M E M O

TO: Mai-Linh Hunyh, Canadian Environmental Assessment Agency
Ann Riemer, Saskatchewan Ministry of Environment
FROM: Ethan Richardson, Shore Gold Inc.

DATE: March 26, 2014

Response to Star-Orion South Diamond Project – Federal Environmental Assessment Federal Information Request (December 18, 2013)

This Memo provides responses to Round 4 Federal Comments received by Shore Gold Inc (Shore) from the Canadian Environmental Assessment Agency on December 18, 2013.

The questions are reproduced below for reference, followed by responses.

Question 1

a) Confirm whether the direct effects on JSCN trapping and mitigations for these effects are described in section 6.4.3.4, page 6-130 of the REIS.
b) What are the indirect project effects on JSCN trapping from displacing trappers to other zones of the fur conservation area caused by the footprint of the Project? Would these effects be mitigated, and if so, how?

Response 1(a)

Potential direct effects on Trapping are described in Section 6.4.3.4, page 6-130 of the EIS. As JSCN members manage all trapping in the Fort à la Corne forest (FalC), this Section, along with the document referenced above, describe the potential effects and mitigation for these effects on JSCN Trapping.

Response 1(b)

Potential indirect effects on JSCN trapping from displacing trappers to other zones of the fur conservation area may result in increased trapping pressure on furbearers and increased density of trapping in Zones outside of the inaccessible area which could lead to resource use conflicts. In a meeting held in November, 2007, members of the JSCN Trappers Association commented that they "would make room" for any displaced trappers from the area of the Project Footprint in other trapping Zones. As such, it is reasonable to assume that trapping pressure and density may increase slightly in areas outside of the Project footprint. Current and recent trapping activity has been limited as shown in the Provincial records (Table 1(b)), potentially by low fur prices (Calliou 2011) and potentially by access to other trapping areas near Hudson Bay (Calliou 2011). As such, it is reasonable to assume that displaced trappers from the Project could be accommodated in the other Zones without affecting furbearer population or creating resource use conflicts among trappers. Any potential indirect effects would be mitigated through Shore's commitment to compensate for direct trapping losses, which could be provided directly to the JSCN Trappers Association for management, pending discussions with JSCN, so that any indirectly affected trappers would benefit.

Table 1(b)- Fur Harvest Statistics, Fur Conservation Area P-085 Fort à la Corne

Period		**Number of Animals**	**Value ($)**
1999	2000	106	1,110
2000	2001	103	2,118.21
2001	2002	16	460
2002	2003	129	2,964.14
2003	2004	71	563.84
2004	2005	n/a	n/a
2005	2006	102	3,674.94
2006	2007	89	873.63
2007	2008	26	253.08
2008	2009	31	623.02
2009	2010	-	no sales reported
2010	2011	-	no sales reported
2011	2012	-	no sales reported
2012	2013	-	no sales reported

Question 2.

Fisheries and Oceans Canada (DFO) cannot assess the effects of the project (i.e. fish habitat losses) associated with the construction of the intake without knowing the losses of fish habitat related to this component of the Project.

a) What is the physical disturbance associated with the intake footprint and construction method for the structure (i.e. isolation/cofferdam/sheet piling, etc.)? The Fish Habitat Compensation Plan should be updated to include these calculated fish habitat losses.
b) Provide a description of design considerations that will allow the water intake to be completely shut down during periods of low Saskatchewan River flows.
c) Provide a plan to incorporate monitoring in water intake design, including sweeping and approach velocities, fish entrainment and impingement, and fish presence in the chamber inlet.
d) Section 2 of the Intake Description document referred to above notes that the raw water intake would have an "*operational life of approximately 13 years (or longer, if needed) throughout the duration of the project*". Clarify what circumstances would require the intake to operate past 13 years.

Response 2(a)

The construction method for the structure is the same as is described in Appendix 6.3.1-B in the REIS, as the diffuser and the intake structure will be constructed simultaneously. From the FHCP: "To accommodate work within the channel during the installation of the diffuser, it is proposed that a vertical sheet pile or caisson coffer dam will be installed by barge. There will be an earthen access berm connected to the coffer dam by an earthen coffer dam segment that is parallel to the flow (Shore 2012; Appendix 6.3.1-B, Figure 1)".

From Section 2.1 of the above referenced document, the intake itself is 25 m long and 4 m wide, resulting in a disturbance of 100 m^2. From Section 2, two 675 mm water lines (with an approximate total width of 2 m including trenching) will be installed 150 m into to River, which results in s disturbance of 300 m^2.

The area of the coffer dam was estimated at 3,250 m^2 in order to construct the 135 m long diffuser plus pipeline. With the addition of the 150 m intake line parallel to the diffuser (with the pier intake oriented perpendicular to the intake line as shown in Figure 1 of *Shore Response to DFO#IR10 and TCIR#3- Intake Description.pdf)* the estimated dimensions of the coffer dam are 24 m wide for the first 100 m from shore (2,400 m^2), with an increase in width to 30 m for the last 50 m (1,500 m^2) to accommodate the intake for a total area of 3,900 m^2.

As a result of constructing the water intake, the total increase in habitat affected is 950 m^2 as compared to the area first described in the FHCP. All of this increase is temporarily affected. Table 6 from the FHCP is updated below, with the revised areas included.

Table 6: Summary of Loss and Gain in Habitat

Location	**Type of Impact**	**2013 Area (m^2)**	**2014 Revised Area (m^2)**	**Temporary or Permanent**	**Lifespan of Impact**
East Ravine	Star Pit and Culvert	-76,103	-76,103	Permanent	Permanent
Duke Ravine	Culvert	-140.8	-140.8	Temporary	~25 Years
101 Ravine	Culvert	-267.5	-267.5	Temporary	~25 Years
Saskatchewan River	Access Berm and Coffer Dam	-3250	-3900	Temporary	0.3 Years
Saskatchewan River	Diffuser Pipeline	-450	-450	Temporary	~25 Years
Saskatchewan River	Intake structure and pipeline	na	-300	Temporary	~25 Years
Pehonan Creek	Revegetation and upgrades	68,833	68,833	Potentially Permanent	25 or more years
Proposed Backwater Channel	Creation of new, high quality habitat	10,000+/-	10,000+/-	Permanent	Permanent
Total Loss		-80,211	-81,161		
Total Gain		78,833	78,833		

Response 2(b)

Project water management is designed to provide pant water by recycling between 0 and 100% of the process water from the Processed Kimberlite Containment Facility (PKCF). In the 0% scenario, all plant water would be sourced through the intake structure in the Saskatchewan River. In the 100% recycle situation, all plant water would consist of process water from the PKCF. This flexibility allows for water management to accommodate environmental variability. For example, during low flows in the Saskatchewan River, intake pumps would simply be shut off, and water pumped from the PKCF to the plant through the third, redundant water/tailings line leading from the PKCF to the plant. As only approximately 10,000 m3/day of make up water is required, the PKCF is expected to hold sufficient make up water for over 150 day of operation.

Response 2 (c)

The proposed water intake screen opening dimensions are designed in accordance with best practices (e.g. Katopodis, 1992) to prevent fish impingement or entrainment, including orienting the intake screens parallel to the river flow to minimize approach velocities. Based on previous experience, supplementary monitoring has not been required for structures that are designed to avoid harm to fish in accordance with these best practices. Detailed design of the water intake will incorporate provisions for removal, inspection, and cleaning of the screens as required. Monitoring of the intake during construction and operation will be conducted as required by appropriate authorizations.

Response 2 (d)

The current Project contemplates the use of the intake structure for approximately 13 years until mining at the Star kimberlite is complete. Possible circumstances that could lead to operation of the intake past 13 years may include discovery of additional minable resources within the Star pit thus extending the life of the Project, or if mining efficiencies are different than described in the Feasibility Study. The water intake would remain in place until closure of the Site and used to actively fill the Star pit. This active filling would be suspended during low flows to minimize potential effects on Saskatchewan River flow.

Question 3

In order to reproduce existing site conditions and perform predictive simulations that underpin estimates of dewatering requirements, capacity of the diffuser system, and predict potential environmental effects associated with groundwater drawdown (such as wetlands and fish habitat), Natural Resources Canada (NRCan) is of the view that revisions to the conceptual groundwater flow model are required. NRCan reviewed the November 1, 2013 SRK Memorandum in which three conceptual groundwater flow model scenarios were investigated. NRCan is of the opinion that the choice of parameters assigned to the hydrogeological units did not result in an improved model calibration for any of the scenarios considered.

a. Taking into account NRCan's review comments and suggestions, revise the groundwater flow model by recalibrating it to observed site conditions, including re-evaluating the recharge estimate as part of the revised model.

b. Based on this re-calibrated model, re-assess the anticipated effects on:

- i. Project operations, such as dewatering requirements and capacity of the diffuser system;
- ii. Local wells (water quantity and quality);

iii. Surface water quality and flow, including providing an updated water balance model and end-of-pipe effluent quality predictions;
iv. Wetlands; and
v. Fish habitat, particularly on the effects of drawdown on fish habitat during operations and post-closure on Duke Ravine, English Creek, 101 Ravine and the Saskatchewan River.
vi. If these effects are greater in magnitude than predicted, determine whether any of these effects will further affect traditional land use and human health.

c. Describe the degree of confidence/level of uncertainty related to the numerical groundwater flow model.

d. Describe the strategies that will be used to manage the risk associated with the level of uncertainty linked to the groundwater modeling, including:

i. Identification of the risks associated with uncertainty in estimating dewatering requirements and capacity of the diffuser system, and risks associated with uncertainty in the environmental effects assessment for components that rely on the groundwater flow model outputs (listed in 3(b)).
ii. Identification of proposed measures (monitoring and contingencies plans) that will be in implemented to reduce the risks identified above.
iii. After taking into account the proposed mitigation measures outlined in the EIS, and the monitoring and contingencies measures proposed, provide a summary of the potential consequences and probability of occurrence of each risk.

Response 3(a)

SRK has evaluated over 66 scenarios incorporating NRCan’s comments with a range of parameters selected for NRCan’s suggestions based on measured data and professional judgment. Despite every effort to incorporate NRCan’s suggestions, as described in information presented to CEAA in November 1, 2013, November 27, 2013 and January 27, 2014, in NRCan’s opinion, these additional scenarios “did not result in an improved model calibration.” Shore and SRK are of the opinion that the existing National Instrument 43-101 compliant groundwater model, with the associated sensitivity analysis, provides sufficient information to enable determination of potential environmental effects, and to assess the risk of modeling uncertainty to the Project.

Response 3(b), (c) and (d)

In light of the differences in professional opinion between SRK and NRCan, the potential effects on valued components linked to groundwater effects have been re-examined on a risk basis in the attached Memo (Shore Gold March 26 GW Response 3(b)(c) and (d).pdf).

Question 4.

Provide a citation from the Fish Habitat Compensation Plan where this variable compensation component is described.

Response 4

The variable component is described in Section 5.0 (page 35) of the Fish Habitat Compensation Plan, and is reproduced below. The current backwater channel is sized at 10,000 m^2, but could be varied to accommodate larger (or smaller) habitat replacement. Note that Shore is committed to low flow supplementation during operations and for a minimum of 20 years post closure to avoid any additional potential effects on fish and fish habitat as described in the response to 3(b)(c) and (d). The risk that this contingency will be required has been described as low in the attached response to 3.

> ### 5.0 Contingency
>
> A minor contingency project that will result in some fish habitat improvement is the English Creek Crossing at Division Road. It has significant erosion issues associated with it which results in deposition of a large amount a sand and material from the roadbed into the Creek every year. The roadbed and approaches of Division Road, at both approaches to the English Creek Bridge will be stabilized using geotextile, clean rock and the construction of drainage channels into the forest rather than into the creek. This will result in a significant decrease of the annual sediment deposition into English Creek and will also stabilize Division Road.
>
> The main contingency included in the FHCP is the flexibility associated with the construction of the backwater channel near the mouth of Pehonan Creek. There is a relatively large, flat and uniformly level and cleared area to the south of Pehonan Creek near the Saskatchewan River. As shown in Figures 3 and 10, the area is well over a kilometer long and 100 to 200 meters wide so there is adequate room for construction of a larger channel or additional channel after the construction of the initial channel. This flexibility provides a reliable contingency if needed.
>
> The factors that will be considered in determining if the contingency is required are discussed in the monitoring section (section 4.0) above.

Please do not hesitate to contact me with any questions or comments about the attached information.

Sincerely,

<original signed by>

Ethan Richardson, M.Sc., P.Eng.
Environment Manager, Shore Gold Inc.

M E M O

TO: Mai-Linh Hunyh, Canadian Environmental Assessment Agency
Ann Riemer, Saskatchewan Ministry of Environment
FROM: Ethan Richardson, Shore Gold Inc.

DATE: March 26, 2014

Response to the December 18, 2013 Information Request 3(b) (c) and (d)

Background

The hydrogeological model for the proposed Star-Orion South Diamond Project Environmental Impact Statement (EIS) was originally submitted for Federal review in 2010, where Natural Resources Canada (NRCan) and the Province of Saskatchewan raised questions regarding the calibration of the model to measured groundwater levels. The model was revised based on results from a 20-day pump test using a prototype dewatering well. The updated model was resubmitted in 2011 in the Revised EIS (REIS). Since that time, discussions between Shore, SRK Consulting, and NRCan have occurred in an attempt to further improve calibration of the model to measured water levels. Incorporating feedback from NRCan, SRK evaluated 66 separate scenarios, considering many factors suggested by NRCan as described in submissions to NRCan in October 2013 and January 2014 such as:

1. the potential presence of higher permeability zones at the contact between the Colorado Shale and the lower till;
2. the potential for higher permeability zones within the till units;
3. the potential for higher permeability zones around the kimberlites allowing better connection between the Mannville formation and the till units;
4. increasing recharge rates from precipitation;
5. introducing regional variability into the aquitard units; and
6. use of a constant head water table upper boundary condition to estimate recharge.

Each of these suggestions were carefully considered by SRK within the context of measured water levels, field measurements of hydraulic parameters, lab testing (including physical and chemical analysis), and the complex stratigraphy and morphology of the geological units. In some cases, the various information sources suggested conflicting conclusions (e.g., potential presence of higher permeability zones at the contact between the Colorado Shale and the lower till was supported by chemical tracer data, but not supported by regional drilling or geology). In these cases, SRK relied on profession judgment based on a weight of evidence approach. SRK also re-evaluated the hydraulic conductivity values for the various geological units. SRK considered all of these factors to generate 66 separate model runs for evaluation. In the opinion of SRK, these modifications improved model calibration to measured water levels. On February 26, 2014, Shore received guidance from NRCan that "the modeled head data does not achieve a satisfactory calibration with the measured head data." NRCan specifies that the "model consistently shows a systematic overestimation of heads in wells screened in lower conductivity units including the Colorado Shale and the upper and lower tills." Considering these differences of professional opinion, further discussion of risk management, monitoring and mitigation was initiated.

In NRCan's February 26 correspondence, NRCan suggested that "it may be productive to engage in further discussions with Fisheries and Oceans Canada, Environment Canada, and the province of Saskatchewan" about the predictions of potential environmental effects resulting from use of the groundwater model, as further discussed below. This suggestion also follows CEAA's December 18, 2013 information request 3(c) and (d) reproduced below:

"c. Describe the degree of confidence/level of uncertainty related to the numerical groundwater flow model.
d. Describe the strategies that will be used to manage the risk associated with the level of uncertainty linked to the groundwater modeling, including:
    i. Identification of the risks associated with uncertainty in estimating dewatering requirements and capacity of the diffuser system, and risks associated with uncertainty in the environmental effects assessment for components that rely on the groundwater flow model outputs (listed in 3(b)).
    ii. Identification of proposed measures (monitoring and contingencies plans) that will be implemented to reduce the risks identified above.
    iii. After taking into account the proposed mitigation measures outlined in the EIS, and the monitoring and contingencies measures proposed, provide a summary of the potential consequences and probability of occurrence of each risk."

Hydrogeological Modeling

Discussion of the groundwater model has been ongoing throughout the review process (see requests and responses contained in Supplemental Information Request NRCan #5). The local geology is a complex mix of glacial and volcanic lithologies, thus creating difficulties for modeling, despite the large amount of local and regional data considered (e.g., over 120 water level observations are included in the model). These difficulties are evident in the calibration of the model to baseline conditions, which has ultimately led to differences in professional opinion between NRCan and SRK regarding the model. Note that the REIS model calibrates well to transient groundwater conditions (as shown during the 20 day pump test). This is important to note as, transient conditions exist throughout operations and closure of the Project.

Considering NRCan's views on the calibration of the existing hydrogeological model to baseline conditions, Shore proposes to submit the following to Fisheries and Oceans Canada, the Saskatchewan Water Security Agency, and the Saskatchewan Ministry of Environment:

1. Provide a full update of the model during detailed design, incorporating any new information gathered during this phase and provide updated impact predictions to determine the risk that impacts may be different than presented in the Revised Environmental Impact Assessment (REIS);
2. Update the model during construction and update impact predictions incorporating information obtained from installation of the dewatering system and excavation of the Star pit overburden;
3. Re-evaluate and update the model 3 months, 6 months and 12 months after start up of the pit dewatering system, incorporating measured data;
4. Re-evaluate and submit groundwater modeling results annually thereafter.

All models dependant on inputs from the hydrogeological model will also be updated (i.e., water balance and water quality model).

Potential Impacts to Potable Groundwater Wells: Drawdown

Model Variability

The estimated range of variability in drawdown was conducted in the REIS by increasing and decreasing the vertical hydraulic conductivity of the shale, clay and till units (Appendix 5.2.7-A) by a factor of 3. This factor was considered appropriate for sensitivity analysis to demonstrate a 'worst case' scenario based on data collection and the role of the confining units (aquitards) within the hydrogeological system. By increasing the conductivity of the shale and aquitard units, drawdown in the Mannville formation resulting from pit dewatering would be able to propagate more rapidly to the surficial aquifers, thus increasing the areal extent of potential impacts. These data are presented in Figures 37 and 38 of Appendix 5.2.7-A of the REIS.

Shore understands that one of NRCan's concern with the groundwater model is that there may be higher conductivity zones within the till units or at the shale-till contact that may allow for horizontal propagation of drawdown. This horizontal propagation is roughly paralleled by the sensitivity run in Appendix 5.2.7-A, and could be considered a worst case surrogate should a high conductivity zone exist above the shale. Changes to the hydrogeological system are driven by the large dewatering effort within the Mannville formation for the Project Case. At baseline, the Mannville aquifer is under pressure, confined by the Colorado group shale (i.e., the Mannville aquifers piezometric surface is approximately 180 m above the elevation of the formation). In the Project case, the drawdown cone of the Mannville extends well beyond the modeling domain, essentially under draining the entire regional system as a high conductivity layer. Regional effects on surficial aquifers must propagate through the Colorado group shale aquitard (which is extremely tight and water moves very slowly through it). NCan's concern is that they believe the measured heads and the radioactive tracer data indicate a second 'drain layer' at the Shale-till interface (which has not been observed as a regional feature in core drilling), which, if dewatered, would act to spread out effects, much like the under draining by the dewatered Mannville.

Increasing the ability of water to move from the Mannville directly to the till (by increasing vertical conductivity by a factor of 3 in the aquitard units) effectively creates a regional drain unit. As such, this scenario roughly recreates the effects of a till-shale drain and is predicted to be a worst case scenario for risk assessment.

Within Section 6.2.6 (p. 6-128) of the REIS, AMEC examined the sensitivity runs as part of their determination of effects, and stated "Using the base case, the predicted drawdown in those wells tapping the lower till due to dewatering of the proposed pits may be in the order of 20 m for those south of the river, and less than 15 m for those north of the FalC forest. These conclusions do not change substantially for the other model variants."

AMEC also comments on the model sensitivity regarding shallow well on Page 6-128 of the REIS: "The predicted impact to the shallower wells completed in the upper till is shown in Figure 6.2.6-8 which shows drawdowns in the model domain of generally between five and twenty metres in areas beyond the FalC forest boundary, mostly in areas to the north and east of the Project site. This does not change substantially when higher or lower vertical hydraulic conductivity values are modeled for the Colorado Shale."

Note that, within SRK's 66 model runs, improvement in calibration within the low conductivity units could be achieved by lowering the conductivity in the aquitard units as opposed to increasing the conductivity as was done in the sensitivity analysis. The 66 runs also illustrate that the confining layers have the greatest effect on model calibration.

The existence of a high conductivity zone above the Colorado Group Shale is uncertain. Extensive drilling in the Local Study Area (LSA) has not identified a continuous, pervasive feature that could act as a drain above the shale. Clifton Associates (See NRCan #5) described the sheared/smeared zone of the upper Colorado as an unlikely source of higher conductivity. However, head measurements at the contact zone, as well as observations of radioactive tracer movement suggest the possibility of such a zone. SRK attempted to model this feature in October 2013, and concluded that they were unable to introduce sufficient transmissivity (i.e., unit thickness times conductivity) in this feature to noticeably improve calibration.

Monitoring and Mitigation

Within the REIS, Shore has committed to monitoring levels in regional wells, and to supplementing water supply as appropriate (e.g., well improvements, alternate water supplies) on a case by case basis should impacts to wells occur. Shore has also committed to a local and regional groundwater monitoring program consisting of nested piezometers to anticipate effects and provide additional information to the groundwater model. Within the REIS (Section 6.2.7, page 124), AMEC states "However, while the model variants affected water levels and the discharge quantities, they did not suggest a change in the mitigation strategies required to address these concerns."

Specific monitoring commitments include:

- Establish a network of groundwater monitoring wells consisting of standpipe/vibrating wire piezometers. Five nests of piezometers (with monitoring in each geological unit, i.e., surficial sand, confining clay, upper till, lower till, Colorado group shale and Mannville formation) will be established, with four positioned within the predicted drawdown cone north, east, south and west of the Project, and one nest outside the drawdown cone in analogous environmental conditions to identify seasonal and climate variations;
- Establish surficial standpipe piezometers in the surficial sand near area watercourses as part of the stream flow monitoring program and wetland monitoring;
- Groundwater level monitoring within the immediate project area (dewatering system pilot holes and seepage monitoring);
- A regional program of water level monitoring in private wells will be commissioned; The program may utilize existing private wells for monitoring, or may drill new dedicated, strategically located, monitoring wells. Approximately 10% (or about 50) wells will be initially included in the monitoring;
- collection of climate, precipitation and snow pack data from established monitoring stations;
- The monitoring will continue for at least two decades after pumping ceases, and will continue until a clear recovery trend is established after mine closure.

Existing mitigation and monitoring is appropriate to manage risk associated with model prediction, however the areal extent of monitoring could be increased to ensure that sufficient baseline information is collected. Mitigation for potential effects on wells include:

- providing additional above ground storage for water;
- lowering the pump setting or by the replacement of existing pumps with more efficient high-lift pumps;
- providing alternative water supplies; or
- drilling new water supply wells.

Model Variability and Assessment of Risk Adjusted Residual Effects

Should a high conductivity zone create a pathway for horizontal propagation of drawdown, then the areal extent of the potential effect could increase, the magnitude of effects may increase, and consequently the number of potential affected wells could also increase. However, based on the additional 66 scenarios developed by SRK, vertical conductivities in the till and clay layers are likely lower than what was modeled, and therefore will further limit the movement of water from surface and control the areal extent of drawdown. Lower conductivities in the regional shale are also supported by Hendry and Schmelling (see responses to NRCan #5). As such, it would be more likely that increased effects may be seen in lower geological units as compared to upper or surficial units.

Considering the discussion above, the probability that modeling effects would be greater than predicted are low (Table 1). Magnitude would depend on where each well was situated, with deeper wells potentially experiencing more drawdown than surficial wells due to confining layers, but may be moderate before implementation of mitigation. After mitigation, the residual magnitude would be low. A horizontally transmissive zone, if present, could increase the areal extent of effects within the lower till. AMEC concluded that the number of potentially affected wells did not change substantially when considering the sensitivity runs. Areal extend within the REIS for this potential effect is Regional, and would not change based on assessment of the sensitivity runs. Mitigation proposed in the REIS is appropriate to account for any modeling uncertainty, and includes commitments listed above.

Table 1. Risk Assessment Matrix for Regional Wells

Receptor	**Direction**	**Probability of Effect Being Different than Predicted**	**Potential for Change in Magnitude**	**Potential for Change in extent**	**Is mitigation appropriate ?**	**Residual Change in Magnitude**	**Residual Risk Rating**
Deep wells in the lower till	Adverse	Low	Moderate	Low	Yes	Low	Low
Wells in the upper till	Adverse	Low	Low	Low	Yes	Low	Low
Wells in the surficial sand	Adverse	Low	Negligible	Low	Yes	Negligible	Low

Considering the low residual potential change in magnitude, and the low overall risk rating, the conclusions in the EIS do not change, and the risk adjusted residual effect of dewatering on wells remains "Not Significant" (Table 6.2.6-4 in the REIS).

Post Closure

Groundwater related potential effects were assessed post closure for all valued components, as groundwater effects are predicted to peak approximately 10 to 20 years post closure. As such, the assessment in the REIS, and the discussion of risk, apply directly to the post closure phase.

Discharge Water Quality

Model Variability

NRCan identified the possibility that more water may be discharged from the Colorado Shale, the upper till and the lower till. The model predicts flow between approximately 5,000 m3/day to 16,000 m3/day, with an average flow of about 8,500 m3/day from these units. Of this inflow, 1.4% is predicted to originate from the Colorado group, and less than 6% is predicted to originate from the surficial sands. In comparison, Mannville water contributes between 80,000 and 120,000 m3/day. Considering the relatively small contribution of the surficial layers to the dewatering volumes, changes in volume produced from upper layers would have a small effect on the overall water quality.

Water quality parameters in the surficial groundwater systems are lower than parameters in the Mannville formation, (Table 3.8 Appendix 6.2.7-A in the REIS; full groundwater chemistry results are in Tables 5.2.7-10 and 5.2.7-11 in the REIS), as such, any increase in contribution from these formations would improve discharge water quality. Selected water quality parameters are summarized below in Table 2.

Table 2. Selected Groundwater Quality Parameters (From Table 5.2.7-10 and Table 5.2.7-11 of the REIS)

Geological Unit		**Surficial Sand**		**Till**					**Kimberlite**	**Colorado Group**	**Mannville**
Approximate depth		**6 m**	**6 m**	**29.6-97.5 m**	**34.8-108.5 m**	**53-61 m**	**78-88 m**	**90-96 m**	**234-249 m**	**186-207m**	**282 m**
Electrical Conductivity	µS/cm	440	382	1,020	2,200	482	736	6,780	5,380	4,920	6,391
Total Dissolved Solids (TDS)	mg/L	242	NA	666	1,590	272	431	6,000	3,110	2,790	3,957
Total Hardness	mg/L	226	NA	451	529	231	320	1,980	293	38	524
pH		7.2	7.95	8.04	8.06	8.8	8.4	8.1	8.6	8.8	7.8
Calcium	mg/L	69	59	105	118	63	87	374	63	9.1	135
Sodium	mg/L	8	4.2	66	339	16	43	1,090	1,010	1,040	1,223
Magnesium	mg/L	13	13	46	57	18	25	254	33	3.7	46
Potassium	mg/L	1	1	7.5	7.5	3.7	5.2	17	43	23	57
Bicarbonate	mg/L	289	240	495	673	305	443	606	443	428	475
Chloride	mg/L	9	7	2	41	2	2	296	1,250	1,210	1,623
Sulphate	mg/L	<6	5.4	190	630	9.4	44	3200	450	280	744
Sum of Ions	-	NA	330	912	1,870	424	661	5,840	3320	3,030	4,301
Aluminum	mg/L	<0.01	<0.0005	NA	NA	0.21	1.6	0.071	0.032	0.6	0.0076
Cadmium	mg/L	<0.0001	<0.0005	0.22	0.34	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00001
Chromium	mg/L	<0.0004	<0.005	<0.0001	<0.0001	<0.005	0.006	<0.005	<0.005	<0.005	<0.005
Copper	mg/L	0.0034	<0.0002	0.0006	0.0006	0.0043	0.0061	0.0019	0.0052	0.0015	0.0052
Iron	mg/L	3.25	0.001	0.0021	0.0011	4.1	4.2	13	9.1	2.3	0.28
Nickel	mg/L	0.0018	<0.0001	0.012	0.0083	NA	NA	NA	NA	NA	0.001
Phosphorous	mg/L	NA	NA	0.0028	0.0018	NA	NA	NA	NA	NA	0.055
Selenium	mg/L	<0.0002	0.0001	0.03	0.48	0.0004	<0.0001	0.0005	0.0001	0.0001	0.00025
Zinc	mg/L	0.069	NA	0.0005	0.0008	0.94	0.078	0.084	2	0.037	0.099

Monitoring and Mitigation

Changes in volume produced from the pit-dewatering system can be managed using the existing water management system. Recycling rates from the PKCF can be adjusted, and volumes pumped from the Saskatchewan River can be altered to accommodate increases or decreases in dewatering volume.

Changes to the water management since the REIS allow for recycling from 0 to 100% of the plant water requirements (approximately 57,000 m^3/day), and varying withdrawal from the Saskatchewan River accordingly. The pit dewatering system is predicted to produce up to 120,000 m^3/day. As such, the system can accommodate changes in flow of approximately 50% within the pit dewatering system. This built in contingency can be expected to maintain predicted water quality seasonally and accommodate changes in pit- flows.

Water quality will be monitored as described in the REIS and supporting information. Shore remains committed to ensuring that discharge water quality meets all requirements of the Fisheries Act.

Model Variability and Assessment of Risk Adjusted Residual Effects

A preliminary risk matrix is presented below (Table 3) for changes in water quality due to model uncertainty. No rating is assigned as the only possible direction for this potential change is positive. As such, there is no difference between the residual effects in the REIS and the risk adjusted residual effect. Also, this potential effect remains "Not Significant" after consideration of model variability.

Table 3. Risk Assessment Matrix for Water Quality

Receptor	**Direction**	**Probability of Effect Being Different than Predicted**	**Potential for Change in Magnitude**	**Rating**
Discharge Water Quality	Positive	Moderate	Negligible/Low	N/A

Post Closure

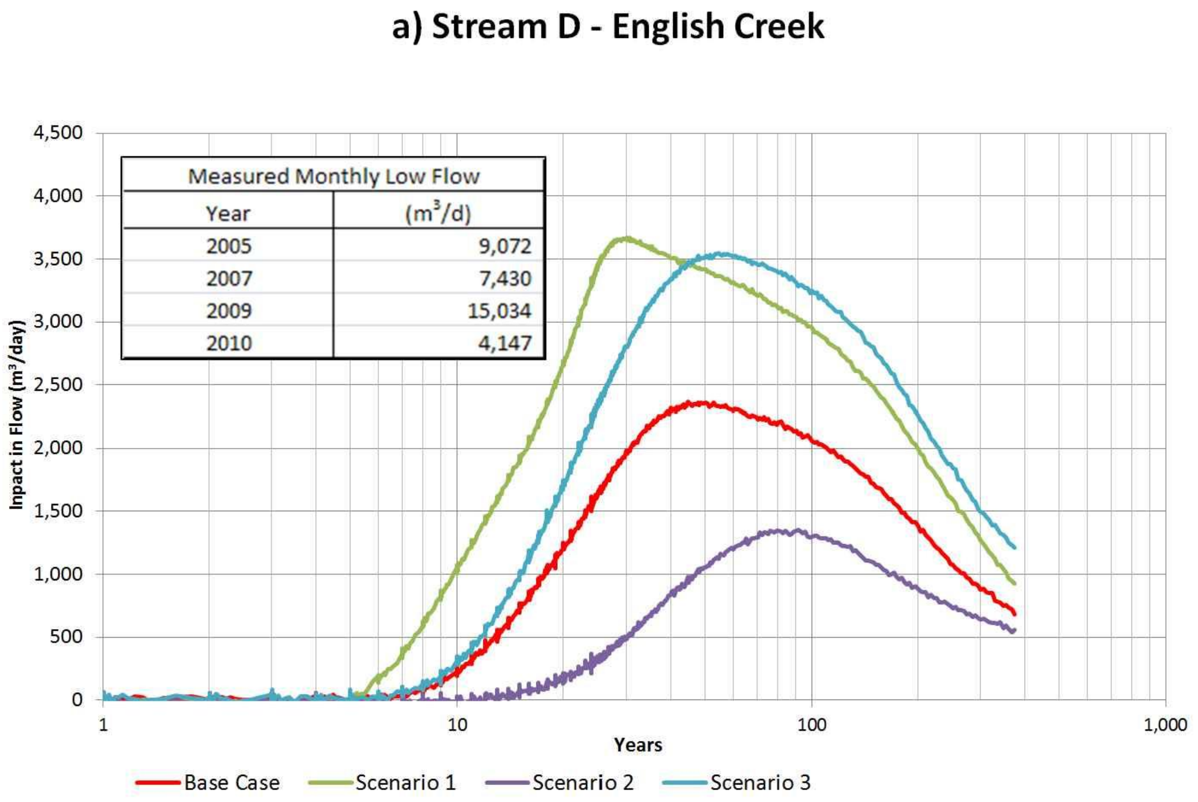
Groundwater related potential effects were assessed post closure for all valued components, as groundwater effects are predicted to peak approximately 10 to 20 years post closure. As such, the assessment in the REIS, and the discussion of risk, apply directly to the post closure phase.

Potential Changes to Surface Water and Fish Habitat: Drawdown

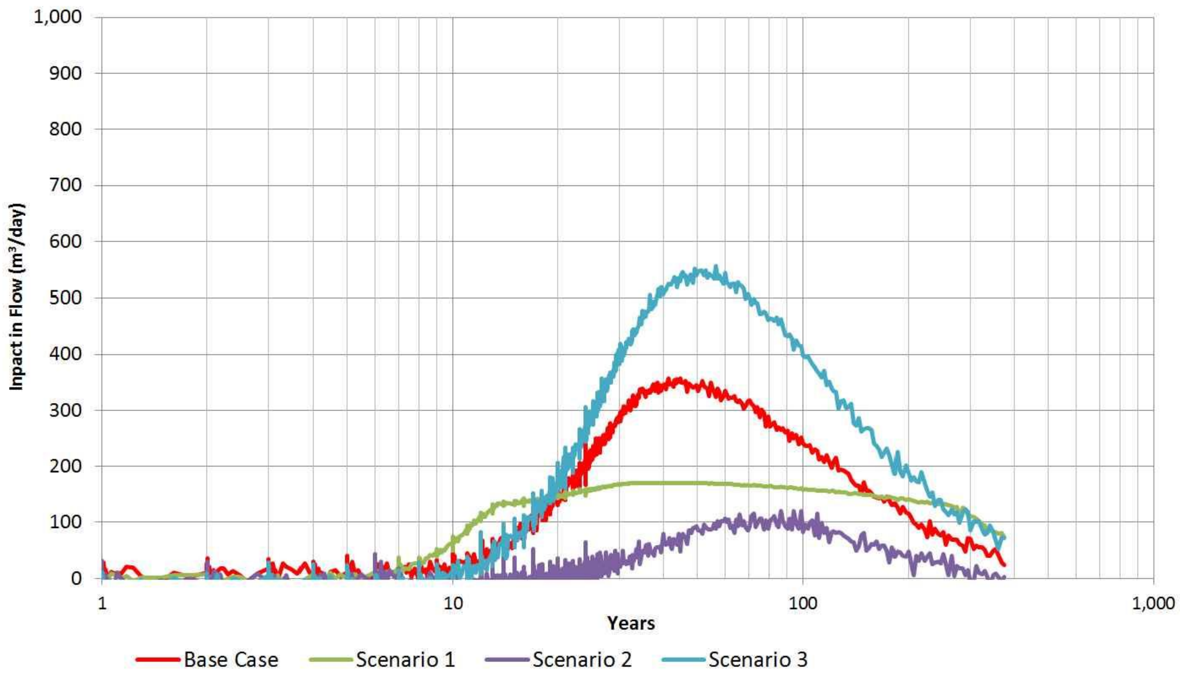
Model Variability

Potential changes in effects to fish habitat result from the same modeling uncertainties as described above in the section discussing potable water wells. NRCan identified a risk that surficial drawdown in the sand, clay, and upper till units may further reduce groundwater contribution to base flow in nearby creeks and ravines. Figure 43 (Appendix 5.2.7-A in the REIS) shows a range of potential impacts to flow in local streams based on scenarios increasing the hydraulic conductivity of the aquitard units by a factor of 3. Comparing scenario 1 in Figure 43 to the baseline, impact may be larger than baseline in creeks and ravines near to the Project (Figure 1(a) below), and less or equivalent to impacts predicted on creeks and ravines south of the Saskatchewan River (Figure 1(b) below).

Figure 1. Potential Changes to Stream Flow



Measured Monthly Low Flow	
Year	(m^3/d)
2005	9,072
2007	7,430
2009	15,034
2010	4,147


d) Stream F - South of Saskatchewan River

As discussed above, if a higher conductivity feature is present above the Colorado Shale, or if water is able to move more quickly through the geological formations than modeled, then the potential effects of pit dewatering may increase in areal extent, potentially affecting additional creeks and ravines. As shown in Figure 1 above, the potential for changes in stream flow south of the Saskatchewan River are less than that for streams north of the River as the Saskatchewan River Valley interrupts the direct connection of the surfical aquifers to the pits.

From Table 17 (Appendix 5.2.7-A of the REIS), the base case model predicts a decrease in 2,410 m3/day of groundwater discharging to the Saskatchewan River. In Scenario 1, this number increases to 5,080 m3/day. Without consideration of pit dewatering inputs, the maximum reductions in flow from Scenario 1 is 0.046% of the 10 year return period, seven day low flow (128 m3/s). Considering that the Project is expected to increase flow in the Saskatchewan River through management of between 80,000 m3/day and 120,000 m3/day, the maximum possible reduction in input is offset by increases due to mining.

Monitoring and Mitigation

Flow monitoring in local streams, including sites where baseline data exists (the 101 Ravine, , East Ravine, well as Caution Creek and English Creek), and new sites (Duke Ravine, Peonan Creek, Stream F and a reference watershed) will begin at construction. In order to account for model variability, flow in the two unnamed ravines east of English Creek, and the tributary to the Whitefox River (to the north of the LSA) will also be monitored at their discharge points. Shallow peizometers will be installed near the monitoring point and above the valley break within the surficial sand to measure water levels in these formations at each stream.

Shore Gold has committed to monitor and supplement flows in local creeks and ravines (English Creek, 101 Ravine, and Duke Ravine) to maintain or exceed 115% of base flow in order to avoid impacts to fish and fish habitat. This mitigation will be extended to any other potentially affected watercourses providing fish habitat so that impacts are avoided. Make-up water would continue to be sourced from the East Ravine diversion or the Saskatchewan River intake. This avoidance of additional potential effects will not change the proposed Fish Habitat Compensation Plan. Monitoring and mitigation by low flow supplementation would begin at construction and continue post closure for at least 20 years, until the site is returned to an appropriate state, or until the site can be returned to provincial control.

Model Variability and Assessment of Risk Adjusted Residual Effects

For fish and fish habitat, risk is summarized in Table 4. Model sensitivity indicates that stream flow could be affected, with greater potential effect on streams north of the Saskatchewan River as compared to south of the River. Probability of effects are considered low, as model runs conducted by SRK indicate improved calibration with lowering vertical hydraulic conductivities. Mitigation in the REIS avoids impacts to fish and fish habitat. During detailed design and construction, the groundwater model will be revised. Reduced stream flow resulting in reduction of fish habitat in adjacent streams will be addressed by flow supplementation so that base flow is maintained. In order to support these potential mitigations, Shore will commit to flow monitoring on additional ravines.

Table 4. Risk Assessment Matrix for Fish and Fish Habitat

Receptor	**Direction**	**Probability of Effect Being Different than Predicted**	**Potential for Change in Magnitude**	**Potential for Change in extent**	**Is mitigation appropriate?**	**Residual Change in Magnitude**
Streams identified in the EIS north of the Sask. River	Adverse	Low	Moderate	Yes	Low	Low
Streams identified in the EIS south of the Sask. River	Adverse	Low	Low	Yes	Low	Low
Other streams in the RSA	Adverse	Low	Moderate	Yes	Low	Low

Considering the low residual potential change in magnitude resulting from the commitment to supplement low flow, and the low overall risk rating, the conclusions in the EIS do not change. The risk adjusted residual effect of changes in flow remains “Not Significant”, with direct loss of fish habitat replaced in the Fish Habitat Compensation Plan.

Conclusions also do not change regarding potential effects on flow in the Saskatchewan River, as Project dewatering continues to add more water to the Saskatchewan River than is removed in all scenarios.

Post Closure

Groundwater related potential effects were assessed post closure for all valued components, as groundwater effects are predicted to peak approximately 10 to 20 years post closure. As such, the assessment in the REIS, and the discussion of risk, apply directly to the post closure phase.

Potential Changes to Wetlands: Drawdown

Model Variability

Model variability described in the fish and fish habitat section also affect potential changes in wetlands.

Monitoring and Mitigation

A wetland monitoring program will be established as part of the vegetation monitoring program, whereby species, abundance, and health will be surveyed at set locations.

Mitigation for potential effects on wetlands will result from flow supplementation in local streams, as most wetland ecosites are located within the upper most reaches of the Ravines and along the Ravine bottoms (see Figure 6.2.3-4 in the REIS). Discharge locations for flow supplementation on Duke Ravine and 101 Ravine would mitigate wetland effects on the upper reaches, while potential effects on English Creek would be mitigated by discharge at Division Road.

Monitoring and mitigation of effects to wetlands by low flow supplementation would begin at construction and continue post closure for at least 20 years, until the site is returned to an appropriate state, or until the site can be returned to provincial control.

Model Variability and Assessment of Risk Adjusted Residual Effects

Should drawdowns in the surficial sands be greater than predicted by the hydrogeolocial model, then there is potential for an increased area of potential effect. Within the RSA, there is the risk that potentially affected wetland areas could exceed 10% of wetlands in the RSA, thus leading to a high magnitude before mitigation. Increased drawdown would increase the likelihood of potential effects, thus reduce the uncertainty of effect. However, SRK's 66 scenarios demonstrated improved calibration by increasing inputs due to precipitation (thus reducing drawdowns in the surficial sand) and by decreasing the vertical conductivity of the surficial clay (thus reducing flows from the surface sands to deeper layers). As such, the probability of the effects being different than predicted in low, but the potential change in magnitude is high. Flow supplementation and replacement of wetland habitat at closure will mitigate some of these effects. The overall risk is summarized in Table 5 below.

Table 5. Risk Assessment Matrix for Wetlands

Receptor	Direction	Probability of Effect Being Different than Predicted	Potential for Change in Magnitude	Potential for Change in extent	Is mitigation appropriate?	Residual Change in Magnitude
Wetland vegetation types in the LSA	Adverse	Low	Low	Yes	Low	Low
Wetland vegetation types in the RSA	Adverse	Low	High	Yes	Moderate	Moderate

Section 6.3.2 of the REIS describes potential indirect effects of drawdown on vegetation, with the potential effects summarized in Table 6.3.2-10. For the LSA, considering the low risk rating, the risk adjusted effects assessment remains the same, and the potential effect remains “not significant”. For the RSA, the moderate residual risk rating increases the likelihood that the magnitude of effect may be ‘high’. However, the risk that the significance determination would change is mitigated by the probability that input from precipitation is likely underestimated, and by the fact that this potential effect in the RSA was given a low level of confidence (to account for model variability). Regional wetland monitoring (as described above) was recommended in the REIS to address this uncertainty. The need and justification for this monitoring is re-enforced by the risk assessment. As such, the potential effects of drawdown on wetlands in the RSA remains ‘not significant’ but with low confidence.

Post Closure

Groundwater related potential effects were assessed post closure for all valued components, as groundwater effects are predicted to peak approximately 10 to 20 years post closure. As such, the assessment in the REIS, and the discussion of risk, apply directly to the post closure phase.

Conclusions

All models contain inherent uncertainty. Based on the large amount of data points, the complexity of the geological system, the additional scenarios examined, and the sensitivity analysis conducted on the low permeability units, Shore believes that the model presents a conservative estimate of hydrogeological effects. Monitoring and mitigation commitments will further minimize uncertainty based on model predictions, and adaptive management during construction and early operations will allow for proactive implementation of mitigations if required.

Using Risk Assessment, Shore has evaluated the potential changes to the assessment of potential effects for valued components related to groundwater. On a risk adjusted basis, all potential effects remain “Not Significant” with low potential risk on all but one valued component. Moderate risk was identified on wetlands in the Regional Study Area, however this uncertainty/risk was already identified and accounted for in the REIS, and this potential effect remains “Not Significant”.

Please do not hesitate to contact me with any questions or comments about the attached information.

Sincerely,

<original signed by>

Ethan Richardson, M.Sc., P.Eng.
Environment Manager, Shore Gold Inc.

M E M O

TO: Mai-Linh Huynh, Canadian Environmental Assessment Agency
Ann Riemer, Saskatchewan Ministry of the Environment

FROM: Ethan Richardson, Shore Gold Inc.

DATE: April 10, 2014

Response to the Star-Orion South Diamond Mine – Federal Environmental Assessment Federal Information Request (April 8, 2014)

Shore Gold Inc. is pleased to provide response to the questions and clarifications provided on April 8, 2014 by the Canadian Environmental Assessment Agency (CEAA) regarding Shore's Round 4 responses. CEAA's questions are repeated below, followed by Shore's responses.

1. Page 3, Hydrologeological Modeling

The proponent commitment to providing updates of the hydrogeological model during detailed design, and 3, 6 and 12 months after start-up of the pit dewatering system and annually thereafter.

Clarify whether the hydrogeological model will be recalibrated to baseline conditions after incorporating measured data after start-up of the pit dewatering system.

Response to Question 1.

Shore will re-calibrate the hydrogeological model to baseline conditions after incorporating measure data collected during construction and after start up of the pit dewatering system.

2. Page 4, Monitoring and Mitigation (Potable Groundwater Wells)

The groundwater monitoring program does not reference results in groundwater flow modelling which may indicate locations where effects may be greater or of significant interest (e.g. monitoring in locations to address characterising groundwater heads in the formations between the Star pit and Saskatchewan River).

Should groundwater flow model updates show greater drawdown effects than predicted in areas of significant interest, will the groundwater monitoring program be adapted to consider additional monitoring in these areas? If so, explain how the program will be adaptive.

Response to Question 2.

The groundwater monitoring program will be adaptive to consider updated results of the groundwater flow modeling, which may indicate additional areas of interest that require monitoring. Changes (i.e., installation of additional monitoring locations/depths) will be considered after each recalibration exercise (e.g., during detailed design, and 3, 6 and 12 months after start-up of the pit dewatering system and annually thereafter) to ensure that appropriate data is collected. Changes in the monitoring program will be made with communication with Provincial and Federal Regulators, and consider input from Aboriginal and non-Aboriginal stakeholders as appropriate.

3. Page 6, Model Variability and Assessment of Risk Adjusted Residual Effects (Discharge Water Quality)

In the REIS, the quality of the pit discharge water was considered similar to that of discharge water from the exploration shafts which contained elevated concentrations of some metals, including nickel.

Discuss whether the discharge water quality from the exploration shafts could represent pit discharge as a possible risk factor in the risk assessment and mitigation planning.

Response to Question 3.

In the draft Environmental Impact Statement (EIS; 2010), exploration shaft water was considered to be similar to that predicted in the pit discharge. In the Revised EIS (2011), water quality modeling considered measured water quality and the detailed humidity cell/ metal leaching test (Section 5.2.3 of the REIS) data to predict in-pit water quality, as well as changes in water quality due to storage in the Processed Kimberlite Containment Facility (PKCF). As such, risks to water quality have been considered in the water quality model. Exploration shaft data does show elevated hydrocarbon levels, likely due to operation and maintenance of underground equipment. These data do highlight the importance of spill prevention, response and clean-up as part of the overall site management (see Sections 2 and 7.2 in the REIS).

4. Page 8, Monitoring and Mitigation (Discharge Water Quality)

The proponent commits to developing a water quality monitoring program and applying an adaptive management approach for the complete project lifecycle. During a teleconference held on March 14, 2014 between the federal review team and the proponent, the proponent indicated that it was committed to an Aquatics Effects Monitoring Program similar to those in place for diamond mines in the Northwest Territories.

Confirm whether an Aquatics Effects Monitoring Program will be in place for the Star-Orion South Diamond Program, when it will be created and implemented, and the proposed content.

Response to Question #4.

The proposed Star-Orion South Diamond Project (the Project) Aquatic Effects Monitoring Plan (AEMP) will be developed pre construction based on similar plans developed for diamond mines in the Northwest Territories (Golder 2013). The AEMP's goal is to monitor Project discharges to all aspects of the aquatic environment so that potential ecological risks can be identified, and appropriate actions can be developed to mitigate possible adverse effects. The AEMP will begin the first year of construction to obtain 4 additional years of pre-operation data and continue throughout operations. The AEMP will be reviewed and updated after construction, and every three years thereafter to conform with existing AEMPs and Environmental Effects Monitoring programs required by other mines and jurisdictions. The Revised Environmental Impact Statement identified a preliminary list of Valued Components related to the aquatic environment that will be incorporated into the AEMP:

1. Water quality, including metals, nutrients and dissolved solids in the effluent, surface water and sediments for the;
    a. Saskatchewan River; and
    b. Tributaries to the Saskatchewan River;
2. Water quantity (flow) in Tributaries to the Saskatchewan River;
3. Fish Habitat including availability of forage (e.g., invertebrates and other food sources);
4. Fish abundance and health; and
5. Fish use/consumption.

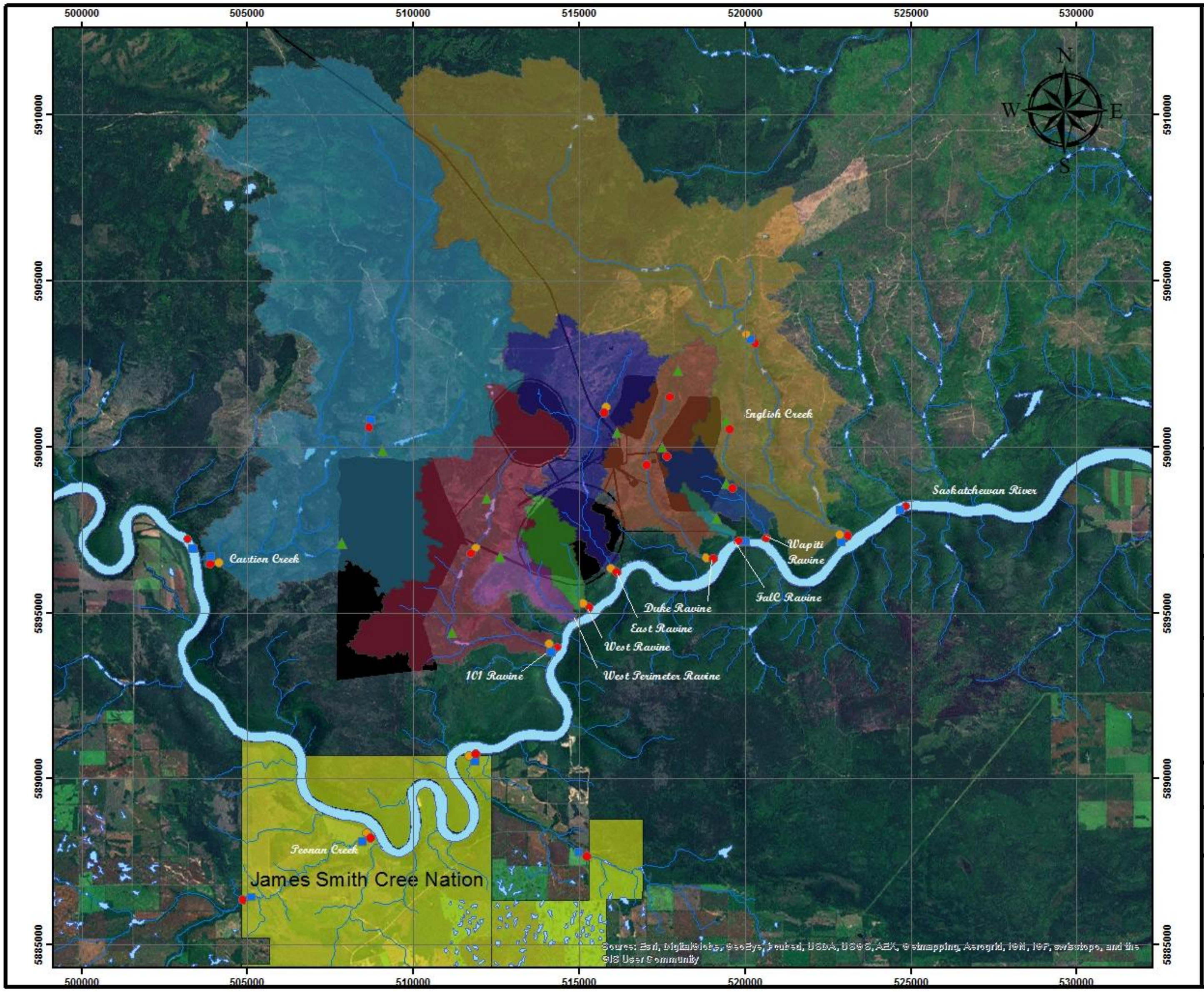
Section 7.4 of the REIS provides more detailed discussion of the specifics of each of the above. Within the AEMP, for each Valued Component, assessment endpoints and measurement endpoints will be based on information in the REIS and current of regulations, with consideration of input from stakeholders, regulators and Aboriginal groups. These endpoints will be further reviewed and refined at the conclusion of the construction period. Changes in assessment and measurement endpoints will then be evaluated within a framework with consideration of appropriate benchmarks to determine if changes can be attributed to Project activities (i.e., are there project related effects, and the ecological importance of the changes), and what management actions, if any, are required. Initial AEMP benchmarks will be based on CCME water quality objectives, Saskatchewan Surface water Quality Objectives, and measured baseline data (including the four year construction period). Traditional knowledge will be incorporated throughout the process.

Sample locations were selected in the REIS based on a reference-exposure sampling method. Locations are marked on Figure 7.4-3 (Revised October 2013; attached) with reference locations upstream of the Project on the Saskatchewan River, at Pehonan Creek and Stream F. Additional reference sites are planned up gradient of the Project on English Creek and Caution Creek. Predicted exposure sites include the mouth of the 101, East, Duke and Wapiti Ravines, and the mouth of English and Caution Creek. Two exposure locations are planned in the Saskatchewan River: one immediately downstream of the Project discharge, and one down River, past English Creek. These locations will be confirmed during detailed study design.

Sampling frequency is described in Section 7.4 of the REIS. During the four year construction phase, flow monitoring will be continuous, water quality sampling will be monthly, and fish, fish health, aquatic resources and sediment sampling will occur twice. Throughout operations, and at least one cycle post closure, flow monitoring will be continuous, water quality will be sampled monthly, fish population, health and aquatic resources sampling will be conducted every three years, and sediment sampling will be conducted every three years, beginning with year 1 of operation. Note that the REIS proposed sediment sampling every five years and fish sampling every two years. Frequency of sampling was changed to match up with the three year AEMP cycle. Sampling location and frequency will be examined after construction and every three years during operations.

Reference

Golder Associates. 2013. Diavik Diamond Mines Inc. Aquatic Effects Monitoring Program. Study Design Version 3.2. October 2013. Doc No. Rpt-1083 Ver. 0. 10-1328-0028/22000 Po No. D0156 Line 1.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Company:

Shore Gold Inc.

Project:

Star - Orion South Diamond Project

Water Monitoring Sites

Date: **October, 2013**	Analyst: **BD**	**Figure 7.4-3**
Projection: **UTM Zone 13**	QA/QC: **ER**	Datum: **NAD27**

References:

Base Data: Saskatchewan Geospatial Imagery

Water Data: GeoBase: National Hydro Network (NHN)

Aboriginal Land Data: GeoBase: Saskatchewan, Edition 2.42

Project Footprint Data: Shore Gold: AutoCad Shape File

Creator: Brian DesGagnes, 2013

5. Page 6, 12 & 13, Post Closure

Groundwater effects are predicted to peak approximately 10 to 20 years post closure.

Confirm whether this peak effect assumes the passive infilling of the pits or considers the active filling of Star pit and/or Orion South pit.

Response to Question 5.

Peak effects on groundwater are predicted to occur 10 to 20 years after closure assuming that no active pit filling is conducted. As Shore has committed to actively fill the Star pit at closure, peak effects are likely to occur closer to the operation period as pit infilling would mitigate local drawdown effects. As such, the analysis, and the timing of effects in the REIS, can be considered conservative.

6. Page 12 and 13, Potential Changes to Wetlands (Drawdown)

a) Flow supplementation is expected to mitigate drawdown effects on wetlands within the local study area. Section 6.2, page 6-40 of the REIS states *that a vegetation and wetland monitoring program would be initiated early in the construction phase of the Project to potentially enable prediction of long term changes with somewhat greater confidence than currently possible*. It further states that *it may then be possible to develop mitigation strategies*.

   What additional mitigation strategies could be implemented should flow supplementation not be sufficient to reduce drawdown effects on wetlands?

Response to Question 6(a)

Additional adaptive management strategies resulting from continued data collection could include: timing of flow supplementation to ensure functioning of vegetation communities reliant on variable flows; and, early adoption of progressive reclamation techniques to encourage replacement of wetland communities within site drainage structures. Note that BP18a, BP25 and BP 28 ELC types are expected in increase in area post closure (Table 6.3.2-1 in the REIS). However, specific additional mitigation strategies would depend on exact nature of measured Project effects and would be better determined at a later date.

b) An estimated 7% of the wetlands in the FalC forest are predicted to be affected by drawdown (Section 6. 3, page 6-56).

   What is the area and ecotype of affected wetlands that would be mitigated from flow supplementation within the local study area?

Response to Question 6(b)

The area and vegetation communities identified as potentially affected by drawdown that would be mitigated by flow supplementation is summarized in Table 6(b) below. The residual area of wetlands potentially affected, after flow supplementation, is 261 ha or 6% of the wetlands in the LSA.

Table 6(b) Residual Area of Potentially Impacted Wetlands after Mitigation by Groundwater Drawdown.

Vegetation Type	Descriptor	Post Reclamation Area in the LSA (ha)	Area Potentially Impacted by Drawdown (ha)	Area Mitigated by Flow supplementation (ha)	Residual Area Potentially Impacted (Ha)	% Residual Area Potentially Impacted by Drawdown in the LSA
BP18	Black spruce - tamarack - treed swamp	144	68	11	57	39
BP18A	Deciduous -mixedwood swamp	5	4	4	0	0
BP19	Black spruce - treed bog	1	0	0	0	0
BP23	Tamarack - treed fen	3	1	0	1	33
BP24	Leatherleaf - shrubby poor fen	0	0	0	0	0
BP25	Willow - shrubby rich fen	306	76	66	10	3
BP26	Graminoid fen	0	0	0	0	0
BP28	Seaside arrow-grass - marsh	134	2	2	0	0
	Other Wetlands (burn, harvest etc)	3,401	173	43	130	5
	Lakes and open water	374	79	16	63	17
Total		*4,368*	*403*	*142*	*261*	*6*

Shore Gold Inc.

MEMO

TO: Mai-Linh Huynh, Canadian Environmental Assessment Agency
Ann Riemer, Saskatchewan Ministry of Environment

FROM: Ethan Richardson, Shore Gold Inc.

DATE: May 30, 2014

Response to Federal comments on proponent response to federal information request filed on April 10, 2014 – Star-Orion South Diamond Project comments received May 28, 2014

Shore Gold Inc. (Shore) has reviewed the comments contained in the Canadian Environmental Assessment Agency's May 28, 2014 letter regarding pit discharge water quality, specifically the applicability of exploration shaft water quality, which contained elevated concentrations of hydrocarbons and metals, to the proposed Star-Orion South Diamond Project (the Project).

As noted in the Revised Environmental Impact Statement (REIS) hydrocarbons in the exploration shaft discharge originated from numerous hydraulic failures from old underground machinery used during exploration. For the Project, diligent maintenance, spill response and clean-up will be implemented. In the unlikely event that hydrocarbons are found in the in-pit water, floating baffles will be installed to exclude hydrocarbons form the discharge, and will be cleaned up in-situ. Water quality modeling conducted by AMEC in the REIS and updates accounted for all water quality sources, including the potential for metal leaching from the kimberlite in the pit discharge and potential spills. The water management system provides contingency to vary recycling rate in the event that end of pipe water quality is different than modeled in order to ensure compliance with the *Fisheries Act*.

Shore confirms that:

1. Contingency exists within the water management system to address the possibility that pit discharge water quality is similar to that of the exploration shaft discharge;
2. Pit water discharge will be sampled and monitored for hydrocarbons and metals as part of site water quality monitoring, prior to pumping to the plant or Processed Kimberlite Containment Facility; and
3. Water quality monitoring requirements will be finalized in consultation with Environment Canada.

Sincerely,

<original signed by>

Ethan Richardson, M.Sc., P.Eng.
Environment Manager, Shore Gold Inc.