Stantec

Memo

To:	Stephen Lines Premier Gold Mines Hardrock Inc	From:	Kana Ganesh, Deborah Hunt Markham ON Office
File:	160960946 PGMH Hardrock Project	Date:	May 27, 2015

Reference: Highway 11 Traffic Noise Assessment

1.0 PURPOSE AND STUDY OBJECTIVES

Premier Gold Mines Hardrock Inc. (Premier) proposes the establishment, construction, operation, and closure of the Hardrock Project, an open pit gold mine and ore processing facility, with ancillary facilities. As the ore body for the Hardrock Project is partially located beneath the current location of Highway 11, a highway realignment is required as well as modification to a small portion of Michael Power Blvd which intersects the highway. Premier will design and construct the realigned portion of Highway 11 in accordance with Ministry of Transportation (MTO) standards, whilst the operation of the highway will fall directly under the care and control of the MTO.

Premier has requested that Stantec Consulting Ltd (Stantec) conduct a traffic noise assessment for the proposed Highway 11 realignment, south of Geralton, Ontario. The purpose of the traffic noise assessment is to determine the potential change in sound levels due to this undertaking at points of reception (PORs) due to traffic and to compare these sound levels against MTO's Environmental Guide for Noise (MTO, 2006). The results of this assessment will also be used in the determination of any noise mitigation requirements for the realignment.

1.1 PROJECT OVERVIEW

The proposed Highway 11 realignment is approximately 4.8 km in length and runs in an arc approximately 1.2 km north of the existing highway at its apex where it intersects with Michael Power Blvd. The realignment extends from the existing MTO Patrol Yard in the east and reconnects to the existing highway directly south of and slightly west of Mosher Lake (Figure 1). The proposed realignment of Highway 11 will also require construction of a new interchange between Michael Power Blvd and Highway 11 and potentially the relocation of the existing MTO yard. Noise from the new MTO yard is expected to be negligible and is therefore is not considered within this traffic noise assessment.

1.2 STUDY AREA

For the purposes of the traffic noise assessment for the Highway 11 realignment, the study area was selected considering the spatial extent to which a quantifiable acoustical effect could be expected to occur from the Highway 11 realignment (undertaking) considering future traffic volumes and alignments.

Generally, the points of reception (PORs) for this assessment were considered within an area extending approximately 1 km in each direction from Highway 11 considering both the realignment and also the existing portion of Highway 11. The PORs used in this assessment are shown in Figure 2. This area is defined as Regional Assessment Area (RAA).

1.3 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise deals with the propagation of sound in the outdoor environment and is subject to the effects of atmospheric conditions as well as the varying character and level of sounds that occur in nature. Environmental noise encompasses the effect of sound on the environment and the effect of the environment on sound.

The energy equivalent sound level (L_{eq}) is the parameter most often used to represent the time-varying aspects of environmental noise. It has been shown to be a good, single number descriptor of the annoyance of noise. The L_{eq} is the energy-averaged sound level for a specified time period. It is defined as the equivalent steady, continuous level that has the same acoustical energy as the actual time-varying sound levels for a specified period of time. The L_{eq} is commonly expressed in A-weighted decibels (dBA) which represents the response of the human ear to different frequencies of sound. A one-hour L_{eq} would be denoted as $L_{eq}(1)$ and would be expressed in dBA. For traffic noise assessments, guidelines and assessments are typically based on 16-hour (daytime 0700h-2300h)) and 8-hour (night-time 2300h-0700h) L_{eq}.

At the federal level, Health Canada draft guidelines are based on a 24-hour L_{eq} or variant known as the day-night sound level (DNL or L_{dn}). The DNL is defined by L_d, or the L_{eq} during the 16 daytime hours from 07:00h to 23:00h, and by L_n, or the L_{eq} during the eight nighttime hours of 23:00h to 07:00h. Since noise is more disturbing to residents at night, a +10 dB penalty is applied to the L_n nighttime level. The two values are then combined as a weighted logarithmic average to give the L_{dn}. For the purposes of this assessment, as the highway is not federally managed, this descriptor will be used for comparison purposes only.

2.0 METHODOLOGY

2.1 ANALYSIS APPROACH

This assessment evaluates the potential incremental change in noise with and without the Highway 11 realignment. In expansion or modification of road projects, the MTO requires comparison of future sound levels (10 years from the assessment period or start of operation), with and without the proposed highway. Therefore the following scenarios were considered as required by the MTO:

1. **Current (2014 baseline):** This refers to the existing traffic sound levels within the RAA for current conditions (i.e. 2014 traffic volumes and road alignments). This scenario is discussed in detail in the Environmental Baseline Data Report – Hardrock Project: Acoustics (Acoustics Baseline Data Report) (Stantec 2015)

2. **Future Ambient/No Build (2018/2028)**: In the no build scenario there is no Hardrock Project and no Highway realignment. In this scenario the existing Highway 11 road alignment remains unchanged and increases in traffic volumes are a function of population growth. This was considered for year 2018 (expected commencement of mine operation) and also for the year 2028 (as required by MTO a future case representing at least 10 years into the future must be evaluated).

3. **Future Build (2018 and 2028)**: The future build scenario includes the Highway 11 realignment and the start of mining operations. Similar to the future ambient case, the future build case was considered for year 2018 (expected commencement of mine operation) and for the year 2028 (as required by MTO). This case considered the realigned Highway 11, and Project site access.

Among the scenarios considered, the year 2028 represents the worst case scenario as the Traffic Impact Study (Stantec 2014)for the Project forecasts year 2028 as having the greatest traffic volumes of the three studied years (2018, 2023, and 2028).

Acoustic modelling was completed for the three scenarios listed above using the worst case traffic volume on the roads. Predicted acoustic effects for each scenario were evaluated against the MTO noise guidelines to determine the need for noise mitigation measures.

2.2 REGULATORY GUIDELINES

Highway 11 forms a part of the Trans-Canada Highway, which is a transcontinental federal-provincial highway system that travels through all ten provinces of Canada. This highway is not primarily under federal jurisdiction, as decisions about highway and freeway construction are entirely under the jurisdiction of the individual provinces.

Within Ontario, requirements for noise assessment and mitigation relating to the construction of new, or expansion of existing, provincial highways are contained in *The Environmental Guide for Noise* published by the MTO (2006). Analysis presented in this noise assessment follows this document.

According to MTO Guide (MTO, 2006), in order to determine noise effects, the assessment should compare the future sound levels with and without the proposed improvements/undertakings, in this case the Highway 11 realignment. This comparison should consider the "most exposed side" of a receptor. If mitigation is required, sound levels are considered only for Outdoor Living Areas (OLAs). This limitation is a result of the fact that the only practical noise mitigation measures for traffic noise are retrofit noise barriers. Mitigation of noise in the form of alterations to existing residential buildings is not considered practically feasible. Therefore this road traffic noise assessment studies the potential noise levels outdoors at "the most exposed side" of the studied points of reception.

The protocol further provides guidelines for determining noise mitigation requirements, which are summarized in Table 2-1.

Table 2-1: Guidelines for Determining Noise Mitigation Requirements (MTO)

Change in Sound Level (SPL, Future Build sound level (i.e. with proposed undertaking) compared with Future Ambient)/Projected Sound levels with Proposed Undertaking	Determination of Mitigation Requirements
Changes in SPL < 5 dBA and project SPL < 65 dBA	None
Changes in SPL ≥ 5 dBA or Project SPL ≥ 65 dBA	• Investigate Noise control measures on right-of-way. • Introduce noise control measures within right-of-way and mitigate to ambient if technically, economically and administratively feasible. • Noise control measures, where introduced should achieve a minimum of 5dBA attenuation, over first row receivers.

In Table 2-1, Future ambient refers to the future sound level without the proposed realignment (No Build case).

2.2.1 Human Perception of Loudness

In addition to the above noted criteria, the following may be used to assess the "significance" of a change or a difference in noise levels. MTO defines significance to mean "the level at which MTO begins determining whether or not the provision of noise mitigation requires investigation" (MTO, 2006). It should be noted that this is provided as additional background data for interpreting results and is not a regulation or criteria.

The published and peer reviewed literature suggests that humans do not linearly respond to a change in loudness in accordance with the loss of acoustical energy - typically a 3 dB change is imperceptible, yet represents a doubling or acoustical energy (H&K, 1981). Human perception to changes in loudness is presented in Table 2-2 (EPA, 1974).

Table 2-2: Human Perception of Changes in Sound Level

Sound Level Change (dB)	Human Perception of Relative Loudness
1 to 3	Insignificant due to Imperceptibility
4 to 5	Just-noticeable
6 to 9	Marginally significant
10 or more	Significant, perceived as a doubling of sound exposure

2.3 POINTS OF RECEPTION

Points of Reception (PORs) were identified as a part of the Acoustics Baseline Data Report and a list is included in the Acoustics Baseline Data Report) and in Attachment A. Table 2-3 lists the 15 PORs that are within a 1km setback from the existing and proposed Highway 11 realignment and were assessed in this report (as shown in Figure 2). These 15 PORs are all residential dwellings. As sound diminishes with distance, it can be concluded that if the potential effect on the assessed PORs is considered insignificant, then no significant adverse residual effect would be expected at PORs at greater distances from the roadways. Receptor IDs have been kept consistent with the Acoustics Baseline Data Report and Environmental Noise Assessment – Construction and Operation of the Hardrock Project Technical Data Report.

Table 2-3: Point of Reception Summary

Point of Reception ID	Description
L_005	Residence
L_008	MacLeod Provincial Park
L_0030	New subdivision vertex 11
L_0031	New subdivision vertex 12
L_0040	Michael Power Boulevard Res 2
L_0041	Michael Power Boulevard Res 3
L_0042	Michael Power Boulevard Res 1
L_0043	Michael Power Boulevard Res 4
L_0044	Michael Power Boulevard Res 5
L_0045	Rosedale Point Res 6
L_0046	Rosedale Point Res 4
L_0047	Rosedale Point Res 5
L_0048	Rosedale Point Res 3
L_0049	Rosedale Point Res 7
L_0050	Rosedale Point Res 1
L_0051	Rosedale Point Res 2

Each of the residential dwellings listed in the Table 2-3 were assumed to be occupied during daytime and night-time hours and were studied for both day and night time traffic noise. The locations of the PORs are presented in Figure 2.

2.4 ACOUSTICAL MODELLING AND TRAFFIC DATA

In order to quantify the noise effects at the PORs for each of the three scenarios discussed in Section 2.1, acoustical modelling was performed. The MTO Protocol prescribes the use of the ORNAMENT assessment methodology where topography is considered to be non-complex, and the expected noise level increase is less than 5 dBA. Topography around the road alignment is fairly flat calculations with a natural traffic volume growth indicated an increase of less than 5 dBA. Therefore the use of the ORNAMENT assessment methodology was considered appropriate.

Forecasted Annual Average Daily Traffic (AADT) volumes for future years were calculated based on data provided in the Traffic Impact Study (Stantec 2014).

AADT data was provided for the Future Build scenario for the years 2028, 2023, and 2018. AADT data was also provided for Future Ambient scenario for the year 2028 based on Traffic Impact Study (Stantec 2014). Table 2-4 summarizes the AADTs used in this study.

Table 2-4: Forecasted AADT Volumes for Build Scenario

Road Section	Average Annual Daily Traffic (AADT)		
	Future Build 2018	Future Build 2023	Future Build 2028
Highway 11: West of Hardrock Project Site Access	1951	2000	**2025**
Highway 11: Between Hardrock Project Site Access and Michael Power Boulevard	3617	3654	**3679**
Highway 11: East of Michael Power Boulevard	2679	2704	**2741**
Michael Power Boulevard: North of Highway 11	2728	2778	**3136**

Table 2-5: Forecasted AADT Volumes for No Build Scenario

Road Section	AADT
	Future No-Build 2028
Highway 11: West of Michael Power Boulevard	1753
Highway 11: East of Michael Power Boulevard	1975
Michael Power Boulevard: North of Highway 11	2210

2.5 ASSESSMENT CRITERIA

In order to assess the significance of the predicted changes in sound levels, the MTO mitigation requirements (Table 2-1) and Human Perception of Changes in Sound Level (Table 2-2) were considered. The following table summarizes the criteria for assessment of significance as defined by MTO.

Table 2-6: Summary of Impact Significance[1]

Significance	Determined Noise Impact / Projected Noise Level	Rationale
Insignificant	0 to 3 dBA Change in SPL and Project SPL projected <65 dBA	Noise impact is imperceptible and less than 5 dBA. Projected noise level is less than 65 dBA. No mitigation is required.
Marginal	3 to 5 dBA Change in SPL and Project SPL projected <65dBA	Noise impact is just barely perceptible, and less than 5 dBA. Projected noise level is less than 65 dBA. No mitigation is required.
Significant	Change in SPL ≥ 5 dBA and/or Project SPL projected ≥ 65 dBA	Noise impact is perceptible and/or projected noise level is greater than 65 dBA. Mitigation is required.

Note:
1. MTO defines significance to mean "the level at which MTO begins determining whether or not the provision of noise mitigation requires investigation" (MTO 2006)

3.0 ASSESSMENT RESULTS

Predicted noise levels for each of the assessment scenarios are presented in the following sections. A summary of the results is presented in Section 3.4.

3.1 CURRENT (BASELINE) TRAFFIC ASSESSMENT

The results of the Current (baseline) sound level assessment are presented below in Table 3-1, and Figure 3 (for details refer to: Acoustics Baseline Data Report (Stantec 2015).

Table 3-1: Summary of Ambient Sound Level Predictions

POR ID	Description	Day-Night Sound Level (Ldn) [dBA]	Daytime (16-Hr) L_{eq}, 07:00 - 23:00 [dBA]	Night-time (8-Hr) L_{eq}, 23:00 - 07:00 [dBA]
L_005	Residence	40	38	32
L_008	MacLeod Provincial Park	55	53	47
L_0030	New subdivision vertex 11	26	25	18
L_0031	New subdivision vertex 12	27	25	19
L_0040	Michael Power Boulevard Res 2	58	57	50
L_0041	Michael Power Boulevard Res 3	56	55	48
L_0042	Michael Power Boulevard Res 1	57	55	49
L_0043	Michael Power Boulevard Res 4	58	57	50
L_0044	Michael Power Boulevard Res 5	53	52	45
L_0045	Rosedale Point Res 6	44	43	36
L_0046	Rosedale Point Res 4	42	41	34
L_0047	Rosedale Point Res 5	40	38	32
L_0048	Rosedale Point Res 3	41	39	33
L_0049	Rosedale Point Res 7	39	38	31
L_0050	Rosedale Point Res 1	44	42	36
L_0051	Rosedale Point Res 2	41	39	33

3.2 FUTURE (2028) AMBIENT ASSESSMENT (FUTURE NO BUILD)

The results of the Future (2028) ambient conditions are presented below in Table 3-2, and Figure 4.

Table 3-2: Future (2028) Ambient Assessment Summary

POR ID	Description	Day-Night Sound Level (Ldn) [dBA]	Daytime (16-Hr) L_{eq}, 07:00 - 23:00 [dBA]	Night-time (8-Hr) L_{eq}, 23:00 - 07:00 [dBA]
L_005	Residence	41	39	33
L_008	MacLeod Provincial Park	56	54	48
L_0030	New subdivision vertex 11	27	25	19
L_0031	New subdivision vertex 12	27	26	19
L_0040	Michael Power Boulevard Res 2	59	57	51
L_0041	Michael Power Boulevard Res 3	56	55	48
L_0042	Michael Power Boulevard Res 1	57	56	49
L_0043	Michael Power Boulevard Res 4	58	57	50
L_0044	Michael Power Boulevard Res 5	53	52	45
L_0045	Rosedale Point Res 6	45	43	37
L_0046	Rosedale Point Res 4	42	41	34
L_0047	Rosedale Point Res 5	40	38	32
L_0048	Rosedale Point Res 3	41	40	33
L_0049	Rosedale Point Res 7	39	38	31
L_0050	Rosedale Point Res 1	44	43	36
L_0051	Rosedale Point Res 2	41	39	33

3.3 FUTURE (2028) BUILD ASSESSMENT

The results of the Future (2028) Build assessment are presented below in Table 3-3, and Figure 5.

Table 3-6: Future (2028) Build Assessment Summary

POR ID	Description	Day-Night Sound Level (Ldn) [dBA]	Daytime (16-Hr) L_{eq}, 07:00 - 23:00 [dBA]	Night-time (8-Hr) L_{eq}, 23:00 - 07:00 [dBA]
L_005	Residence	42	40	34
L_008	MacLeod Provincial Park	57	55	49
L_0030	New subdivision vertex 11	30	29	22
L_0031	New subdivision vertex 12	31	29	23
L_0040	Michael Power Boulevard Res 2	60	59	52
L_0041	Michael Power Boulevard Res 3	58	56	50
L_0042	Michael Power Boulevard Res 1	59	57	51
L_0043	Michael Power Boulevard Res 4	60	58	52
L_0044	Michael Power Boulevard Res 5	55	53	47
L_0045	Rosedale Point Res 6	46	45	38
L_0046	Rosedale Point Res 4	44	42	36
L_0047	Rosedale Point Res 5	42	40	34
L_0048	Rosedale Point Res 3	43	41	35
L_0049	Rosedale Point Res 7	41	40	33
L_0050	Rosedale Point Res 1	45	44	37
L_0051	Rosedale Point Res 2	42	41	34

Reference: Highway 11 Traffic Noise Assessment

3.4 RESULTS SUMMARY

Table 3-4 presents the predicted sound levels due to traffic at the PORs with and without the Highway 11 realignment for each of the assessment scenarios.

Table 3-4: Results Summary Table

	Current Ambient (dBA)			Future No-Build (dBA)			Future Build (dBA)		
POR ID	Day (L_d)	Night (L_d)	Day/Night (L_{dn})	Day (L_d)	Night (L_d)	Day/Night (L_{dn})	Day (L_d)	Night (L_d)	Day/Night (L_{dn})
L_005	38	32	40	39	33	41	40	34	42
L_008	53	47	55	54	48	56	55	49	57
L_0030	25	18	26	25	19	27	29	22	30
L_0031	25	19	27	26	19	27	29	23	31
L_0040	57	50	58	57	51	59	59	52	60
L_0041	55	48	56	55	48	56	56	50	58
L_0042	55	49	57	56	49	57	57	51	59
L_0043	57	50	58	57	50	58	58	52	60
L_0044	52	45	53	52	45	53	53	47	55
L_0045	43	36	44	43	37	45	45	38	46
L_0046	41	34	42	41	34	42	42	36	44
L_0047	38	32	40	38	32	40	40	34	42
L_0048	39	33	41	40	33	41	41	35	43
L_0049	38	31	39	38	31	39	40	33	41
L_0050	42	36	44	43	36	44	44	37	45
L_0051	39	33	41	39	33	41	41	34	42

Table 3-5 below summarizes the significance (as per Table 2-2) of the predicted sound levels at each POR assessed. This change is determined by subtracting the predicted future ambient no-build values (in year 2028) from the predicted future 2028 build values. This quantity is compared to the assessment criteria (as outlined in Section 2) to determine significance and the mitigation effort required.

Table 3-5: Significance of Predicted Changes in Sound Levels

	Change in Sound Level - Future No-Build to Future Build [dB]			Significance	Mitigation Effort Required
POR ID	Day	Night	Day/Night		
L_005	1	1	1	Insignificant	None
L_008	1	1	1	Insignificant	None
L_0030	3	3	3	Insignificant	None
L_0031	4	4	4	Marginal	None
L_0040	2	1	1	Insignificant	None
L_0041	2	2	2	Insignificant	None
L_0042	2	2	2	Insignificant	None
L_0043	1	1	1	Insignificant	None
L_0044	1	1	1	Insignificant	None
L_0045	2	2	2	Insignificant	None
L_0046	2	2	2	Insignificant	None
L_0047	2	2	2	Insignificant	None
L_0048	2	2	2	Insignificant	None
L_0049	2	2	2	Insignificant	None
L_0050	2	1	1	Insignificant	None
L_0051	2	1	1	Insignificant	None

Reference: Highway 11 Traffic Noise Assessment

4.0 CONCLUSION AND CLOSURE

Stantec Consulting Limited (Stantec) was retained by Premier Gold Mines Hardrock Inc. (Premier) to prepare an traffic noise assessment for the proposed Highway 11 realignment, south of Geralton, Ontario. Stantec's assessment predicted that the potential change in background noise levels due to traffic from the proposed realignment of Highway 11 would be 3 dB or less at most (13) of the 15 PORs. Two PORs were predicted to experience a marginal change in background noise levels due to traffic (4 dB) as a result of the proposed Highway 11 realignment. At each of the 15 PORs, a noise level of less than 65 dBA was predicted for daytime, night-time and 24-hour periods. Based on the predicted noise levels presented in this report and the defined assessment criteria, no mitigation is expected to be required for the proposed Highway 11 realignment.

This memo has been prepared on behalf of Premier Gold Mines Hardrock Inc. The acoustic analysis highlighted in this report is based on information obtained from Premier, its consultants and field observations. The assessment represents the conditions of the road alignment proposed at the time of the assessment, and the conclusions are the best judgment of the assessor based on current environmental standards. Stantec Consulting Limited attests that to the best of our knowledge, the information presented in this report is accurate

STANTEC CONSULTING LTD.

<Original signed by>

<Original signed by>

Deborah Hunt, M.Sc., P.Eng
Environmental Engineer
Phone: 905-944-6264
Fax: 905-474-9889
Deborah.Hunt@stantec.com

Kana Ganesh PhD., P.Eng
Sr. Acoustics Noise and Vibration Engineer
Phone: 905 415-6332
Fax: 905 474 9889
kana.ganesh@stantec.com

Attachments: A - Points of Reception (PORs)
B - Figures

c. Fiona Christiansen, Stantec Consulting Ltd.

5.0 REFERENCES

Ministry of Transportation (MTO). 2006. *Environmental Guide for Noise*. Available at: http://www.raqsa.mto.gov.on.ca/techpubs/eps.nsf/8cec129ccb70929b852572950068f16b/69f17cce25a57f1e852572b300578dee/$FILE/MTO%20Env%20Guide%20for%20Noise%20Oct-06%20v%201.1.pdf. Accessed: March 2015.

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Stantec

May 27, 2015
Stephen Lines

Reference: Highway 11 Traffic Noise Assessment

Attachment A
Points of Reception (PORs)

POR ID	Name	X coordinate (m)	Y Coordinate (m)
L_001	Lahtis Road 1	500982	5502146
L_002	Lahtis Road 2	501154	5502006
A_003	Golf Club 6	503616	5503616
A_004	Golf Club 1	503783	5503605
L_005	Residence	506119	5503782
L_006	Dwelling - Kenogamisis Lake Southwest Arm 1	501562	5498999
L_007	Dwelling - Kenogamisis Lake Southwest Arm 2	500332	5497975
L_008	Macleod Provincial Park	506211	5503947
R_009	Goldfield Road 1	498285	5502693
L_0010	New Dev PL5	501632	5504181
L_0011	New Dev PL 4	501703	5504226
L_0012	New Dev PL 6	501632	5504104
L_0013	New subdivision vertex 16	501686	5504179
L_0014	New subdivision vertex 17	501739	5504214
L_0015	New Dev PL 8	501895	5504292
L_0016	New subdivision vertex 15	501707	5504081
L_0017	New subdivision vertex 14	501751	5503994
L_0018	New subdivision vertex 13	501887	5504089
L_0019	New subdivision vertex 18	501993	5504555
L_0020	New subdivision vertex 19	502070	5504616
L_0021	New Dev PL 3	502125	5504770
L_0022	New subdivision vertex 1	502191	5504820
L_0023	New Deve PL2	502217	5504845
L_0024	New subdivision vertex 20	502155	5504756
L_0025	New subdivision vertex 21	502200	5504791
L_0026	New subdivision vertex 2	502241	5504841
L_0027	New Dev PL 9	502211	5504747
L_0028	New subdivision vertex 9	502186	5504675
L_0029	New subdivision vertex 10	502170	5504608
L_0030	New subdivision vertex 11	502368	5504522
L_0031	New subdivision vertex 12	502442	5504406
L_0032	New subdivision vertex 3	502289	5504817
L_0033	New Dev PL 1	502316	5504845
L_0034	New subdivision vertex 5	502343	5504843
L_0035	New subdivision vertex 4	502298	5504804
L_0036	New subdivision vertex 8	502318	5504797
L_0037	New subdivision vertex 6	502370	5504812
L_0038	New subdivision vertex 7	502352	5504793
L_0039	New Dev PL 10	502316	5504756
L_0040	Michael Power Blvd Res 2	503206	5505037
L_0041	Michael Power Blvd Res 3	503196	5504957
L_0042	Michael Power Blvd Res 1	503263	5504995
L_0043	Michael Power Blvd Res 4	503260	5504949
L_0044	Michael Power Blvd Res 5	503283	5504961
L_0045	Rosedale Point Res 6	503353	5505049
L_0046	Rosedale Point Res 4	503383	5505090
L_0047	Rosedale Point Res 5	503421	5505115
L_0048	Rosedale Point Res 3	503400	5505038

POR ID	Name	X coordinate (m)	Y Coordinate (m)
L_0049	Rosedale Point Res 7	503431	5505035
L_0050	Rosedale Point Res 1	503363	5504967
L_0051	Rosedale Point Res 2	503409	5504984
L_0052	Greenstone Administration Office	503205	5505647
L_0053	Motel	503315	5505656
L_0054	East St Res 1	503356	5505670
L_0055	East St Res 6	503390	5505664
L_0056	East St Res 7	503398	5505663
L_0057	East St Res 8	503415	5505667
L_0058	East St Res 2	503437	5505668
L_0059	East St Res 9	503449	5505669
L_0060	East St Res 10	503498	5505666
L_0061	East St Res 3	503387	5505719
L_0062	East St Res 11	503399	5505716
L_0063	East St Res 12	503410	5505715
L_0064	East St Res 13	503423	5505714
L_0065	East St Res 14	503438	5505713
L_0066	East St Res 15	503450	5505721
L_0067	East St Res 16	503463	5505714
L_0068	East St Res 4	503486	5505718
L_0069	East St Res 17	503508	5505711
L_0070	East St Res 5	503564	5505711
L_0071	Queen Ave Res 1	503359	5505761
L_0072	Queen Ave Res 6	503398	5505751
L_0073	Queen Ave Res 7	503424	5505755
L_0074	Queen Ave Res 2	503436	5505771
L_0075	Queen Ave Res 8	503457	5505762
L_0076	Queen Ave Res 9	503473	5505758
L_0077	Queen Ave Res 10	503496	5505764
L_0078	Queen Ave Res 11	503520	5505764
L_0079	Queen Ave Res 3	503545	5505773
L_0080	Queen Ave Res 12	503558	5505765
L_0081	Queen Ave Res 13	503570	5505763
L_0082	Queen Ave Res 4	503387	5505807
L_0083	Queen Ave Res 14	503419	5505805
L_0084	Queen Ave Res 5	503518	5505805
L_0085	Queen Ave Res 15	503445	5505805
L_0086	Queen Ave Res 16	503465	5505803
L_0087	Queen Ave Res 17	503482	5505803
L_0088	Queen Ave Res 18	503548	5505804
L_0089	Queen Ave Res 19	503570	5505801
L_0090	King Ave Res 1	503409	5505863
L_0091	King Ave Res 2	503510	5505859

POR ID	Name	X coordinate (m)	Y Coordinate (m)
L_0092	Queen Ave Res 20	503308	5505901
L_0093	King Ave Res 3	503379	5505903
L_0094	King Ave Res 4	503480	5505899
L_0095	John Res 1	503432	5505952
L_0096	John Res 2	503504	5505950
L_0097	John Res 3	503395	5505990
L_0098	John Res 4	503564	5505991
L_0099	Benner Res 1	503385	5506071
L_00100	Benner Res 2	503439	5506064
L_00101	Cultural Centre	503747	5506050
L_00102	Silver Nugget Motel	503394	5506169
L_00103	Benner Res 3	503495	5506176
L_00104	Greer Ave.	503690	5506130
L_00105	Main St Res 1	503356	5506274
R_00106	1 St East Res 1	503510	5506265
R_00107	Main St Res 3	503426	5506332
R_00108	Main St Res 2	503378	5506400
R_00109	1 St East Res 2	503484	5506376
R_00110	Main St Res 4	503453	5506491
R_00111	1 St East Res 3	503509	5506512
R_00112	Mosher Res 2	503250	5506719
R_00113	Main St Res 5	503492	5506727
R_00114	1 St East Res 4	503589	5506683
R_00115	Mosher Res 1	503206	5506771
R_00116	Clark Res 5	503390	5506786
R_00117	Clark Res 1	503614	5506747
R_00118	Clark Res 2	503687	5506775
R_00119	Clark Res 3	503730	5506734
R_00120	Clark Res 4	503820	5506717
R_00121	Water Treatment Plant	503961	5506754
R_00122	Clark Res 7	503239	5506816
R_00123	Clark Res 6	503323	5506845
R_00124	1 St West Res 1	503408	5506876
R_00125	1 St East Res 6	503576	5506866
R_00126	1 St East Res 5	503612	5506841
R_00127	Jackson Res 1	503668	5506886
R_00128	Jackson Res 2	503697	5506838
R_00129	Jackson Res 3	503768	5506855
R_00130	McKenzie Res 1	503842	5506901
R_00131	Bank Field Res 2	503143	5506900
R_00132	Bank Field Res 1	503215	5506919
R_00133	McKenzie Res 5	503572	5506948
R_00134	McKenzie Res 4	503646	5506984

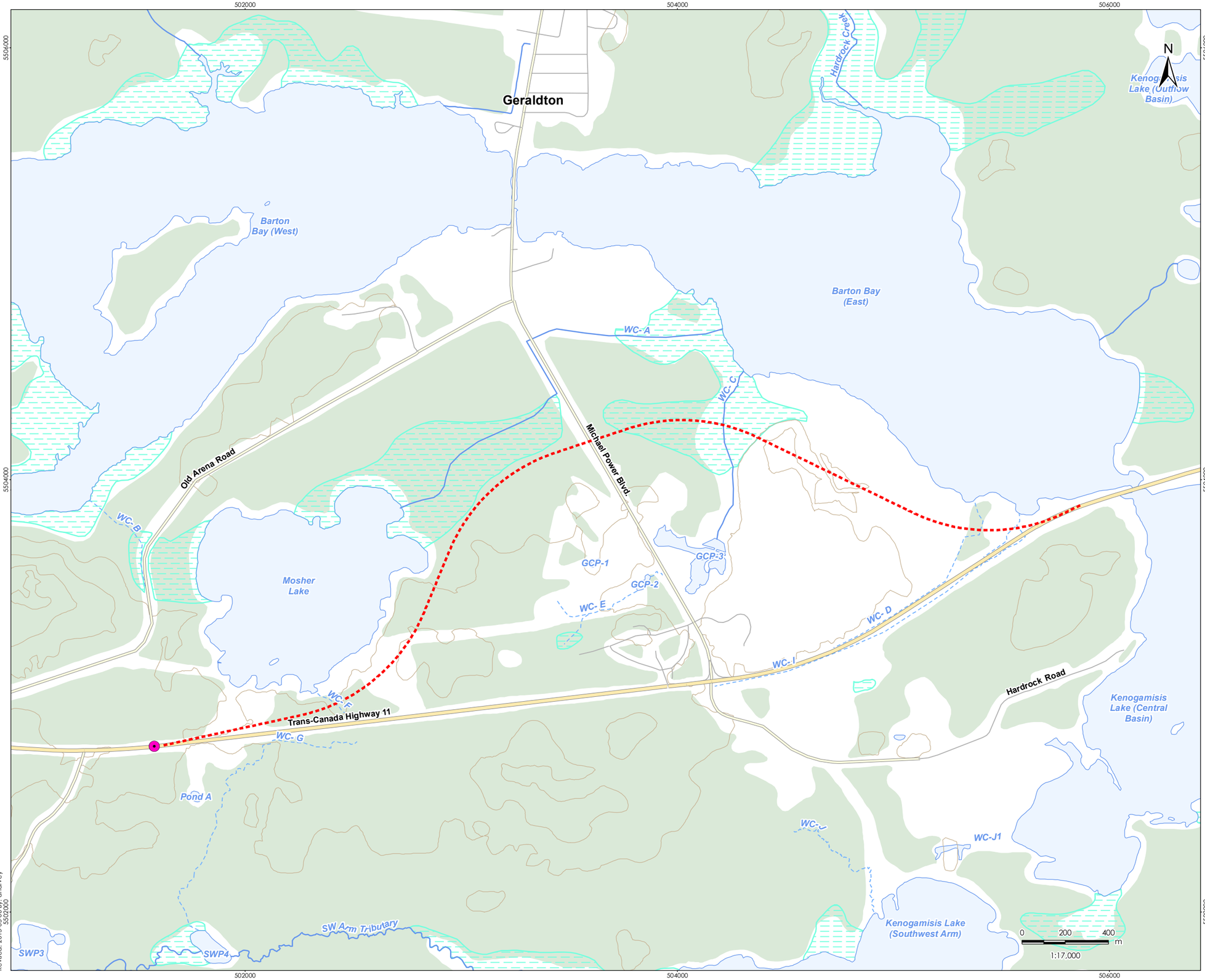
POR ID	Name	X coordinate (m)	Y Coordinate (m)
R_00135	McKenzie Res 3	503700	5506927
R_00136	McKenzie Res 2	503783	5506957
R_00137	McKenzie Res 10	503151	5507047
R_00138	McKenzie Res 9	503252	5507006
R_00139	McKenzie Res 8	503371	5506986
R_00140	1 St West Res 2	503435	5507031
R_00141	McKenzie Res 7	503438	5506977
R_00142	1 St East Res 7	503610	5507066
R_00143	Wardrope Res 1	503412	5507226
R_00144	1 St West Res 3	503453	5507168
R_00145	Main St Res 6	503575	5507194
R_00146	Geraldton Community Centre	503729	5507195
R_00147	1 St West Res 4	503482	5507281
R_00148	Main St Res 7	503547	5507321
R_00149	1 St East Res 8	503650	5507291
R_00150	Daneff Res 4	503156	5507451
R_00151	Daneff Res 3	503190	5507448
R_00152	Daneff Res 1	503278	5507426
R_00153	Forman Res 1	503350	5507427
R_00154	1 St West Res 5	503456	5507419
R_00155	Main St Res 8	503613	5507406
R_00156	Osesky Res 1	503199	5507502
R_00157	Daneff Res 2	503265	5507488
R_00158	Osesky Res 2	503302	5507534
R_00159	Forman Res 2	503395	5507486
R_00160	1 St West Res 6	503511	5507478
R_00161	Main St Res 9	503577	5507497
R_00162	1 St East Res 9	503677	5507465
R_00163	Confederation College - Geraldton Campus	503552	5507544
R_00164	St.James Anglican Church	503658	5507565
R_00165	1 St East Res 11	503746	5507580
R_00166	B.A. Parker Public School	503296	5507629
R_00167	Geraldton Composite High School	503390	5507651
R_00168	Contact North/Contact Nord	503453	5507609
R_00169	1 St West Res 7	503545	5507659
R_00170	Main St Res 10	503611	5507677
R_00171	1 St East Res 10	503716	5507655
R_00172	Hoggarth Res 3	503518	5507737
R_00173	Hoggarth Res 1	503710	5507742
R_00174	1 St East Res 12	503774	5507745
R_00175	Greenstone Family Health Team	503135	5507820
R_00176	North West Community Care Access Centre	503264	5507800
R_00177	Hoggarth Res 4	503387	5507799

POR ID	Name	X coordinate (m)	Y Coordinate (m)
R_00178	Superior Greenstone Association For Comm	503502	5507786
R_00179	Hoggarth Res 2	503572	5507773

May 27, 2015
Stephen Lines

Reference: Highway 11 Traffic Noise Assessment

Attachment B
Figures



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Revised: 2015-05-06 By: dharvey

Stantec

Legend

- Proposed Site Access for the Hardrock Project
- Proposed Highway 11 Realignment

Existing Features

- Contour Line (10m intervals)
- Highway
- Major Road
- Local Road
- Watercourse- Permanent
- Watercourse- Intermittent
- Wetland, Unevaluated
- Waterbody
- Wooded Area

Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

May 2015
160960946

Client/Project

Premier Gold Mines Hardrock Inc
Hardrock Project

Figure No.

1

Title

Highway 11 Realignment and Site Access for the Hardrock Project

502000 504000 506000

5506000 5504000 5502000

Geraldton

Barton Bay (West)

Barton Bay (East)

Kenogamisis Lake (Outflow Basin)

Kenogamisis Lake (Central Basin)

Kenogamisis Lake (Southwest Arm)

Mosher Lake

Pond A

L_030 L_031 L_040 L_041 L_042 L_043 L_044 L_045 L_046 L_047 L_048 L_049 L_050 L_051 L_008 L_005

WC- A WC- B WC- C WC- D WC- E WC- F WC- G WC- I WC- J WC- J1 WC- M WC- N

SWP1 SWP2 SWP3 SWP4

GCP-1 GCP-2 GCP-3

SW Arm Tributary

Michael Power Blvd.

Old Arena Road

Trans-Canada Highway 11

Hardrock Road

Lahtis Road

MUNICIPALITY OF GREENSTONE

UNORGANIZED TERRITORY

N

0 0.5 1 km

1:20,000

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Revised: 2015-05-11 By: dharvey

Stantec

Legend

- Point of Reception Location

Preliminary Site Plan

- Access Road
- Construction Access Road
- Diversion Channel
- Fresh Water Pipeline
- Haul Road
- New Power Line 115kV
- Power Line Realignment 44kV
- Tailings Pipeline and Overhead Powerline
- Open Pit- Full Extent
- Ore Pile
- Process Plant Area
- Collection Pond
- Tailings Managment Facility
- Mosher Pit
- Waste Rock Area

Highway Realignment

- Proposed Highway 11 Realignment

Existing Features

- Contour Line (10m intervals)
- Highway
- Major Road
- Local Road
- Existing Power Line
- Watercourse- Permanent
- Watercourse- Intermittent
- Municipal Boundary
- Wetland, Unevaluated
- Waterbody
- Wooded Area

Notes

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* Project Development Area may be refined as the Project progresses

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Client/Project

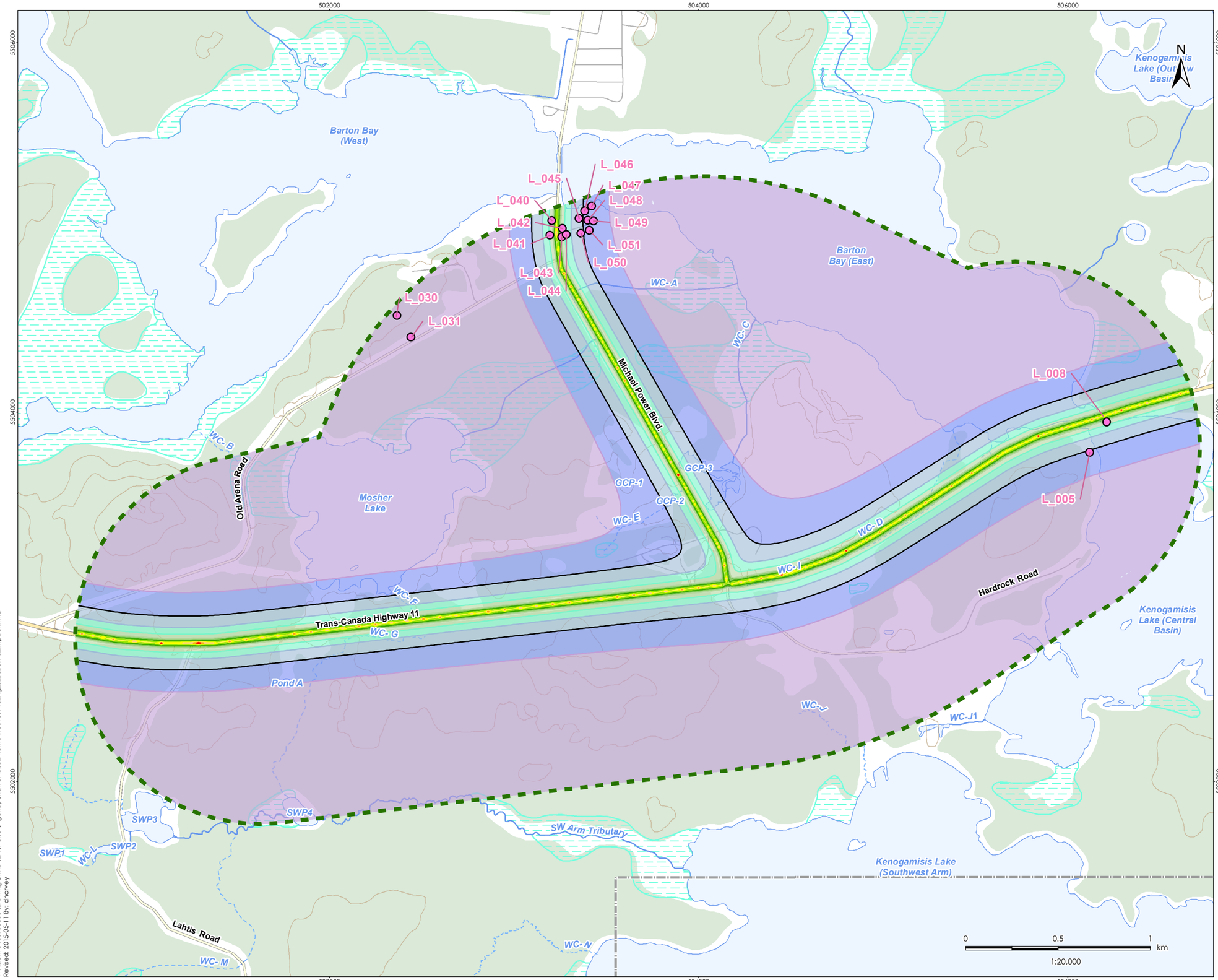
Premier Gold Mines Hardrock Inc
Hardrock Project

Figure No.

2

Title

Receptor Locations



Stantec

Legend

Acoustic

- 1km Setback
- Point of Reception Location

Sound Level Contours (dBA)

- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85

Existing Features

- Contour Line (10m intervals)
- Highway
- Major Road
- Local Road
- Watercourse- Permanent
- Watercourse- Intermittent
- Municipal Boundary
- Wetland, Unevaluated
- Waterbody
- Wooded Area

Notes

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Client/Project

Premier Gold Mines Hardrock Inc
Hardrock Project

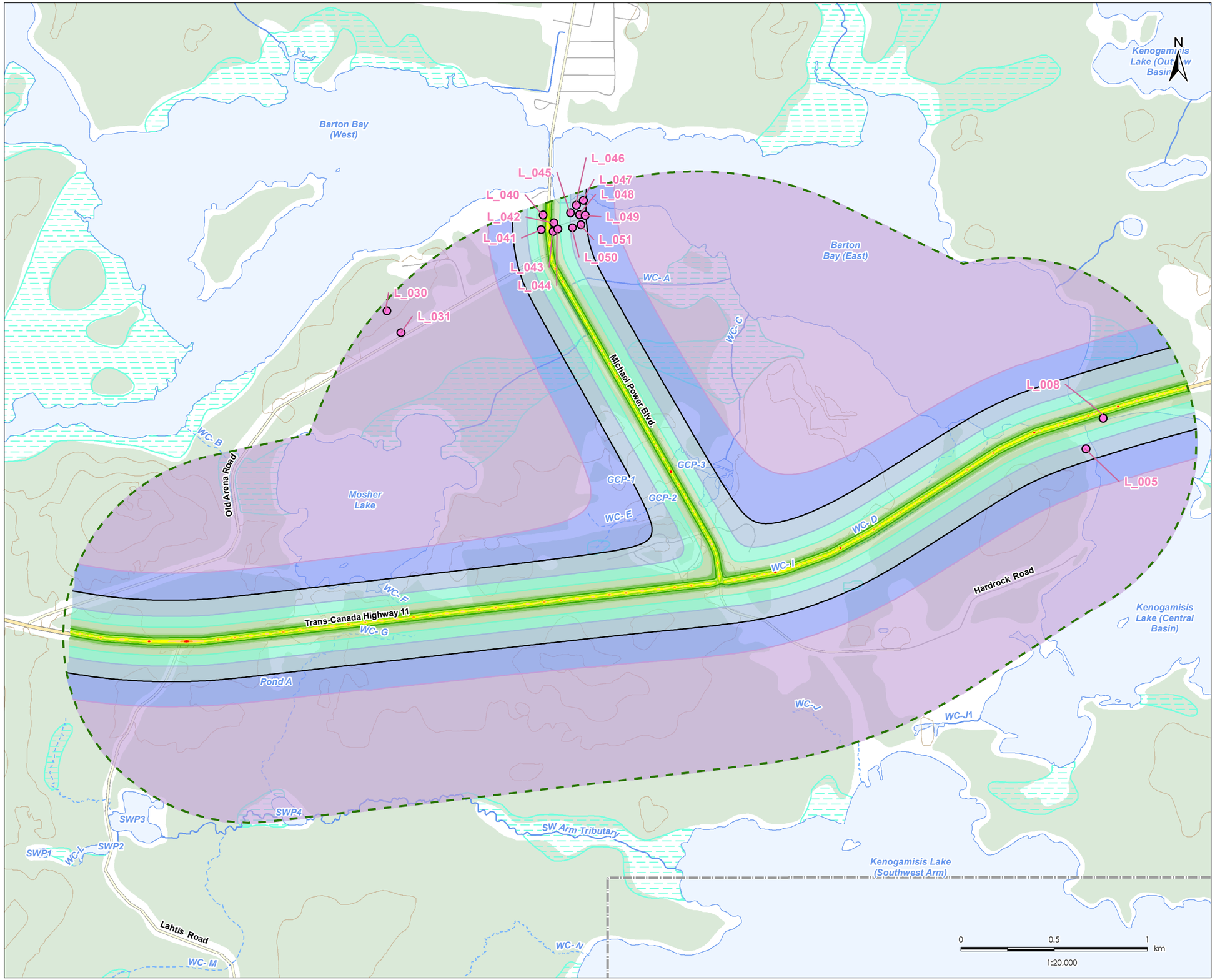
Figure No.

3

Title

Equivalent Sound Level Contours - Baseline 2015

W:\active\60960865\drawing\MXD\EA\Noise\Agency\TrafficNoise_Memo\160960946_Fig_3_Baseline_Impact.mxd
Revised: 2015-05-11 By: dharvey



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Revised: 2015-05-11 By: dharvey

Stantec

Legend

Acoustic

- 1km Setback
- Point of Reception Location

Sound Level Contours (dBA)

- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85

Existing Features

- Contour Line (10m intervals)
- Highway
- Major Road
- Local Road
- Watercourse- Permanent
- Watercourse- Intermittent
- Municipal Boundary
- Wetland, Unevaluated
- Waterbody
- Wooded Area

Notes

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Client/Project

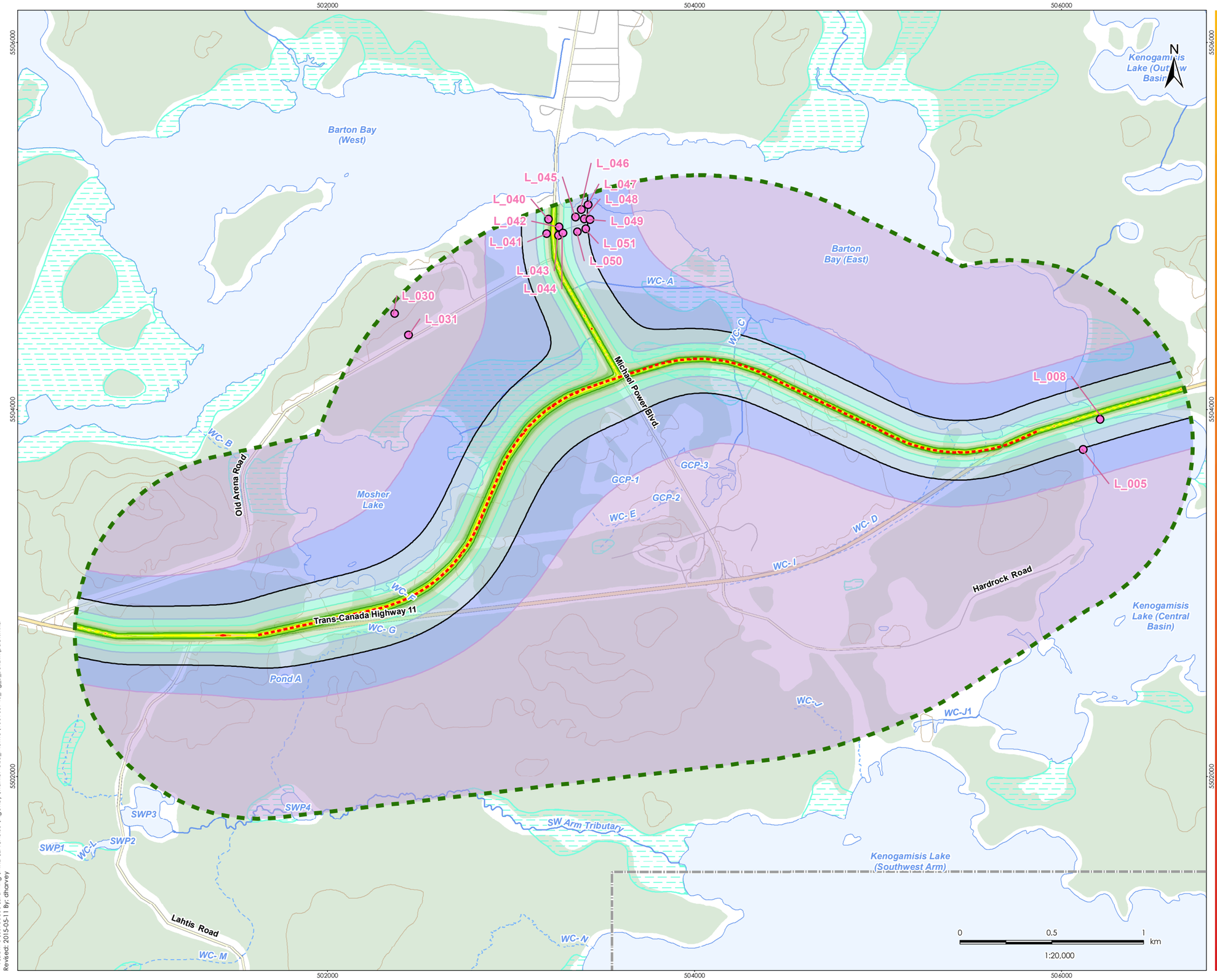
Premier Gold Mines Hardrock Inc
Hardrock Project

Figure No.

4

Title

Equivalent Sound Level Cotours - Future No Build (2028 Ambient)



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Revised: 2015-05-11 By: dharvey

Stantec

Legend

Acoustic

- 1km Setback
- Point of Reception Location
- Proposed Highway 11 Realignment

Sound Level Contours (dBA)

- 35
- 40
- 45
- 50
- 55
- 60
- 65
- 70
- 75
- 80
- 85

Existing Features

- Contour Line (10m intervals)
- Highway
- Major Road
- Local Road
- Watercourse- Permanent
- Watercourse- Intermittent
- Municipal Boundary
- Wetland, Unevaluated
- Waterbody
- Wooded Area

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Client/Project

Premier Gold Mines Hardrock Inc
Hardrock Project

Figure No.

5

Title

Equivalent Sound Level Contours Future Build (2028)