
Dry-sparse tundra	TH	Dry, rocky tundra that occurs in upper slope and crest locations, often complex with TB, BL or BR. Vegetation is variable, with dwarf shrubs and lichens often dominant.	2.4
Mesic dwarf-shrub tundra	TL	Typical tundra that is dominated by dwarf shrubs. Occurs across extensive areas, normally gently sloping tills, and contains a substantial cover of shrub, herb, moss and lichen.	82.3
Shrubby tundra	TS	Moist (less commonly mesic) tundra that is dominated by thick dwarf birch. Typically occurs in water receiving slope positions and often has evidence of surface or subsurface water movement.	22.6
Water sedge marsh	WA	Marsh community that is dominated by a near monoculture of water sedge. Restricted to very wet locations along low gradient watercourses and lake/pond margins.	0.2
Raised bog complex	WB	Variable complex that contains severely mounded raised bogs with various other wetlands types in the inter-mound depressions. Low pH and little water movement.	5.3
Cottongrass-sedge fen	WC	Cottongrass and sedge dominated fen. Slightly to strongly hummocked, often with obvious water movement.	0.9
Willow-sedge fen	WS	Fen association that is dominated by sedges and willow that typically occurs near moving water. Organic soils distinguish it from riparian associations	0.4
Grand Total			**121.2**

Table 8.4-3 presents the rare plants and lichens associated with site preparation activities. A zone of potential alteration (due to dust) was established using a 100 m buffer for roads and a 500 m buffer for the quarries. The 100 m before was established as it is within this area that the majority of the effects of dust due to roads are expected to occur, while 500 m is where the dust effects of quarries are substantially reduced. One rare lichen, *Siphula ceratites*, occur within the zone of alteration for the all-weather road, while two observations of the same lichen fall within the 500 m buffer around the quarries (Table 8.4-3). None of these are within the footprint of the proposed activities.

Although this lichen is classified as S2S3, with less than five observations in Nunavut, it is unlikely that the current available ranking reflects the reality of its occurrences, given that it was observed 14 times within the Project area, on a variety of habitats common across the landscape.

Table 8.4-3 Rare Plants and Lichens within Buffers of Site Preparation Activities.

Element Occurrence	Location	*Species*	*Lifeform*	*Rank*	*Definition*	Habitat
BRL26	Umwelt Pit zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in Nunavut*	Low tundra depression, periodically flooded
BRL29	Existing pit zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in Nunavut*	Low tundra depression, periodically flooded
BRL27	all weather access road zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in the jurisdiction*	On tilted depression at edge of plateau



Rare Plants and Lichens within Buffers of Site Preparation Activities

Element Occurrence	Location	Species	Lifeform	Rank	Definition	Habitat
BRL26	Umwelt Pit zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in Nunavut*	Low tundra depression, periodically flooded
BRL29	Existing pit zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in Nunavut*	Low tundra depression, periodically flooded
BRL27	All weather access road zone of alteration	*Siphula ceratites*	*lichen*	*S1S2*	*five or fewer occurrences in the jurisdiction*	On tilted depression at edge of plateau

LEGEND

Rare Plant Observation

- *Bryoria tenuis*
- *Placynthium flabellosum*
- *Ramalina intermedia*
- *Siphula ceratites*
- Site Preparation Activities Buffer

- Proposed Access Road
- Rascal Stream Realignment Berm
- Proposed Airstrip Extension
- Proposed Umwelt Quarry
- Proposed Site Preparation Quarry
- Water Crossing / Culvert Location

- Winter Road
- Airstrip Access Road
- Laydown Area / Existing Camp / Fuel Storage
- Explosive Magazine Location
- Existing Quarry
- Existing Airstrip

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Rare Plant Observations near Goose Property Infrastrcuture

PROJECTION: UTM Zone 13
DATUM: NAD83
CLIENT: Sabina

Scale: 1:18,000
200 100 0 200
Metres

FILE NO.
V15103033-02_Figure8-4-1_RarePlantGoose.mxd

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	DM	0

OFFICE: Tt EBA-VANC
DATE: October 9, 2014

Figure 8.4-1

Q:\Vancouver\GIS\ENGINEERING\V151\V15103033-02_Sabina\Maps\V15103033-02_Figure8-4-1_RarePlantGoose.mxd modified 10/9/2014 by morgan.zondervan

8.4.2.3 Mitigation and Management

Mitigation measures will be implemented to minimize the effects of the road on the ecosystems and vegetation of the area, including:

- Minimizing the size of the overall footprint;
- Avoiding sensitive ecosystems or ecosystems supporting rare plant habitat, where possible;
- Applying appropriate dust suppression measures, as per the *Environmental Guideline for Dust Suppression* (Nunavut Department of Sustainable Development, Environmental Protection Service 2002);
- Verifying machinery and equipment destined for use at the site is clean prior to being dispatched (as a means of reducing the introduction of invasive plant material to the area);
- Immediate containment and clean-up of spills, as per the established Spill Contingency Plan;
- Installing sufficient cross drainage to prevent or minimize water ponding as well as to limit the alteration of the surface water hydrology regime; and
- During use of the all-weather road and quarries, dust suppression will be undertaken, when feasible and within the limits of allowable water use.

8.4.3 Caribou

8.4.3.1 Baseline Summary

The Project is located within the range of three barren-ground caribou herds. The most important is the Bathurst caribou herd, which is present primarily during post-calving and occasionally during spring migration. The Ahiak herd (also known as the Queen Maud herd) has also been observed in general region of the Project, primarily during the late summer, fall and winter but also during spring migration. The Dolphin and Union herd is named after the Dolphin and Union Strait which this herd crosses each spring and fall to summer on Victoria Island. The southern extent of the winter range on the mainland likely overlaps with the MLA.

Collaring data indicate that Bathurst herd caribou are found predominantly in and around the Project area during the mid-summer months. Bathurst caribou winter below the tree line in Nunavut and the NWT. During spring migration, caribou move quickly north to the calving grounds between the Hood and Burnside Rivers. The Project is located on the eastern edge of the migration route to the calving grounds and approximately 100 km to the south-east of the calving grounds. During post-calving and summer, caribou leave the calving grounds and move south and south-east to the summer grounds. Some of these caribou move through the Wildlife Regional Study Area (RSA, as presented in the Back River DEIS, Volume 5, Chapter 5), predominantly to the south and west of the Project.

Ahiak caribou are found in the RSA primarily during the summer and early fall, but may be found in the RSA during winter and spring at low densities. Ahiak caribou winter both above and below the treeline, generally southeast of the Project. During spring migration, some caribou move through the eastern border of the RSA. Calving is conducted in the Queen Maude Gulf to the northeast, outside of the RSA. The Ahiak caribou move southwest to their summer range which overlaps the RSA between mid-July and the end of August. A smaller portion of collared Ahiak caribou remain in the southern portion of the RSA during the fall and throughout the winter.

Collar data for Dolphin and Union caribou indicate that this herd has potential to interact with the RSA during winter only. A low number of collared caribou used the northern RSA; it is possible that un-collared caribou (males and juveniles) may use the RSA during the winter season especially in the northern portion of the RSA near the MLA. Dolphin and Union caribou calve and summer on Victoria Island prior to their fall migration. In the fall, the herd migrates to the southern coast of Victoria Island for the rut, before migrating back across sea ice between October and late November to over-winter on the mainland. Dolphin and Union caribou are likely present at low densities in the northern extent of the RSA, near the MLA in the winter. The Dolphin Union caribou herd uses the ice to cross Coronation Gulf on their spring and fall migration to and from Victoria Island (Gunn 2005).

Within the immediate vicinity of the Goose Property, both the Bathurst Herd and the Ahiak Herd have been observed. The Bathurst herd are present in the area during post-calving (mid-June to mid/late July) and to a lesser extent, during spring migration. Ahiak caribou are most likely to be present in the region of Goose Camp during summer (mid-July to late August), but have been observed throughout the year.

Caribou detected in the region using remote digital cameras were most frequently associated with freshwater/riparian and lower elevation habitats, and secondarily with tundra and esker habitat (Rescan 2013a). Lake edges and high elevation sites are used during summer for insect relief. The proposed all-weather road traverses primarily mid-elevation tundra habitat.

8.4.3.2 Potential Effects

Potential effects on the VEC caribou related to site preparation activities include the following:

- Habitat loss;
- Disturbance due to noise (e.g., displacement from areas of habitat);
- Disruption to movement;
- Direct mortality and injury from Project activities;
- Indirect mortality (e.g., due to increased access and associated increase in hunting);
- Attraction (e.g., altered inter-species relationships);
- Exposure to contaminants; and
- Reduction in reproductive productivity due to all effects of the Project combined.

Potential interactions of these effects with site preparation activities were assessed and are presented in Table 8.4-4. The all-weather road has the most potential to negatively affect caribou.

Table 8.4-4. Potential Effects to Caribou in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss	Disturbance due to noise	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants	Reduction in Reproductive Productivity
All-weather Road	X	X	X	X	X			X
Quarries	X	X						X
All-weather Airstrip Extension	X	X						
Ice Road		X	X	X	X			X
Temporary Laydown Area		X						

8.4.4 Grizzly Bear

8.4.4.1 Baseline Summary

Barren-ground grizzly bears (*Ursus arctos horribilis*), inhabit the northern edge of the grizzly bear range in North America. Habitats at these high latitudes are relatively low in forage productivity. As a result, barren-ground grizzly bears have large home ranges and exist at low densities compared to other grizzly bear populations in more productive ecosystems (McLoughlin 2000).

Inuit TK indicates that barren-ground grizzly bears (hereafter, grizzly bears) are found throughout the RSA, especially in association with major river systems, watersheds and coastal areas (KIA 2012). Grizzly bears were hunted for meat and fat (food and oil) typically in spring or fall before denning. These mammals are also important and respected by Inuit as many legends and stories exist about them (KIA 2012).

The northern extremity of the range of the barren ground grizzly bear is within the area of the Project. These bears require large home ranges due to low biomass production of the landscape. Average home range sizes vary from 2,100 km^2 for females to 7,245 km^2 for males, and home ranges of individuals overlap more than they do in southern latitudes (McLoughlin, Ferguson, and Messier 2000).

Populations of barren-ground grizzly bear in the central Canadian Arctic are structured into three spatially distinct groups, located in the Kugluktuk region, Bathurst Inlet region, and North Slave region (McLoughlin, Cluff, and Messier 2002a). Grizzly bears in the terrestrial RSA are part of the Bathurst Inlet population cluster and there is no official estimate on grizzly bear population size for the West Kitikmeot region of Nunavut. However, a crude estimate of 800 grizzly bears was determined for a 200,000 km^2 portion of the northwestern mainland of Nunavut, which includes the terrestrial RSA (Ross 2002). This estimate assumed a density of four bears per 1,000 km^2 based on grizzly bear densities in nearby areas (Ross 2002).

Three types of baseline surveys have been conducted for grizzly bears in the RSA: population-estimation using DNA mark-recapture, den surveys, and incidental observations. In 2012, 111 bears were identified in the RSA with the highest numbers of bears on the lower reaches of the Western River (>10 bears), along the Back River. These numbers indicate approximately twice the density of grizzly bears in the Project area relative to the assumed density previously thought (Ross 2002).

Den surveys were conducted in 2007, 2011 and 2012. In total, two dens were identified, including two along the Western River.

8.4.4.2 Potential Effects

Interactions of grizzly bears with site preparation components were evaluated to determine which of the following potential effects may occur (Table 8.4-5):

- Habitat loss;
- Disturbance due to noise (e.g. displacement from areas of habitat);
- Disruption to movement;
- Direct mortality and injury from Project activities;
- Indirect mortality (e.g. due to increased access and associated increase in hunting);
- Attraction (e.g., altered inter-species relationships);
- Exposure to contaminants; and
- Reduction in reproductive productivity due to all effects of the Project combined.

Table 8.4-5. Potential Effects to Grizzly Bears in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss	Disturbance due to Noise	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants	Reduction in Reproductive Productivity
All-weather Road	X	X	X	X	X			X
Quarries	X	X						X
All-weather Airstrip Extension	X	X	X	X				X
Ice Road								
Temporary Laydown Area								

8.4.5 Muskox

8.4.5.1 Baseline Summary

The global range of muskox extends across most of the Arctic islands, northern Greenland, and most of the Canadian tundra, including the Kitikmeot region of Nunavut (Gunn 2003). Overall, in Nunavut and the NWT, the number of muskox was estimated at 134,000 to 144,000 individuals in 2001. The Government of Nunavut estimates that there are 19 populations totalling approximately 50,000 muskox within the Kitikmeot Region (Dumond 2006).

In 2005 the number of muskox between northeast Contwoyto Lake and southwestern Bathurst Inlet, an area that includes the RSA, was estimated at 604 ± 225 animals (Dumond 2007) down from 3,400 ± 460 animals in 1986 (Gunn 1990). Muskox that occur within the RSA are referred to as the central mainland population. Muskox are found throughout the region at relatively low densities (Gunn 1990; Dumond 2007). Average summer home range size is 223 km^2 and they move an average of 2.6 km/day (Reynolds 1998).

Field data for muskox were collected during aerial surveys for caribou in 2007, 2008 and 2010. Surveys followed pre-determined parallel transect lines that were spaced 8 km apart within the RSA. In 2007, five aerial surveys were conducted in May, June, early July, late July, and September and a total of 50 muskox were observed on transects with an additional 82 observed off transect (> 500 m from the plane). In 2008, two adults were observed during the May survey and two during the July survey and an additional 98 muskox (84 adults and 14 young) were observed incidentally.

In 2010, aerial surveys were conducted in May, June, and July and a total of 53 muskox were observed with an additional 34 muskox recorded off transect. Each aerial survey typically observed 2 to 3 groups of muskox. In addition to aerial surveys, three muskox were observed incidentally in the RSA in 2011, and ten separate incidental observations totaling 114 muskox were observed in the RSA in 2012 (Rescan 2013). Typically, a group was observed each year on the low hills to the west of Bathurst inlet, while the other 1 to 2 herds were observed at various locations in the southern portion of the RSA. Productivity (calves and juveniles per adult) of muskox herds observed was very low, frequently with 1-2 calves per 20-30 adults in the spring.

8.4.5.2 Potential Effects

Interactions of muskox with Project components were evaluated to determine which of the following potential effects may occur (Table 8.4-6):

- Habitat loss;
- Disturbance due to noise (e.g., displacement from areas of habitat);
- Disruption to movement;
- Direct mortality and injury from site preparation activities;
- Indirect mortality (e.g., due to increased access and associated increase in hunting);
- Attraction to infrastructure;
- Exposure to contaminants; and
- Reduction in reproductive productivity due to combined effects of the Project.

Table 8.4-6. Potential Effects to Muskox in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss	Disturbance due to Noise	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants	Reduction in Reproductive Productivity
All-weather Road	X	X	X	X	X			X
Quarries	X	X						X
All-weather Airstrip Extension	X	X	X	X				X
Ice Road		X	X	X	X			X
Temporary Laydown Area	X							X

8.4.6 Wolverines/Furbearers

8.4.6.1 Baseline Summary

Arctic furbearers in the Kitikmeot region include wolverines, wolves, red and Arctic foxes, and Arctic ground squirrels. Wolverines and grey wolves are two species representative of furbearers in the environmental assessment with wolves acting as a proxy for foxes (both canids).

Wolverines are members of the mustelid family, which includes weasels, badgers, and marten. Like other mustelids, wolverines are carnivorous, and are both scavengers and predators on a wide range of prey (COSEWIC 2003). Very large home ranges and low population densities are characteristic of this solitary species (Persson, Wedholm, and Segerstrom 2010; Inman et al. 2012). In Nunavut, wolverines have very large territories ranging from 100 km2 for an adult female to over 600 km2 for an adult male (Feldhamer, Thompson, and Chapman 2003). Wolverine populations in the central Arctic appear to be stable, though recent estimates are lacking (COSEWIC 2003). The total population size of wolverines in Nunavut is estimated at 2,000 to 2,500 individuals (COSEWIC 2003; Slough 2007).

The grey wolf is the largest member of the *Canis* genus and is widespread throughout much of northern Canada, including the West Kitikmeot region of Nunavut. Populations are stable or increasing within their Canadian range, except in northern Alberta and some parts of the NWT (Hayes 1995; Frame 2008). In Nunavut, wolf reproductive success and population size are largely regulated by the availability of caribou.

Three types of baseline surveys have been conducted for wolverine and furbearers in the RSA including: i) population-estimation using DNA mark-recapture for wolverines; ii) carnivore den surveys; and iii) incidental observations. The DNA-based mark-recapture program was conducted over two years; 2012 and 2013 in two areas approximately 2,000 km^2 each, surrounding the Project location. In 2012 and 2013, a 35 km by 35 km survey grid, divided into 49 cells (5 km X 5 km) was located north of the Goose Property. An additional grid consisting of 50 cells (5 km X 5 km) was centered around the proposed MLA during 2013. A baited post was located within each cell and re-baited during three checks (approximately 10 days between checks) during March and April. A total of 12 individuals were detected in 2012, including 4 females and eight males. Only one male wolverine was detected during other wolverine surveys conducted in Nunavut or the NWT and results indicate that the Project area supports a moderately sized wolverine population. A formal population estimate will be made after analysis of the 2013 samples and included in the FEIS.

Carnivore dens surveys were conducted in the RSA via low level aerial surveys in esker and glacial-fluvial habitat in 2007, 2011, 2012 and 2013 to identify dens that are active and to identify resident carnivore species using the RSA. No wolverine dens were observed during the aerial surveys in the RSA; however, in 2012 two active wolverine dens were found incidentally within rocky boulder habitat and located within 1 km of proposed site infrastructure. One of these dens was active in 2013. In 2007, five active wolf dens were recorded with pups observed at four of the dens in the RSA, one of the wolf dens were located about 40 km from the Goose Property. No wolf dens were found in 2011, and those revisited from the 2007 surveys were unoccupied. In 2012, two active wolf dens were found both greater than 25 km from proposed infrastructure.

Incidental observations of wolverine have been recorded in the RSA between 2001 and 2013. Nearly 20 incidental observations of wolves and pups have been recorded between 2007 and 2012.

Thirty remote cameras located in the RSA in 2012 recorded 51 observations of wolverine between March and April and 74 observations of wolves totaling 92 individuals between late-May/early June to late-August. Several of these detections are likely repeated observations of individuals at the same or multiple cameras

8.4.6.2 Potential Effects

Interactions of wolverine and grey wolf with site preparation components were evaluated to determine which of the following potential effects may occur (Table 8.4-7):

- Habitat loss;
- Disturbance due to noise (e.g., displacement from areas of habitat);
- Disruption to movement;
- Direct mortality and injury from Project activities;
- Indirect mortality (e.g., due to increased access and associated increase in hunting);
- Attraction (e.g., altered inter-species relationships);
- Exposure to contaminants; and
- Reduction in reproductive productivity due to all effects of the Project combined.

Table 8.4-7. Potential Effects to Wolverine and Wolves in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss[1]	Disturbance due to Noise	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants	Reduction in Reproductive Productivity[2]
All-weather Road	X	X	X	X	X	X		X
Umwelt and Goose Quarry	X	X	X			X		X
All-weather Airstrip Extension	X	X	X	X				X
Ice Road		X	X	X	X			
Temporary Laydown Area		X	X					

8.4.7 Migratory Birds

8.4.7.1 Baseline Summary

Migratory birds including waterbirds and upland breeding birds travel long distances to breed on the Arctic tundra during the short summer season. Migratory birds and their nests are protected under the Canadian *Migratory Birds Convention Act* (1994), the *Canada Wildlife Act* (1985) and the Nunavut *Wildlife Act*.

A total of 24 waterbird species belonging to several species groups including ducks (dabbling and diving), geese, swans, loons, terns/gulls, cranes, jaegers, and grebes were detected during waterbird surveys conducted in the terrestrial and marine RSAs (see Section 5.4.6 of this Chapter) between 2007 and 2012. Of the species recorded, five species of conservation concern listed as “Sensitive” in Nunavut (CESCC 2010) were observed including, long-tailed duck, Arctic tern, glaucous gull, common eider, and king eider.

A much greater number of flocks and birds were observed during staging periods in the survey blocks near the Goose Property. Flocks of birds were well distributed on waterbodies in this area, with the highest abundance of geese observed in the fall of 2012 within 2 km of Goose Lake and Propeller Lake.

Waterbird breeding surveys were conducted during the summer (June and July), when resident birds are laying eggs and rearing young. Very few breeding birds were observed. Long-tailed duck pairs were the most commonly observed, and the majority of pairs occurred in the survey blocks near the Goose Property. Confirmed breeding has been documented for some species in the terrestrial RSA including Canada goose, northern pintail, and sandhill crane. Canada geese were the most commonly detected.

Upland breeding birds are ground-nesting species that include migratory songbirds and shorebirds, and resident ptarmigan. Surveys for upland breeding birds were conducted in 2007, 2011, 2012 and 2013 using the methods established for the Program for Regional and international Shorebird Monitoring (PRISM) and point counts to identify what species are present (including listed species), and to determine territory densities and habitat associations. The numbers and locations of the surveyed PRISM plots were stratified in the RSA in different habitat types. Thirty PRISM plots were surveyed in 2011, 54 in 2012, and 8 in 2013. In addition, 60 point count surveys were conducted in 2013 near the MLA.

Twenty-one upland breeding bird species (10 songbirds, 9 shorebirds, and 2 ptarmigan) were observed in the RSA during PRISM surveys. Ten of these are listed as “Sensitive” in Nunavut due to concern for long term population declines or require special attention or protection to prevent them from becoming at risk. The 10 Sensitive species are: American golden-plover, American pipit, American tree sparrow, dunlin, Harris’s sparrow, hoary redpoll, least sandpiper, red-necked phalarope, semipalmated sandpiper, and white-crowned sparrow. Songbirds were detected on average five times more often than shorebirds and ptarmigan. Breeding evidence was confirmed for nine species. The Lapland longspur was the most commonly detected species, and combined with the savannah sparrow, made up approximately 78% of all songbird territories recorded. The American tree sparrow was the most common “Sensitive” species recorded.

Three distinct habitat communities were noted for songbirds. One community, which includes the savannah sparrow, is primarily associated with wet habitat types such as wetlands and sedge meadow. A second community, including the American tree sparrow and white-crowned sparrow was associated with moist habitats with tall shrubs, and a third group of birds was associated with dry, upland, heath habitat including species such as the horned lark, American pipit and Harris’s sparrow. Shorebird species, except the American golden plover, were observed more often associated with moist and wet habitat. Ptarmigan were predominantly observed in dry and moist habitat types.

8.4.7.2 Potential Effects

Interactions of migratory birds with site preparation components were evaluated to determine which of the following potential effects may occur (Table 8.4-8):

- Direct habitat loss;
- Disturbance (e.g., displacement, behavioural effects leading to negative energetic balance, physiological stress);
- Disruption to movement;
- Direct mortality and injury from Project activities;
- Indirect mortality due to increased access and associated increase in hunting;
- Attraction;
- Exposure to contaminants; and
- Reduction in reproductive productivity due to all potential effects of the Project combined.

Table 8.4-8. Potential Effects to Migratory Birds in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss[1]	Disturbance	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants	Reduction in Reproductive Productivity
All-weather Road	X	X		X	X	X		X
Umwelt and Goose Quarries	X	X		X	X	X		X
Winter Road								
All-weather Airstrip Extension	X	X		X	X	X		X
Temporary Laydown Area		X						

8.4.8 Raptors

8.4.8.1 Baseline Summary

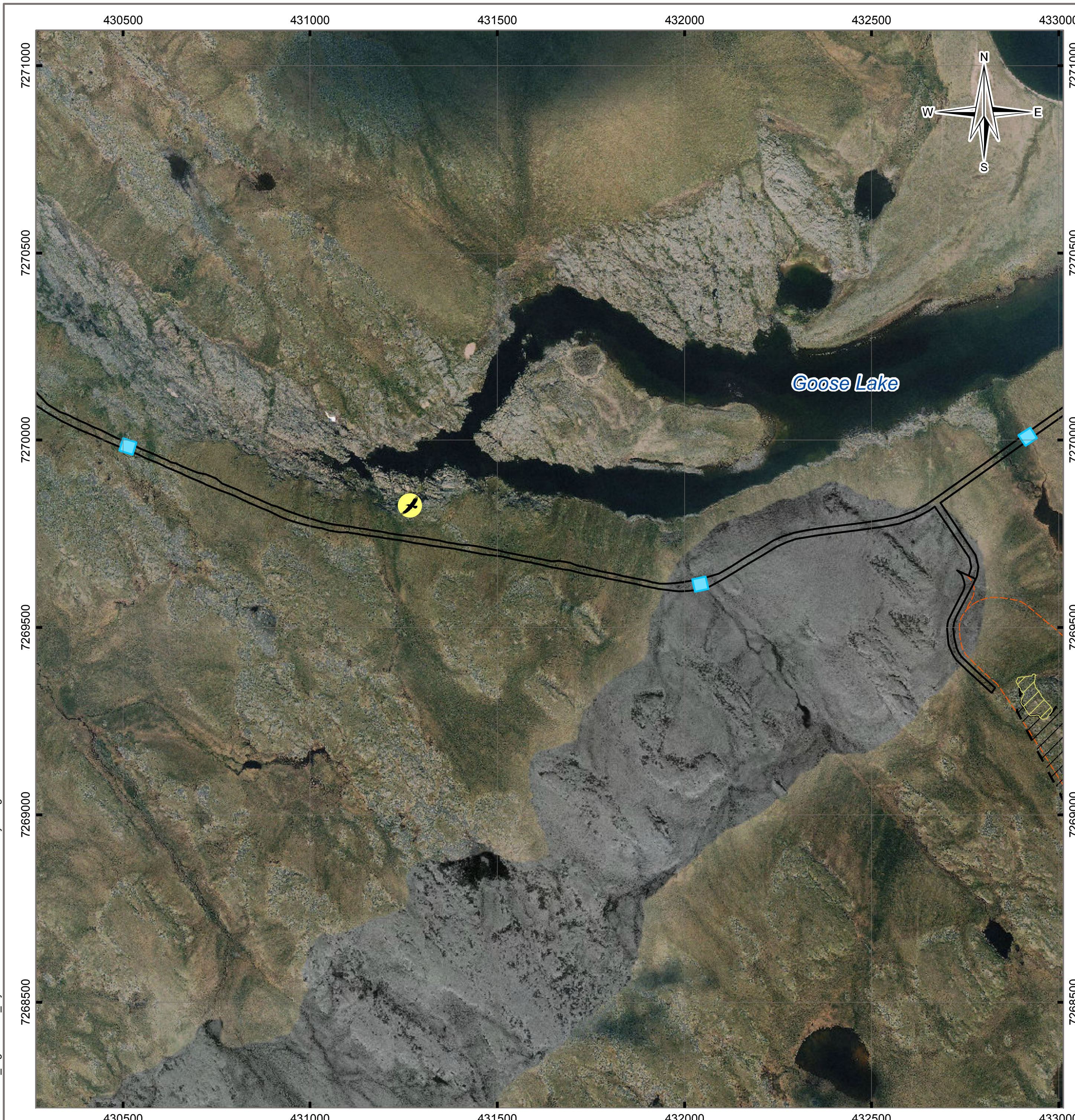
Nine raptor species (including Common Ravens which are considered a "functional" raptor) are known to occur in the Project area (Rescan 2013a). Of these, five species have special conservation status (Table 8.4-9). These species are considered Special Concern and/or Sensitive since their populations may become threatened or endangered because of a combination of its biological characteristics and identified threats, and or, may require special attention or protection to prevent them from becoming at risk.

Table 8.4-9. Raptor Species with Special Conservation Status in the Project Area

Common Name	Scientific Name	Conservation Status*
Golden Eagle	*Aquila chrysaetos*	Territorial Rank = Sensitive COSEWIC = Not At Risk
Gyrfalcon	*Falco rusticolus*	Territorial Rank = Sensitive COSEWIC = Not At Risk
Rough-legged Hawk	*Buteo lagopus*	Territorial Rank = Sensitive COSEWIC = Not At Risk
Peregrine Falcon	*Falco peregrinus anatum/tundrius*	Territorial Rank = Secure COSEWIC = Special Concern SARA = Special Concern Schedule 1
Short-eared Owl	*Asio flammeus*	Territorial Rank = Sensitive COSEWIC = Special Concern SARA =Special Concern Schedule 1

* (Canadian Endangered Species Conservation Council (CESCC) 2012; COSEWIC 2013; Government of Canada 2012)
Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
Species at Risk Act (SARA)

In 2012, a total of 124 raptor nests were detected and monitored in the Project RSA. In the vicinity of the Goose Camp and proposed road infrastructure, one (1) nest occupied by a gyrfalcon pair was located on the western edge of Goose Lake, approximately 100 to 300 m away from the proposed all-weather road alignment (Figure 8.4-2). In May 2012, eggs were reported in this nest; however, by July 2012 the nest was considered unproductive (Rescan 2013a). No other raptor nests are known within 5 km of the proposed all-weather road alignment and existing quarry (Rescan 2013a). Throughout the region, raptor nest success (where known) was estimated at 77% (Rescan 2013a).



LEGEND

- Gyrfalcon Nest (Unproductive, 2012)
- Proposed Access Road
- Winter Road
- Proposed Site Preparation Quarry
- Existing Quarry
- Water Crossing / Culvert Location

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by
JDS Energy and Mining Inc. (2014)
Realignment from
SRK Consulting (2014)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Location of Gyrfalcon Nest in relation to the All-weather Access Road

PROJECTION	DATUM	CLIENT
UTM Zone 13	NAD83	Sabina GOLD & SILVER CORP.

Scale: 1:15,000
200 100 0 200
Metres

FILE NO.
V15103033-02_Figure8-4-2_Gyrfalcon.mxd

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	DM	0

OFFICE	DATE
Tt EBA-VANC	October 8, 2014

Figure 8.4-2

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8.4.8.2 Potential Effects

Interactions of raptors with Project components were evaluated to determine which of the following potential effects may occur (Table 8.4-10):

- Direct habitat loss;
- Disturbance (e.g., displacement, behavioural effects leading to negative energetic balance, physiological stress);
- Disruption to movement;
- Direct mortality and injury from Project activities;
- Indirect mortality due to increased access and associated increase in hunting;
- Attraction; and
- Exposure to contaminants.

Sabina
GOLD & SILVER CORP.

Table 8.4-10. Potential Effects to Raptors in the Goose Property Area and the Marine Laydown Area

Site Development Activity	Habitat Loss[1]	Disturbance	Disruption to Movement	Direct Mortality and Injury	Indirect Mortality	Attraction	Exposure to Contaminants
All-weather Road		X		X		X	
Umwelt and Goose Quarries		X		X		X	
All-weather Airstrip Extension		X		X			
Winter Road							
Temporary Laydown Area							

8.4.9 General Wildlife Potential Effects and Mitigation

The following section outlines best management practices to eliminate or minimize the more important effects of site preparation activities on wildlife. This is summarized in this manner as many of the mitigation measures recommended are similar across species.

8.4.9.1 Mitigation for Habitat Loss

Mitigation measures specific to reducing or eliminating the effects of habitat loss to wildlife may include the following:

- Project infrastructure designed to avoid, where possible, identified wildlife sensitive areas such as caribou calving grounds and caribou high use areas; and
- Consideration of the location of windbreaks to minimize dustfall, to reduce habitat degradation for wildlife.

8.4.9.2 Mitigation for Disturbance

Wildlife specific measures to minimize the effect of disturbance to wildlife may include:

- Pre-construction ground clearing conducted outside of sensitive periods where possible to reduce disturbance;
- Managing above ground blasting (see Quarry Management Plan, Appendix F of the Site Preparation Application Package) activities if large groups of female caribou with young (> 100 animals) occur within 500 m (or line of sight) of the site, until caribou pass through the area to minimize sensory disturbance to caribou;
- Ground-based observations for caribou conducted prior to blasting during the calving and post-calving periods if incidental observations from helicopters indicate that caribou are in the area;
- Above ground blasting scheduled outside of the peak periods of Bathurst caribou presence in the Project area, where possible;
- Vehicles restricted to site roads, winter roads and quarry footprints during construction and operations to avoid unnecessary disturbance to wildlife habitat;
- Helicopters will remain above prescribed flight altitudes when possible, as recommended in the draft caribou protection measure guidelines. Landing and takeoff will only be conducted when herds of caribou are not present in the immediate area; and
- Pilot education to instruct pilots as to the negative effects of overflights on wildlife species and maintaining a minimum prescribed altitude, when possible, wherever wildlife species are observed.

8.4.9.3 Mitigation for Disruption to Movement

Mitigation for disruption of movement involves minimizing the number of trips on the road, including the all-weather road. This can be done by using the largest trucks feasible in order to maximize loads.

8.4.9.4 Mitigation for Direct Mortality and Injury

Measures to minimize the effect of mortality and injury may include:

- Truck speed limits developed, signage installed to alert drivers of speed limits, and enforcement of speed limits to reduce vehicle-related mortality and injury to caribou (See Transportation Management Plan, Appendix G of the Site Preparation Application Package);
- Wildlife will be given the right-of-way on all roads at all times;
- Stopping trucks when groups of caribou are crossing the road to allow small groups (< 10) or individual wildlife standing on the road to move off the road unalarmed; and
- Participation by all contractors and employees working on the Project with the Project orientation. Access road restrictions and operating protocols (e.g., wildlife right-of-way, speed limits, check-ins, and road-wildlife reporting programs) covered during the education/orientation.

8.4.9.5 Mitigation for Indirect Mortality

Measures to minimize the effect of mortality and injury to wildlife may include:

- Access road closed to the public including private vehicles (snowmobile, all-terrain vehicles, etc.) and all foot traffic, and road use restricted only to persons required for construction, operations and maintenance; and
- A policy prohibiting hunting by Project staff and contractors while on site and enforced to prevent an increase in mortality to wildlife.

8.4.9.6 Mitigation for Attraction

The following mitigation measures and best management practices may be applied to minimize the effects of attraction:

- A policy of no feeding and no intentional attraction of wildlife developed, and disseminated to all Project and contractor employees during employee orientation and enforced;
- Management of wastes in accordance with the Waste Management Plan (Appendix D of the Site Preparation Application Package);
- A policy of no littering developed and disseminated to all Project and contractor employees during employee orientation, continued throughout the life of the Project, and enforced; and
- A protocol for human-wildlife interactions developed and disseminated to all employees and contractors as part of orientation with lead management responses undertaken by identified supervisors, wildlife biologists and conservation officers.

8.4.9.7 Mitigation for Exposure to Contaminants

Mitigation and management measures to minimize the potential for effects to wildlife from contaminants due to Project infrastructure, activities, or emissions in:

- Use of wildlife-attracting dust suppressants avoided wherever possible;
- Site roads and winter roads closed to the public and restricted to only persons required for the constructions, operation, and maintenance of the Project;

- A policy of no feeding and no intentional attraction of wildlife developed and disseminated to all Project and contractor employees;
- A no-littering policy developed, to minimize exposure of wildlife to contaminants that may be found in either the product or packaging;
- Management of wastes in accordance with the Waste Management Plan (Appendix D of the Site Preparation Application Package); and
- Appropriate measures taken to exclude wildlife from areas where water or waste could pose a risk to wildlife.

8.4.10 Specific Wildlife Mitigation Measures

Recommended mitigation measures include:

- Implement the following mitigation measures to minimize potential effects at the known raptor nest site:
  - Restrict road construction and blasting/crushing operations to outside sensitive raptor nesting seasons, particularly for Gyrfalcons (late-April for early nesting species such as gyrfalcons to late August for later nesting species).
  - Monitor the known nest site during the nesting season as part of the overall wildlife effects monitoring program.
- Implement the following mitigation measures to minimize potential effects at the known wolverine den site:
  - Monitor the known wolverine den near the proposed road alignment prior to construction to determine occupation.
  - Commence road construction as early as possible (given appropriate freeze conditions and other engineering constraints) prior to the natal denning period (February) to encourage relocation to another den site before parturition (if occupying the known den site).
  - Maintain the monitoring program at the known den site when construction operations are within 2 km of the den and as part of the overall wildlife effects monitoring program.
  - Continue open discussions with Nunavut Department of Environment associated with the wolverine den monitoring program throughout the pre, during, and post-construction operations.
- Establish a warning system to drivers when wildlife are along or near the road, and temporary road closures when caribou and muskox with calves are within 500 m of the road during post-calving season (June to late-July); and
- Monitor the effectiveness of mitigation to avoid or minimize negative effects to species with special conservation status during the overall wildlife effects monitoring program.

8.5 Freshwater and Marine Environment

VECs or subjects of note identified for the Freshwater and Marine Environment include Surface Hydrology, Groundwater, Water Quality, Sediment Quality, Fish/Aquatic Habitat and Fish Community. For the works proposed for site preparation in 2015, potential effects were identified include Surface Hydrology, Water Quality, Sediment Quality and Fish/Aquatic Habitat for the Freshwater and Marine Environment. Freshwater Fish and Fish habitat is discussed separately in Section 8.6.

The freshwater environment is characterized by extensive networks of lakes and streams within a hummocky landscape with low elevation relief and exposed bedrock uplands. Winter is characterized by extreme cold (mean monthly temperatures -33°C), and ice cover is present on lakes between October and July. Air temperatures are highest in July, reaching a mean monthly temperature of 14°C. Regional meteorological stations report total annual precipitation between 125 mm (2009) to 344 mm (2007) for the interval 2006 to 2012. Ice depths on waterbodies are typically 1.5 to 2 metres thick, and shallow waterbodies (< 1.5 m) freeze to the bottom.

Hydrology is snowmelt dominated, with peak flows occurring from early May to mid-June in most watersheds. Occasional rainfall-driven high flow events may occur between June and September. The climate and the presence of permafrost results in one major flood period (freshet) in June, followed by a rapid return to base flow and peak flow events throughout the rest of the summer and early fall periods in response to storms. Winter flow is absent because of negligible groundwater reserves outside of the permafrost and a lack of unfrozen surface water. Streams are generally small and shallow and tend to have low flow and low water levels during summer. Many streams are ephemeral, flowing only during freshet.

8.5.1 Surface Hydrology

The discussion and assessment of effects of the proposed site preparation activities is confined to the Goose Property, as no interactions between surface hydrology and activities at the MLA are anticipated.

8.5.1.1 Baseline Summary

Project infrastructure for the Goose Property is within the Ellice River Watershed, while the MLA is located on a narrow strip of land that drains directly to the west side of Bathurst Inlet. The Ellice River drains an area of 16,900 km^2 into the Arctic Ocean. It winds 287 km north from its headwaters between Beechey Lake and Pelly Lake to its mouth at Queen Maud Gulf. The Western River drains an area of 4,034 km^2 north to Bathurst Inlet approximately 80 km from the MLA. The Back River Watershed, which lies to the south of the Project, drains an area of 106,500 km^2 and flows more than 974 km northeast to its mouth at Cockburn Bay on the Arctic Ocean in the eastern portion of the Kitikmeot Region, south of Gjoa Haven.

The Project lies within the continuous permafrost zone of the continental Canadian Arctic. The presence of permafrost is hydrologically significant, as it has very low hydraulic conductivity, and thus acts as a barrier to deep groundwater recharge. This physical restriction tends to increase surface water runoff and decrease sub-surface flows.

Compared to non-permafrost regions, permafrost watersheds tend to have higher peak flow and lower base flow (Kane 1997). Streamflow in the continuous permafrost zone is dominated by high, snowmelt-driven flows in spring (the freshet), after which flow declines throughout the summer and early fall, with the exception of rare and episodic rainfall-generated runoff (Church 1974). Base flow is low, and is supported primarily by inputs from the shallow upper active layer of the soil profile, which is the only portion of the soil profile that thaws in the summer months.

Channel freeze-up typically occurs between late October and early November. In smaller drainage basins, stream channels typically freeze to their bottom, with zero flow occurring in winter. In very large catchments, and larger lake outlets, flow energy and water turbulence may be sufficient to maintain streamflow and prevent downstream reaches from freezing completely.

The Goose Property has approximately 18% lake coverage, an average ground slope of 1.4%, and a total relief of 85 m. The gauged channels within the study area range from small ephemeral channels, less than 1 m in width, to larger rivers with widths exceeding 50 m.

The hydrometric monitoring network in the Goose Property consisted of two stations in 2010, and was expanded to 9 stations in 2011, 12 stations in 2012 and 17 stations in 2013. (Table 8.5-1). The 2010 data were not used in the hydrologic analyses due to its limited temporal (July to September) and spatial (two stations) coverage.

The hydrologic regime in the Goose Property is characterized by the Arctic nival flow regime. Most streams experienced zero or extreme low flow conditions in August during the open-water period. Flow duration analysis demonstrated that, on average, there was streamflow during 30% of the year for most of the monitored streams.

8.5.1.2 Potential Effects

The following site preparation activities could have potential interactions with the VEC surface water hydrology and affect the quantity of water used, streamflows, and lake volumes:

- Water Use. Water withdrawals from Goose Lake for domestic and industrial uses are planned during the site preparation. These activities could affect the quantity of water used, streamflows, and lake volumes;
- Stream Diversions at Rascal Stream East – please see Appendix K for an analysis of effects; and
- Modification of Natural Drainage; road construction, airstrip construction and quarry development can all alter natural drainage patters.

8.5.1.3 Identification of Mitigation and Management Measures

Mitigation measures that will either eliminate or reduce the effects of the Project activities on surface water hydrology include the following:

- Water withdrawal will follow Fisheries & Oceans Canada’s (DFO's) Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut (DFO 2010) and DFO's Operational Statement on Mineral Exploration Activities (DFO 2009). That is, the quantity of water used will be within the thresholds identified in these DFO documents;
- Water management measures as described in the Transportation Management Plan (Appendix G of the Site Preparation Application Package) will be implemented;
- Site preparation infrastructure at the Goose Property will be confined to the local watersheds; and
- These watersheds are not within the regional Upper Back River Watershed, thereby confining potential changes to water quantity (hydrology) to the local drainage areas.

8.5.2 Water Quality

Water quality and sediment quality are assessed together in the following section as the potential negative effects to both water and sediment quality are related to the same project activities, with mitigation measures also being the same. Thus, mitigating the effects requires the same management activities.

8.5.2.1 Baseline Summary

Freshwater baseline studies have been carried out in the Project area since 1993, with the most continuous sampling from 2010 to 2013. Baseline studies were conducted from 2010 and 2013. Results from site-specific data indicate that lakes in the area have slightly acidic to alkaline pH waters, ranging from 6.3 to 8.3 (Rescan 2012a).

Dissolved oxygen concentrations are typically above Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life in early life stages (9.5 mg O_2/L) but some lakes naturally have lower oxygen levels during the winter or summer. Lakes are very clear with low turbidity values, and generally have low nutrient concentrations (e.g. ammonia and nitrate are considerably lower than the CCME guidelines). Based on the CCME recommended trigger ranges for total phosphorus, most lakes would range from ultra-oligotrophic to mesotrophic.

Metal concentrations in lakes are generally low, and tend to be lower in the summer than in winter. Metal concentrations are below CCME guidelines for the protection of freshwater quality life, with the exceptions of aluminum, arsenic, chromium, cadmium, and copper. These metals can show naturally elevated concentrations, sometimes near or just above the CCME guidelines, depending on the location and season of sampling. Aluminium and copper are the metals that are most frequently found naturally elevated

Results from site-specific data indicate that streams in the area have similar water quality to lakes, with the exception of having more occurrences of naturally elevated metal concentrations. Copper was the metal that was most frequently found to be naturally elevated in streams.

Baseline water quality data are available from southern Bathurst Inlet from 2007, 2008, and 2012 to 2013. Historical information is also available from 2001.

The water of southern Bathurst Inlet is typical of pristine Arctic marine waters, with low concentrations of nutrients, suspended solids, and metals. Nutrients are higher in the winter and lower or depleted in the summer when they are being used by phytoplankton. Nitrate concentrations are near or below detection limits in the summer, while phosphorus concentrations are still measureable in surface waters (> 0.01 mg P/L). Southern Bathurst Inlet is considered oligotrophic based on phytoplankton biomass levels.

Metal concentrations in southern Bathurst Inlet are generally below the CCME guidelines for the protection of marine aquatic life and often undetectable. Near-shore sites near river outflows or in regions of shallow bathymetry sometimes have elevated levels of suspended material and metal concentrations. Metals which have been found to be naturally elevated above CCME marine guidelines in a small subset of samples include cadmium, chromium, and mercury.

Baseline sediment quality data are available from the area from 2007 to 2013. The sediment of lakes and streams is typical of pristine Arctic freshwater systems.

Results from site-specific data indicate that sediments tended to be moderately to slightly acidic. The organic content of the sediments in both lakes and streams tended to be low. Lake sediments were composed of silt and sand particles, with the larger gravel and the smaller clay particles generally comprising <15% of the total. Stream sediments tended to be dominated by larger sand and gravel particles.

Lake sediments have naturally elevated metal concentrations that are often greater than CCME guidelines for arsenic, cadmium, chromium, copper, and/or zinc. The majority of lakes that have been sampled have sediment arsenic concentrations greater the CCME interim sediment quality guideline (ISQG), and many lakes have sediment arsenic concentrations greater than the CCME probable effect level (PEL) guideline.

Stream sediments have naturally elevated metal concentrations that are often greater than CCME guidelines for arsenic, cadmium, chromium, and copper. Similar to lakes, stream sediment arsenic concentrations are naturally elevated.

The sediment quality in Bathurst Inlet has been sampled in 2001, 2002, 2007, 2010, 2012, and 2013. Sampling near the proposed MLA was conducted in 2013. The sediments of Bathurst Inlet are heterogeneous as a result of local physical processes. Sediments ranged from sandy (>90% sand particles) through loose clay-silt sediments (70% clay with the remainder silt). Sand tends to predominate in the shallower sites (<5 m), with silts and clays become more frequent in the deeper near-shore sites.

Marine sediment metal concentrations are generally below the CCME interim marine sediment quality guidelines. However, near-shore sites with high silt/clay content frequently have naturally elevated concentrations of arsenic, chromium, and copper, with elevated levels of arsenic and copper being the most common. Marine sediment metal concentrations have not been found to be greater than the CCME marine probably effect level guidelines which are higher than the marine interim sediment quality guidelines.

8.5.2.2 Potential Effects

Construction and Use of Site Preparation Infrastructure

Excavation required to construct site preparation infrastructure has the potential for effects on freshwater water quality. The primary pathway for these potential effects would be runoff. This would occur primarily during snowmelt and freshet in the spring, during precipitation events in the summer and fall, and would be absent in the winter. Some in-water or near-water activities required during site preparation also carry the potential for effects on water quality. Additional effects may occur via dust deposition.

The pathway of interaction between quarries and the freshwater environment is through runoff, and this may occur during site preparation. Contact water in quarries may transport metals and suspended sediments into the freshwater environment. Runoff from quarries could affect the VEC freshwater water quality by changing pH (interaction with surficial material), and contributing TSS (erosion), metals (TSS and dissolution), nutrients (contact with blasting residues), and hydrocarbons (mechanical use of fuel, oil, and grease) into the freshwater environment.

Geochemical characterization of the Umwelt quarry was carried out in 2014 to determine the suitability of the material for construction purposes. In general, these results indicate that the majority of the upper greywacke samples representing the proposed quarry areas within the Umwelt pit are classified as non-PAG or low S material with a limited potential for ARD. Additionally, based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, upper greywacke from the proposed Umwelt quarry area is considered suitable for use in construction. Details are presented in Appendix A.

Ammonium nitrate (AN) and fuel oil (FO) will be used as the explosive for quarries and possible road and airstrip construction. Both components of the ANFO explosive have the potential for effects on freshwater water quality—AN dis-associates in water into ammonia and nitrate and FO is a mixture of petroleum hydrocarbons. The pathways of interaction between explosives and the freshwater environment are runoff and aerial deposition. Runoff and deposition of explosives (or blasting residues) into the freshwater environment can affect water quality by increasing the concentrations of ammonia, nitrate, and petroleum hydrocarbons.

Fuels, Oils, and PAH

The primary pathways of interactions between these sources of hydrocarbons and the freshwater environment are runoff and aerial deposition. The primary pathway for contamination in the marine environment are spills during barge transport to the TLA. Activities at facilities, laydown areas, fuel storage areas, and waste management areas can deposit hydrocarbon compounds, such as oil or grease, onto surfaces that can subsequently be transported into freshwater environments in runoff.

Combustible waste, including the solids from sewage treatment, will be combusted using an incinerator. Incomplete combustion can create airborne hydrocarbons that can be deposited into freshwater environment via deposition or runoff.

8.5.2.3 Mitigation and Management

The Project will minimize runoff and the transport of material into the freshwater environment by the following planning and design measures:

- Infrastructure will be located, whenever feasible, on competent bedrock or appropriate base material that will limit permeability and the transport of potentially lower quality water into the active layer and ultimately to the freshwater environment;
- Water management measures as described in the Transportation Management Plan (Appendix G of the Site Preparation Application Package) will be implemented;
- Infrastructure will be designed to minimize the footprint area, such as being located near the deposits; and;
- Restoration of the landscape will occur as soon as possible to minimize erosion potential.

Activities undertaken will use Best Management Practices (BMP) drawn from governmental organizations and specific Arctic experience to minimize erosion. Temporary stream crossings will be constructed according to the DFO Nunavut Operational Statement for Temporary Stream Crossings (Fisheries and Oceans Canada 2009). In-water work will be conducted during approved timing windows presented in the DFO Nunavut Operational Statement for Timing Windows (Fisheries and Oceans Canada 2009). Only geochemically suitable rock quarries and borrow sources (i.e., using non-potentially acid-generating rock) will be used to construct the road, pads, and structures. Exposed landscape surfaces will be protected, where possible, by the installation of covering material like riprap, aggregate, or rolled erosion control products. Runoff flow may be controlled by a combination of measures, including:

- Slope texturing/grading to slow runoff and reduce effect slope lengths;
- Installation of synthetic permeable barriers and/or fibre rolls to reduce runoff velocities and retain sediments; and
- Check dams, gabions, and energy dissipation structures to reduce flow velocities in channels.

Sediment levels in runoff will be minimized, where applicable, by intercepting sediment before it reaches the freshwater environment. In addition to measures aimed at controlling runoff flow, the quantity of transported material in runoff may be controlled by measures including:

- Preservation of riparian zones to trap sediment and to reduce flow velocities;
- Installation of synthetic permeable barriers, fibre rolls, and/or silt fences as required;

- Installation of check dams, gabions, and sediment basins to reduce flow velocities and encourage sediment deposition; and
- Refuelling and maintenance activities will not occur, were possible, within 30 m of a watercourse or waterbody except where required due to equipment breakdown or approved activities near water.

Potential effects from explosives will interact with the freshwater environment through the runoff and aerial deposition pathways. Deposition of explosives and blasting residues on surfaces, with the subsequent possibility of transport in runoff to freshwater environments, will be mitigated and managed by:

- Storing explosive products in accordance with Territorial and Federal regulations (1990; C.R.C., c. 599);
- The handling and manufacture of explosives will be contracted to a licensed operator;
- Runoff from explosive storage and manufacture facilities will be intercepted and collected before reaching the freshwater environment ; and
- BMP will be adopted for blasting and the handling of explosives to avoid spillage and minimize ammonium and nitrate residues after blasting.

The mitigation and management measures for runoff are focused on preventing hydrocarbons from being transported in runoff and may consist of the follow measures:

- Machinery will be routinely inspected for leaks and refuelling will occur, when feasible, at a designated refuelling point with drainage capture/collection installed. In the event that refuelling occurs elsewhere, drip trays may be used under vehicles and equipment;
- Appropriate secondary containment systems will be used for petroleum product storage tanks to prevent spills and releases to water, including the prevention of diesel release from pickups carrying tidy-tanks. Storage of fuel at the TLA will be done using double wall storage tanks;
- Bulk fuel storage areas and hazardous materials storage areas will be bermed and lined with impermeable barriers to minimize leaks and spills; and
- Oily water treatment plants at equipment maintenance facilities will be used to minimize water and surface hydrocarbon compounds.

In the event that hydrocarbons are transported in runoff, runoff from camp pads, laydown areas, and waste management areas will be directed to the water management structures and will not be discharged into the freshwater environment. Prior to the completion of the water management infrastructure during Site Preparation, runoff will be collected in sumps and discharged only if it meets water quality standards.

8.6 Fish and Fish Habitat Assessment

8.6.1 Baseline Summary

The Goose Property contains many lentic waterbodies that range in size from large lakes to small ponds and wetlands. Most lakes in the region feature littoral habitat well suited for northern fish species, i.e., shorelines dominated by mixed rock, with occasional outcrops of bedrock (Rescan 2013c). However, deeper lake areas (> 2.5 m depth), which serve as fish overwintering habitat, are uncommon in the Goose Property and may limit fish population sizes in many lakes and ponds (Rescan 2013c). The maximum depth of most lakes averages between 4 and 6 m. Most of the lakes surveyed support fish spawning, rearing, and feeding, with fewer supporting overwintering.

Pond habitat in the Goose Property is generally shallow and many of the ponds featured ephemeral inflows or outflow that would limit fish migration into and out of these waterbodies. Owing to their shallow depths, these ponds freeze all the way to the bottom in winter, making them unsuitable for overwintering habitat.

Umwelt Lake is in the Llama watershed, upstream of Goose Lake and downstream of Llama Lake. The lake is relatively shallow, with a maximum depth of 3.0 m that limits the potential area for fish overwintering as much of the lake freezes to the bottom during winter. Mixed rock shorelines may provide spawning and rearing habitat for Arctic Grayling, and fish may use the lake for summer spawning, rearing and feeding. The limited connection and low flow between Umwelt Lake to Llama and Goose lakes late in summer indicates that Arctic Grayling do use Umwelt to overwinter. The deeper areas of the lake are dominated by sandy substrate. In many places, the transition between rocky shoreline substrate and sandy lake bottom is abrupt.

Goose Lake is the lake most central to proposed infrastructure for the Goose Property. This lake, along with many other lakes and streams in the immediate area, has been surveyed for fish from 1997, and 2007 to 2013. Fish have been present in all lakes that have been sampled to date. However, some of the shallow ponds are not fish-bearing due to their shallow depth and ephemeral connectivity to other waterbodies.

For the Goose Property, lake and stream freshwater fish communities consist of nine species, with Lake Trout and Arctic Grayling being the most numerous. The species that have been found in lakes by site-specific baseline studies include Lake Trout (Salvelinus namaycush), Round Whitefish (Prosopium cylindraceum), Lake Cisco (Coregonus artedi), Longnose Sucker (Catostomus catostomus), Ninespine Stickleback (Pungitius pungitius), and Lake Whitefish (C. clupeaformis). The species that have been found in streams are Arctic Grayling (Thymallus arcticus), Slimy Sculpin (Cottus cognatus), and Burbot (Lota lota) (Rescan 2013c, Rescan 2013d, Rescan 2013e, Rescan 2014a, Rescan 2014b).

8.6.2 Potential Effects

The proposed alignment of the all-weather road will cross four watercourses, three of which are fish bearing. As well, the airstrip extension will result in the realigning of Rascal Stream East, This report provides a fish and fish habitat description of each crossing site based on existing information, and an evaluation of the potential habitat quality at each location. Figure 5.0-2 identifies the locations of the four proposed watercourse crossings.

8.6.2.1 Gander Pond Inflow Stream

The road is proposed to cross the Gander Pond Inflow stream approximately 200 m upstream of Gander Pond. Under high water conditions, which generally exist during freshet, this stream consists of poorly defined banks and multiple channels. Under low flow summer conditions, the bank-full width is about 1.5 m.

The stream morphology can be described as riffle-glide-pool, although pools tend to be shallow. The substrate is dominated by boulder and cobble; cover consists of in-stream vegetation and boulders. Photo 8.6-1 provides a view of the Gander Pond Inflow stream under freshet conditions (Rescan 2012b).

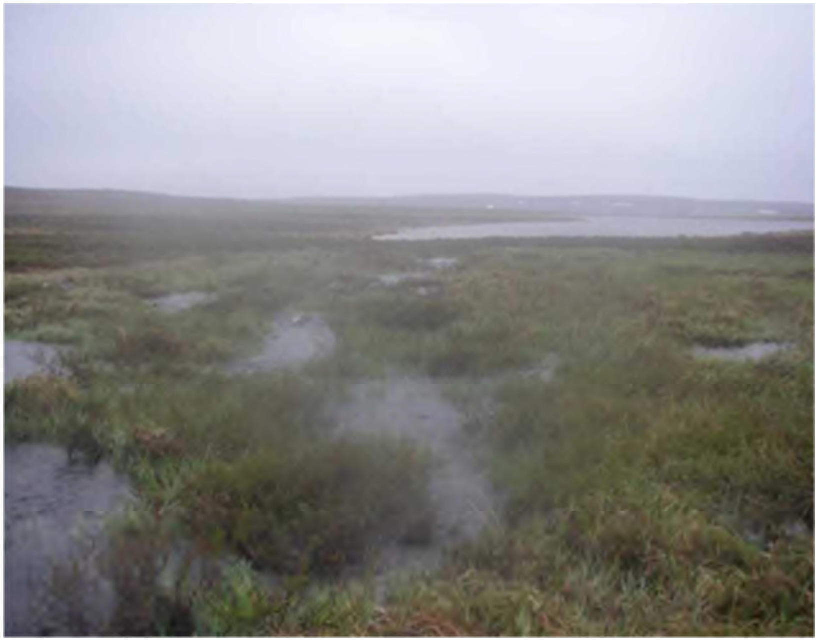


Photo 8.6-1. Gander Pond Inflow Stream, looking downstream toward Gander Pond

Electrofishing was carried out in the Gander Pond Inflow stream in June, 2011 and again in June, 2013. Only one slimy sculpin (*Cottus cognatus*) was observed during the 2011 sampling and no fish were captured during the 2013 survey. It is important to note that Gander Pond is very shallow with a maximum depth of 0.5 m. As such, this pond provides no overwintering habitat opportunities and generally has very limited fish habitat potential. The outflow stream from Gander Pond has also been electrofished and no fish were captured or observed.

Gander Pond Inflow stream provides suitable rearing habitat conditions for small bodied forage fish (e.g. sculpin), although limited overwintering and spawning habitat likely restricts the productive capacity for these fish. While Arctic grayling (*Thymallus arcticus*) may have the potential to ascend The Gander Pond Inflow Stream from Goose Lake via Gander Pond, access by these fish is unlikely due to the minimal availability of suitable spawning gravels and the steep decline in flows following freshet, which commonly occurs in small streams in this area (Rescan 2012a). Analysis of 2012 data from the streamflow gauge installed at the downstream end of the Gander Pond Outflow stream indicated that flow was present in the stream only 31% of the year, with almost all of the flow occurring in June.

Due to poor habitat and flow conditions in the Gander Pond Inlet Stream, a culvert at this site is not expected to result in a HADD and/or a significant change in habitat productive capacity, provided that the culvert is sized and installed to provide fish passage during June and July, to accommodate fish migrations should this occur.

8.6.2.2 Echo Lake Outflow Stream

The Echo Lake Outflow Stream is a small watercourse that drains Echo Lake, which is approximately 1.5 km upstream of the proposed road crossing location. The drainage area of this system is very small, 1.4 km^2. Echo Lake has a depth of less than one metre. Field observations have shown that the Echo Lake Outflow Stream goes dry in the summer, as shown in Photo 8.6-2.

Photo 8.6-2. Gander Pond Inflow Stream, looking downstream toward Gander Pond

Analysis of water quality samples collected from the Echo Outflow Stream during freshet conditions indicates relatively poor water quality conditions in this stream. Mean pH levels were lower than 6.0, which is below the level set by the Canadian Council of Ministers of the Environment (CCME) for the protection of aquatic life. In addition, water samples had concentrations of aluminum, cadmium and copper that exceeded CCME guidelines (Rescan 2012a).

Existing information indicates that this stream is ephemeral, has poor water quality when flowing, and does not provide any overwintering or rearing habitat. As such, no fish or fish habitat concerns are indicated for the construction of a road culvert crossing at this location.

8.6.2.3 Umwelt Lake Outflow Stream

The Umwelt Lake outflow stream drains Llama Lake, Umwelt Lake, Rabbit Lake, and Fox Lake before emptying into the western, narrow end of Goose Lake. At the location of the proposed road crossing (Figure 5.0-2) the stream flows through a wide (up to 200 m) scoured canyon and can be characterized as a boulder garden, with little surface flow occurring past July, as shown in the hydrograph for this stream (Figure 8.7-1) (Rescan 2012a).

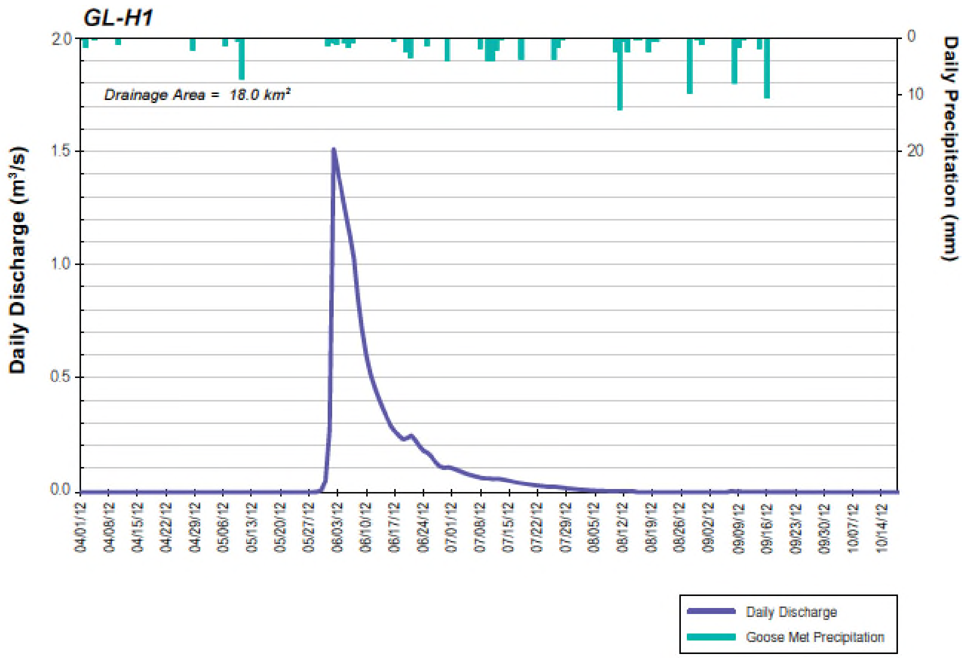


Figure 8.6-1. Hydrograph for 2012 for the Umwelt Outflow Stream based on a stream gauge located 100 m upstream from Goose Lake.

A 4 m high boulder barrier exists approximately 100 m upstream of the inflow to Goose Lake (Photo 8.7-3) and almost 900 metres downstream of the road crossing. This barrier results in a complete obstruction to upstream and downstream fish passage (Rescan 2012a, Rescan 2012b). Even in the absence of this barrier, fish passage and fish utilization in the area of the road crossing is unlikely due to dispersed, subsurface and ephemeral flow conditions.

The above stream characteristics preclude fish use and fish passage in the area of the proposed stream crossing. As such, no fish or fish habitat issues or concerns are indicated at this site.

Photo 8.7-3 Boulder barrier in the Umwelt Outflow Stream 100 m upstream from Goose Lake

8.6.2.4 Rascal Stream

In order to accommodate the airstrip extension, a realignment of Rascal Stream (RS) is required (Figure 5.2-1). Approximately 250 m downstream of Rascal Lake, the outflow splits into two, separate streams: Rascal Stream East (RSE), and Rascal Stream West (RSW). RSE flows northeast towards Goose Lake flowing through the location of the proposed airstrip. RSW flows to the northwest initially passing through Gosling Ponds 1 and 2 and eventually through Gander Pond prior to reaching Goose Lake (Figure 2-1). A small outflow from Gosling Pond 1 also flows east into RSE. Baseline hydrological studies found that approximately 70% of water in Rascal Lake Outflow passes through RSE before entering Goose Lake during spring freshet; the remaining 30% flows northwards through RSW (Rescan 2012a, 2012b, 2014b). Discharge is low in both streams during summer months; however flow in RSW was 0 m^3/s for extended periods on each of the three years of sampling, indicating that this stream is ephemeral.

RSE is the main migratory corridor for Artic Grayling moving between the Goose and Wolf watersheds throughout the open-water season and likely provides a critical pathway for fish migrating between summer and winter rearing habitat. Rascal Lake has a maximum depth of 3.7 m and, along with Goose Lake, likely provides overwintering habitat to fish that rear in both West and East Rascal streams.

Electrofishing, fry and spawner surveys show that Arctic Grayling utilize the full length of RSE for spawning and rearing. Populations overwintering upstream in Rascal Lake and downstream in Goose Lake may use the stream as a migration corridor when moving between summer and winter habitat.

RSW flows from Rascal Lake through Gander Pond and into Goose Lake. Arctic Grayling, Burbot, Slimy Sculpin, and Ninespine Stickleback have been caught in Gander Pond and RSW. A fry survey of RSW in 2013 found that Arctic Grayling do utilize this stream, but in far lower densities than in RSE.

8.6.3 Mitigation and Management

8.6.3.1 All-weather Road Stream Crossings

Due to limited habitat, the installation of road and culvert crossings at four locations along the all-weather road is not anticipated to result in direct adverse effects on fish or fish habitat. However, it is recognized that construction activities, culvert sizing, and culvert installation have the potential to result in the mobilization of sediments that could affect water quality and downstream fish habitats. The following erosion and sediment control (ESC) measures will therefore be implemented to avoid or minimize these effects:

- Culverts will be sized to handle maximum seasonal flows, thereby avoiding backwatering and potential erosion. Their design and installation will follow Northern Land Use Guidelines prepared by Indian and Northern Affairs Canada (now Aboriginal Affairs and Northern Development Canada (INAC 2010);
- In the Gander Pond Inflow Stream and the Echo Lake Outflow Stream, culverts will be embedded to approximately 15-20 percent of the culvert diameter to avoid bed erosion and subsequent perching (elevation drop at the culvert invert), and to permit fish passage if fish are present in the stream. Embedment may not be feasible at the Umwelt Lake Outlet Stream due to its boulder field characteristics; and
- Inlets and outlets will be suitably stabilized with rip-rap or similar material to prevent erosion.

8.6.3.2 Rascal Stream Diversion

The proposed stream re-alignment will permanently divert the flow from RSE into RSW by placing a set of two rock berms just north of Gosling Pond 1 (Figure 5.2-1). The two berms will be 180 and 270 m in length, lined with a geomembrane, 2.3 m in height, 6 m wide and with 1.5:1 H:V side slopes. To facilitate fish passage across the proposed temporary all-weather road, two 2.5 metre diameter by 16.5 metre-long box or Corrugated Steel Pipe (CSP) culverts will be installed approximately 109 metres upstream of the inflow of RSW to Goose Lake.

The re-alignment of Rascal Stream to divert all water from RSE downstream of the berm location into RSW will result in the loss of 8,702 m^2 (17,203 habitat units) of fish bearing habitat in RSE (see Appendix K). RSE is used heavily by Arctic Grayling for spawning and rearing. The re-alignment of this watercourse will result in the original highly productive stream being re-directed through the enhanced RSW before entering Goose Lake.

The re-alignment of Rascal Stream to divert all water from RSE downstream of the berm location into RSW will open up 103,887 m^2 (51,984 habitat units) of available fish bearing habitat in RSW (see Appendix K for the habitat gain budget). This will yield a net gain of 51,537 m^2 (38,896 habitat units) when removing the fisheries value of the existing, low quality fish habitat.

For a detailed assessment of the effects of the diversion on fish habitat budgets, please see Appendix K.

8.7 Human Environment - Archaeology

8.7.1 Baseline Summary

The Project area is within the lands traditionally used by the Copper Inuit, who are ethnographically defined as a group of the Central Eskimo. The territory of the Copper Inuit includes: portions of Victoria and Banks Islands; the Barrenlands south to Back River; Beechey Lake west to Contwoyto Lake; and extends from Wise Point, west of the Coppermine River and east to Perry River (Damas 1984). Early explorations of the area in were conducted by Samuel Hearne (1770 and 1772), John Franklin (1819-1822), George Back (1833-1834) and Vilhjalmur Stefansson and the Canadian Arctic Expedition (1910 and 1913 to 1918).

Previous archaeological research in the Arctic indicates that the earliest archaeological materials from this region date to approximately 3,500 BP and are associated with the Pre-Dorset culture (3,800 to 2,700 BP) (McGhee 1996). Artifacts from later cultural traditions including the Dorset (2,700 to 1,000 BP), Thule (1,100 to 200 BP), and Taltheilei (2,600 to 200 BP) are also expected within the RSA.

In 1978, David Morrison conducted a survey of southern Bathurst Inlet and recorded 61 archaeological sites (Morrison 1978, 1979). In 2004 Darren Keith and Andrew Stewart conducted an oral history and archaeological study of a caribou hunting camp site (*Tahikaffaaluk*) at the north end of Bathurst Lake (Keith and Stewart 2005). Additional archaeological investigations have been conducted as part of site-specific baseline work for this Project (Rescan 2012a, Rescan 2013b), the Goose Lake area by Fedirchuk (1997), the BIPR Project (Fedirchuk 2001, Blower 2003, Tischer 2010) and the Hackett River Project (Rescan 2008).

There are 269 known archaeological site with the RSA as of the end of 2013 (Rescan 2013). Of the 269 sites 172 are prehistoric, 39 are historic, 26 are multicomponent sites with both prehistoric and historic features or artifacts, and 34 are of undetermined antiquity. Within the RSA there are 3 burials, 124 campsites, 37 resource gathering sites, 38 lithic workshops, 33 lithic reduction sites, 5 lithic isolated tool sites, 4 lithic isolated finds (debitage), 17 markers (cairns or inuksuk), 1 quarry site, 2 faunal tool sites, 3 historic artifact scatters, and 1 historic isolated find. Of the 269 sites, 83 contain both artifacts and features, 97 contain only features, and 89 contain only artifacts. Artifacts attributable to specific cultural traditions have been identified at 22 of the 269 sites with 19 having artifacts indicative of the Pre-Dorset, one of the Dorset tradition, and two from the Taltheilei tradition.

8.7.2 Potential Effects

8.7.2.1 Goose Property Area: Airstrip Expansion, All-Weather Road, and Quarries

There are no known archaeological sites in direct conflict with the currently proposed Goose Property area site preparation activities for the airstrip expansion, all-weather road, and quarry infrastructure footprint. Archaeological site LjNh-5 is located approximately 162 m south of the Ice Road Alignment. Archaeological siteLjNhj-5 should be marked as “No Work Zones” and should be monitored by a professional archaeologist on a periodic basis to ensure that it has not been impacted by the Project. All of the remaining archaeological sites are located over 1,000 m from the Project airstrip expansion, all-weather road, and quarry infrastructure and no impacts are anticipated.

Archaeological site LjNh-5 is a prehistoric lithic scatter situated at approximately 320 m asl on a knoll overlooking the outlet of an unnamed creek flowing into Goose Lake. The site measures 12 m N-S by 12 m E-W, and consists of a white chert and three white quartz flakes observed in a surface exposure (left *in situ*). No formed tools or diagnostic artifacts were observed and based on the artifacts present the site is determined to have low archaeological significance.

8.7.2.2 Marine Laydown Area: Temporary Laydown Area

There are no known archaeological sites that will be directly impacted by the currently proposed site preparation activities associated with the Temporary Marine Laydown Area infrastructure footprint. Archaeological sites MdNl-6, MdNl-12, MdNl-13, MdNl-17, MdNl-18, and MdNl-20 are located between 150 m and 1,000 m from the proposed footprint. These sites should be marked as “No Work Zones” on Project maps and should be monitored on a periodic basis by a professional archaeologist to ensure that they have not been impacted by the Project. The remaining archaeological sites are located over 1,000 m from the Project infrastructure and no impacts are anticipated from the site preparation infrastructure footprint.

MdNl-6

Archaeological site MdNl-6 is a prehistoric campsite located in a surface exposure overlooking Bathurst Inlet. Site boundaries measure 230 m E-W by 60 m N-S. Vegetation at the site consists of ground-covering bushes, grasses, lichens, and mosses. The site consists of one cache with a pavement of stones beside it (Photo 8.7-1), two stone ovals, and one lithic scatter of approximately 40 white chert, and pink and white quartzite flakes was located in a surface exposure. Seven artifacts which are suggestive of the Arctic Small Tool tradition were collected from the site. Based on the features and artifacts present the site is determined to have high archaeological significance (Rescan 2013).

Photo 8.7-1. Cache (F1) at site MdNl-6

MdNl-12

Archaeological site MdNl-12 is a prehistoric cache site located on a break-in-slope overlooking Bathurst Inlet. Site boundaries measure 10 m N-S by 21 m E-W. Vegetation at the site consists of ground-covering bushes, grasses, lichens, and mosses. The site consists of one cache and one cairn. No artifacts were located at the site.

Based on the artifacts present the site is determined to have moderate archaeological significance (Rescan 2013).

MdNl-13

Archaeological site MdNl-13 is a prehistoric lithic scatter located in a surface exposure on a terrace overlooking Bathurst Inlet. Site boundaries measure 10 m diameter. Vegetation at the site is sparse consisting of patches of mosses, lichens, and grasses. The site consists of one lithic scatter containing two white quartzite flakes. All artifacts were left *in situ*. Based on the artifacts present the site is determined to have moderate archaeological significance (Rescan 2013).

MdNl-17

Archaeological site MdNl-17 is a campsite of undetermined age located on a bench overlooking the Bathurst Inlet. Site boundaries measure 20 m N-S by 10 m E-W. Vegetation at the site consists of ground-covering bushes, grasses, lichens, and mosses. The site consists of one stone circle and one hearth. No artifacts were found at the site. Based on the features present the site is determined to have moderate archaeological significance. (Rescan 2013).

8.7.3 Mitigation and Management

In all cases, avoidance of archaeological sites is the preferred recommendation. If avoidance is not practicable, then additional archaeological work would be required. Any additional archaeological work would be determined in consultation with the Government of Nunavut's Department of Culture and Heritage.

For any sites that are in close proximity to proposed development areas, but not within immediate impact zones, it is recommended that the areas be designated as "No Work Zones" during construction activities and the site boundaries marked with metal stakes at least one metre high with rope tied between the stakes. Periodic monitoring by a professional archaeologist should also be conducted to confirm that sites are not impacted. No further work is necessary for sites that are well outside of the impact zone of the proposed development; however, it is recommended that they be designated as "No Work Zones" on Project maps.

Should any archaeological materials be encountered during site preparation activities, all work in the immediate area must cease, and the Government of Nunavut, Department of Culture and Heritage and the Project Archaeologist must be contacted.

9.0 MANAGEMENT PLANS

The following management plans have been developed for the proposed site preparation activities and are included as appendices to the 2015 Site Preparation Application Package.

- Spill Contingency and Emergency Response Plan (Appendix C);
- Waste Management Plan (Appendix D);
- Hazardous Materials Management Plan (Appendix E);
- Quarry Management Plan (Appendix F);
- Transportation Management Plan (Appendix G);
- Abandonment and Restoration Plan (Appendix H); and

- Oil Pollution Emergency Plan (Appendix I).

The following sections provide a summary of each of the management plans.

9.1 Spill Contingency and Emergency Response Plan

The purpose of the Spill Contingency and Emergency Response Plan (SCERP) is to outline Sabina's approach to risk management and to ensure that an adequate level of emergency and spill response preparedness is available for 2015 Site Preparation Activities at the Back River Project.

The SCERP outlines Sabina's state of preparedness for events which may occur due to unforeseen circumstances and details response actions to be taken in the event of unintentional materials release or other emergency situations during the 2015 Site Preparation Activities. The SCERP is dynamic and will be updated at least annually to address any significant changes in operating plans, should they occur.

9.2 Waste Management Plan

The purpose of the Waste Management Plan (WMP) is to outline Sabina's plan for managing non-hazardous wastes, recyclables and treated sewage during the 2015 site preparation activities.

The following general waste management measures are presented in the WMP:

- Non-hazardous wastes will be sorted and temporarily stored before being backhauled to Yellowknife for recycling or disposal;
- Contact waters from general construction activities will be managed through the use of sediment fans and retention areas;
- Contact waters that collect in the secondary containment of fuel storage areas will be treated with an oil/water separator, contained within a dedicated berm/tank system and tested for compliance with current water license thresholds; and
- Hazardous waste will be management in accordance with the Hazardous Materials Management Plan (HMMP).

9.3 Hazardous Materials Management Plan

The purpose of the HMMP is to provide a consolidated source of information on the safe and environmentally sound transportation, storage, and handling of the major hazardous products that will be used during the 2015 site preparation activities.

The HMMP is based on the following principles of best practice management for hazardous materials:

- Identify and prepare materials and waste inventories;
- Allocate clear responsibility for managing hazardous materials;
- Describe methods for transport, storage, handling, and use;
- Identify means of long-term storage and disposal;
- Prepare contingency and emergency response plans (see SCERP);

- Ensure training for management, workers, and contractors whose responsibilities include handling hazardous materials; and
- Maintain and review records of hazardous material consumption and incidents in order to anticipate and avoid impacts on personal health and the environment.

9.4 Quarry Management Plan

The Quarry Management Plan (QMP) outlines Sabina's conceptual plans to develop quarries in support of the 2015 Site Preparation activities in an environmentally sound manner. General mitigation measures that Sabina will apply to these and any other quarries or borrow areas are presented, along with development plans for the two quarries associated with the Site Preparation activities. Specific mitigation measures are identified for the construction, operation and closure of each of the two quarries, and a monitoring program is prescribed.

The QMP describes the following key environmental protection measures:

- Only geochemically suitable material will be quarried and used as construction material for site preparation;
- Quarries will be developed to be free draining and berms will be constructed to divert surface water flows away from quarries and associated stockpiles. If present, runoff will be sampled and compared to the quarry runoff criteria outlined in the QMP; and
- Strategic placement of crushers to minimize dust migration beyond quarry boundaries.

9.5 Transportation Management Plan

The TMP has been developed to outline construction, operation and management of access and transportation associated with the 2015 site preparation activities including the all-weather airstrip and all-weather road.

The purpose of the TMP is to ensure sound management of water and waste associated with construction and operation of transportation corridors to minimize impacts to the local environment.

The TMP includes inspection and maintenance procedures, and outlines management measures to minimize potential impacts to wildlife and water quality, and to reduce potential impacts of dust.

9.6 Abandonment and Reclamation Plan

The Abandonment and Reclamation Plan is intended to describe closure scenarios for the 2015 Site Preparation activities at Goose and the MLA. Three scenarios are presented:

- **Site Preparation progresses directly into mine development:** Under this scenario, no closure and reclamation activities related to site preparation activities are required; this scenario would null and void this Plan, and all closure and reclamation activities will be completed as per a future Mine Closure and Reclamation Plan approved under Sabina's Type A Water Licence.
- **Delay between Site Preparation and mine development:** This scenario assumes an unspecified period of time between completion of the Site Preparation activities and mine development. Under normal circumstances, Sabina would continue to operate its camp seasonally with shut-down periods. The scale of the camp is such that full-time presence on-site is not required. Under this scenario, Sabina would have to relinquish control of the site. The landowner would need to conduct an initial site visit with a contractor to confirm site conditions and that there are no unnecessary risks to be addressed between the time of

receivership and implementation of the abandonment and restoration measures the following summer (for example, unsecure explosives or fuel storage; an open camp exposed to the elements, etc.).

- **No mine development:** This scenario assumes that the main Project will not progress into mine development by the end of the Site Preparation activities. Under this scenario, there will be no mine development and the abandonment and restoration measures described in the Plan will be implemented.

The Abandonment and Reclamation Plan also details closure objectives, commitments to progressive reclamation, post-closure monitoring, and estimated closure and reclamation costs.

9.7 Oil Pollution Emergency Plan

An Oil Pollution Emergency Plan (OPEP) has been developed to specifically assist in implementing measures to protect the marine environment and minimize impacts from potential spill events at the MLA site.

The OPEP outlines potential spill scenarios, and provides specific procedures for responding to spills while minimizing potential health and safety hazards and environmental damage. It also provides instructions specific to the MLA to guide all personnel in emergency spill response situations, defines the roles and responsibilities of management and responders and outlines the measures taken to prevent spills, and the related exercise and evaluation programme.

10.0 INDEPENDENCE OF ACTIVITIES

The transportation and storage of equipment, fuel, and materials during site preparation is essential to the development of the Project as it will allow Sabina to progress into timely construction of the Project. These temporary and/or seasonal components would also support ongoing exploration and environmental baseline activities in the area and improve safety and environmental protection.

The all-weather road, airstrip extension and Umwelt and Goose Quarries are considered to be integral to each other, and as such constitute a group of activities that cannot be approved independent of each other. For example, the Umwelt Quarry relies upon the construction of the all-weather road. Since the quarried material will be used to construct the airstrip extension, the permitting of the quarry is necessary to carry out work at the airstrip.

The TLA at Bathurst Inlet is considered a separate activity from the activities at the Goose Property. While important for the Project timeline, it is not dependant on the activities at Goose, nor are they dependant on the permitting of the TLA.

11.0 CONSULTATION

Public consultation and engagement is a legal requirement in Nunavut, an industry best practice, and important corporate commitment. Effective public consultation and engagement helps ensure that community members are informed and knowledgeable about proposed projects, that community support for those projects is more readily obtained, and sustainable development goals are achieved. A key goal of Sabina's public consultation and engagement program has been to ensure the Company obtains a 'social licence to operate', by securing the support of a majority of residents from potentially impacted local communities. In order to obtain this goal, a number of process goals have been followed, including:

- Identification and prioritization of communities and community stakeholder groups;
- Developing an understanding of key community and stakeholder views regarding the Project;
- Addressing community and stakeholder issues and expectations; and
- Continuous improvement.

The establishment of open, respectful, and jointly beneficial relationships with local communities and stakeholders have been, and will continue to be, key priorities for Sabina. Sabina further recognizes the unique characteristics of the Inuit lifestyle and has strived to engage local communities in a culturally sensitive and appropriate manner. The Company is also committed to maintaining ongoing dialogue with local communities and will continue to be open to suggestions as to how its public consultation and engagement activities can be improved.

Sabina has and will continue to engage with the Kitikmeot Inuit Association (KIA), which is the primary Inuit organization with rights and responsibilities in the Project area. Kitikmeot Region communities have also been a key focus of Sabina's public consultation and engagement activities. These communities have been categorized based on the different levels of consultation and engagement employed by Sabina in each location. Categories were determined using a community's proximity to the Project, their potential to be affected by Project-related socio-economic and ecosystemic effects, and linkages to other aspects of the Project.

A number of Northwest Territories Aboriginal organizations have been engaged for the Project. Engagement has occurred (or will occur) primarily through informational meetings with the leadership and other representatives of these organizations. Publically available TK from these organizations has also been reviewed by Sabina and documented in a report on Northwest Territories Aboriginal traditional knowledge.

Sabina's public consultation and engagement program is multi-faceted. It includes a commitment to cultural sensitivity and inclusiveness, and the use of various community engagement methods and tools. These include public meetings, meetings with key stakeholders and stakeholder groups, meetings with community advisory groups in Cambridge Bay and Kugluktuk, Project site visits, social media (e.g., websites and Twitter/email/RSS feeds), a Project newsletter, other distribution materials, establishment of a Cambridge Bay office, use of local employees and contractors including a Cambridge Bay-based Community Liaison Officer, execution of a TK study in partnership with the KIA, execution of various socio-economic/environmental studies, the eventual negotiation of an Inuit Impact and Benefit Agreement with the KIA, other forms of community engagement (e.g., radio shows, trade show participation, cross-cultural training, and community advertisements), and community donations.

Sabina began its public consultation and engagement program in June 2012. Since that time, dozens of formal meetings and numerous informal meetings with Project stakeholders have been held. Meeting minutes were taken during many of Sabina's public consultation and engagement activities, and have been incorporated into a public consultation database that contains over 150 topic directories. This database has been analyzed to identify key issues and concerns amongst communities and stakeholders. These can be categorized under three main themes: community benefits and engagement, employment and training, and environmental management and monitoring.

Community Benefits and Engagement

Information obtained through public consultation and engagement has played a role in the planning and design of the Project in a number of ways including baseline data collection, impact prediction, significance assessment, and the development of mitigation and monitoring programs. Public consultation and engagement will also provide new information to be considered as the Project advances. .

Sabina has gone through extensive effort to ensure no significant negative socio-economic and environmental effects will result from the Project, and has used both scientific methods and TK in this process. Likewise, Sabina has developed policies and plans that address three key areas of concern for local communities: caribou, fish and water quality, and mine tailings and contaminants. Sabina has additionally committed to providing various opportunities to the Kitikmeot Region including preferential employment, contracting, and training for local Inuit, continued implementation of a Kitikmeot-focussed donations policy, and the paying of all applicable taxes and royalties to governing bodies. An Inuit Impact and Benefit Agreement (IIBA) to be negotiated with the KIA will further outline Sabina's benefits-oriented commitments. Sabina hopes to additionally fly Kitikmeot employees directly to site or through Cambridge Bay.

Key specific information and findings from community engagement includes the following:

- Inuit culture, harvesting, and livelihoods should not be negatively affected by the Project;
- Kitikmeot communities should receive maximum benefit from the Project;
- Fear that the Project will prematurely shut down, promised benefits won't be realized, and negative socio-economic effects will result;
- Communities should be regularly engaged about the Project, throughout the mineral development process;
- Inuit should play a role in Project-related environmental management and monitoring;

- Mechanisms pertaining to the permitting, regulation, and oversight of the Project are unclear in some instances;
- Employment and Training
  - Preferential employment opportunities should be made available to Inuit from the Kitikmeot Region;
  - Training and apprenticeship programs should be established to help those without mining skills and experience to become meaningfully employed;
  - Mandatory criminal record checks will mean that many Kitikmeot residents will not be considered for employment;
  - Youth should be a focus of the employment and training initiatives developed by Sabina;
  - Routing employees through Yellowknife should be avoided as it leads to issues pertaining to substance abuse, absenteeism, and family instability;
  - Programs should be developed to support workers and their families dealing with personal, financial, and employment-related issues;
- Environmental Management and Monitoring
  - A comprehensive environmental management and monitoring program should be developed. Key areas of concern for local communities include caribou, fish, water quality, and mine tailings and contaminants;
  - Archaeological sites within the Project footprint must be protected;
  - Spill training, avoidance, and response capabilities must be developed by the Company;
  - Cumulative and transboundary effects of the Project must be assessed and managed; and
  - Guarantees must be in place that mine closure will be done properly.

A complete list of meetings and major correspondence between Sabina, Community and Stakeholder groups is presented in Appendix L.

12.0 MAJOR DEVELOPMENT

As defined in Article 26, Section 26.1.1, of the NLCA, a major development includes:

- A water power generation or water exploitation project in the Nunavut Settlement Area, or
- Is a project involving development or exploitation, but not exploration, of resources wholly or partly under Inuit Owned Lands.

The proposed site preparation activities are required to support additional exploration activity; as such, they do not constitute a major development.

13.0 REGULATORY REQUIREMENTS

Table 13.0-1 presents all of the regulator related permits, licenses, agreements and land leases required to authorize the site preparation activities.

Table 13.0-1: Current Permits, Licenses and Authorizations

Permit No.	Permit Name	Expiry	Issuing Agency
KTL304C017	Goose Lake Exploration	2014-12-13	KIA
KTP11Q001	Goose Lake Rock Quarry	2014-12-13	KIA
KTP12Q001	Goose Lake Airstrip borrow area	2014-12-13	KIA
N2010C0016	Back River Mineral Exploration	2014-10-31	AANDC
2BE-GOO1015	Goose Lake Water License	2015-03-31	NWB
KTL204C012	Boulder exploration	2014-12-13	KIA
KTL204C020	Boot exploration	2014-12-13	KIA
KTL312C004	Wishbone-Malley Exploration	2014-12-13	KIA
N2012C0003	Wishbone-Malley Mineral Exploration	2015-02-06	AANDC
2BE-MLL1217	Wishbone-Malley Water License	2017-03-26	NWB
KTL304F049	Winter road – Bathurst Inlet to Goose and George Lake	2014-12-13	KIA
N2011F0029	Winter road – Goose Lake to George Lake	2014-12-13	AANDC
N2010F0017	Winter road – Bathurst Inlet to Back River Project	2014-09-16	AANDC
KTL304C018	George Lake Exploration	2014-12-13	KIA
KTP12Q002	George Lake Borrow Quarry	2014-12-13	KIA
2BE-GEO1015	George Lake Water License	2015-06-15	NWB

Please see Appendix A of the Site Preparation Application Package for details.

REFERENCES

COSEWIC. 2003. COSEWIC assessment and update status report on the Peary caribou (Rangifer tarandus pearyi) and the barren-ground caribou (Rangifer tarandus groenlandicus) (Dolphin and Union population) in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa, ON.

Church, M. 1974. Hydrology and permafrost with reference to northern North America. Proc. Workshop Seminar on Permafrost Hydrology, Can. Nat. Comm., IHD, Ottawa, pp. 7 - 20.

Damas, D. 1984. Introduction. In Handbook of North American Indians: Arctic. Vol. 5. 1-8. Washington, DC: Smithsonian Institution.

Dumond, M. 2006. Review of Muskox status in the Kitikmeot Region of Nunavut - Working Draft. Nunavut Deparment of the Environment. Iqaluit, NU.

Gunn, A. 1990. Distribution and Abundance of Muskox between Bathurst Inlet and Contwoyto Lake, 1986. Department of Renewable Resources, Government of the Northwest Territories. File Report No. 100: Yellowknife, NT.

Gunn, A. and J. Adamczewski. 2003. Muskox. In Wild Mammals of North America. Ed. G. A. Feldhamer, B. A. Chapman, and J. A. Chapman. 1076-94. Baltimore, MD: The Johns Hopkins University Press.

Gunn, A. 2005. The Decline of Caribou on Northwest Victoria Island 1980–93. Yellowknife, NWT: File Report No. 133, Department of Environment and Natural Resources, Government of the Northwest Territories.

INAC. 2010. Northern land use guideline, access: roads and trails. Ottawa.

Inman, R. M., A. J. Magoun, J. Persson, and J. Mattisson. 2012. The wolverine's niche: linking reproductive chronology, caching, competition, and climate. Journal of Mammology, 93 (3): 634-44.

Kane, D.L., Gieck, R.E., Hinzman, L.D. 1997. Snowmelt Modeling at Small Alaskan Arctic Watershed. Journal of Hydrologic Engineering. Vol. 2, No. 4, 204-210.

KIA. 2012. Inuit Traditional Knowledge of Sabina Gold & Silver Corp. Back River (Hannigayok) Project, Naonaiyaotit Traditional Knowledge Project (NTKP). Prepared for Sabina Gold & Silver Corp. by Kitikmeot Inuit Association: Kugluktuk, NU.

McLoughlin, P. D., S. H. Ferguson, and F. Messier. 2000. Interspecific Variation in Home range overlap with habitat quality: a comparison among brown bear populations. Evolutionary Ecology, 14: 39-60.

Morrison, D. 1978. Archaeological Survey of Southern Bathurst Inlet, N.W.T. Report on file with the Canadian Museum of Civilization, Gatineau, QC.

Morrison, D. 1979. The Archaeology of Bathurst Inlet, N.W.T.: Literature Search. Report prepared for the National Museum of Canada, National Museum of Man, Archaeological Survey of Canada. Report on file with the Canadian Museum of Civilization, Gatineau, QC.

Persson, J., P. Wedholm, and P. Segerstrom. 2010. Space use and territoriality of wolverines (Gulo gulo) in northern Scandinavia. European Journal of Wildlife Research, 56 (1): 49-57.

Rescan. 2012a. Back River Project: 2012 Hydrology Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd. : Vancouver, BC.

Rescan. 2012b. Back River Project: 2011 Fish And Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2012c. Back River Project: 2012 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2013a. Back River Project: Wildlife Baseline Report 2012. Prepared for Sabina Gold and Silver Corp. by Rescan Environmental Services Ltd: Vancouver, BC.

Rescan. 2013b. Back River Project: 2012 Socio-economic and Land Use Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.

Reynolds, P. E. 1998. Seasonal distribution, activity and habitat use of muskoxen in northeastern Alaska. PhD diss., University of Alaska, Fairbanks AK.

Ross, P. I. 2002. Update COSEWIC status report on the grizzly bear Ursus arctos in Canada. Committee on the Status of Endangered Wildlife in Canada: Ottawa.

Slough, B. 2007. Status of the wolverine Gulo gulo in Canada. p76-82. On file with BC Geological Survey, Ministry of Energy, Mines, and Petroleum Resources.

World Health Organization (WHO). 1999. Guidelines for Community Noise.

APPENDIX C

SPILL CONTINGENCY AND EMERGENCY RESPONSE PLAN

Comprehensive Spill Contingency
& Emergency Response Plan
2015 Site Preparation Activities

October 2014

Table of Contents

1. INTRODUCTION AND BACKGROUND

1.1. Background

Sabina Gold & Silver Corp. (Sabina) is actively exploring the Back River property mineral rights Including the Goose Property (and primary exploration camp at Goose Lake), as well as George Property (and a satellite exploration camp at George Lake), and unoccupied claim groups referred to as the Boot, Boulder, Wishbone, Malley/Needle and Del properties.

The Back River Project is located in western Nunavut, south of Bathurst Inlet within the Slave Structural Province. It lies approximately 525 kilometres northeast of Yellowknife, NWT and 400 kilometres south of Cambridge Bay, NU. The project area is within the zone of continuous permafrost, and is represented on National Topographic System 1:250,000 scale map sheets 76F, 76G, 76J, and 76K.

1.2. Purpose

The purpose of the Spill Contingency and Emergency Response Plan (SCERP) is to outline Sabina's approach to risk management and to ensure that an adequate level of emergency and spill response preparedness is available for 2015 Site Preparation Activities at the Back River Project.

This SCERP has been developed to ensure that Sabina respects all applicable laws, regulations and requirements of the federal and territorial authorities. Sabina has applied for, or already obtained all required permits, approvals and authorizations required for the operations described below, in Section **Error! Reference source not found.**.

This document outlines Sabina's state of preparedness for events which may occur due to unforeseen circumstances. The SCERP details response actions to be taken in the event of unintentional materials release or other emergency situations during the 2015 Site Preparation Activities. The SCERP is dynamic and will be updated at least annually to address any significant changes in operating plans, should they occur.

A copy of the SCERP will be available at Sabina's exploration camps and headquarter offices.

1.3. Sabina Social and Environmental Policy

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees and the public as well.

Sabina also subscribes to the principles of sustainable development in mining. While exploration and mining cannot occur without an impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social effects and to enhance positive effects.

To achieve these goals, Sabina is committed to:

- Seeking to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions;
- Comply with all applicable laws, regulations and standards; uphold the spirit of the law and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental effects that could result from its operations;
- Communicate openly with employees, the regulatory community and the public on environmental issues and address concerns pertaining to potential hazards and impacts;
- Assess the potential effects of operations and integrate protective measures into the planning process to prevent or reduce impacts to the environment and on public health and safety;
- Take appropriate corrective actions should unexpected environmental impacts occur. This will also include taking appropriate action to prevent reoccurrence of these impacts.
- Provide adequate resources, personnel and training so that all employees are aware of and able to support implementation of the environmental and social policy;
- Conduct and support research and programs that improve understanding of the local environment, conserve resources, minimize waste, improve processes, and protect the environment.
- Working with the appropriate local regulators and agencies, maximize benefits to the affected communities and residents;
- Balance all decisions with best management practices, scientific principles and traditional knowledge.

1.4. Sabina Policy on Initiation for Cleanup Activities

Sabina initiates cleanup activities when, in the opinion of management, Sabina is clearly associated, or likely associated with the spilled product. The guiding principles of Sabina's comprehensive SCERP is to comply with or exceed existing regulations to ensure protection of the environment, and to keep employees, government officials and the public aware of our plans.

2. ONGOING AND PROPOSED SITE PREPARATION ACTIVITIES

Activities planned for 2015 are divided into two groups, ongoing activities and proposed activities. The following sections describe each group.

Ongoing activities include:

- Goose Camp operations;
- Exploration and support activities; and
- Ice-based airstrip.

Proposed site preparation activities include:

- Ice road and associated water use;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of a 6km all –weather road and associated crossings; and
- Quarry development and operation; and
- Staging of a Temporary Laydown Area (TLA) at the site of the proposed MLA.

2.1. Description of Ongoing Activities

Goose Exploration Camp

During site preparation activities for the Back River Property, it is anticipated that the existing Goose Exploration Camp (Goose Camp) will be used for ongoing exploration, engineering and baseline studies, and other site preparation activities.

Operation of Goose Camp

The Goose Camp will be utilized as a base for the aforementioned activities. No changes to the current camp accommodations are proposed.

Resupply of Goose Camp

The resupply of the Goose Camp and associated activities will take place utilizing all-weather and/or ice-based airstrips. No changes to the current resupply methodology are proposed.

Diesel Fuel Resupply and Storage

Additional fuel may be required for the proposed site preparation activities; this fuel will be supplied via aircraft and stored in the existing Goose Camp fuel storage area.

Arctic-grade diesel fuel will be used by motor vehicles and mining equipment on the site. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery. All fuel to be used during the 2015 site preparation activities will be stored

within the existing 75,000 L tanks, within secondary containment. The Goose Camp fuel storage currently includes six 75,000 L tanks in tertiary containment and seven 75,000 L tanks that will require installation of a lined containment area, if used in 2015.

Explosives and Ammonium Nitrate Storage

Prepackaged explosives will continue to be delivered by air transport, sited and stored in accordance with legislative requirements and best management practices. Two magazines are currently located at Goose Camp; it is anticipated that additional magazines may be required.

Exploration and Study Support

Ongoing exploration and scientific studies to support the permitting and engineering phases will continue onsite. These may include geological mapping, drilling, geophysics, environmental baseline studies, and engineering studies. These activities, although based out of Goose Camp, may occur over the entire Project area.

Ice-based Airstrip

An ice-based airstrip on Goose Lake will be required for the delivery of equipment and materials necessary for site preparation activities. The ice-strip, which has been constructed in previous seasons on Goose Lake, will be built to Transportation Canada regulations and standards. No additional water use is currently anticipated for this activity.

2.2. Description of Proposed Site Preparation Activities

2.2.1 Goose Property

Ice Roads and Water Use

Ice roads, totalling approximately 6 km in length, will be required to connect and access the proposed quarries and explosives storage locations at the Goose Property. To support this work, water for construction will be necessary. It is estimated that 120 m3/day of water will be required to build and maintain this access during ice road operations. In the open water season, an estimated 70 m3/day of this total volume will be used for dust suppression and compaction of placed construction materials.

Quarries

A total estimated volume of 550,000 m^3 of quarried material will be required to complete the outlined site preparation activities. Two quarries have been identified for use: the existing quarry next to the airstrip and a new quarry located within the footprint of the future Umwelt open pit. Up to 550,000 m^3 of rock will be required to support site preparation activities, and this material will be extracted from one or both of these quarries. As such, Sabina is seeking approval to extract up to 550,000 m^3 of rock from each of the existing quarry and the proposed Umwelt quarry. The total volume of rock extracted from one or both quarries, however, will not exceed 550,000 m3.

Only geochemically and physically suitable material will be developed, and handled per current quarry management plans.

All-weather Airstrip Extension

The current airstrip will be extended to allow for servicing passenger and cargo aircraft. This airstrip will serve as the main air access to the Goose Property throughout the life of the Project. The all-weather airstrip will be designed to Transport Canada standard TP 312 Aerodrome Standards and Recommended Practices (2005). The airstrip will be approximately 1,524 m long and 45 m wide.

Rascal Lake Outflow Stream Realignment

One of the Rascal Lake outflows currently intersects the extended airstrip footprint. A realignment of the natural watercourse will be required to divert the water currently flowing from Rascal Lake directly to Goose Lake, to flow via Gander Pond to Goose Lake. This realignment will require the construction of two berms to divert 100% of the flow from Rascal Lake through Gander Pond to discharge into a nearby area of Goose Lake. Berm construction material will be sourced from an approved quarry source.

All-weather Road and Associated Water Crossings

The proposed road alignment at the Goose Property will be constructed as an all-weather road. This road alignment, totaling approximately 5 km in length, is required to access the existing rock quarry, the new Umwelt quarry, and the extended all-weather airstrip.

The all-weather road will be constructed with run-of-quarry rock placed directly onto the tundra to preserve the permafrost. A layer of graded surfacing material will be placed to provide a protective trafficking layer. Construction materials will consist of geochemically suitable rock sourced from the existing quarry and/or Umwelt quarry.

Stream flow through the road alignment will be conveyed using appropriately sized culverts.

2.2.2 Temporary Laydown Area

A TLA will be staged at the site of the future MLA location. Activities will include the offloading of two barges containing materials, equipment, and fuel for future use; these materials will be stored at the TLA. Explosives magazines will also be offloaded to the TLA and stored empty for 2015.

Arrival and offloading of the barges and staging of the TLA will occur in the open-water season of 2015 over a period of approximately 25 days. The barges will come from a western route, either from the Lower Mainland or from Hay River.

Material Storage and Access

An estimated laydown area of up to 1 ha will be required to store equipment, materials and fuel for future Project works. With the exception of large preassembly and modular equipment, materials arriving at the TLA will be housed in sea containers. The equipment and materials will be placed on dunnage or swamp mats to protect the permafrost.

The TLA will be accessed from the barge landing area using swamp mats provisionally placed directly onto the tundra to preserve the permafrost. Once the equipment and fuel are stored, the swamp mats along this corridor will be removed and transported offsite with the outgoing barges.

To facilitate these efforts, personnel (10-14 staff) will be shuttled on a daily basis from the Goose Camp to the TLA. Minimal temporary structures (e.g. tents) will be used at the TLA site; these may include a first aid room, lunch room, and restrooms (pactos). Food, water, and waste will be temporarily stored and removed periodically. Local measures will be implemented to minimize wildlife attraction to the TLA.

Diesel Fuel Supply and Storage

Sabina will require 600,000 L of diesel fuel for future site preparation; this fuel will be shipped to the MLA (via barge) and stored in land-based steel tanks at the TLA. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

The capacity of each berm will be equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greater. In calculating the volume, the footprint of the smaller tanks is subtracted. The above basis is consistent with the document entitled Design Rationale for Fuel Storage and Distribution Facilities published by the Department of Public Works of the Northwest Territories (GNWT 2006; refer to Section 4.6 of these guidelines). The design of these containment products will be based on Arctic installation and industry storage standards. Fuel transfer will incorporate hoses and pumps within tertiary containment. Transfer methodology is described in the attached Oil Pollution Emergency Plan (OPEP).

3. RISK MANAGEMENT AND EMERGENCY CONTACTS

3.1. Risk Management

The likelihood of a significant spill event occurring at either the existing Goose tank farm or the proposed temporary fuel storage area at the MLA is very low, due to the use of double-walled tanks contained in the lined, bermed areas, or within instaberms, and the prescribed procedures for fuel transfer and anti-siphon devices in the tanks.

The greatest likelihood of an incident is present during refueling operations (mitigated with drip trays and absorbent mat), and during local drum movement (e.g. from storage to helipads), which is mitigated by using experienced operators, carefully securing the drums to the loader during movement, and safe driving practices.

As salt is delivered in pelletized form, any spill of the solid product can be easily cleaned up. Regular inspection of storage areas will allow for rapid detection of any spill.

Explosives will be delivered in designated containers approved for transport of explosives and stored within the original packaging in the magazines. Strict housekeeping and tracking standards will be kept. Any spill of explosive material would be immediately cleaned up and regular inspection will allow for rapid detection of any spill.

Frequent inspections of greywater lines will identify any leaks in the system which can be quickly repaired. Any issues would likely be noticed by personnel in camp as either moisture and/or an odour would be present.

Despite the mitigation measures taken, should any incident arise as a result of human error or unforeseen circumstances, the operating procedures outlined in this SCERP will be implemented. An Oil Pollution Emergency Plan (OPEP) has also been developed which will be the governing document for spills occurring at the MLA.

3.2. Emergency Contact Information

Contact information for all Sabina staff members involved in emergency response is presented in Table 1 and will be updated in future iterations of this SCERP. External contacts that may provide additional assistance as necessary are presented in Tables 2 and 3. Key government contacts are provided in Table 4.

These contacts are reviewed and updated with every review of the SCERP.

Table 1 Emergency Response Team

Title	Name	Telephone No.
Environmental Superintendent	Cheryl Wray	(778) 588 1999
Environmental Coordinator	Merle Keefe	(778) 588 1999
Operations Superintendent	Rick Peter	(778) 558 5995

Manager Site Operations	John Laitin	(604) 998-4187
VP Sustainability	Matthew Pickard	(604) 998-4175
VP Project Development	Wes Carson	(604) 998-4175

Table 2 External Emergency Response Contacts

Emergency Situation	Agency Contact	Telephone No.
Medical emergency / medevac	Kitikmeot Regional Health Centre	867-983-4500
	Cambridge Bay Heath Center	867-983-4500
	Stanton General Hospital	1-800-661-0867
	Air Tindi	867-669-8200
Poisonous substance ingestion	Poison Control Centre	1-800-268-9017
Search and Rescue	Cambridge Bay RCMP	867-983-0123
	Kitikmeot Search and Rescue	867-983-5100
Fatality	Cambridge Bay RCMP	867-983-0123
Workers' Safety and Compensation Commission	Incident and Injury Reporting	1-800-661-0792
Hazardous material spill	Emergency/ Spill Report Line	867-920-8130
Crime	Cambridge Bay RCMP	867-983-0123
Wildlife management	Department of Environment – Cambridge Bay	867-983-4164

Table 3 External Spill Response Contacts

Expediting Company	Contact Name	Telephone No.
Shell Canada, Mobile Environmental Response	Steve Bassett	867-874-2562
Kitnuna	Wilf Wilcox	867-983-2331
Nuna Logistics Ltd.	Court Smith	867-682-4667
Dupont (Fuel Dye)	-	905-821-5660
Frontier Mining (Sorbents)	-	867-920-7617
Acklands (Sorbents)	-	867-873-4100 867-920-5359

Table 4 Key Government Contacts

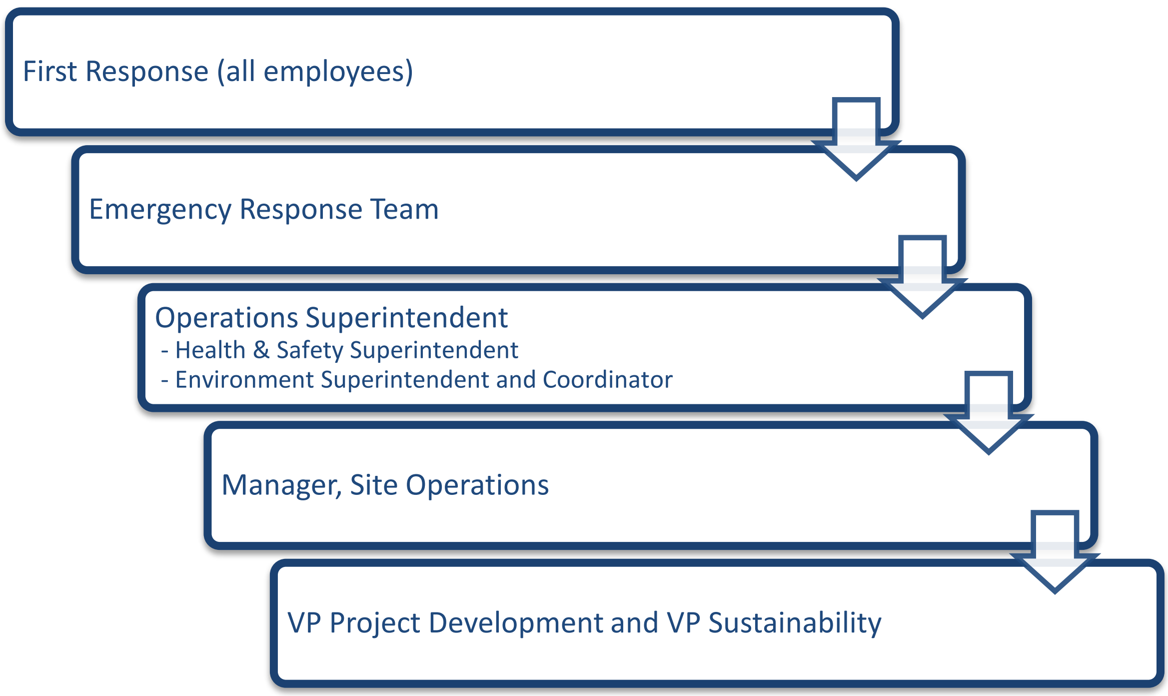
Agency/Organization	Contact	Telephone No.
Aboriginal Affairs and Northern Development Canada	Eva Paul, Water Resources Officer Baba Pederson, Resource Mgmt. Officer Erik Allain A/Manager of Field Ops	867-982-4308 867-975-4296 867-975-4295
Canadian Coast Guard	-	1-800-265-0237

Department of Fisheries and Oceans	Margaret Keast	867-979-8000
Environment Canada	Craig Broome, Manager of Enforcement Wade Romanko, Env. Emerg. Officer	867-669-4730 867-669-4736
Government of Nunavut Environmental Protection	Robert Eno, Director Environment	867-979-7800
Kitikmeot Inuit Association (KIA)	-	867-983-2458
Nunavut Water Board	N/A, Exec. Director Phyllis Beaulieu, Manager of Licensing	867-360-6338
RCMP (Kugluktuk)	-	867-982-2111
RCMP (Yellowknife)	-	867-669-1111

4. ROLES AND RESPONSIBILITIES

The initial stage of any spill or emergency incident and resultant response is critical. An effective and timely response is essential to minimize environmental impacts and prevent an emergency situation from escalating to a higher level. Therefore, all relevant personnel must be fully aware of their individual duties and responsibilities as presented in this SCERP.

The general response and notification chart is:



4.1. All Employees (First Responders)

- Immediately warn other personnel working in the area;
- Evacuate the area if the health and safety of personnel is threatened;
- Notify direct supervisor or site superintendent, who will initiate the response operations;
- In the absence of danger, take any safe and reasonable measure to stop, contain and identify the nature of the spill or emergency situation; and
- Participate in response as directed by the Site Superintendent.

4.2. Emergency Response Team

- Members determined by Operations Superintendent based on response needs;
- Members report to the scene of the incident;
- Work closely with the Operations Superintendent to determine appropriate response strategy;
- Contact departmental resources via radio as required during the emergency response;
- Direct ERT members in their respective tasks as required; and

- Participate in a post-emergency debriefing session.

4.3. Operations Superintendent

- Evaluate the initial situation and assess the magnitude of the emergency;
- Assemble and manage the Emergency Response Team, as required;
- Develop an overall plan of action;
- Notify Manager, Site Operations, Health & Safety Superintendent, and Environmental Superintendent and Coordinator of incident;
- For spills, report to NWT-NU 24-hour Spill Report Line at 867-920-8130 and ensure cleanup is completed to Sabina standards in line with direction from the Manager, Site Operations, Health & Safety Superintendent, Environmental Superintendent Coordinator;
- Provide liaison with management to keep them informed of response activities;
- Act as the spokesperson with government agencies as appropriate;
- Document all actions and decisions;
- Collect photographic records of the event and response efforts;
- Participate in post-emergency debriefing;
- Assist in the accident/incident investigation process;
- Complete Government Agency notification processes;
- Document the cause of the emergency and effectiveness of the response effort, and recommend the appropriate measures to prevent a recurrence;
- Ensures Emergency Response Team is adequately trained;
- Ensures Emergency response and/or monitoring equipment and supplies are regularly inspected and maintained;
- Ensure that all involved departments complete reporting process; and
- Prepare and submit follow-up documentation required by appropriate regulators.

4.4. Manager Site Operations

- Provides advice and ensures response is completed to Sabina standards in line with direction from the Operations Superintendent and VP Sustainability;
- Organize with Operations Superintendent emergency response training and exercises; and
- Lead investigation and identify measure and/or training to prevent similar incidents occurring.

4.5. Environmental Superintendent and Coordinator

- Provides advice and ensures incident is documented appropriately as per this plan and regulatory requirements;
- For spills; record date, location (GPS), material spilled, volume, reason for release, any negative impact, status of cleanup, and corrective actions taken; confirm these details with Operations Superintendent.
- For spills; obtain photographs of spill site before clean up starts if possible and after the cleanup has been completed. Take pictures of undisturbed area beside the spill area for a comparison. If

spill occurs on snow, stake or otherwise identify the affected area so that it can be evaluated once the snow melts.

- As directed by the VP Sustainability and Site Superintendent liaise with NWT/NU applicable agencies regarding on-going cleanup activities, inspections and incident closure;
- Assist in initial and ongoing response efforts;
- Provide advice to assist with cleanup;
- Co-ordinate inspections by applicable agencies; and
- Assist with investigation and identify measure and/or training to prevent similar incidents occurring.

4.6. Health & Safety Superintendent

- Assist in initial and ongoing response efforts;
- Provide advice to assist with response/cleanup; and
- Assist with investigation and identify measure and/or training to prevent incidents occurring.

4.7. VP Project Development and VP Sustainability

- Engage Legal Counsel and Sabina Senior Management and Board of Directors as required; and
- Notify and update Senior Management and Board members as required.

5. TRAINING AND TESTING

Sabina will ensure that personnel involved in emergency and spill response have received prior training and the requisite skills to safely minimize risks and respond to emergencies.

The personnel directly linked to emergency and spill response operations will receive training to familiarize themselves with the SCERP and Hazardous Materials Management Plan (HMMP) on a regular basis according to their duties and responsibilities. All completed training will be recorded in the training register.

The personnel directly linked to emergency and spill response operations, contract employees and the other responders identified in this SCERP should take part in the annual training program. Training will be conducted to ensure adequate numbers of responders are available for all levels, times, and work shifts.

5.1. Training

4.1.1 Site Orientation

On site orientation will be provided to all onsite personnel to ensure employees are aware of:

- What First Responders are to do in case of an emergency situation;
- The location of MSDS sheets and Spill Report Forms;
- The location of the Spill Response Kits;
- The general locations of fire extinguishers and firefighting equipment; and
- The location of the Spill Action Plan and the Fire Action Plan.

5.1.2. Role Specific

Specific on-site training will be provided to all employees, whose job function may have a higher probability of experiencing a spill, to ensure they are aware of:

- WHMIS and Transportation of Dangerous Goods;
- Identify and avoid the conditions which may lead to a spill;
- Develop an understanding of the potential environmental impacts of a spill;
- Develop an understanding of the financial costs of a spill;
- Recognize the hazards associated with sources of ignition (smoking, electrical sparks) near a fuel source;
- Spill kit contents and use of them; and
- Turn off valves to stop the flow of fuel.

For employees involved in fuel handling, additional training will be provided regarding appropriate refueling techniques and drum handling procedures.

5.1.3. Emergency Response Team

Members of the Emergency Response Team will be provided a higher level of training to allow for safe and adequate response. This includes:

- All information given as part of the Role Specific Training;
- Fire extinguishers and water pump locations and use;
- Details of the Spill Action Plan and the Fire Action Plan; and
- Identify, evaluate and mitigate the hazards posed by any spilled product by using appropriate PPE (personal protective equipment).

5.2. Testing

Emergency response exercises will be conducted on a regular basis to validate on site capabilities, practice the internal and external notification processes and evaluate the management of the response through the decisions and actions of the team participating in the exercise(s).

A spills drill is to be held under the Environment and Site Superintendent's direction providing practical training for each personnel rotation at the start of each season, at each field operation. This drill must include a familiarization of all onsite personnel on their responsibilities including what to do in case of a spill. The drill must also include a hands-on scenario where the Emergency Response Team utilizes equipment to deal with the spill scenario. The drill may be broken down into two or more sessions to ensure adequate coverage.

Records of this testing are to be kept on file and posted to provide access for those who were unable to attend.

6. MATERIALS TRANSPORT AND STORAGE

6.1. Fuel Storage

Diesel fuel is required during the 2015 Site Preparation Activities to generate power on-site, heat buildings and to fuel mobile equipment. Diesel fuel at Goose Camp will be stored in double-walled tanks (up to 75,000L ULC-approved) situated within a lined secondary berm. Diesel fuel at the MLA will be stored within double-walled tanks (up to 100,000L ULC-approved) within Arctic-grade manufactured instaberms or similar product.

Anticipated maximum fuel supplies for 2015 are as follows:

Table 5 *Estimate of Fuel Supplies for 2015 Site Preparation Activities*

Fuel	Quantity	Location
Diesel – Envirotanks (75,000 L tanks)	500,000L	Goose Camp
Diesel – Envirotanks (100,000 L tanks)	Up to 600,000L	MLA

6.2. Domestic Greywater, Sewage and Contact Water

Greywater from the kitchen and shower facilities will be screened for coarse particles (e.g. food), and released to a sump for settling, after which it will be released to the environment. Sewage will be dealt with using a Pacto toilet system with incineration of the waste generated.

Contact water is water that collects within the fuel secondary containment berms. This water will be transferred out of each containment once the depth of water is equal, or greater, than 10 cm and treated using oil/water separator. Post treatment, the contact water will be contained within a dedicated berm/tank system and tested for compliance with current water license thresholds. If in compliance with current thresholds of the water license it will be released to the environment.

6.3. Solid Waste

Combustible solid wastes generated from the camp activities will be incinerated. Products such as putrescible domestic and office waste will be burned. Noncombustible wastes such as scrap metal, non-reusable barrels, incinerator ash, etc., will be placed in mega-bags and removed from site using back-haul flights to Yellowknife. Hazardous solid waste for backhaul will sealed in drums for transport to Yellowknife.

Although the potential for quarry material to be acid generating is unlikely, any such waste would be disposed of in an approved location in accordance with accepted standard practices.

6.4. Chemicals

Sabina is committed to the safe and proper handling of waste materials to ensure minimal environmental impact and land disturbance. Waste chemicals that require special attention and handling include waste oil, hydraulic oil, lubricating oil, calcium chloride, grease, and ethylene glycol.

Waste oil is used to either heat the warehouse, or to fuel the incinerator at Goose camp. If not used to fuel heaters or the incinerator, waste oil and oil from filters will be back-hauled for appropriate disposal. Drained spent oil filters will be stored in drums for removal from the site for disposal at an authorized disposal facility.

There are minimal quantities of reagents such as dilute HCl (<5L), concentrated HNO_3 (vials of <10mL), and other materials on site for geological testing and environmental sample preservation.

Explosive products, when on-site, will be stored in appropriate secured facilities at designated explosives storage site(s).

Fire extinguishers and dust suppression is also used on site as needed. The fire extinguishers are stored in appropriate facilities. Small quantities of various household chemicals are on site for domestic use.

Material Safety Data Sheets (MSDS) will be available and kept at the site for all chemicals and fuel products. Appropriate storage and handling of all products will be undertaken.

7. EMERGENCY RESPONSE EQUIPMENT

Important information will be posted conspicuously throughout the Project area, including:

- Location of emergency response equipment (first aid kits, PPE, fire protection equipment, spill response kits) and details of proper use;
- Location of Muster Points and First Aid Stations;
- Lists of personnel trained in emergency response procedures (first aid, fire suppression, spill response);
- Outlines of Emergency Response Procedures; and
- Emergency contact lists.

7.1. Fire Protection Equipment

All work areas will be equipped with proper fire protection equipment and signage will be posted where required. The inspection, and if necessary, testing and maintenance of all firefighting equipment will be conducted by a qualified person at least once a month during the active season.

All precautions necessary will be taken to prevent fire hazards when working, i.e.:

- Flammable substances will be managed in accordance with best practices, Hazardous Materials Management Plan, Waste Management Plan and Explosives Management Plan;
- All areas will be kept clear of any accumulation of material to enhance safe access and egress in case of emergency;
- Scrap, paper, rags etc. will be disposed by placing them in proper containers with lids secured; and
- Oil and grease spills will be cleaned up immediately.

Smoke and carbon monoxide detectors will be located throughout the camp area.

Air horns and/or sirens will be posted by all building exits for use in alerting others in camp of an emergency situation. Air horn signals will be:

- 1 long blast = fire;
- 2 short blasts = wildlife; and
- 3 short blasts = medical emergency.

7.2. Spill Response Equipment

Available heavy equipment and aircraft will be used as appropriate for emergency use to respond to spill incidents.

Appropriately equipped spill response kits, additional on-site spill response equipment and MSDS sheets will be strategically located, as listed in Table 6.

Reserve spill response equipment such as booms, socks and pads will be available for response to larger spill incidents, or to replenish materials used in the smaller equipment spill kits. Spill kits will be inspected routinely and restocked after use.

7.3. Spill Kits

Table 6 *Location of Spill Kits*

Goose Camp	MLA
Tank Farm	Fuel storage area
Drummed Fuel Storage	
Generator Buildings	
Coreshack	
Drum Crusher	
Incinerator	
Helipad Area	
Dock	
Each Diamond Drill	
South Quonset	
Shop North Quonset	

Table 7 ***Goose Spill Kit Contents***

Quantity	Item(s)
1	45 gal, 16 Gauge Open Top Drum, c/w Bolting Ring & Gasket
20	Short Putty Epoxy Sticks
1	48” x 48” x 1/16” Neoprene Pad (Drain Stop)
1	Splash Protective Goggles
1	Pkg. - Polyethylene Disposable Bags (5 ml) 10 per Package
1	Shovel (Spark Proof)
1	Case T-123” x 10’ Absorbent Boom, 4-Booms/Case;
1	Pkg. – Universal absorbent Mats, 16 ½” x 20”, 100 Mats per Package
1	Roll – Oil only absorbent mats 150’ x 33”

Table 8 ***MLA Spill Kit Contents***

Quantity	Item(s)
1	Oil containment boom 300 meters – 24 Inch Fence type
4	Anchor kits for anchoring boom in place
4	Towing bridal for oil boom
4	Spill response unit – X Large Land
4	Overpack spill kit
50	12 kg. Bags granular absorbent
6	0.5m X 0.5m x 15 cm Arctic mini berm for under fittings
6	1m x 1m x 15 cm Arctic mini berm for under fittings
1	1500 Gallon Portable Tank
25	Bales Sorbent Pads
25	Bales Absorbent booms

1	Aluminium workboat with outboard engine, equipped with towing post and related equipment for boom deployment
1	Skimmer and diesel driven power pack, suitable for recovery of distillates – Capacity 7.5 tonnes per hour
12	Rakes for beach cleaning
12	Perforated shovels for sorbent recovery
12	Pitch forks with screens for sorbent and debris recovery
12	Approved flotation devices
1	Minimum 10 ton sand stockpile for spill berming operations

Mobile Response Unit

A mobile Environmental Response Unit is available to Sabina from a major fuel supplier (Shell) in Yellowknife or Cambridge Bay. This unit can be transported to the site from Cambridge Bay in less than three hours, weather permitting.

7.4. First Aid and Medical Equipment

First aid kits will be strategically located in vehicles and all Project sites. They will be stored in marked areas, readily accessible to responders.

Additional medical equipment will be located at the onsite Medical Clinic.

7.5. Communication Systems

The primary means of onsite communication will be the phone system, hand-held radios, and vehicle radios. The primary means of external communication will be the phone system along with email.

Backup power sources and replacement batteries will be available to ensure continuous operation of communication systems. SAT phones provide backup communications capability should other systems be inoperable due to power outages.

In an emergency situation the “CAMP” radio channel will be used. Once an emergency call is given over the radio, all work must stop and radio silence is initiated. The CAMP channel will be used as the Emergency Channel.

Members of the ERT will be on-call for emergency situations 24 hours a day.

Emergency contact information is provided in Section 3.

8. SPILL RESPONSE PROCEDURE

A spill is defined as the discharge of a hazardous product out of its containment and into the environment. Potential hazards to humans, vegetation, water resources, fish and wildlife vary in severity, depending on several factors including nature of the material, quantity spilled, location and season. Fuel is the main product that may be spilled and cause and impact, therefore spill response procedures focus on this hazardous material. Other chemicals that may be spilled include sewage water, and small quantities of lubricants and oils.

All site personnel are briefed on the procedures to be followed to report a spill and initiate spill response. The first person to notice a spill must take the following steps:

- Immediately warn other personnel working near the spill area;
- Evacuate the area if the health and safety of personnel is threatened;
- Notify their supervisor or onsite management, who will initiate the spill response operations; and
- In the absence of danger, and before the spill response team arrives at the scene, take any safe and reasonable measure to stop, contain and identify the nature of the spill.

The following details the steps to be taken in the event of a spill. Steps are listed in order of importance; however, circumstances and conditions may alter the order of these steps to meet a specific situation.

8.1. Source Control

Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as turning off a pump, closing a valve, sealing a puncture hole with almost anything handy (e.g., a rag, a piece of wood, tape, etc.), raising a leaky or discharging hose at a level higher than the product level inside the tank, or transferring fuel from leaking containers.

8.2. Control of Free Product

Prevent or limit the spread of the spilled material. Accumulate/concentrate spilled product in an area to facilitate recovery. Barriers positioned down-gradient of the spill will slow or stop the progression of the spill. Barriers can consist of absorbent booms, dykes, berms, or trenches (dug in the ground or in ice).

8.3. Protection

Evaluate the potential dangers of the spill in order to protect sensitive ecosystems and natural resources. Block or divert the spilled material away from sensitive receptors. This can also be achieved by using various types of barriers.

8.4. Clean up the Spill

Recover and containerize as much free product as possible. Recover and containerize/treat contaminated soil, water, and snow. Pressure-wash contaminated bedrock surfaces, shorelines, ice and recover as much as possible oily water for containerization and/or treatment.

8.5. Report the Spill

Provide basic information such as date and time of the spill, type and amount of product discharged, photographic records, location and approximate size of the spill, actions already taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or the environment.

8.6. Response by Spill Location

Spills on Land

Response to spills on land will include the general procedures previously detailed. The main spill control techniques involve the use of two types of barriers: dykes and trenches. Barriers should be placed down-gradient (down-slope) from the source of the spill, and as close as possible to the source of the spill. Barriers slow the progression of the fuel and also serve as containment to allow for recovery.

Depending on the volume spilled, the site of the spill as well as available material, a dyke may be built with soil, booms, lumber, snow, etc. A plastic liner should be placed at the foot of and over the dykes to protect the underlying soil or other material and to facilitate recovery of the fuel. Construct dykes in such a way as to accumulate a thick layer of free product in a single area (V shaped or U shaped).

Trenches are useful in the presence of permeable soil and when the spilled fuel is migrating below the ground surface. A plastic liner should be placed on the down-gradient edge of the trench to protect the underlying soil. Liners should not be placed at the bottom of the trench to allow water to continue flowing underneath the layer of floating oil.

The use of large quantities of absorbent materials to recover larger volumes of fuel should be avoided. Large volumes of free-product should be recovered, as much as possible, by using vacuum systems and/or pumps, and containerized. Mixtures of water and fuel may be processed through an oil-water separator. Absorbent sheets should be used to soak up residual fuel on water, on the ground (soil and rock), and on vegetation

Spills on Water

Response to spills on water include the general procedures previously detailed. Various containment, diversion and recovery techniques are discussed in the following sections. The following elements must be taken into consideration when conducting response operations:

- Type of waterbody or watercourse (lake, ocean, stream, river);
- Water depth and surface area;
- Wind speed and direction;
- Resonance and range of tides;
- Type of shoreline; and
- Seasonal considerations (open-water, freeze-up, break-up, frozen).

Containment of an oil slick on the ocean requires the deployment of mobile floating booms to intercept, control, contain and concentrate (i.e., increase thickness) the floating oil. One end of the boom is anchored to shore while the other is towed by a boat or other means and used to circle the oil slick and return it close to shore for recovery using a skimmer. Reducing the surface area of the slick increases its thickness and thereby improves recovery. Mechanical recovery equipment (i.e., skimmers and oil/water separators) will be mobilized to site if required.

If oil is spilled in a lake it may not be possible to deploy booms using a boat. In this case, measures are taken to protect sensitive and accessible shoreline. The oil slick is monitored to determine the direction of migration. In the absence of strong winds the oil will likely flow towards the discharge of the lake. Measures are taken to block and concentrate the oil slick at the lake discharge using booms where it will subsequently be recovered using a portable skimmer, a vacuum, or sorbent materials.

In small slowly-flowing rivers, streams, channels, inlets or ditches, inverted weirs (i.e., siphon dams) is used to stop and concentrate moving oil for collection while allowing water to continue to flow unimpeded. In the case of floating oil, in a stream, heading for a culvert (i.e., at a road crossing) a culvert block is used to stop and concentrate moving oil for collection while allowing water to continue to flow unimpeded. In both cases oil will then be recovered using a portable skimmer or sorbent materials.

In the case of spills in larger rivers, with fast moving currents, diversion booming is used to direct the oil slick ashore for recovery. Single or multiple booms (i.e., cascading) may be used for diversion. Typically, the booms are anchored across the river at an angle. The angle will depend on the current velocity. Choosing a section of a river that is both wider and shallower makes boom deployment easier. Diversion booming may also be used to direct an oil slick away from a sensitive area to be protected.

Spills on Snow and Ice

In general, snow and ice will slow the movement of hydrocarbons. The presence of snow may also hide the oil slick and make it more difficult to follow its progression. Snow is generally a good natural sorbent, as hydrocarbons have a tendency to be soaked up by snow through capillary action. However, the use of snow as a sorbent material is to be limited as much as possible. Snow and frozen ground also prevent hydrocarbons from migrating down into soil or at least slow the migration process. Ice prevents seepage of fuel into the water.

Response to spills on snow and ice includes the general procedures previously detailed. Most response procedures for spills on land may be used for spills on snow and ice. The use of dykes (i.e., compacted snow berms lined with plastic sheeting) or trenches (dug in ice) slow the progression of the fuel and also serve as containment to allow recovery of the fuel. Free-product is recovered by using a vacuum, a pump, or sorbent materials. Contaminated snow and ice is scraped up manually or using heavy equipment depending on volumes. The contaminated snow and ice is placed in containers or within plastic lined berms on land. If required, a contaminated snow storage site is to be located in close proximity to one of the four (4) main work sites to facilitate inspection and monitoring, in an area which is still easily accessible once it is time to remove the snow (i.e., spring or summer), and at least 30 m away from any body of water or ditch. Once enough snow has melted, the oily water is removed from the storage and processed through an oil-water separator that would be mobilized to site. Hydrocarbons recovered will be burned in the camp incinerator or shipped off-site for processing.

8.7. Response by Material Spilled

Fuel

Detection of leaks will be using two methods - a fuel inventory reconciliation and inspection. A weekly reconciliation of storage volumes will be completed and a spill response will be initiated in the event of any unexplained loss over five or more weeks.

Weekly inspections will be conducted to ensure either there has not been a leak or that the conditions of the area could result in a leak. These inspections will include the fuel drums and storage containers, secondary containment sumps and associated spill containment devices, any pumps and product-handling equipment, and an overfill protection devices. These inspections will be recorded to include who completed the inspections, areas included in the visual inspection and any deficiencies noted.

Fuel spills, leaks at storage facilities or vehicle accidents will be handled by following these steps:

- Identify the source of the leak or spill;
- Contact the Environmental Coordinator/Site Superintendent;
- Stop leaks from tank or barrel by;
- Turning off valves;
- Utilizing patching kits to seal leaks;
- Placing plastic sheeting at the foot of the tank or barrel to prevent seepage into the ground;
- Contain the spill and the source if possible; and
- Take photographs of the spill site before and after the clean-up.

Small spills will be cleaned up by removing the contaminated soil and storing it in empty 205 L drums for backhaul and disposal at an approved hazardous waste disposal site. Should a large spill occur, cleanup and disposal efforts will be coordinated as necessary with the appropriate authorities and agencies.

Further information on the handling of fuel spills is detailed in Appendix A.

Domestic Sewage, Solid Waste and Contact Water

Any problems with the sewage disposal system, incinerator or other waste disposal procedure will be immediately reported to the Operations Superintendent.

In the event of a power failure, the stand by generator will be put into operation as soon as possible. Similarly, in the case of a pump failure, the backup pump will be put on-line. Any greywater drainage problems will be addressed as quickly as possible to minimize the chance of a spill. As necessary, appropriate safety equipment and personal protective clothing will be available to site personnel involved in handling the situation.

Chemical

Assess the hazard of the spilled material by referring to the relevant MSDS sheet. Each response will vary based on the material. If the chemical is hazardous, ensure personnel protective equipment is utilized (latex gloves, eye protection, etc.) before approaching the spill. As chemicals are only used in extremely small quantities on site use absorbent mats to soak up spilled liquids and place in appropriate container for treatment and/or disposal.

Disposal

Appropriate disposal, as directed by the Environmental Manager, for any recovered product and contaminated soil, water or absorbent clean up material is regulated and must be authorized by the agency investigating the incident. Obtain approval from all appropriate government agencies before disposal. A hazardous waste generator number has been acquired and used by the expeditor when disposing of camp waste.

Fuel contaminated soil can be remediated at camp through incineration or alternatively, the contaminated soil can be flown out to Yellowknife for disposal at an approved disposal/treatment facility.

Any non-reusable recovered product, contaminated soil and clean up material, which cannot be incinerated, will be stored in containers and returned to camp prior to disposal.

9. MEDICAL EMERGENCY PROCEDURE

9.1. Onsite Medical Assistance

If the worker is injured but does not require immediate medical assistance or transportation:

- Provide immediate First Aid;
- Make arrangement with supervisor, or other personnel if needed, for transportation of the injured worker to the onsite Medical Clinic;
- Ensure worker's supervisor is informed of the injury to the worker and that they are being transported to the Medical Clinic;
- Worker is to remain at the Medical Clinic until the supervisor arrives; and
- The Principal Medical Aide Designee who treated the patient is responsible for filling out the appropriate forms and reports.

If a worker is injured and immediate medical assistance or medi-vac transportation is required:

- Provide immediate First Aid;
- Call, or send someone else to notify of need for medical assistance;
- Contact the Principal Medical Aide Designee via the hand held VHF radio on "CAMP" Channel;
- Call: Medic-Medic-Medic and provide the following information:
  - "My name is __________; I am located at _________. (State worker's name) has been injured and requires immediate medical assistance." Describe the nature of the injury. Await confirmation that the message was received.
- Once an emergency call is given over the radio, all work must stop and radio silence is initiated. The CAMP channel will be used as the Emergency Channel.
- Stay at the scene;
  - Maintain contact with the Principal Medical Aide Designee if possible;
  - Render First Aid;
  - Post a spotter for direction;
  - If needed, send an escort vehicle to meet the Principal Medical Aide Designee en-route;
- Hand over the care of the patient to the Principal Medical Aide Designee when they arrive and provide assistance;
- The Principal Medical Aide Designee to assume control over the injured worker and further medical response. The Principal Medical Aide Designee will decide on the need for mobilization and transport; and
- Logistics and Camp Supervisor to be on standby for instructions regarding medevac, runway preparation, lighting, clearing etc.

9.2. Medevac Procedure

If a medical emergency is declared by the Principal Medical Aide Designee, the following will be executed:

- Logistics will be contacted via radio on CAMP Channel, and will be provided the required medical information by the Principal Medical Aide Designee, or their designate;
- Logistics will contact Cambridge Bay Heath Center (867-983-4500) and inform on-duty nurse of emergency;

**Important: A doctor must be receiving to initiate the Medevac*

- If Cambridge Bay Health Center is unavailable, Logistics will call Stanton Hospital in Yellowknife (1-800-661-0867) and inform on-duty nurse of emergency; and
- Provide the following information to the on-duty nurse:

Company Project Camp No.	Sabina Gold & Silver Corp. Back River Project 778-372-2741
Patient Location	Latitude: 65° 32’ 42”N Longitude: 106° 25’ 43”W
Medicare/Health #	May need to be given at a later time.
# Of Injured Persons	
Patient Information	What happened?
Condition:	Conscious or Unconscious?
History	Any other known medical conditions
Age of Patient	
Time of Accident	

- Doctor from Cambridge Bay Health Center will contact a doctor in Yellowknife with the injury details and that they are initiating a Medevac;
- Await a call from Cambridge Bay doctor who will provide the name of the receiving doctor in Yellowknife;
- Call Air Tindi to request a Medevac Plane and provide them with the name of the receiving doctor and a brief incident description;
- Air Tindi Paramedics will call back to have complete incident details; request any medical equipment that is necessary;
- Principal Medical Aid Designee to continue to update Logistics with patient’s status and vitals;
- If a medevac is initiated, Logistics to get direction from Air Tindi as to the estimated time of arrival (ETA); and
- Logistics to notify the Principal Medical Aide Designee of ETA for the medevac.

Secondary Contacts

If Air Tindi cannot be reached, contact:

- Arctic Sunwest 867-669-9789; or
- Northern Air Support 1-250-765-0100.

Compromised Air Transportation

Should air transport be unavailable due to weather or daylight hours, the patient will remain on site at the onsite medical clinic until air support can be provided.

In Case of Death

- Do not move the body unless it could be destroyed by other events happening at the time (e.g. a fire);
- Cover the body;
- Contact supervisor; and
- Supervisor to call the RCMP, Company directors, Mines Inspectors.

10. AIR EMERGENCY PROCEDURE

As soon as an air emergency is identified the Project Air Traffic Controller or security personnel will notify the Operations Superintendent who will assess the need for additional emergency response resources.

In the event of a helicopter or plane crash:

- The Operations Superintendent will contact the RCMP who will establish access and traffic control;
- Medical response procedures will be initiated (Section 9);
- If required, fire response procedures will be initiated (Section 11);
- Emergency response personnel will not move debris associated with the wreckage, unless it inhibits passenger rescue;
- The RCMP/Coroner will be responsible for dealing with fatalities; and
- Following the emergency response, the Operations Superintendent will direct the Emergency Response Team in the investigation and cleanup of the crash site.

11. FIRE / EXPLOSION PROCEDURE

If a fire is discovered:

- Sound the alarm;
- Where it is safe to do so, onsite personnel will take immediate steps to extinguish small fires. All workers will be trained in use of fire extinguishers.
- If it is safe to do so, shut off equipment, warn others and use the planned escape route; and
- In the event of a fire all workers must report to the primary muster point, if this is not possible report to the secondary muster point.

When approaching a fire:

- Always seek help before approaching;
- Before approaching, be sure to check the extinguisher is charged, and complete a visual inspection for any obvious signs of deterioration to the extinguisher or low pressure;
- Always ensure you keep the fire in front of you and that you have a means of escape. Stay upwind of the fire;
- Use the PASS method when operating a fire extinguisher:
  - Pull the pin at the top of the extinguisher. The pin releases a locking mechanism that will allow you to discharge the extinguisher.

- Aim at the base of the fire, not the flames. This is important – in order to put out the fire, you must extinguish the fuel. Spraying the fire directly could cause it to spread.
- Squeeze the lever/nozzle slowly. This will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.
- Sweep from side to side. Using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out, or until all expellant is used.

- Operate the extinguisher from a safe distance, several feet away and then move towards the fire once it starts to diminish;
- Never use a class A extinguisher on an electrical fire;
- Do not hesitate to leave the area if the fire continues to grow;
- Once the fire is out, don't walk away immediately. Watch the area for a few minutes in case it re-ignites;
- Replace the fire extinguisher with a recharged one; and
- Bring the discharged fire extinguishers to the warehouse for recharging.

For emergencies associated with explosives, procedures outlined in the supplier's Explosives Management and Emergency Response plans will be initiated. This information will be available in later revisions of this SCERP.

12. EVACUATION PROCEDURE

The need to evacuate part of or the entire Project site may result from:

- Extreme weather events;
- Seismic activity;
- Tundra fire;
- Toxic gas release;
- Hazardous material spill; and
- Extended power outage during winter conditions.

If an evacuation is required:

- All personnel will be under the direction of the Operations Superintendent;
- All employees will report to the designated Muster Point;
- Supervisors will perform a count of personnel to ensure all are accounted for and call the Operations Superintendent with the message "All persons account for";
- The Operations Superintendent will coordinate airplane/helicopter support as required and handle telephone notifications and inquiries;
- The Operations Superintendent will have the site helicopters stand-by and await instructions. If needed for fighting fires, the Operations Superintendent will ask to have the Bambi basket ready;
- The situation will be accessed, and personnel will be given instructions for which areas have been cleared and can be used as shelter; and
- If required, personnel will be evacuated to Cambridge Bay, Kugluktuk or Yellowknife, where accommodation and any further transport arrangements will be handled by the Operations Superintendent.

13. SPILL POTENTIAL ANALYSIS

13.1. Fuel

Fuel spills could potentially occur from:

- Fuel storage containment leaks;
- Spills during transport from aircraft/barge to fuel storage area;
- Spills from vehicles or equipment as a result of accidents; and
- Spills during fuel transfer from tanks to equipment or heaters.

Spills occurring during fuel handling, transfer or storage operations will be minimized by:

- Secondary containment;
- Inspections of the storage facilities;
- Inventory tracking;
- Staff training in proper fuel handling procedures;
- Spill response training for personnel associated with fuel handling;
- Immediate cleanup of minor spills;
- Enclosing spigots on fuel containers with absorbent mat to collect any slow drips; and
- Fuel line walkers will be used to monitor the fittings etc during fuel transfers.

The potential for spills affecting surface waters is low, as fuel storage and transfer points are located away from watercourses and lakes. Close inspection of fuel transfer activities will be undertaken during all times while fuel is being pumped/transferred to equipment. Secondary containment will be used at all refueling points and storage areas.

13.2. Domestic Sewage and Solid Waste

Waste from the kitchen and Pacto systems will be transported to the incinerator in a small trailer, with virtually no risk of spillage. The greywater lines will be routinely inspected for leaks and repaired as necessary. The screens at the greywater sump will be cleaned of debris daily.

13.3. Solid Waste

Failures may occur in the handling of solid waste through the following situations:

- Incinerator at Goose Camp fails;
- Accidental damage to the incinerator and it components, or the heaters and/or their fuel supplies;
- Mechanical breakdown; and
- Improper maintenance.

Visual inspection of the incinerator and its combustion products will be carried out frequently, typically in the normal course of operation. The incinerator will be operated according to the manufacturer's instructions.

13.4. Chemicals

Any chemicals brought on site are stored in manufacturers' supplied packaging. Although unlikely, leaks may occur resulting in minor spills of chemical product in storage. It is more likely a leak will occur during the transfer of chemicals or from accidental failure of containers.

Sabina provides training to its staff in product handling and inspection procedures, which we feel, will result in reduced occurrences of chemical spills.

13.5. Overland Transport

The following table identifies possible incidents which may occur along the winter and/or all-weather road, the consequences of that incident and the preventative measures to be implemented.

Table 8 Summary of Potential Incidents and Preventative Measures along Transportation corridors

Incident	Description	Consequences	Preventative measures
Refueling of vehicles	Refueling hose could break, spring a leak, overfilling of equipment tank, spillage from gas storage tank	Puddles of fuel over limited area Hose breaks at equipment and sprays a large amount of fuel over a larger area "slick" flows steadily from equipment	All refueling will occur in area 30 m or greater from waterways in designated areas Personnel will be aware of emergency shut-off valves and trained in spills response Spill Kit available Refueling occur within containment and/or absorbent material in place
Vehicle storage and operation	Vehicles could leak fuel while in operation or during a stop along route	Puddles of fuel over limited area to the entire contents of a tank being discharged	Vehicles will stop a minimum of 31 m from waterways. Vehicles parked on ice will have absorbent material placed underneath Personnel will be trained in spills response Spill Kit available
Fuel containers leaking	Fuel being brought to the vehicles could leak fuel while in operation or during a stop along route	Puddles of fuel over limited area to the entire contents of a tank being discharged	Regular visual inspection will occur to ensure tanks are not leaking Personnel will be trained in spills response. Spill Kit available

Incident	Description	Consequences	Preventative measures
Vehicle accident	Accident on road that involves equipment going off road/overturning	This worst case scenario could result in a tank of fuel and any materials being transported spilling entire contents over a large area	Safe road corridor will flagged Speed limits will be in effect Transportation of Dangerous Goods manifest if necessary Coordination and communication between the cat-haul and camps will be maintained Camp personnel will be ready to mobilize in case of accident Spill kit available with cat-haul and on-site
Fuel storage leakage and/or spill	Fuel storage tanks leak/spill and contents are spilled	Puddles of fuel over limited area	All storage will occur in area 30 m from waterways Double-walled tanks with insta-berms Personnel will be aware of emergency shut-off valves and trained in spills response Spill Kit available Regular monitoring and inventory tracking will occur at these remote/temporary fuel storage areas

13.6. Fire Prevention

The most serious spill incident would involve fire and a hydrocarbon-based fuel source. In order to minimize the risk of fire, **No Smoking** and **Flammable** signs will be posted as needed at storage areas and with the cat-haul train along with a dry chemical fire extinguisher. Workers will be trained in the use of the fire extinguisher and be instructed of the risk caused by electrical and open flame fire hazards near fuel.

14. RECORD KEEPING AND REPORTING

All spills and emergency incidents are to be reported to the Operations Superintendent or their designated representative. It is their responsibility to notify Sabina headquarters staff and external parties as outlined in the roles and responsibilities of this SCERP.

An internal log of incidents resulting in an emergency response will be kept and maintained. Each record will include date, location, nature of emergency situation, factors leading to emergency situation, details of response, any negative impact, status of cleanup, and corrective actions taken.

Training records for emergency response personnel and records of emergency response exercises will be kept.

A record will document all significant changes that have been incorporated in the SCERP subsequent to the most recent annual review. The record will include the names of the persons who made and approved the change, as well as the date of the approval.

Documentation will be maintained in accordance with Sabina's standard operating procedures.

To assist with internal tracking a Sabina Spill Form is included in Appendix B.

Reportable spills, as identified in this SCERP, are to be externally reported to the NWT/Nunavut Spill Response Line. The Operations Superintendent will ensure spills are reported externally as required. The Spill response form (Appendix B) is to be completed for all externally reported spills and forwarded to the NWT/Nunavut Spill Response Centre within the required 24 hour reporting period. The Manager, Site Operations, or their designate, will notify Sabina Headquarters senior management of any reportable spills as listed below.

Any spill, or incident that may likely result in a spill, of an amount equal to or greater than the amount listed in the table below shall be promptly externally reported. Spills adjacent to or into a surface water or ground water access will be externally reported regardless of quantity.

Spills within secondary containment will be reported and included in the internal log. In the situation that the spill within the containment is above the thresholds noted below, an external report to the NWT/Nunavut Spills will be submitted if the spill exceeds 40% capacity of the secondary containment.

External Reporting Volumes

TDGA Class	Description of Contaminant	Amount Spilled
1	Explosives	Any amount
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 litres
2.2	Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 litres
2.3	Compressed gas (toxic)	Any amount
2.4	Compressed gas (corrosive)	Any amount
3.1, 3.2, 3.3	Flammable liquid	100 litres
4.1	Flammable solid	25 kg
4.2	Spontaneously combustible solids	25 kg
4.3	Water reactant solids	25 kg
5.1	Oxidizing substances	50 litres or 50 kg
5.2	Organic Peroxides	1 litre or 1 kg
6.1	Poisonous substances	5 litres or 5 kg
6.2	Infectious substances	Any amount
7	Radioactive	Any amount
8	Corrosive substances	5 litres or 5 kg
9.1 (in part)	Miscellaneous products or substances,	50 litres or 50 kg
9.2	Environmentally hazardous	1 litre or 1 kg
9.3	Dangerous wastes	5 litres or 5 kg
9.1 (in part)	PCB mixtures of 5 or more parts per million	0.5 litres or 0.5 kg
None	Other contaminants	100 litres or 100 kg

Appendix A. Procedure In The Event Of A Spill

Priority 1 – Identify spill source and assess hazard

- Ensure safety of all people in the area.
- Find the source, type and extent of spill
- Assess hazards from the spill
- Check for fire and explosion risk:
    - Extinguish all ignition sources in the area
    - Move machinery only if safe to do so or shut down if necessary
    - Isolate all live equipment to prevent sparks and enforce no smoking by site personnel
- Raise alarm and close off affected area

Priority 2 – Stop flow of spill

- Ensure that any necessary safety equipment (PPE) is worn prior to prior to working at the spill site.
- Stop flow at source of spill
- Leak containment requires the planned use of absorbent pads, drip buckets, drip pans, or impermeable geo-membrane secondary containment berms to catch any slow or unexpected leaks.
- Larger spills require attempts to limit the spread of the spill. Prevent movement using sorbent material, berms to form a barrier
- If the spill occurs on ice, attempts should be made to stop the spill from reaching ice-free ground.

Priority 3 – Notify Operations Superintendent (OS)

- Notify the OS as soon as possible after ensuring the safety of all personnel and attempting to stop the flow and limit spread. Provide as much information as possible about the source, material, amount, fire risk, injuries etc.
- OS will report spill to Nu/NWT Spill Reporting Line, notify Sabina headquarters contacts and ensure any further notifications are made depending on the type and extent of spill.

Priority 4 – Spill Containment

- For all spills, use absorbents to contain and soak up the fuel
- Prevent spread of fuel by using booms and berms
- It may be possible to contain the fuel using absorbent materials or by building small berms and dams
- Response operations should not be commenced in the affected area until it is safe.

Priority 5 – Spill Recovery and Cleanup

If the spill has been successfully been contained then spill clean-up can start

The OS is to monitor spill clean-up and coordinate clean-up operations

The OS is to complete the Spill Report form and submit to authorities and Sabina headquarter contacts (using Spill Report Form)

- Recover as much fuel as possible
- If possible pump directly into 205L drums. Ensure that the drums are in good shape and available near the spill site
- Absorbent pads should be spread on any remaining fuel that cannot be pumped or manually removed
- Fuel soaked absorbents must be picked up and placed in plastic bags or 205L empty drums
- Contaminated snow can be stored in 205L drums with tops removed. Allow snow to melt and decant off fuel.
- Any drums containing a mixture of fuel and snow or water are likely to freeze. To prevent drums from splitting use only drums in good condition and do not fill to top.
- Drums containing recovered fuel or water, used absorbents should be stored in secondary containment areas.
- Disposal should be by approved methods and facilities as per OS instructions.

Notes:

- As much fuel as possible should be removed immediately after the spill. The use of dispersants and burning at the site is not allowed, and a large scale cleanup operation may cause more environmental damage that the fuel itself.
- The health and safety of personnel is the first priority in the case of a fuel spill. Emergency spill response actions should not be undertaken in extreme weather conditions or during periods of darkness, unless the situation has been fully assessed by the CM and PM
- Personnel should ensure they are aware of the location and content of the spill kits
- Spill Response Classification:
    - Minor spills – less than 10L – easily contained
    - Moderate spills – less than 500 L – contain and clean-up by on-site personnel
    - Major spills – more than 500L – cannot be contained on-site and will require external assistance to clean-up.

Appendix B. NWT/NU Spill Report and Sabina Internal Spill Report

SABINA INTERNAL SPILL REPORT FORM

This form is to be used for internal documentation of spills of any petroleum product, chemical, ethylene glycol (antifreeze), or other hazardous material. See recent Spill Contingency Plan for reporting thresholds and structure. Once complete file with the Operations Superintendent.

Report Date and Time:	***Spill Date and Time***: ☐ Spill occurred ☐ Spill observed
Spill Location: ☐ Goose ☐ Other (e.g. Drill, Boulder Pond) ☐ George	***Describe Location***:
Coordinates (Lat/Long or UTM):	

Product(s) Spilled:	Jet fuel	Diesel (P50)	Gasoline	AvGas	Oil (type)	Antifreeze	Other (describe)
Quantity (L or kg):							

Personnel Involved:	☐ Sabina	☐ Contractor	☐ Visitor	☐ Other

Cause of Spill:
Containment/Cleanup Measures Taken:
Factors Affecting Spill or Recovery (weather, snow, ground conditions, etc.):
Additional Action Required:
Additional Comments:

	Name	***Employer***	***Signature***
Reported by:			
Reported to:			

APPENDIX D

WASTE MANAGEMENT PLAN

Back River Project
Comprehensive Waste Management Plan
2015 Site Preparation Activities

October 2014

Table of Contents

1. INTRODUCTION AND BACKGROUND

1.1 Purpose

The purpose of this Comprehensive Waste Management Plan (WMP) is to outline Sabina Gold & Silver Corp.'s (Sabina) plan for managing non-hazardous wastes, recyclables and treated sewage during the 2015 Site Preparation Activities at the Back River Project.

The goal of any waste management plan is to reduce and prevent impacts to the environment. Managing wastes and working responsibly will also ensure personnel safety while involved in the 2015 Site Preparation Activities.

Sabina conducts waste management under the following guidance:

- Wherever and whenever possible, Sabina and its employees will work toward the 3Rs – reduce, reuse and recycle;
- Sabina is committed to considering additional best management practices and alternatives to hazardous products; and if an appropriate method and/or substitute is identified then it will be incorporated into exploration activities;
- Every effort will be made to purchase products from suppliers with programs and policies of return for used containers and/or unused product where available and economically feasible to do so; and
- Compliance with company policies, legislation and terms and conditions of water licenses and land use permits.

With this guidance, Sabina understands the steps of waste management to include:

- Understand waste streams;
- Reduce amount generated;
- Separate;
- Safe handling/transportation and disposal; and
- Incineration.

The WMP is dynamic and will be updated at least annually to address any significant changes in operating procedures, should they occur.

A copy of the Plan will be available at each of Sabina's exploration camps and headquarters office.

1.2 Sabina Social and Environmental Policy

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees and the public as well.

Sabina also subscribes to the principles of sustainable development in mining. While exploration and mining cannot occur without an impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social effects and to enhance positive effects.

To achieve these goals, Sabina is committed to:

- Seeking to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions;
- Comply with all applicable laws, regulations and standards; uphold the spirit of the law and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental effects resulting from its operations;
- Communicate openly with employees, the regulatory community and the public on environmental issues and address concerns pertaining to potential hazards and impacts;
- Assess the potential effects of operations and integrate protective measures into the planning process to prevent or reduce impacts to the environment and on public health and safety;
- Take appropriate corrective actions should unexpected environmental impacts occur. This will also include taking appropriate action to prevent reoccurrence of these impacts.
- Provide adequate resources, personnel and training so that all employees are aware of and able to support implementation of the environmental and social policy;
- Conduct and support research and programs that improve understanding of the local environment, conserve resources, minimize waste, improve processes, and protect the environment.
- Working with the appropriate local regulators and agencies, maximize benefits to the affected communities and residents;
- Balance all decisions with best management practices, scientific principles and traditional knowledge.

2. ONGOING AND PROPOSED SITE PREPARATION ACTIVITIES

Activities planned for 2015 are divided into two groups, ongoing activities and proposed activities. The following sections describe each group.

Ongoing activities include:

- Goose Camp operations;
- Exploration and support activities; and
- Ice-based airstrip.

Proposed site preparation activities include:

- Ice road and associated water use;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of a 6km all –weather road and associated crossings; and
- Quarry development and operation; and
- Staging of a Temporary Laydown Area (TLA) at the site of the proposed MLA.

2.1 Description of Ongoing Activities

Goose Exploration Camp

During site preparation activities for the Back River Property, it is anticipated that the existing Goose Exploration Camp (Goose Camp) will be used for ongoing exploration, engineering and baseline studies, and other site preparation activities.

Operation of Goose Camp

The Goose Camp will be utilized as a base for the aforementioned activities. No changes to the current camp accommodations are proposed.

Resupply of Goose Camp

The resupply of the Goose Camp and associated activities will take place utilizing all-weather and/or ice-based airstrips. No changes to the current resupply methodology are proposed.

Diesel Fuel Resupply and Storage

Additional fuel may be required for the proposed site preparation activities; this fuel will be supplied via aircraft and stored in the existing Goose Camp fuel storage area.

Arctic-grade diesel fuel will be used by motor vehicles and mining equipment on the site. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery. All fuel to be used during the 2015 site preparation activities will be stored within the existing 75,000 L tanks, within secondary containment. The Goose Camp fuel storage currently includes six 75,000 L tanks in tertiary containment and seven 75,000 L tanks that will require installation of a lined containment area, if used in 2015.

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Prepackaged explosives will continue to be delivered by air transport, sited and stored in accordance with legislative requirements and best management practices. Two magazines are currently located at Goose Camp; it is anticipated that additional magazines may be required.

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2.2 Description of Proposed Site Preparation Activities

2.2.1 Goose Property

Ice Roads and Water Use

Ice roads, totalling approximately 6 km in length, will be required to connect and access the proposed quarries and explosives storage locations at the Goose Property. To support this work, water for construction will be necessary. It is estimated that 120 m3/day of water will be required to build and maintain this access during ice road operations. In the open water season, an estimated 70 m3/day of this total volume will be used for dust suppression and compaction of placed construction materials.

Quarries

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Only geochemically and physically suitable material will be developed, and handled per current quarry management plans.

All-weather Airstrip Extension

The current airstrip will be extended to allow for servicing passenger and cargo aircraft. This airstrip will serve as the main air access to the Goose Property throughout the life of the Project. The all-weather airstrip will be designed to Transport Canada standard TP 312 Aerodrome Standards and Recommended Practices (2005). The airstrip will be approximately 1,524 m long and 45 m wide.

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One of the Rascal Lake outflows currently intersects the extended airstrip footprint. A realignment of the natural watercourse will be required to divert the water currently flowing from Rascal Lake directly to Goose Lake, to flow via Gander Pond to Goose Lake. This realignment will require the construction of two berms to divert 100% of the flow from Rascal Lake through Gander Pond to discharge into a nearby area of Goose Lake. Berm construction material will be sourced from an approved quarry source.

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The proposed road alignment at the Goose Property will be constructed as an all-weather road. This road alignment, totaling approximately 5 km in length, is required to access the existing rock quarry, the new Umwelt quarry, and the extended all-weather airstrip.

The all-weather road will be constructed with run-of-quarry rock placed directly onto the tundra to preserve the permafrost. A layer of graded surfacing material will be placed to provide a protective trafficking layer. Construction materials will consist of geochemically suitable rock sourced from the existing quarry and/or Umwelt quarry.

Stream flow through the road alignment will be conveyed using appropriately sized culverts.

2.2.2 Temporary Laydown Area

A TLA will be staged at the site of the future MLA location. Activities will include the offloading of two barges containing materials, equipment, and fuel for future use; these materials will be stored at the TLA. Explosives magazines will also be offloaded to the TLA and stored empty for 2015.

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The TLA will be accessed from the barge landing area using swamp mats provisionally placed directly onto the tundra to preserve the permafrost. Once the equipment and fuel are stored, the swamp mats along this corridor will be removed and transported offsite with the outgoing barges.

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Diesel Fuel Supply and Storage

Sabina will require 600,000 L of diesel fuel for future site preparation; this fuel will be shipped to the MLA (via barge) and stored in land-based steel tanks at the TLA. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

The capacity of each berm will be equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greater. In calculating the volume, the footprint of the smaller tanks is subtracted. The above basis is consistent with the document entitled Design Rationale for Fuel Storage and Distribution Facilities published by the Department of Public Works of the Northwest Territories (GNWT 2006; refer to Section 4.6 of these guidelines). The design of these containment products will be based on Arctic installation and industry storage standards. Fuel transfer will incorporate hoses and pumps within tertiary containment. Transfer methodology is described in the attached Oil Pollution Emergency Plan (OPEP).

3. ROLES AND RESPONSIBILITIES

3.1 All Employees

- Place all waste in properly marked containers; and
- Encourage and participate in general good housekeeping within camp boundaries and buildings.

3.2 Environmental Superintendent and Coordinator

- Periodically ensure waste management containers and methods are followed;
- Assist operations Superintendent with tracking, monitoring and reporting as per terms and conditions of permits and licenses;
- Co-ordinate any inspections by applicable agencies; and
- Update and distribute the WMP as needed.

3.3 Operations Superintendent

- Responsible for the overall management of waste as per the WMP;
- Ensures all staff are instructed on the WMP;
- Ensures all legal requirements, including the completion of waste manifests, are filed prior to any shipment;
- Record backhaul volumes for non-hazardous waste;
- Conduct ongoing monitoring as required as per terms and conditions of permits and licenses; and
- Summarizes and reports waste management as per terms and conditions of permits and licenses, or as required by Sabina Senior Management.

4. UNDERSTANDING WASTE AND WASTEWATER STREAMS

This Plan covers wastes generated as a result of the 2015 Site Preparation and Exploration activities outlined in Section 0. Wastes considered include those generated through the operation and maintenance of facilities such as:

- Generators and Heavy Equipment - used oil, antifreeze, used absorbent pads, greases, lubricants, batteries, scrap metal, empty fuel drums
- Camp (kitchen, offices and sleeping quarters) – recyclables, food, wood, cardboard, plastic, rubber, glass, batteries, solvents, scrap metal, empty fuel drums, sewage, greywater, construction debris, paint; and
- Fuel storage – contact water from within berm, used absorbent pads, scrap metal, empty fuel drums.

5. WASTE CLASSIFICATION AND MANAGEMENT

It is important that wastes are sorted and safely handled and disposed of. Whenever practical waste is sorted at the source and divided into the following categories:

1. Non-hazardous
    a. Combustible
        i. Domestic food wastes
        ii. Paper
        iii. Cardboard
        iv. Lumber scraps
        v. Domestic refuse
        vi. Damaged bulk containers
    b. Non-combustible
        i. Recyclables
        ii. Reusables
        iii. For disposal
2. Hazardous.

Non-hazardous waste includes food, sewage, wood, cardboard, plastic, rubber, glass scrap metal and empty fuel drums. Hazardous waste includes used oil, oil filters, used absorbent pads, paint, chemicals, batteries and used grease. The following outlines management of non-hazardous materials on site. Hazardous materials will be managed in accordance with the Hazardous Materials Management Plan (HMMP).

5.1 Non-Hazardous Waste Management

Non-hazardous wastes are identified below with a description of how they will be separated on site, sorted and disposed:

- Combustible wastes – will be incinerated on site per guidance from "Technical Document for Batch Waste Incineration", Environment Canada (March 2009). This includes kitchen waste, pacto sewage waste, cardboard, wood. The waste ash will be stored and backhauled to Yellowknife for disposal.
- Recyclable and Reusable wastes – will be collected, sorted and stored until they can be backhauled to Yellowknife for inclusion in their recycling program. This includes plastic and aluminum drink containers, printer cartridges, metal containers, plastics (#1 thru #6).
- Non-combustible inert waste – will be sorted and stored on site until backhaul to Yellowknife for inclusion in recycling programs and/or disposal in municipal landfill as appropriate. This includes glass containers, paint cans and batteries.
- Non-combustible waste disposed on site - Greywater is currently collected by drainage pipes and gathered in an open tub (up to 500-gallon (1,893 litre) capacity) and then pumped by a

trash pump to a greywater disposal pit located about 110 m from local waterway with an automatic, float-controlled pump. This procedure will continue during the 2015 Site Preparation Activities.

- Scrap metal – will be separated, sorted and stored until backhaul available to Yellowknife and included in scrap metal recycling program. This includes principally empty 205 L fuel drums that will be stacked and stored in secondary containment; this also includes some construction waste and equipment parts.

Note that backhaul quantities will be tracked and recorded by camp management to include the type and volume of waste backhauled and note of final destination. Combustible material will be tracked as identified under "incineration management".

5.2 Hazardous Waste

Hazardous materials management is further outlined in the Hazardous Materials Management Plan.

5.3 Contact Water Management

Contact water is associated with construction activities and fuel storage areas. It is usually non-hazardous waste, however, may be classified as hazardous under water license terms and conditions.

Contact waters associated with general construction activities may become sediment laden and will be managed through the use of sediment fans and retention areas. Sediment laden water will not be directly discharged to nearby waterbodies.

The proposed management of liquid that may have collected in secondary containment of fuel storage areas includes:

- This water will be transferred out of each containment once the depth of water is equal, or greater, than 10 cm and pass through an oil/water separator;
- Following treatment, the water will be contained within a dedicated berm/tank system and tested for compliance with current water license thresholds; and
- If in compliance with current thresholds, it is released to the environment. If non-compliant, additional treatment will be implemented or the water will be drummed and shipped off site for disposal.

5.4 Waste Quantities

The following quantities of waste are estimated to be generated during the 2015 Site Preparation activities. Additional wastes generated by camp activities and incinerator use are managed under the existing Exploration Waste Management Plan and therefore are not listed below. Ongoing activities, as described in Section 0, and associated waste generation are included in Sabina's existing authorizations and approvals.

Waste Type	Quantity (m^3)
General debris	11
Plastics	0.1
Incinerator ash	12.3
Scrap metal	18
Oil/fuel filters	0.5
Hydrocarbon contaminated soil	2.9
Hydrocarbon contaminated water	5.8
Rags and absorbents	2
Waste oil	2.4
Recyclables	0.1
Petroleum grease	0.05

6. WASTE MANAGEMENT INFRASTRUCTURE

During the 2015 Site Preparation activities non-hazardous combustible waste will be burnt in the incinerator system at Goose Camp which is a Westland Environmental Services ltd. model CY-2020 unit installed in 2010. It is a diesel-fired, two stage, dual chambered controlled air batch incinerator contained within its own building on site. The capacity of the incinerator, based on typical mixed camp waste, is about 200 lbs indicating that 2 to 4 cycles can be processed on a daily basis to incinerate the camp waste.

All other wastes will be temporarily stored on-site before being back-hauled for disposal or recycling at an appropriate off-site facility.

6.1 Incinerator Guidelines

- Be sure to wear proper PPE including gloves, goggles, dust mask and face shield before handling waste or incinerator ash;
- Separate waste into what can be burned, and what cannot be burned at the source (e.g. kitchen);
- Burn food wastes daily to avoid accumulation of garbage (minimizes wildlife attractant). The operation of the incinerator will be recorded on a daily basis;
- Make sure the ash is cleaned out prior to recharging for the next burn cycle;
- Once cooled the incinerator can be opened and the ash placed in an empty drum which will be sealed, labeled and properly stored for backhaul and disposal in approved landfill. The weight of ash for backhaul will be recorded.
- Waste to be added to the incinerator should be monitored recording type of waste and weight. Note that Pacto toilet waste should make up 1/5 of each batch;
- When the incinerator is charged with the appropriate mix and quantity of waste, the door should be closed, ensure it is locked and the burn cycle started;

- When satisfied that the burn is proceeding in a controlled manned, the incinerator operator may leave the area while the equipment completes the burn cycle;
- Do not add waste to the incinerator once started;
- Do not use waste oil or any hydrocarbon as an accelerant; and
- Keep the area around the incinerator tidy.

Items that cannot be burned include:

- Styrofoam;
- Wood treated with preservatives; and
- Metal.

6.2 Temporary Waste Storage Facilities

Non-Hazardous Waste Storage

Combustible wastes will be temporarily stored in dedicated bins in proximity to incinerator until they are to be incinerated.

Recyclable non-hazardous, non-combustible waste will be temporarily stored in dedicated waste storage facilities located at Goose Camp before being back-hauled. Specific waste storage locations have not been identified at this time. Material will be safely stored until it is transported to an appropriate recycling or disposal facility. Waste storage locations will have both indoor and outdoor storage, and waste will be segregated according to its susceptibility to exposure to the elements.

Recyclable beverage containers will be stored inside to avoid attracting animals. The majority of other items will be stored in the laydown yard outdoors, and in shipping containers where appropriate. This includes recyclables such as tires, electronics and electrical materials, and scrap metal.

Hazardous Waste Storage

Hazardous waste will be temporarily stored on site in designated storage areas. All hazardous materials will be packaged for shipment to certified southern waste management facilities located in a provincial jurisdiction for subsequent treatment, recycling and/or disposal.

The management and handling of hazardous waste is outlined in detail in the HMMP.

7. TRAINING REQUIREMENTS

As part of their orientation, all on-site personnel will receive basic environmental and waste management training, including:

- Reducing water use;
- Managing food wastes to minimize wildlife attraction;
- Reducing waste; and
- Separating waste (recyclables, dry-cell batteries, food waste, and hazardous waste in colour coded and labeled storage containers).

This training will be key to ensuring that wastes are properly segregated and disposed. This is particularly important for wastes to be burned in the incinerator.

Adequate training is an important component of successful operation of the incinerator. Westland Services, the incinerator manufacturer, provides on-site training to Sabina personnel including incinerator maintenance. Camp management will track who completes this training and any refresher courses completed. Management will also record all preventative maintenance activities undertaken on the equipment.

8. REVIEW OF WASTE MANAGEMENT PLAN

The activities and costing of waste management activities will be reviewed internally on an annual basis relative to the long-term exploration strategy for the Project and operational needs.

APPENDIX E

HAZARDOUS MATERIALS MANAGEMENT PLAN

Sabina

GOLD & SILVER CORP.

Hazardous Materials Management Plan
2015 Site Preparation Activities

October 2014

Table of Contents

1. INTRODUCTION AND BACKGROUND

1.1. Purpose and Scope

The purpose of this Hazardous Materials Management Plan (HMMP) is to provide a consolidated source of information on the safe and environmentally sound transportation, storage, and handling of hazardous products to be used during the 2015 Site Preparation activities at the Back River Project.

A hazardous material is one that, as a result of its physical, chemical, or other properties, poses a hazard to human health or the environment when it is improperly handled, used, stored, disposed of, or otherwise managed. In combination with Sabina's Spill Contingency and Emergency Response Plan (SCERP), this HMMP provides instruction on the prevention, detection, containment, response, and mitigation of accidents that could result from the handling of hazardous materials.

The HMMP is based on the following principles of management for hazardous materials:

- Identify and prepare materials and waste inventories;
- Allocate clear responsibility for managing hazardous materials;
- Describe methods for transport, storage, handling, and use;
- Identify means of long-term storage and disposal;
- Prepare contingency and emergency response plans;
- Ensure training for management, workers, and contractors whose responsibilities include handling hazardous materials; and
- Maintain and review records of hazardous material consumption and incidents in order to anticipate and avoid impacts on personal health and the environment.

All hazardous materials to be used at Sabina's operation will be manufactured, delivered, stored, and handled in compliance with all applicable federal and territorial regulations. Sabina is committed to preventing, to the greatest extent possible, both inadvertent release of these substances to the environment and accidents resulting from mishandling or mishap. Sabina has instituted programs for employee training, facility inspection, periodic drills to test systems, and procedural review to address deficiencies, accountability, and continuous improvement objectives.

Sabina actively works towards minimizing the generation of hazardous wastes by investigating alternatives to the use of hazardous materials, by recycling products and containers wherever feasible, and by treating wastes using state-of-the-art technologies before any release to the environment.

As with all other aspects of health and safety policy at the Back River Project, all employees will be expected to comply with all applicable precautions and handling procedures with regard to hazardous materials. Employees are also expected to report any concerns to their supervisors, the Occupational Health & Safety Committee (OH&SC), or senior site management. All staff are encouraged to bring forward suggestions for improvements that can be incorporated into procedure revisions as appropriate.

1.2. Sabina Social and Environmental Policy

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees and the public as well.

Sabina also subscribes to the principles of sustainable development in mining. While exploration and mining cannot occur without an impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social effects and to enhance positive effects.

To achieve these goals, Sabina is committed to:

- Seeking to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions;
- Comply with all applicable laws, regulations and standards; uphold the spirit of the law and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental effects resulting from its operations;
- Communicate openly with employees, the regulatory community and the public on environmental issues and address concerns pertaining to potential hazards and impacts;
- Assess the potential effects of operations and integrate protective measures into the planning process to prevent or reduce impacts to the environment and on public health and safety;
- Take appropriate corrective actions should unexpected environmental impacts occur. This will also include taking appropriate action to prevent reoccurrence of these impacts.
- Provide adequate resources, personnel and training so that all employees are aware of and able to support implementation of the environmental and social policy;
- Conduct and support research and programs that improve understanding of the local environment, conserve resources, minimize waste, improve processes, and protect the environment.
- Working with the appropriate local regulators and agencies, maximize benefits to the affected communities and residents;
- Balance all decisions with best management practices, scientific principles and traditional knowledge.

1.3. Applicable Legislation

Both federal and territorial legislation regulate the management of hazardous materials in Nunavut. Copies of relevant legal documents will be kept on file at the Project. Sabina will regularly update the HMMP with respect to applicable legislation, and ensure that current legislation documents are available at the site.

The *Transportation of Dangerous Goods Act* (TDGA) classifies hazardous materials into nine main classes according to an internationally recognized system, as follows:

- Class 1 – Explosives;
- Class 2 – Gases;
- Class 3 – Flammable liquids;
- Class 4 – Flammable solids;
- Class 5 – Oxidizing substances and organic products;
- Class 6 – Poisonous (toxic) and infectious substances;
- Class 7 – Nuclear substances, within the meaning of the Nuclear Safety and Control Act, which are radioactive;
- Class 8 – Corrosives; and
- Class 9 – Miscellaneous products or substances.

The classes of hazardous materials relevant to the 2015 Site Preparation activities are classes 1-4. Management and safety personnel will provide training relating to the TDGA and relevant classes, in addition to an overview of the applicable regulations, to all employees as part of their initiation and ongoing training.

2. ONGOING AND PROPOSED SITE PREPARATION ACTIVITIES

Activities planned for 2015 are divided into two groups, ongoing activities and proposed activities. The following sections describe each group.

Ongoing activities include:

- Goose Camp operations;
- Exploration and support activities; and
- Ice-based airstrip.

Proposed site preparation activities include:

- Ice road and associated water use;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of a 6km all –weather road and associated crossings; and
- Quarry development and operation; and
- Staging of a Temporary Laydown Area (TLA) at the site of the proposed MLA.

2.1. Description of Ongoing Activities

Goose Exploration Camp

During site preparation activities for the Back River Property, it is anticipated that the existing Goose Exploration Camp (Goose Camp) will be used for ongoing exploration, engineering and baseline studies, and other site preparation activities.

Operation of Goose Camp

The Goose Camp will be utilized as a base for the aforementioned activities. No changes to the current camp accommodations are proposed.

Resupply of Goose Camp

The resupply of the Goose Camp and associated activities will take place utilizing all-weather and/or ice-based airstrips. No changes to the current resupply methodology are proposed.

Diesel Fuel Resupply and Storage

Additional fuel may be required for the proposed site preparation activities; this fuel will be supplied via aircraft and stored in the existing Goose Camp fuel storage area.

Arctic-grade diesel fuel will be used by motor vehicles and mining equipment on the site. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery. All fuel to be used during the 2015 site preparation activities will be stored

within the existing 75,000 L tanks, within secondary containment. The Goose Camp fuel storage currently includes six 75,000 L tanks in tertiary containment and seven 75,000 L tanks that will require installation of a lined containment area, if used in 2015.

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3. HAZARDOUS MATERIALS LIFE CYCLE MANAGEMENT

"Life cycle management" implies the assessment of a particular product over its entire life — from the time a material need is identified to the time the product is fully consumed or disposed of as waste. It covers product supply, transportation, storage, handling, recycling, and waste disposal. Sabina is committed to ensuring proper life cycle management of all products used at the site, including hazardous materials. Sabina and its contractors will deal only with reputable, certified suppliers, transporters, and expediters.

3.1. Delivery

All hazardous materials are delivered to site by commercial carriers in accordance with the requirements of the Canadian TDGA. Carriers are licensed and inspected as required by the Department of Transportation. All required permits, licences, and certificates of compliance are the responsibility of the carrier. All shipments are properly identified and labelled. Shipping papers are accessible and include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, fire-fighting information, procedures for handling leaks or spills, first aid measures, and emergency response telephone numbers.

Each transportation company is required to develop a spill prevention, control, and countermeasures plan to address the materials they are importing. In the event of a release during transport, the commercial transportation company is responsible for first response and cleanup. Sabina intends to periodically verify the qualifications of transport companies, their personnel and the adequacy of their spill prevention, control and countermeasures plan.

An Oil Pollution Emergency Plan (OPEP) has been developed with respect to fuel delivery to the MLA via barge.

3.2. On-Site Handling

Once dangerous goods are received at the workplace, additional regulations apply. The federal Workplace Hazardous Materials Information System (WHMIS) calls for the proper labelling of products, the availability of product information in the form of Material Data Safety Sheets (MSDS), and employee education on how to identify and handle hazardous products. Sabina obtains each MSDS with all new product deliveries and keeps them current (i.e. no older than three years), and maintaining a system of hardcopy or electronic MSDS catalogue that is readily accessible by all employees.

All hazardous materials are stored in secured areas to prevent access by unauthorized personnel or tampering. All tanks used for the storage of diesel fuel have been installed in secondary containment areas sized to hold at least 100% of the volume of the largest tank, plus 10% of the aggregate capacity of all other containers or tanks. Additional guidelines for the storage of hazardous materials are provided in Section 2.3.2.

In support of pollution prevention, Sabina has established procedures for regularly monitoring storage containers and facilities. If deficient conditions are identified, appropriate corrective actions are taken and documented. Additional details for inspection of storage areas are provided in Section 8. Emergency response procedures for spilled chemical substances are provided in the SCERP and OPEP. These procedures outline the response to accidental spills or releases of hazardous materials to minimize health risks and environmental effects. Included are procedures for evacuating personnel, maintaining safety, cleanup and neutralization activities, emergency contacts, internal and external notifications to regulatory authorities, and incident documentation.

3.3. Wastes

On becoming wastes, materials are stored and/or disposed in accordance with specific government regulations and guidelines. Sabina stores most waste materials on site in secure facilities until they can be transported to other provincial jurisdictions for recycling or disposal.

The Department of Environment, Environment Protection Service (EPS) monitors the movement of hazardous waste, from the generator to final disposal, through use of a tracking document known as a Waste Manifest. Accordingly, a Waste Manifest accompanies movements of hazardous wastes for the Sabina Project. Sabina is registered with the EPS as a waste generator, and will employ only registered waste carriers to transport waste to registered/approved waste receivers. A copy of the completed manifest will be maintained for a period of two years after the hazardous waste is received by the authorized waste disposal facility.

3.4. Empty Product Containers

Many empty chemical containers are not safe to dispose of directly and require handling precautions identical to those for full containers. Chemical users must be familiar with safe waste handling and storage procedures supplied by manufacturers in MSDS. The containers are backhauled to Yellowknife for disposal at an approved facility.

4. HAZARDOUS MATERIALS MANAGEMENT

4.1. Types of Hazardous Materials

The typical types of hazardous materials that will be generated during the 2015 Site Preparation Activities include:

- Petroleum Products and Lubricants – diesel fuel, oils, greases, anti-freeze, and solvents used for equipment operation and maintenance; and
- Hazardous medical waste.

4.2. General Storage Guidelines

Sabina is committed to the safe and appropriate storage of fuels, hazardous materials and hazardous wastes. The following sections outline general guidelines for storing fuels, hazardous materials and hazardous wastes.]

Storage Drums/Containers

Hazardous materials/waste shall be stored in drums/containers according to the following guidelines:

- In the original containers, where possible, or in containers compatible with the material being stored to prevent corrosion or chemical interaction that could lead to leaks or fires;
- Storage containers shall be in good condition, sealable and not damaged or leaking;
- Drums containing hazardous materials/wastes expected to be in storage for more than six months shall be placed on pallets or on a well-drained storage area to prevent rusting;
- Each container shall be clearly labelled to identify the substance being stored according to the requirements of the WHMIS;
- Containers shall be kept closed except when adding or removing product;
- Containers with product shall be kept in the upright position; empty drums can be placed horizontally with a 3-9 configuration;
- Containers shall be arranged to prevent damage from falling or dislodging; and
- Containers shall be arranged to allow for easy access and inspections.

Storage Areas

To assist in the safe and secure storage of fuels, hazardous materials and hazardous wastes, the following general guidelines for storage areas/facilities are followed:

- Design of storage areas are in compliance with the National Fire Code, where appropriate;
- Compliance with the Canadian Council of Ministers of the Environment (CCME) publication, “Environmental Code of Good Practice for Above Ground Storage Tank Systems Containing Petroleum Products”. This CCME code deals with inventory control, inspections, corrosion protection, records and monitoring. Environment Canada’s Storage Tank Systems for Petroleum

Products and Allied Petroleum Products Regulations outline registration and documentation requirements for storage tanks.

- Storage areas have controlled access. Only authorized and trained personnel have access to storage areas;
- Storage areas are adequately signed indicating that hazardous materials/wastes are stored therein;
- Storage locations are clearly defined and marked to prevent damage of storage drums and containers in the event they are covered by snow;
- Incompatible materials are segregated by chemical compatibility within the storage area to prevent contact between materials in the event of a release;
- Storage areas are located at least 30 metres from surface water and on a low-permeability area;
- Storage areas are readily accessible for fire-fighting and other emergency procedures;
- Secondary containment is installed to allow for the containment of at least 110% of the largest container or tank volume within the contained area, plus 10% of the aggregate capacity of all other containers or tanks (CCME 1994);
- Storage areas are constructed, or provided with barriers, to protect containers from physical damage; and
- Adequate spill and emergency response equipment have been installed at each storage area (i.e. spill control, fire protection, etc.). A list of spill control equipment is provided in the SCERP.

4.3. Delivery, Storage and Disposal of Petroleum Products

Petroleum products will be transported, stored, handled and disposed of in accordance with appropriate legislation and best management practices.

With the exception of diesel fuel, most petroleum fuel and lubricant products will be delivered to site and stored in the original packing container from the manufacturer. These types of containers include a variety of sealed drums, pails, cans, and tubes.

All fuel transfer and storage facilities have been designed in accordance with the Canadian Council of Ministers for the Environment (CCME 1994) Environmental Code of Practice for Above Ground Storage Tank Systems Containing Petroleum Products, and the National Fire Code.

Appropriate measures are in place to minimize impacts to surface water, groundwater and soils from potential vehicle accidents when transporting hazardous materials to the site. Details of spill responses are presented in the SCERP.

Used oil that is no longer suitable for its intended use is classified as a hazardous waste. The discharge of used oil to the environment, including but not limited to landfills, sewers and water bodies, is prohibited.

Where possible, waste oil is used as fuel in waste oil burners to heat the Quonset huts. Otherwise, used oil products will be collected in tanks or drums marked “Waste Oil” and disposed of at an approved facility. Empty petroleum containers will be stored on site in a designated area and returned to the supplier on backhauls. Oil filters will be punctured and/or crushed and drained of their contents for 24 hours prior to disposal.

4.4. Storage and Disposal of Hazardous Medical Waste

Hazardous medical waste that may be generated during the 2015 Site Preparation activities will be stored and disposed of in accordance with appropriate legislation and best management practices.

5. INVENTORY, INSPECTION AND RECORDS

A contract expediting company in Yellowknife will arrange all deliveries to the Back River Project and will include the hazardous materials discussed in this HMMP. The Operations Supervisor will have ultimate responsibility for supervising the receipt, inspection, and recording of all material inventories at site. The inventory control will reconcile total amounts received against amounts ordered.

Inventory control tracks and monitors use of these materials with a weekly inventory count and a monthly reconciliation. If any issues are noted during this tracking, it is reported to the Operations Supervisor.

5.1. PETROLEUM PRODUCTS

Inventory Management

Diesel fuel use will be metered automatically when it is pumped from the storage tanks. The metered volumes will be summarized weekly and reconciled against tank levels determined manually with a dipstick from the top of the tanks. Dip stick readings are taken every day and recorded.

Aviation fuel will be dispensed from drums as required under the supervision of aircraft personnel. Consumption and on-site volumes will be reconciled monthly.

Lubricants and other petroleum products will be inventoried weekly and monthly.

Inspection

The Operations Superintendent will coordinate for inspection of all fuel and lubricant storage areas. All inspections will be logged with the date and time of inspection, facility inspected, and name of the person making the inspection.

The condition of hazardous materials storage areas, containers, tanks, connectors and associated plumbing will be checked on a regular basis. Observations on their condition will be logged, dated and kept near the corresponding storage area. Drums/containers will be inspected for the presence and legibility of symbols, words or other marks identifying the contents, and signs of deterioration or damage such as corrosion, rust, leaks at seams or signs that the drum/container is under pressure such as bulging and swelling, spillage or discoloration on the top or sides of the drum/container. If leaks or deterioration is encountered it will be noted and addressed in a timely manner.

The hazardous materials area’s secondary containment will be inspected and the condition of the secondary containment will be noted. Arrangements will be made for repairs if necessary.

Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to the Operations Supervisor. The report will note any remedial repairs that may be made, the date of any repairs, and the need for any follow-up inspection.

Records

Records pertaining to storage, use, and loss of fuels and lubricants are required by CCME and the Fire Marshal (under the National Fire Code). The following records will be prepared under the supervision of the Operations Superintendent:

- Reconciliation of bulk inventory from resupply logs;
- Weekly use summaries;
- Weekly reconciliation for each storage tank;
- Inspections and maintenance checks of the storage tank, piping, and delivery systems;
- Reports of leaks or losses;
- Reports of spill responses; and
- Records of training.

5.2. MISCELLANEOUS HAZARDOUS/TOXIC MATERIALS

Inventory Management

Adequate quantities of all hazardous chemicals will be reconciled against orders on receipt. The appropriate group responsible for the miscellaneous chemicals is responsible for reconciling the resupply inventory.

Inspection

During operations, the appropriate group responsible for storage and handling of the miscellaneous chemicals are to regularly inspect all areas where such hazardous materials are used and stored. Any problems will be noted and reported to the Operations Superintendent. The Operations Superintendent will be responsible for weekly or monthly inspections of miscellaneous hazardous materials and storage areas.

Records

The quantity of hazardous materials received, used, and in possession of personnel are recorded by Inventory Control. Everyone must comply with the environmental regulations.

6. TRAINING REQUIREMENTS

6.1. GENERAL

All staff and contractors will receive the following training:

- Site orientation and operations overview;
- WHMIS;
- MSDS; and
- Spill Contingency and Emergency Response.

Employees will receive additional training in mine safety as specified by the *Mine Health and Safety Act* and regulations. Sabina will ensure compliance with the training requirements specified in the Act and regulations.

A record of training received will be maintained.

6.2. PETROLEUM PRODUCTS HANDLERS

Personnel who handle petroleum products will be expected to be conversant with relevant MSDS information. As well, these personnel will be given training in the following:

- Transportation of dangerous goods (TDG);
- Sabina's fuel handling procedures;
- Spill response and cleanup procedures for petroleum (see the SCERP);
- Emergency response, especially firefighting procedures (see the SCERP);
- Equipment operations and PPE requirements; and
- Slinging and helicopter safety.

6.3. THIRD PARTY CONTRACTORS

It is expected that third party contractors receive adequate and comprehensive training to conduct their work tasks from their employer. Sabina intends to review the general qualifications of third party contractors prior to having them work at the site. In addition, the contractor companies may also be requested to confirm the qualifications of specific individuals that they may have working at the site.

Third party contractors working on the site will be expected to participate in, and complete a site specific health and safety training session. The training session is envisioned to be valid for a period of one year, after which time the contractor may be required to complete the training again, or attend a refresher. The training session will outline site specific hazardous and response procedures that they should be aware of in the course of conducting their work on site. The training session will cover hazardous materials management.

7. REVIEW OF THE PLAN

The HMMP is a living document which will be updated as required based on management reviews, incident investigations, and regulatory changes.

APPENDIX F

QUARRY MANAGEMENT PLAN

BACK RIVER PROJECT
QUARRY MANAGEMENT PLAN

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1. Introduction

Sabina Gold & Silver Corp. (Sabina) is actively developing the Back River Project (the Project) approximately 75 km south of Bathurst Inlet, in the Kitikmeot Region, Nunavut. The Project is currently under review with the Nunavut Impact Review Board (NIRB).

Sabina is planning to seek regulatory approval of a site preparation program to initiate early works for mine development at Back River in advance of completing the mine development environmental assessment. This program (referred to herein and elsewhere as the “Site Preparation Works” or SPW) will consist of the positioning of equipment, consumables and fuel at the Project sites, the quarrying of aggregate for construction, and the establishment of basic infrastructure such as an all-weather road and an extended airstrip at the Goose Property. The SPW is further described in the accompanying environmental screening document prepared by Tetra Tech EBA on behalf of Sabina.

A necessary component of the SPW is the development of rock quarries to support the above site preparation activities at the Goose Property. Two quarries have been identified for use: the existing quarry next to the airstrip and another new quarry located within the footprint of the future Umwelt open pit (Figure 1.1). Up to 550,000 m^3 of rock will be required to support SPW, and this material will be extracted from one or both of these quarries. As such, Sabina is seeking approval to extract up to 550,000 m^3 of rock from each of the existing airstrip quarry and the proposed Umwelt quarry. The total volume of rock extracted from one or both quarries, however, will not exceed 550,000 m^3.

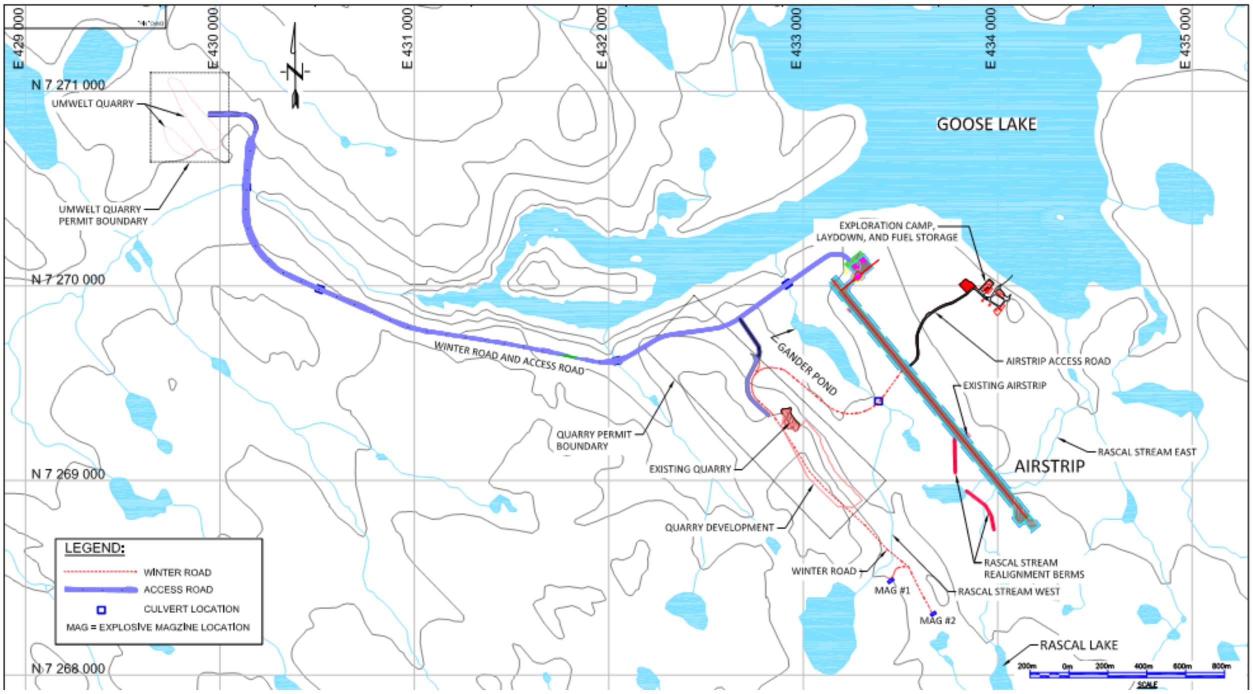
Sabina currently holds a Quarry Permit Agreement with the landowner, the Kitikmeot Inuit Association (KIA), for the existing airport quarry at the Goose Property (“Quarry A”). The existing quarry was also incorporated into Amendment 3 of the Type B Water Licence for the Goose Exploration Property (2BE-GOO1015). The coordinates of the existing and proposed quarries are presented in Table 1.1.

Table 1.1 Quarry Permit Coordinates

Aggregate Source	Permit	Material	Approved/Proposed Volume (m^3)	Approx. Surface Area (hectares)	Permit Area Boundaries
Quarry A	KTP11Q001	Rock	125,000/550,000	55	Point 1 E432188, N7269675 Point 2 E432438, N7269950 Point 3 E433425, N7269000 Point 4 E433138, N7268700
Umwelt	In application	Rock	0/550,000	4	Point 1 E429644, N7271096 Point 2 E430046, N7271096 Point 3 E430046, N7270637 Point 4 E429644, N7270637

An amendment will be sought for the Goose Property’s Quarry A Quarry Permit Agreement, and a new agreement will be sought to develop a rock quarry at the Umwelt deposit.

Figure 1.1 Goose Property Layout for SPW



2. Scope and Objectives

This Quarry Management Plan (QMP) outlines Sabina conceptual plans to develop quarries in support of SPW in an environmentally sound manner. General mitigation measures that Sabina will apply to these and any other quarries or borrow areas are presented, along with development plans for the two quarries associated with the SPW. Specific mitigation measures are identified for the construction, operation and closure of each of the two quarries, and a monitoring program is prescribed.

The QMP addresses the following topics:

- Applicable legislation and guidelines
- Roles and responsibilities
- Environmental protection measures and proposed thresholds
- A monitoring program to collect water quality and quantity data during quarry operations
- Mitigation to avoid or minimize potential adverse effects on water quality and quantity during quarry operations identified through the monitoring program
- Checking and corrective actions
- Record keeping and environmental reporting
- A framework for the evaluation of plan effectiveness
- A Quality Assurance / Quality Control (QA/QC) program to be applied to the monitoring program

This QMP has been prepared to support permitting for site preparation work, the requirements under the Nunavut Water Board (NWB) water licence, and the Kitikmeot Inuit Association (KIA) land use permits. Subject to annual internal review and revision, the QMP will remain applicable throughout the duration of the SPW, or until a material change in the scope of the Project occurs.

Reference documents to support the SPW include:

- SPW Environmental Screening Document
- SPW Abandonment and Restoration Plan
- SPW Spill Contingency Plan
- Goose Exploration Camp Explosives Management Plan

The goal of any management plan is to reduce and prevent impacts to the environment while ensuring personnel safety and appropriate fiscal considerations during mineral exploration and project development activities.

3. Planning and Implementation

3.1 QUARRY A - EXISTING QUARRY

3.1.1 Consideration of Potential Environmental Effects

The existing quarry was previously subject to an environmental screening by NIRB. During that screening, Sabina considered the following:

- A setback of 31 m from watercourses and environmentally sensitive areas, including archaeological features;
- The quarry was assessed to contain adequate aggregate resources and would require minimal stockpiling of overburden;
- The quarry was low in ARD/ML potential (Rescan, 2011; see Section 6.1.1); and
- Extraction of rock from the quarry was not anticipated to meaningfully disrupt permafrost conditions.

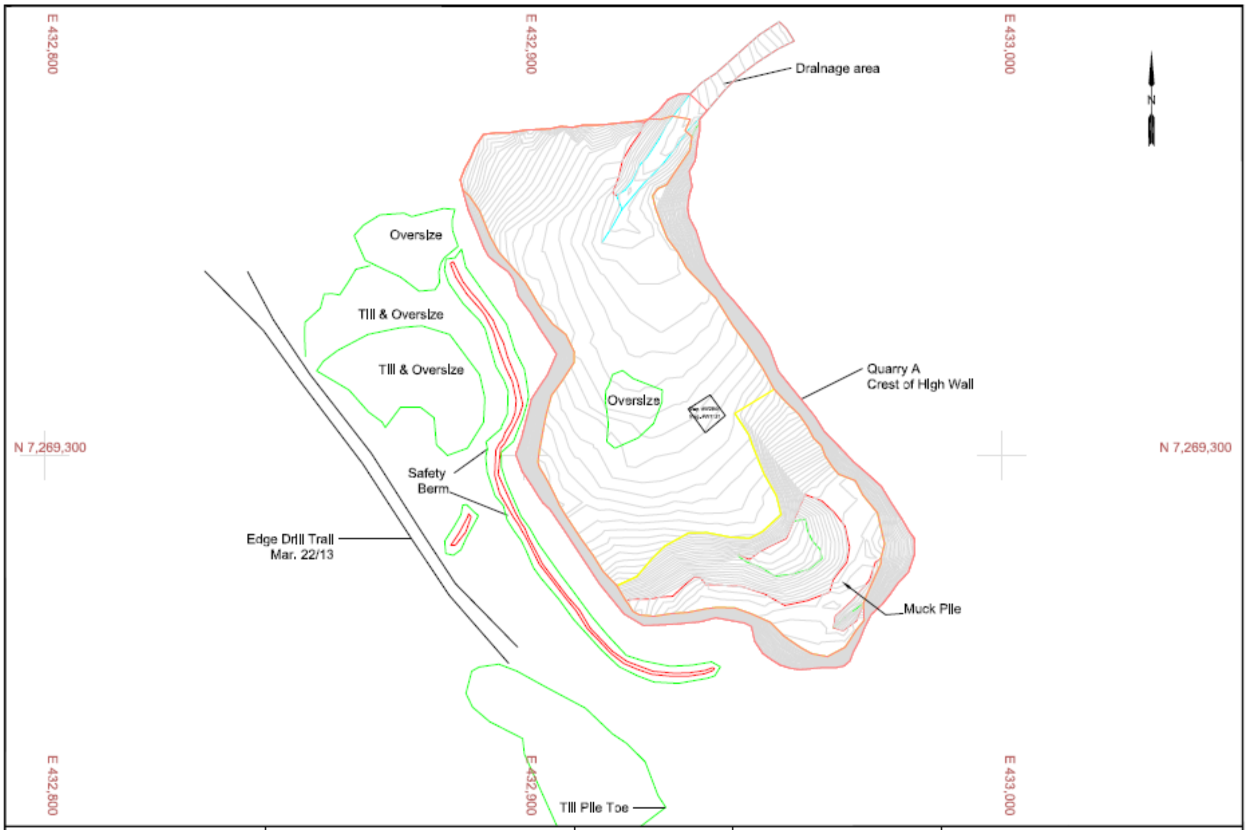
3.1.2 Previous Quarry Development

Sabina's current Quarry Permit Agreement KTP11Q001 allows for the quarrying of up to 125,000 cubic meters (m^3) of rock from Quarry A at the Goose Property. The Quarry A permit boundary is a rectangular area measuring 1,375 m by 400 m (~55 ha) as shown on Figure 1.1. The development of this quarry was incorporated into Amendment 3 of Type B Water Licence 2BE-GOO1015 for the Goose Exploration Property.

During the 2013 season (March 1 to May 15, 2013) approximately 40,000 m^3 of rock material was drilled and blasted at Quarry A. Run of Quarry (ROQ) material was trucked over winter road corridor from the quarry to crushing equipment located at the all-weather airstrip. The material was crushed to 4-inch and ¾ inch aggregate and was used to build a pad and containment for bulk fuel tanks in Goose camp and to surface the all-weather airstrip and connecting road between the airstrip and Goose camp.

Minor stockpiles of surface till and oversized ROQ remain. A survey of the quarry following completion of the 2013 extraction is shown as Figure 3.1.

Figure 3.1 Existing Quarry A after Extraction in 2013



3.1.3 Development Plan

As mentioned above, Sabina intends to extract up to 550,000 m^3 of rock to support the SPW program. Figure 3.2 shows the anticipated final Quarry A footprint based on the maximum extraction of 550,000 m^3 of rock.

Quarry A is located on a rock outcrop. Further development of the quarry will involve drilling and blasting as was undertaken in the previous phase. Quarry operations will use explosives and the design, shape, and size of the blasts shall be planned with safety being the most important consideration. A predetermined pattern of drillholes will be drilled to a depth not exceeding the overall depth of the quarry and filled with explosives. Prior to the blast, all personnel and equipment are moved to a safe distance. The blasted rock and fragments will be loaded into haul trucks using a loader, a hydraulic shovel, or similar means. The ROQ material will then be hauled to the construction area, dumped, and placed using a dozer ("drill, blast, load, haul, dump" sequence).

Some of the ROQ will be moved to a crusher to produce aggregate of various sizes. The crusher will be offset from local waterways and may be shielded from the prevailing wind. The shielding is best managed by placing the crusher within the quarry behind a high wall to reduce the quantity of windblown dust and enabling dust to fall within the quarry boundaries.

A highwall will be created along the high point in the ridge along the western extent of the proposed SPW quarry, and the quarry floor will be sloped to the east. A gentle slope to the quarry floor will ensure that the quarry is free-draining. The highwall may reach a height of 20 m in places, if the quarry is fully developed.

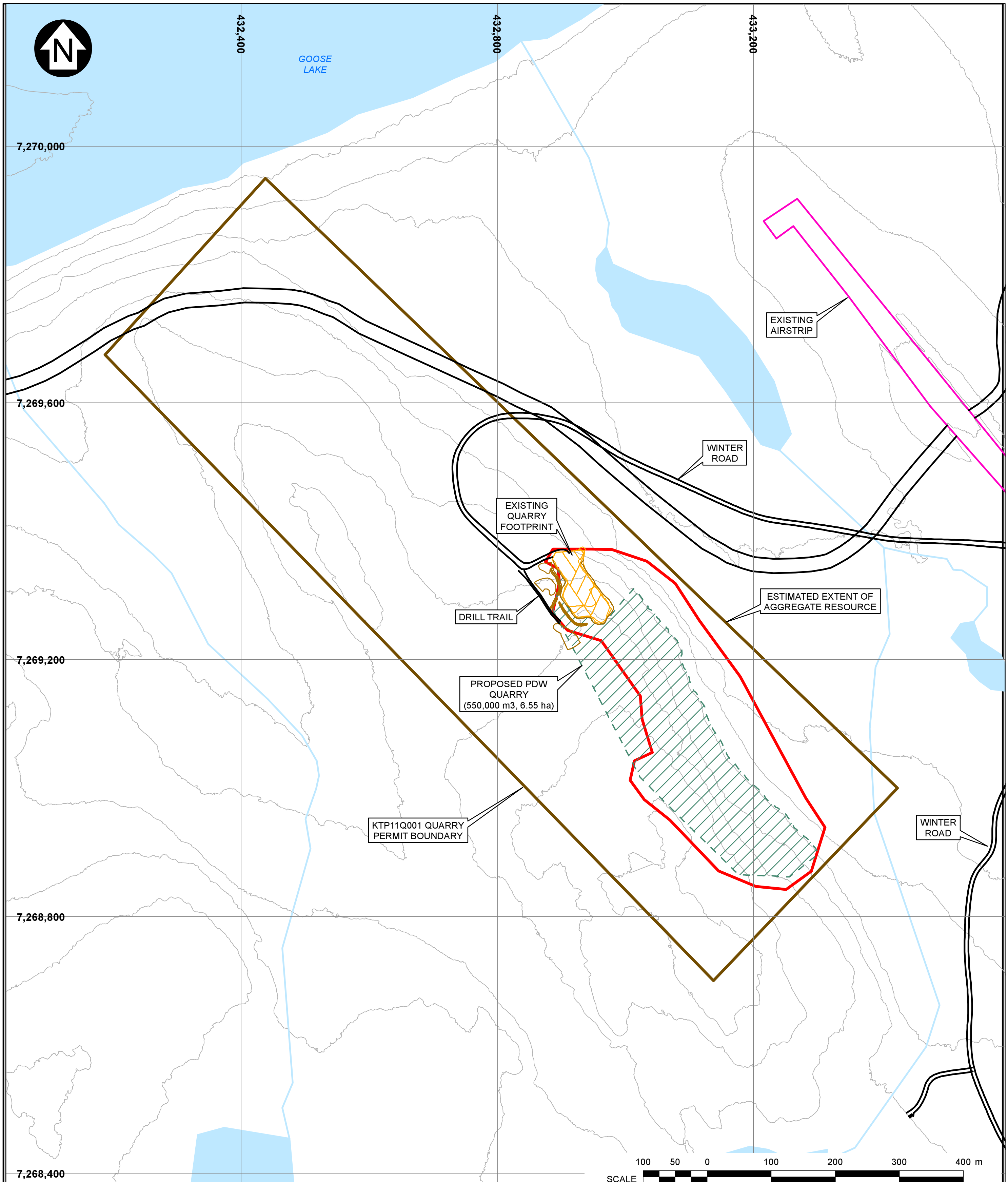
The existing quarry has minimal overburden. Any overburden generated and not used by the Project will be placed in stable stockpiles either above the highwall or along the toe of the quarry.

3.1.4 Water Management

As mentioned above, the quarry will be developed to be free draining. As such, runoff from the quarry will drain to the lower lying area to the east, eventually reporting to the stream that connects to Gander Pond. Runoff, if present, will be sampled and compared to the quarry runoff criteria presented in Section 7.1.

3.1.5 Abandonment and Restoration

The design of the quarry incorporates closure considerations. Sloping of the quarry floor will prevent the ponding of water. A safety berm was established along the highwall during quarrying activities in 2013. This safety berm will be extended as required during quarry expansion as a progressive reclamation measure. At closure, any equipment, fuel and wastes will be removed. The quarry may be used for landfilling bulky, non-hazardous wastes at the conclusion of the program. In this instances, stockpiled rock and/or till overburden will be used to place a 1 m cover over landfilled materials. Remaining stockpiles will be inspected and re-contoured to ensure slopes are stable in the long term.



LEGEND:

- INFRASTRUCTURE
- CONTOUR
- RIVER/STREAM/DRAINAGE
- WATER
- KTP11Q001 QUARRY PERMIT BOUNDARY
- ESTIMATED EXTENT OF AGGREGATE RESOURCE
- EXISTING AIRSTRIP
- 2013 QUARRY FOOTPRINT
- PROPOSED PRE-DEVELOPMENT QUARRY

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 13.
2. LIDAR / TOPOGRAPHY BASED ON INFORMATION PROVIDED BY SABINA GOLD AND SILVER CORP., DATED NOVEMBER 9, 2012.
3. CONTOUR INTERVAL IS 5 METRES.
4. APPROXIMATE WATERBODIES FROM NTS MAPPING (TO BE UPDATED).

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

PROPOSED EXPANSION OF QUARRY A

Knight Piésold CONSULTING

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	03OCT'14	ISSUED WITH REPORT	RAC	SWK	RAC	RAC

P/A NO. NB101-517/6 | REF NO. 2

FIGURE 3.2 | REV 0

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3.2 PROPOSED UMWELT QUARRY

3.2.1 Consideration of Potential Environmental Effects

The Umwelt quarry was selected upon consideration of the following:

- A setback of 31 m from watercourses and environmentally sensitive areas (the quarry is located more than 250 m from a watercourse)
- As a future open pit, the Umwelt deposit area has been assessed to confirm that there are no archaeological features
- The quarry contains suitable aggregate resources and is located in the location of a future open pit (minimizes cumulative surface disturbance)
- The quarry was low in ARD/ML potential (SRK, 2014; see Section 6.1.2)
- Extraction of rock from the quarry is not anticipated to meaningfully disrupt permafrost conditions.

3.2.2 Development Plan

The Umwelt quarry will be located within the footprint of the future Umwelt open pit. Quarry activities will target two large areas within the pit boundary where non-potentially acid-generating and metal leaching (nPAG) waste rock has been identified (see Section 6.1).

The Umwelt deposit is overlain by overburden consisting of a mix of silt, sand and gravel. The thickness of overburden ranges from about 2 m to 6 m. The targeted areas for quarrying have the thinner overburden thickness. The general area proposed for quarrying based on geochemical characterization work (see Section 6.1.2) is shown on Figure 3.2. The final location and configuration of the quarry will be determined by the contractor.

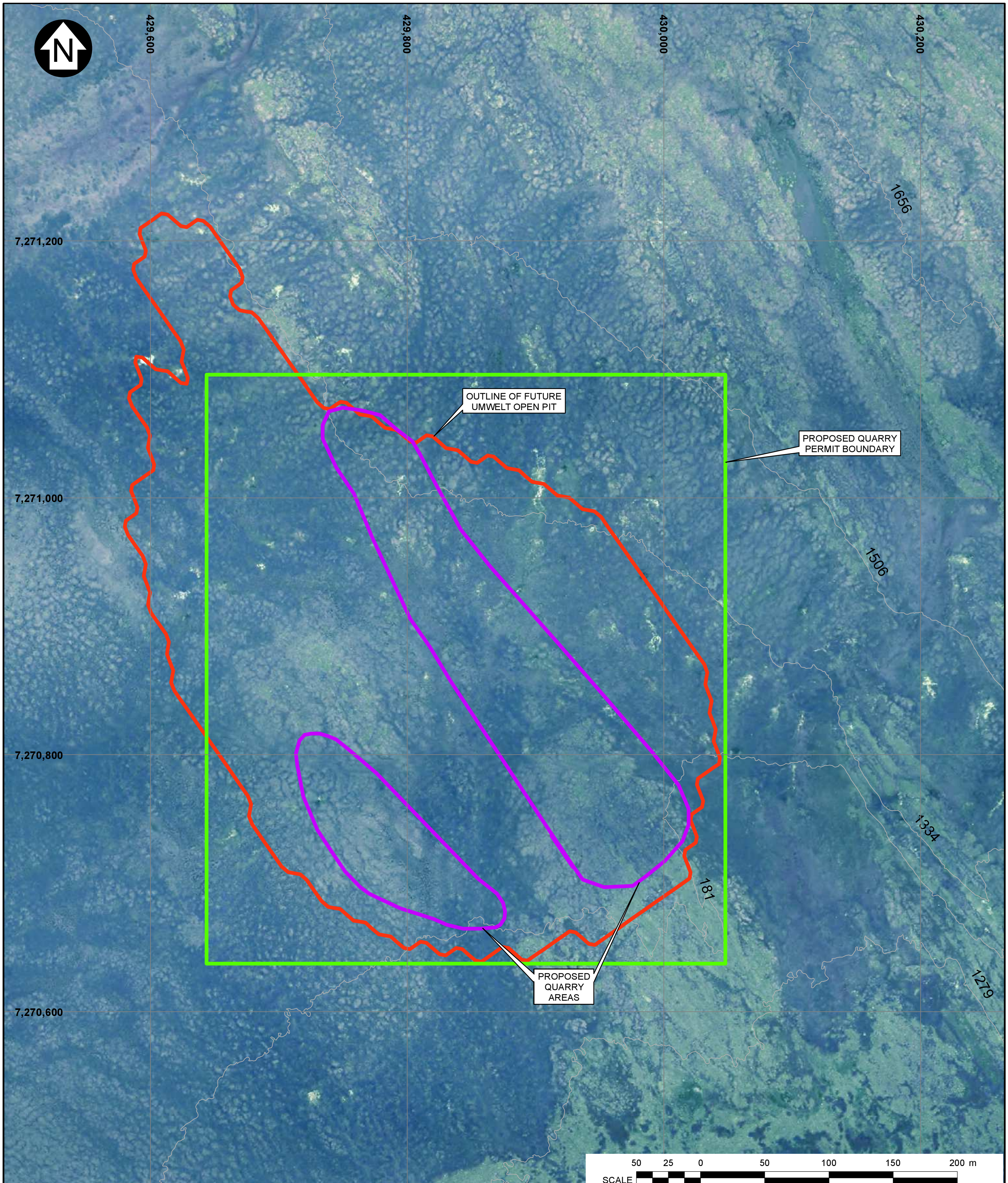
To develop the quarry, it will be necessary to strip and stockpile the overburden. Though the ground is relatively flat across the deposit, the stockpile will be positioned on the upgradient side of the quarry so that the finished quarry can serve to collect runoff from the stockpile. Since the overburden may be frozen and therefore blasted during removal, some slumping is expected as water is released from the soil. The overburden stockpile will likely be constructed in a windrow fashion to an approximate maximum height of 6 m and sloping outward. This configuration could be modified based on observations in the field.

The final quarry design including size and depth will be determined by Sabina in consultation with its contractor, but it is likely not to exceed 30 m into the rock.

Quarry operations will drill and blast the quarry following the same process described for the existing quarry in Section 3.1.3.

3.2.3 Water Management

To minimize the amount of water interacting with the overburden stockpile and the quarry, an earthen berm or ditching will be constructed to divert runoff away from both the stockpile and quarry using overburden stripped from the quarry area.



LEGEND:

- CONTOUR
- RIVER/STREAM/DRAINAGE
- WATER
- UMWELT PIT EXTENT
- UMWELT QUARRY EXTENT
- PROPOSED QUARRY PERMIT BOUNDARY

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 13.
2. LIDAR / TOPOGRAPHY BASED ON INFORMATION PROVIDED BY SABINA GOLD AND SILVER CORP., DATED NOVEMBER 9, 2012.
3. CONTOUR INTERVAL IS 5 METRES.
4. APPROXIMATE WATERBODIES FROM NTS MAPPING (TO BE UPDATED).

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

PROPOSED UMWELT QUARRY LOCATION

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB101-517/6	2

FIGURE 3.3 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	03OCT'14	ISSUED WITH REPORT	RAC	SWK	RAC	RAC

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While the quarry is being operated, runoff from the stockpile will be directed to one or more excavated earthen sumps located away from the quarry. The sumps will be shallow excavations intended to settle out solids before releasing the runoff overland. The nearest water body is a tributary of Goose Lake located more than 250 m from the quarry area. The quality of the water in the sump(s) will be monitored and compared to applicable criteria (see Section 7.1).

Quarry operations through the winter are not expected to require the management of water. The quarry will be within frozen ground (permafrost) with groundwater inflows that are limited to seepage through the active layer. Snowfall will be managed within the quarry by snow clearing as necessary to facilitate quarry operations, with a portion of snow being removed with the quarried rock. Any cleared snow will be deposited next to overburden stockpile so that snowmelt reports to the same water management features. At the onset of spring, minor volumes of water will report to the quarry from residual snow, direct rainfall into the quarry, and minor seepage through the active layer on the upgradient side of the quarry. Sumps will be constructed within the quarry as necessary to collect the water and to pump the water to surface. Any pumped water will be discharged to an excavated sump that will seep and overflow over the tundra. This may or may not be the same sump used to trap sediment in runoff from the overburden stockpile. As mentioned above, the nearest water body is distant from the quarry area. The quality of the water in the sump will be monitored and compared to applicable criteria (see Section 7.1).

3.2.4 Abandonment and Restoration

Once the desired volume of rock has been extracted from the quarry, it will be allowed to passively flood. Runoff from the stockpile located upgradient the quarry will be directed to the quarry. The overburden stockpile will be re-contoured as necessary so that water runs off the pile. If necessary, a spillway on the low side of the quarry will be armoured with rip rap to reduce potential erosion. It is expected that the access ramp into the quarry will provide a suitable means of egress for any wildlife that may inadvertently enter the quarry.

The earthen diversion berm used to divert clean runoff away from the quarry and stockpile during operation will remain at closure to provide the necessary barrier to physical entry. This will be supplemented by a safety berm constructed around the perimeter of the quarry.

4. Applicable Legislation and Guidelines

Borrow pits and rock quarries within IOL require a land use licence or commercial lease and Quarry Permit Agreements issued by the KIA. Quarry permits from the KIA include terms and conditions specifying how operations are to be conducted. The use of explosives will comply with Nunavut`s Explosives Use Act and Regulations and Mine Health and Safety Act and Regulations. A Type B water licence will be needed to operate quarries.

Other applicable legislation from the Government of Nunavut includes the permitting of archaeological surveys completed in advance of operations and compliance with the Nunavut “Wildlife Act” with respect to impacts to raptors and terrestrial animals.

5. Roles and Responsibilities

The Sabina General Manager in charge of the Project will be ultimately responsible for the success of the QMP and will approve all relevant policies and documents, auditing, action planning and the verification process.

The Site Superintendent, along with his direct reports will be responsible for the implementation of the QMP, including overall management of the plan and internal reporting.

6. Environmental Protection Measures

The proper implementation of best management practices will ensure sound management of rock quarry material, explosives, and freshwater which will help to minimize potential impacts to the environment during the life of a quarry.

Table 6.1 presents the best management practices and mitigation measures that will be considered in the design, operation and closure of the quarries.

6.1 GEOCHEMICAL CHARACTERIZATION OF QUARRY ROCK

6.1.1 Quarry A

Geochemical and physical characterization for the Goose property quarry was conducted by Rescan Environmental Services Ltd. (Rescan) in 2011. The results of the 2011 ARD/ML characterization program indicated that the gabbro material is predominately non-potentially acid generating (nPAG) and can be used as construction material. The greywacke unit had two samples (out of 22 samples) that indicated nPAG potential with the mean SNPR for all the samples being 15.8. The greywacke would be suitable to use as construction material in conjunction with the gabbro as incidental ARD generated by the greywacke could be neutralized by the gabbro.

Material extracted during the 2013 quarry operations were predominantly sedimentary greywacke and intrusive gabbro with minor amounts of felsic dykes and iron formation.

6.1.2 Umwelt Quarry

A geochemistry evaluation was conducted by SRK Consulting (Canada) Inc. (SRK) to identify waste rock within the Umwelt deposit with minimal ARD/ML potential that would be suitable to quarry and use as construction material (SRK, 2014; see Appendix J).

Drawing from previous and recent geochemical work, SRK utilized geological modelling and visualization software to identify areas within the footprint of the future open pit that were predominantly greywacke and gabbro and set back from the banded iron formation (BIF) which hosts the gold within sulphide mineralization (including arsenopyrite, pyrite and pyrrhotite). The greywacke material removed from the gold mineralization is expected to have the lowest ARD/ML potential. Two areas were identified, geochemical samples from or representative of these areas were reviewed (Figure 3.3).

Table 6.1 Environmental Protection Measures for Quarries

Development Phase	Activities	Environmental Concerns	Mitigation Techniques
Site design and development	• Locating adequate quantities of potential rock • Vegetation clearing • Overburden removal	• Potential ARD/ML • Potential effects to cultural heritage resources • Habitat loss • Soil erosion • Sediment deposition	• Minimize project footprint • Identify suitable rock with low ARD/ML potential • Identify and avoid environmentally sensitive areas, including potential archaeological sites • Minimize the quantity of overburden to be removed, if possible • Identify suitable storage location for overburden considering sediment runoff • Maintain natural drainage patterns • Identify water management features necessary to protect local watercourses • Retain vegetation buffer zones to maintain slope stability and protect waterbodies
Operation	• Storage and handling of explosives • Blasting • Excavating • Crushing • Piling material • Access road maintenance • Equipment operation and refuelling	• Soil erosion • Sediment deposition	• Implement Explosives Management Plan • Limit sediment movement using sediment and erosion control measures appropriate to the conditions • Proper handling of explosives to minimize spillage • Use rip-rap to reinforce drainage channel corners and water discharge points, if necessary • Use sumps or settling ponds before discharging water • Create stable side slopes • Stockpile overburden and other materials with stable slopes • Stabilize slopes as necessary with armouring or revegetation
		• Fuel spills • Blasting residue	• Use proper fuel containment and explosives-handling techniques • Clean-up any spills that may occur (Spill Contingency Plan)
		• Permafrost degradation	• Minimize the ponding of water, if possible • Avoid thaw-sensitive soils (applicable to borrow pits) • Use berms as a preference to ditches where practical for diverting and controlling runoff
		• Dust generation	• Locate crushers in-quarry or behind other natural or man-made barriers to reduce exposure to wind • When practical, use water and dust skirts on conveyors to minimize dust
Closure	Implementing restoration measures and long-term stability	• Physical safety • Soil erosion • Sediment deposition • Permafrost degradation	• Implement closure measures specified in the QMP and Abandonment & Restoration Plan • Remove all equipment, fuel and waste materials • Position safety berms or fencing around high walls • Confirm side slopes and stockpiles will be physically stable and will not erode and cause significant sediment deposition

Review of the representative geochemical testing results indicated that material from the upper greywacke in the Umwelt pit was classified as nPAG, as having an uncertain potential for ARD, or as low sulphur material with a limited potential for ARD. Based on the relatively low sulphide content, it was determined unlikely that any of these materials would generate appreciable amounts of acidity. Based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, these materials were considered suitable for use in construction. Sabina will limit quarrying operations within the two areas identified on Figure 3.3.

6.2 WATER MANAGEMENT MEASURES

Water management measures are identified in Table 6.1. Generally, the following measures will be followed or applied to appropriate manage surface drainage and minimize effects on aquatic habitat and resources:

- Locate quarries and stockpiles removed from watercourses as much as possible;
- Minimize grubbing of the organic vegetation and/or the upper soil horizons;
- Divert clean runoff away from the quarry and associated stockpiles;
- Implement arctic-appropriate sediment and erosion control measures, including berms, ditching (to be minimized in favour of berms); sumps, sediment basins, rock flow check dams and rock armouring;
- Stockpile cleared snow where existing water management controls are in place; and
- Establishing stable slopes, and armouring or revegetating as necessary.

6.3 DUST MANAGEMENT MEASURES

Crushers may be located near high obstacles to facilitate shielding from the prevailing winds and thereby reducing and restricting the quantity of dust migrating past the quarry boundary. ROQ will be transported from the quarries within speed restrictions to help reduce dust along the road corridors. Consideration will be given to using dust skirts or watering if necessary.

6.4 GROUND ICE AND PERMAFROST PROTECTION

Quarry sites are expected to be free of ground ice and will not extend below the bottom limits of the continuous permafrost. There will be some localized impacts to the surrounding active zone of the quarry locations and any water seeps originating in the quarries as a result of permafrost melting or precipitation events will be monitored as part of surface water monitoring programs.

Borrow pits at the Project are generally comprised of glaciofluvial deposits and weathered bedrock located in well-drained areas with relatively higher topography. Granular glaciofluvial deposits are selected as they can be relatively free of ground ice. Less ground ice reduces the potential for thaw settlement, melt water causing erosion, and slumping. In the event that ground ice is prevalent, the area will be monitored and may be stabilized by covering the affected land with granular material. This would allow the permafrost to aggrade into the covering material and restrict the remaining ground ice from melting.

7. Monitoring

7.1 WATER QUALITY MONITORING

During periods of high runoff, water may flow from rock quarry areas. Runoff may contain suspended solids due to erosion of ground surfaces, oils and grease from heavy equipment, ammonia from blasting residues, and metals. Runoff from the quarries will meet the quarry runoff discharge criteria presented in Table 7.1 (derived from Schedule 4 of the Metal Mining Effluent Regulations).

Table 7.1 Quarry Runoff Criteria

Parameter	Grab Sample Maximum Concentration (mg/L)
Total Arsenic	0.50
Total Copper	0.30
Total Lead	0.20
Total Nickel	0.50
Total Zinc	0.50
Total Suspended Solids	50.0
Ammonia (NH3-N)	4.0
Oil and Grease	No visible sheen
pH	Between 6.0 and 9.5

Any water accumulating in sumps will be sampled as part of ongoing monitoring and allowed to discharge to the environment if it meets water licence criteria. The results of sampling will be submitted to appropriate regulatory parties in accordance with permit requirements.

Water quality results will be tracked on site, made available during inspections, and included in annual reports.

7.2 PHYSICAL STABILITY MONITORING

Physical stability monitoring includes inspection of quarry walls as well as permafrost features within the quarries.

Routine visual monitoring of quarry wall stability and any relevant permafrost features within active rock quarrying areas will be completed and recorded. Inactive, open areas will also be visually monitored (typically monthly) between July and September and will also be recorded. Closed areas will be visually monitored annually (during the July to September period) and these observations will be recorded.

7.3 WILDLIFE MONITORING

Wildlife monitoring will include maintaining a written log of species and frequency of sightings near the workings. Data will be maintained by the Environmental Department and presented during inspections and in accordance with permit conditions.

8. Adaptive Management

Checking and corrective action will occur through regular inspections and the evaluation of monitoring data.

Corrective action will be undertaken if inspections identify inconsistencies with this management plan or with applicable legislation. Work will be stopped if necessary to implement corrective action.

Results of water quality monitoring will be reviewed by an environmental specialist. Field water quality data and visual observations will trigger immediate corrective action if appropriate, and water quality results will be reviewed upon receipt from the laboratory. Adaptive management with respect to water quality monitoring at the quarries may include maintenance, repair or replacement of water management features, ceasing discharge of quarry water, or modifications to the handling of explosives to minimize spillage.

9. Record Keeping and Environmental Reporting

Record keeping will be conducted by the site environmental compliance supervisor. Field and laboratory data will be entered into suitable electronic databases and checked for quality control. Monitoring results will be made available to inspectors upon request, and in monthly or annual reports as prescribed in Sabina's permits.

The following information will be presented in the annual report under the applicable water licence:

- A description of quarry activities during the year;
- Monitoring data obtained during the year;
- Results from formal inspections by land or water inspectors;
- Evaluation of the effectiveness mitigation measures; and
- Discussion of the need for any additional corrective action or modification to the mitigation measures identified in this plan.

An updated QMP will also be filed with the water licence annual report if changes to the scope of the plan or mitigation measures are required.

All formalized documents and reports will follow a version control procedure to ensure they are approved before use and the internal and external users are accessing the most current information.

10. Plan Effectiveness

The effectiveness and relevance of this management plan will be reviewed internally on an annual basis and will be updated as appropriate to meet the plan's objectives.

11. QA/QC

Quality Assurance and Quality Control (QA/QC) measures will be applied to water quality and other monitoring programs based on current best current approach.

12. Glossary of Terms, Acronyms, or Abbreviations

12.1 GLOSSARY OF TERMS

Abandonment: The permanent dismantlement of a facility so it is permanently incapable of its intended use. This includes the removal of associated equipment and structures.

Active layer: The layer of ground above the permafrost which thaws and freezes annually.

Berm: A mound or wall, usually of earth, used to retain substances or to prevent substances from entering an area.

Closure: When a mine ceases operations without the intent to resume mining activities in the future.

Contaminant: Any physical, chemical, biological or radiological substance in the air, soil or water that has an adverse effect. Any chemical substance with a concentration that exceeds background levels or which is not naturally occurring in the environment.

Contouring: The process of shaping the land surface to fit the form of the surrounding land.

Drainage: The removal of excess surface water or groundwater from land by natural runoff and permeation, or by surface or subsurface drains.

Erosion: The wearing away of rock, soil or other surface material by water, rain, waves, wind or ice; the process may be accelerated by human activities.

Groundwater: All subsurface water that occurs beneath the water table in rocks and geologic formations that are fully saturated.

Hydrology: The science that deals with water, its properties, distribution and circulation over the Earth's surface.

Landfill: An engineered waste management facility at which waste is disposed by placing it on or in land in a manner that minimizes adverse human health and environmental effects.

Mitigation: The process of rectifying an impact by repairing, rehabilitating or restoring the affected environment, or the process of compensating for the impact by replacing or providing substitute resources or environments.

Monitoring: Observing the change in geophysical, hydrogeological or geochemical measurements over time.

Objectives: Objectives describe what the reclamation activities are aiming to achieve. The goal of mine closure is to achieve the long-term objectives that are selected for the site.

Permafrost: Ground that remains at or below zero degrees Celsius for a minimum of two consecutive years.

Permeability: The ease with which gases, liquids, or plant toots penetrate or pass through soil or a layer of soil. The rate of permeability depends upon the composition of the soil.

Progressive Reclamation: Actions that can be taken during mining operations before permanent closure, to take advantage of cost and operating efficiencies by using the resources available from mine operations to reduce the overall reclamation costs incurred. It enhances environmental protection and shortens the timeframe for achieving the reclamation objectives and goals.

Reclamation: The process of returning a disturbed site to its natural state or one for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety

Rehabilitation: Activities to ensure that the land will be returned to a form and productivity in conformity with a prior land use plan, including a stable ecological state that does not contribute substantially to environmental deterioration and is consistent with surrounding aesthetic values.

Remediation: The removal, reduction, or neutralization of substances, wastes or hazardous material from a site in order to prevent or minimize any adverse effects on the environment and public safety now or in the future.

Restoration: The renewing, repairing, cleaning-up, remediation or other management of soil, groundwater or sediment so that its functions and qualities are comparable to those of its original, unaltered state.

Revegetation: Replacing vegetation as ground cover following a disturbance to the land.

Runoff: Water that is not absorbed by soil and drains off the land into bodies of water. Scarification: Seedbed preparation to make a site more amenable to plant growth. Security Deposit: Funds held by the Crown that can be used in the case of abandonment of an undertaking to reclaim the site, or carry out any ongoing measures that may remain to be taken after the abandonment of the undertaking.

Sediment: Solid material, both mineral and organic, that has been moved by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Surface Water: Natural water bodies such as river, streams, brooks, ponds and lakes, as well as artificial watercourses, such as irrigation, industrial and navigational canals, in direct contact with the atmosphere.

Watershed: A region or area bordered by ridges of higher ground that drains into a particular watercourse or body of water.

12.2 ACRONYMS AND ABBREVIATIONS

AANDC ....Aboriginal Affairs and Northern Development Canada
ARD...Acid Rock Drainage

BIF .... Banded Iron Formation
EHS .... Environmental, Health and Safety
EIS .... Environmental Impact Statement
INAC .... Indian and Northern Affairs Canada
IOL .... Inuit Owned Land
KIA .... Kitikmeot Inuit Association
ML .... Metal Leaching
MCRP .... Mine Closure and Reclamation Plan
NLCA .... Nunavut Land Claims Agreement
NIRB .... Nunavut Impact Review Board
nPAG .... Non-potentially Acid Generating
NWB .... Nunavut Water Board
PAG .... Potentially Acid Generating
Sabina .... Sabina Gold & Silver Corp.
the Project .... Back River Project
uPAG .... Uncertain Potentially Acid Generating

13. References

Canada. (1985b). *Fisheries Act*. R.S.C., 1985, c. F-14.

Canada. (1985c). *Territorial Lands Act*. R.S.C., 1985, c. T-7.

Canada. n.d. *Territorial Lands Regulations*. C.R.C., c. 1525.

Nunavut. (1995). *Mine Health and Safety Regulations*. NWT Reg. (Nu) 125-95.

Nunavut. (1994). *Nunavut Mine Health and Safety Act*. SNWT (Nu) 1994, c 25.

Nunavut. (1988a). *Environmental Protection Act*. RSNWT (Nu) 1988, c E-7.

Nunavut. (1988b). *Environmental Rights Act*. RSNWT (Nu) 1988, c 83.

Rescan Environmental Services Ltd. (Rescan). 2011. *ML/ARD Characterization of Goose Lake Airstrip Material*. Prepared for Sabina Gold & Silver Corp. Technical Memorandum dated November 15, 2011.

SRK Consulting (Canada) Ltd. *Geochemical Characterization Results for the Umwelt Quarry*. Memo dated October 1, 2014.

APPENDIX G
TRANSPORTATION MANAGEMENT PLAN

Back River Project

Transportation Management Plan

2015 Site Preparation Activities

October 2014

Table of Contents

1. INTRODUCTION AND BACKGROUND

1.1. Purpose

This Transportation Management Plan (TMP) has been developed to outline construction, operation and management of access and transportation associated with the 2015 Site Preparation Activities including the all-weather airstrip and all-weather access road.

This TMP provides construction and operating maintenance methods and best management practices that will be used during the 2015 Site Preparation activities.

The purpose of this TMP is to ensure sound management of water and waste associated with construction and operation of transportation corridors to minimize impacts to the local environment. Implementing best management practices and working responsibly will ensure protection of the environment and personnel safety.

Sabina will implement this TMP and will continue to look for opportunities to minimize or eliminate potential impacts to the environment as a result of its activities, products and services at Sabina's projects.

The TMP is dynamic and will be updated at least annually to address any significant changes in operating plans, should they occur.

A copy of the TMP will be available at the exploration camps and headquarter offices.

1.2. Sabina Social and Environmental Policy

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees and the public as well.

Sabina also subscribes to the principles of sustainable development in mining. While exploration and mining cannot occur without an impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social effects and to enhance positive effects.

To achieve these goals, Sabina is committed to:

- Seeking to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions;
- Comply with all applicable laws, regulations and standards; uphold the spirit of the law and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental effects resulting from its operations;

- Communicate openly with employees, the regulatory community and the public on environmental issues and address concerns pertaining to potential hazards and impacts;
- Assess the potential effects of operations and integrate protective measures into the planning process to prevent or reduce impacts to the environment and on public health and safety;
- Take appropriate corrective actions should unexpected environmental impacts occur. This will also include taking appropriate action to prevent reoccurrence of these impacts;
- Provide adequate resources, personnel and training so that all employees are aware of and able to support implementation of the environmental and social policy;
- Conduct and support research and programs that improve understanding of the local environment, conserve resources, minimize waste, improve processes, and protect the environment;
- Working with the appropriate local regulators and agencies, maximize benefits to the affected communities and residents; and
- Balance all decisions with best management practices, scientific principles and traditional knowledge.

2. ONGOING AND PROPOSED SITE PREPARATION ACTIVITIES

Activities planned for 2015 are divided into two groups, ongoing activities and proposed activities. The following sections describe each group.

Ongoing activities include:

- Goose Camp operations;
- Exploration and support activities; and
- Ice-based airstrip.

Proposed site preparation activities include:

- Ice road and associated water use;
- All-weather airstrip extension;
- Rascal Lake outflow stream realignment;
- Construction and use of a 6km all –weather road and associated crossings; and
- Quarry development and operation; and
- Staging of a Temporary Laydown Area (TLA) at the site of the proposed MLA.

2.1. Description of Ongoing Activities

Goose Exploration Camp

During site preparation activities for the Back River Property, it is anticipated that the existing Goose Exploration Camp (Goose Camp) will be used for ongoing exploration, engineering and baseline studies, and other site preparation activities.

Operation of Goose Camp

The Goose Camp will be utilized as a base for the aforementioned activities. No changes to the current camp accommodations are proposed.

Resupply of Goose Camp

The resupply of the Goose Camp and associated activities will take place utilizing all-weather and/or ice-based airstrips. No changes to the current resupply methodology are proposed.

Diesel Fuel Resupply and Storage

Additional fuel may be required for the proposed site preparation activities; this fuel will be supplied via aircraft and stored in the existing Goose Camp fuel storage area.

Arctic-grade diesel fuel will be used by motor vehicles and mining equipment on the site. Limited quantities of propane and gasoline will be used in maintenance facilities for smaller motorized equipment and machinery. All fuel to be used during the 2015 site preparation activities will be stored

within the existing 75,000 L tanks, within secondary containment. The Goose Camp fuel storage currently includes six 75,000 L tanks in tertiary containment and seven 75,000 L tanks that will require installation of a lined containment area, if used in 2015.

Explosives and Ammonium Nitrate Storage

Prepackaged explosives will continue to be delivered by air transport, sited and stored in accordance with legislative requirements and best management practices. Two magazines are currently located at Goose Camp; it is anticipated that additional magazines may be required.

Exploration and Study Support

Ongoing exploration and scientific studies to support the permitting and engineering phases will continue onsite. These may include geological mapping, drilling, geophysics, environmental baseline studies, and engineering studies. These activities, although based out of Goose Camp, may occur over the entire Project area.

Ice-based Airstrip

An ice-based airstrip on Goose Lake will be required for the delivery of equipment and materials necessary for site preparation activities. The ice-strip, which has been constructed in previous seasons on Goose Lake, will be built to Transportation Canada regulations and standards. No additional water use is currently anticipated for this activity.

2.2. Description of Proposed Site Preparation Activities

2.2.1 Goose Property

Ice Roads and Water Use

Ice roads, totalling approximately 6 km in length, will be required to connect and access the proposed quarries and explosives storage locations at the Goose Property. To support this work, water for construction will be necessary. It is estimated that 120 m3/day of water will be required to build and maintain this access during ice road operations. In the open water season, an estimated 70 m3/day of this total volume will be used for dust suppression and compaction of placed construction materials.

Quarries

A total estimated volume of 550,000 m^3 of quarried material will be required to complete the outlined site preparation activities. Two quarries have been identified for use: the existing quarry next to the airstrip and a new quarry located within the footprint of the future Umwelt open pit. Up to 550,000 m^3 of rock will be required to support site preparation activities, and this material will be extracted from one or both of these quarries. As such, Sabina is seeking approval to extract up to 550,000 m^3 of rock from each of the existing quarry and the proposed Umwelt quarry. The total volume of rock extracted from one or both quarries, however, will not exceed 550,000 m3.

Only geochemically and physically suitable material will be developed, and handled per current quarry management plans.

All-weather Airstrip Extension

The current airstrip will be extended to allow for servicing passenger and cargo aircraft. This airstrip will serve as the main air access to the Goose Property throughout the life of the Project. The all-weather airstrip will be designed to Transport Canada standard TP 312 Aerodrome Standards and Recommended Practices (2005). The airstrip will be approximately 1,524 m long and 45 m wide.

Rascal Lake Outflow Stream Realignment

One of the Rascal Lake outflows currently intersects the extended airstrip footprint. A realignment of the natural watercourse will be required to divert the water currently flowing from Rascal Lake directly to Goose Lake, to flow via Gander Pond to Goose Lake. This realignment will require the construction of two berms to divert 100% of the flow from Rascal Lake through Gander Pond to discharge into a nearby area of Goose Lake. Berm construction material will be sourced from an approved quarry source.

All-weather Road and Associated Water Crossings

The proposed road alignment at the Goose Property will be constructed as an all-weather road. This road alignment, totaling approximately 5 km in length, is required to access the existing rock quarry, the new Umwelt quarry, and the extended all-weather airstrip.

The all-weather road will be constructed with run-of-quarry rock placed directly onto the tundra to preserve the permafrost. A layer of graded surfacing material will be placed to provide a protective trafficking layer. Construction materials will consist of geochemically suitable rock sourced from the existing quarry and/or Umwelt quarry.

Stream flow through the road alignment will be conveyed using appropriately sized culverts.

2.2.2 Temporary Laydown Area

A TLA will be staged at the site of the future MLA location. Activities will include the offloading of two barges containing materials, equipment, and fuel for future use; these materials will be stored at the TLA. Explosives magazines will also be offloaded to the TLA and stored empty for 2015.

Arrival and offloading of the barges and staging of the TLA will occur in the open-water season of 2015 over a period of approximately 25 days. The barges will come from a western route, either from the Lower Mainland or from Hay River.

No over-land transport routes will be developed to access the MLA during the 2015 site preparation activities.

2.3. Site Preparation Construction Schedule

The proposed site preparation works which, subject to securing necessary permits and approvals, will be undertaken at the Goose Property and MLA over a period of approximately 180 days, from February to August, 2015.

The following construction order is proposed for site preparation activities at the Goose Property. The majority of steps will be completed pre-thaw, however construction of the all-weather airstrip extension and secondary all-weather road construction can be completed post-thaw.

- After mobilizing site preparation personnel to site, the first activity to be undertaken will be construction of the ice-based airstrip on Goose Lake;
- The ice-road will then be constructed from the existing airstrip to the Goose and Umwelt quarries, as well as to the two explosives magazines;
- Once accessible by ice-road, the quarries will be developed using a drill-blast-crush-haul methodology;
- Berm material, sourced from either the existing stockpile or 2015 quarry operations, will be placed at the proposed Rascal Lake outflow realignment;
- Sediment and erosions controls will be established for site preparation activities, as required;
- Initial construction of the all-weather road:
  - If Goose quarry is selected as the primary source of material initial construction will connect the Goose quarry to the existing all-weather airstrip;
  - Alternatively, if the Umwelt quarry is selected as the primary source of material initial construction will focus on connecting the Umwelt quarry to the all-weather airstrip;
- Concurrent with initial all-weather road construction, the main Rascal Lake outflow realignment will be constructed;
- Construction of the all-weather airstrip extension will then commence; and
- If Goose quarry is selected as the primary source of material for initial all-weather road construction, secondary construction will extend the all-weather road to Umwelt quarry. Concurrent to secondary all-weather road construction, the ephemeral crossings will be built as the road reaches each crossing location.

The following activities will be completed over a period of approximately 25 days during the open-water season at the MLA:

- Two barges will arrive from a western route, either from the Lower Mainland or from Hay River and will land at the MLA;
- Swamp mats will be laid out along the access trail from the barge landing area to the TLA;
- Temporary structures, such as tents, will be erected at the TLA;
- Swamp mats will be placed as a foundation to the TLA;
- Tertiary containment for the TLA fuel storage area will be erected;
- Barges will then be offloaded with seacans, bulk materials and equipment placed at the TLA first;

- Fuel storage tanks will then be offloaded and placed at the TLA within the tertiary containment;
- Fuel storage tanks will then be filled from the barge; and
- Once all fuel, materials, and equipment have been placed at the TLA, the swamp mats along the access trail will be removed and loaded back onto the barges, which will then depart.

3. AIRSTRIP AND ROAD CONSTRUCTION AND OPERATION

3.1. All-weather Road and Airstrip Infrastructure

The all-weather airstrip, along with the connecting all-weather road will be privately-owned and built entirely on Inuit-Owned Lands currently permitted by Sabina from the KIA. The airstrip extension and road will be constructed, inspected, and maintained by Sabina to support exploration activity and the 2015 Site Preparation activities at the Back River Project.

The design of the airstrip is in accordance with Transport Canada's Aerodrome Standards and Recommended Practices (Transport Canada 2005). The construction of the road follows generally accepted good engineering practices for building roads in permafrost areas of the Northwest Territories and Nunavut. The airstrip and road design is detailed in the SRK Consulting (Canada) Inc. memo "Goose Lake Airstrip Design"(SRK August 2011).

Environmental considerations have been incorporated into design and routing. Wind direction and speeds, existing terrain and ground conditions have all been considered to determine the optimal airstrip orientation. The road alignment, connecting the airstrip to the camp and airstrip to the quarries considered the existing terrain and topography to determine the optimal route for equipment movement. A key objective of the design was to minimize the Project footprint.

Additional fieldwork determined that the airstrip and road alignments did not include any archaeological sites or vegetation/wildlife species under the "Species at Risk" Act. Establishing fish and fish habitat included water quality and quantity, fish population and fish habitat studies. These data have been considered in determining the optimal alignment for the airstrip and road and the associated water crossings.

3.2. Rock Quarries

The proposed rock quarries needed to provide construction material are on Inuit-Owned Lands currently permitted by Sabina from the Kitikmeot Inuit Association (KIA). The existing Goose Quarry will continue to be operated, inspected and maintained and the proposed Umwelt Quarry will be constructed, inspected, and maintained by Sabina to support construction and operation of the all-weather airstrip and access road at the Goose Project.

Fieldwork has indicated that the underlying geology of the existing Goose Quarry area is a gabbro dyke. This material will be suitable to quarry using drill/blast methods followed by crushing and sorting to generate the material needed for construction and operation. Acid Rock Drainage/Metal Leaching (ARD/ML) potential was investigated within the quarry area, and the material has a low potential for generating acidic drainage due to the low sulphide content.

The underlying geology of the proposed Umwelt Quarry consists of folded turbiditic meta-sediments of the Beechey Lake Group, including a banded iron formation (BIF), which is the primary host for gold mineralization, and interbedded greywacke and mudstones. The upper greywacke samples representing the proposed quarry areas are classified as non-PAG or low S material with a limited potential for ARD. Additionally, based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, upper greywacke from the proposed Umwelt quarry area is considered suitable for use in construction.

Permafrost conditions exist across the Project area and environmental data collected to date indicate that the active layer is approximately 2-3 m thick, with the permafrost extending to a depth of approximately 500 m. Given the consolidated nature of the gabbro dyke, it is not anticipated that ice lenses would be encountered during quarry operations.

Environmental considerations have also been incorporated into the proposed quarry locations. Proximity of the gabbro units close to the airstrip and road corridor help to minimize transportation needs for the quarry operations, thus minimizing the overall Project footprint.

Quarry development and operations are detailed in the Quarry Management Plan.

3.3. Water Crossings

The all-weather airstrip and connecting road and associated water crossings will be privately-owned infrastructure, built entirely on Inuit-Owned Lands currently permitted by Sabina from the KIA. The airstrip extension and road will be constructed, inspected, and maintained by Sabina to support ongoing exploration activities at the Back River Project.

The airstrip and road design is detailed in the SRK Consulting (Canada) Inc. memo (SRK 2014). There are four water crossings associated with this infrastructure, as illustrated in Figure 1.

Based on Sabina's understanding of the seasonal hydrology, water quality, and the limited fisheries values within each of these streams, the current plan is to install appropriately-sized culverts in each stream during the winter construction program. Culvert type (box vs. CSP) will be determined during Sabina's procurement process. One fish-bearing crossing will be required on the airstrip access road which will require two 2.5 m culverts to be installed.

3.4. Winter Road and Ice Airstrip Infrastructure

Currently, environmental conditions determine the route selected for winter road corridors including:

- Ice of a sufficient thickness to support equipment so that pumping and using water to build up ice will be unnecessary;
- Snow thickness will be a minimum of 15 cm on land to prevent damage to soil and vegetation; and
- Weather conditions permit safe transport of equipment and materials.

Once the camps are open, the road route will be determined by means of reconnaissance trips using helicopters and/or snow machines. The road route determined will be staked to facilitate driving and to help with snow plowing. While the road is in use, any litter or contamination will be removed by Sabina personnel and relocated to the existing camps for disposal. When the winter road corridor use ends, the corridor will be inspected for any remaining litter and contamination, cleaned, stakes are removed and snow piled/or removed at the entrance to prevent further use of the route. At break-up the road will melt.

During the summer months, the route will be inspected using a helicopter and any further reclamation work will be built into progressive reclamation for the exploration program.

Surface preparation will include verification that ice thickness will support equipment weight. It is also anticipated that movement of snow may be required in some areas to ensure a safe operating grade for the equipment and to a minimum thickness to protect underlying vegetation and soil.

Speed and road grades will be determined by safety, operational needs of the equipment, road conditions and weather/environmental conditions. The public will not have access to the corridor.

Construction and operation of the ice airstrip on Goose Lake is also dependent on environmental conditions including:

- Prevalent wind direction and speeds for safe landing/takeoff;
- Ice thickness of a sufficient thickness to support equipment and aircraft so that pumping and using water to build up will be unnecessary; and
- Weather conditions permit safe transport of equipment and materials.

Once camps are open, the priority is to determine the optimal airstrip route, using snow machines. The orientation determined is staked to facilitate snow plowing; snow is removed using equipment already on-site within the staked area to allow additional freezing and thickening of the ice. Surface preparation will include verification that ice thickness will support aircraft weight. Flooding and ice build-up methods are not used to construct ice airstrip.

Once the appropriate thickness and area is available, the airstrip is inspected by authorities and approved for use.

While the airstrip is in use, any litter or contamination is removed by Sabina personnel and relocated to the existing camps for disposal. When the ice airstrip use is completed, the area is inspected for any remaining litter and contamination, cleaned, and stakes are removed. At break-up the airstrip will melt.

Q:\Vancouver\GIS\ENGINEERING\V151\V15103033-02_Sabina\Maps\TransportationMgmntPlan\V15103033-02_Figure01_WaterCrossings.mxd modified 10/7/2014 by morgan.zondervan

LEGEND

- Proposed Access Road
- Proposed Water Crossing / Culvert Location
- Airstrip Access Road
- Winter Road
- Existing Airstrip
- Proposed Airstrip Extension
- Proposed Umwelt Quarry
- Existing Quarry
- Proposed Site Preparation Quarry

NOTES
Base data source:
Imagery from Sabina (2006/2011)
Infrastructure provided by JDS Energy and Mining Inc. (2014)

STATUS
ISSUED FOR REVIEW

SABINA BACK RIVER PROJECT, NUNAVUT

Proposed Water Crossing / Culvert Locations

PROJECTION: UTM Zone 13
DATUM: NAD83
CLIENT: Sabina

Scale: 1:15,000
200 100 0 200
Metres

FILE NO.: V15103033-02_Figure01_WaterCrossings.mxd

PROJECT NO.	DWN	CKD	APVD	REV
V15103033-02	MEZ	SL	AR	0

OFFICE: Tt EBA-VANC
DATE: October 7, 2014

Figure 1

4. INSPECTIONS AND MAINTENANCE

Sabina has sole responsibility for the ongoing inspection and maintenance of all components of the airstrip and road, including the road bed, the airstrip foundation, the culverts and the quarry sites.

Sabina's Site Supervisor, or its designate, will be responsible for ongoing inspection and maintenance. The following is a summary of the procedures that will be applied.

4.1. Surface Inspection and Maintenance

Sabina recognizes that a good inspection program will lead to the early identification of areas of the airstrip and road where improvements are or may be necessary. The early resolution of any deficiencies will result in less ongoing maintenance and repair of the infrastructure.

The road and associated shoulders will be inspected bi-weekly (at a minimum) during the summer period for evidence of seasonal freeze and thaw adjacent to the toe of the road embankment. Such movements are expected and may lead to longitudinal cracking and thaw settlement especially for portions of the road founded on thaw-susceptible (ice-rich) soil. When such areas are identified, the affected area will be repaired using granular material and/or crushed rock. Sabina will maintain stockpiles of such material in the quarry areas.

The road and airstrip will be inspected for signs of accumulation of ponded water, either on the surface or along the sides. Where observed, the site supervisor will evaluate and monitor the condition to determine why water is accumulating in these areas. Based on these evaluations, the site supervisor will take remedial action where and when necessary to correct the cause of such ponding, such as grading of the surface to remove areas of ponding or the installation of additional culverts if the road is causing excessive water ponding.

The quarries will also be inspected as outlined in the Quarry Management Plan. Remedial action will be taken as soon as problems are noted. The site supervisor will conduct periodic inspections (minimum of bi-weekly) of the road to ensure that the road is maintained for safe travel of personnel, equipment and supplies. These inspections will be recorded and any deficiency recorded and followed up by corrective action.

These periodic inspections will include an inspection of the water crossings and a visual observation of the road surface to assess the status of the road foundation.

During the summer, the road surface will be maintained with gravel being spread as required and regular grading of the road. In fall, winter and spring, maintenance will be adjusted according to the weather conditions. Snow clearing along the road will be done to ensure that the road can be operated safely. The manner in which the snow is cleared will also take into account the road configuration to ensure that snow accumulation will not cause any problems during freshet or other high water conditions.

Inspection frequency will be increased during the following critical time periods:

- Just prior to spring freshet to ensure that the culverts and stream crossings are in good state to accommodate the rapid spring thaw;
- During the spring freshet to ensure that the culverts and stream crossings are not impeding spring freshet and to initiate action when and where required to prevent wash outs; and
- Immediately following heavy rainfall events to monitor water accumulation, to ensure that culverts and diversion/collection channels and ponds are passing precipitation as planned and to initiate action when and where required to prevent erosion and wash outs.

The amount of dust generated along the road and airstrip is dependent on the dryness of the surface, the number of vehicles, weight and speed, and maintenance of the driving surface. Regular grading of the road and airstrip, combined with the addition of granular material to the surface will be undertaken as necessary. This will improve road safety and also reduce dust. In areas or times identified by the site supervisor as being prone to high dust levels or areas where safe road visibility is impaired or in areas where dust deposition is impacting fish habitat and/or water quality, the site supervisor will implement further mitigation measures as appropriate. This could involve actions such as grading of the road surface, placement of new coarser topping, and/or watering of the road surface. Use of chemical dust suppressants will be only used as a last resort and only in accordance with the Environmental Guidance for Dust Suppression published by the Government of Nunavut Department of Environment (January 2002), available online at the following web site:
http://env.gov.nu.ca/sites/default/files/Guideline%20Dust%20Suppression.pdf

All Sabina employees and contractors are instructed to report any road and airstrip maintenance problems or hazardous conditions to Project Management. Regular scheduled safety meetings will incorporate discussion and reminders related to all-weather airstrip and road use, operation and maintenance.

4.2. Watercourse Crossings Inspection and Maintenance

The watercourse crossing inspection and maintenance program has three main components:

a) A regular inspection program to identify issues relating to watercourse crossings, such as structural integrity and hydraulic function;

b) An event inspection program to track the impacts of large storm events on watercourse crossings, such as structural integrity and hydraulic function; and

c) A culvert location inspection program to ensure that culverts have been installed in the most suitable location with respect to the watercourse and that culvert capacity is adequate to ensure that the culvert(s) pass the water under all hydraulic conditions. In most cases there will be multiple culverts installed at different elevations at each stream crossing to ensure that these culverts can adequately pass normal summer flows as well as spring freshet and heavy rainfall flows.

Regular Crossing Inspection and Maintenance

During the freshet period, crossings inspections will be performed twice a week (mid-May through June) and weekly during the remainder of the ice-free period prior to fall freeze-up (July through October).

The inspection activities for each watercourse crossing will consist of:

- Visual inspection of infrastructure to identify defects, cracks or any other risks to structural integrity. Particular attention will be paid to the inlet and outlet structures of culverts.
- Visual inspection to identify sediment or other debris accumulation impeding the free flow of water through the crossings. Maintenance operations will consist of hand removal of accumulated debris and repairing damage as soon as possible.
- Visual inspection of the upstream and downstream channel to identify bed erosion or scour around the watercourse crossing. Particular attention will also be directed to potential sources of sediment transport at the crossing. Inspection results will be recorded to help track changes in conditions over time. Maintenance operations will consist of undertaking remediation of any detected problems and repairing damage as soon as possible.

Event Crossing Inspection and Maintenance

Following heavy or prolonged rainfall, each watercourse crossing will be inspected to identify potential risks to the crossing's structural integrity, debris accumulation and whether erosion and scour have occurred. Results will be recorded to help track changes in conditions over time. The remediation of any detected problem and any necessary damage repairs will be undertaken as soon as possible, under the direction of the site supervisor.

Culvert Location Inspection

Culvert crossings will be visually inspected to confirm they have been properly executed and installed. These culverts will initially be installed during low flow conditions and thus it is possible that a culvert will not be sited correctly to pass all ponded water through the road. The intent is to check for such conditions during the first snow melt and after rain so that adjustments can be made accordingly.

Additional culverts will be installed, if necessary, should the inspection indicate that the culverts were installed in a location that does not optimally route water flows.

4.3. Snow Clearing

The Goose Property experiences snow drifts due to the strong winter winds. As much snow as possible will be cleared to the downwind side of the road and airstrip to limit the re-deposition of this snow on cleared areas. Routine spring snow management will include the removal of snow that accumulates at culverts so that water at freshet can move freely through the culverts and waterway. In the case of culverts, snow will be removed from both ends but not from the inside.

4.4. Accidents and Malfunctions

Despite the preventative and mitigation measures taken, should any spill incident arise as a result of human error or unforeseen circumstances, the response procedures outlined in the Spill Contingency and Emergency Response Plan will be implemented.

Emergency Response

As a private road the responsibility for response to any emergency or accident lies solely with Sabina. It will be Sabina personnel that respond and deal with any emergencies that occur on the road and airstrip. Sabina has people on site trained in emergency response (firefighting, first aid, spill response). As and where appropriate, Sabina will request assistance from other parties in the area (e.g. Xstrata Zinc and Sabina George camp). Sabina does not anticipate that emergency response will result in any demand on local public service providers in Kugluktuk or Cambridge Bay (e.g. fire, police, ambulance, medical, maintenance). In most circumstances the emergency response will be handled directly by Sabina personnel.

Sabina's emphasis will be on prevention with on-going awareness, training and on-going safety measures while at the same time keeping resources close at hand to respond to emergencies at the Project in a timely manner.

Sabina is fully responsible for the design, construction and maintenance of the road and airstrip for private use. Sabina will ensure its vehicles and equipment are in good working order and train its employees on airstrip/road safety (including use of helmets, seatbelts, speed limits, and improving visibility using reflective clothing and vehicle lights) and emergency response (first aid, firefighting, emergency response). Emergency response also incorporates nursing/medical staff available at Goose camp.

5. ENVIRONMENTAL MANAGEMENT

5.1. Wildlife

Wildlife may occasionally be observed on or immediately along the side of the all-weather airstrip and connecting road. Caribou and other wildlife will have the right-of-way at all times. In case of problems (e.g. groups of caribou), the Project management and environmental personnel on site will manage the situation. The Project personnel will be notified by radio if any wildlife are observed on the road according to current communication procedures.

The following protocol will be implemented on the road and airstrip for the protection of wildlife:

- Vehicular traffic speeds on the access road will be limited to 50 km/hr.
- Prior to aircraft landing on the airstrip, a visual inspection will be conducted to identify the presence of any wildlife. If possible, the wildlife will be escorted off the airstrip; the flight crew will be notified by radio that such action is taking place and that they are not to land until it has been completed. If the wildlife cannot be escorted from the airstrip within a reasonable length of time, the flight crew will be instructed to divert to the George airstrip or to return to Yellowknife at the pilot’s discretion.
- Where small to moderate aggregations of caribou (i.e., 1-50 animals) are observed within 100 m of the road, travel speeds will be reduced to 30 km/hr.
- Where large aggregations of caribou (i.e., 50 or more) are observed within 100 m of the road, at the discretion of the site supervisor, vehicle movements may be suspended until the animals have moved away from the road.
- If caribou are on the airstrip, at the discretion of the site supervisor, aircraft movement may be suspended and the aircraft diverted to George camp or back to Yellowknife until the animals have moved away from the area.
- Caribou and all wildlife will be given right-of-way on the road. Vehicles must stop until the animals are off the road.
- Locations of large aggregations of animals must be reported to the site supervisor who will inform all potentially affected employees and the environmental representative.
- All incidents between vehicles and wildlife must be reported to the Project Management/Environmental Department whether they are:
    - near-miss;
    - collision with injury to the wildlife; or

- accidental death.

- Each incident will be investigated by the site supervisor and the environment department and measures taken to avoid re-occurrence. Disciplinary measures will be taken against any employee if the investigation concludes that the accident is the result of negligence.

- In the case of the accidental death of an animal, the Project Manager/Environmental Department will contact the GN Conservation Officer, KIA Senior Lands Manager and the HTO office in Kugluktuk and Cambridge Bay. The carcass will be removed from the road and incinerated to avoid attracting scavengers such as Arctic Fox, Wolves, Grizzly Bear, and/or Wolverine.

5.2. Water

General Runoff

The general runoff from the all-weather road and airstrip surfaces may contain suspended solids due to erosion of ground surfaces, or oils and grease from heavy equipment. General runoff will meet the discharge criteria presented in Table 5.2.1.

Table 5.2.1. Site Runoff Discharge Criteria

Parameter	Maximum Average Concentration (mg/L)	Grab Sample Maximum Concentration (mg/L)
TSS (Construction)	50	100
TSS (Operations)	15	30
Oil and Grease	No visible sheen	No visible sheen
pH	Between 6.0 and 9.5	Between 6.0 and 9.5

Contact water associated with the construction and operation of transportation corridors will be managed as described in the Waste Management Plan.

Quarries

A Quarry Management Plan has been developed to outline procedures for operating the quarries, as well as environmental protection measures and monitoring plans, including water quality criteria for runoff associated with the quarries.

Water Crossings

Sabina recognizes that a good inspection program will lead to the early identification of areas of the airstrip and road where improvements are necessary. The early resolution of any deficiencies will result in less ongoing maintenance and repair of the infrastructure. Monitoring of transportation corridors and associated water crossings will be conducted as described in Section 4.

6. MONITORING PROGRAM

6.1. Wildlife

Wildlife monitoring will be incorporated into current wildlife tracking in accordance with the terms and conditions of existing land use permits. This includes a log of sightings that detail wildlife observed, estimate of numbers and nearest kilometre marker along the road. The data will be aggregated and made available on-site during inspections.

6.2. Water Quality

Water crossings at culverts are the best locations for monitoring water quality. Water in these locations would have a greater probability of being in contact with any construction material, dust and spilled material. These locations provide access to upstream and downstream sections of the waterway and historic data are available as they have been reported in baseline monitoring to date.

There could also be drainage from the quarry areas. When there is noticeable flow out of a quarry, likely during spring melt, a water sample will be collected before this water is permitted to enter a receiving waterbody. Standing water, unless it is to be discharged to the environment, will not be collected as it poses little risk to the receiving environment.

Water samples will be collected on a monthly basis over the open water period, late June to September inclusive. The parameters to be collected are similar to current terms and conditions of the water licence and include:

- Physical parameters – field pH and water temperature, lab pH, conductivity, major anions and cations, turbidity, TSS; and
- Total and Dissolved metals.

The results will be compiled in camp, made available during inspection and included in the NWB annual report.

7. REVIEW OF THE TRANSPORTATION MANAGEMENT PLAN

The activities and costing of transportation management activities will be reviewed internally on an annual basis relative to the long-term exploration strategy for the Project and operational needs.

APPENDIX H

ABANDONMENT AND RESTORATION PLAN

BACK RIVER PROJECT

ABANDONMENT AND RECLAMATION PLAN FOR SITE PREPARATION WORK

Table of Contents

List of Figures

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1. Introduction

1.1 OVERVIEW

1.1.1 Background

Sabina Gold & Silver Corp. (Sabina) is actively developing the Back River Project (the Project) approximately 75 km south of Bathurst Inlet, in the Kitikmeot Region, Nunavut. The Project consists of proposed mines at the Goose and George Properties, a Marine Laydown Area (MLA) at Bathurst Inlet, and a connecting winter road (see Figure 1.1). The mine development project is currently under environmental review with the Nunavut Impact Review Board (NIRB).

Sabina is planning to seek regulatory approval to conduct site preparation works (SPW) at the Back River Project in advance of completing the mine development environmental assessment. SPW will consist of the positioning of equipment, consumables and fuel at the Project sites, the quarrying of aggregate for construction, and the establishment of basic infrastructure such as a section of all-weather road and an extended airstrip at the Goose Property. The SPW is expected to be undertaken in 2015. The SPW is described in an environmental screening document prepared by on behalf of Sabina.

1.1.2 Purpose and Scope of Plan

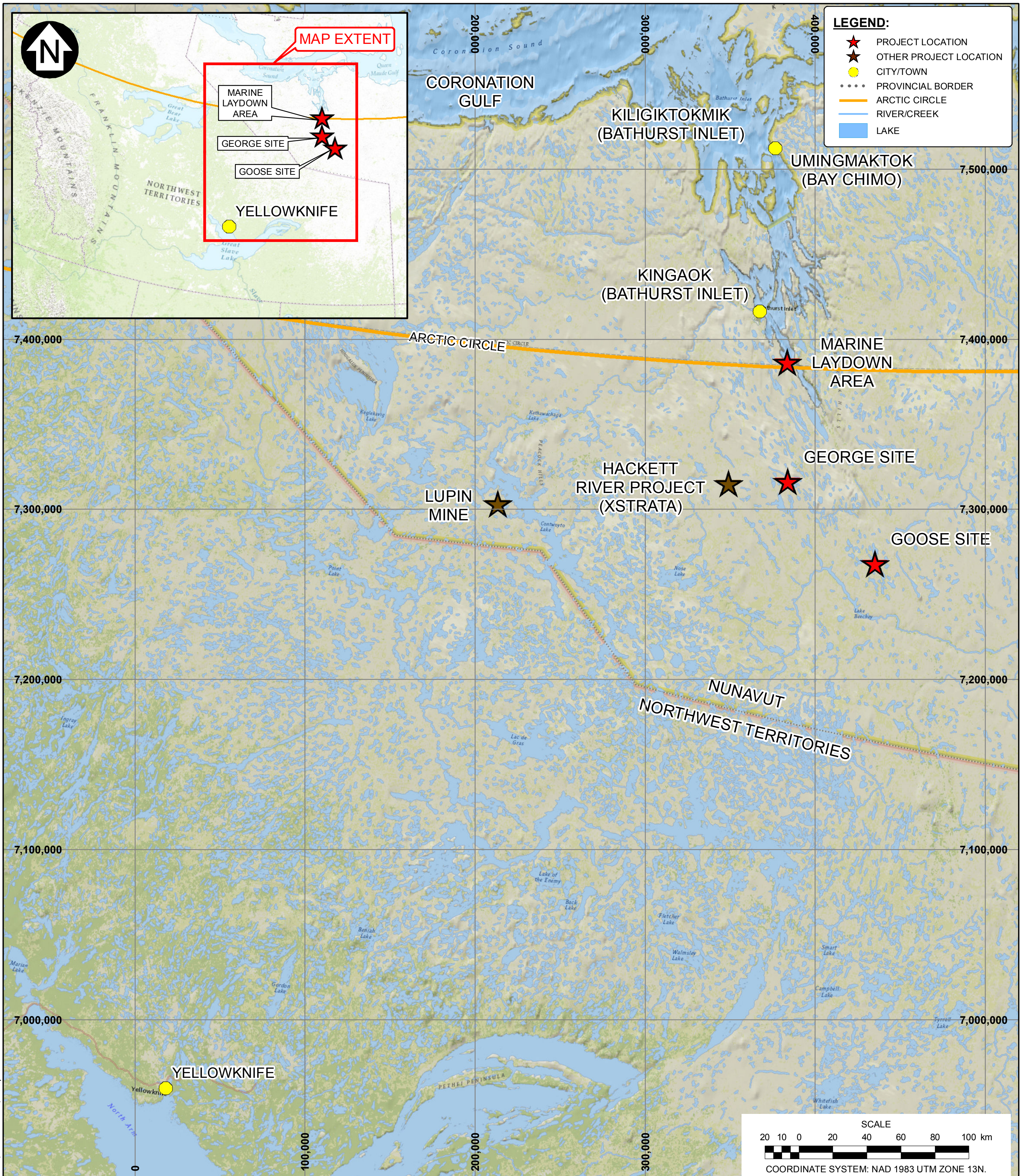
This Abandonment and Reclamation Plan (A&R Plan) is intended to cover the activities and infrastructure associated with the proposed SPW at the Goose Property and MLA.

There are two A&R Plans currently filed with the Nunavut Water Board (NWB) and the Kitikmeot Inuit Association (KIA):

- Back River Project - Abandonment and Restoration Plan - Goose Camp and Exploration Project, March 2012; and
- Back River Project - Abandonment and Restoration Plan - George Camp and Exploration Project, January 2013.

The SPW involves site preparation activities mainly at the Goose Property and the MLA. It is Sabina`s view that, if approved, that this A&R Plan for the SPW would supersede the March 2012 A&R Plan for the Goose Property. Following the same reasoning, since the SPW involves little new activity at the George Property, the January 2013 A&R Plan for the George Property referenced above would remain in effect if Sabina proceeded with the SPW.

A Preliminary Mine Closure and Reclamation Plan (pMCRP) for mine development was presented to the Nunavut Impact Review Board (NIRB) for review as part of Sabina`s Draft Environmental Impact Statement (DEIS) in January 2013. This A&R Plan is not related to the mine development pMCRP presented in the DEIS. Sabina notes that if the SPW is approved and executed, that pre-mine development conditions at site will change. Corresponding updates to the pMCRP will in this instance be presented in an updated pMCRP as part of the Final Environmental Impact Statement (FEIS) and accompanying Application for a Type A Water Licence, to be submitted in 2015.



NOTES:

1. BASE MAP: NATIONAL GEOGRAPHIC TOPOGRAPHIC MAP.
2. COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 13N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:3,000,000 FOR 8.5x11 (LETTER) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

PROJECT LOCATION

Knight Piésold CONSULTING

P/A NO. VA101-517/2

REF NO. 4

FIGURE 1.1

REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	21OCT'13	ISSUED WITH REPORT	CC	SWK	RAC	KJB

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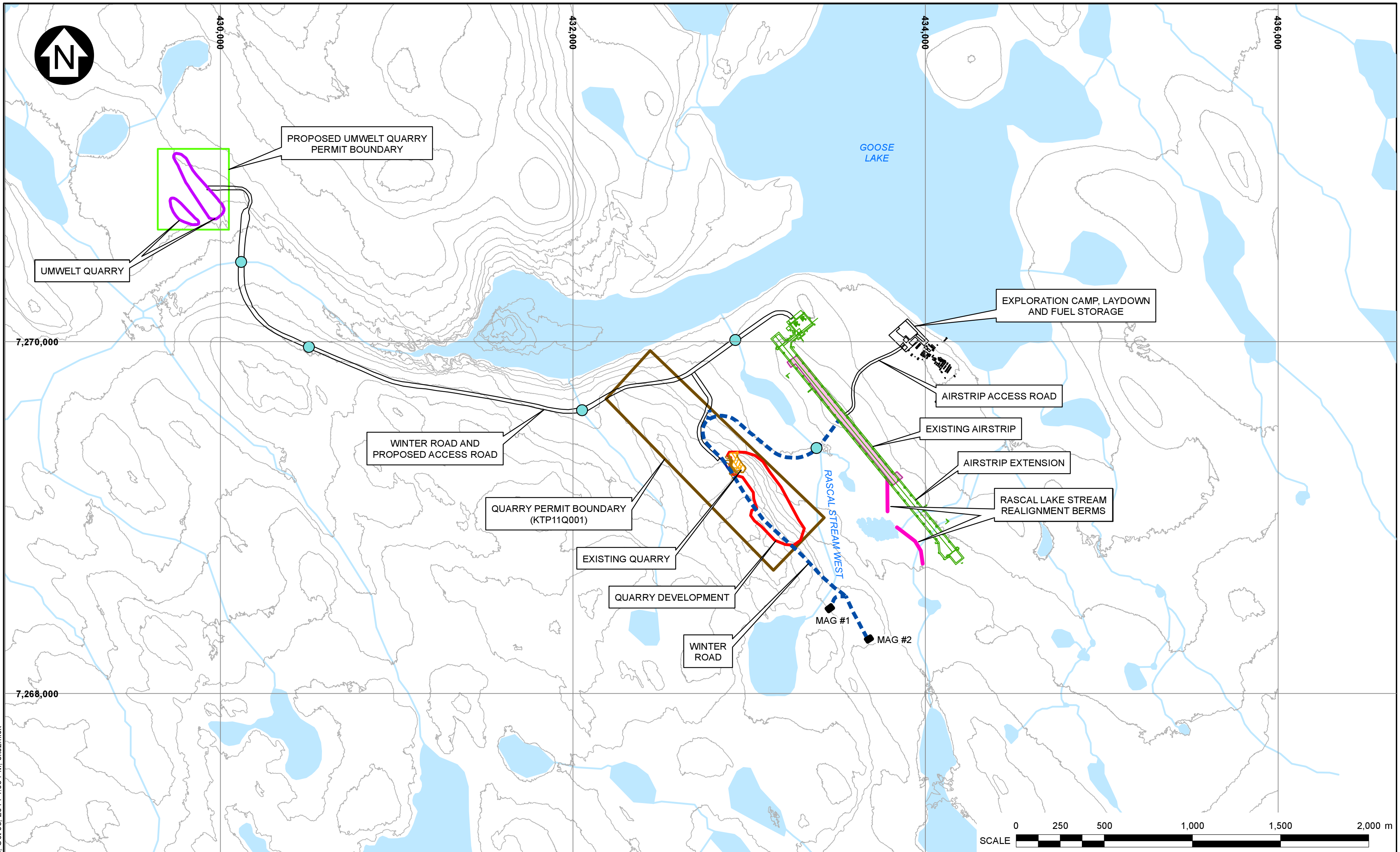
1.1.3 Scope of Site Preparation Work

SPW will involve access to Crown and Inuit-Owned Land (IOL) under land use permits and water use under Type B licences for the following activities:

- Seasonal operation of the existing exploration camps at Goose and George
- Continued exploration, environmental, and engineering data collection
- Sealift delivery of equipment, 600,000 L of fuel, and various consumables to the MLA, and temporary storage within a 1 ha area
- Airlift delivery of additional fuel and consumables to the Goose Property as required, utilizing the existing airstrip and/or ice-based airstrips
- Establishment of one to two rock quarries at the Goose Property to produce a total of 550,000 m^3 of aggregate for construction purposes
- Construction of a 5 km all-weather road between the existing Goose camp and Umwelt exploration area within the Goose Property
- Lengthening the existing all-weather airstrip at the Goose property to 1,524 m

Figure 1.2 shows the Goose site layout as a result of the SPW. The Goose and George exploration camps will be utilized as-is to support SPW; no upgrades or expansion to the existing facilities will be required. Minimal disturbance will occur at the MLA as rig mats will be used to move and store equipment and materials to a designated laydown area. No permanent accommodations will be required at the MLA as activities will be short-term and personnel will be transported to the MLA daily from the other camps.

The transportation and storage of equipment, fuel, and materials during SPW is essential to the development the Project as it will allow Sabina to progress into timely construction of the Project. These temporary and/or seasonal components would also support advanced exploration and environmental baseline activities in the area and improve safety and environmental protection.



LEGEND:

- PROPOSED CULVERT CROSSING
- INFRASTRUCTURE / ACCESS ROAD
- WINTER ROAD
- REALIGNMENT BERM
- CONTOUR
- RIVER/STREAM/DRAINAGE
- WATER
- QUARRY PERMIT BOUNDARY (KTP11Q001)
- EXISTING AIRSTRIP
- EXTENDED AIRSTRIP
- EXISTING QUARRY
- UMWELT QUARRY
- PROPOSED UMWELT QUARRY PERMIT BOUNDARY
- QUARRY DEVELOPMENT

NOTES:

1. COORDINATE GRID IS UTM (NAD83) ZONE 13.
2. LIDAR / TOPOGRAPHY BASED ON INFORMATION PROVIDED BY SABINA GOLD AND SILVER CORP., DATED NOVEMBER 9, 2012.
3. CONTOUR INTERVAL IS 5 METRES.
4. APPROXIMATE WATERBODIES FROM NTS MAPPING.

SABINA GOLD & SILVER CORP.

BACK RIVER PROJECT

GOOSE PROPERTY SITE PREPARATION PLAN

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB101-517/6	2

FIGURE 1.2 — REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	06OCT'14	ISSUED WITH REPORT	RAC	SWK	RAC	RAC

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1.2 PROPONENT INFORMATION

1.2.1 Sabina's Contact Information

Sabina's corporate office is located at the following:

Sabina Gold & Silver Corporation
#202 - 930 West 1st Street
North Vancouver, BC Canada V7P 3N4
Tel: (604) 998-4175
Fax: (604) 998-1051
Toll Free: (888) 648-4218

1.2.2 Sabina's Environmental Policy

The following is Sabina's Environmental Policy (Sabina, 2013):

"Sabina takes its responsibility to act as a steward of the environment seriously.

To fulfill this responsibility, Sabina strives to:

- *Ensure that we design our activities and operate in compliance with all environmental regulations to minimize our impact on the environment.*
- *Promote responsibility and accountability of managers, employees and contractors to protect the environment and make environmental performance an essential part of the management/contractor review process.*
- *Provide resources, personnel and training to enable management, employees and contractors to implement programs and policies to protect the environment.*
- *Communicate openly with employees, contractors, local stakeholders and government on our environmental protection and sustainability programs and performance. We will also address any concerns pertaining to potential hazards and impacts.*
- *Promote the development and implementation of systems and technologies to reduce environmental risks.*
- *Establish and maintain appropriate emergency response plans for all activities and facilities.*
- *Maintain a self-monitoring program at each facility to ensure compliance and to proactively address plans to correct potential deficiencies.*
- Work cooperatively with government agencies, local communities and contractors to develop and enhance systems and technologies to improve environmental and sustainability practices.
- Encourage all employees, contractors or stakeholders to report to management any known or suspected departures from this policy or its related procedures."

1.3 HISTORY OF THE SITE

The Project comprises 45 Federal Mineral Leases and 16 Federal Mining Claims covering approximately 52,014 ha. The Property is divided into two projects: Goose and George, and four exploration prospects: Boot, Boulder, Del, and Bath.

There have been a number of owners from the start of exploration activities in 1982. Most recently, Dundee Precious Metals (Dundee) owned the Project from 2005 until it was purchased by Sabina in 2009. Periods of intensive exploration were undertaken from 1987 to 1992 by Homestake Mineral Development (Homestake), in 1997 by AuRico Gold Inc. (AuRico), and almost continuously from 1999 to the present by Kinross Gold Corp. (Kinross), Miramar Mining Corp. (Miramar; since acquired by Newmont Mining Corp., Newmont), and Dundee. There has been no production from any of the deposits associated with the Project.

1.4 SITE CONDITION CONSIDERATIONS

1.4.1 Social Conditions

The Project is located in a remote area in Nunavut with virtually no development and very little human disturbance, aside from various mineral exploration campaigns conducted since 1982. These campaigns are discussed in Section 1.3.

1.4.2 Permafrost

The Project is located in an area of continuous permafrost that extends to a depth of between 400 and 500 mbgs (SRK, 2012). Beneath the permafrost, the regional groundwater is suspected to be saline.

1.4.3 Geochemical Characterization of Construction Materials

The SPW will involve the quarrying of rock from two quarries to produce aggregate for construction of roads, airstrips, etc. Geochemical evaluations were conducted to assess the suitability of the proposed quarry materials for construction.

Quarry A

Geochemical and physical characterization for the Goose property quarry was conducted by Rescan Environmental Services Ltd. (Rescan) in 2011. The results of the 2011 ARD/ML characterization program indicated that the gabbro material is predominately nPAG and can be used as construction material. The greywacke unit had two samples (out of 22 samples) that indicated not-acid potentially generating (nPAG) potential with the mean SNPR for all the samples being 15.8. The greywacke would be suitable to use as construction material in conjunction with the gabbro as incidental ARD generated by the greywacke could be neutralized by the gabbro.

Umwelt Quarry

A geochemistry evaluation was conducted by SRK in 2014 to identify waste rock within the Umwelt deposit with minimal acid rock generation / metal leaching (ARD/ML) potential that would be suitable to quarry and use as construction material.

Drawing from previous and recent geochemical work, SRK utilized geological modelling and visualization software to identify areas within the footprint of the future open pit that were predominantly greywacke and gabbro and set back from the banded iron formation (BIF) which hosts the gold within sulphide mineralization (including arsenopyrite, pyrite and pyrrhotite). The greywacke material removed from the gold mineralization is expected to have the lowest ARD/ML potential. Two areas were identified, geochemical samples from or representative of these areas were reviewed.

Review of the representative geochemical testing results indicated that material from parts of the upper greywacke in the Umwelt pit were classified as nPAG, as having an uncertain potential for ARD, or as low sulphur material with a limited potential for ARD. Based on the relatively low sulphide content, it is unlikely that any of these materials would be unlikely to generate appreciable amounts of acidity. Based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, the identified materials were considered suitable for use in construction. Sabina will limit quarrying operations within these areas.

1.5 REGULATORY CONTEXT

1.5.1 Current Permits and Approvals

Table 1.1 lists the current permits and approvals that govern activities at the Project. Surface rights for IOL are vested in the Kitikmeot Inuit Association (KIA) which administers the access and management of the lands for the benefit of the Inuit of that region. Access to and use of surface lands requires an Inuit Land Use permit, licence, or commercial lease issued by the KIA. The Goose and George properties are mostly located on surface and subsurface IOL.

Table 1.1 Summary of Current Exploration Permits

Permit No.	Expiry	Agency	Description
N2011F0029	2013-12-13	AANDC	Winter Road connecting Goose-George-Wishbone
N2010F0017	2013-09-16	AANDC	Winter Road Bathurst Inlet - Back River Project
N2009F0015	2013-03-01	AANDC	Winter road connecting Hackett and George Camps
KTL304F049 - Amended	2013-12-13	KIA	Winter Road Bathurst Inlet - Back River Project
KTL304F012	2013-12-13	KIA	Winter road connecting Hackett and George Camps
N2010C0016	2013-10-31	AANDC	Exploration activities
KTL304C017 - Amended	2013-12-13	KIA	Staking/prospecting, exploration (ground/air geophysics), drilling, bulk sampling, bulk fuel storage, camp, winter road, all-weather airstrip and road (Goose)
KTL204C012 - Amended	2013-12-13	KIA	Staking/prospecting, exploration (ground/air geophysics), geophysical survey, gridding and drilling (Boulder)
KTL304C018 - Amended	2013-12-13	KIA	Staking/prospecting, exploration (ground/air geophysics), drilling, bulk sampling, bulk fuel storage, camp, winter road (George)
KTL204C020 - Amended	2013-12-13	KIA	Exploration (air/ground geophysics), staking, prospecting, fly/survival camp and drilling (Boot)
2BE-GEO1015	2015-06-15	NWB	Water use and waste disposal for exploration and clean-up activities (175 m^3/d max)
2BE-GOO1015	2015-03-31	NWB	Industrial water use and waste disposal, bulk sample and exploration (297 m^3/d max)
KTP11Q001	2013-12-13	KIA	Goose rock quarry
KTP12Q001	2013-12-13	KIA	Goose airstrip borrow quarry
KTP12Q002	2013-12-13	KIA	George borrow quarry

As of March 31, 2013.

Surface rights on Crown Land are vested in the federal government and in the Aboriginal Affairs and Northern Development Canada (AANDC; formerly Indian and Northern Affairs Canada, INAC). Access to and use of these surface lands requires a land use permit, license or commercial lease issued by the AANDC.

Use of water resources as well as waste disposal in Nunavut is regulated by the Nunavut Water Board (NWB). Sabina's A&R Plan for SPW will require approval under a new Type B Water Licence, pursuant to the *Nunavut Waters Act*.

1.5.2 Legislation Applicable to Abandonment and Restoration

The following legislation is applicable to abandonment and restoration of projects in Nunavut.

<u>Federal Legislation</u>

- *Nunavut Land Claim Agreement* (NLCA; Canada, 1993);
- *Territorial Lands Act* (Canada, 1985c) and Regulations (Canada, n.d.);
- *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (Canada, 2002) and Regulations (Canada, 2002);
- *Fisheries Act* (Canada, 1985b) and applicable regulations;

- *Arctic Waters Pollution Prevention Act* (Canada, 1985a) and Regulations (Canada, n.d.); and
- *Transportation of Dangerous Goods Act* (Canada, 1992) and Regulations (Canada, 2001).

Territorial (Nunavut) Legislation

- *Environmental Protection Act* (Nunavut, 1988a) and Regulations*;*
- *Environmental Rights Act* (Nunavut, 1988b) and Regulations*; and*
- *Mine Health and Safety Act* (Nunavut, 1994) and Regulations (Nunavut, 1995).

An important element of closure planning in Nunavut is the establishment of closure costs, or an assessment of the potential liabilities on the properties. For projects of sufficient size with considerable environmental risk, financial security may be required. When required, financial security may be posted to the AANDC for water-related closure costs and to the landowner(s) for land-based reclamation activities.

The majority of the Project, including the MLA, Goose and George sites, is located on either surface rights or surface and subsurface rights IOL administered by the KIA. A portion of the connecting winter road is located on Crown Land.

1.5.3 Permits and Approvals Required for Site Preparation Activities

Similar to the exploration, a number of permits and authorizations will be required for SPW. These permits are identified in Table 1.2.

Table 1.2 Permits and Approvals Required for Site Preparation Activities

Permit / Approval Legislation	Administering Agency
FEDERAL	
Positive Screening Decision under Part 4 of Article 4; no review required Nunavut Land Claims Agreement (Article 12)	Nunavut Impact Review Board
Water Licence Nunavut Land Claims Agreement (Article 13) *Nunavut Waters and Nunavut Surface Rights Tribunal Act* Northwest Territories Water Regulations	Nunavut Water Board
Inuit Owned Land - Commercial Land Use Lease Nunavut Land Claims Agreement	Kitikmeot Inuit Association
Inuit Owned Land - Quarry Permit Agreements Nunavut Land Claims Agreement	Kitikmeot Inuit Association
Crown Land - Class A Land Use Permit(s) *Territorial Lands Act* Territorial Land Use Regulations	Aboriginal Affairs and Northern Development Canada
Approval and/or Exemption *Navigable Waters Protection Act*	Transport Canada
Fisheries Authorization for Harmful Alteration Disruption or Destruction (HADD) of Fish or Fish Habitat *Fisheries Act*, Section 35(2)	Department of Fisheries and Oceans
License for a Factory and Magazine *Explosives Act* and Regulations	Natural Resources Canada
TERRITORIAL	
Permit to Store Detonators *Explosives Use Act*	Mine Health and Safety, Workers

Permit / Approval Legislation	Administering Agency
Mine Health and Safety Act and Regulations	Compensation Board
Explosive Use Permit *Explosives Use Act* *Mine Health and Safety Act and Regulations*	Mine Health and Safety, Workers Compensation Board
Spill Contingency Plan Approval *Environmental Protection Act* *Spill Contingency Planning and Reporting Regulations*	Department of Environment

1.5.4 Applicable Guidelines

This Abandonment & Restoration Plan adopts the guidance available for mine closure in Nunavut, as follows:

- Mine Site Reclamation Policy for Nunavut (AANDC, 2002); and
- Mine Site Reclamation Guidelines for the Northwest Territories (AANDC, 2007).

1.5.5 Environmental Assessment Requirements

This Abandonment & Restoration Plan for SPW accompanies a permitting package for the SPW Project. The SPW is expected to undergo an environmental screening by NIRB, seeking an exemption or exception from review.

Following successful environmental screening, Sabina will seek the necessary permits (new permits and/or amendments) to be able to execute the program.

1.6 CLOSURE SCENARIOS FOR SITE PREPARATION WORK

Scenario 1: SPW Progresses Directly Into Mine Development

Sabina`s intent is to progresses directly into mine development shortly following the SPW. This means that the overall Project permitting process is completed during the SPW and there is no or a known, finite, negligible/insignificant period of time between the SPW and mine development. Under this scenario, no closure and reclamation activities related to SPW are required; this scenario would null and void this Plan, and all closure and reclamation activities will be completed as per a future MCRP approved under Sabina`s Type A Water Licence.

Scenario 2: Delay Between SPW and Mine Development

This scenario assumes an unspecified period of time between completion of the SPW and mine development. Under normal circumstances, Sabina would continue to operate its camp seasonally with shut-down periods. The scale of the camp is such that full-time presence on-site is not required. Under this scenario, Sabina would have to relinquish control of the site. The landowner would need to conduct an initial site visit with a contractor to confirm site conditions and that there are no unnecessary risks to be addressed between the time of receivership and implementation of the abandonment and restoration measures the following summer (for example, unsecure explosives or fuel storage; an open camp exposed to the elements, etc.). The cost for such an initial visit has been included as an interim care and maintenance cost.

Scenario 3: No Mine Development

This scenario assumes that the Project will not progress into mine development as the Project is proposed by the end of the SPW. Under this scenario, there will be no mine development and the abandonment and restoration measures described in this document will be implemented.

1.7 CLOSURE OBJECTIVES AND CRITERIA

Closure Objectives

This A&R Plan is based on the objectives that follow.

Objective 1: Design for Closure

This involves identifying the processes and forces that may act upon the Project after closure and reclamation so that they can be factored into the Work. This includes adoption of the objectives outlined by AANDC (2007) as follows:

- Design and construct in such a way that they achieve, or can readily be modified to achieve, the reclamation objectives and closure criteria;
- Determine reclamation costs as part of the closure planning and provide adequate security to cover the cost of reclamation over the life of the mine to ensure the closure criteria can be met;
- Include reclamation planning in execution of the SPW. This planning will ensure that activities do not unnecessarily increase the amount of reclamation work or effectively compromise what might otherwise be promising reclamation activities, or that this A&R Plan is updated to reflect changed conditions on-site; and
- Incorporate progressive reclamation activities into SPW.

Objective 2: Achieve Physical Stability

Components that will remain after closure of SPW will be constructed or modified at closure to be physically stable so as to not erode, subside, or move from its intended location under natural extreme events or disruptive forces to which it may be subjected after closure. The objective of physical stability is to not pose a hazard to humans, wildlife, or environment health and safety.

Achieving physical stability includes establishing the conditions post-closure that allow for natural revegetation so that the land returns to productive use by wildlife. Active revegetation of the site as part of closure is not planned given the cold climate setting of the Project as well as the precedent established for closure in Nunavut.

Objective 3: Achieve Chemical Stability

The Project site, including wastes remaining after closure, will be chemically stable. Chemical constituents released from components should not endanger public, wildlife, or impact environmental health and safety. These constituents should not result in the inability to achieve the water quality objectives in the receiving environment and should not adversely affect long-term soil or air quality. If necessary, appropriate long-term management of ARD/ML materials and any affected waters will be considered.

Objective 4: Consider Future Use and Aesthetics

The site will be compatible with the surrounding lands once reclamation activities have been completed. Consideration of future use and aesthetics involves the following elements:

- Naturally occurring biophysical conditions, including any physical hazards of the area;
- Characteristics of the surrounding landscape;
- Level of ecological productivity and diversity prior to mine development and intended level of ecological productivity and diversity for post-closure;
- Local community values and culturally significant or unique attributes of the land; and
- Level and scale of environmental impact.

Criteria

Thresholds will be identified in the environmental screening document and relevant management plans prepared for the SPW. Where these thresholds conflict with any discharge limits specified in the applicable water licences, the latter will govern.

1.8 FUTURE ITERATIONS OF THIS PLAN

The SPW is a short-term program and therefore future iterations of this plan are unlikely, unless activities that occur on site differ substantially from the activities contemplated in this plan. Future updates to the Plan will reflect project modifications, provide additional details and closure costs, and account for potential changes in technology, standards or legislation.

1.9 APPROACH TO INCLUSION OF COMMUNITY VALUES

Sabina will consider incorporating feedback from the communities or the regional Inuit association on this A&R Plan during the public comment period associated with the environmental screening by the NIRB.

2. Progressive Reclamation

2.1 DEFINITION OF PROGRESSIVE RECLAMATION

Progressive reclamation is defined as the opportunistic reclamation activities completed during the operational phase of a project (AANDC, 2007). Progressive reclamation can increase efficiencies by utilizing available resources to conduct reclamation activities during the SPW. Progressive reclamation typically reduces the final closure costs as well as the duration of closure and reclamation activities.

2.2 CANDIDATE FACILITIES/AREAS AND RECLAMATION ACTIVITIES

Progressive reclamation efforts will be focused on any final earthworks opportunities that present themselves, including:

Quarries

- Establish partial or full safety berms or boulder fences around excavation areas;
- Install proper signage around excavation areas; and

- Stockpiling overburden and blasted rock in final locations with stable side slopes.

<u>Buildings and Infrastructure</u>

- As buildings and infrastructure become unnecessary, they can be removed and the sites will be reclaimed as much as practicable.

<u>Contaminated Materials and Waste Disposal</u>

- Materials (soil, snow, ice) that may become contaminated during SPW due to fuel or other spills can be cleaned up and even backhauled off-site immediately following the spill;
- Hazardous wastes will be shipped off-site periodically to minimize the amount of waste requiring removal at closure; and
- Any remaining explosives will be safely detonated on-site or removed from site at the conclusion of the program.

2.3 PROGRESSIVE RECLAMATION SCHEDULE

Progressive reclamation activities at the quarries can be completed as material becomes available to construct boulder fences and spillways.

Progressive reclamation measures will be considered successful if they are completed as described in this section and monitoring confirms that the completed work is physically and chemically stable (i.e., there are no signs of erosion or settlement, and downstream water quality meets criteria).

3. Permanent Closure and Reclamation

3.1 DECISION TO CLOSE

As stated in Section 1.6, closure will occur under the scenario where the mine will not progress into development as it is proposed at the end of the SPW. Whatever the conditions, the mine would not be expected to be economic or operate for the foreseeable future.

3.2 OVERVIEW AND SCHEDULE

Abandonment and restoration activities are expected to take two summer months to complete. Winter closure activities are not contemplated. This will be followed by two years of post-closure monitoring (two annual site visits during the summer period).

Industry standard reclamation methods will be employed to close out the sites. Hazardous materials will be collected for off-site disposal including hazardous components of vehicles and equipment (i.e., fuel tanks, gear boxes and hydraulic oil). Equipment stripped of hazardous components will be stored in quarry. Buildings will be demolished and disposed of in the same quarry. Culverts will be removed from roads and the natural drainage restored, but the roads will otherwise remain intact. The airstrip will remain functional with a gravel surface to support closure, post-closure monitoring, and future mineral exploration activities.

Equipment and materials will only be stored at the MLA and no site development will be undertaken. As such, the only closure required will be to re-load the equipment and materials on another southbound sealift.

3.3 QUARRIES AND BORROW AREAS

One or two quarries will be developed as part of the SPW. Up to 550,000 m^3 of rock will be excavated from either the existing airport quarry ("Quarry A") and/or a quarry developed within the footprint of the future Umwelt open pit (the "Umwelt Quarry"). The total volume quarried will be 550,000 m^3. A Quarry Management Plan has been developed describing how the quarries will be developed and closed.

Closure measures common to both quarries includes:

- Placement of safety berms or boulder fencing around the excavation perimeters (mostly completed during operations as progressive reclamation); and
- Removal of equipment and materials from within the excavation areas.

The existing airport quarry ("Quarry A") is a hillside excavation developed to be free-draining. The Umwelt quarry, if developed, will eventually flood to form a pond. The site-specific closure measures are described for each below.

Quarry A

The design of the quarry incorporates closure considerations. Sloping of the quarry floor will prevent the ponding of water. A safety berm was established along the highwall during quarrying activities in 2013. This safety berm will be extended as required during quarry expansion as a progressive reclamation measure or during final closure.

Any equipment, fuel and wastes will be removed. The quarry will be used for landfilling bulky, non-hazardous wastes at the conclusion of the program. In this instances, stockpiled rock and/or till overburden will be used to place a 1 m cover over landfilled materials. Overburden generated from development of Quarry A may be supplemented with overburden from the Umwelt Quarry.

Any remaining stockpiles will be inspected and re-contoured to ensure slopes are stable in the long term.

Umwelt Quarry

Once the desired volume of rock has been extracted from the quarry, it will be allowed to passively flood. Runoff from the stockpile located upgradient the quarry will be directed to the quarry. The overburden stockpile will be re-contoured as necessary to shed water. If necessary, a spillway on the low side of the quarry will be armoured with rip rap to reduce potential erosion. It is expected that the access ramp into the quarry will provide a suitable means of egress for any wildlife that may inadvertently enter the quarry.

The earthen diversion berm used to divert clean runoff away from the quarry and stockpile during operation will remain at closure to provide the necessary barrier to physical entry. This will be supplemented by a safety berm constructed around the perimeter of the quarry.

Borrow Area

A borrow pit is permitted under the exploration program for the extraction of minor volumes of sand and gravel. Limited extraction has occurred to date, and no meaningful extraction of sand and gravel is contemplated as part of the SPW. Closure of the borrow area will consist of re-grading as necessary so that the area is free draining, slopes are stable and resistant to erosion, and the extraction area fits with the surrounding landscape.

3.4 OVERBURDEN STOCKPILES

Overburden stockpiles will be generated at each of the quarries. Abandonment and restoration measures are described in Section 3.3 as part of quarry closure.

3.5 BUILDINGS AND EQUIPMENT

3.5.1 Buildings

The current inventory of buildings at the Goose Property are a mix of canvas tents, Weatherhaven™ tents, larger fabric Quonsets, and wood buildings, as listed in Table 3.1. This building inventory will remain unchanged through the SPW.

Table 3.1 Building Inventory

Qty	Item	Area (m^2)
11	Sleeping tents	228.9
29	Sleeping tents (wood sides)	517.3
2	Sleeping cabin (emergency shack)	41.6
1	Sleeping complex/medic (bunkhouse)	148.6
2	TV tents (wood sides)	41.6
1	Emergency response tents (Fire and airport emergency response)	26.4
1	Core processing facility (core shack, saw room, sample dispatch)	423.6
1	Kitchen/dining hall/cold storage	74.3
1	Dry (men's/women's/water storage & treatment)	142.3
1	Driller's dry	69.7
1	Office complex	303.2
2	Generator shacks (main and auxiliary power)	41.6
1	Drillers' office (old)	29.7
1	Shop building (Helicopter contractor)	17.8
1	Tool crib and storage	78.0
1	Drill Contractor' s Shop Building (old)	35.7
1	Drill Contractor' s Shop Building (new)	163.5
1	Oil storage shed	11.1
2	Quonsets (2 lined shops with dirt floor)	334.5
1	Warehouse	353.0
1	Exercise building	41.6
1	Sauna	15.6
1	Environment Building (1 office and 1 storage)	72.8
1	Incinerator Building	44.6
1	Potable Water Pump Shack	0.8

All buildings will be disposed of in an on-site landfill created in Quarry A. The developed area of the camp will be re-graded and contoured to remove uneven ground for public safety, minimize the potential for erosion, and to blend with the surrounding landscape.

3.5.2 Fuel Storage

Up to thirteen (13) 75,000 L capacity fuel tanks and 6 portable tidy tanks currently at site will be used for the SPW with no additional fuel capacity added. The tanks are shown in the photo below (Figure 3.1).

Figure 3.1 Fuel Storage Facilities

Fuel tanks will be emptied of all residual fuel. An excavator will pierce and open a side of each tank so that any residual fuel can be carefully removed and the empty tank conditions documented. The tanks will be crushed and disposed of in the landfill. Absorbent materials used to collect residual fuel will be disposed of in the camp incinerator.

3.5.3 Equipment

An inventory of equipment to be at the Goose Property during the SPW is provided in Table 3.2.

Table 3.2 Equipment Inventory

Heavy Equipment Summary	No. Units	Heavy Equipment Summary (Cont'd)	No. Units
Loader (Cat 966H)	1	Grader (Cat 140M)	1
Dozer (Cat D6N)	1	Packer (Cat C563)	1
Mobile Crusher	1	Water Truck	1
Mobile Screener	1	Drill (Cat MD5075)	2
Crusher Jaw	1	Primary generator (500kW)	2
Fuel Truck	1	Auxiliary generator (400kW)	1
Skid-steers (Cat 289)	2	**Light Equipment Summary**	
Loader (Cat IT28)	1	Snowmobiles	31
Tele-handler	1	ATVs	2
Low bed trailers	2	Kubota skid-steer	1
Challenger (Cat 755B)	1	Aluminum boats and motors	8
Tractor / Trailer	1	Waste incinerator	1
Ford Pick-ups	3	**Other Items**	
Dozer (Cat D7)	2	Bermed fuel storage area	1
Excavator (Cat 320E)		Lined containment area (drums, salt)	1
Articulated Trucks (Cat 730C)	3	Jetty and floating dock (14' x 20')	1

Equipment will be disposed of in an on-site landfill after any hazardous material has been removed. This will involve draining engines, gear boxes and fuel tanks. Waste oil and fuel will be incinerated using a waste oil burner, or will be removed from site to an approved disposal facility.

3.5.4 Equipment and Materials at MLA

The MLA is currently undeveloped. As part of the SPW, equipment, fuel and consumables will be delivered by sealift and moved to a storage location. Minimal to no ground preparation will be carried out. The proposed equipment and materials to be delivered to the MLA as part of the SPW is listed in Table 3.3.

Table 3.3 Inventory of Equipment and Materials at MLA

Item	No. Units	Item	No. Units
Excavator (Cat 349F)	1	Water Truck	1
Articulated Trucks (Cat 740B)	2	Tractor / Trailer	1
Dozer (Cat D6T)	1	Truck (1-ton)	2
Grader (Cat 140M)	1	Generator (125 kW)	2
Drill (Cat MD5075)	1	Camp Modules	15
IT Loader (Cat 930K)	1	Double Wall Fuel Tanks (100,000 L)	6
Packer (Cat CS56B)	1	Fuel Berms (136,000 L capacity)	6
Crane (65RT)	1	Explosive Magazine (40ft)	1
Mobile Crusher	1	Explosive Magazine (20ft)	1

Mobile Screener	1	Steel for 10 ML Fuel Tank	1
Fuel Truck	1	Swamp Mats (8'x14')	300
Mechanic Truck	1	Portable Shop	1

Abandonment and restoration activities at the MLA involve a sealift going to the MLA to demobilize all equipment and materials.

3.6 ROADS AND AIRSTRIPS

Since the Back River Project is a promising project in the advanced exploration phase, it is expected that the Project will be developed at some point in the future if not in the near term as proposed by Sabina. As such, roads and an intact airstrip are important assets that can support future exploration or mine development at the Back River Project or nearby projects, provided that these features will be physically stable in the long-term.

Culverts will be removed from the access road and the natural drainage restored. The access road will otherwise remain intact to facilitate long-term site access. The airstrip at the Goose Property will remain intact. All equipment and materials will be removed.

3.7 PIPELINES AND POWER DISTRIBUTION LINES

Pipelines at the Goose Property will consist of the freshwater intake and grey water pipelines, and electrical wiring that is on surface or shallow buried. These features dismantled and disposed of in a landfill. There will be no overhead power lines or transformers.

3.8 WATER MANAGEMENT SYSTEMS

Ditches and berms related to the quarries will remain in place to continue to direct runoff to the identified receiving environment during the post-closure period (see Section 3.3). There will be no water management ponds associated with the SPW.

An important element of the SPW is construction of the Rascal Lake Outflow Stream Realignment. One of the Rascal Lake outflows currently intersects the extended airstrip footprint, and a realignment of the natural watercourse will be completed to divert the water to Gander Pond (Figure 1.1). The realignment will involve the construction of two berms at the locations shown on Figure 1.1. The realignment will remain into closure.

3.9 CHEMICALS AND EXPLOSIVES

Hazardous material will include: unused chemical reagents, unused explosives, unused fuel, used oil, used glycol, and the hazardous components of vehicles and related equipment (i.e., fuel tanks, gear boxes and hydraulic oil). All hazardous materials will be removed from the site and transported to a licensed facility for disposal.

3.10 CONTAMINATED SOIL

Soil found to exceed applicable Nunavut Site Remediation criteria will be excavated, placed into tote bags, and transported off-site for disposal at a licensed disposal facility.

3.11 ABANDONMENT AND RESTORATION SCHEDULE

The schedule for active closure of the SPW is expected to take up to two months, with the work completed during the summer months. A close-out inspection will be conducted with land and water inspectors at the conclusion of the reclamation program, and summer site visits will be conducted for two years following, to confirm that reclamation objectives have been met.

3.12 EXPECTED CONDITIONS POST-CLOSURE

The final landscape at the Goose Property and MLA is expected to consist of a disturbed Project footprint that is physically and chemically stable in the long term.

At the Goose Property, the airstrip and access road will remain intact, and the Rascal Lake outflow stream realignment will also remain. There will be evidence of a previous camp where the ground surface has been disturbed. Quarry A will have been partially backfilled with equipment and materials as a landfill, with an earthen cover, and the Umwelt Quarry will consist of a partially filled to filled pond. Runoff from the adjacent overburden stockpile will be reporting to the quarry pond.

At the MLA, there will likely be some evidence of ground disturbance where materials and equipment were stored and transported between the barge and the laydown area.

3.13 POST-RECLAMATION RISKS TO HUMAN AND ENVIRONMENTAL HEALTH

The activities associated with the SPW are limited mainly to earthworks. No chemically reactive rock is expected to be exposed and physical hazards will have bene mitigated through the use of safety berms and covers. As such, the post-reclamation risks to human and environmental health are expected to be minimal.

4. Monitoring

Monitoring will be carried out during abandonment and restoration activities to confirm that:

- Abandonment and restoration activities are being undertaken as identified in the Plan;
- Embankments, stockpiles, and other structures are physically stable; and
- Water quality being discharged from quarries all meet water quality objectives.

Post-closure monitoring is expected to be required for two years after departure from site. A site visit will be conducted by a geotechnical engineer and qualified environmental professional once each summer, likely accompanied by the land and/or water inspector if available. The geotechnical engineer will inspect the physical stability of embankments, stockpiles, excavation walls, and other areas. The environmental professional will collect water quality samples at water licence monitoring locations. A site inspection report will present the results of inspections and sampling, and supported by a detailed photographic log, will document site conditions. The report will be filed with the landowners and the Nunavut Water Board.

4.1 ADAPTIVE MANAGEMENT

Adaptive management will be undertaken as appropriate. This may include:

- Modifying the content of this A&R Plan to reflect unexpected conditions, or proposed changes in the closure approach based on new information. Prior to implementing the A&R Plan, such changes would appear in an updated document. During abandonment and restoration activities, any changes would be discussed with the land owner and water inspector, with follow up in writing; and

- Conducting additional post-closure monitoring or implementing further mitigation measures, if required.

5. Estimated Closure and Reclamation Costs

The estimated liability of the SPW, inclusive of all current liabilities at the Goose Property, is $2,354,950. Table 5.1 provides a breakdown of the costs, with a detailed cost breakdown provided in Appendix A.

AANDC's RECLAIM model, Version 7 (dated March 26, 2014) was used to establish the costs to execute this A&R Plan. Where available, Sabina's actual costs based on operation of its exploration camps or contractor quotes for the SPW program were used and adjusted to represent third-party costs. Where site-specific costs were not available, the unit rates in the RECLAIM model were applied.

The assumptions upon which the cost estimate was prepared are listed below.

- All work will be completed by a third-party contractor
- All reclamation work will occur during the summer months; it is estimated that 2 months will be sufficient time to complete all the works.
- The camp will not require continuous attendance by care and maintenance staff, since the camp is currently fully shut down in the off-seasons. An allowance has been made for the third-party to visit and inspect the site to ensure that the camp is found in a secure state in advance of an upcoming summer reclamation program.
- The existing camp will be in usable condition to house the reclamation crew
- The heavy equipment on-site will be unusable, and will be decontaminated and landfilled at site
- The following equipment will be mobilized to site to complete reclamation work:
    - CAT 320 excavator (1)
    - Tandem dump truck (3)
    - CAT D6 Dozer (1)
    - CAT 930 Loader (1)
    - Pickup Truck (2)
    - Minor tools and equipment and truck tires
- Equipment will be mobilized and demobilized from site using 5 trips each way with a Hercules aircraft
- An estimated 100,000 L of fuel (combined diesel and Jet A fuel) will be left at site and will be unusable, requiring disposal. Fuel will be removed from site by Hercules aircraft (5 flights) and will require paid disposal in Yellowknife.
- A total of 75,000 L of fuel required to operate mobile equipment and the camp during the 2-month summer will be airlifted to site from Yellowknife (4 flights)

- Since explosives will be delivered to site by air approximately every 5 days, one delivery of explosives is the maximum on-site requiring disposal;
- Both quarries are fully developed and require closure;
- The extended airstrip is capable of landing Hercules aircraft;
- All bulky non-hazardous wastes to be landfilled in a quarry, and only hazardous waste is removed from site (including used engine oil, hydraulic oil, gear oil, and antifreeze) for disposal in a licenced facility;
- The airstrip will be left intact to facilitate closure, post-closure monitoring, and future exploration and mine development activities;
- The access road will be left intact but culverts will be removed; and
- Two years of post-closure monitoring will be completed, with a site inspection conducted by a Geotechnical Engineer and an Environmental Technician/Scientist each summer.

Table 5.1 SPW Closure Cost Summary

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT	Umwelt Quarry	$36,068	$29,360	$6,708
	Airport Quarry	$27,525	$27,525	$0
UNDERGROUND MINE	None	$0	$0	$0
TAILINGS FACILITY	None	$0	$0	$0
ROCK PILE	Umwelt Quarry Overburden Stockpile	$1,913	$0	$1,913
BUILDINGS AND EQUIPMENT	Access Road	$2,132	$2,132	$0
	Goose Camp	$310,063	$310,063	$0
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT	Goose Camp	$235,903	$235,903	$0
SURFACE AND GROUNDWATER MANAGEMENT	Goose Camp	$1,300	-	$1,300
INTERIM CARE AND MAINTENANCE	Goose Camp	$10,000	-	$10,000
	SUBTOTAL: Capital Costs	**$624,904**	**$604,984**	**$19,920**
	PERCENT OF SUBTOTAL		**97%**	**3%**

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION		$1,465,066	$1,418,364	$46,702
POST-CLOSURE MONITORING AND MAINTENANCE		$140,000	$135,537	$4,463
ENGINEERING	5%	$31,245	$30,249	$996
PROJECT MANAGEMENT	5%	$31,245	$30,249	$996
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	0%	$0	$0	$0
BONDING/INSURANCE	0%	$0	$0	$0
CONTINGENCY	10%	$62,490	$60,498	$1,992
MARKET PRICE FACTOR ADJUSTMENT	0%	$0	$0	$0
	SUBTOTAL: Indirect Costs	**$1,730,046**	**$1,674,898**	**$55,149**

TOTAL COSTS	**$2,354,950**	**$2,279,881**	**$75,069**

6. Glossary of Terms, Acronyms, or Abbreviations

6.1 GLOSSARY OF TERMS

Abandonment: The permanent dismantlement of a facility so it is permanently incapable of its intended use. This includes the removal of associated equipment and structures.

Active layer: The layer of ground above the permafrost which thaws and freezes annually.

Backfill: Material excavated from a site and reused for filling the surface or underground void created by mining.

Berm: A mound or wall, usually of earth, used to retain substances or to prevent substances from entering an area.

Care and Maintenance: A term to describe the status of a mine when it undergoes a temporary closure.

Closure: When a mine ceases operations without the intent to resume mining activities in the future.

Closure Criteria: Detail to set precise measures of when the objective has been satisfied.

Contaminant: Any physical, chemical, biological or radiological substance in the air, soil or water that has an adverse effect. Any chemical substance with a concentration that exceeds background levels or which is not naturally occurring in the environment.

Contouring: The process of shaping the land surface to fit the form of the surrounding land.

Decommissioning: The process of permanently closing a site; removing equipment, buildings and structures. Rehabilitation and plans for future maintenance of affected land and water are also included.

Disposal: The relocation, containment, treatment or processing of unwanted materials. This may involve the removal of contaminants or their conversion to less harmful forms.

Drainage: The removal of excess surface water or groundwater from land by natural runoff and permeation, or by surface or subsurface drains.

Effluent: Treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond or a treatment plant.

Erosion: The wearing away of rock, soil or other surface material by water, rain, waves, wind or ice; the process may be accelerated by human activities.

Groundwater: All subsurface water that occurs beneath the water table in rocks and geologic formations that are fully saturated.

Landfill: An engineered waste management facility at which waste is disposed by placing it on or in land in a manner that minimizes adverse human health and environmental effects.

Leachate: Water or other liquid that has washed (leached) from a solid material, such as a layer of soil or water; leachate may contain contaminants.

Mitigation: The process of rectifying an impact by repairing, rehabilitating or restoring the affected environment, or the process of compensating for the impact by replacing or providing substitute resources or environments.

Monitoring: Observing the change in geophysical, hydrogeological or geochemical measurements over time.

Objectives: Objectives describe what the reclamation activities are aiming to achieve. The goal of mine closure is to achieve the long-term objectives that are selected for the site.

Permafrost: Ground that remains at or below zero degrees Celsius for a minimum of two consecutive years.

Progressive Reclamation: Actions that can be taken during mining operations before permanent closure, to take advantage of cost and operating efficiencies by using the resources available from mine operations to reduce the overall reclamation costs incurred. It enhances environmental protection and shortens the timeframe for achieving the reclamation objectives and goals.

Reclamation: The process of returning a disturbed site to its natural state or one for other productive uses that prevents or minimizes any adverse effects on the environment or threats to human health and safety

Rehabilitation: Activities to ensure that the land will be returned to a form and productivity in conformity with a prior land use plan, including a stable ecological state that does not contribute substantially to environmental deterioration and is consistent with surrounding aesthetic values.

Remediation: The removal, reduction, or neutralization of substances, wastes or hazardous material from a site in order to prevent or minimize any adverse effects on the environment and public safety now or in the future.

Restoration: The renewing, repairing, cleaning-up, remediation or other management of soil, groundwater or sediment so that its functions and qualities are comparable to those of its original, unaltered state.

Revegetation: Replacing original ground cover following a disturbance to the land.

Runoff: Water that is not absorbed by soil and drains off the land into bodies of water. Scarification: Seedbed preparation to make a site more amenable to plant growth. Security Deposit: Funds held by the Crown that can be used in the case of abandonment of an undertaking to reclaim the site, or carry out any ongoing measures that may remain to be taken after the abandonment of the undertaking.

Sediment: Solid material, both mineral and organic, that has been moved by air, water, gravity, or ice and has come to rest on the earth’s surface either above or below sea level.

Surface Water: Natural water bodies such as river, streams, brooks, ponds and lakes, as well as artificial watercourses, such as irrigation, industrial and navigational canals, in direct contact with the atmosphere.

Temporary Closure: When a mine ceases operations with the intent to resume mining activities in the future. Temporary closures can last for a period of weeks, or for several years, based on economic, environmental, political, or social factors.

Watershed: A region or area bordered by ridges of higher ground that drains into a particular watercourse or body of water.

Water Table: The level below where the ground is saturated with water.

6.2 ACRONYMS AND ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
ARD	Acid Rock Drainage
A&R Plan	Abandonment and Restoration Plan
BIF	Banded Iron Formation
EEM	Environmental Effects Monitoring
EIS	Environmental Impact Statement
INAC	Indian and Northern Affairs Canada
IOL	Inuit Owned Land
KIA	Kitikmeot Inuit Association
ML	Metal Leaching
MLA	Marine Laydown Area
MCRP	Mine Closure and Reclamation Plan
NLCA	Nunavut Land Claims Agreement
NIRB	Nunavut Impact Review Board
nPAG	Non-potentially Acid Generating
NWB	Nunavut Water Board
PAG	Potentially Acid Generation
Sabina	Sabina Gold & Silver Corp.
the Project/Property	Back River Project/Property
uPAG	Uncertain Potentially Acid Generating

7. References

Aboriginal Affairs and Northern Development Canada. (2007). *Mine Site Reclamation Guidelines for the Northwest Territories*. January.

Aboriginal Affairs and Northern Development Canada. (2002). *Nunavut Mine Site Reclamation Policy for Nunavut: A Policy for the protection of the environment and the disposition of liability relating to mine closures in Nunavut*. ISBN 0-662-32073-5. Copyright: Minister of Public Works and Government Services Canada.

Canada. (2013). *Nunavut Waters Regulations*. SOR/2013-69.

Canada. (2002). *Nunavut Waters and Nunavut Surface Rights Tribunal Act*. S.C. 2002, c. 10.

Canada. (2001). *Transportation of Dangerous Goods Regulations*. SOR/2001-286.

Canada. (1993). *Nunavut Land Claims Agreement Act*. S.C. 1993, c. 29.

Canada. (1992). *Transportation of Dangerous Goods Act, 1992*. S.C. 1992, c. 34.

Canada. (1985a). *Arctic Waters Pollution Prevention Act*. R.S.C., 1985, c. A-12.

Canada. (1985b). *Fisheries Act*. R.S.C., 1985, c. F-14.

Canada. (1985c). *Territorial Lands Act*. R.S.C., 1985, c. T-7.

Canada. n.d. *Arctic Waters Pollution Prevention Regulations*. C.R.C., c. 354.

Canada. n.d. *Territorial Lands Regulations*. C.R.C., c. 1525.

Nunavut. (1995). *Mine Health and Safety Regulations*. NWT Reg. (Nu) 125-95.

Nunavut. (1994). *Mine Health and Safety Act*. SNWT (Nu) 1994, c 25.

Nunavut. (1988a). *Environmental Protection Act*. RSNWT (Nu) 1988, c E-7.

Nunavut. (1988b). *Environmental Rights Act*. RSNWT (Nu) 1988, c 83.

Rescan Environmental Services Ltd. (Rescan). 2013. Back River Project: Geochemical Characterization and Metal Leaching / Acid Rock Drainage Potential Report. Prepared for Sabina Gold & Silver Corp. PROJ#0194096-0040-0007, Rev. A.1, dated October 2013.

Sabina Gold & Silver Corp. (Sabina). (2013). *Environmental Policy* [webpage]. Accessed on October 8, 2013. Located at: http://www.sabinagoldsilver.com/s/environmental_policy.asp.

SRK Consulting (Canada) Ltd. *Geochemical Characterization Results for the Umwelt Quarry*. Memo dated October 1, 2014.

APPENDIX I

OIL POLLUTION EMERGENCY PLAN

Sabina
GOLD & SILVER CORP.

Back River Project

Marine Laydown Area
Oil Handling Facility

Oil Pollution Emergency Plan
2015 Operating Season

October 2014

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Universal Transverse Mercator	(UTM)
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OIL HANDLING FACILITY DECLARATION

Pursuant to paragraph 168(1) (b) of the *Canada Shipping Act, 2001*, Sabina Gold & Silver Corp declares that:

(a) to comply with the regulations made under paragraph 182(a) of the Canada Shipping Act, 2001, on the detection of an oil pollution incident that arises out of the loading or unloading of oil to or from a ship, the measures as outlined in the Back River Project, Marine Laydown Area - Oil Handling Facility, Oil Pollution Emergency Plan shall be implemented.

(b) ~~in accordance with paragraph 168(1)(a) of the *Canada Shipping Act, 2001*, I have an arrangement with the certified response organization known as *~~

~~(Name of response organization)~~

~~The arrangement is with respect to ________________ tonnes of oil~~

~~(Number of tonnes)~~

~~and in respect of ____~~

~~(Geographic location of the oil handling facility)~~

*** NOTE: In accordance with paragraph 168(2) of the *Canada Shipping Act, 2001*, the requirements under paragraph 168(1)(a) and 168(1)(b)(ii) do not apply.**

(c) ~~the persons listed below are authorized to implement the arrangement described in paragraph (b):**~~

**** NOTE: In accordance with paragraph 168(2) of the *Canada Shipping Act, 2001*, the requirements under paragraph 168(1)(b)(iii) do not apply in respect to the arrangement described in paragraph (b).**

(d) the persons listed below are authorized to implement the oil pollution emergency plan required by paragraph 168(1)(d) of the *Canada Shipping Act, 2001*:

Title	Name	Telephone No.
Environmental Superintendent	Cheryl Wray	(778)-588-1999
Environmental Coordinator	Merle Keefe	(778)-588-1999
Operations Superintendent	Rick Peter	(779)-588-5995
Manager, Site Operations	John Laitin	(604) 998-4187
VP Environment & Sustainability	Matthew Pickard	(604) 998-4175

Date: October 1, 2014

Sabina Gold & Silver Corp. ______________________________ Wes Carson, Vice President, Project Development

PREAMBLE

This Oil Handling Facility, Oil Pollution Emergency Plan (OPEP) for the Back River Project Marine Laydown Area - Oil Handling Facility shall be in effect at the commencement of operations 2015.

Formal distribution of the Plan shall be made to:

Transport Canada
Box 8550,
344 Edmonton Street (RMW),
Winnipeg, Manitoba, R3C 0P6

Additional copies and updates of this Plan may be obtained from:

Sabina Gold & Silver Corp
Sabina Gold & Silver Corp.
202 - 930 West First Street
North Vancouver, BC
V7P 3N4
Tel : 604-998-4186

Or :

Navenco Marine Inc.
Attn: Todd Mitchell
350 boul. Ford, Suite 130
Chateauguay, QC, J6J 4Z2
Tel : (450) 698-2810
info@navenco.com

Environmental Policy

Sabina Gold & Silver Corp. takes its responsibility to act as a steward of the environment seriously.

To fulfill this responsibility, Sabina strives to:

- Ensure that we design our activities and operate in compliance with all environmental regulations to minimize our impact on the environment.
- Promote responsibility and accountability of managers, employees, and contractors to protect the environment and make environmental performance an essential part of the management/contractor review process.
- Provide resources, personnel, and training to enable management, employees, and contractors to implement programs and policies to protect the environment.
- Communicate openly with employees, contractors, local stakeholders, and government on our environmental protection and sustainability programs and performance. We will also address any concerns pertaining to potential hazards and impacts.
- Promote the development and implementation of systems and technologies to reduce environmental risks.
- Establish and maintain appropriate emergency response plans for all activities and facilities.
- Maintain a self-monitoring program at each facility to ensure compliance and to proactively address plans to correct potential deficiencies.
- Work cooperatively with government agencies, local communities, and contractors to develop and enhance systems and technologies to improve environmental and sustainability practices.
- Encourage all employees, contractors, and stakeholders to report to management any known or suspected departures from this policy or its related procedures.

1. INTRODUCTION AND BACKGROUND

1.1. Purpose and Scope

The Back River Project, Marine Laydown Area, Oil Handling Facility (MLA-OHF), Oil Pollution Emergency Plan (OPEP) was developed to specifically assist in implementing measures to protect the marine environment and minimize impacts from potential spill events. The Plan outlines potential spill scenarios, and provides specific procedures for responding to spills while minimizing potential health and safety hazards and environmental damage. The OPEP provides instructions to guide all personnel in emergency spill response situations, defines the roles and responsibilities of management and responders and outlines the measures taken to prevent spills, the related exercise and evaluation programme, and the mechanism for regular updates to the plan.

1.2. Legislative Requirement

The *Canada Shipping Act*, 2001, stipulates that operators of designated oil handling facilities must have an on-site oil pollution emergency plan.

The MLA-OHF, OPEP takes into account the requirements of the Canada Shipping Act, 2001, part 8, subsections 168. (1), 168. (2) and 168. (3). Although the subsection 168 (2) is applicable, as the MLA-OHF site is located North of 60', therefore the subsections 168. (1) (a), 168. (1) (b) (ii), 168. (1) (b) (iii) do not apply.

The Canada Shipping Act Response Organizations and Oil Handling Facilities Regulations (SOR/95-405) applies.

The Oil Handling Facilities Standards, TP12402 applies.

Pollutant Discharge Reporting Regulations, 1995 - SOR/95-351 applies.

Vessel Pollution and Dangerous Chemical Regulations, (SOR 2012-69) applies.

1.3. Links to Sabina Gold & Silver Corp. Spill Contingency & Emergency Response Plan (SCERP)

Spills of all types, both marine and land based, are addressed in the Sabina Gold & Silver Corp. (Sabina), Back River Project (The Project) "Spill Contingency & Emergency Response Plan" (SCERP) which is a separate document. The SCERP addresses a wider scope of operations and includes storage areas other than the MLA-OHF. The SCERP also addresses other materials including soluble solids such as ammonium nitrate prill, liquids such as glycols and paints, corrosive liquids including sulphuric acid and sodium cyanide, compressed (inert and flammable) gas, and other hazardous substances.

The MLA-OHF OPEP has been designed specifically to compliment the Back River Project SCERP document. The OPEP is not to be construed as to supersede existing emergency response plans, rather it is conceived to address the specifics of the fuel storage facility, the bulk incoming transfer of fuel, and spill scenarios directly relating to this operation.

2. PLANNING STANDARDS

In the preparation of the MLA-OHF OPEP, the standards as outlined in the Oil Handling Facility standards, TP 12402 have been employed.

2.1. Facility Category

Based on the ship to shore maximum pumping rate of less than 149 m3/hr, the MLA-OHF is classified as a level 1 facility. Spill scenarios have been developed and are outlined in section 8 of this plan. The minimum size of an oil pollution incident for which a response is described in this OPEP is 1m3.

2.2. General Planning Guidelines

Beyond the requirements of the CSA and the Oil Handling Facilities Standards, Sabina recognizes the unique nature of the geographical location and the challenges inherent in mounting a response to a pollution incident.

All spill contingencies for Bathurst Inlet must take into consideration the diverse elements that might define, simplify, or even reduce the possibility of taking action. The harsh climate, the remoteness, transportation difficulties (for personnel and goods), limited availability of manpower in case of oil spills, and the lack of infrastructure in case of a fire are all elements that can limit the response to take in this type of situation. Air transportation is the only transportation on a regular basis, but weather conditions may not be favorable, rendering a quick response difficult.

In the preparation of this plan, existing documents relating to the site specifications (physical, natural, and social conditions) have been utilized. In the preparation of the final plan and related Project SCERP, extensive consultations with local authorities shall be undertaken, with the goal of a cooperative response as an important part of an incident.

To specifically address the CSA and Oil Handling Facilities Standards, spill scenarios have been developed, taking into consideration among various factors the following:

(a) The nature of the oil product in respect of which the scenario is developed;

(b) The types of ships that are unloaded at the facility;

(c) The tides and currents that prevail at the facility;

(d) The meteorological conditions that prevail at the facility;

(e) The surrounding areas of environmental sensitivities that would likely be affected by an oil spill;

(f) The measures that will be implemented to minimize an oil pollution incident; and

(g) The time within which an effective response to an oil pollution incident can be carried out.

Several priorities have also been identified, among which include:

(a) The safety of the facility's personnel;

(b) The safety of the facility;

(c) The safety of the communities living adjacent to the facility;

(d) The prevention of fire and explosion;

(e) The minimization of the oil pollution incident;

(f) The notification and reporting of the oil pollution incident;

(g) The environmental impact of the oil pollution incident; and

(h) The requirements for cleaning up the oil pollution incident.

2.2.1 Response Time Standards

The operations and response structure at the MLA-OHF have been designed so that a rapid response to a spill incident can be carried out. All equipment and resources are strategically placed near the beach front, directly at the port operation site. Responders, workboats, and other support equipment are on standby during all facility operations. The deployment of equipment and resources required to contain and control the oil, or where the oil cannot be contained, to control the quantity of oil involved in the incident, up to the minimum spill size of 1 m^3 as determined in accordance with section 2 of the Oil Handling Facilities Standards, shall be on site and deployed on scene within 1 hour after the discovery of the oil pollution incident, unless deployment would be unsafe.

The equipment and resources required to recover and clean up the oil involved in the incident, up to the minimum spill size of 1 m^3 as determined in accordance with section 2 of the Oil Handling Facilities Standards, shall be deployed on scene as soon as practical and effective, within 6 hours of the oil pollution incident.

2.2.2 On-Water Recovery

On water recovery of spilled product shall be initiated immediately upon containment of free floating product. The skimming capacity projected for the MLA-OHF is capable of several times the recovery of the potential spill volume within the time standards after derating formula are applied.

2.2.3 Dedicated Facility Spill Response Equipment

The MLA-OHF shall be equipped with appropriate spill response equipment which provides resident capability for the response to spills in accordance with the scenarios which have been developed under this OPEP. Containment and recovery equipment inventories exceed the facility category planning standards and are especially appropriate for the potential spill volumes as outlined in the scenarios contained in the OPEP. A list of the equipment can be found in Annex 4.

3. MARINE LAYDOWN AREA – OIL HANDLING FACILITY

3.1. General Overview and Site Description

The proposed MLA-OHF is situated on the western shore of southern Bathurst Inlet at approximately 66°38.59' N and 107°42.69' W. A site overview plan showing its location is presented in Annex 1.

3.2. Oil Handling Facility and Infrastructure

The bulk fuel storage facility located at the MLA site for 2015 shall consist of six (6) land-based double walled 100,000 litre tanks at the temporary laydown area. A total of 600,000 litres is anticipated to be stored on site for 2015. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

The capacity of each instaberm will be equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greater. In calculating the volume, the footprint of the smaller tanks is subtracted. The above basis is consistent with the document entitled Design Rationale for Fuel Storage and Distribution Facilities published by the Department of Public Works of the Northwest Territories (GNWT 2006; refer to Section 4.6 of these guidelines). The design of these containment products will be based on Arctic installation and industry storage standards. Fuel transfer will incorporate hoses and pumps within tertiary containment.

3.3. Bathurst Inlet Physical Environment and Sensitivities

3.3.1 Inlet and Approaches

Bathurst Inlet is a deep fjord-type inlet along the northern coast of the Canadian mainland, within the territory of Nunavut. The entrance to the inlet is through Coronation Gulf between Cape Barrow

(68° 01' N, 110° 06' W) and Cape Flinders (68° 17' N, 108° 35' W), and the body extends over 20 km southwest into the mainland southof the Arctic Circle. It has a large network of irregular shores, and is littered with numerous islands, islets and rocks, most of which are described in greater detail by the Canadian Hydrographic Service (1994). Melville Sound extends eastward from northern Bathurst Inlet into Elu Inlet.

The main channel of Bathurst Inlet is relatively narrow (~2 to 15 km) and deep, with depths generally between 100 and 200 m depth, and maximum depth over 300 m in the northern basin near Omingmaktok (Bay Chimo). The most characteristic oceanographic features of the channel are several sills spread along the inlet, which result in rapid shoaling of the bathymetry to depths shallower than

50 m. The largest sill is near Manning Point at the centre of Bathurst Inlet, and the shallow bathymetry is accompanied by a narrowing of the channel width to less than 1.5 km between Quadyuk Island and the Tinney Hills. This sill approximately divides Bathurst Inlet in two major basins: the outer inlet that comprises all regions north of Manning Channel and contains the deeper, more complex bathymetry; and the inner inlet that runs landward from near Kingaok and has few islands and relatively simple structure with shallower depths between 100 and 150 m.

3.3.2 MLA-OHF Area

The MLA-OHF is proposed for the western shore of southern Bathurst Inlet. The deeply indented rocky shorelines in the region lead to steep bathymetry with narrow near-shore areas; a consequence of the inlet cutting through the massive granite rocks that characterize the surrounding Bathurst Hills Ecoregion. Hence, the MLA site consists of a long cobble/sand beach with a steep shoreline consisting of limited shallow areas (i.e., < 10 m) and follows a general 120 - 125° WSW heading. The water shelf extends orthogonally from the shore at a steep slope of approximately 20% to depths below 50 m about 240 m offshore. Beyond this distance, the seabed slopes more gently to depths below 150 m in the main inlet channel.

3.3.3 Bathymetric and Marine Data

Limited bathymetric and marine data is available for the Bathurst Inlet site. Charts 7791, 7792, and 7793 cover most of the area; however data within the shallow beach areas is limited.

The measured tidal heights for the inlet are small, with a maximum tidal range for spring tides (new and full moon) of around 0.4 m, and between 0.1 and 0.3 m for neap tides (first and third quarter moons).

Bathurst Inlet water circulation during open-water season is influenced by winds rather than by tides, with tidal currents likely significantly weaker than the down-slope density flows originating from freshwater discharge at the inlet surface.

The marine environment at the proposed Bathurst Inlet Bulk Storage Facility is characterized as a sheltered waters environment. As has been noted at the site, the prevailing winds generally provide sea conditions of onshore waves, varying in height from flat calm to less than 0.65 meter in average winds of less than 30 km/hr. Bulk transfer procedures established jointly by the OHF and the charterer preclude the transfer of bulk product when conditions become excessive, i.e. wave heights greater than approximately 0.7 m. This enhances the possibility of deploying pollution gear should an incident occur.

3.3.4 Meteorological Data

The Back River Project Atmospheric Environment Study (DEIS Volume 4: Atmospheric Environment) baseline data has been used to help in project design, for assessing potential effects on air quality, and for understanding trends in climate change.

The climate in the project area is characterized by extremes and is primarily subject to cold, dry Arctic air masses and American continental air masses from the south.

Long-term meteorological data is collected at Environment Canada – Meteorological Service of Canada (EC-MSC) meteorological stations. The closest stations which are currently operating are Lupin CS, and Kugluktuk A and CS meteorological stations. Climate normal data (arithmetic averages of climate elements over a prescribed 30-year interval) has been used from these EC-MSC stations. The most updated climate normals and extremes currently offered by EC are based on Canadian climate stations with at least 15 years of data between 1982 to 2010.

Project-specific meteorological baseline data collection commenced in August 2004 at the George and Goose meteorological stations which are located within the George and Goose properties, respectively.

These stations continue to be operational. Meteorological data are also available from the Bathurst Inlet Port and Road (BIPR) Project meteorological station, which has been located near the MLA in Bathurst Inlet since 2001.

The climate at the MLA consists of a winter period (October to May) of extremely cold mean monthly temperatures ranging from -33.0ºC to -1.3ºC and a cool spring, summer, and fall period (June to September) with mean monthly temperatures ranging from -0.3ºC to 14.5ºC.

Precipitation climate normals in the regional area range from 249.4 to 299.2 mm per year. Project meteorological station precipitation was measured as rainfall during the summer period only (June, July, August, and September), when temperatures were above freezing. During the 2006 to 2011 monitoring period, summer monthly rainfall ranged from 0 mm (September 2006) to 102 mm (August 2008). The summer total rainfall between June and September ranged from 4 mm (2006) to 211 mm (2008).

Wind speed data was collected during the measurement period (2006 to September 2012) specifically at the BIPR meteorological station. For the open shipping season, during the summer season (June to September), winds predominantly came from the north and northwest, 17% and 15% of the time respectively, more than 5 m/s 45% of the time, but less than 9 m/s approximately 86% of the time. On average, wind speeds during the summer were slightly slower than winter wind speeds.

3.3.5 Ice Conditions

Historically, consolidated first-year ice covers Bathurst Inlet from October to June. Ice break-up usually occurs in the first few weeks of July, after which open waters prevail until thin new ice forms around mid-October.

Environment Canada data documents the average sea ice freeze-up and break-up dates within the Canadian Arctic for the past 30 years. There has been significant temporal and spatial variation in the timing of break-up and freeze-up in southern Bathurst Inlet, as well as in the amount of ice present year-to-year. Environment Canada data is well documented for the area and includes the areas of Barrow Strait, Franklin Strait, and the area between Queen Maud and Coronation Gulfs. Ice data indicates an open shipping season of more than 60 days in the area of the MLA.

Observational evidence from the last few decades indicates that sea ice in the Arctic has been thinning and retreating earlier than historical reports (Stroeve et al. 2012). Most ice concentration records in the last 8 years have been lower than historical averages. The strongest changes occurred in the summer for the more northern straits, with several ice-free periods recently recorded where ice used to be present year-round. In 2012, Arctic sea ice was at the lowest recorded levels since ice monitoring by satellite began three decades ago (NSIDC 2012).

Ships sailing to Bathurst Inlet will arrive from western Canada thus bulk fuel deliveries at the MLA-OHF shall be limited to the period of open water only, and by ships of appropriate ice class for the marine shipping zone.

3.3.6 Sensitivities

As noted in Section 3.3.2. above, the MLA site consists of a long cobble/sand beach with a steep shoreline consisting of limited shallow areas (i.e., < 10 m) and follows a general 120 - 125° WSW heading. The water shelf extends orthogonally from the shore at a steep slope of approximately 20% to depths below 50 m about 240 m offshore. Beyond this distance, the seabed slopes more gently to depths below 150 m in the main inlet channel.

The 2013 Bathurst Inlet Marine Diesel Fuel Spill Modeling Study (Rescan, 2013) was completed to predict the fate of potential diesel fuel spills near the MLA in Bathurst Inlet during the open-water season. The spills were assumed to originate near the MLA site. The fuel spill modeling undertaken also addresses the potential for environmental damage from diesel spills resulting from transportation and storage of fuel near the proposed Project MLA.

In open-water diesel spills, a fraction of the diesel fuel becomes entrained into the upper water column immediately under slicks by direct solution or by entrainment of small oil droplets through current and wave action (Mackay et al. 1980; Kuiper and Van den Brink 1987; ITOPF 2011). Diesel fuel concentrations in this cloud of oil-contaminated water depend on the oil properties and the level of mixing energy (winds/waves). In theory, these concentrations may initially exceed the toxic thresholds of marine species present in the spill area. As the diesel fuel spreads under the influence of water currents, turbulent diffusion, and weathering processes, the hydrocarbon concentrations within it are reduced. In time, these diesel fuel concentrations will fall below the threshold levels that cause toxicity to living organisms and ultimately decline to background levels.

The diesel volume scenarios presented in the study were modeled under hundreds of different wind conditions, from which spill probability distribution figures were derived. Most of the diesel deposits were limited to the southern portion of the modeled inlet, and over two-thirds of the diesel quickly weathered out within the first 10 days of all simulations. In the detailed simulations prepared for the study, the diesel high probability distributions and spread resulting from a 20 kL diesel spill were only recorded directly near the MLA site; diesel very rarely spread in the areas outside of the MLA.

Marine birds are one of the more vulnerable and sensitive marine organisms to all types of oil spills.

However, unlike cruder distillates, diesel spills (particularly small ones ≤ 20,000 L) usually have limited impacts on marine bird wildlife due to the oils high volatility (NOAA 2013). While diesel is highly toxic when in direct contact with marine birds, the number of birds affected is usually small due to the short residence times on surface waters.

Numerous marine bird species have been documented in southern Bathurst Inlet (Rescan 2012b,

2013b). Ordered from commonly (i.e., over >200 individuals counted) to rarely (i.e., less than

30 individuals) observed, these are: Canadian goose; red-breasted merganser; greater scaup; black, white-winged, and surf scoters; herring and glaucous gulls; long-tailed duck; pacific, red-throated, and yellow-billed loons; and the common eider. Amongst these populations, the glaucous gull, long-tailed duck, and common eider are all listed as sensitive species in Nunavut (CESCC 2010).

Aside from the eider, all of these species have been recorded to forage and/or nest within a few kilometers of the MLA and in multiple areas around southern Bathurst Inlet. The observations occurred mainly in the late summer and fall when a number of birds were present in marine habitats for molting and staging purposes.

The approximate locality of each bird population within the study area has been included in the figures presented in Annex 3 of this OPEP. The birds were grouped in a few basic taxa to simplify the color scheme: duck (incl. mergansers, scaups, scoters, and long-tailed duck), goose, gull, and loon.

Any large groups of marine birds that were documented during baseline studies from 2010 to the present during any time of the year were thus mapped (Rescan 2012b, 2013b). Large groups are defined as any observation of a group of more than 10 individuals for any species of duck, loon, or gull, or any observation of a group of more than 25 individuals of a goose species.

In the assessments, the most apparent feature of Figure 5.3-1 contained in annex 3 is the lack of bird populations located near the MLA, which has by far the highest spill probabilities. Only a medium flock of geese and a brief observation of an unidentified fowl have been recorded within 4 km of the on-land MLA infrastructure. Conversely, the highest proportion of bird observations in the inlet is located in the small cove just south the MLA, which is seasonally inhabited by large groups of ducks and geese. Diesel particles appear to reach the cove only in <10% of simulations, and the results of the simulations indicate it would take several hours before a spill would reach the area. It is logical that birds would favor the southern cove relative to the MLA shoreline for nesting grounds, as the cove is relatively sheltered from the main currents driving the circulation in the main Bathurst Inlet channel. The alongshore currents near the MLA will disperse spills northwards.

Two other bird areas could potentially interact with diesel fuel spills: the northern shores directly across the main channel from the MLA, and the shores surrounding the peninsula to the south of the MLA. The former is largely inhabited by duck populations that span over 10 km of the coast. The diesel residual probabilities there still remain relatively low with respect to the MLA coast; some small areas can have probabilities as high as 30%, but on average most of the coast probabilities are <10%. The peninsula to the south, on the contrary, is far enough south to receive little diesel fuel overall, with only a few patches of <5% probabilities present.

The spill modeling summarizes that the wind conditions, current regime, and overall spill volume play a critical role in determining the fate of diesel spills within southern Bathurst Inlet. Regardless of diesel amounts, spills occurring in mild to moderate wind conditions generally did not progress past a few kilometers from the source location.

Preventive measures such as strict criteria for acceptable conditions for discharge are outlined in cargo transfer procedures and in section 9 of this plan. Preventive booming following any spill to protect sensitive areas of significant bird populations should be considered as outlined in the scenarios presented in section 8 of this plan. The hazing techniques and wildlife protection procedures as outlined in section 7.4 of this plan are of utmost importance.

4. SITE ACTIVITIES

4.1. Bulk Oil Transfer - Ship to Shore

For the 2015 operating season, a single bulk fuel delivery by barge of 600,000 litres of ultra-low sulphur diesel (ULSD) will take place during the open shipping season.

The fuel transfer shall take place by means of a single 4 inch hose between barge and the six 100,000 litre double walled storage tanks at the MLA-OHF. It is anticipated that the bow of the barge will be situated directly at the shoreline so that no floating hose shall be required for this operation.

It is expected that once cargo operations are underway, the ship will discharge at a rate not exceeding 149 m^3/hour.

The tides are not a major risk factor at this location. Wind force and direction are the dictating environmental factors during bulk transfer and criteria for acceptable conditions for discharge are outlined in cargo transfer procedures.

The tanks shall take varying times to fill, depending on the final pumping rates obtained. Accurate reconciliation of discharge & fill volumes through regular communication between barge & shore personnel is required to ensure the safe transfer of fuel and prevent any overfilling that could result in a spill.

The bulk transfer procedures are fully detailed in the standard operating procedures of the fuel supplier and are included in Annex 5 of this document.

4.2. Other MLA-OHF Operations

Other than the planned bulk fuel and transfers, no other port operations involving fuel are anticipated at the MLA-OHF for the 2015 season.

Dry cargo sealift operations are anticipated to occur at the MLA, however these will be separate from the operations of the bulk fuel storage facility and are not considered in this Oil Pollution Emergency Plan.

5. GENERAL RESPONSE TO MARINE SPILL EMERGENCIES

In order to effectively manage emergency response, SABINA has implemented a detailed emergency response structure that is applicable to all emergencies.

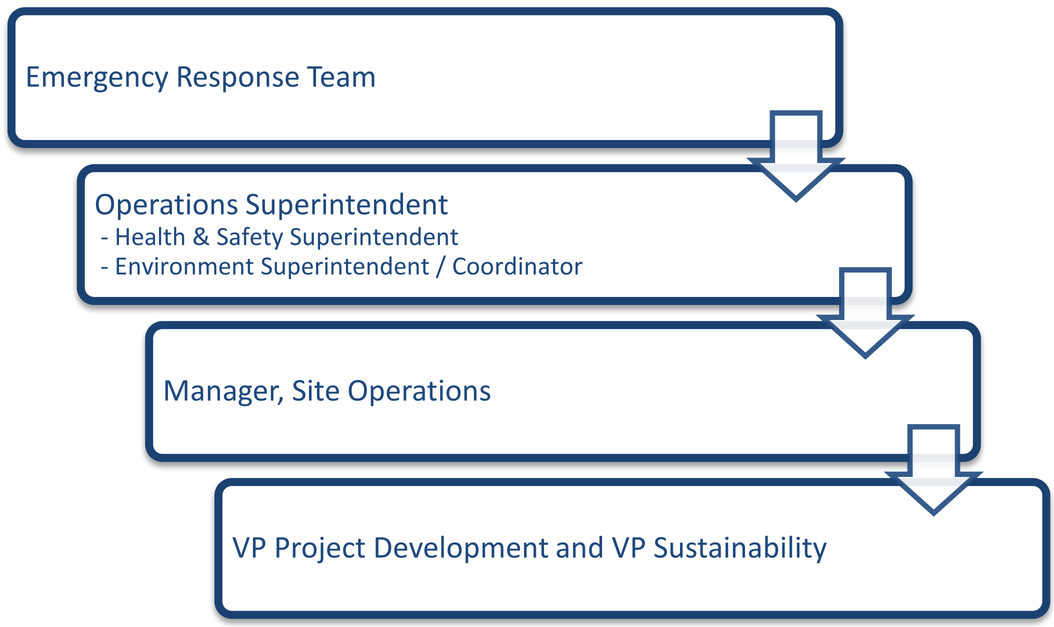


Figure 5.1: Marine Spill Response Organizational Chart

5.1. Response Management Structure

All spill procedures and response functions are to be implemented through the Emergency Response Team (ERT), which will be managed by the Operations Superintendent. Table 1 1 presents the management team responsible for overseeing emergency spill response operations and their contact information. The Emergency Response Organizational Chart is provided above, as Figure 5-1.

Once a spill event is reported, the Operations Superintendent establishes a specific strategy for containing and controlling the spill and initiates the cleanup activities. Other site personnel may act as technical advisers before and during the intervention. The trained Emergency Response Team will conduct all emergency spill response operations under the direction of the Operations Superintendent. During the cleanup phase of the intervention, other site personnel (e.g., heavy equipment operators, laborers) could be involved in the intervention.

5.2. Emergency Response Team

The Emergency Response Team will be structured from a worker volunteer base at site; this team will be overseen by the Operations Superintendent, or proxy, during an emergency response event. Acknowledging rotational work schedules, Sabina will maintain a sufficient numbers of responders at site at all times during MLA fuel off-loading operations.

5.3. Equipment and Personal Protection

In order to provide adequate response in case of spill events, Sabina maintains the appropriate type and quantity of response equipment and materials onsite.

Spill kits are strategically placed primarily in areas of fuel handling to facilitate immediate first response in the event of a hydrocarbon release to land. A complete list of spill response equipment is found in Annex 4 of this plan.

In addition to the spill response material, a variety of mobile heavy equipment, including excavators, front end loaders, bull-dozers, haul trucks, small workboat for in-land water use, and marine support boats, are available to aid in spill response and recovery efforts.

5.4. Communication

Effective communication systems are critical to the success of emergency responses. Personnel involved, from first person on scene to the Operations Superintendent, rely on the ability to quickly relay accurate information.

Communications available at the Project site during an emergency are listed below:

- Hand-held radio communication,
- Telephone,
- Satellite Phone, and
- Internet.

5.4.1 Hand-Held Radio Communication

During an emergency, the primary communications link between all emergency response personnel is through radio communication. Additionally, other individuals involved in emergency response will also carry hand-held radios as part of their regular work requirement.

During any emergency at site, radio communications are kept to a minimum. If radio silence is required, a designated member of the ERT will announce this. This ensures open and free communications among personnel involved in the direct response.

5.4.2 Telephone Communication

During an emergency, telephone communications will be used to:

- Notify internal personnel and resources.
- Notify external personnel and resources.

To supplement radio communications, the site telephone system may be used to alert site personnel during an emergency response.

Communications links with Corporate Sabina office may also be required during some emergency situations. Constant communications links will be established by telephone where offsite assistance is required (from Sabina, or external resources such as medical practitioners or SAR/Coast Guards).

5.5. Communication with the Public

Only authorized Sabina Senior Management shall provide external communication to the public during emergencies.

Local residents, community leaders, other stakeholders, and non governmental agencies will be contacted as appropriate. The designated officer(s) will coordinate dissemination of information to the media whenever necessary.

6. ROLES AND RESPONSIBILITIES

The initial stage of any spill or emergency incident and resultant response is critical. An effective and timely response is essential to minimize environmental impacts and prevent an emergency situation from escalating to a higher level. Therefore, all relevant personnel must be fully aware of their individual duties and responsibilities as presented in this OPEP.

6.1. All Employees (First Responders)

- Immediately warn other personnel working in the area;
- Evacuate the area if the health and safety of personnel is threatened;
- Notify direct supervisor or site superintendent, who will initiate the response operations;
- In the absence of danger, take any safe and reasonable measure to stop, contain, and identify the nature of the spill or emergency situation;
- • Participate in response as directed by the Operations Superintendent.

6.2. Emergency Response Team (ERT)

- Members determined by Operations Superintendent based on response needs;
- Members report to the scene of the incident;
- Work closely with the Operations Superintendent to determine appropriate response strategy;
- Contact departmental resources via radio as required during the emergency response;

- Direct ERT members in their respective tasks as required; and
- Participate in a post-emergency debriefing session.

6.3. Operations Superintendent

- Evaluate the initial situation and assess the magnitude of the emergency;
- Assemble and manage the ERT, as required;
- Develop an overall plan of action;
- Notify Manager, Site Operations, Health & Safety Superintendent, and Environmental Superintendent/Coordinator of incident.
- Report the spill to the Canadian Coast Guard (Central and Arctic region) 1-800-265-0237 (24-hour). The fax number for transmission of the written report is (519) 337-2498. Reporting of marine spills shall be in accordance with Transport Canada Guideline TP- 9834E, "Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and /or Marine Pollutants". Detailed harmful substances report requirements are outlined in Appendix A-2 of the guideline.
- Report the spill to NWT-NU 24-hour Spill Report Line at 867-920-8130, and ensure cleanup is completed to Sabina standards in line with direction from the Manager, Site Operations, Health & Safety Superintendent, Environmental Superintendent and Environmental Coordinator;
- Provide liaison with management to keep them informed of response activities;
- Act as the spokesperson with government agencies as appropriate;
- Document all actions and decisions;
- Collect photographic records of the event and response efforts;
- Participate in post-emergency debriefing;
- Assist in the accident/incident investigation process;
- Complete Government Agency notification processes;
- Document the cause of the emergency and effectiveness of the response effort, and recommend the appropriate measures to prevent a recurrence;
- Ensure that all involved departments complete reporting process; and
- Prepare and submit follow-up documentation required by appropriate regulators.

For marine spills at the MLA-OHF, the SABINA Environment Superintendent will be accessible to the Canadian Coast Guard during the entire incident.

6.4. Manager, Site Operations

- Provides advice and ensures response is completed to Sabina standards in line with direction from the Operations Superintendent and VP Sustainability;
- Ensures Emergency Response Team is adequately trained;
- Ensures emergency response and/or monitoring equipment and supplies are regularly inspected and maintained;
- Organize with Operations Superintendent emergency response training and exercises; and
- Lead investigation and identify measure and/or training to prevent similar incidents occurring.

6.5. Environmental Superintendent and Coordinator

- Provides advice and ensures incident is documented appropriately as per this plan and regulatory requirements;
- For spills: record date, location (GPS), material spilled, volume, reason for release, any negative impact, status of cleanup, and corrective actions taken; confirm these details with Operations Superintendent.
- For spills: obtain photographs of spill site before clean up starts, if possible, and after the cleanup has been completed. Take pictures of undisturbed area beside the spill area for a comparison. If spill occurs on snow, stake or otherwise identify the affected area so that it can be evaluated once the snow melts.
- As directed by the VP Sustainability and Site Superintendent, liaise with NWT/NU applicable agencies regarding on-going cleanup activities, inspections and incident closure;
- Assist in initial and ongoing response efforts;
- Provide advice to assist with cleanup;
- Co-ordinate inspections by applicable agencies; and
- Assist with investigation and identify measure and/or training to prevent similar incidents occurring.

6.6. Health & Safety Superintendent

- Assist in initial and ongoing response efforts;
- Provide advice to assist with response/cleanup; and
- Assist with investigation and identify measure and/or training to prevent incidents occurring.

6.7. VP Project Development and VP Sustainability

- Engage Legal Counsel and Sabina Senior Management and Board of Directors as required; and
- Notify and update Senior Management and Board members as required.

7. GENERAL SPILL PROCEDURES

The response to spills begins immediately when the spill has been detected. In all cases immediately upon detection of a spill, all transfer operations are to be shut down and not restarted in any manner that would interfere with the immediate, effective, and sustained response to the oil pollution incident.

This plan clearly outlines the notification procedure and the roles and responsibilities of Sabina's emergency response personnel ERT. All emergency telephone numbers are clearly listed and the persons are contacted as needed and according to the priority of the incident. The contact list is included in Table-1-1.

The ERT, following a spill, must ensure that personnel safety is their first priority. First and foremost, evaluate the risks as quickly as possible to guarantee that appropriate measures are taken to prevent or reduce the risk of injury to personnel, to avoid fire or explosion, to protect property and to minimize the damage to the environment. It is important to contain the spill and to start cleaning up as quickly as possible to stop the spill from contaminating a greater area.

Full details of the properties and hazards associated with potential spills of all products are found on the Material Safety Data Sheets (MSDS) in Annex 8 of this plan.

When responding to spills, all procedures and safety methods in handling the products must be observed. The following specific measures must be followed with spills on water or on land:

Take personal protective safety measures. Personal protective equipment must be worn at all times during response operations.

Close all electrical sources.

Take all appropriate measures to ensure personnel safety and the safety of the facility.

Request help to control personnel and vehicle access, and close the area. Never enter inside and/or within the radius of the contaminated area. Have a fire extinguisher close by. If a fire starts, extinguish the fire only if it is safe for you and that you were trained to do so without exposing yourself to unnecessary risks.

Through the spill training initiative, all spill response personnel will be fully briefed on the procedures to be followed to report a spill and initiate spill response. The first person to notice a spill will take the following steps:

1. Immediately warn other personnel working near the spill area;
2. Evacuate the area if the health and safety of personnel is threatened;
3. Notify an appropriate supervisor, who will initiate the spill response operations;
4. In the absence of danger, and before the spill response team arrives at the scene, take any safe and reasonable measure to stop, contain, and identify the nature of the spill.

All spill response actions carried out by the ERT will follow these general procedures:

Cease Transfer Operations - In all cases immediately upon detection of a spill, all transfer operations are to be shut down and not restarted in any manner that would interfere with the immediate, effective and sustained response to the oil pollution incident.

Source Control - Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as closing shore valves, sealing a puncture hole with almost anything handy (e.g., a rag, a piece of wood, tape, etc.), raising a leaky or discharging hose at a level higher than the product level inside the tank.

Control of Free Product - Prevent or limit the spread of the spilled material. Accumulate/concentrate spilled product in an area to facilitate recovery. Barriers positioned down-gradient of the spill will slow or stop the progression of the spill. Barriers can consist of absorbent booms, dykes, berms, or trenches (dug in the ground). Deployment of floating booms to contain a marine spill should be carried out by the spill response team as soon as safe and practical.

Protection - Evaluate the potential dangers of the spill in order to protect sensitive ecosystems and natural resources. Block or divert the spilled material away from sensitive areas where possible.

Clean up the Spill – Recover and containerize as much free product as possible. Recover contaminated soil, and water. Pressure-wash contaminated bedrock surfaces, shorelines, ice and recover as much as possible oily water for containerization and/or treatment.

Report the Spill - Provide basic information such as date and time of the spill, type and amount of product discharged, location and approximate size of the spill, actions already taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or the environment. Reporting requirements are presented in section 7.3 of this plan.

7.1. Health and Safety

Sabina and its senior management are committed to ensuring the health, safety and welfare of its employees, contractors, and visitors. As a consequence of this, Sabina requires all personnel to regard accident prevention and working safely as a collective individual responsibility.

Sabina conducts all site activities in accordance with all applicable Federal and Territorial health and safety regulations. The following applicable health and safety regulations apply to the activities described in this Oil Pollution Emergency Plan:

Northwest Territories, Nunavut Worker's Compensation Act - Provides the territorial legislation covering the health and safety of workers in Nunavut

Mine Health and Safety Act and Regulations (Nunavut) - Provides specific health and safety guidelines for mines operating in Nunavut .. Section 2(1) Duties and Responsibilities (the Owner)

Canada Labour Code Part II – Provides Federal regulations for the health and safety of workers involved in shipping and marine port operations

Sabina requires and provides WHMIS training for all employees and contractors throughout the Back River Project. Mines Health & Safety Act & Regulations : Part VI Regs. Training 6.03

It is also a requirement for supervisory personnel to hold a St John's Abulance Advanced First Aid (or equivalent) level 1 or level 2 certification as required by the Mine Health and Safety Act. Mines Health & safety Act & Regulations : Part V Regs. Supervision

Comprehensive general training is provided to spill responders throughout the Project in relation to on land spills. In addition, specific training with relation to safety during response to marine spills is provided to all responders through Sabina's marine spill training program. All responders who are involved in marine operations shall participate in the training as outlined in Section 9 of this Oil Pollution Emergency Plan.

7.1.1 Personal Protective Equipment (PPE) – Requirements

For all responders, personal protective equipment requirements shall be as follows:

MLA Site Services: (non-water operations, no contact with spilled product)

- Hard Hat
- CSA approved work boots
- Safety glasses
- Leather work gloves

- Orange/yellow retro reflective vests

MLA Site Services: (non-water operations, possible contact with spilled product)

- Hard Hat
- CSA approved work boots
- Safety glasses
- Orange/yellow retro reflective vests (if not wearing rain wear)
- PVC rain suit
- Nitrile work gloves

Workboat and shoreline responders: (beach or on-water operations, possible contact with spilled product)

- Hard Hat
- CSA approved work boots
- Safety glasses
- PVC rain suit
- Nitrile work gloves
- Approved personal flotation device

7.2. Coordination with Canadian Coast Guard and other Governmental agencies

7.2.1 Canadian Coast Guard

The response to spills at the MLA-OHF shall be managed in coordination with the Canadian Coast Guard who are the lead response agency north of 60°.

The Central & Arctic Regional Response Plan (2008) and the Kitikmeot Region, Nunavut Area Plan outline the Canadian Coast Guard's response capability for the region. This plan is a component of the Canadian Coast Guard National Response Plan which is the responsibility of the Director of Safety and Environmental Response Systems, Ottawa. It establishes the framework and the procedures by which Central & Arctic Region will prepare for, assess, respond to, and document actions taken in response to pollution incidents in this Region. This capability and the information contained in the Coast Guard plans are considered a valuable resource in the planning and response to spills at the MLA-OHF.

7.2.2 Environment Canada – National Environmental Emergencies Centre

The Canadian Coast Guard (lead agency) with primary jurisdiction for the spill, oversees and monitors response and recovery efforts by the responsible party and further, may request that Environment Canada provide scientific and technical advice to inform response actions that will reduce the environmental impact of the spill. Additionally, Environment Canada has legislative responsibility to address pollution incidents that impact federally managed resources such as fish and wildlife under the Fisheries Act and the Migratory Birds Convention Act, as well as hazardous substances regulated by the Environmental Emergency Regulations. Environment Canada may issue directions under its legislative mandate, if the environment is not being adequately protected and, when warranted take over the lead agency role.

In the event of a polluting incident that requires Environment Canada's involvement, the National Environmental Emergencies Centre (NEEC) is Environment Canada's focal point for the provision of scientific advice, such as weather forecasts, contaminant dispersion and trajectory modeling, fate and behavior of hazardous substances, the establishment of clean-up priorities and techniques, as well as the protection of sensitive ecosystems and wildlife such as migratory birds and fish. Environment Canada's Emergency officers have Hazardous Materials (HAZMAT) expertise which enables response in the event of spills involving hazardous materials.

7.2.3 Other Governmental Agencies

At all times, the response to spill incidents shall be coordinated with the various agencies as listed above.

7.3. Reporting Requirements

Three individual reporting requirements are applicable in the case of all marine spills. Procedures for each are outlined herewith:

7.3.1 Canadian Coast Guard Reporting Requirements

All spills of a marine nature will be reported to the Canadian Coast Guard (Central and Arctic region) 1-800-265-0237 (24-hour). The fax number for transmission of the written report is (519) 337-2498.

Reporting of marine spills shall be in accordance with Transport Canada Guideline TP- 9834E,

"Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and /or Marine Pollutants". Detailed harmful substances report requirements are outlined in Appendix A-2 of the guideline, a copy of which is included in Annex 9 of this plan.

7.3.2 Reporting to Transport Canada

The Vessel Pollution and Dangerous Chemical Regulations (SOR 2012-69) require that any spills be reported to the nearest office of Transport Canada as follows:

Jaideep Johar
Manager, Technical Services
Transport Canada, Marine Safety.
Prairie and Northern Region
Marine Safety Tel: 204 984 8618
Cell: 204 880 0754,Email:joharj@tc.gc.ca

Craig D. Miller
Manager, Marine Safety (PNR)
Transport Canada
Box 8550, 344 Edmonton Street, Winnipeg, MB, R3C 0P6
Email: craig.miller@tc.gc.ca
Telephone (204) 984-0397 / Facsimile, (204) 984-8417

Reporting of marine spills shall be in accordance with Transport Canada Guideline TP- 9834E,

"Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and /or Marine Pollutants". Detailed harmful substances report requirements are outlined in Appendix A-2 of the guideline, a copy of which is included in Annex 9 of this plan.

7.3.3 Government of Nunavut Reporting Requirements

Quantities of hazardous substances spilled that require reporting are listed in Schedule B of the Nunavut Spill Contingency and Reporting Regulation.

After the initial field emergency response to the spill event, spills are reported to the 24-hour Spill Report Line:

24-Hour Spill Report Line
spills@gov.nt.ca
Tel. (867) 920-8130 or
Fax (867) 873-6924

Failure to report a spill can lead to fines. The Kitikmeot Inuit Association (KIA) Lands Administrator will also be promptly notified at (867) 983-2458 or via e-mail. Similarly, the AANDC Water Resources Officer will be promptly notified of the spill event at (867) 982-4308 or via e-mail.

It is the responsibility of the Operations Superintendent to prepare the proper reports and transmit them to regulatory authorities.

The spill event is reported in writing using the standard NWT-NU Spill Report Form.

In the event of a spill involving the marine carrier delivering bulk fuel, Sabina will ensure that the subcontractor reports any spill event under its responsibility.

7.4. Wildlife Protection Procedures

In response to a spill event, techniques used to prevent wildlife from becoming oiled or contaminated, by preventing animals from entering the contaminated area, will consist of hazing and other deterrents. This will be accomplished using a combination of both audible and visual devices, including but not limited to:

- Pyrotechnics, i.e. shell crackers, screamers, propane cannons for shore based spills.
- Visual scare tactics, i.e.: helicopters, emergency response vessels or other water vessels.
- Broadcast sounds, i.e. Breco Bird Scarer designed to float with an oil spill.
- Exclusion, i.e. netting applied in smaller contaminated areas

These techniques need to be set in place immediately after a spill occurrence so as to minimize environmental impact.

The size of the spill and location in relation to sensitive wildlife areas must be assessed at the time of the event as to correctly apply the appropriate level of deterrence. Only workers trained in the safe and proper use of certain hazing equipment will be permitted to haze wildlife. Personal Protective Equipment will be worn by all personnel using equipment, as per manufactures instructions; at a minimum this will include the use of eye and ear protection. Other workers in the vicinity of such devices should also use ear protection or remain a safe distance away. Hazing through the use of pyrotechnics should not be used too close to dry vegetation or flammable spill materials due to fire hazard.

Hazing should be consistent and continuous in all contaminated areas to prevent wildlife from being hazed into an area where they may be in danger; in addition, these measures should be applied as soon as possible to prevent any initial contact on the surface waters (if applicable). It is also important to ensure that hazing efforts do not cause already contaminated animals to scatter.

All emergency response vessels shall be equipped with deterrent devices to ensure timely response in case of a spill occurrence off-shore. To prevent habituation, variation of hazing techniques will be used such as changing the location, appearance, and types of hazing or using a combination of hazing techniques.

Efforts shall be made to collect alive or dead oiled wildlife. In the event of a spill occurring in or around a water body, shorelines and beaches shall be inspected for contaminated wildlife to be collected. Emergency Response vessels shall be equipped with dip-nets, large plastic collecting bags for dead wildlife, and cardboard boxes or cloth bags for live oiled wildlife. To ensure alive, oiled wildlife be dealt with humanely, capture and handling of wildlife shall only be done by trained and permitted individuals. Gloves shall be worn when handling contaminated wildlife (leather gloves for raptors and mammals, latex/rubber gloves for ducks and small shorebirds). Wildlife will be kept individually within cloth bags or ventilated cardboard boxes and labelled with the date and time animal was found, the name of finder, location, and name of species, if known. Wildlife treatment facilities will then be contacted for advisement on treatment. All contaminated wildlife will be held in a warm quiet place until treatment. The Canadian Wildlife Services (CWS) will be consulted to determine the most humane treatment strategy to be implemented for live oiled wildlife, whether rehabilitation or euthanization.

For wildlife mortalities, each carcass shall be bagged and labeled individually. The date and time animal was found, name of finder, location, and name of species, if known, shall be documented. CWS shall be consulted and approval obtained prior to disposing of any dead wildlife. Contact information for experts in bird hazing and bird exclusion, oiled bird rehabilitation, and, permits needed to haze, salvage, hold and clean, or euthanize birds, are shown in Table 7-1.

Table 7 1: Emergency Contacts in Case of Spills Affecting Wildlife

Name	Location	Phone Number	Purpose
Canadian Wildlife Services (CWS)	TBA	TBA	Knowing and providing information on the migratory bird resource and species at risk (under CWS jurisdiction) in the area of a spill (this includes damage assessment and restoration planning after the event) Minimizing the damage to birds by deterring unoiled birds from becoming oiled Ensuring the humane treatment of captured migratory birds and species at risk by determining the appropriate response and treatment strategies which may include euthanization or cleaning and rehabilitation.
Cobequid Wildlife Rehabilitation Centre	Brookfield, NS	1-902-893-0253	Provide veterinary care and rehabilitation for wildlife
Nunavut Emergency Management	P.O. Box 1000, Station 700 Iqaluit, NU X0A 0H0	1-800-693-1666	Nunavut Emergency Management is responsible for developing the territorial emergency response plans, coordinating general emergency operations at the territorial and regional levels, and supporting community emergency response operations.
International Bird Rescue	International	1-888-447-7143	Wildlife rehabilitation specialists, can manage all aspects of wildlife response

7.5. Treatment and Disposal

Plastic sacks, steel drums, or other appropriate containers as approved by the Environmental Superintendent, are used to contain and transport contaminated soil for treatment. Depending on the nature of the spilled contaminant, the soil may be treated for remediation onsite, or shipped to a licensed facility for treatment and disposal. Contaminated soil resulting from the spill of hazardous chemicals will be treated as a hazardous waste and shipped to a licensed facility for treatment and disposal. Temporary storage of contaminated materials is within lined berms.

8. SPILL SCENARIOS AND RESPONSE STRATEGIES

Sabina is committed to planning for spills at the MLA-OHF using an analysis of possible spill scenarios. The potential incident analysis is based on real projected operations, and potential quantities spilled are based on pumping rates and estimated times to halt pumping operations.

In the development of the scenarios the following constant factors have been applied:

- The type of barge that is employed for the bulk fuel delivery is a conventional appropriately classed, double hulled, multi-compartment petroleum barge, generally less than 75 meters in length. It is anticipated that the bow of the barge will be situated directly at the shoreline so that no floating hose shall be required for this operation.
- As outlined in Section 3.2 of this plan, only one product (ULTRA LOW SULPHUR DIESEL (ULSD)) is anticipated to be received at the facility in 2015. ULSD is classified as a non-persistent combustible hydrocarbon. Full details of the properties and hazards associated with this product are found on the Material Safety Data Sheets (MSDS) in annex 8 at the end of this plan.
- The product is of relative low viscosity, is clear to yellow in color and will float readily when spilled. It should be anticipated that any spillage will rapidly spread when spilled and a high rate of evaporation will occur. Wind will be the most important factor in promoting the spread of the product on the water surface.
- Where environmental sensitivities are mentioned in the scenarios, these relate to the area sensitivities as outlined in Annex 3 of this plan.
- Local topography plays an important part in wind direction and force, but it is generally noted at the MLA site that the most common wind direction is from the north and northwest, 17% and 15% of the time respectively, more than 5 m/s 45% of the time but less than 9 m/s approximately 86% of the time. On average, wind speeds during the summer were slightly slower than winter wind speeds.
- As is indicated in the plan, upon discovery of spillage of any sort, pumping operations are ceased.

General response time limits should be observed for each action as follows:

- *Deployment of containment boom*: 0-1 hr following the spillage event.
- *Deployment of skimming equipment*: 0-6 hours following the spillage event.

During ship to shore discharge of the product, the discharge conduit (hose) is inspected on a regular basis. Stoppers and absorbents are available in case they are needed. The barge has a Shipboard Oil Pollution Emergency Plan (SOPEP), appropriate response gear on board, and the crew is fully trained in its use.

There is a person on watch at the shore tanks at all times during discharge and in direct radio communication with the barge. In addition, regular discharge pressure monitoring is carried out by the discharge watchman. The discharge conduit is inspected visually and regularly by walking alongside of it. All discharge hoses are hydrostatically tested annually, clearly marked, and identified; certificates are submitted to Sabina prior to discharge.

All spills within the bulk fuel storage facility zone would be retained within the bermed area. During the filling of the tanks (unloading of the barge), continuous monitoring will take place. At all times there is a person on watch during discharge and in contact with the vessel.

In the presentation of the spill scenarios in this section, it is implied that the initial spill response actions outlined in Section 7 above have first and foremost been addressed. The scenarios are designed moreover for the purpose of identifying the appropriate specific actions and therefore the related resources required for a given incident.

Detailed scenarios are as follows:

8.1. During Barge to Shore Tank Transfer

Source of discharge	Potential loss*	Appropriate actions	Resources Required
Coupling or hose break / malfunction at the barge manifold	20 – 600 liters	1. Deploy containment boom as required to control migration of spill. Consideration of protection booming of beach front, or sensitive areas as defined in Annex 3 of the OPEP depending on wind direction, tides, and marine conditions present. Typical deployment lengths of 50 meters are anticipated for this task. (Multiple lengths should be used	Boat – Sabina near shore workboat - 2-3 responders Boom – 100 meters and accessories, additional booms if necessary to provide shoreline protection Shore crew to deploy from containers – 3 responders

		when required) 2. Deploy skimmer and recover spill 3. Final recovery of spill using sorbents if necessary 4. Monitor any free floating oil that is unable to be contained 5. Notifications of local authorities	

8.2. Along Shore-based hose length

Source of discharge	Potential loss*	Appropriate actions	Resources required
Failure of flange or coupling Accident involving shore based hose length	20-1000 liters	Land spill only: 1: Immediately install portable berms under leaking or damaged line where possible. 2: If portable berms are not feasible, contain and recover oil spill using dykes or trenches 3: Prevent the oil from reaching natural drainage paths leading to the ocean. 4: Collect free-product for temporary storage. Excavate contaminated soil, store and manage appropriately. Marine response, if necessary: 1: Deploy containment boom to control migration of spill. Consideration of protection booming of beach front, or sensitive areas as defined in Annex 3 of the OPEP depending on wind direction, tides and marine conditions present. Typical deployment lengths of 50 meters are anticipated for this task. (Multiple lengths should be	Land spill only: Response by MLA site services Recover free products with sorbents, pumps within temporary berms Earth moving equipment available for berming, etc. Marine response, if necessary: Boat – Sabina near shore workboat - 3 responders Boom – 100 meters and accessories, additional booms if necessary to provide shoreline protection Shore crew to deploy from container – 3 responders

		used when required) 2: Deploy skimmer and recover spill 3: Final recovery of spill using sorbents if necessary 4: Monitor any free floating oil that is unable to be contained 5: Notifications of local authorities	MLA site services

8.3. Within bulk fuel storage facility

The bulk fuel storage facility located at the MLA site shall consist of six (6) land-based double walled 100,000 liter tanks at the temporary laydown area. A total of 600,000 liters is anticipated to be stored on site for 2015. The tertiary containment for fuel tanks will be Arctic-grade manufactured instaberms or similar product. These will be placed on a stable foundation of interlocking swamp mats that will remain for the duration of the facility.

The capacity of each instaberm will be equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greater. In calculating the volume, the footprint of the smaller tanks is subtracted. The above basis is consistent with the document entitled Design Rationale for Fuel Storage and Distribution Facilities published by the Department of Public Works of the Northwest Territories (GNWT 2006; refer to Section 4.6 of these guidelines). The design of these containment products will be based on Arctic installation and industry storage standards. Fuel transfer will incorporate hoses and pumps within tertiary containment.

Source of discharge	Potential loss*	Appropriate actions	Resources required
Leaking Tank or piping/valves	20-500 liters	Isolate and patch accordingly, berm or portable berms	Patch kits/ portable berms Response by MLA site services Recover free products with sorbents

*** Potential loss estimated based on pumping rate and anticipated response time to shut down pumping operations**

8.4. Response Strategies – Large Spills

For the purposes of this plan, spills less than 1 m^3 are to be handled by MLA-OHF response operations. MLA personnel shall deploy the resident on-site equipment as outlined in the plan.

If the spill is larger than 1 m^3 and depending on the specific circumstances, the Operations Superintendent shall determine if it is necessary to increase the response capability by requesting 3rd party assistance.

Where this support is deemed necessary, the Operations Superintendent shall immediately request this assistance while ensuring ongoing mitigation of spill impact to the extent possible while awaiting additional resources and assistance from the 3rd party responder.

The choice of 3rd party responder and any contractual arrangements (if required) is a commercial element of the project and shall be determined at a future date prior to commencement of operations. The choice of a 3rd party responder shall be commensurate with the required capabilities under the regulations.

9. PREVENTIVE MEASURES

It is Sabina policy to prevent any accidental spillage and all efforts shall be made in advance to minimize the risk of incidents and impact to the environment. Sabina shall ensure the facility is up to date, shall have adequate safety equipment at the site, and provide comprehensive training to its employees, contractors and visitors with the goal of avoiding spills and to minimize their impact if they should occur.

For the 2015 bulk fuel transfer, Sabina shall contract the entire fuel delivery and transfer operation to the barge operator. The barge operator has established bulk fuel transfer procedures meeting all of the required regulations for Arctic bulk fuel transfers. All barge personnel involved in the transfer shall possess appropriate SOTO certifications. The barges maintain pollution response equipment onboard and are trained in its use.

9.1. Training - General

Sabina ensures that personnel involved during a response receive training for their own safety, the safety of the public, and that they have the required skills to minimize the impact of a spill on the environment.

The personnel directly linked to spill response operations will receive training to familiarize themselves with the environmental emergency plan. These personnel will also reexamine the manual of the OPEP on a yearly basis according to their duties and responsibilities. All training is recorded in the training register and kept up to date in the OPEP binder.

The personnel directly linked to spill response operations, contract employees, and the other responders identified in the environmental emergency plan should take part in the yearly training program. Sabina confirms that training is carried out to ensure adequate numbers of responders at all levels are available at all times.

All workboat operators and crews shall possess a Pleasure Craft Operator Competency Card.

9.1.1 Training Content

Spill training shall be provided on site prior to transfer operations for all personnel to be involved in the management and response to possible spills.

Sabina emergency personnel shall possess spill management training to a level commensurate to the duties required of the position.

Responder training is to be of a combined theoretical presentation (classroom) and also of hands on nature (equipment deployment exercise).

The major components of this training program shall include:

Classroom Training:

- Introduction and overview of marine spill response;
- Review of Sabina general spill response plan and integration of same to marine response;
- Review of Marine Oil Pollution Emergency Plan elements;
- Short review of oil spill behavior and operational parameters / limitations for marine spill response operations;
- Spill assessment;
- Basic safety for spill responders to marine oil spills, presentation of video – small craft safety practices;
- Basic oil boom deployment, presentation of video and booming techniques / guidelines; and
- Marine and shoreline recovery operations.

Hands on Training and Deployments:

- Hands on review with participants of Sabina inventory of spill equipment;
- Hands on instruction - boom connections, tow bridles, rope handling, basic knots and attachment of deployment accessories;

- Simulated deployment of booms and related gear on water using appropriate vessels; and
- Debriefing and lessons learned.

9.1.2 Short Notice Training

In the event of a large spill, the personnel requirements may exceed those that have received the specific responder training as outlined in Section 9.1.1 above. Due to the remoteness of the site, volunteers are not anticipated. MLA personnel and barge operators shall be employed as additional responders. If necessary, additional staff may be sourced from either George or Goose Camp.

Although these personnel possess WHMIS training, additional short notice training shall be carried out for these new responders on an as-needed basis. Certain modules of the responder training shall be delivered on site to these personnel selected specifically from the training outlined in Section 9.1.1 above. The Operations Superintendent shall determine which modules are pertinent to each group of additional responders and shall be responsible for assuring adequate training for each group.

9.2. Exercises

Following the annual delivery of the spill training as outlined in section 9.1 a comprehensive spill exercise shall be undertaken. The exercise is structured to test the readiness of management, responders and to practice and validate the logistics of the deployment of spill gear. The exercise content shall be different from year to year so that it can validate the various elements of the plan and the response over a three year period. Some of the factors that shall be evaluated include but are not limited to:

- Activation of the emergency plan;
- Management response;
- Internal and external notifications;
- Site safety;
- Communications;
- Equipment deployment to a specific scenario;
- Reporting and co-ordination with outside agencies;
- Exercise coordination with Canadian Coast Guard; and
- Exercise coordination with barge.

9.3. Spill Prevention Measures

9.3.1 Bulk Fuel Storage Facility:

Normal operation procedures of Sabina include many inspections which are performed regularly and kept on record. Any discrepancies noted are documented and investigated. Corrective measures are then applied.

9.3.2 Bulk Fuel Transfer:

Several preventive measures are in place to minimize risk of spills during bulk fuel transfer including:

- The bulk fuel storage facility and all related equipment and infrastructures are inspected prior to the bulk cargo transfer and the inspection methods are documented as a standard operating procedure
- The fuel supplier has established complete bulk cargo transfer procedures, a copy of which is found in Annex 5 of this OPEP
- As required by the applicable legislation the barge has a comprehensive Shipboard Oil Pollution Emergency Plan (SOPEP) and a copy of this plan shall be reviewed by Sabina prior to bulk fuel transfer
- The barge carries a compliment of spill response equipment as listed in Annex 6 of the OPEP and this equipment is ready on the barge at all times for deployment during cargo operations
- Sabina oil spill response equipment is on the beach, ready for immediate deployment at all times during cargo operations
- The workboat and trained responders are available at all times during cargo operations for spill equipment deployment
- Standard transfer procedures include regular inspections of the transfer hose for leaks or defects
- During transfer operations the barge and shore facility are manned at all times
- Regular monitoring of transfer rates and discharge pressure is carried out at all times
- The bulk fuel storage facility is monitored at all times by Sabina personnel during the transfer
- The transfer hose is inspected regularly on foot during the transfer operation

9.4 Response Equipment Auditing

As part of the annual exercise program, a scenario based deployment of spill gear is carried out. Prior to the exercise all gear is inspected, its condition is evaluated and any defects or missing equipment is replaced. The equipment audit is documented in the training register in Annex 7.

9.5 Oil Pollution Response Plan Updates

The Oil Pollution Emergency Plan (OPEP) will be scrutinized at least once a year to take into consideration any amendments of the legislation, new characteristics of the site, the equipment on site, new policies of the company, environmental issues and also new staff and particulars of team members. Furthermore following an exercise or an incident, the OPEP will be evaluated and modified accordingly.

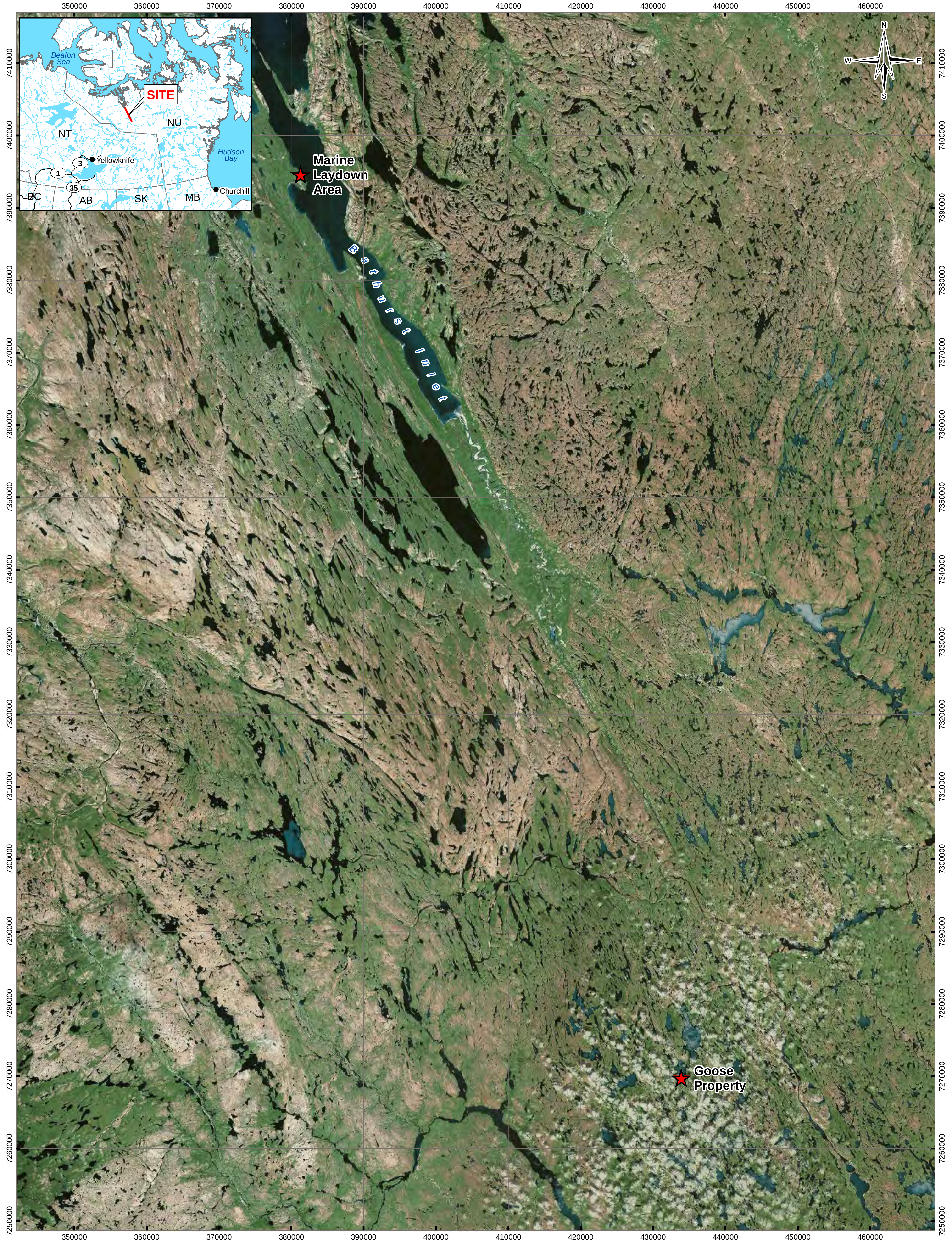
Even if there is no change to be brought to the OPEP, it will be updated at least once a year. The corrected version of the plan will then be sent to the responsible person onsite to ensure that the team at the site always has an updated version of the plan in case their intervention is needed.

9.5.1 Update Registry

The Oil Pollution Emergency Plan (OPEP) shall be updated, reprinted and redistributed when changes are made as noted above. The plan carries the latest version identified by date as indicated in the footer of each page of the plan. If plan amendments result in a reprinting, all old versions of the plan shall be recalled and destroyed accordingly.

ANNEX 1: Site Overview Plan

Q:\Vancouver\GIS\ENGINEERING\V151\V15103033-02_Sabina\Maps\V15103033-02_Figure5-0-1_Overview.mxd modified 10/7/2014 by morgan.zondervan



LEGEND

★ Proposed Site Preparation Activity Location

NOTES
Base data source:
Imagery from ESRI Basemaps (1999)

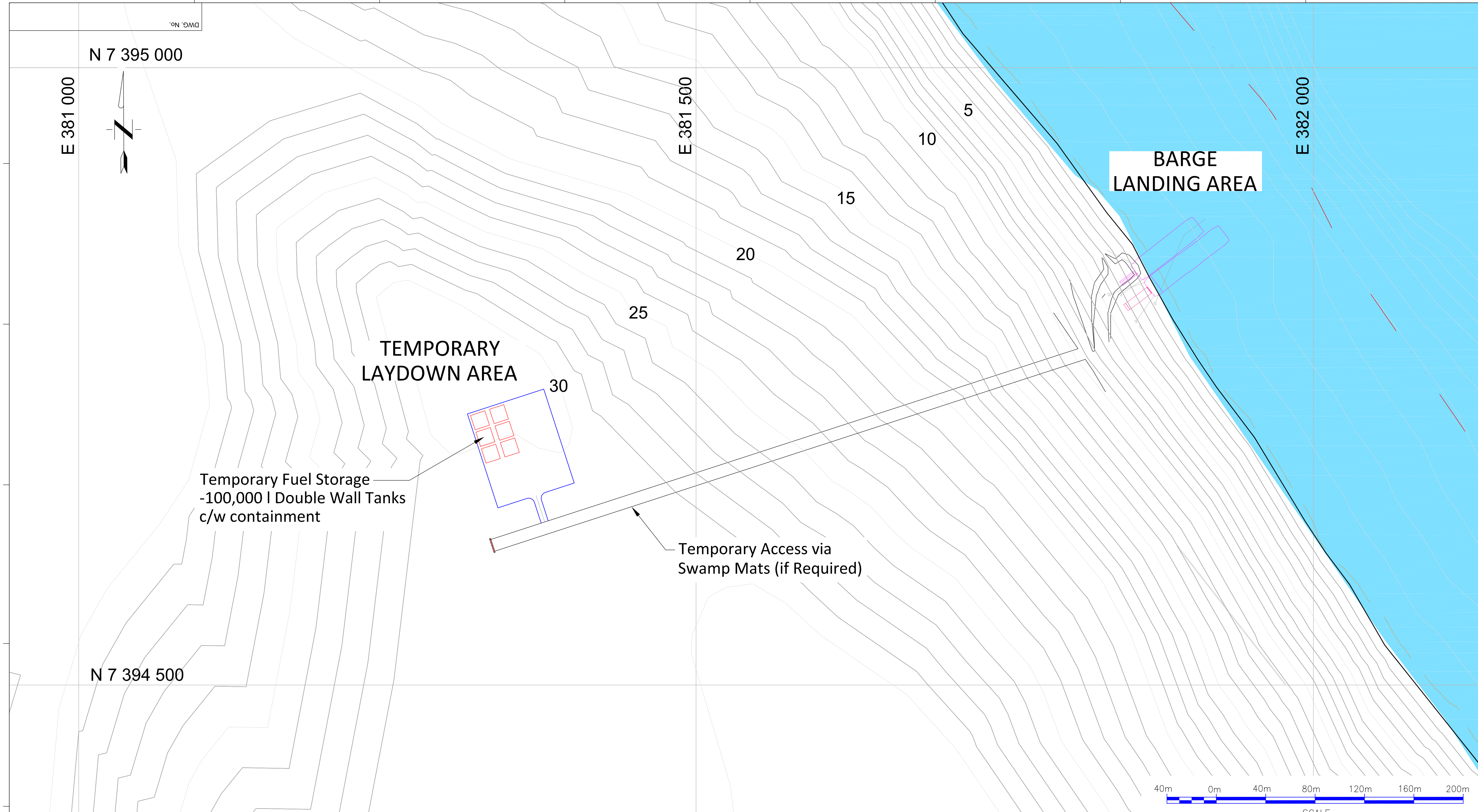
SABINA BACK RIVER PROJECT, NUNAVUT

Overview of Area Subject to Site Preparation Activities

PROJECTION UTM Zone 13				**DATUM** NAD83	**CLIENT** Sabina
Scale: 1:500,000 10 5 0 10 Kilometres					
FILE NO. V15103033-02_Figure5-0-1_Overview.mxd					
PROJECT NO. V15103033-02	**DWN** MEZ	**CKD** SL	**APVD** AR	**REV** 0	Figure 5.0-1
OFFICE Tt EBA-VANC	**DATE** October 7, 2014				

STATUS
ISSUED FOR REVIEW

ANNEX 2: Bulk Fuel Storage Facility Overview



JDS Energy & Mining Inc.

Sabina

BACK RIVER FEASIBILITY STUDY

PORT SITE PRE-DEVELOPMENT LAYDOWN AREA PLAN

DRAWING No.	DRAWING TITLE
REFERENCE DRAWINGS	

REGISTERED PROFESSIONAL

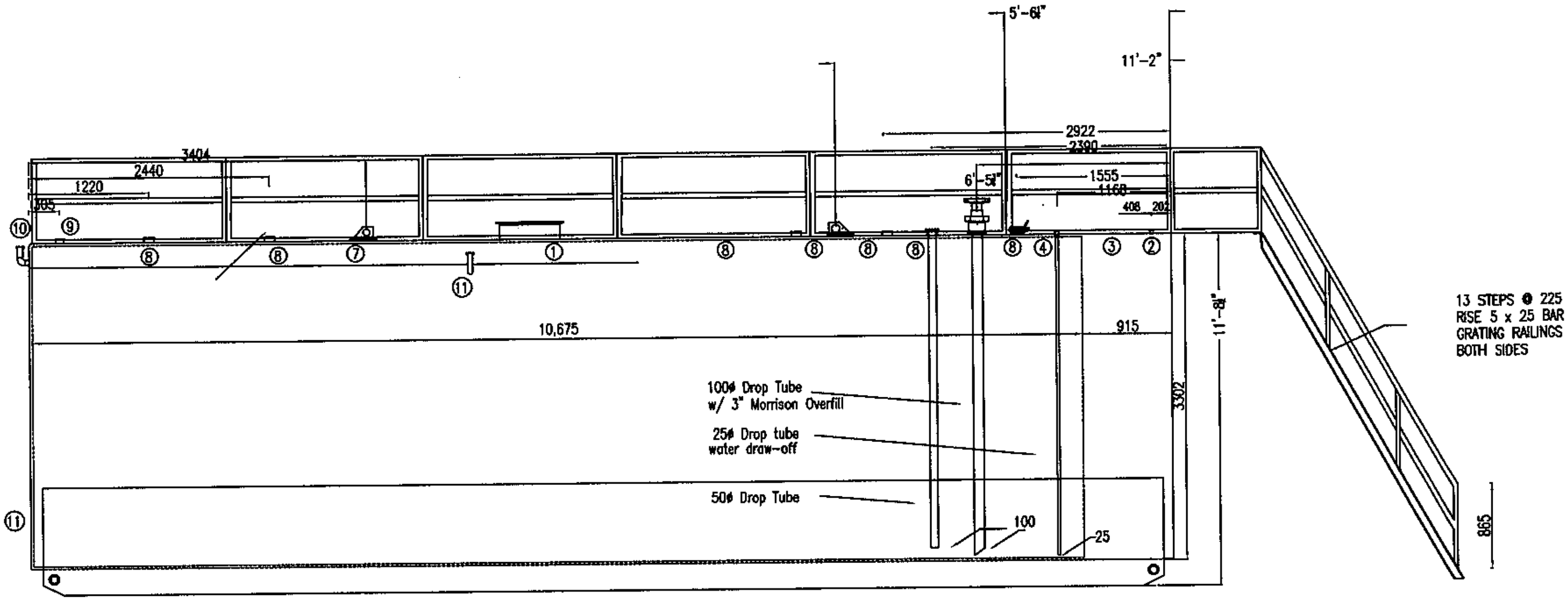
No.	DESCRIPTION	BY	CHK'D	DATE
REVISIONS				

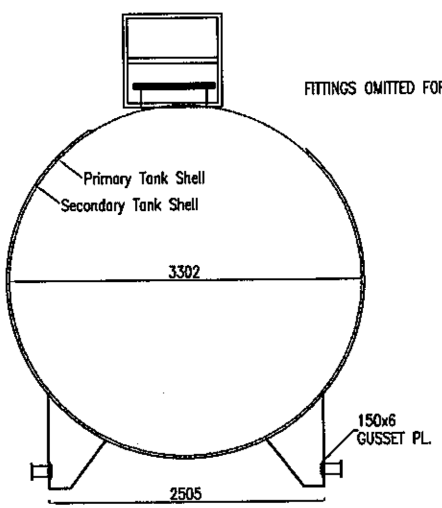
ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON			
DESIGNER			
CHECKER			
DESIGN COORD.			
RESP. ENG.			
LEAD DISC. ENG.			
ENG. MANAGER			
PROJ. MANAGER			

DRAWING APPROVAL STATUS:

SCALE	DWG. No.	REV
1:18000 OR AS NOTED	10-10-201	

$USERNAMES$





FITTINGS OMITTED FOR CLARITY

#	SIZE	FITTING
1	610	MANWAY/EMERGENCY VENT
2	25	1/2 COUPLING – VACUUM GAUGE
3	100	SECONDARY VENT
4	50	1/2 COUPLING WATER DRAW OFF
5	100	OVERFILL PORT- 95% SHUT OFF
6	100	GAUGE HATCH
7	--	LIFTING LUG
8	100	1/2 COUPLING
9	75	1/2 COUPLING VENT – 75 mm w/ Gooseneck
10	50	SECONDARY VENT
11	75	150# FLANGE

NOTE:
ULC S 601 & S653 LABELED
STAIR SLOPE 60°

KINGLAND

1

FRAME INSTA-BERM™

SECONDARY CONTAINMENT BERM WITH ALUMINUM FRAME

For larger applications that require superior environmental protection, count on the Insta-Berm (Frame) for durable and reliable secondary containment.

Recommended for use with collapsible fuel tanks and constructed from industrial-strength fabric, the Insta-Berm (Frame) is an easy-to-install environmental safeguard that allows companies to meet today's strict guidelines. Meets EPA regulation 40CFR112.7

DESIGN FEATURES

- Rugged aluminum frame is easily assembled and quickly deployed with just one tool
- 5-ft (1.2 m) frame sections make for easy transport
- Fully collapsible for compact storage and relocation
- Wide range of standard sizes and custom sizes available
- Easily cleaned and maintained
- Includes eyelet patches for staking down the berm
- Appropriate for containment of waste water, petroleum products and various other chemicals

BERM OPTIONS

- Drain fitting – this fitting can be opened to let out accumulated rainwater or connected to a hose to pump out spilled product
- Over-fill protection – allows precipitation to be drained from the Insta-Berm while containing spilled chemicals
- RainDrain™ – removes hydrocarbons and additives from captured water through gravity drainage
- High-wind stakes – anchors the berm to the ground

FABRIC OPTIONS

- Chem-Shield™ – Chemical-resistant fabric
- Arctic-Shield™ – Chemical and fire resistant fabric for temperatures to -50 degrees Fahrenheit / -45.6 degrees Celsius (Arctic-Shield fabric is not suitable for acids)

RELATED PRODUCTS

- Mini-Berm™ – compact secondary containment solution
- Insta-Berm (L-Rod)™ – berm with fast deployment system
- Ride-Side Berm™ – secondary containment for vehicles
- Drip Defender™ – spill collection pad for vehicles
- Hazmat Tank™ – primary containment for hazardous liquids

SEI Industries Ltd. 7400 Wilson Ave, Delta, BC Canada V4G 1H3
604.946.3131 seisales@sei-ind.com www.sei-ind.com

SEI INDUSTRIES

INSTA-BERM (FRAME)™

The Insta-Berm (Frame) comes in 20 standard sizes as well as two fabric options to choose from.

The optional RainDrain filter ensures your berm has enough capacity to protect the environment in the event of a spill.

INSTA-BERM (FRAME) SPECIFICATIONS

MODEL	CAPACITY		COLLAPSIBLE DIMENSIONS (L X W X H)		SHIPPING WEIGHT	
	USG	L	IN	CM	LB	KG
IBFS101020	1060	4012	10'x 10'x 20"	305 x 305 x 50	156	71
IBFS102020	2119	8023	10'x 20'x 20"	305 x 610 x 50	242	110
IBFS202020	4239	16046	20'x 20'x 20"	610 x 610 x 50	350	159
IBFS203020	6358	24063	20'x 30'x 20"	610 x 914 x 50	458	208
IBFS204020	8478	32092	20'x 40'x 20"	610 x 1219 x 50	567	257
IBFS205020	10597	40115	20'x 50'x 20"	610 x 1524 x 50	589	306
IBFS303020	9538	36104	30'x 30'x 20"	914 x 914 x 50	589	267
IBFS304020	12717	48138	30'x 40'x 20"	914 x 1219 x 50	719	326
IBFS305020	15896	60173	30'x 50'x 20"	914 x 1524 x 50	850	386
IBFS404020	16956	64185	40'x 40'x 20"	1219 x 1219 x 50	872	396
IBFS405020	21195	80231	40'x 50'x 20"	1219 x 1524 x 50	1025	465
IBFS505020	26494	100289	50'x 50'x 20"	1524 x 1524 x 50	1200	544
IBFS101032	1808	6843	10'x 10'x 32"	305 x 305 x 80	242	110
IBFS202032	7231	27373	20'x 20'x 32"	610 x 610 x 80	515	234
IBFS203032	10847	41059	20'x 30'x 32"	610 x 914 x 80	662	300
IBFS303032	16270	61589	30'x 30'x 32"	914 x 914 x 80	832	377
IBFS304032	21694	82119	30'x 40'x 32"	914 x 1219 x 80	1003	455
IBFS404032	28925	109491	40'x 40'x 32"	1219 x 1219 x 80	1195	542
IBFS405032	36156	136864	40'x 50'x 32"	1219 x 1524 x 80	1387	629
IBFS505032	45195	171080	50'x 50'x 32"	1524 x 1524 x 80	1602	727

Shipping weight based on 30 oz. fabrics.

SEI Industries Ltd. 7400 Wilson Ave, Delta, BC Canada V4G 1H3
604.946.3131 seisales@sei-ind.com www.sei-ind.com

ANNEX 3: Sensitivity Zones

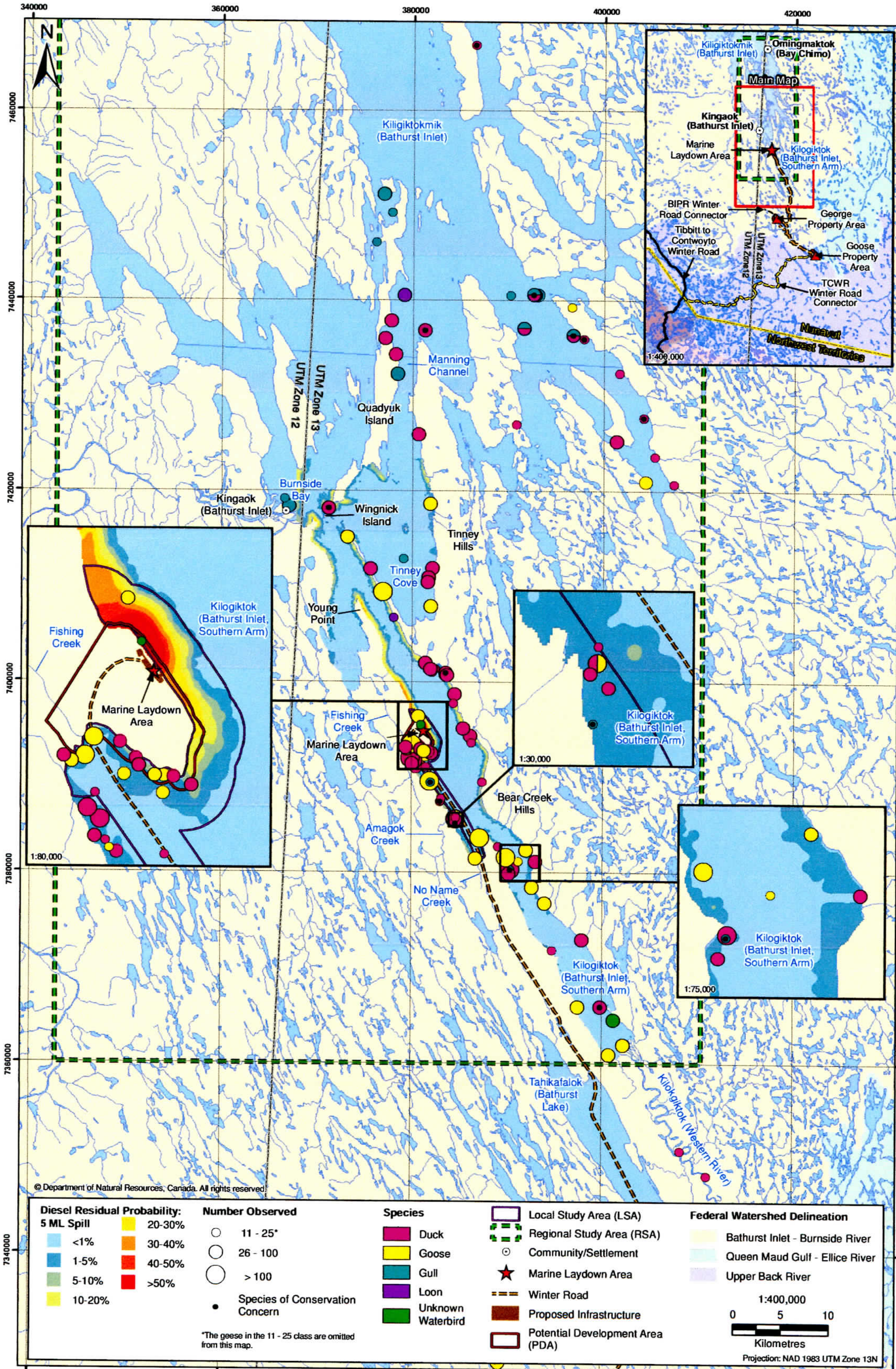


Figure 5.3-1

Sabina GOLD & SILVER CORP

5 ML Spill Sensitivity in Relation to Migratory Bird Staging Areas in Bathurst Inlet

Rescan Engineers & Scientists

PROJECT #0194096-0040 GIS # BAC-23-237

September 16 2013

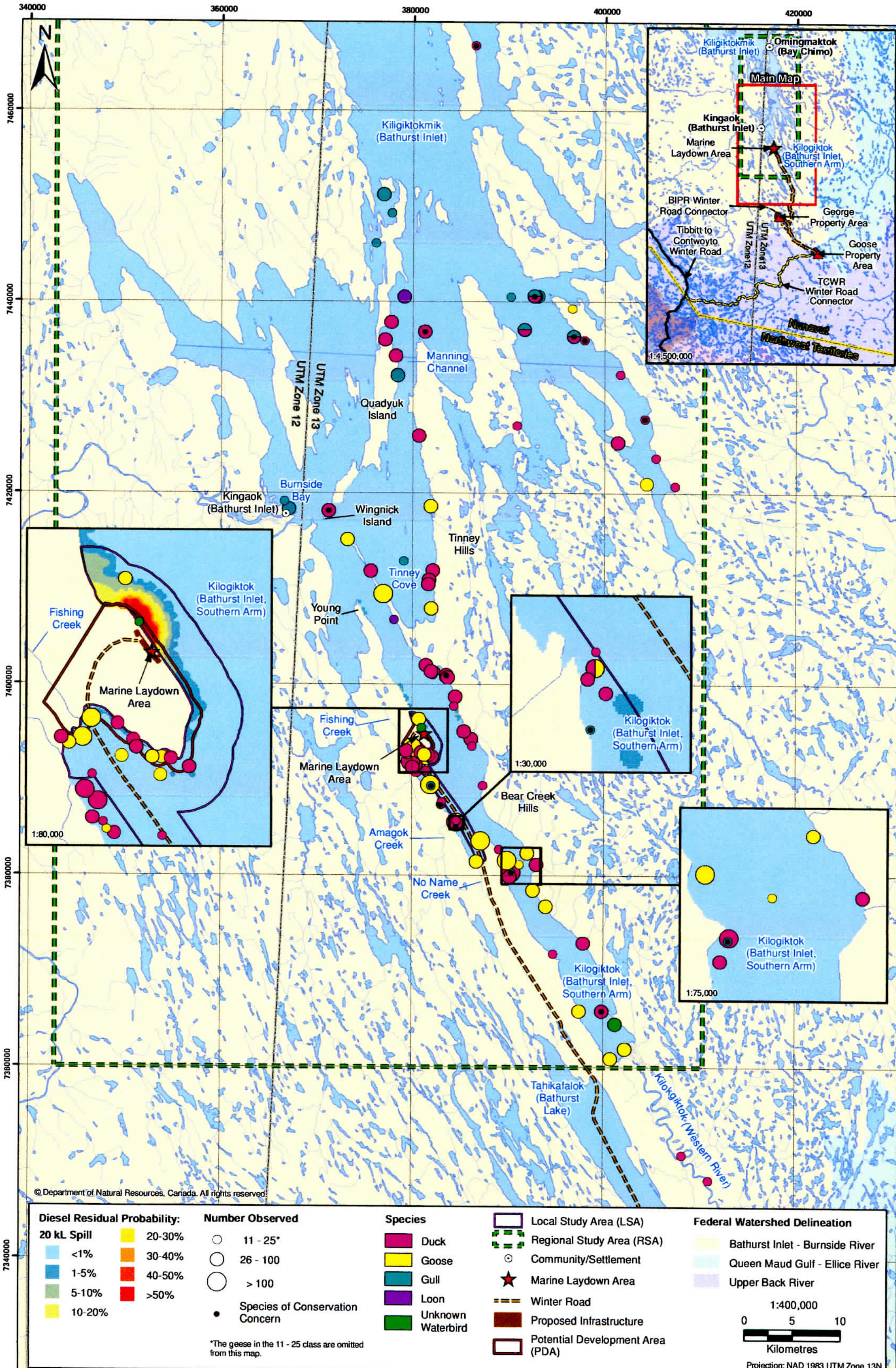


Figure 5.3-2

Sabina GOLD & SILVER CORP

20 kL Spill Sensitivity in Relation to Migratory Bird Staging Areas in Bathurst Inlet

Figure 5.3-2

Rescan Engineers & Scientists

ANNEX 4: Resident Spill Response Equipment

RESIDENT OIL SPILL RESPONSE EQUIPMENT MARINE LAYDOWN AREA – OIL HANDLING FACILITY

Quantity	Description
1	Oil containment boom 300 meters – 24 Inch Fence type
4	Anchor kits for anchoring boom in place
4	Towing bridal for oil boom
4	Spill response unit – X Large Land
4	Overpack spill kit
50	12 kg. Bags granular absorbant
6	0.5m X 0.5m x 15 cm Arctic mini berm for under fittings
6	1m x 1m x 15 cm Arctic mini berm for under fittings
1	1500 Gallon Portable Tank
25	Bales Sorbent Pads
25	Bales Absorbant booms
1	Aluminium workboat with outboard engine, equipped with towing post and related equipment for boom deployment
1	Skimmer and diesel driven power pack, suitable for recovery of distillates – Capacity 7.5 tonnes per hour
12	Rakes for beach cleaning
12	Perforated shovels for sorbent recovery
12	Pitch forks with screens for sorbent and debris recovery
12	Approved flotation devices
1	Minimum 10 ton sand stockpile for spill berming operations

ANNEX 5: Bulk Cargo Transfer Procedures

Bulk Fuel Transfer Procedures:

Bulk fuel transfer procedures are proprietary to the barge operator and the selection of fuel supplier is a commercial element of the project which shall be determined at a future date prior to commencement of operations. Sabina shall ensure that the transfer protocol shall be in accordance with all applicable regulations.

ANNEX 6: **Spill Response Equipment - Onboard Barge**

Certificate / License	Qty min.	Island Tdr		ITB Rel		ITB Res		ITB Sup		ITB Vcr	
		Qty	Loc	Qty	Loc	Qty	Loc	Qty	Loc	Qty	Loc
Containment Boom	1000’	-	PC	-	PC	-	PC	-	PC	-	PC
Boom Towing Bridles	2	-	PC	-	PC	-	PC	-	PC	-	PC
Absorbent Boom 4" x 10'	10	-	PC	-	PC	-	PC	-	PC	-	PC
Absorbent Pads (100 per Bale)	6	-	PC	-	PC	-	PC	-	PC	-	PC
Absorbent Pads (Bales)	4	-	ER	-	ER	-	ER	-	ER	-	ER
Absorbent Pads (Bales)	1	-	CMR	-	CMR	-	CMR	-	CMR	-	CMR
Open Headed Barrels (empty)	4	-	PC	-	PC	-	PC	-	PC	-	PC
Pad/Barrel Ringer	1	-	PC	-	PC	-	PC	-	PC	-	PC
Aluminum Shovels	3	-	PC	-	PC	-	PC	-	PC	-	PC
Aluminum Pitch Fork	2	-	PC	-	PC	-	PC	-	PC	-	PC
Heavy Duty Plastic Bags	200	-	PC	-	PC	-	PC	-	PC	-	PC
Anchor Assemblies	4	-	PC	-	PC	-	PC	-	PC	-	PC
Garbage Pails 100 ltr.	4	-	PC	-	PC	-	PC	-	PC	-	PC

ER – Engine Room
CMR – Cargo Monitoring Room
PC – Pollution Container

ANNEX 7: Training Register and Exercise Documentation

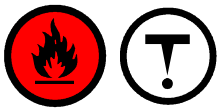
Sabina
GOLD & SILVER CORP.

OIL HANDLING FACILITY - OIL POLLUTION EMERGENCY PLAN TRAINING REGISTRY

Course Title	Participant Name	Organization	Date	Completion Y/N	Comments

ANNEX 8: Material Safety Data Sheets

Material Safety Data Sheet

WHMIS	Product name	TDG Road/Rail
	Diesel / Furnace oil	

Section 1. Identification

Chemical name : Fuel oil, No 2

Other means of identification : Gasoil - unspecified

Code : 0101

CAS number : Not applicable.

Relevant identified uses of the substance or mixture and uses advised against

Supplier's details : ÉNERGIE VALERO INC
1801Avenue McGill College
13è étage
Montréal, Québec
H3A 2N4

Emergency telephone number with hours of operation. : **Canutec (24 heures)**
613-996-6666

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
CARCINOGENICITY - Category 2

Percentage of the mixture consisting of ingredient(s) of unknown toxicity: 15%

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Combustible liquid.
Causes skin and eye irritation.
Suspected of causing cancer.

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from flames and hot surfaces. - No smoking. Wash hands thoroughly after handling.

Section 2. Hazards identification

Response : IF exposed or concerned: Get medical attention. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture Mixture

Ingredient name	%	CAS number
Fuel oil, No 2	100	68476-30-2
Fuel oil, No 2	100	68476-30-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

Peut contenir du sulfure d'hydrogène

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Section 4. First aid measures

Ingestion : Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

United States

Occupational exposure limits

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
Fuel oil, No 2	**ACGIH TLV (United States, 6/2013). Absorbed through skin.** TWA: 100 mg/m³, (measured as total hydrocarbons) 8 hours. Form: Inhalable fraction and vapor
Fuel oil, No 2	**ACGIH TLV (United States, 6/2013). Absorbed through skin.** TWA: 100 mg/m³, (measured as total hydrocarbons) 8 hours. Form: Inhalable fraction and vapor
Fuel oil, No 2	**ACGIH TLV (United States, 6/2013). Absorbed through skin.** TWA: 100 mg/m³, (measured as total hydrocarbons) 8 hours. Form: Inhalable fraction and vapor

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	**List name**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**Notations**
Fuel oil, No 2, measured as total hydrocarbons	US ACGIH 6/2013	-	100	-	-	-	-	-	-	-	[1] [a]
Fuel oil, No 2, as total hydrocarbons	AB 4/2009	-	100	-	-	-	-	-	-	-	
	BC 7/2013	-	100	-	-	-	-	-	-	-	[1] [b]
Fuel oil, No 2, measured as total hydrocarbons	ON 1/2013	-	100	-	-	-	-	-	-	-	[1] [c]
Fuel oil, No 2, measured as total hydrocarbons	US ACGIH 6/2013	-	100	-	-	-	-	-	-	-	[1] [a]
Fuel oil, No 2, as total hydrocarbons	AB 4/2009	-	100	-	-	-	-	-	-	-	
		-	100	-	-	-	-	-	-	-	[1] [b]
Fuel oil, No 2, measured as total hydrocarbons	ON 1/2013	-	100	-	-	-	-	-	-	-	[1] [c]
Fuel oil, No 2, measured as total hydrocarbons	US ACGIH 6/2013	-	100	-	-	-	-	-	-	-	[1] [a]
Fuel oil, No 2, as total hydrocarbons	AB 4/2009	-	100	-	-	-	-	-	-	-	
		-	100	-	-	-	-	-	-	-	[1] [b]
Fuel oil, No 2, measured as total hydrocarbons	ON 1/2013	-	100	-	-	-	-	-	-	-	[1] [c]

[1]Absorbed through skin.
Form: [a]Inhalable fraction and vapor [b]Inhalable vapour and aerosol [c]Total hydrocarbons

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
Body protection	: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection	: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection	: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance	
Physical state	: Liquid.
Color	: Not available.
Odor	: Characteristic.
Odor threshold	: Not available.
pH	: Not available.
Melting point	: -40 to 6°C (-40 to 42,8°F)
Boiling point	: 141 to 462°C (285,8 to 863,6°F)
Flash point	: Closed cup: >56°C (>132,8°F)
Evaporation rate	: Not available.
Flammability (solid, gas)	: Not available.
Lower and upper explosive (flammable) limits	: Lower: 0,5% Upper: 5%
Vapor pressure	: Not available.
Vapor density	: Not available.
Relative density	: 0,879
Solubility	: Not available.
Partition coefficient: n-octanol/water	: Not available.
Auto-ignition temperature	: 225°C (437°F)
Decomposition temperature	: Not available.
Viscosity	: Kinematic (40°C (104°F)): 0,015 cm^2/s (1,5 cSt)
Aerosol product	
Heat of combustion	: -42,8 kJ/g

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.

Section 10. Stability and reactivity

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Reactive or incompatible with the following materials:
oxidizing materials

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuel oil, No 2	LD50 Oral	Rat	12 g/kg	-
Fuel oil, No 2	LD50 Oral	Rat	12 g/kg	-
Fuel oil, No 2	LD50 Oral	Rat	12 g/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Fuel oil, No 2	Eyes - Mild irritant	Rabbit	-	0,5 minutes 100 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Fuel oil, No 2	Eyes - Mild irritant	Rabbit	-	0,5 minutes 100 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Fuel oil, No 2	Eyes - Mild irritant	Rabbit	-	0,5 minutes 100 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.
Inhalation : No known significant effects or critical hazards.
Skin contact : Causes skin irritation.
Ingestion : Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness
Inhalation : No specific data.
Skin contact : Adverse symptoms may include the following:
irritation
redness
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.
Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Section 12. Ecological information

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	TDG Classification	Mexico Classification	ADR/RID	IMDG	IATA
UN number	UN1202	UN1202	UN1202	UN1202	UN1202	UN1202
UN proper shipping name	Diésel	Diésel	Diésel	Diésel	Diésel	Diésel
Transport hazard class(es)	3 	3 	3 	3 	3 	3 
Packing group	III	III	III	III	III	III
Environmental hazards	No.	No.	No.	No.	No.	No.
Additional information	This product may be re-classified as "Combustible Liquid," unless transported by vessel or aircraft. Non-bulk packages (less than or equal to 119 gal) of combustible liquids are not	-	-	**Special provisions** 640 (E)	-	-

Section 14. Transport information

	regulated as hazardous materials.					

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: All components are listed or exempted.

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Fuel oil, No 2 Fuel oil, No 2	100 100	Yes. Yes.	No. No.	No. No.	Yes. Yes.	Yes. Yes.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : The following components are listed: FUEL OIL

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2B: Material causing other toxic effects (Toxic).

Section 15. Regulatory information

Canadian lists

Canadian NPRI : None of the components are listed.

CEPA Toxic substances : None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

International lists

Canada : All components are listed or exempted.

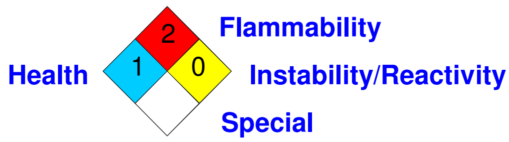
Europe : All components are listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health *	1
Flammability	2
Physical hazards	0

National Fire Protection Association (U.S.A.)



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Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Section 16. Other information

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ANNEX 9: Transport Canada – TP-9834E – "Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and /or Marine Pollutants"

Transport Canada Transports Canada

TP 9834E
(07/2009)

Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants

2ND EDITION
JULY 2009

TC-1003421

Canada

Responsible Authority	Approval
The Director Operations and Environmental Programs is responsible for this document, including any change, correction, or update.	Director Operations and Environmental Programs Marine Safety

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(07/2009)

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1	**July 2009**	**All**	**T. Morris**	Updated to reflect the *Canada Shipping Act, 2001* and the amendments to IMO Resolution A.851(20) in Resolution MEPC.138(53).

TABLE OF CONTENTS

INTRODUCTION

These Guidelines comply as far as practicable with the general principles and standard reporting format procedures described in Resolution A.851(20) of the 20th Session of the Assembly of the International Maritime Organization (IMO), adopted 27 November 1997, as amended by Resolution MEPC.138(53).

The intent of these Guidelines is to enable the proper authorities to be informed without delay so that appropriate action may be taken when:

1. any incident occurs involving the loss, or likely loss, overboard of packaged dangerous goods in the sea; or
2. any incident occurs giving rise to pollution, or threat of pollution to the marine environment, as well as of assistance and salvage measures; or
3. any oil pollution incident occurs involving the loading or unloading of oil to or from a vessel at an oil handling facility.

The *Pollutant Discharge Reporting Regulations, 1995* stipulate that a vessel's master or owner must make reports required under the Regulations in the manner described in these Guidelines or IMO Resolution A.851(20). The Regulations also stipulate that the operator of an oil handling facility must make reports in a manner described in these Guidelines. These Guidelines should then be used in conjunction with the *Pollutant Discharge Reporting Regulations, 1995* when harmful substances and/or marine pollutants are involved. Where any discrepancy exists between the regulations and the Guidelines, the requirements of the regulations shall prevail.

1. ABBREVIATIONS

HF	High Frequency
IMO	International Maritime Organization
MARPOL	*The International Convention for the Prevention of Pollution from Ships*, 1973, and the *Protocols* of 1978 and 1997, as amended from time to time
MF	Medium Frequency
UN	United Nations
UTC	Coordinated Universal Time
VHF	Very High Frequency

2. DEFINITIONS

2.1 In these Guidelines,

"dangerous goods" means goods that by reason of their nature, quantity or mode of stowage are either singly or collectively liable to endanger the lives of the passengers or imperil the vessel and includes all substances determined by the Governor in Council, in regulations made by him, including the *Cargo, Fumigation and Tackle Regulations*, to be dangerous goods; *(marchandises dangereuses)*

"harmful substance in packaged form" means any substance which is identified as a marine pollutant in the International Maritimes Dangerous Goods Code (IMDG Code); *(substance nuisible en colis)*

"in bulk" means in a hold or tank that is part of the structure of the vessel, without any intermediate form of containment; *(en vrac)*

"incident" includes the discharge of a pollutant, a dangerous good or a harmful substance in packaged form or their anticipated discharge; (*incident)*

"marine safety inspector" means a person appointed as a marine safety inspector under section 11 of the *Canada Shipping Act, 2001; (inspecteur de la sécurité maritime)* "marine communications and traffic services officer" means a person designated as a marine communications and traffic services officer by the Minister of Fisheries and Oceans under subsection 126(2) of the *Canada Shipping Act, 2001; (fonctionnaire chargé des services de communications et de trafic maritimes)*

"packaged form" means the forms of containment specified for harmful substances or dangerous goods in the International Maritimes Dangerous Goods Code (IMDG Code); *(en colis)*

"pollution prevention officer" means a person designated as a pollution prevention officer pursuant to section 14 of the *Arctic Waters Pollution Prevention Act*; *(fonctionnaire chargé de la prévention de la pollution)*

"waters under Canadian jurisdiction" means the internal waters of Canada as described in section 6 of the *Oceans Act*, the territorial sea of Canada as described in section 4 of the *Oceans Act* and the exclusive economic zone of Canada as described in section 13 of the *Oceans Act*, , and includes the shipping safety control zones prescribed pursuant to section 11 of the *Arctic Waters Pollution Prevention Act*. *(eaux de compétence canadienne)*

3. HOW TO MAKE A REPORT

3.1 The report should be transmitted in the following manner:

1. when an incident occurs involving a vessel in waters under Canadian jurisdiction, the report shall be made with the highest possible priority and using the quickest means available to a marine safety inspector, or for incidents occurring in a shipping safety control zone, to a pollution prevention officer;
2. when the vessel referred to in paragraph 3.1.1 is in a radio telecommunications area that is covered by Canadian Coast Guard Marine Communications and Traffic Services, the report should, where expedient, be routed through that system to a marine communications and traffic services officer;
3. when an incident occurs involving a Canadian vessel outside waters under Canadian jurisdiction, the report should be made to the nearest coastal State through an appropriate coast station, preceded by the safety signal (if the incident affects the safety of navigation), or by the urgency signal (if the incident affects the safety of the vessel or persons);
4. on appropriate frequencies (in the bands 405-525 kHz, 1605-2850 kHz or 156-174 MHz);
5. when the vessel is not within reach of a MF or VHF coast station, to the most appropriate HF coast station or on the relevant maritime satellite communication system;
6. when the vessel is within or near an area for which a vessel reporting system has been established, to the designated shore establishment responsible for operation of that system;
7. the format and procedures should, when practicable, comply with the relevant requirements of Section A2 in the Appendix, *Standard Reporting Format and Procedures*; and
8. in addition to any report referred to in paragraph 3.1.1, when an oil pollution incident occurs involving a vessel at a designated oil handling facility, the operator of the oil handling facility shall:
    1. report with the highest possible priority and using the quickest means available, to the federal emergency telephone number identified in the facility's oil pollution emergency plan;
    2. report in writing any incident involving oil to the Transport Canada Marine Safety office nearest to the facility; and
    3. report, when practicable, in compliance with the relevant requirements of Section A2 of the Appendix, *Standard Reporting Format and Procedures*.

4. CONTENT OF REPORT

4.1 Reports should contain the specific information listed in Section A3 of the Appendix, *Detailed Reporting Requirements*.

5. SUPPLEMENTARY REPORT

5.1 Particulars not immediately available should be inserted in a supplementary message or messages.

5.2 When harmful substances and/or marine pollutants are involved, a supplementary message should follow immediately or as soon as possible after the initial report. Information that is essential for the protection of the marine environment, as appropriate to the incident, should be included. That information should include Items P, Q, R, S and X, as listed in Section A2 of the Appendix.

6. PROBABILITY OF DISCHARGE

6.1 The probability of a discharge resulting from damage to the vessel or its equipment is a reason for making a report. In judging whether there is such a probability and whether a report should be made, the following factors, among others, should be taken into account:

1. the nature of the damage, failure or breakdown of the vessel, machinery or equipment; and
2. sea and wind state and also traffic density in the area at the time and place of the incident.

6.2 It is recognized that it would be impracticable to lay down precise definitions of all types of incidents involving probable discharge which would warrant an obligation to report. Nevertheless as a general guideline, the master of the vessel should make reports in cases of:

1. damage, failure or breakdown which affects the safety of vessels. Examples of such incidents are collision, grounding, fire, explosion, structural failure, flooding, cargo shifting; and
2. failure or breakdown of machinery or equipment which results in the impairment of the safety of navigation. Examples of such incidents are failure or breakdown of steering gear, propulsion plant, electrical generating system, essential shipborne navigational aids.

7. REPORT ON ASSISTANCE OR SALVAGE

7.1 The master of any vessel engaged in or requested to engage in an operation to render assistance or undertake salvage should report, as far as practicable, Items A, B, C (or D), E, F, L, M, N, P, Q, R, S, T, U, X of the *Standard Reporting Format* (Appendix). The Master should ensure that the coastal State is kept informed of developments.

APPENDIX

A1. PROCEDURES

A1.1 Reports should be sent as follows:

Dangerous Goods Report - Packaged form (DG)	When an incident takes place involving loss, or likely loss overboard of packaged dangerous goods, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges, into the sea.
Harmful Substances Report in Bulk (HS)	When an incident takes place involving the discharge or probable discharge of oil (Annex I of MARPOL) or noxious liquid substances in bulk (Annex II of MARPOL).
Harmful Substances Report - packaged form (MP)	In the case of loss or likely loss overboard of harmful substances in packaged form, including those in freight containers, portable tanks, road and rail vehicles and shipborne barges, identified in the *International Maritime Dangerous Goods Code* as marine pollutants (Annex III of MARPOL).

A2. STANDARD REPORTING FORMAT AND PROCEDURES

A2.1 Sections of the reporting format which are inappropriate should be omitted from the report.

A2.2 Where language difficulties may exist, the languages used should include English, using where possible the *Standard Marine Navigational Vocabulary.*

A2.3 Alternatively, the *International Code of Signals* may be used to send detailed information. When the International Code is used, the appropriate indicator should be inserted in the text, after the alphabetical index.

A2.4 For route information, latitude and longitude should be given for each turn point, expressed as in Item C below, together with type of intended track between these points, for example “RL” (rhumb line), “GC” (great circle) or “coastal”, in the case of coastal sailing the estimated date and time of passing significant points expressed by a 6 digit group as in Item B below.

Telegraphy	**Telephone (alternative)**	**Function**	**Information Required**
Name of system (e.g., AMVER/ MAREP/ ECAREG/ NORDREG/ WESTREG)	Name of system (e.g., AMVER/ MAREP/ ECAREG/ NORDREG/ WESTREG)	System Identifier	Ship Reporting system or nearest appropriate coast radio station
DG	Dangerous goods report – packaged form	Type of report	Dangerous goods report – packaged form

Telegraphy	Telephone (alternative)	Function	Information Required
HS	Harmful substances report - in bulk	Type of report	Harmful substances report - in bulk
MP	Harmful substances report - packaged from	Type of report	Harmful substances report - packaged from
A	Vessel (alpha)	Vessel identity	Name, call sign or ship station identity, and flag
B	Time (bravo)	Date and time of event	A 6 digit group giving day of month (first two digits), hours and minutes (last four digits). If other than UTC state time zone used
C	Position (charlie)	Position	A 4 digit group giving latitude in degrees and minutes suffixed with N (north) or S (south) and a 5 digit group giving longitude in degrees and minutes suffixed with E (east) or W (west); or
D	Position (delta)	Position	True bearing (first 3 digits) and distance (state distance) in nautical miles form a clearly identified landmark (state landmark)
E	Course (echo)	True course	A 3 digit group
F	Speed (foxtrot)	Speed in knots & tenths of knots	A 3 digit group
G	Departed (golf)	Port of departure	Name of last port of call
H	Entry (hotel)	Date, time and point of entry into System	Entry time expressed as in (B) and entry position expressed as in (C) or (D)
I	Destination and ETA (india)	Destination and estimated time of arrival	Name of port and date time group expressed as in (B)
J	Pilot (juliet)	Pilot	State whether a deep sea or local Pilot is on board
K	Exit (kilo)	Date, time and point of exit from system or arrival at the vessel's destination	Exit time expressed as in (B) and exit position expressed as in (C) or (D)
L	Route (lima)	Route information	Intended track
M	Radio communications (mike)	Radio communications	State in full names of stations/frequencies guarded

Telegraphy	**Telephone (alternative)**	**Function**	**Information Required**
N	Next report (november)	Time of next report	Date time group expressed as in (B)
O	Draught (oscar)	Maximum present static drought in metres	4 digit group giving metres and centimetres
P	Cargo (papa)	Cargo on board	Cargo and brief details of any dangerous cargoes as well as harmful substances and gases that could endanger persons or the environment (See *Detailed Reporting Requirements*)
Q	Defect, damage, deficiency, limitations (quebec)	Defects/damage deficiencies/ other limitations	Brief details of defects, damage, deficiencies or other limitations (See *Detailed Reporting Requirements*)
R	Pollution/ dangerous goods lost overboard (romeo)	Description of pollutant or dangerous goods lost overboard	Brief details of type of pollution (oil, chemicals, etc.) or dangerous goods lost overboard; position expressed as in (C) or (D) (See *Detailed Reporting Requirements*)
S	Weather (sierra)	Weather conditions	Brief details of weather and sea conditions prevailing
T	Agent (tango)	Vessel's representative and/or owner	Details of name and particulars of vessel's representative or owner or both for provision of information (See *Detailed Reporting Requirements*)
U	Size and type (uniform)	Vessel size and type	Details of length, breadth, tonnage, and type etc. as required
V	Medic (victor)	Medical personnel	Doctor, physician's assistant, nurse, no-medic
W	Persons (whiskey)	Total number of persons on board	State number
X	Remarks (x-ray)	Miscellaneous	Any other information - including as appropriate brief details of incident and of other vessels involved either in incident, assistance or salvage (See *Detailed Reporting Requirements*)

Telegraphy	Telephone (alternative)	Function	Information Required
Y	Relay (yankee)	Request to relay report to another system e.g., AMVER, AUSREP, JASREP, MAREP etc.	Content of report
Z	End of report (zulu)	End of report	No further information required

A3. DETAILED REPORTING REQUIREMENTS

A3.1 Dangerous Goods Reports - Packaged Form (DG)

A3.1.1 Primary report should contain Items, A, B, C (or D), M, Q, R, S, T, U, X of the *Standard Reporting Format*; details for Item R should be as follows:

R

1. Correct technical name or names of goods.
2. UN number or numbers.
3. IMO Hazard class or classes.
4. Names of manufacturers of goods when known, or consignee or consignor.
5. Types of packages including identification marks. Specify whether portable tank or tank vehicle, or whether vehicle or freight container or other cargo transport unit containing packages. Include official registration marks and numbers assigned to the unit.
6. An estimate of the quantity and likely condition of the goods.
7. Whether loss floated or sank.
8. Whether loss is continuing.
9. Cause of loss.

A3.1.2 If the condition of the vessel is such that there is danger of further loss of packaged dangerous goods into the sea, items P and Q of the *Standard Reporting Format* should be reported; details for P should be as follows:

P

1. Correct technical name or names of goods.
2. UN number or numbers.
3. IMO Hazard class or classes.
4. Names of manufacturers of goods when known, or consignee or consignor.
5. Types of packages including identification marks. Specify whether portable tank or tank vehicle, or whether vehicle or freight container or other cargo transport unit containing packages. Include official registration marks and numbers assigned to the unit.
6. An estimate of the quantity and likely condition of the goods.

A3.1.3 Particulars not immediately available should be inserted in a supplementary message or messages.

A3.2 Harmful Substances Reports - In Bulk (HS)

A3.2.1 In the case of actual discharge, primary HS reports should contain Items A, B, C (or D), E, F, L, M, N, Q, R, S, T, U, X of the *Standard Reporting Format*. In the case of probable discharge, item P should also be included. Details for P, Q, R, T and X should be as follows:

P

1. Type of oil or the correct technical name of the noxious liquid substances on board.
2. UN number or numbers if available.
3. Pollution category (X, Y or Z), for noxious liquid substances.
4. Names of manufacturers of substances if appropriate and known, or consignee or consignor.
5. Quantity.

Q

1. Condition of the vessel as relevant.
2. Ability to transfer cargo/ballast/fuel.

R

1. Type of oil or the correct technical name of the noxious liquid substances discharged into the sea.
2. UN number or numbers if available.
3. Pollution category (X, Y or Z), for noxious liquid substances.
4. Names of manufacturers of substances if appropriate and known, or consignee or consignor.
5. An estimate of the quantity of the substances.
6. Whether loss floated or sank.
7. Whether loss is continuing.
8. Cause of loss.
9. Estimate of the movement of the discharge or loss, giving current conditions if known.
10. Estimate of the surface area of the spill if possible.

T

1. Name, address, telex and telephone number of the vessel's owner and representative (charterer, manager or operator of the vessel or their agent).

X

1. Action being taken with regard to the discharge and the movement of the vessel.
2. Assistance or salvage efforts which have been requested or which have been provided by others.
3. The master of an assisting or salvaging vessel should report the particulars of the action undertaken or planned.

A3.2.2 Particulars not immediately available should be inserted in a supplementary message or messages.

A3.3 Harmful Substance Reports - Packaged Form (MP)

A3.3.1 In the case of actual discharges, primary MP reports should contain Items A, B, C (or D), M, Q, R, S, T, U, X of the *Standard Reporting Format*. In the case of probable discharge, Item P should also be included. Details of P, Q, R, T and X should be as follows:

P

1. Correct technical name or names of goods.
2. UN number or numbers.
3. IMO Hazard class or classes.
4. Names of manufacturers of goods when known, or consignee or consignor.
5. Types of packages including identification marks. Specify whether portable tank or tank vehicle, or whether vehicle or freight container or other cargo transport unit containing packages. Include official registration marks and numbers assigned to the unit.
6. An estimate of the quantity and likely condition of the goods.

Q

1. Condition of the vessel as relevant.
2. Ability to transfer cargo/ballast/fuel.

R

1. Correct technical name or names of goods.
2. UN number or numbers.
3. IMO Hazard class or classes.
4. Names of manufacturers of goods when known, or consignee or consignor.
5. Types of packages including identification marks. Specify whether portable tank or tank vehicle, or whether vehicle or freight container or other cargo transport unit containing packages. Include official registration marks and numbers assigned to the unit.
6. An estimate of the quantity and likely condition of the goods.
7. Whether lost goods floated or sank.
8. Whether loss is continuing.
9. Cause of loss.

T

1. Name, address, telex and telephone number of the vessel's owner and representative (charterer, manager or operator of the vessel or their agent).

X

1. Actions being taken with regard to the discharge and movement of the vessel.
2. Assistance or salvage efforts which have been requested or which have been provided by others.
3. The master of an assisting or salvaging vessel should report the particulars of the action undertaken or planned.

A3.3.2 Particulars not immediately available should be inserted in a supplementary message or messages.

A4. PRIMARY REPORT FORMS

A4.1 Dangerous Goods Report - Packaged Form (DG)

Function		**Report**
DG	Type of report	/DG//
A	Vessel identity	A/ /__ __ __ __//
B	Date and time of event	B/ __ __ __ __ __ __ Z //
C	Position	C/__ __ __ __N S __ __ __ __ __ E W//
D*	Position	D/ //
M	Radio communications	M/ //
P**	Cargo on board	P/*** //
Q**	Defect, damage, deficiency, other limitations	Q/ //
R	Description of dangerous goods lost overboard	R/*** //
S	Weather conditions	S/ //
T	Agent	T/ //
U	Vessel size and type	U/ //
X	Remarks	X/ //

* Report either Item C or D.

** Include if the condition of the vessel is such that there is danger of further loss of packaged dangerous goods into the sea.

*** See *Detailed Reporting Requirements* (Appendix A3.1).

A4.2 Harmful Substances Report - In Bulk (HS)

Function		**Report**
HS	Type of report	/HS//
A	Vessel identity	A/ /__ __ __ __//
B	Date and time of event	B/ __ __ __ __ __ __ Z //
C	Position	C/__ __ __ __N S __ __ __ __ __ E W//
D*	Position	D/ //
E	True course	E/ __ __ __ //
F	Speed in knots and tenths of knots	F/ __ __ __ //
L	Route information	L/ //
M	Radio communications	M/ //
N	Next report	N/__ __ __ __ __ __ Z//
P**	Cargo on board	P/*** //
Q	Defect, damage, deficiency, other limitations	Q/*** //
R	Description of dangerous goods lost overboard	R/*** //
S	Weather conditions	S/ //
T	Agent	T/*** //
U	Vessel size and type	U/ //
X	Remarks	X/*** //

* Report either Item C or D.

** Include in the case of a probable discharge.

*** See *Detailed Reporting Requirements* (Appendix A3.2).

A4.3 Harmful Substances Report - Packaged Form (MP)

Function		**Report**
MP	Type of report	/MP//
A	Vessel identity	A/ /__ __ __ __//
B	Date and time of event	B/ __ __ __ __ __ __ Z //
C	Position	C/__ __ __ __N S __ __ __ __ __ E W//
D*	Position	D/ //
M	Radio communications	M/ //
P**	Cargo on board	P/*** //
Q	Defect, damage, deficiency, other limitations	Q/*** //
R	Description of dangerous goods lost overboard	R/*** //
S	Weather conditions	S/ //
T	Agent	T/*** //
U	Vessel size and type	U/ //
X	Remarks	X/*** //

* Report either Item C or D.

** Include in the case of a probable discharge.

*** See *Detailed Reporting Requirements* (Appendix A3.3).

APPENDIX J

GEOCHEMICAL CHARACTERIZATION OF THE UMWELT QUARRY

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Memo

To:	Max Brownhill	**Client:**	Sabina Gold and Silver Corporation.
From:	Kelly Sexsmith Kirsty Ketchum	**Project No:**	1CS002.005
Cc:	Catherine Paul, Sabina Richard Cook, Knight Piésold Ltd.	**Date:**	October 1, 2014
Subject:	Geochemical Characterization Results for the Umwelt Quarry		

1 Introduction

Sabina Gold and Silver Corporation (Sabina) is planning to seek regulatory approvals to initiate site preparation work for early construction activities at Back River. This work would be initiated in advance of completing the environmental assessment for the Back River Project, and would establish basic infrastructure including an all-weather road and an extended airstrip in the Goose area (Sabina 2014). The site preparation activities would require development of a quarry within the footprint of the future Umwelt open pit to provide material for construction.

SRK Consulting was asked to compile and review relevant data from the Umwelt quarry area, and to assess the acid rock drainage/metal leaching (ARD/ML) potential of the quarry rock to determine whether it would be suitable for construction. This memo presents the results of our assessment.

2 Background

2.1 Proposed Quarry at Umwelt

The Umwelt quarry would be located entirely within the footprint of the future Umwelt pit, as shown in Figure 1.

The site preparation work will require a total of 550,000 cubic meters of quarry rock, which would be obtained from the current quarry west of the Goose Camp and/or the proposed Umwelt quarry. The relative amount of material from each of these quarries will be determined by operational logistics which are yet to be solidified. However, up to 550,000 cubic meters could be sourced from the Umwelt quarry.

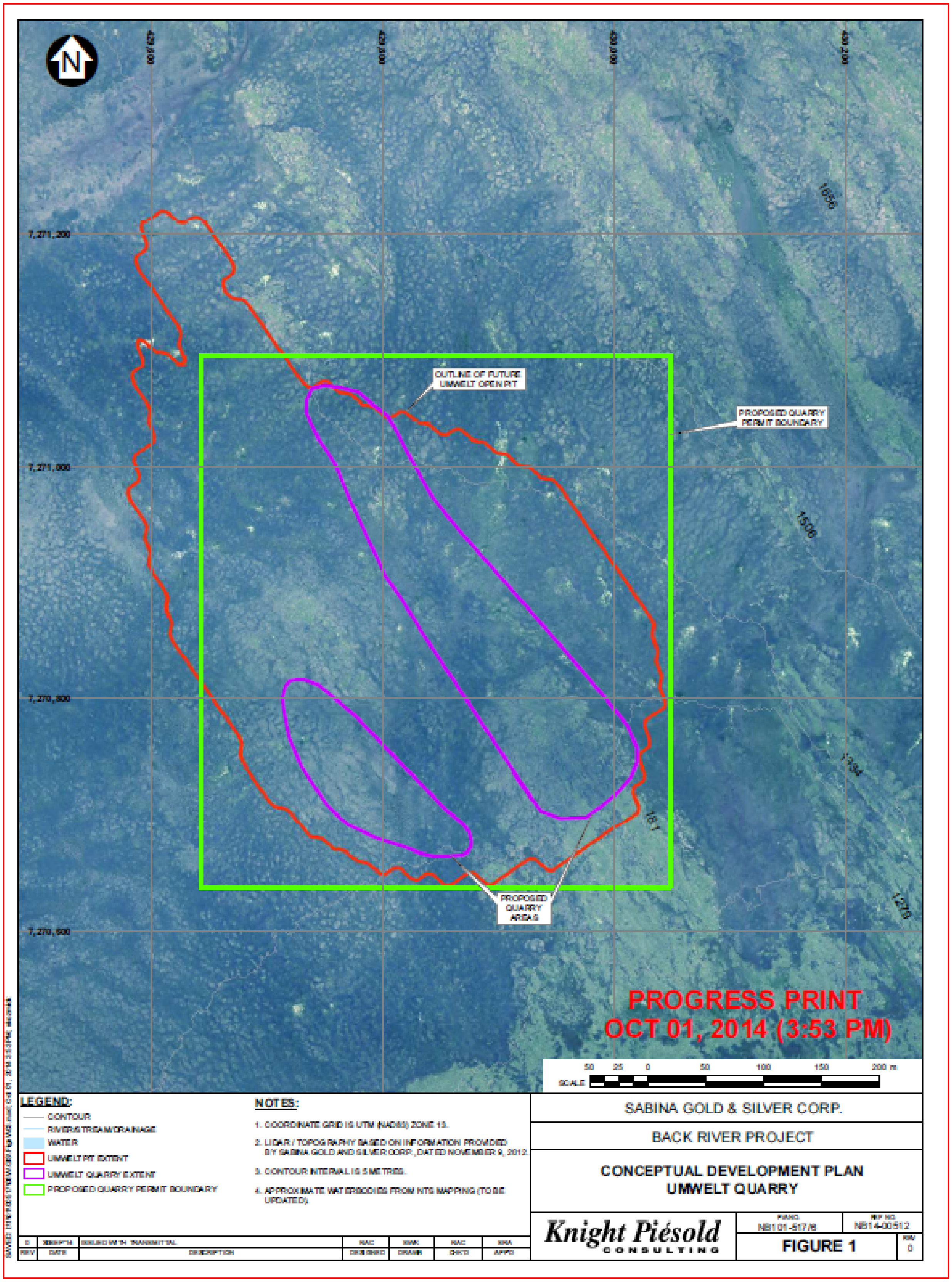

Figure 1: Umwelt Quarry Location

2.2 Geology

The Umwelt deposit consists of folded turbiditic meta-sediments of the Beechey Lake Group, including a banded iron formation (BIF), which is the primary host for gold mineralization, and interbedded greywacke and mudstones. This sequence is cut by felsic and gabbro dykes of variable thicknesses. The gold mineralization occurs within quartz ± carbonate veins and is typically found in association with sulphides within the BIF. Sulphide mineralization includes arsenopyrite, pyrite and pyrrhotite.

A geological plan and cross sections of the deposit area are provided in Figure 2. The areas outlined as a potential quarry resource are located within the upper greywacke unit on either side of the mineralization trend.

2.3 Geochemical Characterization Programs

Detailed results of the geochemical characterization program completed for the Back River Project are presented in the "*Back River Project – 2013 Geochemistry Baseline Report*" prepared by Rescan Environmental Services in March 2014, included as Appendix V11-4A of the DEIS.

In June 2014, SRK Consulting initiated additional static testing on waste rock from the Goose and George deposits to supplement the information presented in the DEIS. The focus of the more recent testing was to assess downhole continuity and thereby determine whether segregation of potentially acid generating material is feasible. Therefore, sampling was designed to obtain a continuous set of samples representing a typical cross section through each of the deposits. Complete results from this program will be presented in the FEIS.

Static testing data from both the earlier and more recent characterization programs included included sulphur speciation, total inorganic carbon analyses and either standard or siderite corrected NP. The acid potential (AP) was calculated based on the total sulphur content, and the NP was used without further adjustments.

This data has been combined and uploaded into geological modelling and visualization software (Leapfrog™) to identify samples that were representative of the potential quarry material at Umwelt. Samples were considered representative if they were located within the upper greywacke, within or in close proximity to the pit, and outside of the trend of the gold mineralization (Figure 2). Other samples from within the upper greywacke from both the Umwelt and Llama deposit areas were also considered in the assessment. However, it is noted that some of these are within the trend of the mineralization and may have been affected by mineralization processes. The quarry areas within the upper greywacke were selected specifically to avoid those areas.

Altogether, there were 73 samples from the upper greywacke unit, of which 16 were representative of the material within the potential quarry area.

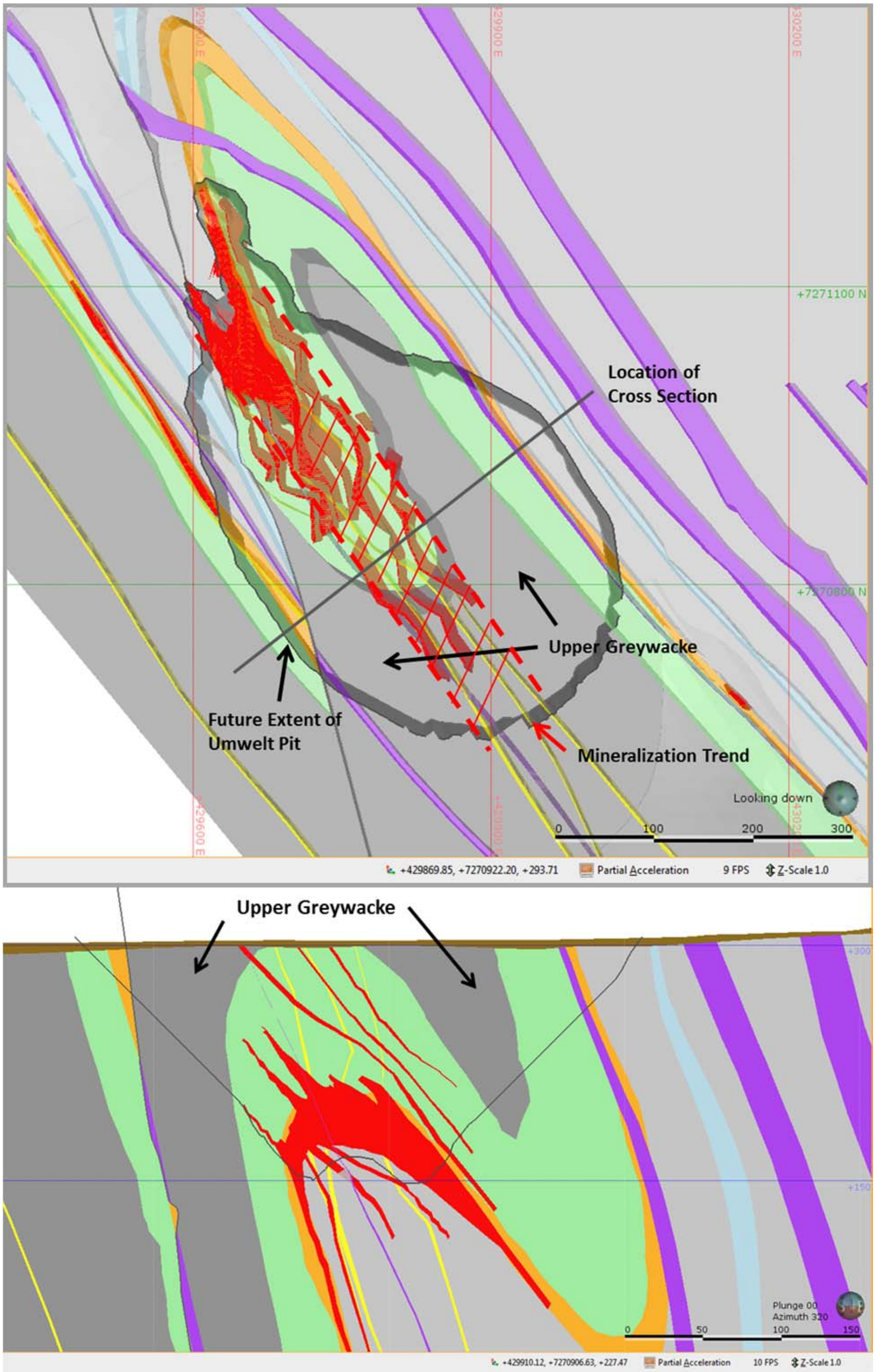

Figure 2: Plan and Section of Umwelt Geology

3 Umwelt Quarry Results and Discussion

Relevant static testing data from the Umwelt quarry area are summarized in Appendix 1. Figure 3 is a plot of the neutralization potential (NP) versus acid potential (AP) for the upper greywacke showing results for all of the samples from the Umwelt and Llama deposit areas, with circles depicting the samples that are specifically representative of the potential quarry areas located on either side of the Umwelt mineralization trend.

The results for the upper greywacke indicate that in general, this unit contains very little sulphide (estimated based on total sulphur content and reported as AP), with average AP values of 6.5 kg $CaCO_3$ eq/t, and only 10% of the samples having an AP of greater than 10 kg $CaCO_3$ eq/t. The generally low AP suggests that this material is not likely to be an appreciable source of acidity. NPs were also very low indicating limited pH buffering capacity. Based on these results, approximately 67% of samples are classified as non-PAG or as having a low sulphur content (AP <5), 27% are classified as having an uncertain potential for ARD (NP/AP=1 to 3), and 5% are classified as potentially acid generating (PAG; NP/AP<1).

As stated previously, 16 of the upper greywacke samples are considered to be representative of the potential quarry area. The majority of these are classified as non-PAG or low sulphur material, and three samples are classified as having an uncertain potential for ARD. Only one of these samples has an AP greater than 10 kg $CaCO_3$ eq/t, again, indicating that this material is unlikely to be an appreciable source of acidity.

Previous work on the project has indicated that arsenic is the main contaminant of potential concern (COPC). Samples representing the quarry areas had solid phase arsenic concentrations consistently less than 50 ppm (with a median of 11 ppm), indicating a relatively limited potential for metal leaching.

4 Summary and Conclusions

In general, these results indicate that the majority of the upper greywacke samples representing the proposed quarry areas within the Umwelt pit are classified as non-PAG or low S material with a limited potential for ARD. Additionally, based on low solid phase arsenic concentrations, metal leaching is unlikely to be an issue. For these reasons, upper greywacke from the proposed Umwelt quarry area is considered suitable for use in construction.

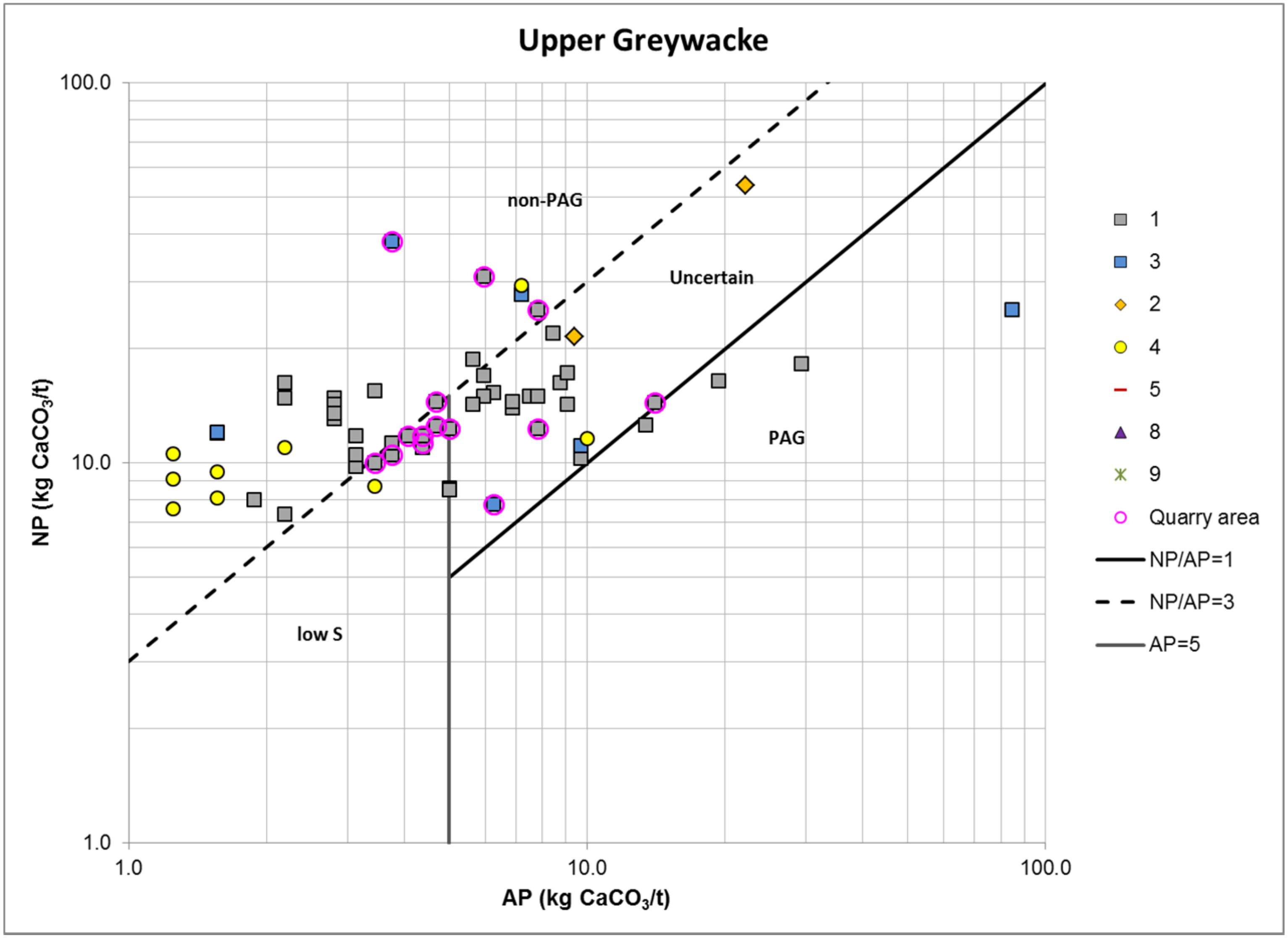

Figure 3: NP versus AP for Upper Greywacke Samples. Samples circled in pink are considered to be representative of material from the proposed quarry areas on either side of the mineralization trend

5 References

Sabina Gold and Silver Corporation, 2014. Back River Project 2015 Site Preparation Activities, Project Description / Environmental Screening Report.

Rescan Environmental Services, 2014. Back River Project – 2013 Geochemistry Baseline Report. prepared for Sabina Gold and Silver Corporation, *In:* Appendix V11-4A of the DEIS. March 2014.

APPENDIX K

FISHERIES ASSESSMENT OF RASCAL STREAM REALIGNMENT

Sabina Gold & Silver Corp.

BACK RIVER PROJECT
Fisheries Assessment of Rascal Stream Re-alignment

Sabina
GOLD & SILVER CORP.

Rescan
an ERM company

Rescan Environmental Services Ltd., an ERM company
ERM Rescan Building, 15th Floor - 1111 West Hastings Street
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October 2014

BACK RIVER PROJECT
FISHERIES ASSESSMENT OF RASCAL STREAM RE-ALIGNMENT

October 2014
Project #0234411-0008

Citation:

Rescan. 2014. *Back River Project: Fisheries Assessment of Rascal Stream Re-alignment*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM company.

Prepared for:

Sabina Gold & Silver Corp.

Prepared by:

Rescan Environmental Services Ltd., an ERM company
Vancouver, British Columbia

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BACK RIVER PROJECT
FISHERIES ASSESSMENT OF RASCAL STREAM RE-ALIGNMENT

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Glossary and Abbreviations

Glossary and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

BACI	Before-After/Control-Impact
CCME	Canadian Council of Ministers of the Environment
Chl *a*	Chlorophyll *a*
CSP	Corrugated Steel Pipe culvert
DFO	Fisheries and Oceans Canada
ha	Hectare(s)
HEP	Habitat Evaluation Procedure
HSI	Habitat Suitability Index
HU	Habitat Unit(s)
Project, the	The Back River Project
RSE	Rascal Stream East
RSW	Rascal Stream West
SHIM	Sensitive Habitat Index Mapping
WSA	Weighted Suitable Area

1. Introduction

1. Introduction

1.1 OVERVIEW

The Sabina Gold & Silver Corp. (Sabina) Back River Project (the Project) is a proposed gold mine located in the West Kitikmeot region of Nunavut (Figure 1.1-1).

A Draft Environmental Impact Statement (DEIS) was submitted to NIRB in January of 2014 (Rescan 2013). The DEIS included an assessment of all phases of the proposed Project including ongoing exploration, site preparation, construction, operations, and closure.

However, Sabina wishes to conduct some site preparation work in 2015, and is preparing applications for submission to various regulatory agencies. Part of the site preparation work includes extending the airstrip to allow for servicing passenger and cargo aircraft.

Extending the airstrip will require a re-alignment of a natural watercourse (an outflow of Rascal Lake) in order to divert water currently flowing from Rascal Lake directly to Goose Lake. This realignment will require the construction of two berms to divert 100% of the flow from Rascal Lake through Gander Pond to discharge into a nearby area of Goose Lake. Berm construction material will be sourced from an approved quarry source.

This report presents an assessment of potential effects to fishery production arising from the re-alignment of the section of stream flowing from Rascal Lake to Goose Lake at the Goose Property. The proposed stream re-alignment is sought to avoid causing serious harm to Arctic Grayling (*Thymallus arcticus*) resulting from the extension of the airstrip (proposed for construction in 2015) over Rascal Stream East (RSE).

1.2 REGULATORY FRAMEWORK

The *Fisheries Act* (1985) was amended in 2012 to shift the mandate of Fisheries and Oceans Canada (DFO) from management of fish habitat to management of fisheries. The amended act prohibits *serious harm to fish* that are part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery. “Serious harm” is defined to include the killing fish by means other than fishing, permanent alteration of habitat, and destruction of habitat.

The amended act focuses on “commercial, recreational, or Aboriginal fisheries” and fish that support those fisheries. These fisheries are defined as those fish that fall within the scope of applicable federal or provincial fisheries regulations, as well as those that can be fished by Aboriginal organization or their members for food, social, or ceremonial purposes, or for purposes set out in a land claims agreement. Fish that support these fisheries are those that contribute to the productivity of a fishery. These include prey fish and other fish species that may reside in water bodies that contain the commercial, recreational, or Aboriginal fishery, or in waters that are connected to such waterbodies.

Under Section 35(2) of the *Fisheries Act* (1985), any project or activity that causes serious harm to fish may require an authorization. Prior to issuing an authorization, the Minister must consider four factors listed in Section 6 of the act:

- The contribution of the relevant fish to the ongoing productivity of commercial, recreational, or Aboriginal fisheries;

PROJECT # 0194096-0015 GIS # BAC-06-220 September 29 2014

Figure 1.1-1

Sabina GOLD & SILVER CORP.

Back River Project Location

Rescan an ERM company

- Fisheries management objectives;
- Whether there are measures or standards to avoid, mitigate, or offset serious harm to fish; and
- The public interest.

Serious harm to fish should be avoided or mitigated wherever possible. Avoidance measures may include locating infrastructure to avoid serious harm to fish or by timing certain activities to avoid harm to fish and fish habitat. Mitigation measures are those that are taken to reduce the spatial scale, duration, or intensity of the impact where it cannot be completely avoided. These include the implementation of best management practices during all phases of a project.

Once efforts have been made to avoid or mitigate serious harm to fish, any residual impact should be addressed by offsetting. Offset measures are those that are taken to replace or enhance fisheries productivity to compensate for unavoidable impacts with the goal of maintaining the productivity of commercial, recreational, or Aboriginal fisheries. The *Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting* (DFO 2013) describes four guiding principles for the consideration of fisheries offsetting projects:

- Offsetting measures must support fisheries management objectives or local restoration priorities;
- Benefits from offsetting measures must balance project impacts;
- Offsetting measures must provide additional benefits to the fishery; and
- Offsetting measures must generate self-sustaining benefits over the long term.

Offsetting may be accomplished through a variety of methods including habitat restoration or enhancement, habitat creation, chemical or biological manipulations, and complementary measures such as funding scientific research. Habitat restoration and creation are generally preferred over chemical and biological manipulations and complementary measures; however, the latter may be considered when enhancement or creation opportunities are particularly rare across a landscape.

1.3 OBJECTIVES

The objectives of this report are as follows:

- Describe the baseline data on fish and fish habitat in the streams potentially affected by the re-alignment and associated infrastructure;
- Describe potential effects of the stream re-alignment;
- Describe the mitigation proposed to avoid serious harm; and
- Outline the proposed monitoring program to ensure no-net loss of Arctic Grayling productions.

2. Methods

2. Methods

Data used for the assessment of potential effects on fisheries were collected from several sources. The primary data sources were baseline studies conducted by Rescan between 2011 and 2013 (Rescan 2012a, 2012b, 2012c, 2012d, 2012e, 2014a, 2014b). Figure 2-1 presents a summary of sample sites that were used in this assessment.

In 2011, fish community and habitat in Gander Pond were sampled. No stream surveys were conducted in this area in 2011.

Habitat was sampled at two stream sites in 2012; Rascal Lake Outflow above where RSE and RSW (Rascal Stream West) split (Site 126), and at RSE (Site 113) just upstream from Goose Lake. The site in RSE (Site 113) was also sampled for fish community. Rascal Lake was sampled for fish community and fish habitat in 2012.

In 2013 extensive assessments were completed on RSE and RSW (Rescan 2014a). Fish community sampling was completed at one site on Rascal Lake Outflow upstream of where RSE and RSW split, at three sites on RSE and at one site on RSW downstream of Gander Pond. Spawner, fry, and habitat surveys were conducted on both RSE and RSW and their tributaries, so that the entire length of stream between Rascal and Goose lakes was assessed.

The methods outlining the flow modeling used to predict velocity, stream path and extent of the stream re-alignment can be found in detail in Appendix 2.1.

2.1 HABITAT EVALUATION PROCEDURE (HEP)

In addition to providing the area (in m^2) of potentially lost and gained habitat resulting from the stream re-alignment, this report used a HEP to construct a habitat budget of the fisheries value of lost and gained habitat (USFWS 1980). HEP is a generalized procedure for assessing habitat suitability in streams and lakes. By multiplying habitat area (measured in m^2) by a Habitat Suitability Index (HSI, no units), the HEP produces Habitat Units (HU) that are indices of both habitat quantity and quality. HU are the currency of habitat budgeting and compensation planning.

HEP has been used as a tool for developing habitat budgets for fisheries offsetting in the Canadian Arctic (e.g., Diavik 1998; BHP Billiton 2002; RL&L/Golder 2003; Rescan 2005, 2007, 2010). The HEP approach has two advantages. First, it provides an objective method to characterize the quality or importance of affected habitats to fish species and aquatic resources. Second, it allows standardization of habitat quality ratings relative to other habitats that have different physical characteristics (e.g., lakes versus streams). This facilitates comparisons among habitat types and ultimately allows affected habitats to be evaluated as a single group for the compensation calculation.

Where Project components cause a serious harm, affected habitats are quantified and characterized in terms of their importance to fish. The amount of newly created habitat to offset lost habitat is based upon the estimation of both area and HUs lost. Overall, the HEP is based upon the suitability of a habitat type to support different life history stages of a species. HSIs, derived primarily from scientific literature, are used to quantify the suitability of the habitat type to support each critical life history stage.

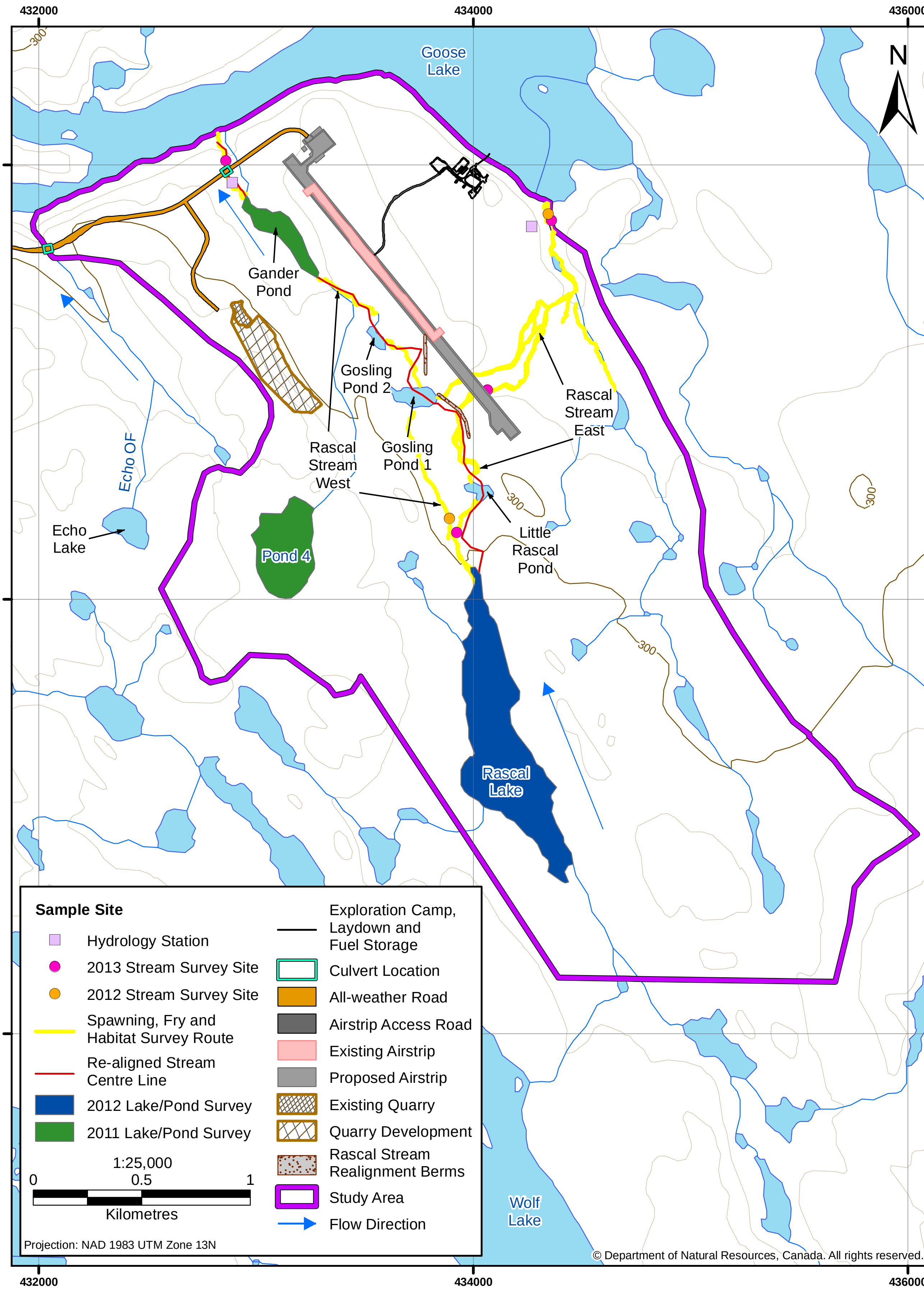

Figure 2-1

Sample Site Locations and Study Area

Sabina GOLD & SILVER CORP

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There are four steps in the HEP used:

1. Initial scoping of the study area and relevant species. This includes brief reviews of the life histories of relevant species, followed by justification of the decision to base habitat compensation planning on certain species habitat requirements.
2. Utilization and/or development of HSI models for target fish species.
3. Habitat assessment of the Project area and of the proposed offsetting.
4. Preparation of a budget of lost and gained HUs.

The ratio of offsetting area to lost habitat area is dependent on the value of the habitat destroyed as well as the value of the proposed offsetting habitat. For example, high quality habitat may require additional compensation area in order to ensure no net loss of fish production. Alternatively, low quality habitat may be replaced with a smaller area of higher quality habitat. The value of the habitat is multiplied by the offsetting and lost areas separately to create HUs which are used to construct the habitat budget.

For each water body, the number of HUs for each life stage of Arctic Grayling was calculated as the Weighted Suitable Area (WSA) for each habitat type. The WSA is the product of the surface area of the habitat type and the Habitat Suitability Index (HSI) for a particular life-stage. The life-stage specific WSAs are then summed to obtain a total number of HUs for Arctic Grayling.

For the existing habitat in RSE and RSW, the results from Sensitive Habitat Index Mapping (SHIM; Rescan 2014a) were used to calculate the surface area of the fish bearing habitat. For the post re-alignment of RSW, the surface area of fish habitat was obtained using polygon areas traced from the predicted stream margins during the fall period (July-Oct) and represent the predicted bankfull widths of the newly aligned RSW.

2.2 HABITAT SUITABILITY INDICES (HSI) MODEL

There are no established and uniformly accepted regional HSI models for northern mining projects. Each compensation project adjusts existing models to the specific habitat and fish species being negatively affected. For this habitat budget, the HSI models were adapted from three sources: the Doris North Project (Golder 2007); the Gahcho Kué Project (Golder 2012); and the Ekati Diamond Mine (Rescan 2010).

Habitat categories for ponds were taken from the Doris North model used for lakes. Doris North's *No Net Loss Plan* refined the Lake Trout HSI model developed for the Diavik Diamond Project (Diavik 1998) and was also used in the Snap Lake Project (De Beers 2002). The Doris North HSI lake habitat model was determined to be most appropriate because, in addition to being close geographically, lakes within the Back River Project area are more biologically and physically similar to lakes within the Doris North Project area than other project areas.

The HSI values for Arctic Grayling in ponds were modified from Gahcho Kué (Golder 2012; Appendix 2.2). The Gahcho Kue Project developed HSI models for species occurring at northern mining projects in consultation with DFO. The models were updated primarily from those developed for Snap Lake.

Stream habitat types and HSI models for Arctic Grayling were developed from previously successful methods for northern mining projects (De Beers 2002; Diavik 1998; Evans et al. 2002; Golder 2012; Stewart et al. 2007).

2.3 EFFECTS ASSESSMENT METHODOLOGY OVERVIEW

The stream re-alignment effects assessment for Arctic Grayling generally followed the process detailed in the General Methodology for Project Effects Assessment in the Back River Project DEIS (Volume 9, Chapter 1; Rescan 2013). This involved the following steps:

1. Identify and characterize the potential effects between the re-alignment activites and Arctic Grayling;
2. Identify mitgation or management measures that could be taken to eliminate or reduce the potential effects;
3. Characterize any residual effects (potential effects that would remain after mitigation and management measures have been applied); and
4. Determine the significance of potential residual effects.

Residual effects on Arctic Grayling were characterized using the rating criteria outlined in Table 2.3-1 below. These include the Magnitude, Extent, Frequency, Duration, Reversibility, Certainty, and Probability of the effects occurring.

Table 2.3-1. Rating Criteria for Evaluating Residual Effects on Arctic Grayling

Criteria	Classification	
Magnitude	Negligible	Changes are unlikely to have an effect on productive capacity that is distinguishable from natural variation.
	Low	Reductions in productive capacity are unlikely to affect the entire Arctic Grayling population of the Wolf and Goose Watersheds.
	Moderate	Reductions in productive capacity may affect Arctic Grayling population of the Wolf and Goose Watersheds.
	High	Reductions in productive capacity of Arctic Grayling likely to occur within and beyond the Wolf and Goose Watersheds, affecting an entire fish population or more than one fish population.
Extent The physical extent of the effect, relative to study area boundaries	Project Footprint	Confined to the re-aligned stream
	Local	Beyond the re-aligned stream and within the study area
	Regional	Beyond the study area and within Wolf and Goose Watersheds
	Beyond Regional	Beyond the Wolf and Goose Watersheds
Frequency How often the effect occurs	Once	Infrequent
	Sporadic	Intermittent
	Continuous	Frequent or continuous
Duration The length of time over which a Project effect will occur	Short	Short term (effect lasts up to two years)
	Medium	Medium term (up to 5 years, for the life of the all-weather road)
	Long	Long term (> 5yrs beyond the life of the all-weather road) or permanent

(continued)

Table 2.2-1. Rating Criteria for Evaluating Residual Effects on Arctic Grayling (completed)

Criteria	Classification	
Reversibility The likelihood of the VEC to recover from the effect	Reversible	Fully reversible
	Reversible with effort	Reversible with cost/effort
	Irreversible	Irreversible
Qualifiers		
Certainty Limitations in the overall understanding of the ecosystem and ability to predict future conditions	High	Baseline data are comprehensive; predictions are based on quantitative data; effect relationship is well understood
	Medium	Intermediate degree of confidence between high and low
	Low	Baseline data are limited; predictions are based on qualitative data; effect relationship is not well understood
Probability The likelihood that the predicted effect/residual effect will occur	Unlikely	Less than 20% likelihood of occurrence
	Moderate	Between 20 and 60% likelihood of occurrence
	Likely	Over 60% likelihood of occurrence

If the magnitude of a residual effect was qualitatively determined to be greater than *Low* after mitigation and management (i.e. reductions in productive capacity may affect Arctic Grayling population of the Wolf and Goose Watersheds), then the potential effect was identified as a residual effect.

The significance of a residual effect was rated either as Significant or Not Significant (Table 2.3-2). For example, residual effects receive a rating of 'Not Significant' if they are expected to be one of the following: negligible or low magnitude, confined to re-aligned RSW, moderate to high reversibility, or short duration.

Table 2.3-2. Definitions of Significance Ratings

Significance	Descriptor of Significance
Significant	Effect is expected to result in a decrease in productive capacity of Arctic Grayling that is not mitigated through re-alignment design and mitigation, and is long-lasting or permanent within the zone of influence of the Project relative to reference condition.
Not Significant	Effect may result in a decrease in productive capacity of Arctic Grayling, but one that is fully mitigated through re-alignment design and management, or fully reversible to baseline conditions in the shorter-term.

3. Environmental Setting

3. Environmental Setting

3.1 STUDY AREA

The study area described in this report encompasses upstream and downstream fish habitat potentially affected by the stream re-alignment and associated construction of the airstrip extension at the Goose Property (Figure 2-1).

The proposed stream re-alignment is located in the Wolf Watershed (Figure 2-1) with streams emptying into Goose Lake. The Wolf Lake Watershed is large with numerous lakes and ponds discharging first into Wolf Lake and then into Rascal Lake, the headwater for the stream re-alignment.

Approximately 250 m downstream of Rascal Lake, the outflow splits into two, separate streams: Rascal Stream East (RSE), and Rascal Stream West (RSW). RSE flows northeast towards Goose Lake flowing through the location of the proposed airstrip. RSW flows to the northwest initially passing through Gosling Ponds 1 and 2 and eventually through Gander Pond prior to reaching Goose Lake (Figure 2-1). A small outflow from Gosling Pond 1 also flows east into RSE. Baseline hydrological studies found that approximately 70% of water in Rascal Lake Outflow passes through RSE before entering Goose Lake during spring freshet; the remaining 30% flows northwards through RSW (Rescan 2012a, 2012b, 2014b). Discharge is low in both streams during summer months; however flow in RSW was 0 m^3/s for extended periods on each of the three years of sampling, indicating that this stream is ephemeral.

3.2 FISHERIES

Arctic Grayling are a relatively long lived (30+ years) iteroparous species that spawn early in the spring in small streams over a variety of substrates ranging from mud to boulders, although gravel is preferred (Scott and Crossman 1973; Hubert et al. 1985; Stewart et al. 2007). Juveniles tend to rear in these streams for most of the summer, while adults rear in lakes, to which they return after spawning (Table 3.2-1; Hubert et al. 1985). Both adults and juveniles overwinter in larger rivers and lakes upstream and downstream of spawning areas (Stewart et al. 2007).

Baseline data were collected from RSE, RSW, Rascal Lake, Gander Pond, and Gosling Ponds to determine the fisheries values of those waterbodies prior to the stream re-alignment and associated construction of the airstrip at the Goose Property (Figure 2-1). The following section summarizes the fisheries resources in each of these waterbodies.

3.2.1 Rascal Stream East (RSE)

RSE is the main migratory corridor for Artic Grayling moving between the Goose and Wolf watersheds throughout the open-water season and likely provides a critical pathway for fish migrating between summer and winter rearing habitat. Rascal Lake has a maximum depth of 3.7 m and, along with Goose Lake, likely provides overwintering habitat to fish that rear in both West and East Rascal streams.

Electrofishing, fry and spawner surveys show that Arctic Grayling utilize the full length of RSE for spawning and rearing. In addition, fry, spawner, and habitat surveys completed on inflows and outflows to Goose Lake suggest that RSE has the most abundant and highest quality Arctic Grayling spawning habitat available to the overwintering population in Goose Lake. Populations overwintering upstream in Rascal Lake and downstream in Goose Lake may use the stream as a migration corridor when moving between summer and winter habitat.

Table 3.2-1. Life History Periodicity Table for Arctic Grayling

Species	Life stage	Habitat	Month											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Arctic Grayling	Spawning	Streams/Rivers												
	Hatching	Streams/Rivers												
	Fry rearing/migration	Streams/Rivers												
	Rearing/overwintering	Rivers/Lakes												
	Adult migration	Streams/Rivers												

Information compiled from Scott and Crossman (1973) and from field observations.

The flow and substrate composition within RSE indicate it provides good quality spawning and rearing habitat to Arctic Grayling, Slimy Sculpin, and Ninespine Stickleback (Appendix 3.1; Rescan 2014a). RSE was found to have the highest juvenile fry densities (1,122 fry) in the Goose Property area (Figure 3.2-1). Electrofishing was completed at three sites in RSE in 2013 (Table 3.2-2). At two sites, located under the proposed airstrip in RSE (Site 1101 and 1004, both approximately 100 m in length), a total of 15 Arctic Grayling and 11 Slimy Sculpin were captured during 525 s of electrofishing on August 11, 2013 and (Rescan 2014a).

Table 3.2-2. Fish Species Captured in the Stream Re-alignment Areas at the Goose Property Area, 1997 to 2013

	Species						
Waterbodies Sampled	**Lake Trout (*Salvelinus namaycush*)**	**Round Whitefish (*Prosopium cylindraceum*)**	**Lake Whitefish (*Coregonus clupeaformis*)**	**Arctic Grayling (*Thymallus arcticus*)**	**Burbot (*Lota lota*)**	**Slimy Sculpin (*Cottus cognatus*)**	**Ninespine Stickleback (*Pungitius pungitius*)**
Rascal Lake	X	X	-	X	-	-	-
Goose Lake	X	X	X	X	X	X	X
Rascal Stream East	-	-	-	X	-	X	X
Rascal Stream West	-	-	-	X	X	X	X
Gander Pond	-	-	-	X	-	X	X

Note: Rascal Stream East and Rascal Stream West were renamed for this report; see Appendix 5.1 for re-naming structure from previous baseline reports.

Extensive high flow (i.e., during freshet) fish habitat assessment surveys were completed for RSE in June 2013 using SHIM (Rescan 2014a). These surveys identified seven reaches between Goose and Rascal lakes (Figure 3.2-2). Overall, the upstream reaches of RSE near Rascal Lake are a mixture of braided channels intermixed with run and riffle sections with gravel, cobble and boulder substrates rated as important for Artic Grayling spawning, rearing and foraging (Appendix 3.1).

3.2.2 Rascal Stream West (RSW)

RSW flows from Rascal Lake through Gander Pond and into Goose Lake. Arctic Grayling, Burbot, Slimy Sculpin, and Ninespine Stickleback have been caught in Gander Pond and RSW (Table 3.2-2). A fry survey of RSW in 2013 found that Arctic Grayling do utilize this stream, but in far lower densities than in RSE (99 individuals, Figure 3.2-3).

RSW has three reaches between its divergence from RSE and Goose Lake (Figure 3.2-4). The reach between Gander Pond and Goose Lake (Reach 1) has abundant instream cover, heterogeneous habitat types (riffle, pool, run, and cascade), and good rearing habitat. There are also some patches of gravel and cobble substrate that may provide spawning habitat.

A small cascade located mid-reach may form a barrier to fish migration during periods of low flow, but does not form a barrier during high flow periods (Plate 3.2-1 and Plate 3.2-2). A second cascade further downstream does not form an impassable barrier to fish but may prevent very small fish from moving upstream at low flows.

The remaining two reaches (between Gander Pond and Gosling Ponds 1 and 2) are of marginal fisheries value. Channelization is intermittent at Reach 2 (between Gander Pond and Gosling Pond 2), the Gander Pond inflow with low bankfull depth (0.15 m) indicating this reach is shallow at normal flows. The substrate is primarily fine substrate with some embedded boulder and cobbles. The quality of the habitat for rearing is fair, although the intermittent channelization and shallow depths make it unsuitable for larger stream fish. Spawning habitat is poor due to the high proportion of fine sediments. Reach 2 has marginal fish habitat overall from the intermittent channelization.

Plate 3.2-1. The cascade in RSW Reach 1 is passable at high flows, June 14, 2013.

Plate 3.2-2. The cascade in RSW Reach 1 is impassable at low flows, June 22, 2013.

At Reach 3 (between Gosling Ponds 1 and 2), there was no visible channel and was deemed a non-classified drainage unsuitable as fish habitat (Appendix 3.2).

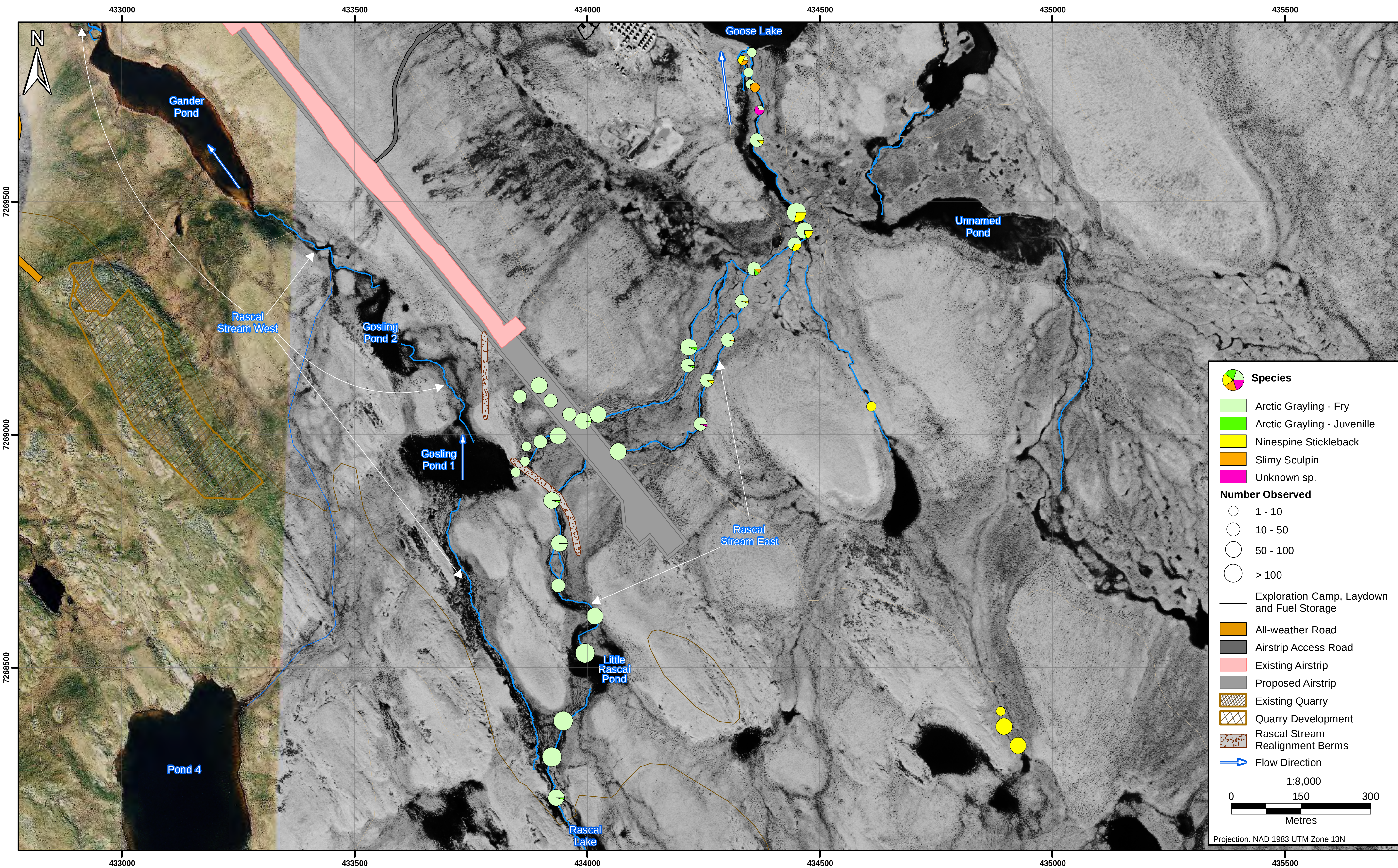

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Figure 3.2-1

Rascal Stream East Fry Survey Observations, 2013

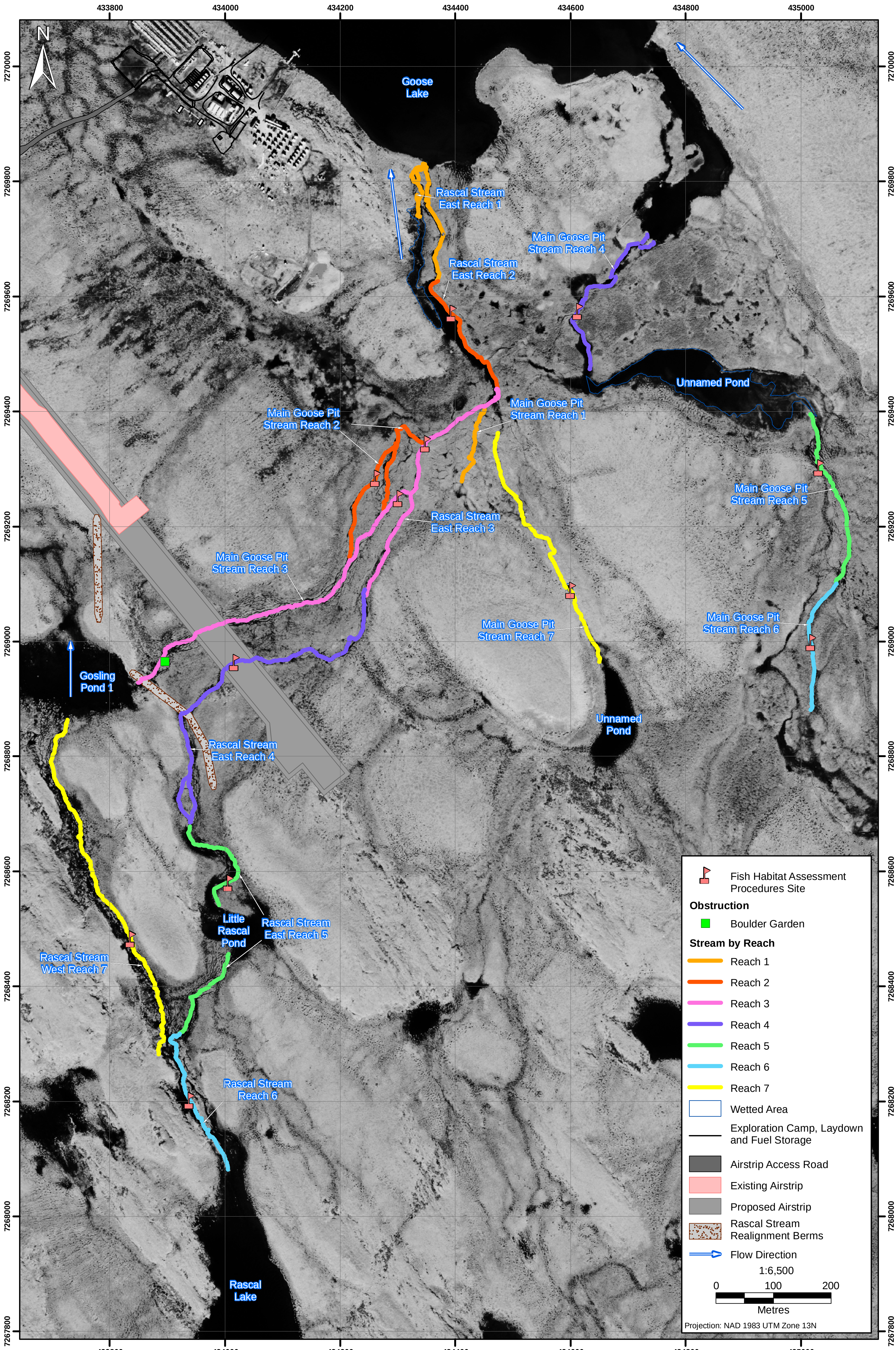

Figure 3.2-2

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Rascal Stream East and Main Goose Pit Stream Reaches and Survey Sites, 2013

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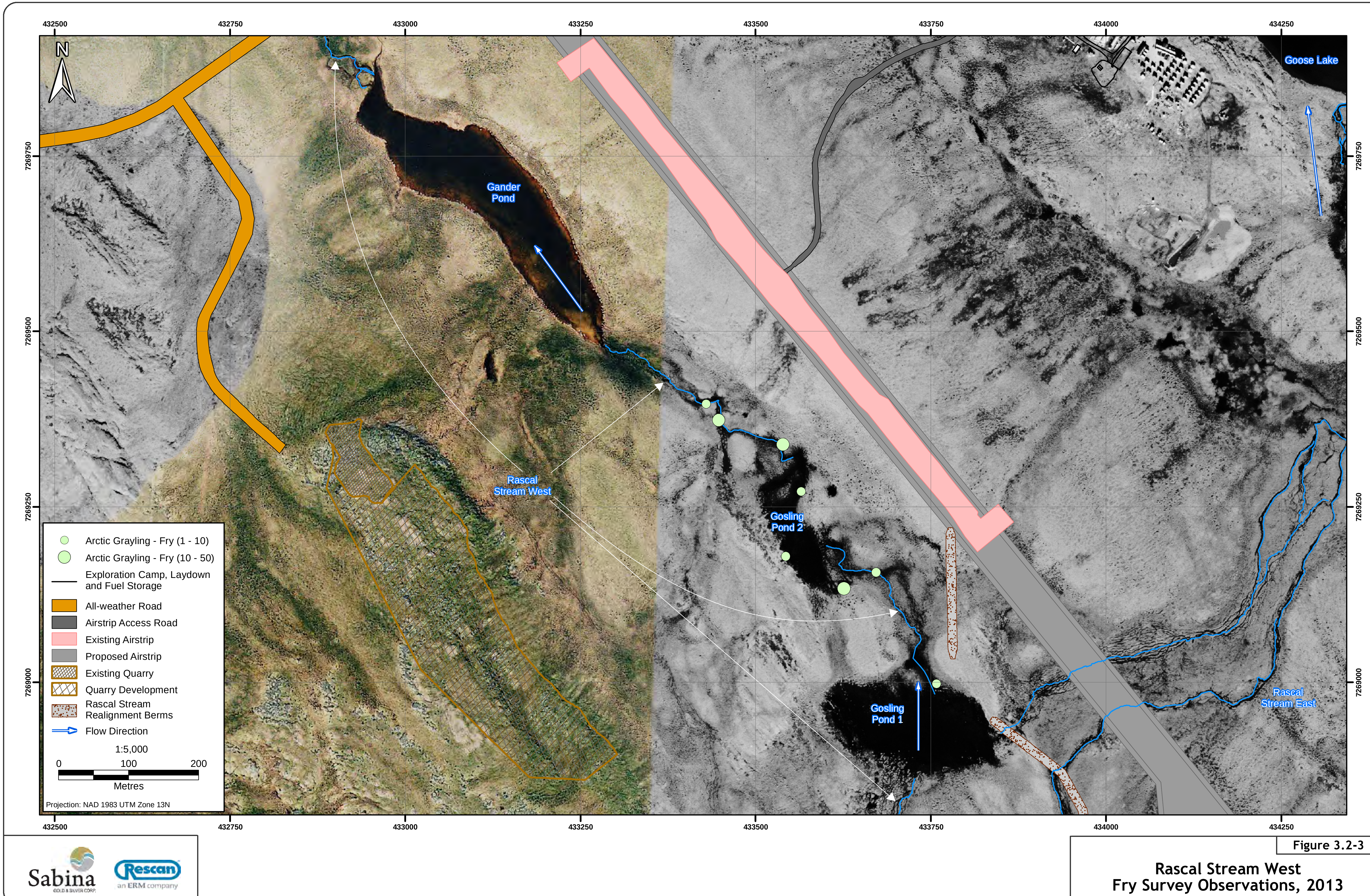

Figure 3.2-3

Rascal Stream West Fry Survey Observations, 2013

PROJECT #0194096-0026 GIS # BAC-06-219 October 15 2014

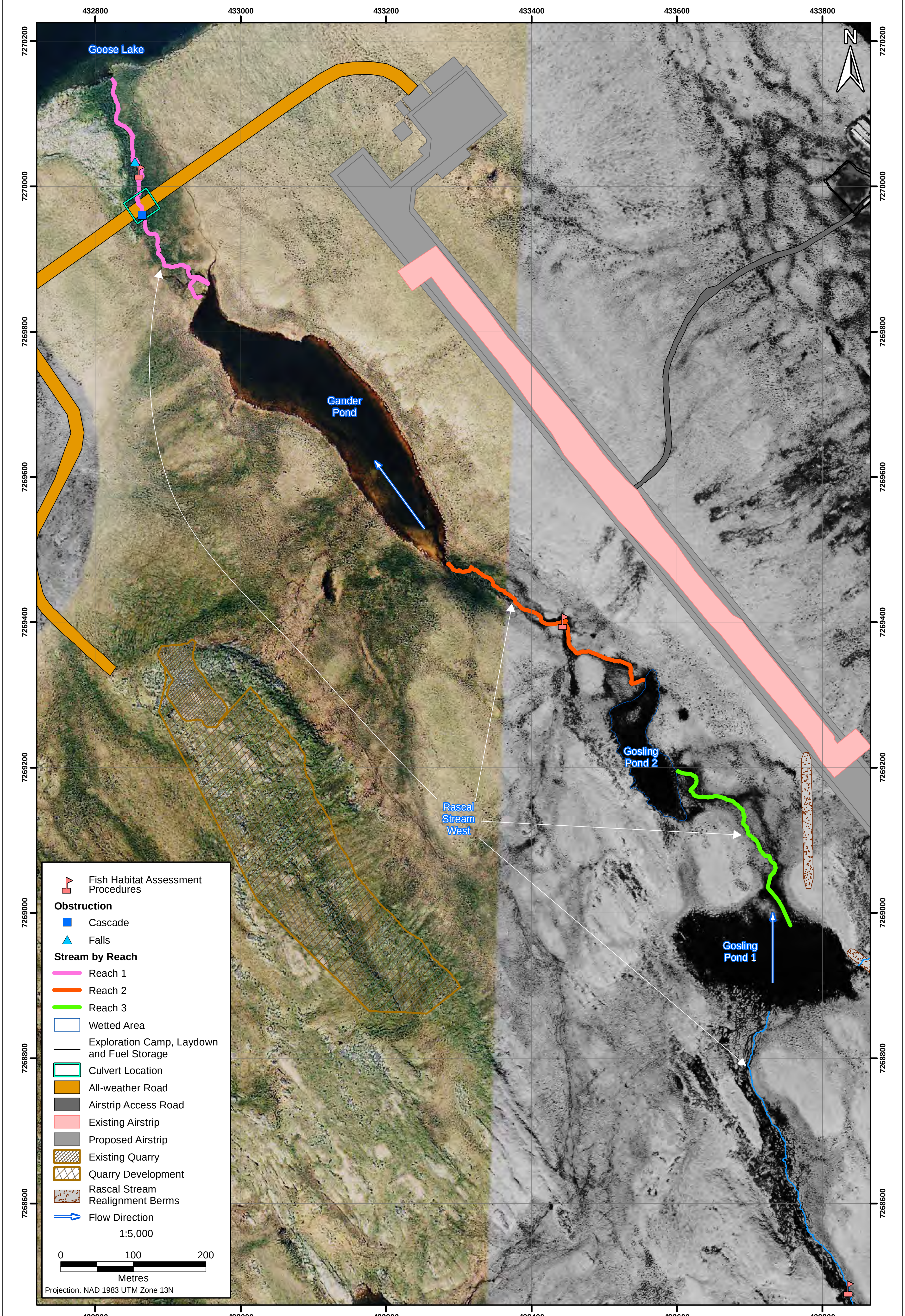

Figure 3.2-4

Rascal Stream West Stream Reaches and Survey Sites, 2013

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3.2.3 Gosling Ponds and Gander Pond along Rascal Stream West (RSW)

Gosling Ponds 1 and 2 are shallow waterbodies that are located between Rascal Lake (upstream) and Gander Pond (downstream) on RSW (Figure 2-1). Both ponds are likely shallow (< 1 m depth) with predominately fine substrates. In August 2013, the inflows and outflows of Gosling Pond 1 and 2 contained isolated pools; there was no flow in the channel at that time (Rescan 2014a). Arctic Grayling fry were observed in both ponds at relatively low numbers: likely the result of ephemeral flow conditions in the inflows and outflows and poor connectivity with overwintering habitat (Figure 3.2-3).

Gander Pond is located downstream of Gosling Ponds 1 and 2 and it drains north into Goose Lake (Figure 3.2-4). The shoreline of Gander Pond is composed almost entirely of fine sediment (Figure 3.2-5). One permanent inflow and two ephemeral inflows were present during habitat surveys in July 2011, and the pond has one outflow to Goose Lake (Rescan 2012c). Gander Pond has a maximum depth of approximately 1.5 m. Habitat quality of Gander Pond is poor due to its shallow nature and due to the near total absence of cover available to fish.

PROJECT #0234411-0008 GIS # BAC-06-218 October 03 2014

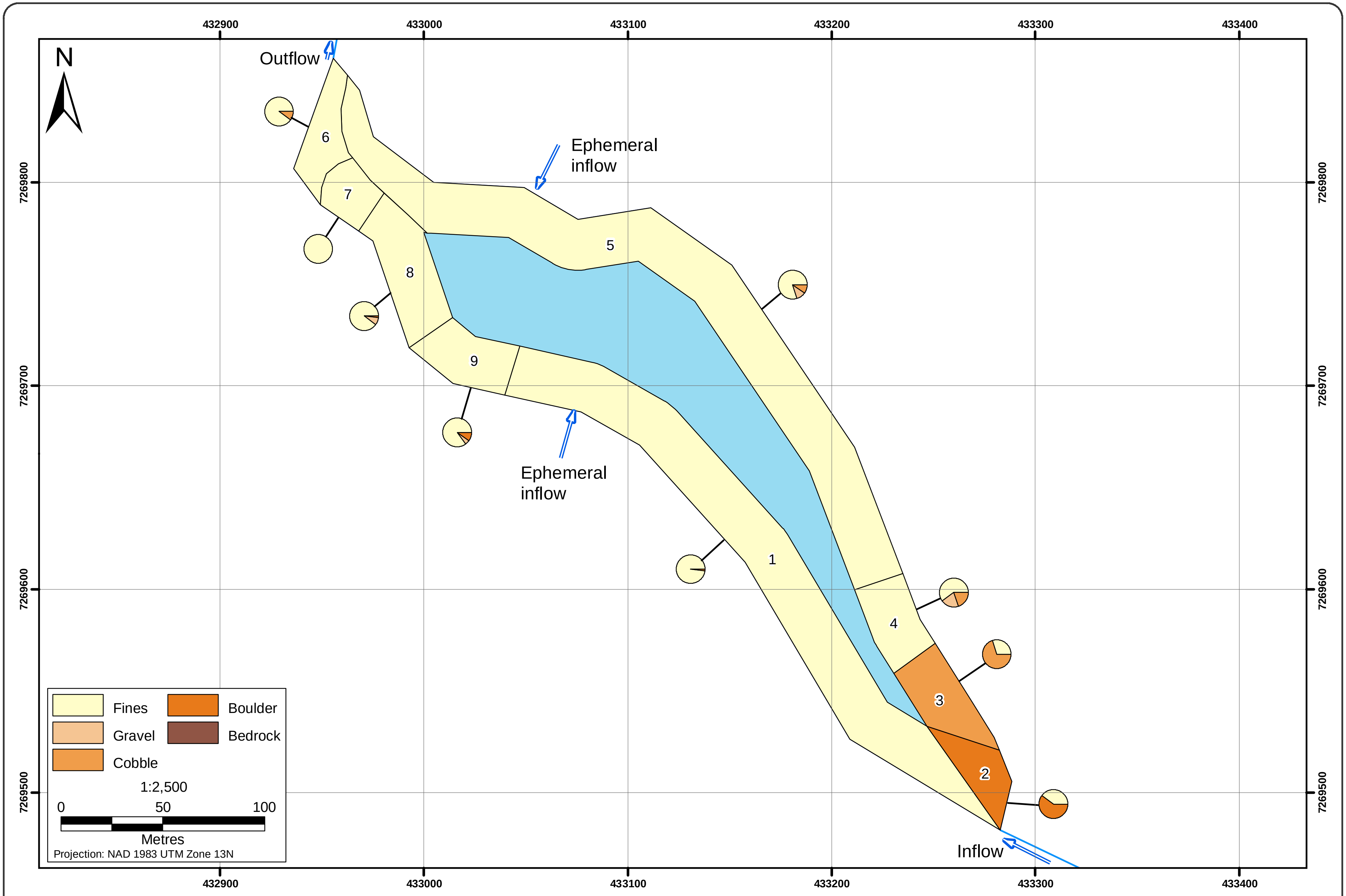

Figure 3.2-5

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Shoreline Substrate of Gander Pond, Back River Project

Figure 3.2-5

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4. Proposed Activities

4. Proposed Activities

4.1 STREAM RE-ALIGNMENT

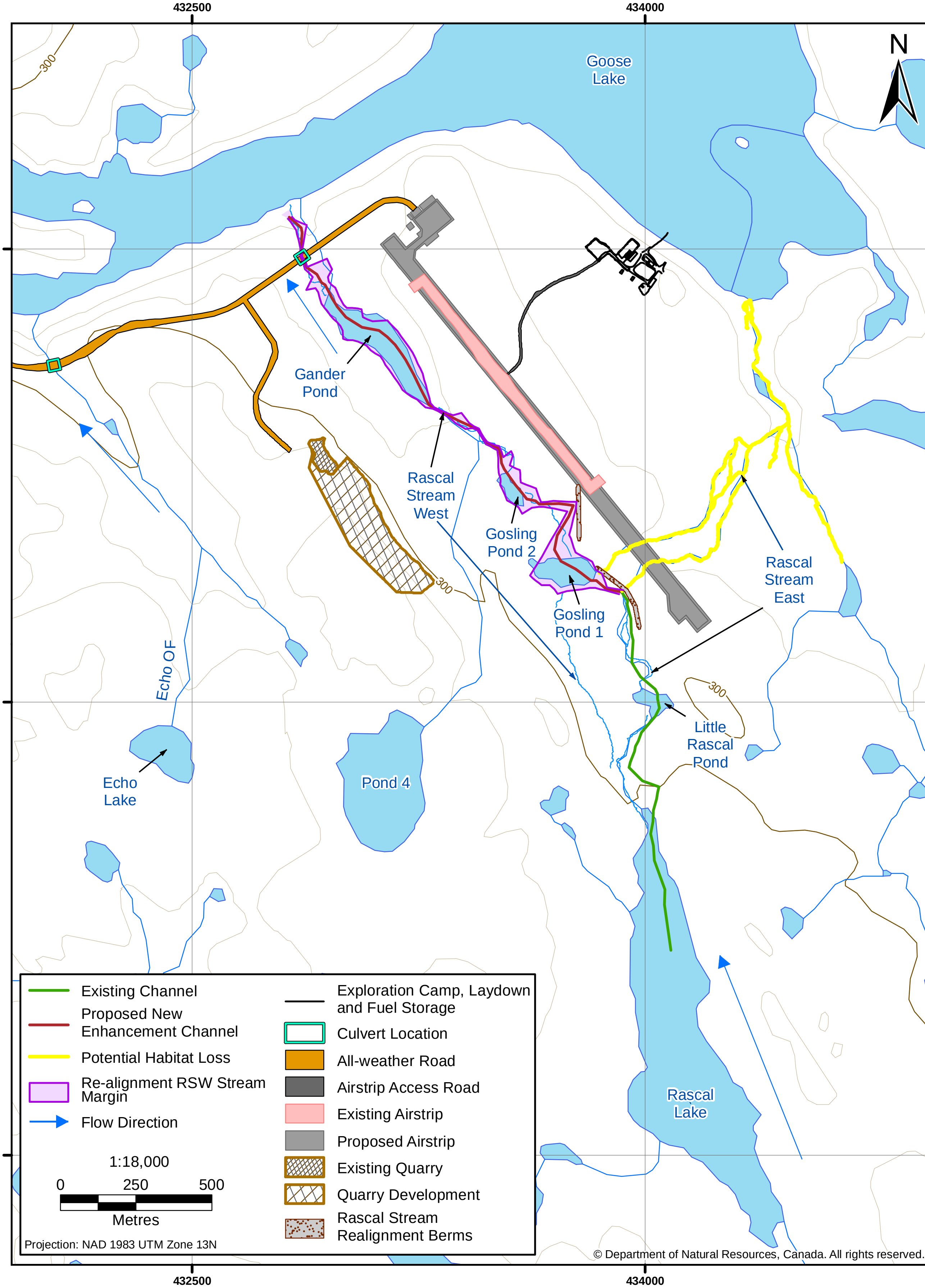
The proposed stream re-alignment will permanently divert the flow from RSE into RSW by placing a set of two rock berms just north of Gosling Pond 1 (Figure 4.1-1). The two berms will be 180 and 270 m in length, lined with a geomembrane, 2.3 m in height, 6 m wide and with 1.5:1 H:V side slopes (Appendix 2.1). The proposed time for construction is during the spring of 2015 (Table 4.1-1), prior to snow melt and fish access to the streams. All construction materials will be sourced from locally developed, geochemically suitable rock quarries already permitted or under application.

Table 4.1-1. Timing of Proposed Stream Re-alignment Activities

Activity	Year 1 (2015)	Year 2 (2016)	Year 3 to 5 (to be determined)
Fisheries Losses	RSE (8,702 m^2) RSW (52,350 m2 of existing habitat)		
Fisheries Gains	RSW (103,887 m^2)		
Construction	Installation of berms and culverts during airstrip expansion and road construction.		culvert removal from all-weather road
Mitigation/ Fisheries Offsetting	Fisheries Offsetting: boulder and gravel/cobble placement in ponds. Stockpiling exposed cobble and boulder substrates, including from lost stream channel. Placement of sediment curtains to minimize sediment/erosion potential downstream in to Goose Lake.	Rascal-Gander-Goose Stream (quantity, spawning gravel). Strategic Placement of Spawning gravels and cobble along length of stream.	Channel restoration when culverts removed from all-weather road. Sediment/erosion control measures.
Monitoring	Hydrological and fisheries assessments during high (freshet) and low (summer) flows (results used to determine strategic placement of gravels and cobble in 2016). Arctic Grayling and Fish Habitat Monitoring.	Arctic Grayling and Fish Habitat Monitoring.	Arctic Grayling and Fish Habitat Monitoring for Years 3, 5 and 6.

4.2 CULVERT INSTALLATION

To facilitate fish passage across the proposed temporary all-weather road, two 2.5 metre diameter by 16.5 metre-long box or Corrugated Steel Pipe (CSP) culverts will be installed approximately 109 metres upstream of the inflow of RSW to Goose Lake (Appendix 2.1). All rock used as construction material will be sourced from locally developed, geochemically suitable rock quarries already permitted or under application. The proposed time for installation is during the spring of 2015 (Table 4.1-1), prior to snow melt and fish access to the streams. Culverts will remain in place temporarily from two to five years, after which the channel will be restored to a natural substrate or the crossing will be re-evaluated should the road be used by a greater range of vehicles/machinery.



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Proposed Stream Re-alignment to Accommodate Airstrip Expansion

Figure 4.1-1

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5. Effects Assessment

5. Effects Assessment

5.1 POTENTIAL EFFECTS OF AIRSTRIP EXPANSION TO FISHERIES

The following three key potential effects to Arctic Grayling productivity are anticipated:

1. Habitat losses in Rascal Stream East (RSE);
2. Habitat gains in Rascal Stream West (RSW); and
3. Sedimentation and erosion in Rascal Stream West (RSW).

5.1.1 Habitat Losses in RSE

The re-alignment of Rascal Stream to divert all water from RSE downstream of the berm location into RSW will result in the loss of 8,702 m^2 (17,203 habitat units) of fish bearing habitat in RSE (see Appendix 5.1 for the habitat loss budget). RSE is used heavily by Arctic Grayling for spawning and rearing (for further information, refer to Section 3.2-1). The re-alignment of this watercourse will result in the original highly productive stream being re-directed through the enhanced RSW before entering Goose Lake.

Post-alignment flow in RSE will continue, though at much reduced level during freshet and the stream channel is likely to become dry and ephemeral when snow melt is complete. There is a potential for stranding Arctic Grayling which may enter RSE post-alignment. However, the species is highly mobile and adapted to migrating to lakes and larger streams as flow becomes reduced in smaller tributaries. Arctic Graying show some fidelity to both spawning and overwintering sites (Stewart et al. 2007) and may fail to use newly constructed spawning grounds, or select less optimal habitat for spawning, reducing their population abundance.

5.1.2 Habitat Gains in RSW

The re-alignment of Rascal Stream to divert all water from RSE downstream of the berm location into RSW will open up 103,887 m^2 (51,984 habitat units) of available fish bearing habitat in RSW (see Appendix 5.3 for the habitat gain budget). This will yield a net gain of 51,537 m^2 (38,896 habitat units) when removing the fisheries value of the existing, low quality fish habitat (see Appendix 5.2 and 5.3 for the habitat loss and gain budgets).

The gain in habitat area and value (habitat units) within RSW is predicted from the increase in flow within the channel and the strategic placement of substrates to promote spawning and rearing for Arctic Grayling (Figure 5.1-1). Baseline flow was insufficient to support Arctic Grayling throughout most of RSW and predicted flows suggest spawning, rearing and foraging within the stream sections of the re-aligned RSW will be within the acceptable set of ranges for all life history stages of Arctic Grayling (Figure 5.1-1): 0.05 – 0.15 m/s (rearing fry), 0.25-0.50 m/s (spawning), 0.15- 0.8 (juvenile foraging) and less than approximately 1.5 m/s for migration.

The design of spawning and rearing habitat within the re-aligned stream reaches and pond sections of RSW (Figure 5.1-1) will involve placing substrates suited for Arctic Grayling production over a two year period. Prior to snowmelt in year one (2015), the habitat design will include the placement of boulder and gravel groynes within each of the three ponds along the re-aligned RSW (Figures 5.1-2 and 5.1-3). Approximately 800 to 1600 m^3 of boulder and gravel sized substrate will be distributed among Gander Pond (5% boulder and gravel) and Gosling Ponds 1 and 2 (2.5% boulder and gravel) to enhance the quality of rearing habitat for Arctic Grayling (Figures 5.1-2 and 5.1-3). In year 2 (2016), following the first season of monitoring and the redistribution of fine sediments in the stream, gravel will be placed in areas of higher flow and slope to enhance the spawning capacity of streams for Arctic Grayling (Figure 5.1-1).

There will be substantially more gravel substrate in the realigned RSW channel compared to baseline conditions. As gravel is the preferred spawning substrate for Arctic Grayling, this increase will likely improve the overall availability of spawning habitat. Currently, there is a total of 756 m^2 of gravel substrate in RSE and RSW (700 m^2 in RSE and 56 m^2 in RSW). There will be 1525 m^2 in RSW after the stream has been realigned and enhanced, providing a net gain of 768 m^2 over existing conditions.

5.1.3 Sedimentation and Erosion in RSW

Increased sedimentation and erosion may occur as a result of construction near and within the stream channel and through increased flow in the re-aligned stream. The construction of berms and culverts will occur during winter, when streams remain frozen and unable to suspend particulate matter. Increased flow resulting from the stream re-alignment has the potential to increase the erosive potential and increase the amount of suspended material, particularly during freshet and in the year immediately following construction, but also during spawning gravel placement in year 2 and culvert removal (potentially in years 3 to 5). The suspension of fine particulate matter could result in decreased Arctic Grayling production through avoidance of turbid sections of stream, or by smothering eggs laid within the channel. This could result in fewer migrants between Rascal and Goose lakes and decreased spawning production.

5.2 IDENTIFICATION OF MITIGATION AND MANAGEMENT MEASURES

The main mitigation measure for the adverse effect of habitat loss in RSE will be the gain in fish habitat in RSW. The objective when designing the re-aligned/enhanced RSW was to replace the natural habitat found in RSE with habitat of equal or greater value and size.

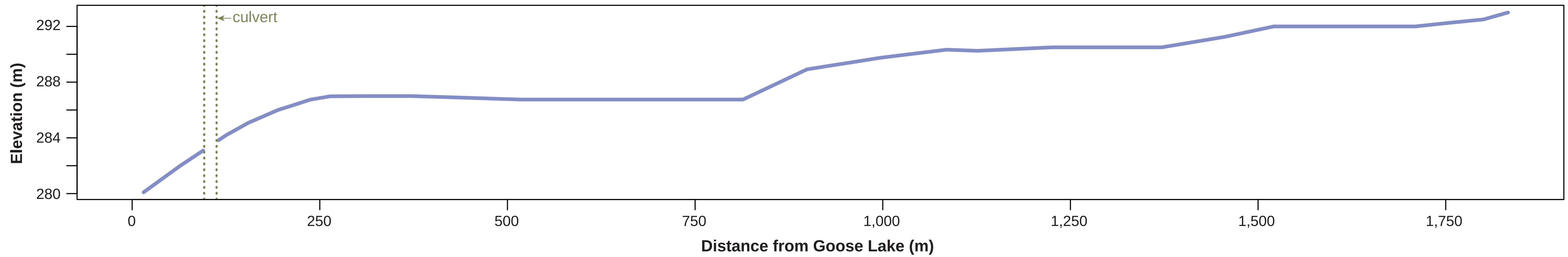
5.2.1 Habitat Mitigation

The fisheries enhancement in RSW is proposed to occur over two years, with the first activities commencing as early as April 2015, prior to the start of freshet and co-occurring with berm and culvert construction. By coordinating the enhancement over two, successive years, the mitigation measures will account for any uncertainty in the modelled wetted perimeters and flow path of the re-aligned RSW, by allowing for distribution of substrate after the first year habitat evaluation. The first year of habitat mitigation will focus on improving existing pond habitats provided by Gosling Ponds 1 and 2, and Gander Pond, and areas just slightly upstream and downstream of the pond habitats, known to be limiting in spawning gravels (Figure 5.1-1). The second year of habitat mitigation will focus on improving spawning habitat in the channels between ponds by distributing spawning sized gravel and cobble in appropriate sections of stream (Figure 5.1-1). Most of the spawning gravel placement will take place in Year 2 to prevent smothering of this habitat by sediment that is mobilized during the first flush after diversion.

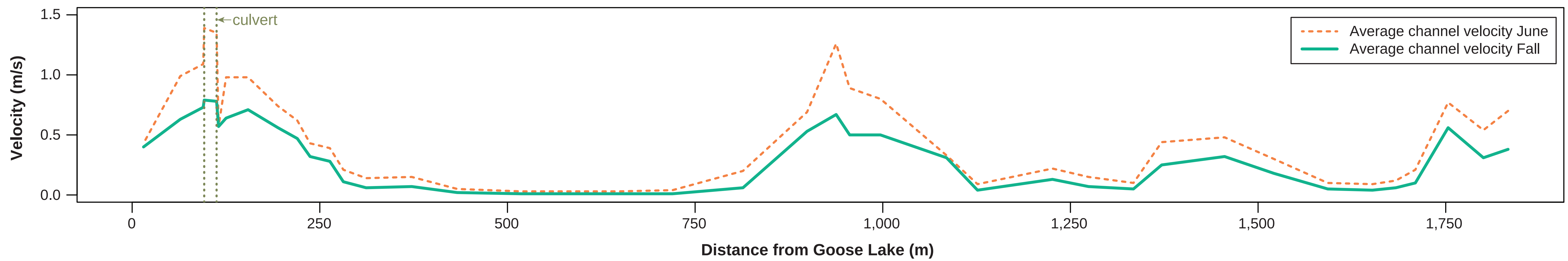
5.2.2 Mitigation for Erosion and Sedimentation

Experience with other Arctic diversion channels has shown that sediment can be mobilized from a new stream channel and/or from disturbed areas through thermal degradation, and transported downstream immediately after freshet flows begin in late May/early June.

a) Elevation Profile



b) Velocity Profile



c) Plan View

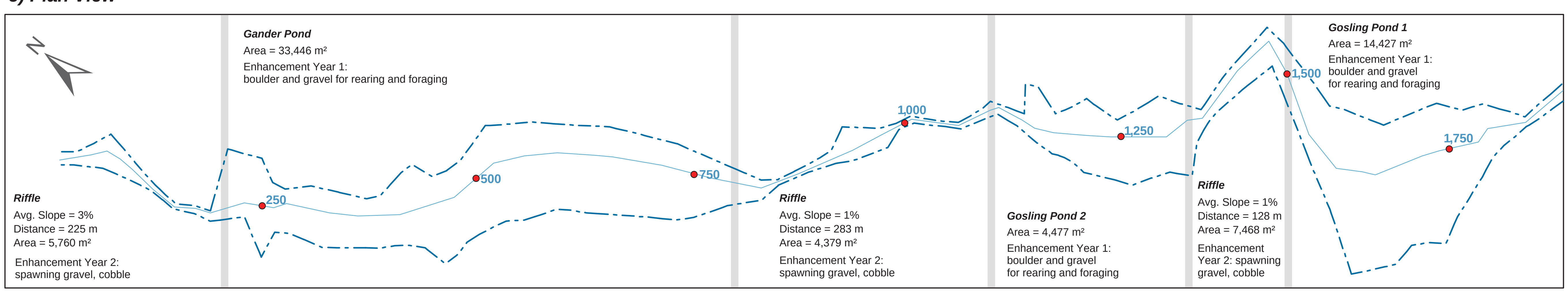


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Figure 5.1-1

Design Plans for Re-aligned Rascal Stream West

PROJECT # 0194096-0008 GRAPHICS # BAC-0008-28b September 25, 2014

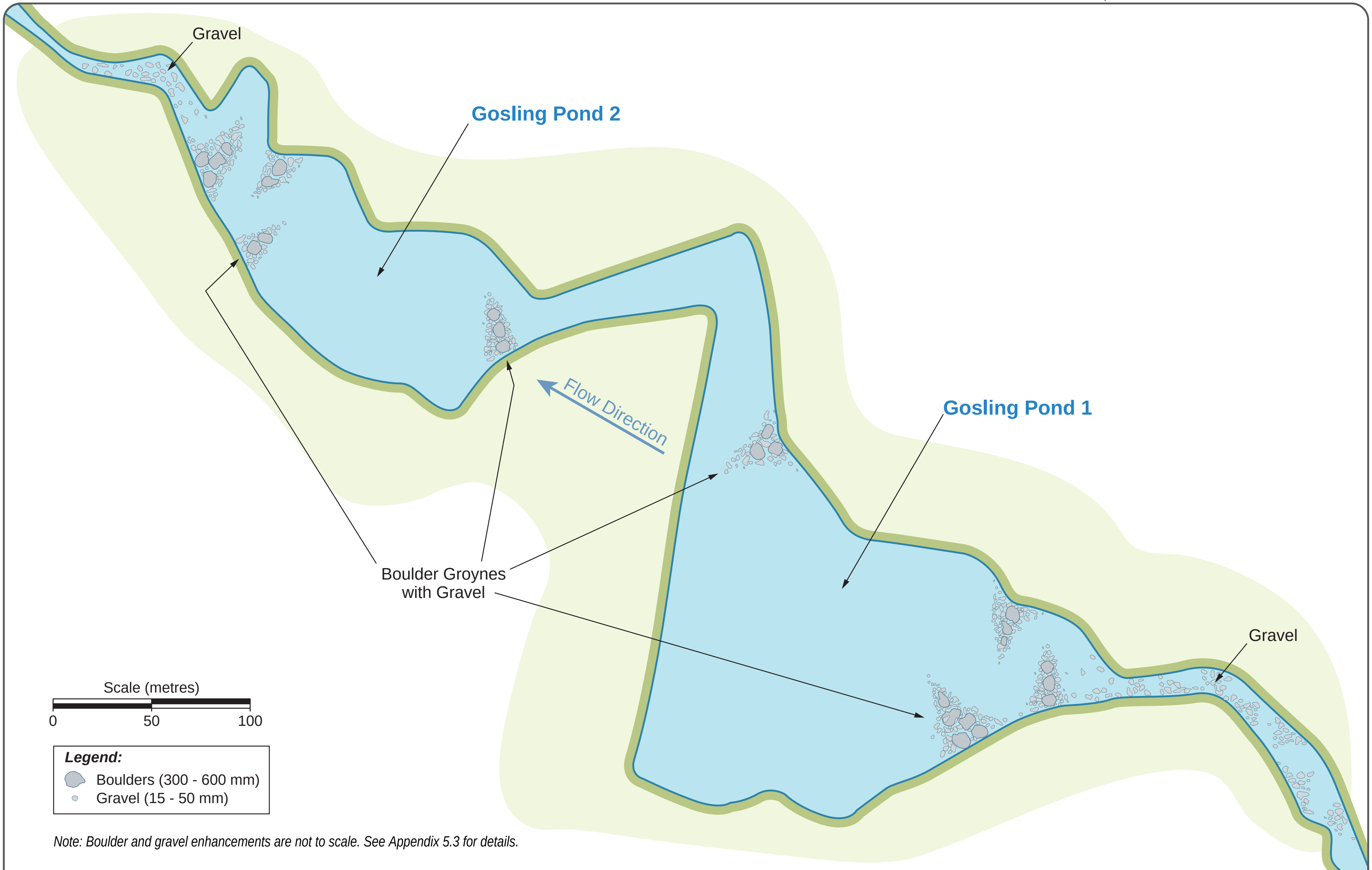

Figure 5.1-2

Proposed Habitat Enhancements at Gosling Ponds 1 and 2

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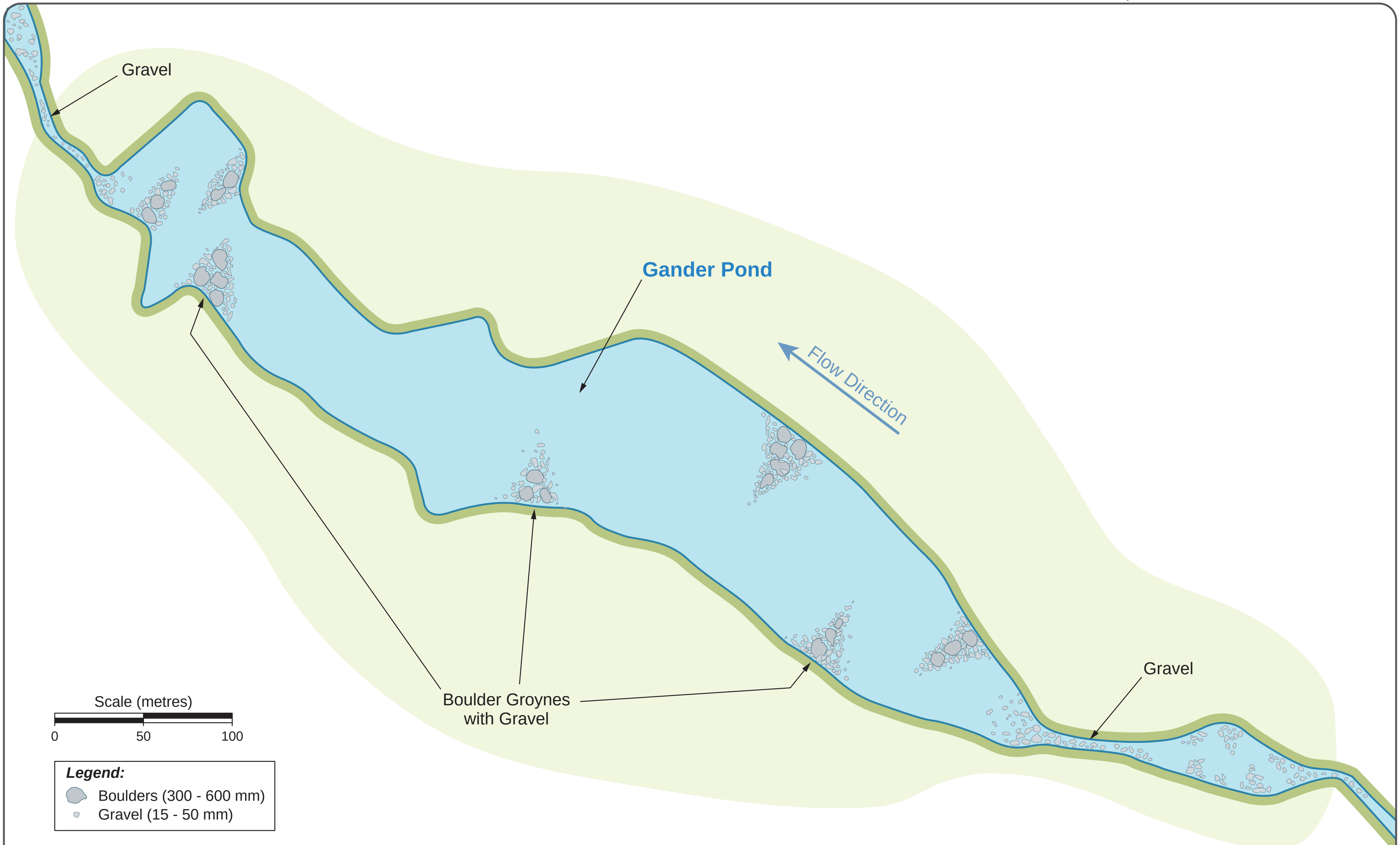

Note: Boulder and gravel enhancements are not to scale. See Appendix 5.3 for details.

Figure 5.1-3

Proposed Habitat Enhancement at Gander Pond

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During freshet of 2015, releases in sediment are expected to occur following the winter construction of berms and culverts and increased channel flows over the entire length of the re-realigned RSW. Increased suspended sediment will be mitigated naturally in the three ponds (Gander, Gosling 1 and 2) where low velocities (Figure 5.1-1) will cause a large portion of suspended solids to deposit without being carried farther downstream. The result will be a natural lowering of concentrations of suspended solids in the water between pond reaches, and most importantly, in the most downstream reach located just upstream of Goose Lake where Arctic Grayling will enter the re-aligned stream to spawn and migrate.

The boulder and gravel groynes placed in each pond to increase habitat heterogeneity and rearing cover will also serve to increase the surface area available to trap and remove suspended sediments from water transport. Moreover, the relatively flat topography over the length of the enhanced RSW should allow for additional settling onto the tundra should flows overtop existing banks.

In the event that particulates do not adequately settle prior to leaving Gander Pond, sediment curtains will be installed in Goose Lake at the mouth of the re-aligned RSW, to mitigate for the potential of sediments entering Goose Lake. Sediment curtains will be placed in an overlapping configuration, such that the majority of suspended particulates are captured, but also so fish may pass between curtains and migrate into the stream.

5.2.3 Construction Schedule and Environmental Mitigation Measures

5.2.3.1 Construction Period

The schedule for construction is presented in Table 4.1-1. Two rock berms (See Figure 4.1-1 for placement) will be constructed during April 2015 when the ground is still frozen. During the first winter season, heavy machinery can move freely around the site with limited damage to the tundra. Substrates used for construction of the berm will be composed of clean rock (i.e., non-potentially acid generating rock) and will be placed to impede natural flows from moving eastwards towards Goose Lake. As a result of proposed berm placements, it is expected that at freshet, water will be forced to flow towards the most western branch (i.e., Rascal Stream West), and northwards to Goose Lake passing first through Gosling Ponds 1 and 2, and eventually through Gander Pond. Gander Pond will act as the final natural sediment trap should any fine sediments be transported downstream from Gosling Ponds 2 and 1, and along lowland areas along the re-aligned course.

Gravel and boulder additions proposed for the three pond locations as depicted in schematic drawings will also be conducted in the winter to minimize damage to the tundra (Figures 5.1-2 and 5.1-3, Table 5.2-1). Clean substrates will be placed on the ice/snow-covered ponds using a two-step process consisting of initial placement of large boulders, followed by gravel additions. Gravel substrates will also be added to areas just upstream and downstream of these ponds. All of these substrate additions have the objective of enhancing existing fish habitat at RSW (Table 5.2-1) in addition to reducing transport of sediment released into Goose Lake (see section 5.2.2 for additional information).

Following detailed hydrological and fish habitat assessments conducted in 2015 (see Proposed Monitoring Program, Chapter 6 of this report) at both high (freshet) and low flows following berm construction, habitat enhancement works will be designed and adapted to conditions observed and will be implemented the following winter.

Table 5.2-1. Details of Proposed Fish Habitat Enhancement Activities to be Conducted within Re-aligned Rascal Stream and Associated Ponds during Year 1 of Post-Berm Construction

Enhancement	Description	Habitat Unit Created	Function	Effect	Proposed Location
Spawning gravel enhancement pads	Addition of gravel (15 - 50 mm) and boulders ~300 - 600 mm	Riffle	Arctic Grayling spawning and juvenile rearing/foraging habitat	Increase in available spawning habitat	• Upstream Gosling Pond 1 • Between Gosling Ponds 1 and 2 • Downstream Gosling Pond 2 • Upstream Gander Pond • Downstream Gander Pond
Boulder groynes	Addition of large boulders (300 - 600 mm) placed into single fingerlike projections	Pool, run, and shallow backwater	Arctic grayling rearing/foraging habitat, and cover	Fine sediment trapping upstream of projections	• Gosling Pond 1 • Gosling Pond 2 • Gander Pond
Addition of large boulders (clusters)/gravel	Boulders: 300 - 600 mm; Gravel ~15 - 50 mm	Pool and run	Cover; juvenile Arctic Grayling rearing/foraging; velocity refugia for fish and aquatic invertebrates	Increase in habitat complexity; boulders create cover; water flow is reflected and directed around boulders; depth created by scouring	• Gosling Pond 1 • Gosling Pond 2 • Gander Pond

5.2.3.2 Source of Substrate

Any natural boulder and cobble material dug up during construction anywhere at site will be separated from the rest of the boulder/cobble material and retained for use in the new re-aligned stream section. Larger substrates (i.e., boulders) will be retained for pond enhancement works. All substrate materials larger than sand will be washed (whenever feasible) prior to use to reduce the amount of small particles. Only clean (i.e., non-potentially acid generating substrates) will be used.

Substrates remaining in RSE but no longer within a wetted channel will also be retained for use as spawning gravel and cobble during habitat mitigation in year 2.

5.2.3.3 Culvert Mitigation

Placement of box culverts (sea cans) or circular culverts located at meter 96 between Goose Lake and Gander Pond will occur during the winter to minimize/eliminate to accommodate the construction of an all-weather road. Culverts will be installed following best practices (BC MFLNRO 2012, DFO 2007). Sizing of culverts to be placed was determined such that they did not present a velocity barrier to migrating Arctic Grayling.

Regular culvert maintenance will be performed on an ongoing basis in order to prevent culvert blockage and will generally follow the DFO Nunavut Operation Statement for Culvert Maintenance (DFO Nunavut Operation Statement: Culvert Maintenance, version 3.0 (2007)). Specifically, culverts will be blocked prior to winter to prevent snow from accumulating inside the culvert and blocking flows during freshet, which would have the potential of overflooding the area, possibly leading to sedimentation and erosion.

5.3 RESIDUAL EFFECTS

Residual effects are those effects predicted to remain after the application of mitigation and management measures.

Three potential effects to Arctic Grayling productivity were evaluated:

- Habitat losses in Rascal Stream East (RSE);
- Habitat gains in Rascal Stream West (RSW); and
- Sedimentation and erosion in Rascal Stream West (RSW).

There is no residual effect anticipated from the loss of fish habitat in RSE because of the proposed offsetting/habitat enhancement in RSW.

For the potential effect of sedimentation/erosion on Arctic Grayling, mitigation measures such as the timing of construction (winter) along with the use of silt curtains will eliminate or minimize this potential effect in downstream Goose Lake and in sections of RSW. However, silt curtains, when installed in an overlapping configuration with a gap between panels to allow fish passage may still create a barrier to Arctic Grayling being able to use portions of RSW. Hence, a potential adverse residual effect due to sedimentation/erosion on the Arctic Grayling population spawning in year one following stream re-alignment is evaluated below (Table 5.3-1).

Table 5.3-1. Summary of Potential Residual Effect and Significance Rating for Arctic Grayling

	Qualifier	Primary Criteria		Secondary Criteria			Qualifier	Significance Rating
Potential Residual Effect	**Direction (positive, neutral, negative)**	**Magnitude (low, moderate, high)**	**Reversibility (reversible, reversible with effort, irreversible)**	**Duration (short, medium, long)**	**Frequency (once, sporadic, continuous)**	**Geographic Extent (footprint, local, regional, beyond regional)**	**Probability (unlikely, moderate, likely)**	**(Not Significant (N), Significant (S))**
Sedimentation/Erosion potential effects. Mitigation measure will be in place (e.g. winter construction, local sediment controls); however, the placement of silt curtains would prevent Arctic Grayling from accessing the new RSW habitat. Consider the potential residual effect of sedimentation/erosion in order to allow access of Arctic Grayling to new RSW habitat. Decreased Arctic Grayling production caused by mobilization of fine particulate matter.	Negative	Low-moderate	Reversible	Medium	Sporadic	Local	Likely	N

In the absence of using silt curtains (in order to allow for Arctic Grayling passage through RSW), a residual effect arising from the suspension of fine particulate matter could result in decreased Arctic Grayling production through avoidance of turbid sections of stream, or by smothering eggs laid within spawning gravels in the channel. The geographical extent of the residual effect would be limited to the re-aligned RSW and confined to within the Rascal Lake to Goose Lake study area; therefore it would be considered *local*. The residual effect would be sporadic, with the majority of the sediment pulse occurring in year one following the re-alignment. However, subsequent, smaller pulses could occur during the placement of spawning gravels in year 2 and during culvert removal (possibly in years three to five). The potential increase in erosion and sedimentation would be of *medium* duration (primarily limited to the first year following construction) and thus, the potential adverse effect on Arctic Grayling would also be of *medium* duration. The potential residual effect would be *fully reversible* — spawning, rearing and migration should re-establish naturally with no intervention once freshet removes the suspended matter.

Arctic Grayling have a highly adaptable life history that allows for flexibility in its spawning, rearing and foraging locations which can occur in lakes, streams and rivers (Evans, Reist, and Minns 2002). In addition, Arctic Grayling are long lived, iteroparous spawners. This strategy is adaptive to overcome for the loss, or partial loss of yearly cohorts in unpredictable environments like the Arctic. Thus, the magnitude of the potential residual effect due to erosion/sedimentation on Arctic Grayling spawning and migration is anticipated to be *low to moderate*, with a temporary loss of production, largely taking place in year 1 of the re-alignment.

The probability of the potential residual effect occurring is dependent upon whether silt curtains are used to mitigate for sediment/erosion potential, or whether it is deemed preferable to allow access to the newly created RSW habitat. However, even if silt curtains are not used, it is predicted that the potential residual effect of sedimentation/erosion would be ***Not Significant*** due to the flexibility of Arctic Grayling life history and the predicted increase in spawning and rearing habitat provided by the design of the re-aligned RSW and mitigation measures. This significance rating is made with *moderate* certainty. However, there will be a robust monitoring program in place that will allow for adaptation should further sedimentation/erosion mitigation measures become necessary (e.g. placement of silt curtains).

6. Proposed Monitoring Program

6. Proposed Monitoring Program

6.1 OVERVIEW

A monitoring program will be implemented to determine if the proposed enhancement of RSW through re-alignment of RSE is functioning effectively, and to determine progressive enhancement strategies of RSW through the placement of gravel, cobble, and boulders after Year 1 of post-enhancement monitoring.

This Proposed Monitoring Program will commence during Year 1 synchronous with the expansion of the airstrip and construction of the temporary all-weather road. Results from Year 1 monitoring will be used to determine the placement of gravel, cobble and boulders during Year 2.

In order to determine whether the enhanced RSW has successfully replaced lost Arctic Grayling production in RSE, monitoring will occur annually during Years 1, 2, and 3, and again in Years 5 and 6 after the new habitat has had time to settle in and mature and after the removal of the temporary all-weather road culverts. If the all-weather road culverts are removed at a later date, then the Monitoring Program will be modified to include monitoring during and after the culvert removal.

The main objective of the Monitoring Program is to evaluate the effectiveness of compensatory habitat designed to offset losses in Arctic Grayling production in RSE.

6.2 MONITORING PROGRAM SCHEDULE AND DESIGN

Table 6.2-1 presents the proposed schedule for the Monitoring Program. The Monitoring Program will assess Arctic Grayling, fish habitat, and other environmental components of fish habitat for the first 3 years of the stream re-alignment and then again in years 5 and 6. Not all components are scheduled to be sampled in each monitoring year, but rather at intervals allowing for the stream community to establish over time, promoting a quantitative assessment of the offsetting program's effectiveness.

Little baseline information was collected prior to the scheduled construction timing of the re-alignment, partly due to low, intermittent flows and limited fish habitat present along the length of RSW. To address these limitations, it is proposed that the monitoring program include reference sampling sites (RS1 to RS3) located upstream of the junction where RSE will be re-aligned towards RSW (Figure 6.2-1). Monitoring sites (MS1 to MS6) located downstream of this junction will form part of the 'impacted' sites to which upstream, 'un-impacted' reference sites can be compared to.

Because few enhancement works are anticipated to be made during the re-alignment phase (other than gravel and boulder additions in ponds and immediate inflow and outflow sections), data collection conducted prior to the completion of all enhancement works (Year 1) will form part of the baseline collection year(s). Additional habitat enhancement designs (e.g., boulder structures, additional channelization, etc.) will be developed only after the first year of post- re-alignment data are collected such that the most suitable works may be selected and implemented the following winter. Only once these works are completed will the 'Post-habitat enhancement of RSW' begin (Year 2 in Table 6.2-1).

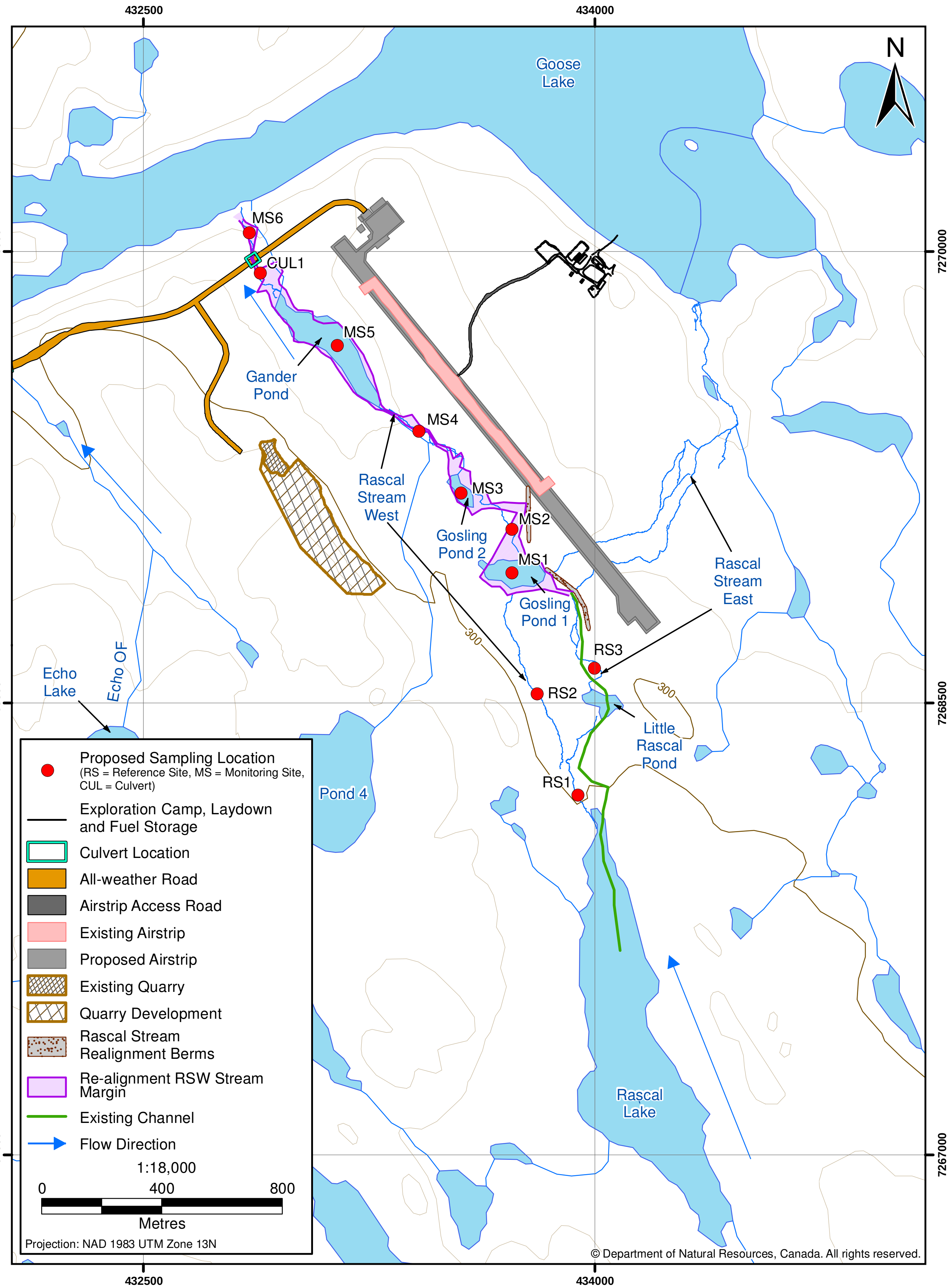

Figure 6.2-1

Proposed Monitoring Program Sampling Locations

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Table 6.2-1. Monitoring Program Schedule and Design Summary

	Year 1 (likely 2015)	Year 2	Year 3	Year 5	Year 6
Monitoring Program Design Year:	**Baseline Post Re-Alignment Year**	**Post-Habitat Enhancement of RSW Monitoring**			
Monitoring Component:					
Stream flow	X	X	X	X	X
Water quality[1]	X	X	X	X	X
Sediment quality	X	-	-	-	X
Periphyton	X	X	-	X	X
Benthic invertebrates	X	X	-	X	X
Fish habitat[1]	X	X	X		X
Number of Arctic Grayling spawners[1]	X	X	X	X	X
Visual counts of Arctic Grayling fry[1]	X	X	X	X	X
Number of outmigrant Arctic Grayling/other fish	X	X	X	X	X
Fish culvert passage assessment	-	X	-	-	-

Note: Monitoring of project construction is not included, but required during berm construction and culvert installation.
[1] Baseline pre- re-alignment data collected in 2013 for RSE and RSW.

6.3 DETAILED MONITORING METHODS

6.3.1 Stream Flow

Detailed hydrological assessments including stream velocity and channel profiles will be required to confirm predicted flows following re-alignment. Hydrological assessments will be taken at each month at 5 transects along each re-aligned RSW section (i.e., between ponds; Figure 5.1-1c) to ensure the flow conditions are within the range of values to support the Arctic Grayling life cycle. In addition, velocity measurements will be taken at the upstream and downstream ends of each culvert (and within each culvert) to ensure Arctic Grayling migration is not restricted by culvert velocities.

Following detailed monthly hydrological and fish habitat assessments conducted in Year 1 (2015), the location and extent of spawning gravel placement will be designed and adapted to conditions observed and will be implemented the following winter.

6.3.2 Water and Sediment Quality

To ensure water and sediments remain within Canadian Council of Ministers of the Environment (CCME) guidelines for aquatic life or at natural background concentrations, water and sediment quality will be monitored at three reference sites upstream of the re-aligned RSW and at six locations within the re-aligned RSW (Figure 6.2-1; Table 6.3-1). Water temperatures will be monitored with stationary data loggers installed at each water and sediment quality sampling station. Manual measurements will also be taken each time data are collected.

Table 6.3-1. Proposed Sampling Stations between Rascal and Goose Lakes

Location	Site	Approximate UTM Coordinates (Zone 13N)		Adult Fish Migration	Culvert Passage	Fry Outmigration	Fish Community	Water Quality	Sediment Quality	Periphyton	Benthic Invertebrates
		Easting	Northing								
Downstream of Rascal Lake	RS1	433964	7268146	X	-	X	X	X	X	X	X
RSW (upstream of Gosling Pond 1)	RS2	433785	7268534	-	-	-	X	X	X	X	X
RSE (upstream of Gosling Pond 1)	RS3	433999	7268616	-	-	-	X	X	X	X	X
Gosling Pond 1	MS1	433724	7268933	-	-	-	X	X	X	X	X
RSW (between Gosling ponds 1 and 2)	MS2	433741	7269108	-	-	-	X	X	X	X	X
Gosling Pond 2	MS3	433554	7269199	-	-	-	X	X	X	X	X
RSW (upstream of Gander Pond)	MS4	433390	7269367	-	-	X	X	X	X	X	X
Gander Pond	MS5	433143	7269688	-	-	-	X	X	X	X	X
Upstream of Culvert	CUL1	432886	7269929	-	X	-	-	-	-	-	-
RSW (upstream of Goose Lake)	MS6	432844	7270030	X	X	X	X	X	X	X	X

Note: RSW = Rascal Stream West, RSE = Rascal Stream East, RS= Reference Site, MS = Monitoring Site. Each site will encompass a 100m section of creek. The upstream and downstream limits of each site will be determined during Year 1 of the monitoring program.

6.3.3 Periphyton

Periphyton samples will be collected using a plate technique to determine the level of initial colonization of primary producers (using Chlorophyll *a*) and to evaluate whole community composition. Periphyton plates will be used at the same sites as water quality sampling sites (Figure 6.2-1; Table 6.3-1). Five samplers will be submerged at each location at the end of July and will be recovered in late August or early September for a total submerged time of approximately 30 days.

Appropriate metrics and indices will be used to evaluate periphyton data including: biomass, density, relative density (i.e., the proportion of each taxonomic group in the community) and several diversity metrics (e.g., Shannon-Weiner Diversity Index, Simpson's Diversity Index, genus richness, G, and maximum dominance).

6.3.4 Benthic Invertebrates

Benthic invertebrate community structure will be sampled at the same sites selected for periphyton sampling (Figure 6.2-1; Table 6.3-1). Benthic invertebrates will be collected using Hester-Dendy samplers to document invertebrate community structure. Samplers will be submerged at the end of July and recovered in late August or early September of each sampling year. Five replicate samples will be collected within 15 m of each designated location.

Metrics and indices used to evaluate benthic invertebrate data will include density, relative density (i.e., the proportion of each taxonomic group in the community), biomass, relative biomass, and several diversity metrics. Particular emphasis will be placed on comparing functional feeding groups between reference and monitored sites.

6.3.5 Fish Habitat

The fish habitat surveys will be conducted along the length of the re-aligned RSW using SHIM twice per year, once during high and once during low flows, following berm construction and culvert installation to compare as built habitat gains to modeled habitat gains (Appendix 5.3) following the re-alignment activities.

6.3.6 Arctic Grayling Spawner and Adult Spring Migrant Monitoring

Along with visual spawner counts conducted at the onset of spring melt, Arctic Grayling spawners and migrants will be enumerated as they move between Rascal and Goose lakes via the re-aligned RSW using fish boxes according to the schedule set out in Table 6.2-1. Two fish boxes will be installed in the spring to track migrations as soon as water begins to flow and boxes will be removed when spawner numbers decline to zero, typically occurring at the end of June. One fish box net will be located at the outlet of Rascal Lake (Site RS1), and another box will be located at the inflow to Goose Lake (MS6; Table 6.3-1). The ratio of visual-survey-fish-counts to box-trap-counts will also be calculated to examine for potential visual underestimation during the spring spawner surveys and it will be compared to baseline data from 2013.

The fish boxes will be serviced once each day during peak spawning migration and once every two days after peak migration. During each visit, all fish will be counted, identified to species, sub-sampled for length and weight, and released in the direction they were swimming. All Arctic Grayling ≥ 170 mm long will be tagged with a unique T-bar Floy Tag attached below the dorsal fin. Tagging of Arctic grayling will allow for evaluation of fish movement patterns and time spent in the re-aligned stream, in addition to fish passage through the stream and installed culverts, and it will also indicate the proportion of the population that overwinters in Rascal Lake and Goose Lake.

If barriers or seasonal restrictions to fish movement are identified in RSW during adult migrant monitoring (e.g. the cascade located in Reach 1 of RSW), those locations may need to be adaptively managed to improve egress.

6.3.7 Summer Fish Community Surveys

Summer fish community surveys will be conducted according to the schedule set out in Table 6.2-1. Newly-emerged Arctic Grayling fry will be enumerated in early to mid-July to help determine if the re-aligned RSW diversion is being used successfully for spawning. Fry will be counted using timed walking surveys of the entire length of stream habitat located between Rascal and Goose lakes, including the re-aligned RSW and the reference sections located upstream of where RSE is diverted to RSW. Subsequent dipnet/pole seine surveys conducted at specific sites will be used to determine fish community and fish-size-at-sampling-date (Table 6.3-1). These data will allow for the direct comparisons of fry health and growth between the re-aligned RSW and baseline measurements taken at RSE, in addition to reference sites located upstream of where RSE is diverted to RSW.

Electrofishing surveys will also be conducted to determine which fish species utilize the newly created habitat in the re-aligned RSW. These electrofishing surveys will take place in mid-August at the same locations as used for the dipnet/pole seine surveys, though additional fry length/weight measurements will be made during the electrofishing surveys.

6.3.8 Fry Outmigration

Juvenile fish movement through the re-aligned RSW prior to winter freeze-up will be monitored using bi-directional fyke nets. Three nets will be installed from early to mid July until freeze-up (~early October) at the same locations as the fish boxes: one at the outlet of Rascal Lake and one at the inflow to Goose Lake (Figure 6.2-1; Table 6.3-1). Each fyke net will be serviced once a day during peak outmigration, and once every two days after peak migration. During each visit, all fish will be counted, identified to species, sub-sampled for length and weight, and released in the direction they were swimming. Fyke nets will allow for the determination of stream residence time of fry and juvenile fish, as well as the total growth of fry during their stream residence. It will also provide information as to lake preferences for overwintering habitat.

6.3.9 Culvert Passage Assessment

An assessment of upstream passage through the culvert will be completed to ensure that the culvert does not restrict egress for fish. A box trap will be installed immediately upstream of the culvert in Year 2 to assess fish movement. Catch at this trap will be compared to the catch at the fish box net located at the outlet of Rascal Lake (Site RS1; Section 6.3.6), downstream of the culvert.

6.3.10 Evaluating Success of the Stream Re-alignment

To evaluate the offsetting plan's success for no net loss of fisheries productivity, primary production (as Chl *a*), periphyton community composition, invertebrate community composition and fish use parameters will be compared to baseline conditions using a Before-After/Control-Impact (BACI) design when data is available, otherwise data collected within the RSW will be compared to those collected in reference areas (i.e., upstream of where RSE is diverted to RSW). For this analysis, control sites will be chosen within the unmodified upstream eastern and western sections of the re-aligned RSW (Figure 6.2-1), impact sites located within the re-aligned RSW (Figure 6.2-1). Temporal trends in measured parameters will also be examined in the final two years of the sampling program.

The re-alignment of the streams and offsetting of RSE habitat will be considered successful if parameters measured in the re-aligned RSW are found to be: 1) greater than that found during baseline conditions in the re-aligned sections of RSW for which data is available (before-after), 2) indistinguishable to that found during baseline conditions in the unmodified upstream eastern and western sections of the re-aligned RSW (control-impact), and 3) improve over successive sampling intervals post-construction (trends through time).

References

References

Definitions of the acronyms and abbreviations used in this reference list can be found in the Glossary and Abbreviations section.

1985. *Fisheries Act*, RS. C. F-14.

B.C. Ministry of Forests, Lands and Natural Resource Operations, B.C. Ministry of Environment, and Fisheries and Oceans Canada. 2012. Fish-stream crossing guidebook. Rev. ed. For. Prac. Invest. Br. Victoria, B.C.

BHP Billiton. 2002. *EKATI Diamond Mine: Sable, Pigeon and Beartooth No Net Loss Plan*. Prepared for BHP Billiton Diamonds Inc. by Dillon Consulting Ltd.

De Beers. 2002. *Aquatic organisms and habitat section of the De Beers Snap Lake Diamond Project – Environmental Assessment*. Prepared for De Beers Canada Mining Inc by Golder Associates Ltd.

DFO. 2007. DFO Nunavut Operational Statement: Culvert Maintenance. Version 3.0, DFO/2007-1329.

DFO. 2013. *Fisheries Productivity Investment Policy: A Proponent's Guide to Offsetting*. Department of Fisheries and Oceans: Ottawa, ON.

Diavik. 1998. *"No Net Loss" plan*. Prepared for De Beers Canada Inc. by Golder Associates Ltd.

Evans, C.L., J.D. Reist, and C.K. Minns. 2002. Life History Characteristics of Freshwater Fishes Occurring in the Northwest Territories and Nunavut, with Major Emphasis on Riverine Habitat Requirements. Can. Manu. Rep. Fish. Aquat. Sci. 2614.

Golder. 2007. *Doris North Project "No Net Loss" Plan – Revision 6 Final Report*. Prepared for Miramar Hope Bay Ltd. by Golder Associates Ltd.: Edmonton, AB.

Golder. 2012. *Gahcho Kué Fish Habitat Compensation Plan - Update*. Prepared for De Beers Canada Inc. by Golder Associates Ltd.: Saskatoon, SK.

Hubert, W.A., R.S. Helzner, L.A. Lee and P.C. Nelson. 1985. Habitat suitability index models and instream flow suitability curves: Arctic grayling riverine populations. *U.S. Fish and Wildlife Service Biological Report* 82(10.110), U.S. Department of the Interior, Washington, D.C., USA.

Rescan. 2005. *Twin Lakes Diversion Project conceptual no net loss fish habitat compensation plan*. Prepared for BHP Billiton Base Metals by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2007. *Galore Creek Project: Fish Habitat Compensation Plan*. Prepared for Novagold Canada Inc. by Rescan Environmental Services Ltd.

Rescan. 2010. *EKATI Diamond Mine Pigeon Stream Diversion Fish Habitat Compensation and Monitoring Plan*. Prepared for BHP Billiton Diamond Inc. by Rescan Environmental Services: Vancouver, B.C.

Rescan. 2012a. *Back River Project: 2011 Hydrology Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2012b. *Back River Project: 2012 Hydrology Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd. : Vancouver, BC.

Rescan. 2012c. *Back River Project: 2011 Fish And Fish Habitat Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2012d. *Back River Project: 2012 Fish and Fish Habitat Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2012e. *Back River Project: 2012 Freshwater Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd.: Vancouver, BC.

Rescan. 2013. *Back River Project: Draft Environmental Impact Statement*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM company.

Rescan. 2014a. *Back River Project: 2013 Fish and Fish Habitat Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.

Rescan. 2014b. *Back River Project: 2013 Hydrology Baseline Report*. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM company.

RL&L/Golder. 2003. *Doris North Project no net loss plan*. Prepared for Miramar Hope Bay Ltd. by RL&L Environmental Services Ltd./Golder Associates Ltd.: Edmonton, AB.

Scott, W. B., and E. J. Crossman. 1973. *Freshwater Fishes of Canada*. Oakville, ON: Galt House Publications Ltd.

Stewart, D.B., N.J. Mochnacz, J.D. Reist, T.J. Carmichael, and C.D. Sawatsky. 2007. Fish life history and habitat use in the Northwest Territories: Arctic Grayling (Thymallus arcticus). Can. Manu. Rep. Fish. Aquat. Sci. 2797.

US Fish and Wildlife Service (USFWS). 1980. Habitat evaluation procedures (HEP) ESM 102. US Department of Interior: Washington, DC.

Appendix 2.1

Rascal Realignment Hydraulic Model

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Memo

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Cc:	Kerry Marchinko, ERM Rescan	**Date:**	October 7, 2014
Subject:	Rascal Realignment Hydraulic Model		

1 Introduction

Sabina Gold & Silver Corp. (Sabina) intends to extend the existing airstrip servicing the Goose Lake camp. In order to construct this extension, a stream realignment is required. The work will require that Sabina place a berm on the Rascal Stream East (RSE), realigning it to augment flows along the Rascal Stream West (RSW) watercourse. With the construction of a series of berms, RSE will be realigned towards an existing smaller catchment flowing into Gander Pond. The realigned RSW will generate increased flows into Gander Pond and create new fish habitat to mitigate the loss of habitat from RSE.

A hydraulic model was prepared to analyze velocities and flow depths in the realigned RSW. A temporary access road will be constructed across the realigned stream, which will require culverts to convey the flow and allow for fish passage. One location was identified as a feasible culvert crossing location, where the sizing was governed by conveyance and fish passage design criterion. The diversion berms were incorporated into the model in order to characterize the realigned stream and confirm that water will not pond along the airstrip.

There are stream velocity constraints that exist for the culverts and along the entire stream length to allow fish passage. The goal of the realignment is to create a fish habitat that matches or exceeds the quality of habitat that will be lost from these proposed works.

2 Supporting Information

2.1 Hydrology

RSE currently flows northeast and bypasses the existing airstrip, eventually discharging to Goose Lake. With the airstrip expansion, RSE will lose its upstream flow contributions. The realignment will route 100% of the RSE flow northwest towards Gander Pond, discharging into a nearby location in Goose Lake.

The connection of the Gander Pond and Rascal Lake catchment will significantly increase the flows in Gander Pond since the Rascal catchment is significantly larger than the Gander Pond catchment. Figure 1 shows the catchment areas contributing to each system. The resulting catchment through Gander Pond is equal to 34.3 km^2, whereas the current catchment is 1.8 km^2.

Flows were estimated based on a regional hydrometric analysis. This analysis generated unit peak flows for various regional stations, and compared the flows based on average elevation, and lake cover percentage. A unit peak flow was developed for the Back River Project, and will be described in the SRK Hydrology Report.

Two flow conditions were modelled to assess fish habitat potential. These flows included the monthly average flow in June, which represents the spring snowmelt, and the monthly average flows between July and October denoted as the average fall flow.

The 2-year and 20-year flow events were also modelled to verify the extent of flooding and capacity of the culvert, and the 100-year flow event was modelled to evaluate the freeboard along the berms.

2.2 Topography

Topographical data was provided by Sabina in the form of 1 m LiDAR contours across the complete Goose Property, as well as 25 cm LiDAR in the vicinity of the airstrip.

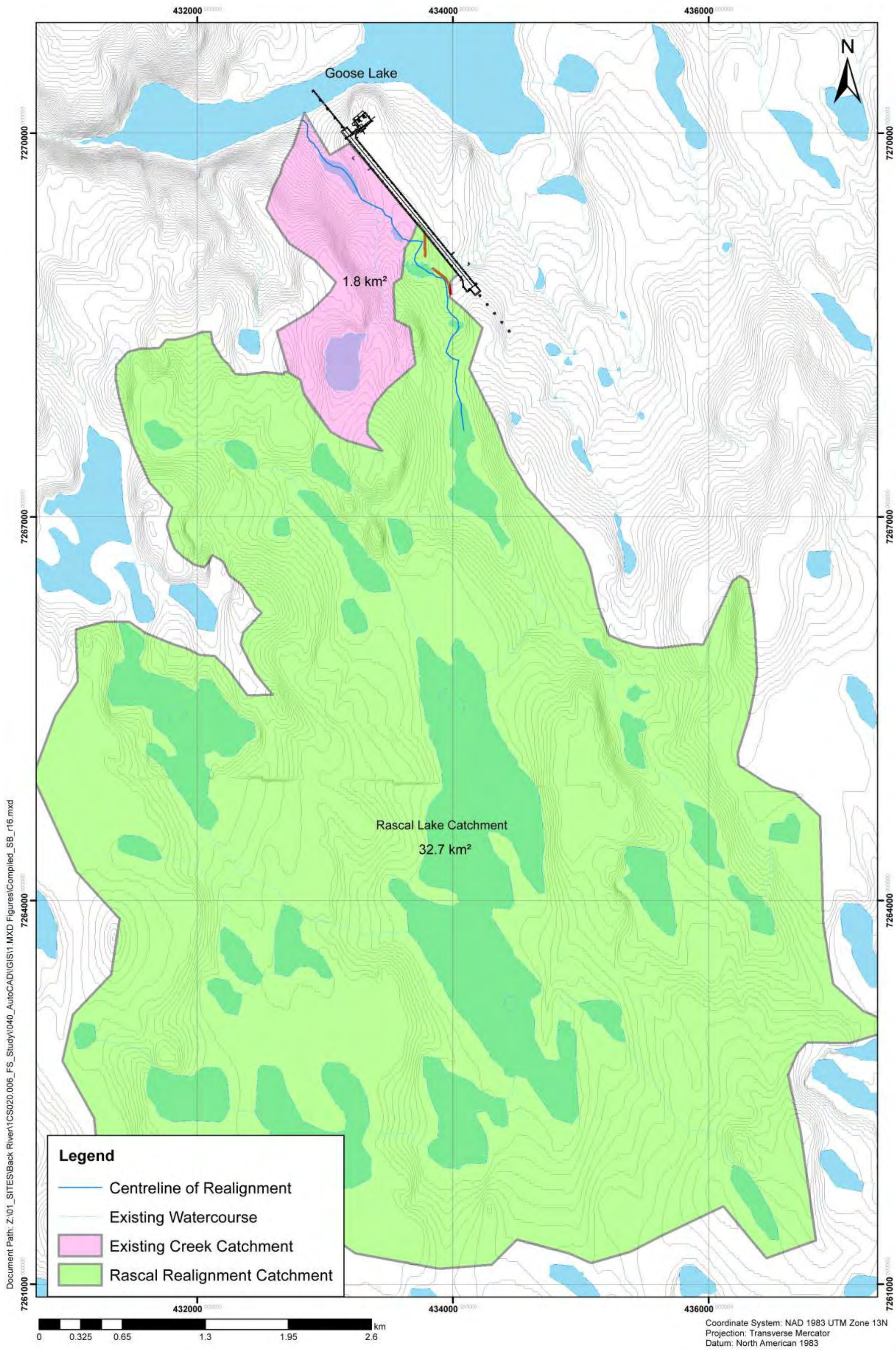


Figure 1: Catchments for Rascal Lake and Gander Pond

3 Design Criteria

The hydrotechnical design criteria that were used for the Rascal realignment design are defined from a compilation of civil engineering best management practices, SRK professional judgment working in the north and ERM Rescan prescribing the fish passage criterion (Table 1).

Table 1: Hydrotechnical Design Criteria

Item	Value	Unit	Source/Comments
Channel Design			
Average fall flow	0.27	m³/s	*Specified by SRK*
Average June flow	1.22	m³/s	*Specified by SRK*
2-year peak flow	2.4	m³/s	*Specified by SRK*
Manning's roughness for channel	0.029	n/a	*Based on substrate material and riprap. Assumed D_{50}= 10 cm.*
Preferred velocity range	0.05 – 0.80	m/s	*Based on fish habitat requirements*
Berm Design			
100-year peak flow	5.1	m³/s	*Specified by SRK*
Side slopes	1.5:1 (H:V)	m	*Specified by SRK*
Minimum freeboard	0.3	m	*(U.S. Bureau of Reclamation [USBOR], 1978)*
Minimum height	2.3	m	*Specified by SRK*
Minimum top width	6	m	*Specified by SRK*
Culvert Design			
20 year-peak flow	4.2	m³/s	*Specified by SRK*
Manning's roughness for bottom of culvert	0.040	n/a	*For gravel, cobbles and few small boulders (Chow V. T., 1994)*
Maximum velocity over short length	1	m/s	*Based on fish passage requirements supplied by ERM Rescan*

Due to the presence of permafrost across the realignment area, excavation into the existing ground is to be minimized. Long-term ponding in the area adjacent to the works should also be minimized to prevent differential thawing in the permafrost beneath the airstrip.

4 Hydraulic Model

4.1 Hydraulic Model

The hydraulic model used for this project was HEC-RAS. HEC-RAS is a one-dimensional computer program developed by the US Army Corps of Engineers and is typically used to estimate hydraulic parameters for flow through natural rivers and other channels.

The realigned RSW hydraulic model was prepared as a steady state model, with fixed flows established for each specified event, including the average fall flow, the average June flow, and the peak 2-year, 20-year, and 100-year return period events.

A TIN model was prepared using the 25 cm LiDAR topography which was extended using the 1 m LiDAR data. The TIN was defined to include the floodplain and channel extents along the 3 km reach of the realignment. The hydraulic model included the proposed berm structures adjacent to the airstrip, as well as the culvert crossing beneath a proposed access road. A total of 48 cross-sections were generated in ARCGIS with the application ARC-GeoRAS and transformed into geometric data for HEC-RAS. Cross-sections were then interpolated at a minimum of 20 m spacing within HEC-RAS. Figure 6 illustrates a plan view of the HEC-RAS model showing the realignment, cross-sections and 100-year flood extents.

The stream reach analyzed had a longitudinal slope that varies between zero and 0.03 m/m and consists of several ponds and meandering sections. The model provides a representation of the water levels and hydraulic parameters expected during the different flow events.

4.2 Alternative Analysis

4.2.1 Berm Alignment

The historical alignment of RSE routes water immediately south of the existing airstrip to Goose Lake. The lower reach of the channel north of the airstrip is in conflict with other mining infrastructure and it was therefore decided to realign RSE towards the RSW watercourse, through Gander Pond to Goose Lake. The realignment is accomplished with minimal excavation by constructing the south berm illustrated on Figure 2. There is a low point situated adjacent to the proposed extension downstream of the south berm along the new alignment, and the proposed north berm will restrict water from ponding along the airstrip. For each flow event, HEC-RAS produced an aerial view of the ponding extents within each cross-section. Based on available topography and HEC-RAS model results, the berms were generated in an iterative process to minimize the length of berm, while ensuring that no water shall impinge on the airstrip during the design events.

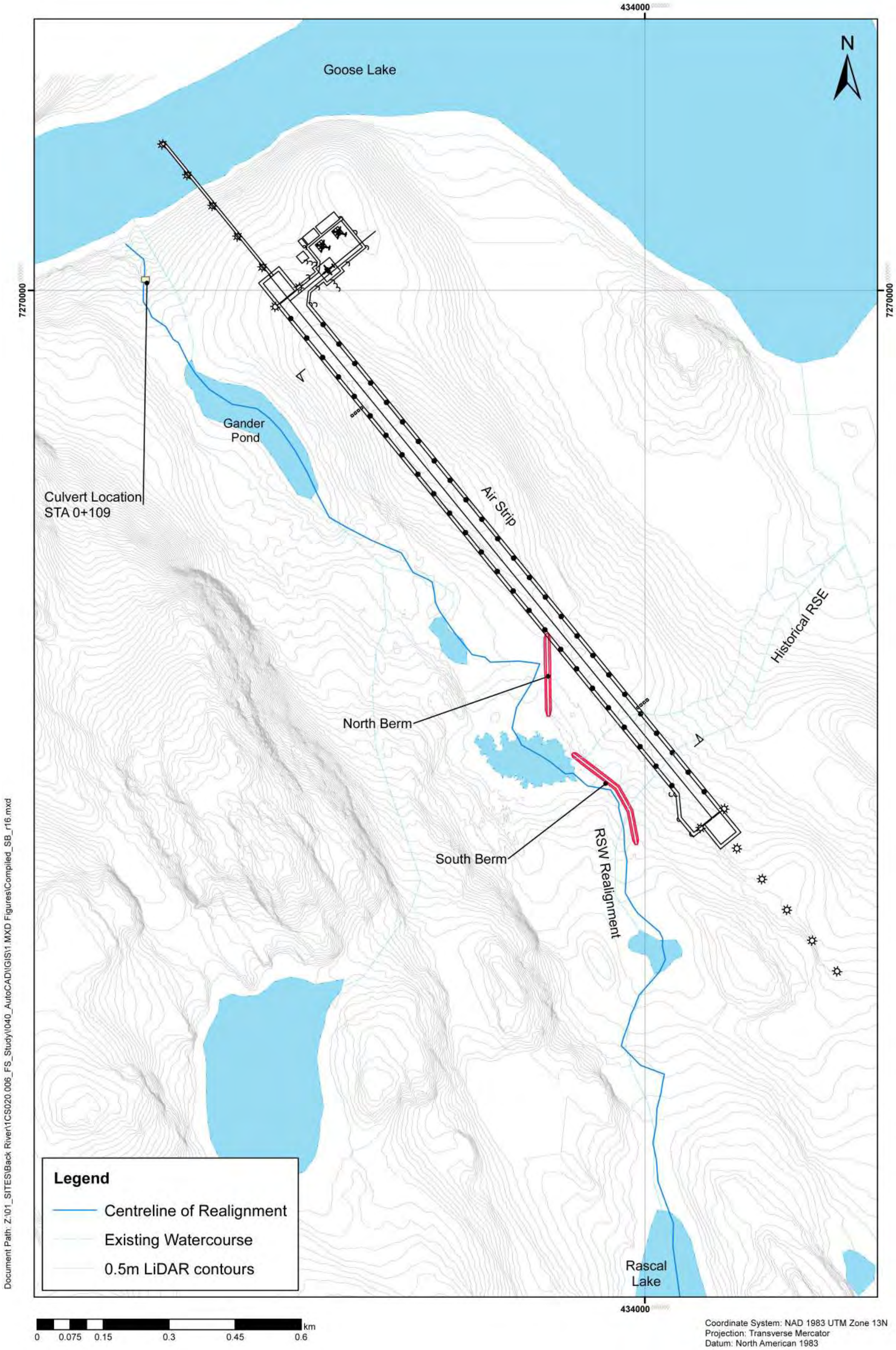


Figure 2: Rascal Realignment

4.2.2 Culvert Location and Sizing

The culvert location was selected based on stream slope and cross-sectional topography to minimize the fill required for the road crossing. The crossing location is identified in Figure 2, at Station 0+109. The longitudinal slope in this section is 3.6% along the base of the culvert.

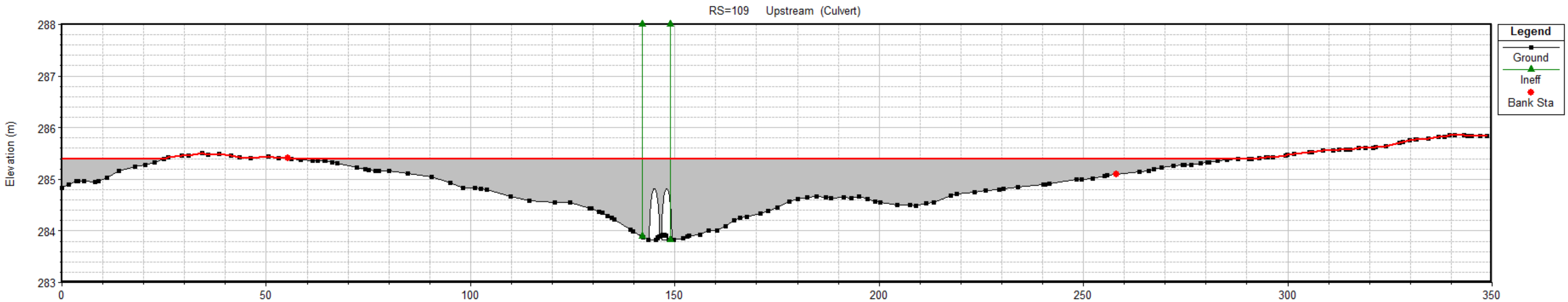
Two culvert alternatives were assessed;

- 2 x 2.5 m box culverts
- 2 x 2.5 m Corrugated Steel Pipe (CSP) culverts

The culverts will be filled with subgrade and large boulders or baffles to facilitate fish passage and increase the roughness in the pipe. The cross-section at the culvert location is provided in Figure 3, for the box and CSP culverts.

The box culverts will be embedded below existing ground by approximately 15 cm in order to place the substrate layer. Several boulders with a minimum diameter of 0.4 m will also be placed within the culverts to reduce velocities during high flow events.

The CSP culverts will need to be filled with substrate to a depth equal to 40% of the culvert diameter. This will require an excavation below existing ground of 1 m.



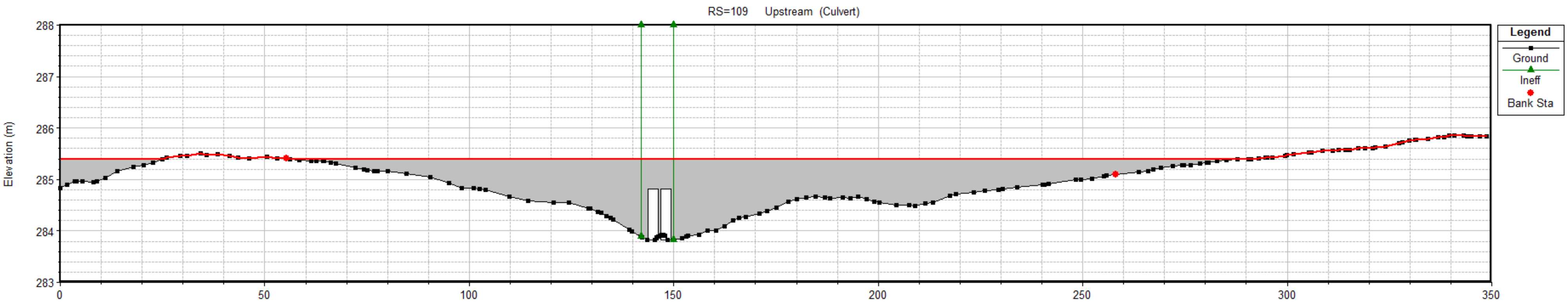


Figure 3: Cross-section along Proposed Culvert, for Box and CSP culverts

5 Results

The results of the HEC-RAS model are presented in terms of the channel, berms, and culverts.

5.1 Channel Results

Velocity and water depth profile results are presented for the channel along the realigned centreline. The velocities in each cross-section allow for the selection of an appropriate substrate material based on the fish habitat classification. Velocity profiles for each alternative are presented in Figure 4, for average fall flow and average June flow. The water depth profile ensures that there is sufficient depth for fish passage, and is presented in Figure 5 during the average fall flow and average June flow.

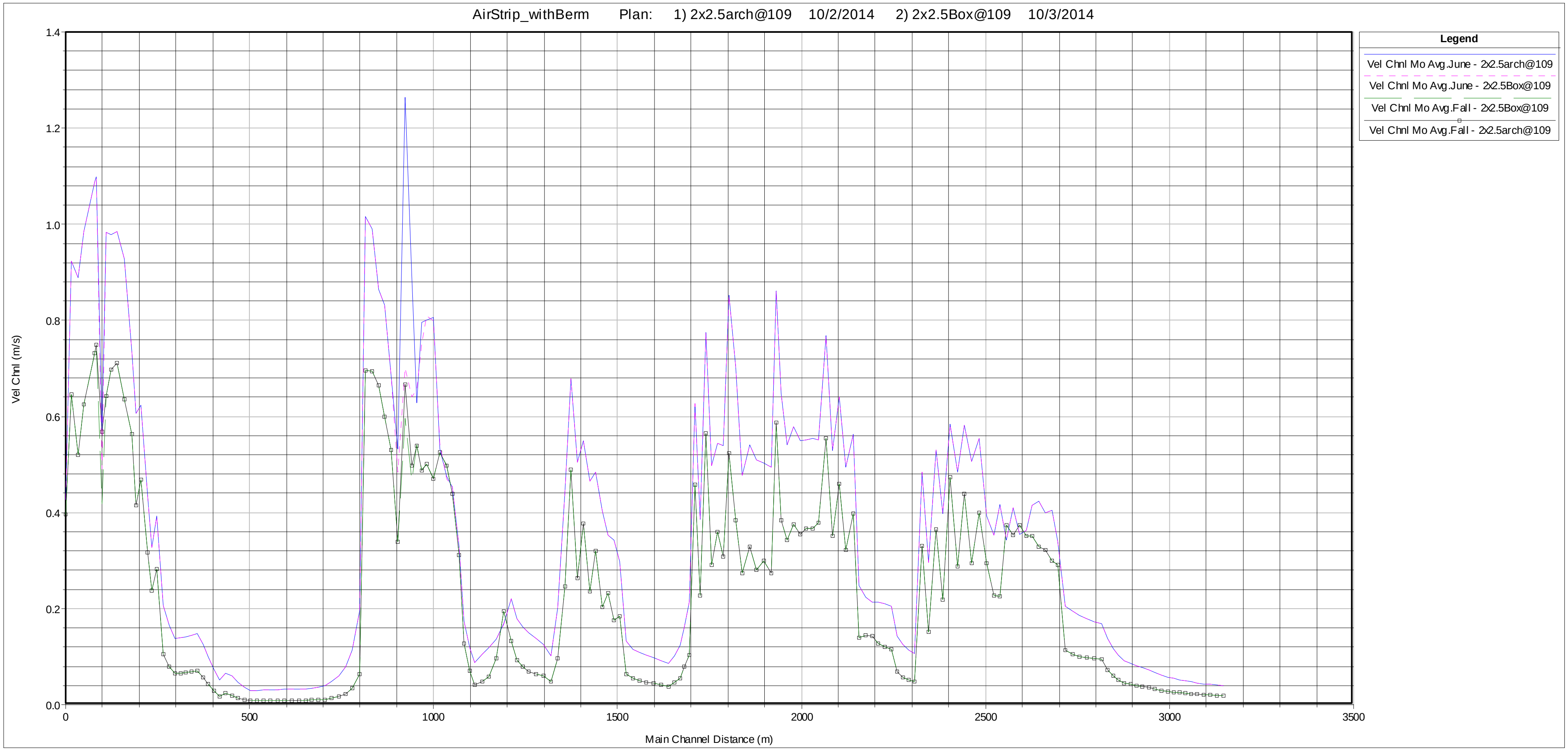


Figure 4: Velocity Profile for Average Fall Flow and Average June Flow

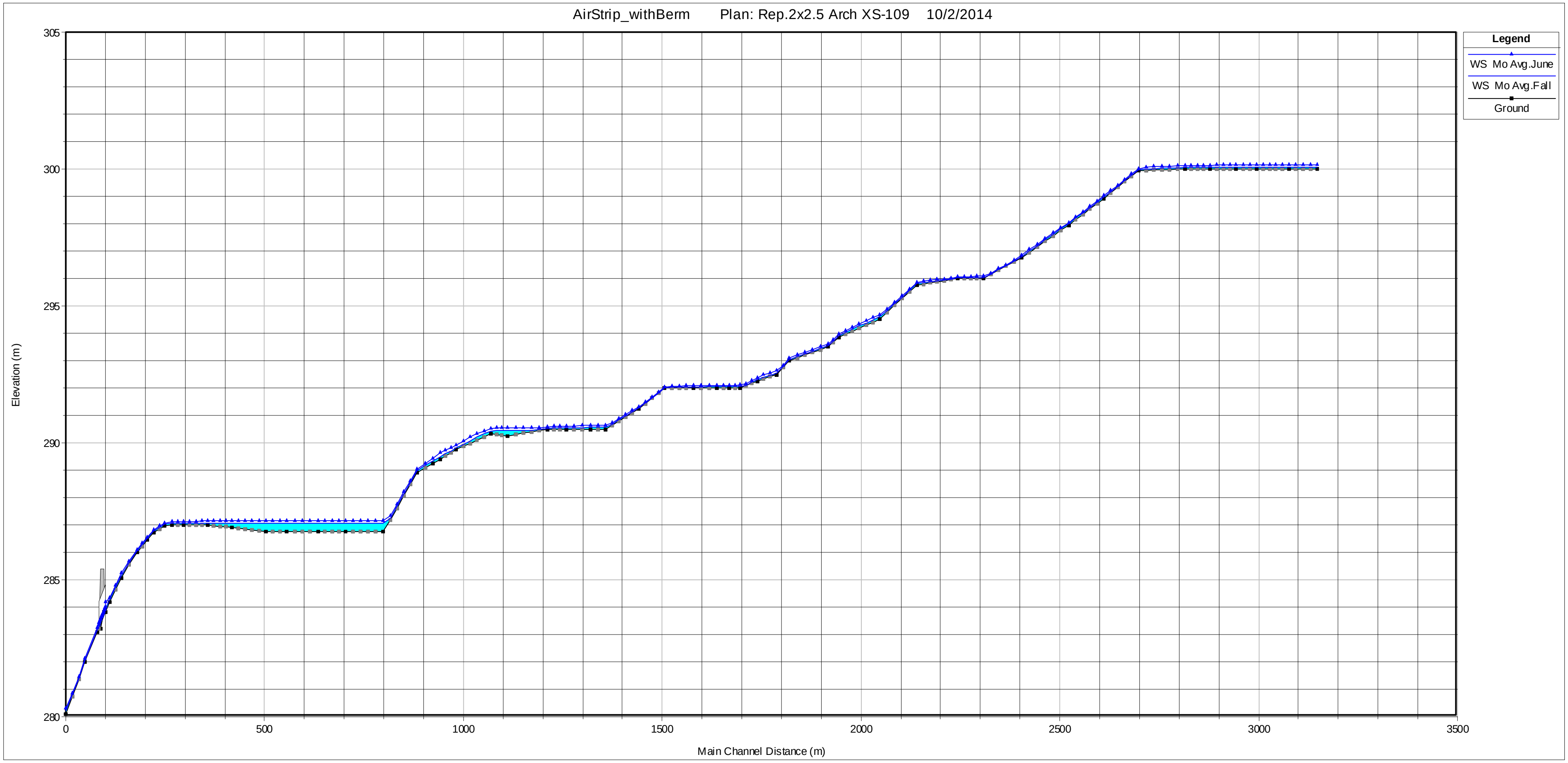


Figure 5: Water depth profile with culvert at location, for Average Fall Flow and Average June Flow

5.2 Berm Selection

The flooding extents show the limit of potential ponding during each flow event. The berm alignments were selected based on the results of the 100-year and 20-year return period flood events. The 100-year return flood event with the culverts in place is illustrated in Figure 6. Two berms were necessary to ensure that no water would pool adjacent to the airstrip for both the 20 and 100-year events. Based on the flood extents, the downstream and upstream berm were designed with a length of 180 m and 270 m respectively. Berm alignments are shown in Figure 2. The berm heights were governed by the minimum height criterion used to bring the permafrost line to the bottom of the berm section. The haul road and culverts are expected to be in place for only a few years during the project early works. Upon removal of the haul road and culverts, adequate freeboard exists on the berms during the 100-year design event.

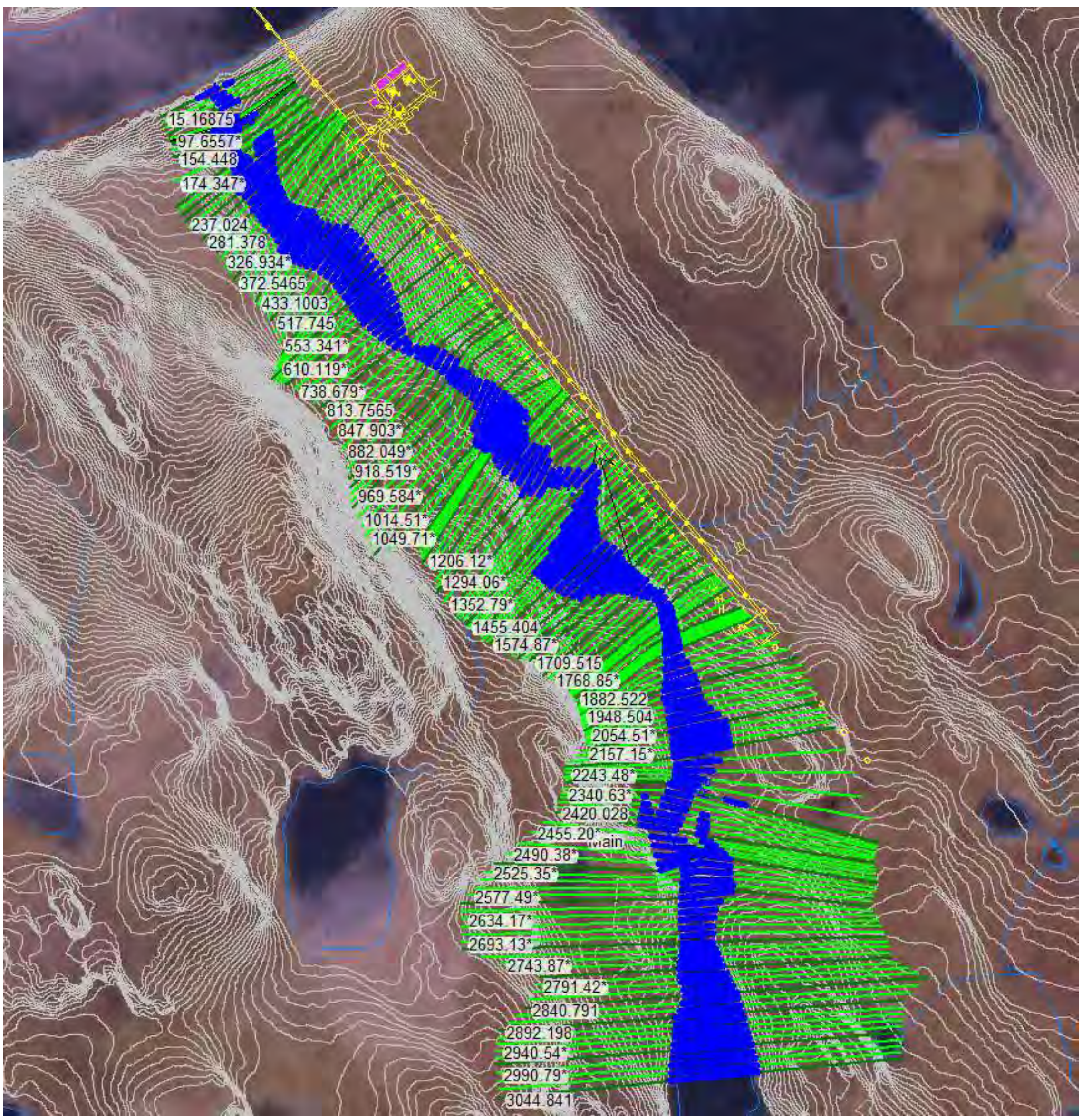


Figure 6: HEC-RAS Model Plan View with 100 year flooding extents

5.3 Culvert Results

The maximum recommended current velocity for sustained swimming in Arctic Grayling is 1.5 m/s. This velocity became the limiting factor in the culvert sizing, and was set as the maximum velocity for the culvert during June average flows, which coincides with the timing of fish swimming upstream. Velocities higher than 1.5 m/s during the month of June will require boulder placement or baffles throughout the culvert in order to provide areas of reduced velocities.

Based on this velocity constraint, two culvert options were proposed. These alternatives include two adjacent 2.5 m diameter box culverts, versus two adjacent 2.5 m diameter CSP culverts. The upstream and downstream velocities for the 2 culvert alternatives are presented in Table 2. The minimum water depths are also presented for the average fall flows to illustrate the minimum depth expected in the culvert during open water season other than the snowmelt period. Both culvert options were also found to have enough capacity to convey the 20-year flood event.

Table 2: Culvert Design Summary

Culvert Station	Culvert Description	Upstream Culvert Velocity in June (m/s)	Downstream Culvert Velocity in June (m/s)	Minimum Water Depth in Culvert in fall (m)
0+109	2 x 2.5m submerged CSP	1.35	1.39	0.07
0+109	2 x 2.5m box	1.35	1.38	0.07

6 Recommendation

Based on the results presented in Table 2, both culvert alternatives will provide similar hydraulic results. The velocities presented could be mitigated by placing boulders in the culverts to create low velocity resting areas for fish. It is recommended that either two 2.5 m box culverts or two 2.5 m CSP culverts be installed. The bottom of the culverts will contain substrate material as well as large boulders to facilitate the fish passage.

The CSP culverts will require an excavation depth of approximately 1 m through permafrost in order to properly place the substrate material and achieve the hydraulic results presented in the HEC-RAS model. It is best practice to avoid excavating through permafrost and as such, the preference would be to install box culverts over CSP culverts.

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Memo

To:	Max Brownhill	**Client:**	Sabina Gold & Silver Corp.
From:	Iozsef Miskolczi	**Project No:**	1CS020.006
Cc:	John Duncan, SRK	**Date:**	October 8, 2014
Subject:	Rascal Stream East Realignment		

1 Introduction

Sabina Gold & Silver Corp. plans to extend the existing airstrip servicing the Goose Lake camp. This work will require placing a berm on the Rascal Stream East that will realign it to augment flows along Rascal Stream West watercourse. A second berm is required along the watercourse to avoid water from ponding along the airstrip. Figure 1 shows the location of the stream realignment and berms in relation to the airstrip.

The hydraulic design of the realignment was completed by SRK as documented in the October 3, 2014, memo. This memo documents design criteria and parameters for the berms.

2 Description of Berms

Ponding water around the Goose Lake camp airstrip could cause permafrost degradation in the area and failure of the airstrip embankment. The berms will direct flows to the Rascal Stream West watercourse to keep ponding water away from the airstrip.

The South Berm will redirect water from Rascal Stream East towards a natural pond further west of the airstrip. Water in the pond will overflow through an existing ephemeral channel and flow towards Gander Pond to the north. The North Berm was designed to prevent water from overtopping the ephemeral channel and ponding in a low spot against the airstrip.

3 Design Criteria and Parameters

The berms were designed to divert water during normal and high flows (freshet) and to provide protection from a 1 in 100 year flood event. The berms must be resistant to erosion and not susceptible to freeze-thaw damage.

The berms' geometries are shown in Figure 1. The cross section shows the berms are 2.3 m high with a crest widths of 6 m and side-slope grades of 1.5H:1V. The 6 m crest width was specified for constructability. The berms will be terminated at the same 1.5H:1V grades.

The material quantities required for construction are provided in Table 1. The liner quantities do not include overlap and wastage.

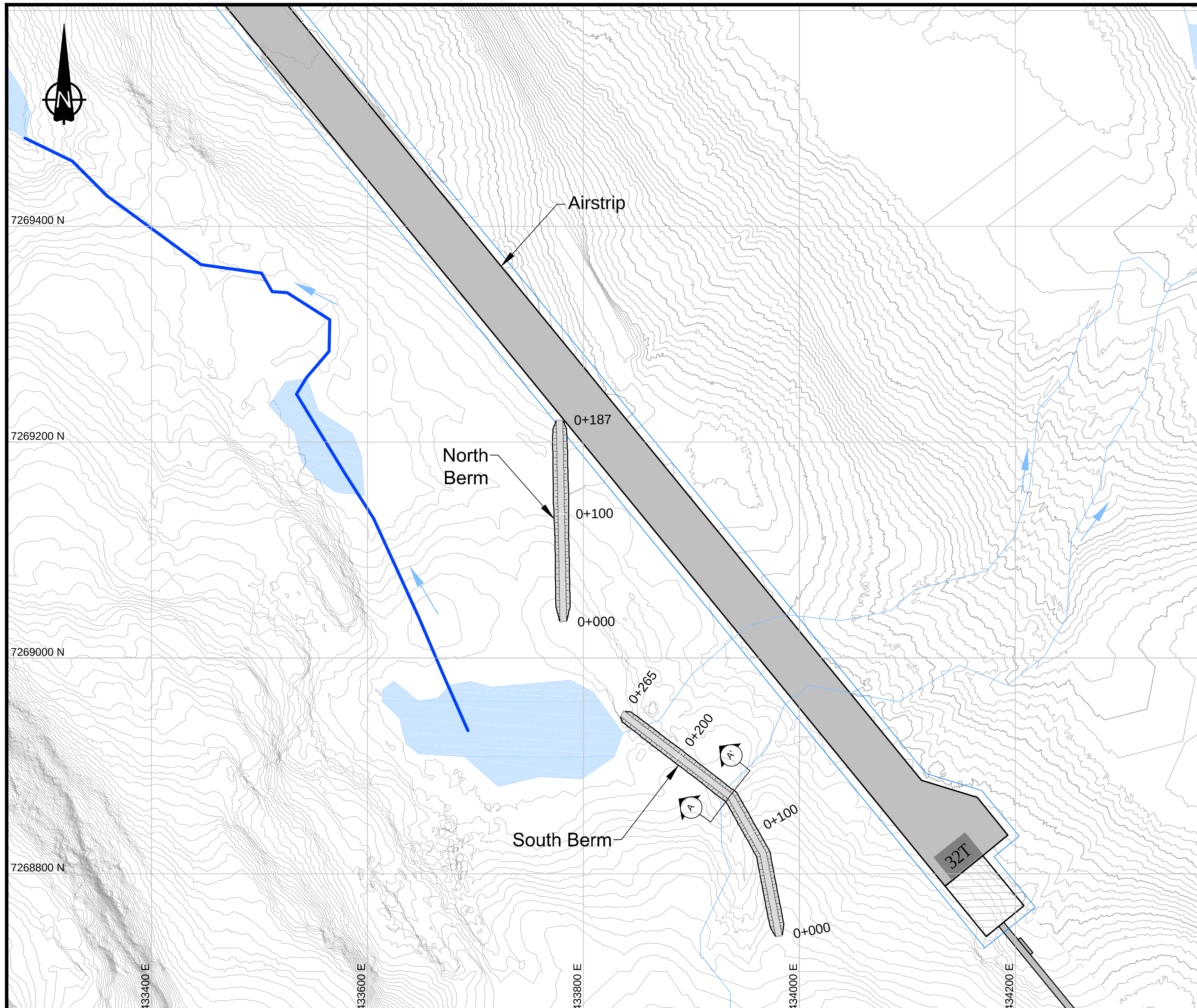
Table 1: Material Quantities Summary

	North Berm	South Berm
Length (m)	187	265
Fill Volume (m^3)	4,100	5,800
Liner Quantity (m^2)	374	530

The berms will be constructed of select waste rock or run-of-quarry material. The fill shall be well graded, containing sufficient quantities of gravel, sand, and silt sized particles. The maximum boulder size shall not exceed 1,000 mm in any direction.

To provide the required stream realignment, an impermeable liner shall be installed within the fill, near the centerline of the berm. The design drawing includes installation details. Ground preparation for liner installation should include clearing vegetation in the contact area between the original ground surface and liner. The installation should be performed ideally in the winter, and the disturbance should be kept to minimum to protect the permafrost.

Based on the thermal modelling completed by SRK for the Back River project, the 2.3 m height of the rock fill will result in permafrost aggradation of about 17 cm above the original ground level. This would ensure adequate water-tightness of the structure, with the liner being well keyed-in to the permafrost.

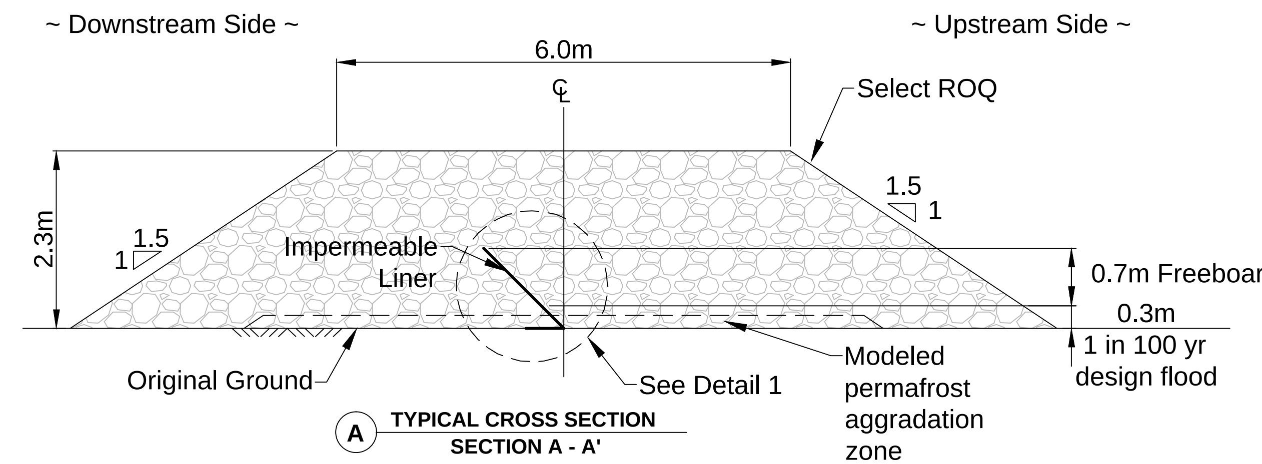


LEGEND

- Existing Flow Path
- Major Contour (5m)
- Minor Contour (1m)
- Rascal West Flow Augmentation
- Centerline of Creek
- Design Crest
- Design Toe
- Riprap
- Pond Area

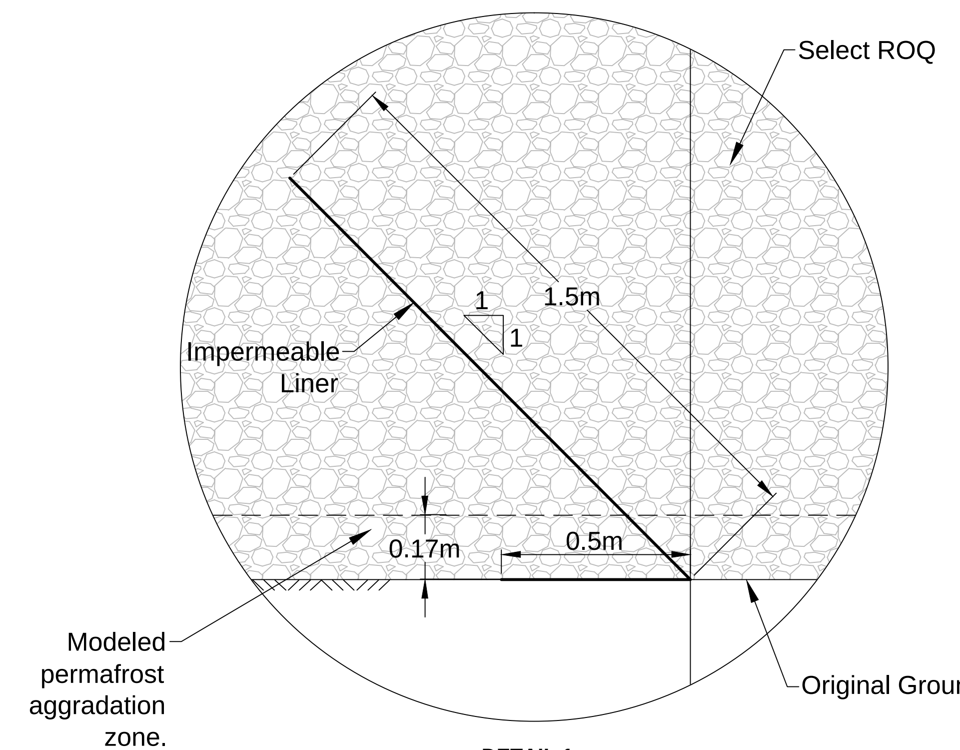
NOTES

1. Liner welding is not required. Minimum overlap of 0.5m.
2. Select Run of Quarry (ROQ) material shall be well-graded, containing sufficient quantities of gravel, sand and silt sized materials; the maximum boulder size shall not exceed 1000mm in any direction. Basic screening or manual selection may be used to achieve the desired gradation.



A TYPICAL CROSS SECTION
SECTION A - A'

0 0.5 1 1.5 2 2.5
Scale in Metres



1 DETAIL 1
TIE-IN OF IMPERMEABLE LINER

0 0.1 0.2 0.3 0.4 0.5
Scale in Metres

srk consulting

SRK JOB NO.: –

FILE NAME: Sabina Goose Overview – Sept 17.dwg

Sabina Gold & Silver Corp

Sabina Gold and Silver Corp.

Rascal West Realignment Berm

Plan and Details

DATE: October 2014 | APPROVED: JD | FIGURE: 1

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Appendix 2.2

Habitat Suitability Indices

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Appendix 2.2. Habitat Suitability Indices

Habitat Suitability Indices and Descriptions	
HSI Value	**Habitat Description**
1.00	Optimal
0.75	Above Average
0.50	Average
0.25	Below Average
0.00	**Unsuitable**

Note: HSI = Habitat Suitability Index

Lake Habitat Suitability Indices by Habitat Type					
Species	**Habitat Type**	**Spawning/Nursery**	**Rearing**	**Foraging**	**Overwintering**
Arctic Grayling	Nearshore with fine sediment (< 2.5 m)	0.00	0.00	0.25	0.00
	Nearshore with large substrate (< 4 m)	0.00	0.50	0.50	0.25
	Deepwater (> 4 m) plus > 2.5 m with fine sediment	0.00	0.00	0.25	0.75

Stream Habitat Suitability Indices by Habitat Type					
Species	**Habitat Type**	**Spawning**	**Nursing**	**Rearing**	**Foraging (adult)**
Arctic Grayling	Organics	0.00	0.25	0.00	0.00
	Fines	0.00	1.00	0.00	0.00
	Gravel	1.00	0.50	0.25	0.25
	Cobble	0.00	0.50	1.00	1.00
	Boulder	0.00	0.25	0.75	0.75
	Bedrock	0.00	0.00	0.00	0.00

Source: Diavik 1998; Debeers 2002; Stewart et al. 2007; Golder 2013; Mainstream Aquatics 2004; Evans et al. 2002

Appendix 3.1

Rascal Stream East Reach Characteristics and Site Photos

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Appendix 3.1. Rascal Stream East Reach Characteristics and Site Photos

Table A3.1-1. Characteristics of RSE Reaches, 2013

		Rascal-Goose Stream						
Attribute	**Units**	**Reach 1**	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**
Site number	n/a	300	301	302	305	306	307	308
Morphology	n/a	Run	Run	Riffle	Riffle	Run	Riffle	Boulder Garden
Secondary Habitat	n/a	Braided	OCH	OCH	Braided	-	-	Braided
Reach Length	m	385.9	257.6	536.9	806.0	545.0	313.7	740.6
Mean Gradient	%	1.0	0.0	1.0	1.0	0.0	4.0	1.0
Mean Bankfull Width	m	1.5	18.0	2.5	3.7	7.1	8.0	17.0
Mean Wetted Width	m	2.0	20.0	2.5	5.1	13.5	10.0	17.4
Mean Bankfull Depth	m	0.35	0.35	0.20	0.25	0.32	0.20	0.19
Mean Wetted Depth	m	0.35	0.60	0.20	0.30	0.35	0.25	0.19
Bankfull area	m^2	579	4,637	1,342	2,982	3,870	2,510	12,590
Spawning	n/a	Good	None	Poor	Fair	None	None	Fair
Overwintering	n/a	None	None	None	None	None	None	None
Rearing	n/a	Good	Fair	Fair	Fair	Poor	Fair	Good
Overall	n/a	Important	Important	Important	Important	Marginal	Important	Important

Braided = braided channel morphology
OCH = off-channel habitat
n/a = not applicable
Dashes indicate data not available

Table A3.1-2. Weighted Mean Habitat Characteristics of RSE Reaches, 2013

		Rascal-Goose Stream						
Attribute	**Units**	**Reach 1**	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**
Site number	n/a	300	301	302	305	306	307	308
Organics	%	5	98	0	0	0	4	0
Fine	%	0	0	0	0	60	0	0
Gravel	%	30	2	0	10	10	0	0
Cobble	%	40	0	75	60	20	3	20
Boulder	%	25	0	25	30	10	82	80
Bedrock	%	0	0	0	0	0	11	0
Compaction	n/a	Medium	Medium	Low	Medium	Medium	High	Medium
Bank Stability	n/a	Unstable	Unstable	Unstable	Unstable	Unstable	Stable	Unstable
Bank Substrate	n/a	Fines	Fines	Fines	Fines	Fines	Boulder	Fines

Table A3.1-2. Weighted Mean Habitat Characteristics of RSE Reaches, 2013

		Rascal-Goose Stream						
Attribute	**Units**	**Reach 1**	**Reach 2**	**Reach 3**	**Reach 4**	**Reach 5**	**Reach 6**	**Reach 7**
Pool	%	2	0	0	0	0	3	0
Boulder	%	0	3	2	2	1	7	20
Instream Vegetation	%	2	0	1	1	1	0	0
Overhead Vegetation	%	0	0	0	0	0	0	0
Undercut Bank	%	1	2	3	0	0	0	0
Total Cover	%	5	5	6	2	2	9	20
Number of Pools	no.	0	0	0	0	0	1	0
Mean Maximum Pool Depth	m	-	-	-	-	-	1.0	-
Mean Crest Depth	m	-	-	-	-	-	0.3	-
Residual Pool Depth	m	-	-	-	-	-	0.7	-
Riffle	no.	0	0	1	1	0	1	0
Pool	no.	0	0	0	0	0	1	0
Run	no.	1	1	0	0	1	1	0
Cascade	no.	0	0	0	0	0	0	0
Boulder Garden	no.	0	0	0	0	0	0	1
Other	no.	0	0	0	0	0	0	0

n/a = not applicable
Dashes indicate data not available
No. = number

Plate A3.1-1. Braided channels with mixed cobble, gravel, and boulder substrate at Reach 1 of RSE, June 16, 2013.

Plate A3.1-2. Off-channel habitat was present in wetted areas outside the bankfull width at Reach 2 of RSE, June 16, 2013.

Plate A3.1-3. Ephemeral fish habitat at a flooded area west of Reach 2 of RSE, June 16, 2013.

Plate A3.1-4. Upstream view of riffle habitat at Reach 3 of RSE, June 16, 2013.

Plate A3.1-5. Braiding at Reach 4 of RSE, June 16, 2013.

Plate A3.1-6. Low gradient channel at Reach 5 of RSE, June 16, 2013.

Plate A3.1-7. Riffle and pool habitat at Reach 6 of RSE, June 16, 2013.

Plate A3.1-8. Boulder-dominated substrate at Reach 7 of RSE, June 16, 2013.

Appendix 3.2

Rascal Stream West Reach Characteristics and Site Photos

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Appendix 3.2. Rascal Stream West Reach Characteristics and Site Photos

Table A3.2-1. Characteristics of RSW (Gander Pond) Stream Reaches, 2013

Attribute	Units	Gander Pond Stream Reach		
		1	2	3
Site	n/a	101	804	-
Morphology	n/a	Run	Run	NCD
Secondary Habitat	n/a	Braided	Intermittent Channelization	-
Reach Length	m	473	385	254
Mean Gradient	%	2	1	-
Mean Bankfull Width	m	0.7	1.2	-
Mean Wetted Width	m	1.1	4.5	-
Mean Bankfull Depth	m	0.15	0.15	-
Mean Wetted Depth	m	0.20	0.31	-
Bankfull area	m^2	331	462	-
Spawning	n/a	Fair	Poor	None
Overwintering	n/a	None	None	None
Rearing	n/a	Good	Fair	None
Overall	n/a	Important	Marginal	None

NCD = non-classified drainage
Dashes indicate data not available
n/a = not applicable

Table A3.2-2. Weighted Mean Habitat Characteristics of Gander Pond Stream Reaches, 2013

Attribute	Units	Gander Pond Stream Reach		
		1	2	3
Organics	%	40	0	-
Fine	%	2	70	-
Gravel	%	16	5	-
Cobble	%	25	20	-
Boulder	%	17	25	-
Bedrock	%	0	0	-
Compaction	n/a	Medium	Medium	-
Bank Stability	n/a	Stable	Stable	-
Bank Substrate	n/a	Cobble	Fines	-
Number of Pools	no.	3	0	-
Mean Maximum Pool Depth	m	0.53	-	-
Mean Crest Depth	m	0.18	-	-
Mean Residual Depth	m	0.35	-	-
Pool	%	16	0	-

Table A3.2-2. Weighted Mean Habitat Characteristics of Gander Pond Stream Reaches, 2013

Attribute	Units	Gander Pond Stream Reach		
		1	2	3
Boulder	%	8	2	-
Instream Vegetation	%	3	5	-
Overhanging Vegetation	%	1	0	-
Undercut Bank	%	1	1	-
Total Cover	%	29	8	-
Riffle	no.	1	0	-
Pool	no.	3	0	-
Run	no.	2	1	-
Cascade	no.	1	0	-
Boulder Garden	no.	0	0	-
Other	no.	0	0	-

No. = number; Dashes indicate data not available; n/a = not applicable

Plate A3.2-1. View of intermittent channelization at Reach 2 of Gander Pond Stream, facing north-west towards Gander Pond, June 22, 2013.

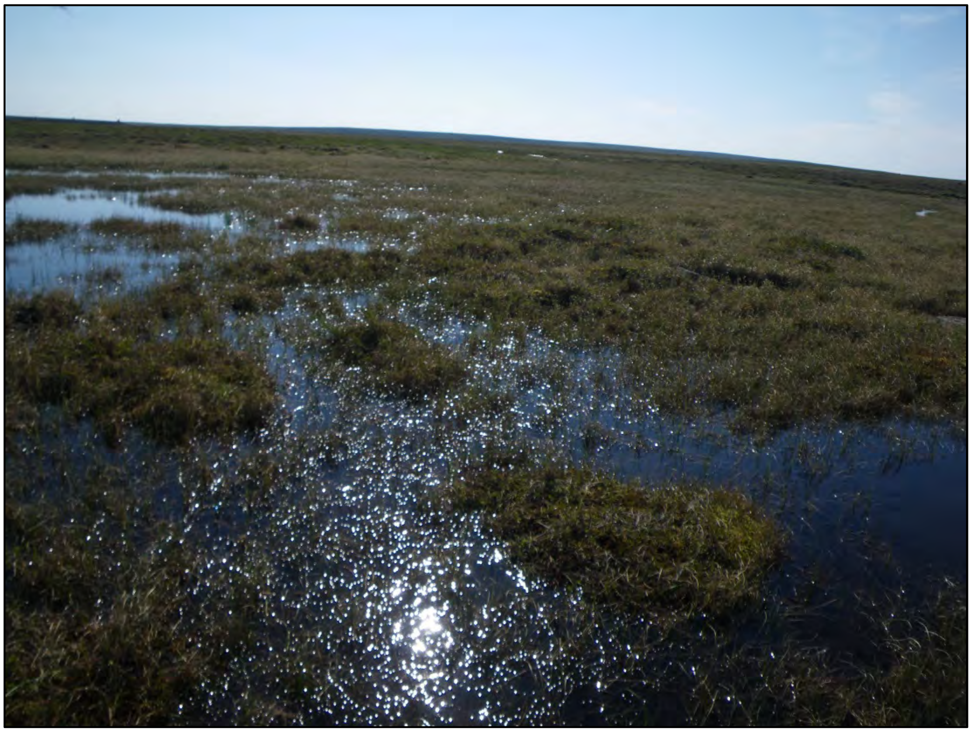

Plate A3.2-2. Non-channelized ephemeral wetted areas at Reach 3 of Gander Pond Stream, June 22, 2013.

Appendix 5.1
Habitat Loss Calculations for Rascal Stream East

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Appendix 5.1. Habitat Loss Calculations for Rascal Stream East

			Habitat	Spawning		Nursery		Rearing		Foraging		Total
Stream Reach	**Species**	**Habitat Type**	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
2013 Report Name: Main Goose Pit Stream — Reach 1	Arctic Grayling	Organics	16.35	0.00	0.0000	0.25	4.0875	0.00	0.0000	0.00	0.0000	4.0875
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	0.00	1.00	0.0000	0.50	0.0000	0.25	0.0000	0.25	0.0000	0.0000
		Cobble	0.00	0.00	0.0000	0.50	0.0000	1.00	0.0000	1.00	0.0000	0.0000
		Boulder	0.00	0.00	0.0000	0.25	0.0000	0.75	0.0000	0.75	0.0000	0.0000
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		16.35		0.0000		4.0875		0.0000		0.0000	
	Total HU											4.09

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

			Habitat	Spawning		Nursery		Rearing		Foraging		Total
Stream Reach	**Species**	**Habitat Type**	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
2013 Report Name: Main Goose Pit Stream — Reach 2	Arctic Grayling	Organics	0.00	0.00	0.0000	0.25	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	116.66	1.00	116.6622	0.50	58.3311	0.25	29.1656	0.25	29.1656	233.3244
		Cobble	816.64	0.00	0.0000	0.50	408.3177	1.00	816.6355	1.00	816.6355	2041.5887
		Boulder	233.32	0.00	0.0000	0.25	58.3311	0.75	174.9933	0.75	174.9933	408.3177
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		1166.62		116.6622		524.9799		1020.7943		1020.7943	
	Total HU											2683.23

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

			Habitat	Spawning		Nursery		Rearing		Foraging		Total
Stream Reach	**Species**	**Habitat Type**	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
2013 Report Name: Main Goose Pit Stream — Reach 3	Arctic Grayling	Organics	0.00	0.00	0.0000	0.25	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	173.80	1.00	173.8037	0.50	86.9019	0.25	43.4509	0.25	43.4509	347.6075
		Cobble	1738.04	0.00	0.0000	0.50	869.0186	1.00	1738.0373	1.00	1738.0373	4345.0932
		Boulder	1564.23	0.00	0.0000	0.25	391.0584	0.75	1173.1752	0.75	1173.1752	2737.4087
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		3476.07		173.8037		1346.9789		2954.6633		2954.6633	
	Total HU											7430.11

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Appendix 5.1. Habitat Loss Calculations for Rascal Stream East

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	WSA	Nursery HSI	WSA	Rearing HSI	WSA	Foraging HSI	WSA	Total WSA
2013 Report Name: Main Goose Pit Stream — Reach 4	Arctic Grayling	Organics	21.76	0.00	0.0000	0.25	5.4406	0.00	0.0000	0.00	0.0000	5.4406
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	0.00	1.00	0.0000	0.50	0.0000	0.25	0.0000	0.25	0.0000	0.0000
		Cobble	0.00	0.00	0.0000	0.50	0.0000	1.00	0.0000	1.00	0.0000	0.0000
		Boulder	0.00	0.00	0.0000	0.25	0.0000	0.75	0.0000	0.75	0.0000	0.0000
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		21.76		0.0000		5.4406		0.0000		0.0000	
	Total HU											5.44

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	WSA	Nursery HSI	WSA	Rearing HSI	WSA	Foraging HSI	WSA	Total WSA
2013 Report Name: Rascal to Goose Stream — Reach 1	Arctic Grayling	Organics	19.29	0.00	0.0000	0.25	4.8233	0.00	0.0000	0.00	0.0000	4.8233
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	115.76	1.00	115.7600	0.50	57.8800	0.25	28.9400	0.25	28.9400	231.5199
		Cobble	154.35	0.00	0.0000	0.50	77.1733	1.00	154.3466	1.00	154.3466	385.8666
		Boulder	96.47	0.00	0.0000	0.25	24.1167	0.75	72.3500	0.75	72.3500	168.8166
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		385.87		115.7600		163.9933		255.6366		255.6366	
	Total HU											791.03

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	WSA	Nursery HSI	WSA	Rearing HSI	WSA	Foraging HSI	WSA	Total WSA
2013 Report Name: Rascal to Goose Stream — Reach 2	Arctic Grayling	Organics	908.74	0.00	0.0000	0.25	227.1855	0.00	0.0000	0.00	0.0000	227.1855
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	69.90	1.00	69.9032	0.50	34.9516	0.25	17.4758	0.25	17.4758	139.8064
		Cobble	279.61	0.00	0.0000	0.50	139.8064	1.00	279.6129	1.00	279.6129	699.0322
		Boulder	139.81	0.00	0.0000	0.25	34.9516	0.75	104.8548	0.75	104.8548	244.6613
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		1398.06		69.9032		436.8951		401.9435		401.9435	
	Total HU											1310.69

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Appendix 5.1. Habitat Loss Calculations for Rascal Stream East

			Habitat	Spawning		Nursery		Rearing		Foraging		Total
Stream Reach	Species	Habitat Type	Area (m^2)	HSI	WSA	HSI	WSA	HSI	WSA	HSI	WSA	WSA
2013 Report Name: Rascal to Goose Stream — Reach 4	Arctic Grayling	Organics	0.00	0.00	0.0000	0.25	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Fines	0.00	0.00	0.0000	1.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Gravel	223.79	1.00	223.7852	0.50	111.8926	0.25	55.9463	0.25	55.9463	447.5704
		Cobble	1342.71	0.00	0.0000	0.50	671.3557	1.00	1342.7113	1.00	1342.7113	3356.7783
		Boulder	671.36	0.00	0.0000	0.25	167.8389	0.75	503.5167	0.75	503.5167	1174.8724
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		2237.85		298.3803		1268.1162		2536.2325		2536.2325	
	Total HU											4979.22

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Conversion of Stream Naming Conventions between this Report and Previous Baselines

2013 Report Name	2014 Report Name
Main Goose Pit Stream — Reach 1	Main Goose Pit Stream — Reach 1
Main Goose Pit Stream — Reach 2	Main Goose Pit Stream — Reach 2
Main Goose Pit Stream — Reach 3	Main Goose Pit Stream — Reach 3
Main Goose Pit Stream — Reach 4	Main Goose Pit Stream — Reach 4
Rascal to Goose Stream — Reach 1	Rascal Stream East Reach 1
Rascal to Goose Stream — Reach 2	Rascal Stream East Reach 2
Rascal to Goose Stream — Reach 4	Rascal Stream East Reach 4

Appendix 5.2

Habitat Loss Calculations for Rascal Stream West

Appendix 5.2. Baseline Habitat Calculations for Rascal Stream West

A. Stream Reaches

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	Spawning WSA	Nursery HSI	Nursery WSA	Rearing HSI	Rearing WSA	Foraging HSI	Foraging WSA	Total WSA
2013 Report Name: Gander Stream Reach 1*	Arctic Grayling	Organics	0.00	0.00	0.0000	0.25	0.0000	0.00	0.0000	0.00	0.0000	0.0000
		Fines	230.98	0.00	0.0000	1.00	230.9840	0.00	0.0000	0.00	0.0000	230.9840
		Gravel	23.10	1.00	23.0984	0.50	11.5492	0.25	5.7746	0.25	5.7746	46.1968
		Cobble	92.39	0.00	0.0000	0.50	46.1968	1.00	92.3936	1.00	92.3936	230.9840
		Boulder	115.49	0.00	0.0000	0.25	28.8730	0.75	86.6190	0.75	86.6190	202.1110
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		461.97		23.0984		317.6030		184.7872		184.7872	
	Total HU											710.28

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

** Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.*

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	Spawning WSA	Nursery HSI	Nursery WSA	Rearing HSI	Rearing WSA	Foraging HSI	Foraging WSA	Total WSA
2013 Report Name: Gander Stream Reach 2*	Arctic Grayling	Organics	82.88	0.00	0.0000	0.25	20.7204	0.00	0.0000	0.00	0.0000	20.7204
		Fines	16.58	0.00	0.0000	1.00	16.5763	0.00	0.0000	0.00	0.0000	16.5763
		Gravel	33.15	1.00	33.1526	0.50	16.5763	0.25	8.2881	0.25	8.2881	66.3052
		Cobble	132.61	0.00	0.0000	0.50	66.3052	1.00	132.6104	1.00	132.6104	331.5260
		Boulder	66.31	0.00	0.0000	0.25	16.5763	0.75	49.7289	0.75	49.7289	116.0341
		Bedrock	0.00	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.00	0.0000	0.0000
	Total Area		331.53		33.1526		136.7545		190.6274		190.6274	
	Total HU											551.16

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

** Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.*

Appendix 5.2. Baseline Habitat Calculations for Rascal Stream West

B. Ponds

Habitat Type	Habitat Area (m²)	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
		HSI	WSA	HSI	WSA	HSI	WSA	HSI	WSA	WSA
Gander Pond										
Nearshore with fines (< 2.5 m)	33446.00	0.00	0.0	0.00	0.0	0.25	8361.5	0.00	0.0	8361.5
Nearshore with large substr. (< 4 m)	0.00	0.00	0.0	0.50	0.0	0.50	0.0	0.25	0.0	0.0
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	33446.00		0.0		0.0		8361.5		0.0	8361.5

Habitat Type	Habitat Area (m²)	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
		HSI	WSA	HSI	WSA	HSI	WSA	HSI	WSA	WSA
Gosling Pond 2										
Nearshore with fines (< 2.5 m)	4477.00	0.00	0.0	0.00	0.0	0.25	1119.3	0.00	0.0	1119.3
Nearshore with large substr. (< 4 m)	0.00	0.00	0.0	0.50	0.0	0.50	0.0	0.25	0.0	0.0
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	4477.00		0.0		0.0		1119.3		0.0	1119.3

Habitat Type	Habitat Area (m²)	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
		HSI	WSA	HSI	WSA	HSI	WSA	HSI	WSA	WSA
Gosling Pond 1										
Nearshore with fines (< 2.5 m)	14427.00	0.00	0.0	0.00	0.0	0.25	3606.8	0.00	0.0	3606.8
Nearshore with large substr. (< 4 m)	0.00	0.00	0.0	0.50	0.0	0.50	0.0	0.25	0.0	0.0
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	14427.00		0.0		0.0		3606.8		0.0	3606.8

Note: Overwintering WSA was set to zero to reflect the high liklihood that ponds will freeze to bottom in winter.

Conversion of Stream Naming Conventions between this Report and Previous Baselines

2013 Report Name	2014 Report Name
Gander Stream Reach 1	Rascal Stream West Reach 1
Gander Stream Reach 2	Rascal Stream West Reach 2

Appendix 5.3

Habitat Gain Calculations for Rascal Stream West

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Appendix 5.3. Habitat Gain Calculations for Rascal Stream West

A. Stream Reaches

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	Spawning WSA	Nursery HSI	Nursery WSA	Rearing HSI	Rearing WSA	Foraging HSI	Foraging WSA	Total WSA
Gander Stream Reach 1*	Arctic Grayling	Organics	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
		Fines	2695.0	0.0	0.0	1.0	2695.0	0.0	0.0	0.0	0.0	2695.0
		Gravel	269.5	1.0	269.5	0.5	134.7	0.3	67.4	0.3	67.4	539.0
		Cobble	1078.0	0.0	0.0	0.5	539.0	1.0	1078.0	1.0	1078.0	2695.0
		Boulder	1347.5	0.0	0.0	0.3	336.9	0.8	1010.6	0.8	1010.6	2358.1
		Bedrock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Area		5390.0		269.5		3705.6		2156.0		2156.0	
	Total HU											8287.0

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Culvert loss accounted for by removing proportion stream occupied by culverts (22 m = 7.8%)

Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	Spawning WSA	Nursery HSI	Nursery WSA	Rearing HSI	Rearing WSA	Foraging HSI	Foraging WSA	Total WSA
Gander Stream Reach 2*	Arctic Grayling	Organics	1274.2	0.0	0.0	0.3	318.6	0.0	0.0	0.0	0.0	318.6
		Fines	254.8	0.0	0.0	1.0	254.8	0.0	0.0	0.0	0.0	254.8
		Gravel	509.7	1.0	509.7	0.5	254.8	0.3	127.4	0.3	127.4	1019.4
		Cobble	2038.8	0.0	0.0	0.5	1019.4	1.0	2038.8	1.0	2038.8	5096.9
		Boulder	1019.4	0.0	0.0	0.3	254.8	0.8	764.5	0.8	764.5	1783.9
		Bedrock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Area		5096.9		509.7		2102.5		2930.7		2930.7	
	Total HU											8473.6

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.

Stream Reach	Species	Habitat Type	Habitat Area (m^2)	Spawning HSI	Spawning WSA	Nursery HSI	Nursery WSA	Rearing HSI	Rearing WSA	Foraging HSI	Foraging WSA	Total WSA
Gander Stream Reach 3*	Arctic Grayling	Organics	1864.5	0.0	0.0	0.3	466.1	0.0	0.0	0.0	0.0	466.1
		Fines	372.9	0.0	0.0	1.0	372.9	0.0	0.0	0.0	0.0	372.9
		Gravel	745.8	1.0	745.8	0.5	372.9	0.3	186.5	0.3	186.5	1491.6
		Cobble	2983.3	0.0	0.0	0.5	1491.6	1.0	2983.3	1.0	2983.3	7458.2
		Boulder	1491.6	0.0	0.0	0.3	372.9	0.8	1118.7	0.8	1118.7	2610.4
		Bedrock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Area		7458.2		745.8		3076.5		4288.4		4288.4	
	Total HU											12399.2

Notes: HSI = Habitat Suitability Index, WSA = Weighted Suitable Area

Rescan. 2014a. Back River Project: 2013 Fish and Fish Habitat Baseline Report. Prepared for Sabina Gold & Silver Corp. by Rescan Environmental Services Ltd., an ERM Company: Vancouver, BC.

Appendix 5.3. Habitat Gain Calculations for Rascal Stream West

B. Ponds

Gain of Habitat Units Calculated for Arctic Grayling in Rascal Lake to Goose Lake Stream Realignment Option											
	Habitat	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
Habitat Type	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
Gander Pond										
Nearshore with fines (< 2.5 m)	36340.01	0.00	0.0	0.00	0.0	0.25	9085.0	0.00	0.0	9085.0
Nearshore with large substr. (< 4 m)	2137.65	0.00	0.0	0.50	1068.8	0.50	1068.8	0.25	534.4	2672.1
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	42752.95		0.0		1068.8		10153.8		534.4	11757.1

Gain of Habitat Units Calculated for Arctic Grayling in Rascal Lake to Goose Lake Stream Realignment Option										
	Habitat	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
Habitat Type	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
Gosling Pond 2										
Nearshore with fines (< 2.5 m)	12279.06	0.00	0.0	0.00	0.0	0.25	3069.8	0.00	0.0	3069.8
Nearshore with large substr. (< 4 m)	341.08	0.00	0.0	0.50	170.5	0.50	170.5	0.25	85.3	426.4
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	13643.40		0.0		170.5		3240.3		85.3	3496.1

Gain of Habitat Units Calculated for Arctic Grayling in Rascal Lake to Goose Lake Stream Realignment Option										
	Habitat	Spawning/Nursery		Rearing		Foraging		Overwintering		Total
Habitat Type	**Area (m^2)**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**HSI**	**WSA**	**WSA**
Gosling Pond 1										
Nearshore with fines (< 2.5 m)	26591.78	0.00	0.0	0.00	0.0	0.25	6647.9	0.00	0.0	6647.9
Nearshore with large substr. (< 4 m)	738.66	0.00	0.0	0.50	369.3	0.50	369.3	0.25	184.7	923.3
Deepwater (> 4 m) plus > 2.5 with fines	0.00	0.00	0.0	0.00	0.0	0.25	0.0	0.75	0.0	0.0
Total HU	29546.42		0.0		369.3		7017.3		184.7	7571.3

Note: Overwintering WSA was set to zero to reflect the high liklihood that ponds will freeze to bottom in winter.

Conversion of Stream Naming Conventions between this Report and Previous Baselines

2013 Report Name	2014 Report Name
Gander Stream Reach 1	Rascal Stream West Reach 1
Gander Stream Reach 2	Rascal Stream West Reach 2
Gander Stream Reach 3	Rascal Stream West Reach 3

APPENDIX L

SABINA BACK RIVER PROJECT CONSULTATION LOG

Appendix C. Record of Meetings and Major Correspondence with Community and Stakeholder Groups

Date	Individual(s) / Organization	Type of Activity
Cambridge Bay		
February 14, 2012	Brenda Sitatak, HTO Manager	Introductions and information sharing
February 14, 2012	Renee Krucas Executive Director, Kitikmeot Heritage Society	Introductions and information sharing
February 14, 2012	Connie Kapolak High School Principal	Introductions and information sharing
March 27, 2012	Brenda Sitatak, HTO Manager	Introductions and update
March 27, 2012	Stephen King, Senior Administrative Officer Jim McEchrean, Economic Development Officer Hamlet of Cambridge Bay	Project introduction
April 5, 2012	Renee Krucas Executive Director, Kitikmeot Heritage Society	Letter / invitation to nominate representatives to the Cambridge Bay Community Advisory Group
April 5, 2012	Stephen King, Senior Administrative Officer Hamlet of Cambridge Bay	Letter / invitation to nominate representative to the Cambridge Bay Community Advisory Group
April 5, 2012	Brenda Sitatak HTO Manager	Letter / invitation to nominate representative to the Cambridge Bay Community Advisory Group
June 14, 2012	General public	Call-in radio show
June 14, 2012	Jessie Lyall, HTO Board Member Brenda Sitatak, HTO Manager	Project introduction
June 14, 2012	General public	Public meeting - Project overview
June 14, 2012	Hamlet council and administration	Project introduction
June 15, 2012	Cambridge Bay Community Advisory Group	Project introduction
September 11-12, 2012	Cambridge Bay Community Advisory Group	Sabina hosted a dinner and meeting for the Cambridge Bay and Kugluktuk Community Advisory Groups (CAGs) in Cambridge Bay on September 11, 2012. The CAGs also visited the Back River Project site on September 12, 2012.
September 27-29, 2012	Interviews conducted with a number of individuals representing a variety of interests in the community including: government administration; health, wellness and social services; safety and protection services; business and economic development; and education and training	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures

Date	Individual(s) / Organization	Type of Activity
November 19, 2012	High school students and staff	Mining and geology presentation
November 19, 2012	General public	Public open house
November 19, 2012	Cambridge Bay Community Advisory Group	Project update
November 30 - December 1, 2012	Local hunters from Cambridge Bay	Land use focus group
February 5 - 6, 2013	General public	Sabina representatives participated in NIRB's scoping meetings for the Project and were available to the public for questions and information sharing
February 5, 2013	Cambridge Bay Community Advisory Group	Project update
April 23, 2013	General public	Public meeting - Project overview/update
April 23, 2013	Cambridge Bay HTO	Project overview/update
August 20, 2013	General public	Sabina provided an overview of the Back River Project and its traditional knowledge study
August 20, 2013	General public	The Kitikmeot Inuit Association provided an overview of the Naonaiyaotit Traditional Knowledge Project (NTKP) report completed for the Back River Project and additional traditional knowledge workshops being conducted
August 21 - 23, 2013	Selected elders and knowledge holders	A series of traditional knowledge workshops were held with selected elders and local knowledge holders for Sabina's traditional knowledge study. These workshops focused on the topics of 'heritage and land use', 'terrestrial environment' and 'marine environment'.
November 19, 2013	General public	Public meeting - Project overview/update & DEIS submission overview
November 19, 2013	Cambridge Bay Community Advisory Group	Project update
November 19, 2013	Cambridge Bay high school students	Project overview and discussion of future employment opportunities
November 19, 2013	General public	Radio update
January 23, 2014	General public	Career fair participation
February 2014	Kitikmeot Heritage Society	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Cambridge Bay Community Advisory Group	Letter – Update on January 2014 DEIS submission to NIRB

Date	Individual(s) / Organization	Type of Activity
		and NWB. DEIS Plain Language Summary included.
February 2014	Hamlet of Cambridge Bay	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Cambridge Bay HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
March 25, 2014	General public	NIRB held community information sessions for the Project's DEIS and were available to the public for questions and information sharing. Note – Sabina representatives were unable to attend due to flight cancellations.
March 28, 2014	Cambridge Bay Community Advisory Group	Project update
April 27, 2014	General public	Radio update / call-in radio show
April 28, 2014	Jim McEchrean, Economic Development Officer, Hamlet of Cambridge Bay	Project update
April 28, 2014	Brendan Griebel, Executive Director, Kitikmeot Heritage Society	Introductions and Project update/overview
April 28, 2014	General public	Radio update / call-in radio show
June 7 - 10, 2014	Selected elders and knowledge holders	A series of traditional knowledge interviews were held with selected elders and local knowledge holders as a component of proposed fish compensation activities in the Bernard Harbour, Nunavut area.
July 14 - 15, 2014	Cambridge Bay Community Advisory Group	Sabina hosted the Cambridge Bay and Kugluktuk Community Advisory Groups at the Back River Project site on July 14-15. Site tours were provided and Project information was shared.
Kugluktuk		
April 11, 2012	Barbara Adjun HTO Manager	Letter / invitation to nominate representative to the Kugluktuk Community Advisory Group
April 26, 2013	Donald LeBlanc, Senior Administrative Officer Hamlet of Kugluktuk	Letter / invitation to nominate representative to the Kugluktuk Community Advisory Group
June 12, 2012	Kugluktuk HTO	Project introduction
June 12, 2012	General public	Public meeting - Project overview
June 13, 2012	Donald LeBlanc, Senior Administrative Officer	Project introduction

Date	Individual(s) / Organization	Type of Activity
	Hamlet of Kugluktuk	
June 13, 2012	Kugluktuk Community Advisory Group	Project introduction
September 11-12, 2012	Kugluktuk Community Advisory Group	Sabina hosted a dinner and meeting for the Kugluktuk and Cambridge Bay Community Advisory Groups (CAGs) in Cambridge Bay on September 11, 2012. The CAGs also visited the Back River Project site on September 12, 2012.
October 1-3, 2012	Interviews conducted with a number of individuals representing a variety of interests in the community including: government administration; health, wellness and social services; safety and protection services; business and economic development; and education and training	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures
November 21, 2012	High school students and staff	Mining and geology presentation
November 21, 2012	General public	Public meeting - Project overview/update
November 21, 2012	Kugluktuk Community Advisory Group	Project update
November 27, 2012	Local hunters from Kugluktuk	Land use focus group
February 7-8, 2013	General public	Sabina representatives participated in NIRB's scoping meetings for the Project and were available to the public for questions and information sharing
February 8, 2013	Kugluktuk Community Advisory Group	Project update
April 22, 2013	General public	Public meeting - Project overview/update
April 22, 2013	Kugluktuk Community Advisory Group	Project update
August 12, 2013	General public	Sabina provided an overview of the Back River Project and its traditional knowledge study
August 13, 2013	General public	The Kitikmeot Inuit Association provided an overview of the Naonaiyaotit Traditional Knowledge Project (NTKP) report completed for the Back River Project and additional traditional knowledge workshops being conducted
August 14-16, 2013	Selected elders and knowledge holders	A series of traditional knowledge workshops were held with selected elders and local knowledge holders for Sabina's traditional knowledge study. These workshops focused on the topics of 'heritage and land use', 'terrestrial environment' and 'marine environment'.

Date	Individual(s) / Organization	Type of Activity
November 18, 2013	General public	Public meeting - Project overview/update & DEIS submission overview
November 18, 2013	Kugluktuk Hamlet council	Project update
November 18, 2013	Kugluktuk Community Advisory Group	Project update
November 18, 2013	Kugluktuk high school students	Project overview and discussion of future employment opportunities
January 24, 2014	General public	Career fair participation
February 12, 2014	Donald LeBlanc, Senior Administrative Officer Hamlet of Kugluktuk	Letter / invitation to nominate representative to the Kugluktuk Community Advisory Group
February 2014	Kugluktuk Community Advisory Group	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Hamlet of Kugluktuk	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Kugluktuk HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
March 19, 2014	David Nivingalok (Chairperson) and Kevin Klengenberg (Secretary-Treasurer), Kugluktuk HTO	Teleconference to discuss proposed fisheries offsetting work to be conducted at Bernard Harbour.
March 24, 2014	General public	Sabina representatives participated in NIRB's community information sessions for the Project's DEIS and were available to the public for questions and information sharing
March 24, 2014	Kugluktuk Community Advisory Group	Project update
March 25, 2014	Kugluktuk HTO	Meeting to discuss proposed fisheries offsetting work to be conducted at Bernard Harbour and associated TK study.
April 29, 2014	Kugluktuk HTO	Meeting to discuss Kugluktuk HTO-Sabina Bernard Harbour Restoration Project Agreement.
April 30, 2014	Kugluktuk Community Readiness Initiative Committee	Sabina met with Kugluktuk's Community Readiness Initiative Committee in Kugluktuk to discuss the plans and goals of the committee and how Sabina might contribute.
April 30, 2014	Donald LeBlanc, SAO, Hamlet of Kugluktuk	Project update
May 2, 2014	Kugluktuk Community Readiness Initiative Committee	Sabina met with Kugluktuk's Community Readiness Initiative Committee in Yellowknife to discuss the plans and goals of the committee and how Sabina might contribute.

Date	Individual(s) / Organization	Type of Activity
June 1-6, 2014	Selected elders and knowledge holders	A series of traditional knowledge interviews were held with selected elders and local knowledge holders as a component of proposed fish compensation activities in the Bernard Harbour, Nunavut area. A project overview meeting/presentation was also held with local study participants prior to the interviews commencing.
July 13, 2014	Bernard Harbour TK study participants; HTO chairperson and acting manager	A TK study results verification meeting was held with participants in the Bernard Harbour TK study and with the Kugluktuk HTO chairperson and acting manager. Various clarifications were made by the participants, which were later incorporated into the final TK study report.
July 14-15, 2014	Kugluktuk Community Advisory Group	Sabina hosted the Cambridge Bay and Kugluktuk Community Advisory Groups at the Back River Project site on July 14-15. Site tours were provided and Project information was shared.
July 17, 2014	Kugluktuk HTO chairperson	The chairperson of the Kugluktuk HTO accompanied Sabina representatives and various other attendees during a day-long site visit to the Bernard Harbour stream restoration project.
Kingaok		
April 5, 2012	Sam Kapolak, Chairperson Bathurst Inlet HTO	Letter / invitation to nominate representative to the Cambridge Bay Community Advisory Group
November 18, 2012	Various residents of Kingaok	Sabina hosted a Project information meeting in Cambridge Bay specifically for residents of Kingaok and Omingmaktok
November 30 - December 1, 2012	Local hunters from the Bathurst Inlet area	Land use focus group
Fall 2012	Interviews conducted with selected individuals from the community for Sabina's socio-economic study	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures
January 1, 2013	Boyd Warner President, Bathurst Inlet Lodge	Project discussion (via phone)
August 14-16, 2013 (in Kugluktuk) August 21-23 (in Cambridge Bay)	Selected elders and knowledge holders from or familiar with the Bathurst Inlet area	A series of traditional knowledge workshops were held with selected elders and local knowledge holders for Sabina's traditional knowledge study. These workshops focused on

Date	Individual(s) / Organization	Type of Activity
		the topics of 'heritage and land use', 'terrestrial environment' and 'marine environment'.
November 19, 2013	Resident of Kingaok	Project update in Cambridge Bay specifically for residents of Kingaok and Omingmaktok and the Cambridge Bay community advisory group
Omingmaktok		
April 5, 2012	Peter Kapolak, Chairperson Omingmaktok HTO	Letter / invitation to nominate representative to the Cambridge Bay Community Advisory Group
November 18, 2013	Various residents of Omingmaktok	Sabina hosted a Project information meeting in Cambridge Bay specifically for residents of Kingaok and Omingmaktok
November 30 - December 1, 2012	Local hunters from the Bathurst Inlet area	Land use focus group
Fall 2012	Interview conducted with individual from the community for Sabina's socio-economic study	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures
August 14-16, 2013 (in Kugluktuk) August 21-23 (in Cambridge Bay)	Selected elders and knowledge holders from or familiar with the Bathurst Inlet area	A series of traditional knowledge workshops were held with selected elders and local knowledge holders for Sabina's traditional knowledge study. These workshops focused on the topics of 'heritage and land use', 'terrestrial environment' and 'marine environment'.
November 19, 2013	Various residents of Omingmaktok	Project update in Cambridge Bay specifically for residents of Kingaok and Omingmaktok and the Cambridge Bay community advisory group
February 2014	Omingmaktok HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
Gjoa Haven		
June 20, 2012	Hamlet council members and staff	Project introduction
June 20, 2012	General public	Public meeting - Project overview
September 17-19, 2012	Interviews conducted with a number of individuals representing a variety of interests in the community including: government administration; health, wellness and social services; business and economic development; and education and training	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures
February 12, 2013	General public	Sabina representatives participated in NIRB's scoping

Date	Individual(s) / Organization	Type of Activity
		meeting for the Project and were available to the public for questions and information sharing
February 13, 2013	General public	Radio Show - Project update and notice of upcoming Actua educational program for Kitikmeot youth
April 24, 2013	General public	Public meeting - Project overview/update
April 24, 2013	Gjoa Haven HTO	Project overview/update
April 24, 2013	General public	Radio Show - Project update
November 20, 2013	General public	Public meeting - Project overview/update & DEIS submission overview
November 20, 2013	Gjoa Haven HTO	Project update
November 20, 2013	Gjoa Haven Hamlet representatives	Project update
November 20, 2013	Gjoa Haven high school students	Project overview and discussion of future employment opportunities
November 20, 2013	General public	Radio update
January 21, 2014	General public	Career fair participation
February 2014	Hamlet of Gjoa Haven	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Gjoa Haven HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
March 26, 2014	General public	NIRB held community information sessions for the Project's DEIS and were available to the public for questions and information sharing. Note – Sabina representatives were unable to attend due to flight cancellations.
Taloyoak		
June 19, 2012	General public	Public meeting - Project overview
June 19, 2012	Taloyoak HTO	Project overview
June 19, 2012	Tommy Aiyout, Mayor of Taloyoak David Irqquit, Assistant SAO Hamlet of Taloyoak	Project overview
September 25-26, 2012	Interviews conducted with a number of individuals representing a variety of interests in the community including: government	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested

Date	Individual(s) / Organization	Type of Activity
	administration; health, wellness and social services; safety and protection services; business and economic development; and education and training	mitigation measures
February 13, 2013	General public	Sabina representatives participated in NIRB's scoping meeting for the Project and were available to the public for questions and information sharing
February 14, 2013	General public	Radio Show - Project update and notice of upcoming Actua educational program for Kitikmeot youth
April 25, 2013	General public	Public meeting - Project overview/update
April 25, 2013	General public	Radio Show - Project update
November 21, 2013	General public	Public meeting - Project overview/update & DEIS submission overview
November 21, 2013	Taloyoak HTO	Project update
November 21, 2013	Taloyoak Hamlet council	Project update
November 21, 2013	Taloyoak high school students	Project overview and discussion of future employment opportunities
November 21, 2013	General public	Radio update
January 20, 2014	General public	Career fair participation
February 2014	Hamlet of Taloyoak	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Taloyoak HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
March 28, 2014	General public	NIRB held community information sessions for the Project's DEIS and were available to the public for questions and information sharing. Note – Sabina representatives were unable to attend due to flight cancellations.
Kugaaruk		
June 18, 2012	General public	Public meeting - Project overview
September 20-21, 2012	Interviews conducted with a number of individuals representing a variety of interests in the community including: government administration; health, wellness and social services; safety and protection services; business and economic development; and	Socio-economic baseline data collection; documentation of expected Project benefits, Project concerns, and suggested mitigation measures

Date	Individual(s) / Organization	Type of Activity
	education and training	
February 11, 2013	General public	Sabina representatives participated in NIRB's scoping meeting for the Project and were available to the public for questions and information sharing
February 11, 2013	General public	Radio Show - Project update and notice of upcoming Actua educational program for Kitikmeot youth
April 26, 2013	General public	Public meeting - Project overview/update
April 26, 2013	General public	Radio Show - Project update
April 26, 2013	Kugaaruk Hamlet council	Project overview/update
November 22, 2013	General public	Public meeting - Project overview/update & DEIS submission overview
November 22, 2013	Kugaaruk Hamlet council	Project update
November 22, 2013	Kugaaruk high school students	Project overview and discussion of future employment opportunities
November 22, 2013	General public	Radio update
January 22, 2014	General public	Career fair participation
February 2014	Hamlet of Kugaaruk	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
February 2014	Kugaaruk HTO	Letter – Update on January 2014 DEIS submission to NIRB and NWB. DEIS Plain Language Summary included.
March 27, 2014	General public	NIRB held community information sessions for the Project's DEIS and were available to the public for questions and information sharing. Note – Sabina representatives were unable to attend due to flight cancellations.
Yellowknife / Other Locations in the Northwest Territories		
November 15, 2012	Yellowknives Dene First Nation representatives	Project overview
November 16, 2012	General public	Public meeting – Project overview
February 20, 2013	General public	Sabina representatives participated in NIRB's scoping meeting for the Project and were available to the public for questions and information sharing
November 12, 2013	Tlicho Government / Kwe Beh Working Group representatives	Project overview

Date	Individual(s) / Organization	Type of Activity
November 13, 2013	Deninu K'ue First Nation representatives	Project overview
November 13, 2013	General public	Public meeting - Project overview/update
November 14, 2013	Yellowknives Dene First Nation representative (T. Slack)	Project update
November 15, 2013	North Slave Métis Alliance representatives	Project overview
January 24, 2013	Yellowknives Dene First Nation (Attn: Todd Slack)	Delivery of two USB memory sticks with full digital versions of Sabina's DEIS submission included on each.
January 24, 2013	Tlicho Government / Kwe Beh Working Group (Attn: Henry Zoe and Sonny Zoe)	Delivery of two USB memory sticks with full digital versions of Sabina's DEIS submission included on each.
January 24, 2013	North Slave Métis Alliance (Attn: Eric Binion)	Delivery of two USB memory sticks with full digital versions of Sabina's DEIS submission included on each.
January 24, 2013	Deninu K'ue First Nation (Attn: Chief Louis Balsillie and Stephen Cuthbert)	Delivery of two USB memory sticks with full digital versions of Sabina's DEIS submission included on each.
April 1, 2014	General public	Sabina representatives participated in NIRB's community information sessions for the Project's DEIS and were available to the public for questions and information sharing
May 8, 2014	Yellowknives Dene First Nation	Email update re: DEIS / NIRB regulatory process
May 8, 2014	Tlicho Government / Kwe Beh Working Group	Email update re: DEIS / NIRB regulatory process
May 8, 2014	North Slave Métis Alliance	Email update re: DEIS / NIRB regulatory process
May 8, 2014	Lutsel K'e Dene First Nation	Email update re: DEIS / NIRB regulatory process
May 8, 2014	Deninu K'ue First Nation	Email update re: DEIS / NIRB regulatory process
May 8, 2014	Dene Nation	Email update re: DEIS / NIRB regulatory process
July 24, 2014	Yellowknives Dene First Nation	Email update re: Sabina's DEIS IR responses
July 24, 2014	Tlicho Government / Kwe Beh Working Group	Email update re: Sabina's DEIS IR responses
July 24, 2014	North Slave Métis Alliance	Email update re: Sabina's DEIS IR responses
July 24, 2014	Lutsel K'e Dene First Nation	Email update re: Sabina's DEIS IR responses
July 24, 2014	Deninu K'ue First Nation	Email update re: Sabina's DEIS IR responses
July 24, 2014	Dene Nation	Email update re: Sabina's DEIS IR responses
July 25, 2014	North Slave Métis Alliance representative (Matt Hoover)	Phone call to discuss Sabina's DEIS Information Request responses and future regulatory timelines/requirements.

Date	Individual(s) / Organization	Type of Activity
Other		
February 13-15, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Kitikmeot Trade Show in Cambridge Bay
March 28, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Kitikmeot Socio-Economic Monitoring Committee meeting in Cambridge Bay
April 16-19, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Nunavut Mining Symposium in Iqaluit
September 25-27, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Nunavut Trade Show in Iqaluit
October 30-31, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Kitikmeot Stakeholders Meeting in Cambridge Bay to discuss training and labour market needs in the Kitikmeot Region
November 13-15, 2012	Various community, government, and industry stakeholders participated	Sabina participated in the Yellowknife Geoscience Forum
February 11-13, 2013	Various community, government, and industry stakeholders participated	Sabina participated in the Kitikmeot Trade Show in Cambridge Bay
April 8-11, 2013	Various community, government, and industry stakeholders participated	Sabina participated in the Nunavut Mining Symposium in Iqaluit
September 12, 2013	Various community, government, and industry stakeholders participated	Sabina participated in a meeting on Community Readiness in the Kitikmeot Region, hosted by the Kitikmeot Inuit Association and Canadian Northern Economic Development Agency, in Cambridge Bay
September 24-26, 2013	Various community, government, and industry stakeholders participated	Sabina participated in the Nunavut Trade Show in Iqaluit
November 19-21, 2013	Various community, government, and industry stakeholders participated	Sabina participated in the Yellowknife Geoscience Forum
November 20-21, 2013	Various community, government, and industry stakeholders participated	Sabina participated in the Kitikmeot Socio-Economic Monitoring Committee meeting in Cambridge Bay
February 10-12, 2014	Various community, government, and industry stakeholders participation	Sabina participated in the Kitikmeot Trade Show in Cambridge Bay
April 7-10, 2014	Various community, government, and industry stakeholders participated	Sabina participated in the Nunavut Mining Symposium in Iqaluit

APPENDIX M

SABINA GOLD AND SILVER CORP. FINANCIAL AND CORPORATE INFORMATION

- The Company added personnel to the management group in key areas for project development. Mr. Leon Coetzer was appointed to the position of Vice president, Engineering and Project Development. Mr. Matthew Pickard was appointed Director of Environment and Community Relations. Also in September, the Company announced that it had engaged SRK Engineering Ltd. to commence work on a Preliminary Economic Assessment ("PEA") of a gold mining operation at Back River.

Subsequent to the quarter, on October 4, 2011 the Company announced the closing of the sale of its Hackett River project and certain Wishbone claims to Xstrata Canada Corporation, Xstrata Zinc Canada Division ("Xstrata"). Xstrata deposited $50 million in escrow pending registration of land transfers and transfers of associated licenses and permits for which the Company has received all required consents. On November 14, 2011, all transfers were completed and the Company received the $50 million from escrow. In addition, the Company has retained a silver royalty equal to 22.5% of the first 190 million ounces of payable silver from the current resource at Hackett River and other properties and 12.5% of all payable silver from the Properties thereafter at no future cost to Sabina.

Also subsequent to the quarter, on October 24, 2011, the Company announced the retirement of Tony Walsh as president and CEO and the appointment of Rob Pease, P.Geo as his successor.

Financial Results

For the three month period ended September 30, 2011, the Company reported a net loss of $2.6 million compared to a loss of $3.6 million in 2010. The loss in Q3 2011 was lower than the same period last year as a result of a lower deferred income tax expense and higher interest income partially offset by increased amortization of the flow-through premium.

Operating expenses in Q3 2011 were $1.0 million as compared to $0.9 million in 2010, higher by $0.1 million due primarily to higher share based payment costs, which increased by $153 thousand. Share based payment costs increased due to a higher fair value in Q3 2011 than in the comparable period in 2010 and resulted primarily from a higher underlying share price. The number of share based payments granted or vested in the period did not change materially from 2010.

The Company had cash and cash equivalents and short-term investments of $119.8 million at September 30, 2010 compared to cash and cash equivalents of 82.8 million at December 31, 2010.

For the full September 30, 2011 financial statements and Management's Discussion and Analysis, please see the Company website at www.sabinagoldsilver.com.

SABINA GOLD & SILVER CORP

Sabina Gold & Silver Corp. is an emerging precious metals company with district scale, world class undeveloped assets in one of the world's newest, most politically stable mining jurisdictions: Nunavut, Canada.

Sabina's primary properties consist of the Back River Gold Project as well as the Wishbone Claims, a vastly prospective grass roots project and the Hackett River poly metallic project all in Nunavut. The Company has announced the completion of the sale of Hackett River and certain claims in the Wishbone greenstone belt to Xstrata Zinc Canada Division (Xstrata) for which the Company received $50 m cash and a silver royalty on Xstrata's Hackett River silver production of 22.5% of the first 190 million ounces produced and 12.5% of all silver produced thereafter. The Company expects to finish 2011 with approximately $160 million in the treasury with no debt.

For further information please contact:

Nicole Hoeller, Vice-President, IR: **1 888 648-4218**
nhoeller@sabinagoldsilver.com

Statements relating to development, feasibility and exploration work at the Back River gold project and the Wishbone Greenstone Belt, and the expected results of this work are forward-looking statements within the meaning of securities legislation of certain Provinces in Canada. Forward looking statements are statements that are not historical facts and are generally, but not always, identified by the words "expects," "plans," "anticipates," "believes," "intends," "estimates," 'projects," "potential" and similar expressions, or that events or conditions "will," "would," "may," "could" or "should" occur. Information inferred from the interpretation of drilling results and information concerning mineral resource estimates may also be deemed to be forward looking statements, as it constitutes a prediction of what might be found to be present when and if a project is actually developed. These forward-looking statements are subject to a variety of risks and uncertainties which could cause actual events or results to differ materially from those reflected in the forward-looking statements, including, without limitation: risks related to fluctuations in gold prices; uncertainties related to raising sufficient financing to fund the planned work in a timely manner and on acceptable terms; changes in planned work resulting from weather, logistical, technical or other factors; the possibility that results of work will not fulfill expectations and realize the perceived potential of the Company's properties; uncertainties involved in the estimation of metal reserves and resources; the possibility that required permits may not be obtained on a timely manner or at all; the possibility that capital and operating costs may be higher than currently estimated and may preclude commercial development or render operations uneconomic; the possibility that the estimated recovery rates may not be achieved; risk of accidents, equipment breakdowns and labour disputes or other unanticipated difficulties or interruptions; the possibility of cost overruns or unanticipated expenses in the work program; the risk of environmental contamination or damage resulting from Sabina's operations, failure to negotiate a formal option agreement on the Cook Lake property, unsatisfactory due-diligence results on the Cook Lake property and other risks and uncertainties, including those described in Sabina's Annual Report for the year ended December 31, 2010.

Forward-looking statements are based on the beliefs, estimates and opinions of Sabina's management on the date the statements are made. Sabina undertakes no obligation to update these forward-looking statements should management's beliefs, estimates or opinions, or other factors, change.

This news release has been authorized by the undersigned on behalf of Sabina Gold & Silver Corp

Tony Walsh, President and CEO
930 West 1st Street, suite 202
North Vancouver, BC V7P 3N4

Nunavut

FORM 23
BUSINESS CORPORATIONS ACT
NOTICE OF CHANGE OF DIRECTORS EXTRA-TERRITORIAL CORPORATION
FORMULE 23
LOI SUR LES SOCIÉTÉS PAR ACTIONS
AVIS DE CHANGEMENT D'ADMINISTRATEURS D'UNE

FILED-DÉPÔT
No.: ET8219
Date: June 29, 2011
Jeff Mason
DEPUTY/REGISTRAR OF CORPORATIONS
REGISTRAIRE OU REGISTRAIRE ADJOINT DES SOCIÉTÉS

1) Name of corporation — Dénomination sociale de la société

Sabina Gold & Silver Corp.

2) The following persons became directors of this corporation: — Les personnes suivantes sont devenues administrateurs de la présente société :

Name - Nom	Postal and street address (including postal code) Adresse (y compris le code postal)	Effective Date Date de prise d'effet
John Wakeford	6560 N. Gale Avenue, Sechelt, BC V0N 3A5	Apr 1, 2011

3) The following persons ceased to be directors of this corporation: — Les personnes suivantes ont cessé d'être administrateurs de la présente société :

Name - Nom	Postal and street address (including postal code) Adresse (y compris le code postal)	Effective Date Date de prise d'effet

4) The directors of this corporation are: — Les administrateurs de la société sont :

Name - Nom	Postal and street address (including postal code) Adresse (y compris le code postal)
LeRoy E Wilkes	5154 LeDuce Lane, Castle Rock, Colorado, USA 80108
John Whitton	Box 934, 44 Howey Bay Rd, Red Lake, Ontario, Canada P0V 4J7
Terry E. Eyton	873 Roche Point Drive, North Vancouver, Canada, V7H 2W6

IMPORTANT: If required / Si exigé ☑ Schedule of additional directors is attached. Une liste d'administrateurs supplémentaires est jointe.

Date	Signature	Title (Director, Officer or Solicitor) Titre (Administrateur, dirigeant ou avocat)
June 27/11	[signature]	CORPORATE SECRETARY

Anthony P. Walsh – 200-508 Waters Edge Cres, West Vancouver, Canada V7T 0A2

James N. Morton – 1200 – 750 West Pender Street, Vancouver, Canada V6C 2T8

Jonathan Goodman – 55th Floor, 40 King Street West, Toronto, Ontario, Canada M5H 4A9

David Fennell – P.O. Box CB 113341, Nassau, New Providence, Bahamas

Scott Hean – 6372 Argyle Ave, West Vancouver, BC, Canada V7W 2E6

John Wakeford – 6560 N. Gale Avenue, Sechelt, BC V0N 3A5

No.: ET8219

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Nunavut
Canada

BUSINESS CORPORATIONS ACT

CERTIFICATE OF AMENDMENT OF REGISTRATION OF AN EXTRA-TERRITORIAL CORPORATION

LOI SUR LES SOCIÉTÉS ACTIONS

CERTIFICAT DE MODIFICATION DE L'ENREGISTREMENT D'UNE SOCIÉTÉ PAR ACTIONS EXTRATERRITORIALE

I HEREBY CERTIFY THAT the name of

JE CERTIFIE PAR LA PRÉSENTE QUE La dénomination sociale de

SABINA SILVER CORPORATION

Registered under Part XXI of the *Business Corporations Act of Nunavut*, has been changed to

Enregistrée en vertu de la Partie XXI de la *Loi sur les sociétés par actions au Nunavut*, *a été changée pour*

SABINA GOLD & SILVER CORP.

Effective as of **à compter du**

10/27/2009

Dated
Fait le **04-Nov-2009**

Tammy Heffernan

Digitally signed by Tammy Heffernan
DN: cn=Tammy Heffernan, o=Legal Registries, ou, email=theffernan@gov.nu.ca, c=CA
Date: 2009.11.05 16:54:52 -05'00'

DEPUTY / REGISTRAR OF CORPORATIONS
REGISTRAIRE OU REGISTRAIRE ADJOINT DES SOCIÉTÉS PAR ACTIONS

No.: **ET8219**

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Nunavut

Canada

BUSINESS CORPORATIONS ACT

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