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dbowen@hydro.mb.ca

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2015 11 06

Tracey Braun  
Director – Environmental Approvals Branch  
Manitoba Conservation and Water Stewardship  
123 Main Street, Suite 160 (Box 80)  
Winnipeg, MB R3C 1A5

Dear Ms. Braun:

**RE: KEYASK GENERATION PROJECT – ALTERATION REQUEST  
TEMPORARY RELEASE OF IMPOUNDED WATER WITH ELEVATED TSS  
ENVIRONMENT ACT LICENCE NO. 3107, CLIENT FILE 5550.00**

Manitoba Hydro, in its delegated authority to manage construction of the Keeyask Generation Project on behalf of the Keeyask Hydropower Limited Partnership, is requesting an alteration to Environment Act Licence (EAL) No. 3107 to temporarily release impounded water from the Central Dam Cofferdam directly to the Nelson River, even if the end-of-pipe Total Suspended Solids (TSS) concentration is greater than 25 mg/L.

The duration of this request is until the repairs to the cofferdam have been completed. It is anticipated that this work will be complete by the middle of December 2015. Please see the attached documents that provide the background and potential environmental effects to the aquatic environment.

It is recognized that the end-of-pipe 25 mg/L TSS limit has been and continues to be challenging to meet in a range of circumstances. Therefore, a longer term plan is being developed and will be submitted in the near future.

If there are any questions or concerns with this request, please contact Jodine MacDuff at 204-360-5539.

Yours truly,

A handwritten signature in blue ink, appearing to read 'Dave Bowen', with a long horizontal flourish extending to the right.

Dave Bowen, P. Eng, M.Sc  
Keeyask Project Manager  
Major Capital Projects

Att.

**Keeyask Generation Project**  
**Alteration Request to Environment Act Licence No. 3107**  
**Temporary Release of Impounded Water with Elevated Total Suspended Solids**

Manitoba Hydro, in its delegated authority to manage construction of the Keeyask Generation Project on behalf of the Keeyask Hydropower Limited Partnership, is requesting an alteration to Environment Act Licence (EAL) No. 3107 to temporarily release impounded water from the Central Dam Cofferdam directly to the Nelson River, even if the end-of-pipe Total Suspended Solids (TSS) concentration is greater than 25 mg/L.

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**Background**

Construction of the Keeyask Generation Project Central Dam will occur this winter, this includes excavation activities within the Central Channel. To work in the dry, the central dam cofferdam is required. Dewatering of this area is occurring and water is discharged directly to the Nelson River if it meets requirements specified in the Environmental Protection Plan.

The central dam cofferdam is experiencing leakage at a rate of approximately 2000 L/s (2 cms or 31,700 USgpm) and geotechnical investigations are taking place to determine the source of the leakage, which appears to be attributed to unforeseen geological conditions. Once the full extent of the geologic conditions is determined, a repair will be executed. The TSS of this water is currently less than 25 mg/L; however, based on past experience, levels may increase as a result of investigations and corrective measures as the water inside the cofferdam is drawn down. The corrective measures are planned to be complete by the middle of December.

It is not feasible to divert this water for treatment of elevated TSS prior to release based on the high leakage rate (2000 L/s). Therefore, Manitoba Hydro is requesting an alteration to EAL 3107 to temporarily release impounded water from the cofferdams directly to the Nelson River, even if TSS is greater than 25 mg/L.

Field measurements of turbidity (Tu) of the discharge water will be taken on a regular basis. If TSS is greater than 25 mg/L, based on the relationship between TSS and Tu as described in the Sediment Management Plan, Manitoba Hydro will notify Fisheries and Oceans Canada and Manitoba Conservation and Water Stewardship of the occurrence.

## Potential Environmental Effects

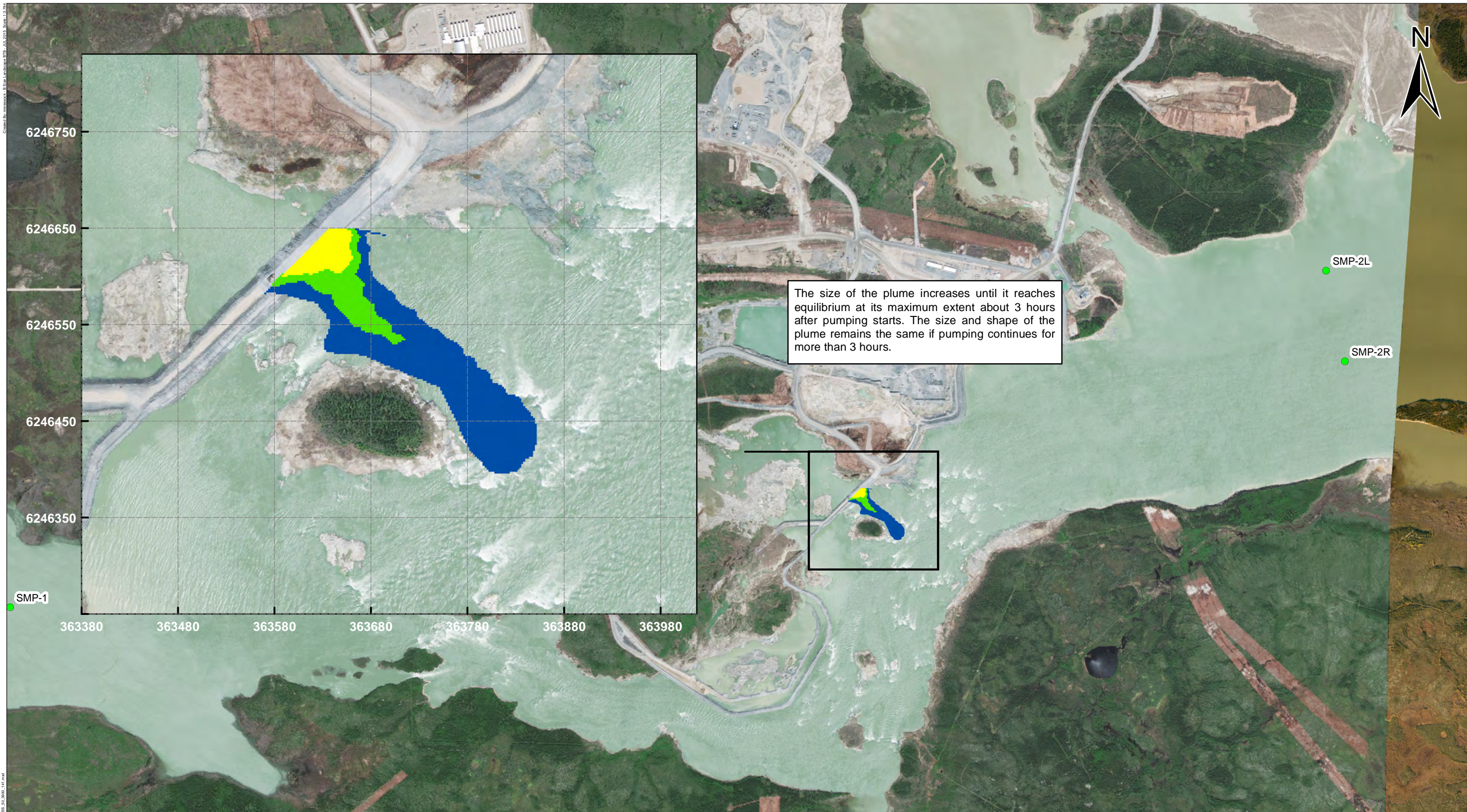
Dewatering the central dam cofferdam area may result in the discharge of water with a TSS greater than 25 mg/L. While TSS will likely remain below 25 mg/L, peak concentrations are expected to be in the range of 50-150 mg/L based on dewatering of the spillway cofferdam. However, there may be short increases to 400 mg/L. The high leakage rate will be experienced until repairs are completed, which will take approximately 30 days. There is the potential for elevated TSS during this time, but the largest TSS increases would likely be for a short period. Modeling results show a small plume of increased instream TSS concentrations greater 5 mg/L restricted to near the cofferdam in the central area of Gull Rapids. The plume extends at concentrations of less than 5 mg/L along the north bank of the Nelson River. The attached figures show the plume of TSS increases for end-of-pipe discharges with TSS at 50 mg/L, 150 mg/L and 400 mg/L, and having a discharge rate of 2,500 L/s.

The provincial MWQSOG objective and the federal CCME guideline for the protection of aquatic life for TSS is an increase of 5 mg/L or less. A short term (<24 hour) increase of 25 mg/L is also identified. Based on the objective/guideline, significant effects are not expected for the majority of the area of the plume and not at all outside of the plume.

As of October 11, 2015, 4 adult and 1 juvenile Lake Sturgeon, 5 Walleye, and 5 Lake Whitefish were detected by an acoustic receiver set near the north shore 2.4 km downstream of Gull Rapids (just past the causeway). Based on monitoring in previous years, it is expected that the Walleye and Lake Sturgeon would have moved further downstream by the end of October. The Lake Whitefish were likely staging to spawn within the fast-flowing water habitat in the rapids/cofferdam area. The exact locations are not known but would likely extend upstream along the edge of the flow. The extent to which Lake Whitefish eggs would be affected by discharge with a high concentration of TSS is not known. As discussed in the Keeyask Generation Project EIS, the available scientific literature indicates a potential for reduced hatching success in salmonid eggs exposed to elevated TSS concentrations at concentrations ranging from 6.6–157 mg/L, with greater effects occurring for longer durations of exposure. Based on the model results, these elevated concentrations are restricted to a small portion of the total area in which Lake Whitefish may spawn, suggesting that only a fraction of the eggs that may have been spawned in Gull Rapids may be affected.

Overall, the discharge of TSS would have a negligible effect on the fish community in Stephens Lake since the total increase in sediment load is negligible (0.2 – 1.5%). As noted in the EIS, the major construction effect will be a decrease in the year-class strength of fish species residing in Stephens Lake that rely primarily on spawning habitat in Gull Rapids (in particular Lake Whitefish) during the years that the cofferdams are in place. The assessment was conducted on the basis that spawning habitat in Gull Rapids would not be available and that fish would need to rely on other areas in Stephens Lake; therefore, if a portion of the eggs thought to have been spawned in Gull Rapids this fall are subject to mortality due to TSS inputs, the effect would be comparable to that anticipated in the EIS.





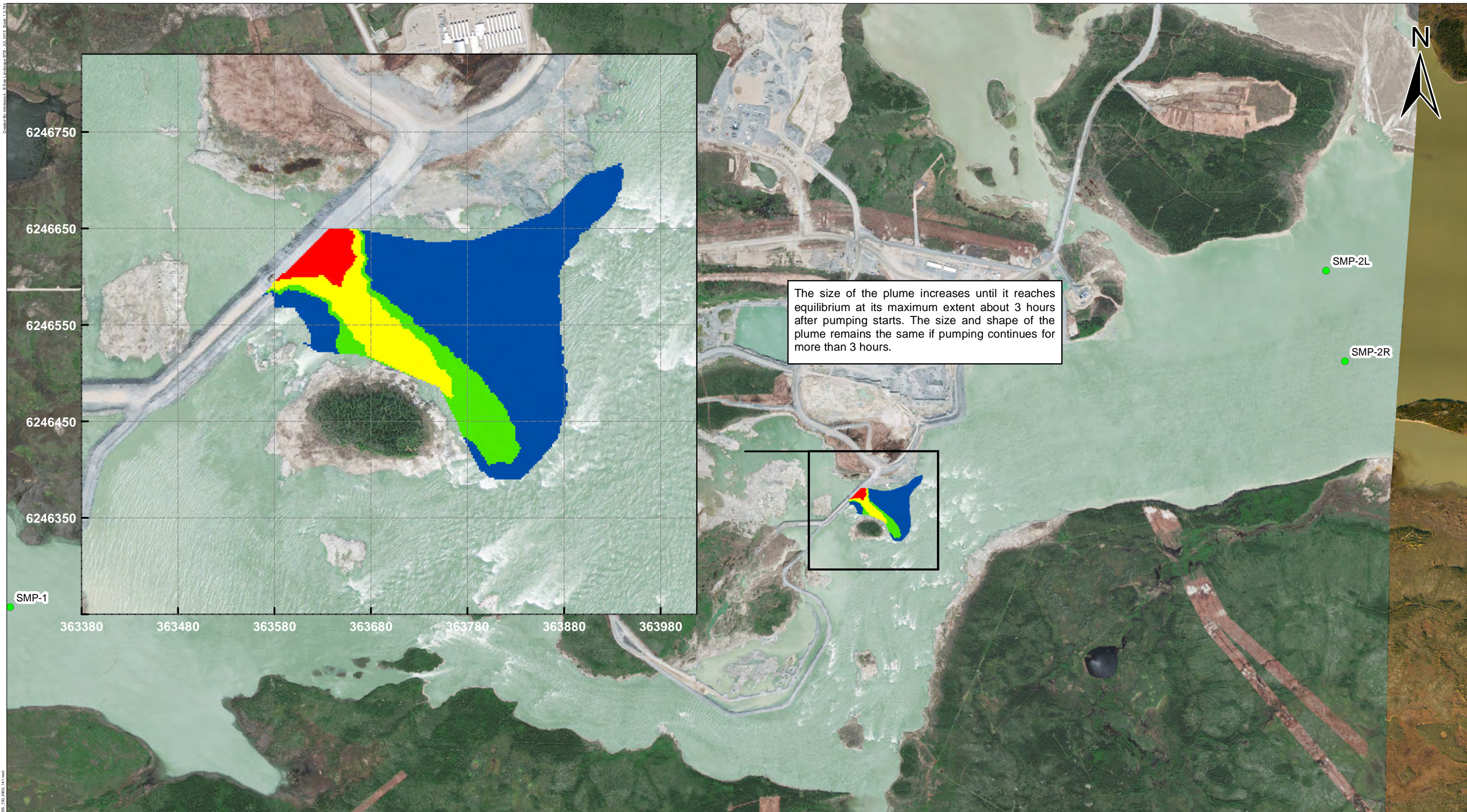
DATA SOURCE: Manitoba Hydro		
CREATED BY: Water Resources Engineering - Hydraulic Engineering		
COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 04-NOV-15	REVISION DATE: 05-NOV-15
0 0.2 0.4 Kilometres 0 0.15 0.3 Miles	VERSION NO: 1.0	QA/QC: XXX/YYY/ZZZ

<b>Legend</b>
<b>TSS Increase (mg/L)</b>
<span style="color: blue;">■</span> 1 - 5
<span style="color: green;">■</span> 5 - 10
<span style="color: yellow;">■</span> 10 - 25
<span style="color: red;">■</span> > 25
<span style="color: green;">●</span> Sediment Management Plan Monitoring Sites (Open Water)

Notes:  
 Nelson River Flow = 3900cms  
 Stephens Lake Water Level = 141m  
 Dewatering Rate = 2500 L/s  
 End of Pipe TSS = 50mg/L

**Keeyask GS**  
 Central Dam Cofferdam Dewatering  
 End of Pipe = 50mg/L  
 Instream TSS Increase After 3 Hours





Ground: 6246750, 6246650, 6246550, 6246450, 6246350  
 363380, 363480, 363580, 363680, 363780, 363880, 363980  
 File Location: K:\0108\_Keeyask\GIS\MapDocs\MapDocs\_0108\_150\_300\_141.mxd



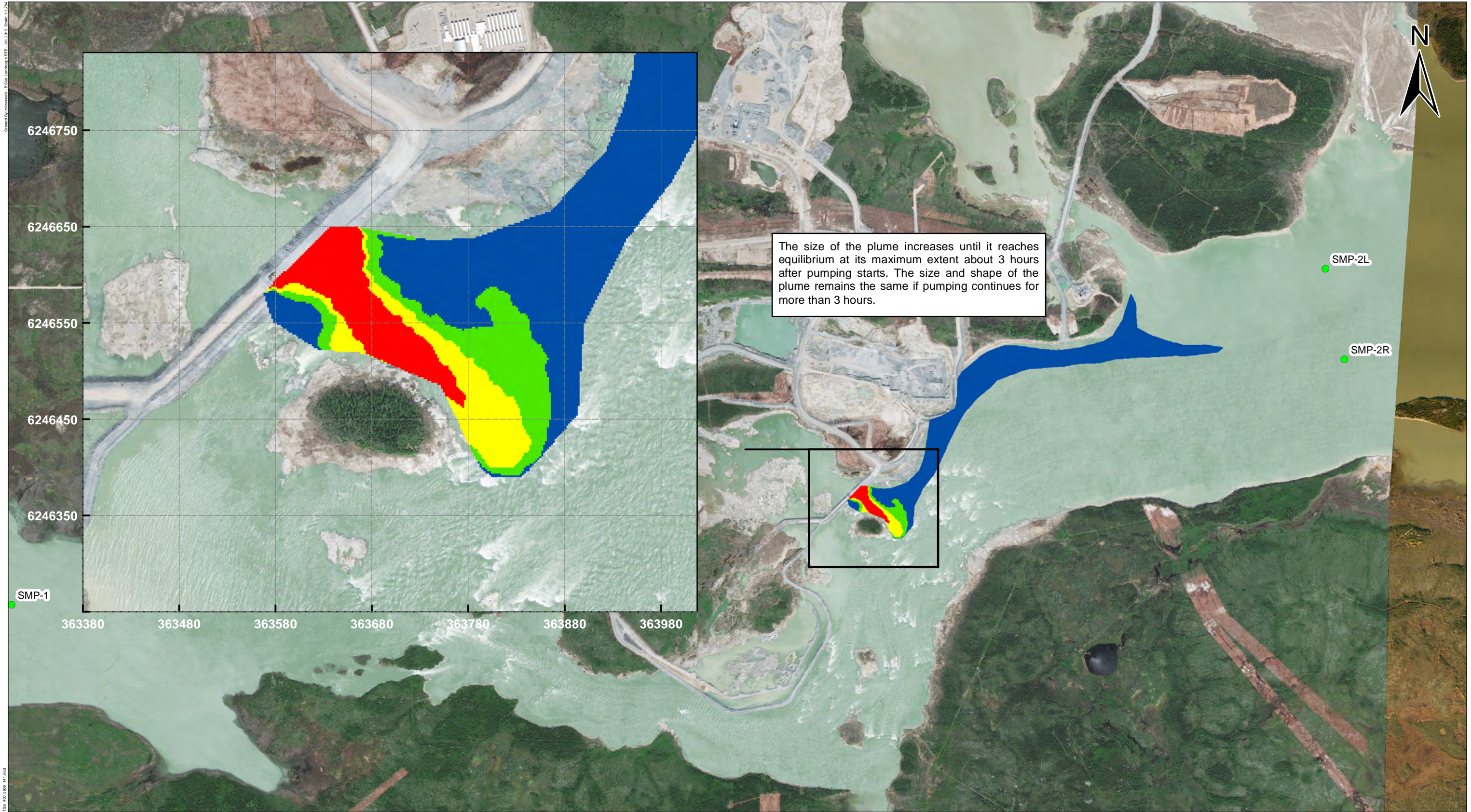
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**Notes:**  
 Nelson River Flow = 3900cms  
 Stephens Lake Water Level = 141m  
 Dewatering Rate = 2500 L/s  
 End of Pipe TSS = 150mg/L

**Keeyask GS**  
 Central Dam Cofferdam Dewatering  
 End of Pipe = 150mg/L  
 Instream TSS Increase After 3 Hours





The size of the plume increases until it reaches equilibrium at its maximum extent about 3 hours after pumping starts. The size and shape of the plume remains the same if pumping continues for more than 3 hours.



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