

APPENDIX C.4

Tote Road Priority Action Schedule

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Site WP No. 2009	Km Post	Priority	Ground Photos	Aerial Oblique Photos	2019 Comments	Proposed Timeline for Completion	2021 Update
14	89.8	A++++	2655, 2656	2597	QIA - Noted road stability issues. Instability is very evident, water is very deep and the embankment side slope on the right side of the road is very steep and shows cracking on the shoulder and side slope. Stabilization should be undertaken as soon as possible (see Section 4.0)	Planned Q2/Q3 2020- Materials stockpiled within 100 meters from erosion stabilization work completed at km 90 area in 2017.	Work has been completed
–	89.3	A	1712, 1713	1656	Realignment of road with a cut on the west side of road exposed massive ground ice in the ditch, extensive thaw settlement is expected unless this exposed ice is covered by 1.5 m or more of fill to re-establish an active layer.	Planned in coordination with km 89.8 works.	Work has been completed
22	72.4	A++++	2653	2555	QIA - noted issues at KM 72.3 and the uphill (left) borrow pit appears to be a source of sediment. Continued settlement and slope instability, and road maintenance noted that the left side of the road collapsed into the pond on left side earlier this year. Further work is needed as soon as possible to curtail further thawing and potential road collapse (see Section 4.0 for suggested repair). Filling in the pits will lessen the potential for sediment release if some check dams and armouring (rip rap) is also applied to the left of the road below the borrow pit.	Planned Q3 2020- Sourcing materials from km 76 old road alignments, Km 74 old road alignments- complete decommissioning and reclaim of these old road segments.	Work has been completed
29	63.7	A++++	2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664	2558, 2559, 2560, 2595, 2596	This series of pits has gotten worse, recommendations from 2014 remain appropriate. See Section 4.0 in the report for additional details.	Planned for 2022- Area to be properly assessed, but preliminary plans to level areas and pull material from slopes back into pits, create even terrain that will freely drain. Material haulage required to backfill.	Work started in 2021 – to be completed in 2022
32	56.9R	A++++	2668, 2669, 2670, 2671, 2672, 2673, 2674	2562, 2592	There has been significant road realignment at this location. Water is ponding along portions of the new road and cracking is noted on the shoulders and side slopes of the new road. The old road is now very unstable and side slopes are failing in many locations. Water must be pushed back from the edge by placing additional fill on the side slopes of the new road embankment to enhance stability. Of significant concern is the fact that the water currently ponding along the new road is only drained away by a culvert in the old road near the sharp corner. With no maintenance on the old road, there's concerns that the culvert will become inoperable/blocked and water levels in the pond will rise significantly leading to more thaw and further threaten stability on the new road. Suggest removal of the culvert and breaching the old road embankment to lower water levels. See Section 4.0 for further discussion.	Planned for 2022-Preliminary plans to decommission old road segment, utilizing materials to create even and sustainable slopes. Material haulage required to backfill.	Planned for 2022
37	52.2	A	–	2563, 2591	QIA noted that the road appeared to have been raised at this location. Actually the road was significantly realigned to improve grades and is now located at a lower elevation and borrow pit 37 is now well away from the new road. Therefore, the stability of the old road is not of significant concern, The thaw degradation that was noted to be ongoing is still happening in the pit and there is the potential for sediment laden water to be released from the old pit. The priority has been downgraded to reflect the lessened safety issue but is still rated A because of the potential sediment issue. Regrade pit surface, assess potential water release locations and armour outflow and install check dams as required to control sediment release.	Planned for 2022- Reclaim blasted sand piles from road alignment work that was done in 2015/2016, as well additional materials from old decommissioned road in same area.	Planned for 2022

Notes:
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40	51.2	A+	2701, 2702	–	Thaw is ongoing and pit is deepening, steepening the side slope. Drainage out of the pit flows to the south towards the lake (Photo 2702). There is some thermal degradation happening in the natural drainage probably due to increased water flow in the spring. Ideally this pit would benefit from being backfilled as this would arrest thaw, improve embankment stability and reduce spring flows.	Planned for 2022 - Preliminary plans to pull slopes on back hill, level area and provide drainage that is free draining.	Planned for 2022
–	49.0	A+	2698, 2699, 2700	–	QIA - noted ponding and road instability. There is a cut that was made to improve grade and a communications tower is situated on the top of the terrace on the west side of the road. There is ponding on the east side of the road. An ice wedge can be seen to be degrading on the terrace and is very evident on the cut slope on the west side of the road (Photos 2698 and 2699). Material should be placed over the degrading ice wedge both on the terrace and on the cut slope. The ditch (Photo 2700) to the south of the wedge is unstable as is the side of the road, suggest some regrading and slope flattening to help improve stability. Close monitoring of the road should be undertaken and if any dips are noted at the ice wedge locations further remediation may be required.	Planned for 2021- Materials available on east side of roadway from old road alignment.	Work has been completed
61B	29.1	A++++	2693, 2694, 2695, 2696	–	QIA noted water accumulation and stability issues at KM 29.4 but the pit with issues is located at 29.1 on the Figure (assumed to be the area of concern). As noted in 2014 this entire pit should be backfilled with imported material after removing as much water as possible. See Section 4.0 for further information	Planned for 2021 - excavator to slope high steep hills and utilize materials for fill at bottom. Will also reduce/eliminate the hill slope degradation from the steepness left behind from previous construction in the past.	Work has been completed
68	21.9R	A++++	2691, 2692	–	QIA noted water accumulation and road instability at this location. Pits should be backfilled and graded as noted in 2014 to cause the permafrost to aggrade and enhance the stability of the embankment side slopes. See Section 4.0 for more information	Planned for Q4 2020.	Work has been completed
71	20.7R	A++++	2543, 2544, 2545	2571	Pit remains similar to 2014 and settlement and instability of the road side slope is evident. Filling of the pit as soon as possible is still recommended to improve safety. See Section 4.0 for further detail	Planned Q3 2020, Material fill estimated at 3000 m3, planned to source from decommissioned road at km 23.5.	Work has been completed
72	19.8L	A++++	2540, 2541, 2542	2572, 2587	Photos 2541 and 2542 show instability on the side slopes and observed conditions and suggested stabilization measures remain as indicated in 2014. See Section 4.0 for further information.	Planned Q3 2020- Material fill estimated at 20,000 m3 - plan to source from decommissioned section of old road at km 23.5.	Work has been completed
74	16.9L&R	A	–	–	More water is ponding in the pits than noticed in 2014, and there is concern that rate of thaw will increase potentially leading to embankment instability but road currently appears stable. Determine if it is feasible to direct water from pit to reduce potential for increased thaw. Otherwise monitor closely to evaluate road stability.	Planned for 2021- Materials sourced from km 13 old road alignment construction stockpile.	Work has been completed
75	15.0R	A	–	2574, 2586	More ponded water and there is a short section at the south end of the pit where there is a very steep side slope and considerable drop from the edge of the road down into the water. Pond should be drained and the area where water is ponding should be backfilled.	Planned for 2021- Material sourcing from Milne Inlet strippings, Q1 quarry, Km 13 road alignment leftover materials.	Work has been completed

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80	9.7L	A	2539	2576	See 2014 recommendations for stabilization. Also consider adding a toe berm to the left side of the road or at a minimum flatten the side slope near the natural pond to stabilize embankment on that side (east side).	Sloping and shaping work to be planned for 2021 when areas are not frozen and materials can be manipulated. Should not require additional materials.	Work has been completed
83	7.7L&R	A++++	–	2578, 2584	Thaw has continued and instability is more prominent on the sides of the road. The priority has therefore been increased to A++++ and therefore reclamation as per the 2009 recommendation should commence as soon as possible. See Section 4.0 for further details.	ROQ bulk fill planned for Q1 2020, hill sloping and final fills with finer materials planned for Q2/Q3 2020 when materials are not frozen, additional materials will be sourced from Milne Inlet Hatch stripping piles	Work has been completed
83A	7.2	A++++	2531, 2535, 2536, 2537, 2538	2578, 2584	QIA noted that the road was surrounded by water at nearly the elevation of the road and noted that there appeared to be degradation of permafrost. Indeed, ongoing permafrost degradation is ongoing in the pit. The road appears much less stable in 2019 and the water levels have risen in the pits, leading to road instability due to thaw. This pit needs to be filled on both sides of the road after removing as much water as possible. Filling the pits a regrading will hopefully lead to aggradation of permafrost and enhance the stability of the road much worse. See Section 4.0 for further discussion.	Bulk fill commenced late November 2019 with ROQ from Q1 quarry, continued work to be done in Q2/Q3 2020 due to unavailability of finer materials being frozen and inaccessible. Estimated 15,000 m3 of overburden material required- source from Hatch strip piles in Milne from 2019 pad constructions. Completion in 2021.	Work has been completed

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PHOTO 1 – KM 16.9, July 14 2021



PHOTO 2 – KM 7.7, Aug 2 2021



PHOTO 3 – KM 15, Nov 20 2021



PHOTO 4 – KM 20.7, Nov 7 2021



PHOTO 5— KM 21.9, Nov 4 2021