

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-047	Active	Risk Review Session	Health and Safety	Dropped objects	Access Pioneering	Dropped or roll away objects from equipment working on slopes or switchback roads can cause worker injury	3-Rare	4-Critical		12 Never plan work over top of or above other crews. Secure pipe and materials properly. Signage posted to prevent unauthorized access. Delineation or barricades to prevent unauthorized access. Have communication methods (ex. radio) to relay hazards. Ensure all stored materials are chocked and blocks to prevent any rolling.	2-Unlikely	3-Major	6	Ethan Leigh	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-010	2021-06-10	Approved
5B-KBTPN-191	Active	Risk Review Session	Health and Safety	Ground Conditions	Access Pioneering	There is potential of equipment tipping due to uneven ground conditions that can result in operator injury.	5-Expected	3-Major		15 Perform a rollover risk assessment and implement control measures such as Rollover Protection System, Restrain mobile equipment by a wire rope or by a synthetic rope which may include webbing or another machine that is suitable for restraining the mobile equipment. Ensure tethering of equipment as required. Level road as much as possible.	5-Expected	3-Major	15	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-034	2021-06-10	Approved
5B-KBTP-462	Active	Risk Workshop	Environment	Soil Disturbance	Access Roads	General impacts from drainage, erosion and sedimentation.	4-Occasional	3-Major		12 Implement drainage, erosion and sediment control measures (e.g., check dams, sediment traps and culverts) during the development and use of new access roads and upgrading of existing roads/trails. Top roads with clean gravel. Restrict the use of sand within 10 m of watercourses, wetlands or lakes. Monitoring. Culvert installation and maintenance. Ditch Design and maintenance.	4-Occasional	2-Moderate	8	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-180	2021-01-06	Approved
5B-KBTP-485	Active	Risk Workshop	Environment	Toxic Fluid/Solvents	Access Roads	Chemical impacts from use of chemicals for ice and snow mitigation and/or dust control	3-Rare	2-Moderate		6 Do not use de-icer or salt for access road maintenance. Apply only water or non-toxic and non-persistent chemical products approved by an Environmental Inspector or designate to access roads for dust control at park locations or resource-specific features including agricultural crop production areas, especially berry crops. Do not apply dust control chemicals to roads during windy conditions or within 300 m of a watercourse, wetland or lake or sensitive agricultural crops (e.g., berries, nurseries and organic farms). Dust control chemicals are to be approved by an Environmental Inspector or designate, in advance of application. Refer to the Dust Control heading of the EPP. Restrict the application of herbicides to licenced applicators and follow all Project requirements regarding herbicide use.	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-203	2021-01-06	Approved
5B-KBTP-099	Inactive	Risk Review Session	Environment	Groundwater	All Stages	Contaminated groundwater from undisclosed / chance find contamination leaving site uncontrolled during excavation	3-Rare	2-Moderate		6 Conduct environmental Inspection to identify/confirm areas with potential for incoming groundwater during excavation operations Review EAS to determine areas of shallow groundwater or artesian conditions prior to start of works Review RSMT to determine areas of known contamination prior to start of excavation and if needed, engage TM EI and/or RS to determine mitigation methodology for groundwater Contaminated Sites Environmental Execution Plan Water management methodology to include dams; earthen berms, sumps lined with poly liners to contain groundwater; pumps to effectively control water; poly lined ditches/swales to effectively direct any contaminated water.	3-Rare	1-Minor	3	Linda Pawson	Gary Shorthouse	NOC	Applicable to night shift activities	2021-06-10	Approved
5B-KBTP-150	Active	Risk Review Session	Environment	Waterwells	All Stages	Water well destruction during excavation	1-Extremely Unlikely	3-Major		3 -Work permit which specifies if wells are present -EAS and RSMT, Water well inventory -EPP Hydrogeology -Decommission water wells prior to construction -Identify wells on Safe work permit; also ensure any required signage and flagging are in place prior to commencing activities -Complete TMEP pre-construction RoW inspection checklist to assess any issues with wells	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTP-184	Active	Risk Review Session	Environment	Hydrocarbons	All Stages	Release of oil or grease due to the failure of containers, hoses, or transfer methods during the servicing of equipment on the ROW.	2-Unlikely	1-Minor		2 - Environmental Protection Plan to be followed - Daily visual examination of work sites by CECs - Spill kits in all vehicles - Major Spill Kits in place - Crews to familiar with and implement the KBTP fueling procedures (maintenance) - Drip trays placed under equipment being serviced. - Environmental Manager will have in place trained spill response personnel - Construction Manager will verify that crews are adhering to the KBTP Pipeline Environmental Protection Plan - Superintended will be familiar with and ready to implement the KBTP Emergency Response Plan - Superintendent will verify the completion of detailed advanced planning of all near water activity and equipment - Superintendent will verify adequate spill response supplies	2-Unlikely	1-Minor	2	Craig Ratcliffe	Gary Shorthouse	NOC		2021-07-12	Approved
5B-KBTP-228	Inactive	Risk Review Session	Environment	Toxic Fluid/Solvents	All Stages	Release of chemicals or impacted water due to hydrotest water discharge.	3-Rare	2-Moderate		6 Testing of test water/chemicals and monitoring to controlled discharge specifications. Ensure any applicable permitting and planning is in place - Hydrostatic test plan, C-113 care of water plan, waste discharge plan. Should treatment be required ensure systems are installed and inspected for proper functionality prior to commencing work.	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	NOC	Will be changes to active once testing commences - 2023	2021-06-10	Approved
5B-KBTP-239	Active	Risk Review Session	Environment	Protected & Rare Vegetation	All Stages	Removal of a protected plant (medicinal and/or important) resulting to a potential irreversible environmental damage	2-Unlikely	2-Moderate		4 Identify Locations where this may be a potential issue (environmental alignment sheets / LRSMT) Pre-construction site walks with by RS / EI / CEC Qualified specialists available to assess sites and provide mitigation plans if required Worker orientation shall include information on vegetation management Rare species contingency Plan shall be available and followed as required Establish Exclusion Zone, signage, flagging any any identified areas as per the TMEP EFG on environmental flagging Transplanting should be considered as an option should avoidance not be possible	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved

TABLE 1: KBTP CHRR

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTP-240	Active	Risk Review Session	Environment	Protected Sites	All Stages	Damage a traditional land use site (fishing area, camp site) resulting to an environmental damage.	2-Unlikely	3-Major		6 Indigenous monitors to present as per TMEP requirements Archaeological assessment pre-construction to be completed - stay out of no-go zones Pre-planning work to utilize the EAS / LRSMT / Archy red/green maps to ensure no trespass KBTP Environmental Hazard Analysis to be used in planning stage to ensure areas are identified in work plans Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones Have available and use as required the Heritage and TLU chance find contingency plans	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTP-241	Active	Risk Review Session	Environment	Protected Sites	All Stages	Inadvertent removal of a historical sacred feature (e.g. sacred sites and grandfather trees) resulting to an irreversible environmental damage.	2-Unlikely	3-Major		6 Indigenous monitors to present as per TMEP requirements Archaeological assessment pre-construction to be completed - stay out of no-go zones Pre-planning work to utilize the EAS / LRSMT / Archy red/green maps to ensure no trespass KBTP Environmental Hazard Analysis to be used in planning stage to ensure areas are identified in work plans Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones Have available and use as required the Heritage and TLU chance find contingency plans	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTP-260	Inactive	Risk Review Session	Environment	Harmful Micro-organisms	All stages	GSD: Interbasin transfer of aquatic organisms resulting from hydrotest water from one location being discharged to another location  Abnormal	3-Rare	2-Moderate		6 Follow Hydrostatic Water Discharge Plan Complete water quality laboratory analysis to determine if hydrostatic test water can be returned to source or released in a controlled manner to a well vegetated area; if third party water supplier, return to truck tank once hydrostatic testing completed.	2-Unlikely	2-Moderate	4	Stefano Liut	Stefano Liut	AOC		2021-06-10	Approved
5B-KBTPN-001	Active	Risk Review Session	Health and Safety	Air Quality/Smoke	All stages	Workers exposed to wildfire smoke/dry heat (dust) when performing construction activities resulting in deterioration of air quality leading to a range of health issues (respiratory and cardiovascular problems)	5-Expected	4-Critical		20 Forest Fire Prevention Plan Hazard Assessment prior to starting any work activities Use masks and respirators, as required. Air quality checks to ensure conditions safe for work. Monitoring of weather and fire/smoke forecasts to determine if safe to work. Daily fit for duty assessments prior to work start	5-Expected	4-Critical	20	Olivier Beaulieu/Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-281	2021-07-12	Approved
5B-KBTPN-007	Active	Risk Review Session	Health and Safety	Airborne Debris	All Stages	Worker being struck by air-borne debris (dirt, rocks, waste) due to disturbance of loose material during hydrovac.	2-Unlikely	3-Major		6 Hydro vac proximity restrictions, and exclusion zones Apparel including long sleeves and pants/coveralls, Hard hats with side protection, double safety eye wear for hydro vac crews. Pressure controls on hydrovac pumps, signage for exclusion zone.	1-Extremely Unlikely	2-Moderate	2	Stefano Liut	Wade Medley	NOC	Former Risk ID was 5B-KBTP-181 No daylighting work during night shift  CDN - Controls adjusted to reflect qualifiable content, negligible comments removed.	2021-07-12	Approved
5B-KBTPN-008	Active	Risk Review Session	Health and Safety	Airborne Debris	All Stages	Worker injury from flying metal fragments or high-velocity water due to pipe, fitting, hose, or component failure during hydro-testing from overpressure	1-Extremely Unlikely	4-Critical		4 Flagging or barricades will be in place to prevent unauthorized persons within the testing area. Radio communication between crew members on longer lines being tested.	1-Extremely Unlikely	4-Critical	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-227	2021-06-10	Approved
5B-KBTPN-012	Active	Risk Review Session	Health and Safety	Buried Services	All Stages	Inadequate location or marking underground services in the field may result in striking active underground services (TMEP pipeline or 3rd party utilities) that can cause near miss, worker injury or fatality.	4-Occasional	5-Extreme		20 TMEP Damage Prevention Plan (including assigned and approved GD Supervisor) Ground Disturbance Permit (KBP and TMEP as required) Ground Disturbance Level II Training Ground Disturbance Checklist Daily Pre-work inspections Emergency Utility Contact numbers Second utility scan Fully exposed in excavation area Pothole/daylight to expose every 8m in proximal location to the work. Superintendent will develop the DEP. This will contain the pre-construction survey data, and as-built information identifying the location of the known utilities. Construction Manager verifies that an approved Ground Disturbance Supervisor is assigned to the operation according to the TMEP Damage Prevention Plan Superintendent verifies approved Ground Disturbance Permit is received and that the permit requirements are completed including Ground Disturbance Checklist, Daily Pre-work inspections, Superintendent verifies that crew has completed Ground Disturbance Level II Training (competency check) Ensure crossing agreements are in place where required De-energization of buried services or work completion during shutdown activities when practical.	2-Unlikely	5-Extreme	10	Olivier Beaulieu	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-029	2021-06-10	Approved
5B-KBTPN-015	Active	Lessons Learned	Health and Safety	Buried Services	All Stages	Damage to existing buried utilities caused by blasting activities or operating vibratory equipment in close proximity to it.	4-Occasional	4-Critical		16 BC One Calls, 2 Line Sweeps, Beacons, Sirens Signage Barriers / Fencing / Blast Matts 2 Stage Detonation Box Geophones Vibration monitoring	3-Rare	2-Moderate	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-272, 5B-KBTP-554	2021-01-22	Approved

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5B-KBTPN-026	Active	Risk Review Session	Health and Safety	Construction Dust	All Stages	Exposure to dust or other particulate matter due to soil, rock, or vegetation disturbance, exacerbated by dry conditions.	2-Unlikely	3-Major		6 Project Specific Safety Plan (PSSP) Environmental Protection Plan, Competency Assurance, Fatigue Management Program, Drug and Alcohol Program safety eye wear, Respiratory Protection equipment. ES: Application of dust suppressant. TP: Follow SWP Night Operations -Before the start of any night operations, complete a detailed hazard analysis addressing possible night hazards of night work. -During pre-trip all equipment with reflective decals shall be free of debris and or damage. -All parking areas shall be sufficiently illuminated and delineated. -All equipment operators and drivers will go through appropriate tool-box trainings which highlights the importance of stopping and re-assessing if the illumination impairs visibility in any way. Don't go if you don't know/can't see. -All incidents shall be reported immediately to the foreman/supervisor and to the Safety Hotline (604) 860-9971. -Supervision to complete a shift cross over meeting at the end and beginning of each shift between days and nights. -KBTP to perform a mock emergency rescue drill for each A/B/C crew during their first shift cycle on nights to ensure no gaps are identified. -A competent person shall be designated the responsibility for maintaining surveillance on the work area to alert other workers of encroaching vehicles. -Mobile equipment (incl. light plants & generators) shall be inspected at the start and end of each shift using KBTP Daily Visual Inspection process and document operating conditions and damages beyond wear & tear. -Lighting, delineation, and reflective strips on stationary equipment as well as any other mitigations shall be used in locations designated by field supervision to provide a safe environment for the operation. - Personnel working at night will have reflective tape on their hard hats and will	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-182	2021-07-12	Approved
5B-KBTPN-038	Active	Lesson Learned	Health and Safety	Culture	All stages	Worker doesn't receive timely medical care resulting in fatality	3-Rare	4-Critical		12 Local radio SME consulted and used in planning, equipment selection Hardwired Truck Mounted Radios for enhanced coverage 5w Handheld radios with upgraded attentats Medic Staged for a maximum of 10 minutes surface travel time Cell phone with booster will be provided to supervisor Poor receptions zone in project area identified and documented Manual Communication Relay Use of digital repeater towers BC OHS regulation 3.21 First Aid Attendant Responsibilities	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-281, 5B-KBTP-563	2021-01-22	Approved
5B-KBTPN-039R	Active	Lesson Learned	Health and Safety	Culture	All Stages	Inexperienced/incompetent supervision directing work and assessing hazards resulting in injury	3-Rare	4-Critical		12 Supervisor Competency Assessment Focused Management Inspection Supervisor Safety Awareness Training TMEP Damage Prevention Supervisor, H&S and Forman formal and informal inspections Senior and Project Management to actively participate in Supervision monitoring TMEP Ethics hotline	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-282R, 5B-KBTP-564R	2021-01-22	Approved
5B-KBTPN-040R	Active	Incidents	Health and Safety	Culture	All Stages	Worker conducts scope of work without knowing approved safe work or safe job procedure - worker is struck, pinched or crushed by object - Injury or Fatality	3-Rare	4-Critical		12 Green Hand / New Young Worker Program Signage Beacons, Airhorns Focused Inspections Informal/formal H&S and Supervisor inspections	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-287R, 5B-KBTP-569R	2021-01-23	Approved
5B-KBTPN-044	Active	Risk Review Session	Health and Safety	Culture	All Stages	Personnel with ESL (English as a Second Language) do not understand signage, procedures, or verbal instructions leading to an incident that results in injuries or fatalities	3-Rare	5-Extreme		15 • Translators available on site. • Health and Safety documents are translated into relevant languages. • Use of universal pictogram signage (multilingual signage as needed). • Meetings/trainings have translators or translated documentation.	3-Rare	5-Extreme	15	Matthew Praine	Alessio Testo	NOC	Former Risk ID was 5B-KBTP-681	2022-04-10	Approved
5B-KBTPN-045	Active	Risk register re-issue	Health and Safety	Culture	All Stages	Insufficient traffic signs/AFADs on highway results in member of public drivers hitting another vehicle	2-Unlikely	4-Critical		8 Audit/Ensure the number of signs/AFADS and spacing between follow the TCP and are approved by the traffic group Traffic Management Plan Traffic Control Plan specific to work zone. (TC Person, Signs, Flagging, delineators, speed reduction spacing.) Trained and competent TCPs Monitoring and compliance verification Police speed control enforcement Speed reader signs Communication with CVSE	1-Extremely Unlikely	4-Critical	4	Matthew Praine	Justin Calabrese	NOC		2022-05-23	Approved
5B-KBTPN-057	Active	Risk Review Session	Health and Safety	Dropped objects	All Stages	Worker injury from improperly loaded material on truck - while worker unloading material	3-Rare	4-Critical		12 personnel trained in signaling an emergency stop, pre-work inspection of straps by a competent worker and quarterly inspection by a certified worker, supervisor instruction regarding safe positioning during off loading procedures. High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection, eye protection. Use of proper straps to secure type of loads. Truck parked on level ground before unloading material Use of taglines to control loads when using mechanical means to lift material.	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-213	2021-06-10	Approved
5B-KBTPN-067	Active	Risk Review Session	Health and Safety	Electricity/High Voltage	All stages	Exposure to a short circuit (ground fault) due to operating electrical hand tools.	2-Unlikely	2-Moderate		4 Electrical and power line safety requirements at Orientation. Proper CSA marked footwear, electrically insulated. Use of double grounded tools whenever possible. Ground fault circuit interrupting (GFCI) receptacles are installed on generators used for electrical hand tools, preventing electric shock in case of detectable fault.	2-Unlikely	1-Minor	2	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-162	2021-06-10	Approved

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5B-KBTPN-081	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	All Stages	Lifting and placing objects with excavator resulting to worker injury	3-Rare	4-Critical		12 Competency assessment lifting gear inspection Use of tag lines to control loads, use of equipment that is rated for the load being lifted Project Specific Safety Plan (PSSP), JHA's, FLHA's, Training, Competency assessment. equipment certification, formal lifting gear inspection Rigger 2 certification and Spotter traing sign off. Lift calculations forms are specific to the equipment being used. Calculations are prepared by the operation foreman, sign off by everyone involved in the lift and verified and signed off by the Superintendent (squad check). High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection. Use of tag lines to control load, use of equipment that is rated for the load being lifted. Review signals with the operator to ensure communication and signals are clear.	3-Rare	3-Major	9	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-172	2021-06-10	Approved
5B-KBTPN-082	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	All Stages	Worker injury (crushing) by controlled moving machinery due to proximity to moving machinery	3-Rare	4-Critical		12 Project Specific Safety Plan (PSSP), JHA's, FLHA's, Training, Pre-job and regular Competency assessments, Fit for Duty, Fatigue Management Program, Drug and Alcohol Program, supervisor instruction, New/Young worker Mentorship program. Spotters on site, exclusion zones High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection, eye protection. Engineering/Substitution Reverse alarms , buggy whips on vehicles.	2-Unlikely	4-Critical	8	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-234	2021-06-10	Approved
5B-KBTPN-083	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	All Stages	Misuse of heavy equipment due to inexperience or lack of qualified operators.	3-Rare	4-Critical		12 Project Specific Safety Plan (PSSP), JHA's, FLHA's, Training, Pre-job and regular Competency assessments, Fit for Duty, Fatigue Management Program, Drug and Alcohol Program ES/Seat belts installed and use enforced on all machines. Designated Operator Porgrams to help ensure operator competence.	3-Rare	4-Critical	12	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-237	2021-06-10	Approved
5B-KBTPN-091	Active	Lesson Learned	Health and Safety	Equipment/Heavy Machinery	All Stages	Inadvertent start up of equipment/machinery with workers in the line of fire	3-Rare	4-Critical		12 Use of master mechanic key Use of hydraulic lockout if so equipped Lock out tag out TMEP Mobile Equipment Standard OEM Operating Guidelines and procedures Life Saving Rule: Energy Isolation Contractor Competency Awareness Program Macro PME Competency Assurance Program	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-286, 5B-KBTP-568	2021-01-22	Approved
5B-KBTPN-092	Active	Incidents	Health and Safety	Equipment/Heavy Machinery	All Stages	Worker caught in crush point while maintenance equipment resulting in injury	4-Occasional	3-Major		12 Chock wheels/tracks, Isolation using master mechanic switch Isolation using master hydraulic lockout if so equipped OEM Guidelines and Procedures for Maintenance and Repair Worker Competency Life Saving Rule Energy Isolation	4-Occasional	1-Minor	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-291, 5B-KBTP-573	2021-01-23	Approved
5B-KBTPN-098	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	All Stages	Contact with side boom cables or draw-works due to proximity to cables or draw-works	1-Extremely Unlikely	4-Critical		4 Restrictions of access to Operator controls when equipment is operating for all crews where Side booms are used Daily tailgate meetings including supervisor instruction on hazards and protective measures. Seat belt use rule. Operator control station restricted to the Operator when equipment is working. High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection. Reverse alarms, guarding installed to prevent access to cable, preventive maintenance program to ensure all equipment has safety devices installed properly and is in safe operating condition.	1-Extremely Unlikely	3-Major	3	Stefano Liut	Wade Medley	NOC	No stringing will be conducted during night shift Former Risk ID was 5B-KBTP-198	2021-06-10	Approved
5B-KBTPN-110	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	All Stages	There is potential of workers falling from, being caught, in crush point while workers are setting up, repairing, servicing or maintaining the equipment due to unwanted movement of equipment or parts of the equipment that can result in near miss, worker injury	4-Occasional	4-Critical		16 Use LOTO protocol to ensure equipment is deenergized and bump test to ensure zero energy. Use testing in progress protocol with delineation when operating equipment for testing and adjusting purposes. Latch or secure compartment doors to prevent unwanted movement. Three points of contact when climbing on or off equipment and do not carry tools or supplies whild climbing on or off equipment. Automatic Shut-off system (every rig) No loose clothing No entry as machinery is moving	3-Rare	3-Major	9	Ethan Leigh	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-063	2021-06-10	Approved
5B-KBTPN-111	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	All Stages	Contact with the cutting, drilling, grasping, rotating, and/or electrical components of hand tools.	2-Unlikely	3-Major		6 Tool inspection prior to use. Verify all guards on tools used/installed properly. Using proper disk for task and disk rated for the RPM of the grinder, inspect disks for faults/failures. Gloves suitable for the task, safety boots, hard hats with side protection. eye protection of safety glasses and a side shield added as needed. Double insulated and/or grounded electrical connections, screening of work areas.	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-200	2021-06-10	Approved
5B-KBTPN-112	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	All Stages	Cut injury caused by contact with the sharp surface an exposed pipe cut.	3-Rare	2-Moderate		6 High visibility apparel with long sleeves and pants are required for site, listed in orientation. Gloves suitable for the task, safety boots, hard hats with side protection, eye protection. Use of cutting tools less likely to leave sharp edges. Procedure of "deburring" edge after cutting to be followed.	3-Rare	2-Moderate	6	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-201	2021-06-10	Approved
5B-KBTPN-116	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Pressure (high/low)	All Stages	Contact by an uncontrolled hose due to broken hose connection caused by overpressure during pressure washing or hydrovaccing operation.	2-Unlikely	3-Major		6 Daily tailgate safety meetings including supervisor instruction. Hose inspections prior to use, and quarterly by a competent person as part of preventative maintenance program for machinery . High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection, eye protection. Hose whip preventors.	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-204	2021-06-10	Approved

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5B-KBTPN-121	Active	Risk Review Session	Health and Safety	Ergonomic - Hot/Cold Stress	All stages	There is potential of workers being exposed to heat/cold conditions from hot work, hot and cold surfaces, and extreme weather conditions that can result in workers; heat and cold illnesses.	5-Expected	3-Major	15	Hard hat sweat absortion pad Provide training to workers on heat and cold illnesses awareness. Micro or Hydration Breaks Rotate workers into shaded areas to cool off Provide shade were practical Buddy system Nearby cooler with water, fruit, and electrolyte supplements	4-Occasional	3-Major	12	Olivier Beaulieu	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-070	2021-06-10	Approved
5B-KBTPN-122	Active	Risk Review Session	Health and Safety	Ergonomic - Hot/Cold Surfaces	All stages	Hot Work activities have the potential of causing worker injuries due to contact with hot equipment parts/surfaces (i.e., burns)	4-Occasional	3-Major	12	Hot Work Permit, given prior to starting work Wear Specialized PPE, Fire Rated Delineation and/or signage to prevent other workers from entering work space. Worker will have radio contact with foreman or supervisor at designated times. Proper work area set-up, to prevent hot material from fallign and making contact with worker(s)	2-Unlikely	3-Major	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-050	2021-06-10	Approved
5B-KBTPN-127	Active	Risk Review Session	Health and Safety	Ergonomic - Repetitive work	All Stages	Worker injuries due to repetitive work, (I.e. skid hustling) such as carpal tunnel syndrome.	3-Rare	3-Major	9	Project Specific Safety Plan (PSSP), Job specific JHA's, pre-work inspections using FLHA's, worker instruction in use of tools/equipment that require repetitive actions, Competency assessment, Fit for Duty, Manual lifting, mini-breaks, Line of Sight instruction. Fatigue Management Program, Drug and Alcohol Program. Mini breaks and task trade off schedules established. High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection. ES: Selection of equipment that is ergonomically friendly prioritized.	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-173	2021-06-10	Approved
5B-KBTPN-142	Active	Risk Review Session	Health and Safety	Fit for Duty	All Stages	There is potential of having short-term sub contractors or workers on site that did not complete the project site specific orientation resulting in procedural errors or missions that can cause near miss, worker injury	4-Occasional	2-Moderate	8	Ensure the all sub contractors/suppliers/visitors are made aware of orientation obligations prior to coming on site. Install signage at all site entrances indicating minimum PPE required, COVID Checklist QR Code, Orientation Obligation.	4-Occasional	2-Moderate	8	Olivier Beaulieu	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-082	2021-06-10	Approved
5B-KBTPN-144	Active	Risk Review Session	Health and Safety	Fit for Duty	All Stages	Contact with another vehicle or fixed object due to unsafe driving condition caused by inattentiveness or fatigue.	2-Unlikely	4-Critical	8	Competency assessment Fit for Duty, Fatigue Management Program, Drug and Alcohol Program, Defensive Driver training Supervisor observations Following the "Fatigue managment plan" limiting the hours workers can work in a row	2-Unlikely	4-Critical	8	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-207	2021-06-10	Approved
5B-KBTPN-145	Active	Risk Review Session	Health and Safety	Fit for Duty	All Stages	Worker injury from a another vehicle, on a roadway, due to loss of control caused by worker ignorance, inexperience (including new or young workers) or inattentiveness (fatigue or impairment)	2-Unlikely	4-Critical	8	Project Specific Safety Plan (PSSP) Emergency Response Plan, Competency Assurance, Fatigue Management Program, Drug and Alcohol Program, New Worker and Mentorship Program, supervisor instruction, Traffic Management Plans. Hi-vis apparel, Hard hats with side protection, safety eye wear, safety footwear. Adequate Lighting, installation of adequate traffic control measures. Installation of traffic cones, barricades. Traffic Control Plan specific to work zone. (TC Person, Signs, Flagging, delineators, speed reduction spacing.), Traffic Control Monitoring Police speed control enforcement Speed zone reduction on Hwy 5 - 120kph to 90/60 kph Speed reader signs Communicate with non-project affected highway contractors Crash trucks placed ahead of TCP if feasible in high risk TMEP controlled work area's Installation of traffic cones, barricades.	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-216	2021-06-10	Approved
5B-KBTPN-146	Active	Risk Review Session	Health and Safety	Fit for Duty	All Stages	Worker fall from permanent platform or stairway, due to loss of balance, missed step, or missed handhold caused by worker ignorance, inexperience (including new or young workers) or inattentiveness (fatigue or impairment).	3-Rare	3-Major	9	Project Specific Safety Plan (PSSP) working at heights sections and Safe Work Procedure JHA's, FLHA's, Training Competency and Fitness assessment Fit for Duty Program Fatigue Management Program Drug and Alcohol Program Supervisor instruction New/Young worker Mentorship program. Inspection protocols include examination of permanent platforms to ensure they remain in a safe to use condition. Signage and awareness in place. High visibility apparel, Gloves suitable for the task, safety footwear, hard hats with side protection, eye protection. Guardrails installed on stairs and permanent platforms.	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-238	2021-06-10	Approved
5B-KBTPN-147	Active	Risk Review Session	Health and Safety	Fit for Duty	All Stages	Contact with an abusive worker having behavior-related mental health issues.	2-Unlikely	3-Major	6	Project Specific Safety Plan (PSSP), Harassment Policy, Training and awareness programs for most effective ways to respond to aggressive and abusive behavior included in orientation, Fit For Duty Program, Fatigue Management Program, Mentorship Program Training, , Discipline Action Program, Alcohol Drug abuse program, Security Plan	1-Extremely Unlikely	3-Major	3	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-242	2021-06-10	Approved
5B-KBTPN-164R	Active	Incidents	Health and Safety	Fit for Duty	All Stages	Workers are exposed to the hazards of using a piece of a equipment for a task that it was not designed for	3-Rare	4-Critical	12	Competency Assessment Program Operator Competency Assessments Inspections on equipment Always follow OEM Operating Guidelines and Specifications	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-273R, 5B-KBTP-555R	2021-01-22	Approved
5B-KBTPN-165	Active	Lessons Learned	Health and Safety	Fit for Duty	All Stages	Worker injured as a result of improperly installed light plant falling over	3-Rare	4-Critical	12	Ensure equipment is placed on even ground. Wheel chocks shall be set in place prior to unhitching towed equipment Deploy outriggers as per manufacturer's recommendations. Monitor weather for high winds and adjust light plants as necessary or any other mobile equipment Only competent workers are permitted to setup light plants - Trained and signed off Mating to be used under outriggers for soft ground conditions Level to be used to ensure the mast is plumb	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-288, 5B-KBTP-570	2021-01-23	Approved

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-182	Active	Risk register re-issue	Health and Safety	Fit for Duty - Loss of Control	All Stages	KBTP Driver loses control of vehicle due to poor visibility and slippery road conditions results in an injury (e.g. vehicle slides off the road and/or vehicle hits another object)	3-Rare	4-Critical	12	Make sure slow traffic speeds are posted and adhered to using traffic control personnel Place concrete barricades where required to prevent contact with workers Illuminate areas when required with light plants/street lights Use traffic cones and equipment with reflective features/strips Personnel working at night will have reflective tape on their hard hats and will wear class 3 retroreflective vests as a minimum. Utilize AFADS when required to slow and control the flow of traffic Train workers and follow the TCP Ensure company vehicles follow the maintenance program and equipped with appropriate tires for the season	2-Unlikely	3-Major	6	Matthew Praine	Justin Calabrese	NOC		2022-05-23	Approved
5B-KBTPN-189	Active	Risk Review Session	Health and Safety	Flammable Substances	All Stages	Exposure to extreme heat due to proximity to an industrial fire caused by a vapor release from operational process piping combined with an ignition source.	2-Unlikely	4-Critical	8	Project Risk Assessment that identifies operations close to or with the potential to impact the project. High visibility apparel, Fire retardant apparel as required, Gloves suitable for the task, safety boots, hard hats with side protection. Fire Extinguishers and equipment readily available. Delineation and/or signage to keep unauthorized personnel from entering high risk work areas. All workers are trained in the emergency repsonse procedures associated with their specific work risks.	2-Unlikely	4-Critical	8	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-243	2021-06-10	Approved
5B-KBTPN-190	Active	Incidents	Health and Safety	Flammable Substances	All Stages	Worker exposure to fire/explosion during handling or storage of flammable materials	3-Rare	4-Critical	12	Review Product SDS/GHS Signage GHS /TDG competency for handling and transport of Flammable materials Focused Inspections Explosion and Fire Resistant Storage Units Cargo Management Program Remove all ignition sources Gas monitoring Fire Watch Fire Resistant Clothing	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-270, 5B-KBTP-552	2021-01-22	Approved
5B-KBTPN-200	Active	Risk Review Session	Health and Safety	Ground Conditions	All Stages	Construction material placed on unstable terrain, close to an excavation, falling onto a worker.	2-Unlikely	2-Moderate	4	Project Specific Safety Plan (PSSP), SWP's, Fit For Duty Program, Fatigue Management Program, Mentorship Program, Training, FLHA, as per TMEP Requirement, Hi-vis apparel, gloves suitable for the task, Hard hats with side protection, safety eye wear, safety footwear. Provision of sufficient work space. Use equipment to prepare surfaces to place material, such as maintaining the 1 meter distance of spoil from trench . Follow SWP Night Operations	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-221	2021-06-10	Approved
5B-KBTPN-201	Active	Risk Review Session	Health and Safety	Ground Conditions	All Stages	contact by moving machinery due to loss of control caused by steep and/or unstable slopes.	2-Unlikely	3-Major	6	Project Specific Safety Plan (PSSP), SWP's, Fit For Duty Program, Fatigue Management Program, Mentorship Program, Training, Orientation, FLHA, Trade Certifications, Exclusion Zone, Equipment Inspection, Slope specific Steep slopes Plans in compliance to HSMP Section 58 and Appendix G. No persons shall work below machinery on a steep or unstable slope enforced. Hi-vis apparel, gloves suitable for the task, Hard hats with side protection, safety eye wear, safety footwear. Machine securement./anchoring as required. Cabs of machines to be protected from cables whip if they break	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-222	2021-06-10	Approved
5B-KBTPN-202	Active	Risk Review Session	Health and Safety	Ground Conditions	All Stages	A fall from a river bank into the water due to slippery surfaces caused by climatic conditions.	3-Rare	3-Major	9	Project Specific Safety Plan (PSSP), SWP working near water, Fit For Duty Program, Fatigue Management Program, Mentorship Program, Training, Orientation, FLHA, Policy of no closer than 10 meters when close to water. Working near water procedure where the use of PPE is mandatory and rescue equipment is in place. Floatation device (PFD), available and used when within 10m of waterways. Fall restraint system can be used to prevent potential falls into waterways.	3-Rare	2-Moderate	6	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-224	2021-06-10	Approved
5B-KBTPN-207	Active	Lessons Learned	Health and Safety	Ground Conditions	All stages	The Risk worker struch by construction material caused by unstable terrain	3-Rare	4-Critical	12	Geotechnical assessment, Engineered controls (e.g. shoring walls, coco matting slope protection), Site inspections, Scaling of loose materials and debris Barriers and Fencing Signage, Air horns Exclusion zones, Spotters/Safety Watch Skid piles, Anchors and tethers Magnets or tag lines where applicable	1-Extremely Unlikely	2-Moderate	2	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-279, 5B-KBTP-561	2021-01-22	Approved
5B-KBTPN-234	Active	Risk Review Session	Health and Safety	Lighting	All Stages	Poor lighting causing a worker to fail to see a ground level obstruction where the worker tripped and fell.	4-Occasional	2-Moderate	8	Project Specific Safety Plan (PSSP), SWP's, Fit For Duty Program, Fatigue Management Program, Mentorship Program, Training, Orientation, FLHA, lighting studies in areas and times of poor lighting to ensure lighting is compliant with standards and regulations. Gloves suitable for the task, Hard hats with side protection, safety eye wear, safety footwear. Walkways and travel ways to be kept free of obstacles as much as possible. Light towers and other sources to be in place where lighting is inadequate for the work being performed. Light plants used to increase lighting conditions in work and parking areas.	4-Occasional	1-Minor	4	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-225	2021-06-10	Approved
5B-KBTPN-235	Inactive	Risk Review Session	Health and Safety	Lighting	All stages	Performing crane lifts in low light conditions.	2-Unlikely	3-Major	6	Perform lift in day light hours or with staged artificial lighting. Barricades High visibility apparel to help signalman to see all workers, Gloves suitable for the task, safety boots, hard hats with side protection. Rigging training Competency assessment Signal person Supervisor instruction regarding safe positioning Signage Use taglines	1-Extremely Unlikely	2-Moderate	2	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-261	2021-06-10	Approved

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/N OC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-239	Active	Risk Review Session	Health and Safety	Noise	All Stages	Exposure to 90-95dB noise or higher. High frequency noise due to proximity to noise generating machines or devices.	4-Occasional	2-Moderate		8 Project Specific Safety Plan (PSSP) Competency Assurance Program, Fit for duty requirements, hearing protection procedure, sound surveys to ensure noise is within tolerable levels. Hearing protection mandatory for certain jobs, situations. Sound level studies for noisy ENVs. Hearing protection (ear plugs), double hearing protection as identified through sound measurements. Noise barriers, use of low noise machinery when possible,	4-Occasional	1-Minor	4	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-164	2021-06-10	Approved
5B-KBTPN-250	Active	Risk Review Session	Health and Safety	Pandemic	All Stages	All workers have the potential of contracting Communicable Disease while completing activities at the worksite and while in vehicles/busses/camp	2-Unlikely	3-Major		6 Surgical face mask or N95/K95, as required by local, provincial, or federal mandate. Additional lunch rooms (if required) to support provincial and federal distancing guidelines Increased cleaning frequency for all site based temp offices, trailers and vehicles Promotion of proper hygiene routines (signage for washing hands, etc.) Site wide communications regarding communicable disease and proactive prevention measures	4-Occasional	3-Major	12	Wade Medley	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-118	2021-06-10	Approved
5B-KBTPN-254	Active	Risk Review Session	Health and Safety	Radio interference	All stages	Operators losing control of load when not getting voice signals during lowering in pipe	4-Occasional	3-Major		12 Competency assessment and training Lifting Plan Supervisor instructions for operator to stop operation when continuous communication has stopped.	4-Occasional	3-Major	12	Stefano Liut	Wade Medley	AOC	Former Risk ID was 5B-KBTP-263	2021-06-10	Approved
5B-KBTPN-256	Active	Risk Review Session	Health and Safety	Railway Crossings	All Stages	Worker injuries resulting from worker or vehicle being struck by train	1-Extremely Unlikely	4-Critical		4 Project Specific safety Plan (PSSP) Emergency Response Plan (ERP) Environmental Protection Plan Competency Assurance Fatigue Management Program Drug and Alcohol Program, CN Orientation. Hi-vis apparel, Hard hats with side protection, safety eye wear. Signage to indicate hazard of the train track crossing.	1-Extremely Unlikely	4-Critical	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-177	2021-06-10	Approved
5B-KBTPN-259	Active	Risk Review Session	Health and Safety	Roadway - Traffic	All Stages	There is potential of roadway vehicle incidents when traveling to worksites that can result in worker injuries	3-Rare	3-Major		9 Vehicle inspection prior to starting the trip Prepare a journey management plan prior to starting a trip. Drivers abstract checks as part of hiring process. Use of seatbelt is required on all roadways and vehicles. Drivers are to follow the posted speed limits and adjust driving speed to road/weather conditions Construction vehicles are to use additional lighting (ex. flashing amber lights) to make more visible to other motorists in vicinity. Site access points are maintained to reduce transition time from public roadway to site roadway. Site traffic department utilized to reduce hazard of slower site vehicles while enter/exiting site.	2-Unlikely	3-Major	6	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-007	2021-06-10	Approved
5B-KBTPN-264	Active	Risk Review Session	Health and Safety	Roadway - Traffic	All Stages	Flying objects coming from public traffic have the potential of causing injuries to driver/operator	4-Occasional	3-Major		12 Worksite protection using roadside barrier Fencing and gaulk screen near live traffic Ensure that dirt/rocks/debris are cleaned from the sideboards of dump trucks prior to departing the site, to reduce/control/eliminate road debris Buffer vehicles if required Traffic control personnel slowing traffic near workers Change posted speed limit if required Ensure that dirt/rocks/debris are cleaned from the sideboards of dump trucks, prior to departing site, to reduce/control/eliminate road debris.	3-Rare	3-Major	9	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-127	2021-06-10	Approved
5B-KBTPN-266	Active	Risk Review Session	Health and Safety	Roadway - Traffic	All Stages	Flag person exposure to general public vehicles while controlling traffic on the roadway	4-Occasional	5-Extreme		20 Approved Traffic Management Plans (reviewed and approved by TMEP, MOTI, etc) Hi-vis apparel, Hard hats with side protection, safety eye wear, safety footwear. Adequate Lighting, installation of adequate traffic control measures. Installation of traffic cones, barricades. Traffic Control Plan specific to work zone. (TC Person, Signs, Flagging, delineators, speed reduction spacing.), Traffic Control Monitoring Police speed control enforcement Speed zone reduction on Hwy 5 - 120kph to 90/60 kph Speed reader signs Communicate with non-project affected highway contractors Crash trucks placed ahead of TCP if feasible in high risk TMEP controlled work area's Installation of traffic cones, barricades. Use of Automated Flagger Assistance Device (AFAD) to keep workers out of the line of fire (where applicable)	3-Rare	4-Critical	12	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-214	2021-06-10	Approved
5B-KBTPN-267	Active	Risk Review Session	Health and Safety	Roadway - Traffic	All stages	Worker injury resulting from a Member of Public driving unsafely	2-Unlikely	3-Major		6 Approved Traffic Management plans (Approved by TMEP, MOTI, etc) Flag persons, signage, barricades, supervisor instruction regarding safe positioning . High visibility apparel, Gloves suitable for the task, safety footwear, hard hats with side protection. Use of Automated Flagger Assistance Device (AFAD) to keep workers out of the line of fire (where applicable)	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-251	2021-06-10	Approved
5B-KBTPN-269	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	Construction vehicle hits a hiker and/or cyclist (any member of the public) while driving on the ROW.	3-Rare	4-Critical		12 ROW will be blocked using gates, fence, barricades etc. to prevent members of the the public from entering ROW. Areas where the trail is outside, but below ROW will have a berm built to prevent material or equipment from entering the ROW. Spotters will be used when moving equipment in areas where equipment and the public migh interface. Ensure applicable warning signage and barricades are in place.	3-Rare	3-Major	9	Matthew Praine	Justin Calabrese	NOC		2022-05-23	Approved

TABLE 1: KBTP CHRR

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-270	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	Member of Public not following traffic signs (including AFADs) and hits a KBTP worker (e.g. speeding)	3-Rare	5-Extreme	15	Make sure slow traffic speeds are posted and adhered to using traffic control personnel Place concrete barricades where required to prevent contact with workers Illuminate areas when required with light plants/street lights Use traffic cones and equipment with reflective features/strips Personnel working at night will have reflective tape on their hard hats and will wear class 3 retroreflective vests as a minimum. Utilize AFADS when required to slow and control the flow of traffic Train workers and follow the TCP	2-Unlikely	4-Critical	8	Matthew Praine	Justin Calabrese	NOC	This risk also extends to residential/side roads	2022-05-23	Approved
5B-KBTPN-271	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	Member of public driver loses control of vehicle (e.g. tries to stop abruptly) causing injury or fatality, caused by an unexpected traffic lineup (e.g. driver misses the warning signs on highway).	3-Rare	5-Extreme	15	Make sure slow traffic speeds are posted and adhered to using traffic control personnel Place concrete barricades where required to prevent contact with workers Illuminate areas when required with light plants/street lights Use traffic cones and equipment with reflective features/strips Personnel working at night will have reflective tape on their hard hats and will wear class 3 retroreflective vests as a minimum. Utilize AFADS when required to slow and control the flow of traffic Train workers using, setting up and towing AFADs Train workers and follow the TCP	2-Unlikely	4-Critical	8	Matthew Praine	Justin Calabrese	NOC		2022-05-23	Approved
5B-KBTPN-272	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	KBTP Driver not following traffic signs (including AFADS) and hits a member of public, worker or equipment (e.g. speeding)	3-Rare	4-Critical	12	Vehcles are equipped with telematics to prevent/warn drivers of speeding. Workers will be assessed daily for being fit for duty. Workers will follow the fit for duty and fatigue management plan. Any workers found to be breaking the rules will be subject to disciplinary action Workers will recieve awareness training for driving and periodic DSB reminders Workers will recieve periodic safe driver awareness information through DSB/s and PTI's. Only qualified drivers with clean abstracts will be allowed to drive company vehicles	2-Unlikely	4-Critical	8	Matthew Praine	Justin Calabrese	NOC	This risk also extends to residential/side roads	2022-05-23	Approved
5B-KBTPN-273	Inactive	Risk Review Session	Health and Safety	Security - Protesting	All Stages	Worker injuries resulting from being assaulted by protesters	2-Unlikely	3-Major	6	TMEP Security Protection plan, Project Specific safety Plan (PSSP), Emergency Response Plan (ERP), Security awareness training included in orientation and notices as required/advised. Hi-vis apparel, Hard hats with side protection, safety eye wear Fencing, Hi power security cameras, locked and monitored gates, entrances and mobile and foot security patrols at vulnerable locations.	1-Extremely Unlikely	2-Moderate	2	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-179	2021-06-10	Approved
5B-KBTPN-275	Active	Risk Review Session	Health and Safety	Security - Terrorism	All stages	Bomb planted on job site	1-Extremely Unlikely	5-Extreme	5	Workers to immediately report suspicious bags, boxes, and devices, as well as unknown persons. Security personnel are actively monitoring site 24/7 to help ensure no un-authorized access. Security risks are discussed/trained on in the orientation procedure. Compounds require valid Identification Cards to gain access (Laydowns and Camps).	1-Extremely Unlikely	5-Extreme	5	Wade Medley	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-264	2021-06-10	Approved
5B-KBTPN-280	Active	Risk Review Session	Health and Safety	Security - Vandalism	All Stages	There is potential of vandalism to equipment, construction materials, personnel vehicles Near miss, or injury as a result of the effects of vandalism to equipment, construction materials, personal vehicles at a pipeline construction site, office or yard facility due to criminal conduct from anti-pipeline protestors (i.e. drilling into pipe pre hydrotest etc.)	5-Expected	2-Moderate	10	Daily Visual Inspections of Equipment - Security fencing to protect workers in construction work area including laydowns Law enforcement Full time security at all work locations Cameras at high risk locations (pending review with KBP and TMEP Security) Monitoring tools (Social Media, etc.) to predict events	4-Occasional	1-Minor	4	Olivier Beaulieu	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-129	2021-06-10	Approved
5B-KBTPN-292	Active	Lesson Learned	Health and Safety	Toxic Fluid/Solvents	All Stages	Worker exposure to Corrosive liquids and associated vapors during equipment maintenance, cleaning, weed and pest control applications	3-Rare	4-Critical	12	Review Product SDS/GHS Specialized PPE (rubber gloves, respiratory filters, Tyvek coveralls, aprons, rubber boots) per SDS Worker competency assessment as per SDS Storage, Transport, and Handling as GHS /SDS. Substitute for less toxic product where possible Ventilation Signage Barriers Spill Containment	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-269, 5B-KBTP-551	2021-01-22	Approved
5B-KBTPN-295	Active	Risk Review Session	Health and Safety	Toxic Gases	All Stages	An exposure to a vapor release due to filling a sump tank/tank truck/vacuum truck caused by inadequate tank vent routing	2-Unlikely	3-Major	6	Proper work wear/apparel (safety eye wear, proper respiratory and any specially required PPE as per the SDS. Effective ventilation as required in the SDS. Signage in areas if required Communicate and coordinate with other trades/people in the area prior to starting any work	1-Extremely Unlikely	2-Moderate	2	Stefano Liut	Wade Medley	AOC	No daylighting work during night shift Former Risk ID was 5B-KBTP-194	2021-07-12	Approved
5B-KBTPN-298	Active	Risk Review Session	Health and Safety	Vibration	All Stages	Worker injury, fatigue, strain from vibration caused by using power sprayers and handheld power tools for long periods of time..	2-Unlikely	3-Major	6	Project Specific Safety Plan (PSSP, JHA), Competency Assurance Program, Fit for duty requirements, including fatigue management, green hand program. Hi-vis apparel, gloves (suitable for the job), Safety Boots, Hard hat, eye protection. Vibration Gloves	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-169	2021-06-10	Approved
5B-KBTPN-302	Active	Risk Review Session	Health and Safety	Wildlife & Aquatic Habitats	All stages	Personnel may encounter bears while conducting work activities that can result in worker injury	4-Occasional	3-Major	12	Bear Awareness Training Provide bear spray to personnel and train them on how and when to use it. Use of UTV's or other vehicles in remote areas as a noise deterrent to wildlife, as well as a faster method to remove workers from those situations.	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-271	2021-06-10	Approved
5B-KBTPN-307	Active	Risk Review Session	Health and Safety	Working at Height	All stages	Trailer work - fall from an extension ladder, step-ladder or scaffolding due to loss of balance, missed step, or missed handhold	4-Occasional	3-Major	12	Project Specific Safety Plan (PSSP, JHA), Competency Assurance Program, Fit for duty requirements, including fatigue management, green hand program, working at heights rules such as 3 point contact. Personal Protective Equipment : gloves suitable for the job, , fall arrest and fall restraint (100% tie off) Engineered tie off points.	4-Occasional	2-Moderate	8	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-167	2021-06-10	Approved

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5B-KBTPN-308	Active	Risk Review Session	Health and Safety	Working at Height	All Stages	Worker injury from fall from permanent platform or stairway, due to loss of balance, missed step, or missed handhold	3-Rare	4-Critical	12	Project Specific Safety Plan (PSSP, JHA), Competency Assurance Program, Fit for duty requirements, including fatigue management, green hand program, working at heights rules such as 3 point contact. Hi-vis apparel, gloves suitable for the job, , fall arrest and fall restraint (100% tie off) ES: Use of other portable work platforms as available, Engineered tie off points, Adequate lighting.	3-Rare	3-Major	9	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-168	2021-06-10	Approved
5B-KBTPN-311	Active	Risk Review Session	Health and Safety	Workplace Congestion	All Stages	There is potential of workers being struck by equipment while performing activities around equipment/machinery that may result in near miss, worker injury, or fatality.	2-Unlikely	4-Critical	8	Class II reflective vest Utilize competent spotters in tight areas Personnel training on working near equipment Standard offset for walking or working behind equipment Do not approach within an excavator’s swing radius (approx.15m), Do not approach a dozer / rock truck / packer within 15m without the operator stopping and acknowledging you, Do not approach a machine from its blind side. Blind side is where you can’t see the operator from where you are approaching(right side of all equipment) Receive positive communication from the operator that they see you; Hand or Verbal signal from operator, Equipment implements are grounded, Operator turns off hydraulics Two horn blast protocol before backing up - Keep different operations separated as far as possible from one another Designated Operator Program (i.e. Competency) TPI Establish designated walkways, when possible. Establish designated access points, when possible Clearly identify designated drop off and pick up points for workers. Limit number of vehicles and equipment allowed on site. One-way traffic around site where practicable. Identify the entrances/exits to work areas with contact information signage Delineation of the worksite (barricades) Review signals with the operator to ensure communication and signals are clear. Pull-overs installed along the Right-of-Way to allow traffic to pull off the main roadway and large equipment to pass or light duty vehicles.	1-Extremely Unlikely	3-Major	3	Olivier Beaulieu	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-030	2021-06-10	Approved
5B-KBTPN-313	Active	Risk Review Session	Health and Safety	Workplace Congestion	All Stages	Worker injuries resulting from being struck by Light Duty Vehicle	2-Unlikely	4-Critical	8	Project Specific safety Plan (PSSP) Emergency Response Plan (ERP) Environmental Protection Plan Competency Assurance Fatigue Management Program Drug and Alcohol Program, Fit for Duty , Line of Sight, Spotter Safety Training, Drug and Alcohol Program. Hi-vis apparel, Hard hats with side protection, safety eye wear. ES: Buggy Whips on vehicles, reverse alarms on equipment and vehicles .	1-Extremely Unlikely	4-Critical	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-178	2021-06-10	Approved
5B-KBTPN-317	Active	New equipment for operations	Health and Safety	Roadway - Traffic	All Stages	Incorrect/improper setup of Automated Flagger Assistance Device (AFAD) causes it to fall, impacting worker	4-Occasional	3-Major	12	Training provided to workers involved with AFAD setups AFADs to be setup on roadway shoulders where level, solid ground is present 4-point jack system to be used to level the unit, stabilizing jack pads to be used on soft ground.	4-Occasional	2-Moderate	8	Matt Praine	Justin Calabrese	AOC	Former Risk ID was 5B-KBTP-682	2022-06-06	Approved
5B-KBTPN-320	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	Highway vehicle (worker or public) impacting a broken down vehicle while on highway (e.g. Public RV, construction vehicle, truck and trailers, towing vehicles), causing injury to either operator (worker or public).	3-Rare	4-Critical	12	Vehicle inspection prior to starting the trip. Drivers abstract checks as part of hiring process.(Valid Licence) Use of seatbelt is required on all roadways and vehicles. Drivers are to follow the posted speed limits and adjust driving speed to road/weather conditions During pre-trip all equipment with reflective decals shall be free of debris and or damage. All vehicle operators/drivers will go through appropriate tool-box trainings which highlights the importance of defensive driving. Use of Trained Traffic Control Personnel to assist with emergency roadway hazards, controlling traffic.	2-Unlikely	4-Critical	8	Matt Praine	Justin Calabrese	AOC		2022-05-23	Approved
5B-KBTPN-321	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	Inexperienced/unauthorized driver driving on highway causing an impact to a member of the public or employee/worker (e.g. new driver class 1 or 3)	3-Rare	4-Critical	12	Onsite drivers competency evaluation prior to being approved to drive company vehicles on site. Vehicles are equipped with telematics to prevent/warn drivers of speeding. Workers will be assessed daily for being fit for duty. Workers will follow the fit for duty and fatigue management plan. Any workers found to be breaking the rules will be subject to disciplinary action Workers will receive awareness training for driving and periodic DSB reminders Workers will receive periodic safe driver awareness information through DSB/s and PTI's.	2-Unlikely	4-Critical	8	Matt Praine	Justin Calabrese	AOC		2022-05-23	Approved
5B-KBTPN-328	Active	Risk register re-issue	Health and Safety	Roadway - Traffic	All Stages	While towing a trailer or trailer mounted equipment (E.g. AFAD, generator, or light plant) decoupling occurs resulting in the trailer impacting workers or the public.	3-Rare	5-Extreme	15	Safety chains and when required emergency braking installed on trailers Inspections completed on trailers prior to use Trailer towing competency and evaluation Trailer tongue locking pin installed prior to moving (if present) ensure tongue lock has properly grabbed tow ball prior to moving. Ensure properly sized tow ball for trailer tongue. Ensure workers are trained on proper AFAD hook-up and dis-connection procedures. Ensure Hook-up and Dis-Connection is being done according to the manufactures specifications and training.	3-Rare	4-Critical	12	Matt Praine	Jeff Sorenson	NOC		2022-06-06	Approved

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5B-KBTPN-133	Inactive	Risk Review Session	Health and Safety	Extreme Weather	All Stages - Seasonal	There's is potential of having persons working or driving in areas that may be exposed to a risk associated with an avalanche that may result in injury to workers.	1-Extremely Unlikely	5-Extreme		5 Personnel to review the project avalanche report each morning and follow the directions for each zone. Personnel to check road conditions and closures on DriveBC before going. Snow rated tires on vehicles driving into areas of higher elevation (BC highway requirements also need to be followed) Vehicles will be equipped with emergency kits Avalanche rescue gear utilized by all personnel working in avalanche zones. Obey all road closures. Personnel will be orientated on avalanche safety awareness Supervisors will ensure that a written avalanche risk assessment is completed and control measures prior to starting the work.	1-Extremely Unlikely	4-Critical	4	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination. Avalanche season runs approximately from mid November to the end of April. Former Risk ID was 5B-KBTP-079	2021-06-10	Approved
5B-KBTPN-134	Active	Risk Review Session	Health and Safety	Extreme Weather	All Stages - Seasonal	Workers exposed to extreme temperatures when working outdoors may result in worker heat illnesses such as dehydration, heat stress or heat exhaustion	5-Expected	2-Moderate		10 Hydration Breaks Rotate workers either into shaded areas to cool off Training for heat illness prevention Safe Work Practice -Long sleeve policy Buddy system Nearby cooler with water, fruit, and electrolyte supplements Hard hat sweat absorption pad	3-Rare	2-Moderate	6	Jeff Sorenson	Wade Medley	NOC	No welding activities during night shift Former Risk ID was 5B-KBTP-080	2021-06-10	Approved
5B-KBTPN-199	Active	Risk Review Session	Health and Safety	Ground Conditions	All Stages (if needed)	Contact by moving construction material due to loss of material stability in an excavation. Contact with equipment.	2-Unlikely	4-Critical		8 KBP Confined Space Safe Work Practice, TMEP HSMP Confined Space, Ditch entry assessment in the PSSP, JHA for working in trenches or bell holes, Competency Assurance Program, Fatigue Management Program, Mentorship Program Training, Drug and Alcohol Program, Work site inspection schedule. Restricted space vs confined space comparative analysis. Safe work practices for working in a restricted space to be put in place. Hi-vis apparel to aid in the location of a person who needs to be recued. Hard hats with side protection, safety eye wear. Use of shoring and/or trench boxes based on site conditions, Minimum of 2 ladders secured for access/exit.	1-Extremely Unlikely	3-Major	3	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-158	2021-06-10	Approved
5B-KBTPN-135	Active	Risk Review Session	Health and Safety	Extreme Weather	All Stages Seasonal	Contact by lightning due to proximity and exposure to an active thunderstorm cloud.	2-Unlikely	4-Critical		8 Apply the 30-30 Rule to determine the threat of lightning in the working area. Count the second between seeing lightning and hearing thunder. If this this time is less than 30 seconds, seek shelter immediately. Allow enough time to find and take cover in a safe shelter, Stay away from water bodies and metal objects (i.e., tools and chainsaws) TP:Turn off radio and communication equipment Spread out, do not stand in a group - stay at least 10 m (33 ft.) away from the highest potential conductor.	1-Extremely Unlikely	4-Critical	4	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-211	2021-06-10	Approved
5B-KBTPN-252	Active	Risk Review Session	Health and Safety	Radiation	All Stages Welding	Exposure to ultraviolet radiation due to exposed high-current arc caused by welding.	2-Unlikely	3-Major		6 Unprotected and non-essential personnel not permitted in the welding area. Corrdinate with other contractors adjacent to work area. Signage and exclusion zones as required. Long sleeves and pants/ coveralls, Hard hats with side protection, safety eye wear, welder specific protective work wear. Use of UV protective creams, etc. Setting up of welder screens when possible.	2-Unlikely	2-Moderate	4	Stefano Liut	Wade Medley	AOC	No welding activities during night shift Former Risk ID was 5B-KBTP-185	2021-06-10	Approved
5B-KBTPN-253	Active	Risk Review Session	Health and Safety	Radiation	All Stages Welding	Exposure to radiation due to proximity to radiation generating devices (i.e. weld X-ray source) during NDE activities.	3-Rare	3-Major		9 Non-essential personnel not permitted in area. Warning signs, barricades as required, and awareness sessions with crews. Radiation awareness part of orientation. Technicians preform their visual check of the area prior to the shot being taken Unnecessary personnel evacuated form the danger zone Flashing beacon to warn people and keep them away during potential exposure times.	2-Unlikely	3-Major	6	Stefano Liut	Wade Medley	AOC	No welding activities during night shift Former Risk ID was 5B-KBTP-186	2021-06-10	Approved
5B-KBTPN-329	Active	TMEP Audit	Health and Safety	Ergonomic - Hot/Cold Surfaces	All Stages Welding	Worker injury due to worker being exposed to flames during hot work inside trenches.	4-Occasional	3-Major		12 Hot Work Permit, given prior to starting work Wear Specialized PPE, Fire Rated Delineation and/or signage to prevent other workers from entering work space. Worker will have radio contact with foreman or supervisor at designated times. Proper work area set-up, to prevent hot material from falling and making contact with worker(s) Fire extinguisher readily available inside trench Flammable substances and sources removed from trench	3-Rare	3-Major	9	Matthew Praine	Wade Tinant	NOC		2022-07-10	Approved
5B-KBTP-081	Active - Materialized	Risk Review Session	Environment	Extreme Weather	Backfill and Compaction	Sediment release resulting from sudden impact by (or immersion in) flood water due to a normally dry drainage course or low water level at the time of sudden heavy rain or snow melt	5-Expected	2-Moderate		10 Environmental Coordinator to conduct regular inspections to ensure ESC measures in place and effective Monitor weather current conditions Advanced weather monitoring (forecast) Spare equipment (pumps) available to support events Stream diversion (isolation) Work in dry season (if possible) Use pre-washed clean equipment to reduce sedimentation Detailed assessments on the watercoarases Determine low flow periods Engineer device over or under the stream and avoid it altogether Isolate the work area Design seasonally appropriate timelines Use of swales, sumps and similar devices to contain and drop sediment from water	5-Expected	1-Minor	5	Craig Ratcliffe	Gary Shorthouse	NOC	No backfilling will be conducted during night shifts	2021-06-10	Approved
5B-KBTP-465	Active	Risk Workshop	Environment	Soil Disturbance	Backfilling	Harm to wetlands from sedimentation	3-Rare	4-Critical		12 Install temporary erosion and sediment control structures (e.g., diversion ditches and berms, sediment fences and coir logs) immediately following the completion of backfilling adjacent to wetland crossings where the potential for erosion and sedimentation exists.	3-Rare	3-Major	9	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-183	2021-01-06	Approved

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5B-KBTP-128	Active	Risk Review Session	Environment	Rock Chemicals	Blasting Drill & Shot ROW	There is potential of being exposed to acid rock drainage/metal-laden leachates from blasting activities and removal/disposal of acid rock debris that can lead to contamination of land, surface, and ground water resources and impact to humans health and wildlife.	2-Unlikely	2-Moderate		4 LRSMR / EAS - Awareness of the potential acid rock locations (flat vs incline) - plan work in respect of those locations Conduct environmental Inspection pre-task with EI/RS Field testing for PAG Rock as directed by Geochemistry Resource Specialists Proper removal and disposal of acid rock debris as per the guidance of the Geochemistry Resource Specialists Neutralization by adding lime during reclamation phase Any Acid or metal leaching rock found in work area will be hauled off site to prevent potential contamination of waters  AD: MAP Visual: Environmental Alignment Sheets TP: Environmental Inspection TP: Field testing TP: Neutralization by adding lime during reclamation phase E/S: Acid or metal leaching rock found will be hauled off site to prevent potential contamination of waters	1-Extremely Unlikely	1-Minor	1	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTPN-006	Active	Risk Review Session	Health and Safety	Airborne Debris	Blasting Drill & Shot ROW	Drill and shot ROW activities have the potential of generating flying materials that may cause worker injury	2-Unlikely	4-Critical		8 Blast Plan Use blast mats for every shot to protect nearby structures, personnel and the public from blast projectiles Ground mobile equipment, including trucks, operating near electrical blasting operation Keep mobile radio transmitters and cell phones well away from electrical blasting operations. Intall signs for all nearby transmitters to be turned off. Ensure that drill holes are not left loaded overnight unless approved by TMEP onsite management. Suspend blasting operations during adverse weather conditions and dry conditions. Ensure everyone is out of the blast danger area Blaster to designate workers who have the sole responsibility of guarding against entry into the danger area of the blast site. Use traffic control where needed to keep vehicles out of the blast danger area during initiation. Use signage to keep workers and the public informed of the potential hazard in conjunction with any physical barricades.	1-Extremely Unlikely	3-Major	3	James Goggans	Wade Medley	NOC	No Blasting on Night Shift Former Risk ID was 5B-KBTP-004	2021-06-10	Approved
5B-KBTP-495R	Active	Risk Workshop	Environment	Vibration	Blasting, Trenching and Grading	Mobile Equipment or Blasting causing vibration damage to the existing TMPL 24" line resulting in a release of hydrocarbons.	2-Unlikely	4-Critical		8 - Signage indicating presence of utilities ion the area - DPP, Crossing Agreements, - Locating of lines ( hydrovac) - Vibration monitoring for Blasting activities., Blasting Plan - Limits of Approach to line established	1-Extremely Unlikely	4-Critical	4	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-213R	2021-01-06	Approved
5B-KBTPN-084	Inactive	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Boring	Human equipment interface - Use of slip bores working within a trench - side booms/excavators moving in congested workspace can result in worker injury	4-Occasional	4-Critical		16 Equipment daily inspections Daily inspection of placed trench walls and braces Tailgate will discuss movement of side booms or excavators movement near to trench walls (turning out will cause pressure to walls) Use trained spotters Radios used for communcation by equipment and ground crews. Delineation and/or signage to keep unauthorized personnel from entering hazardous areas. (line-of-fire)	3-Rare	4-Critical	12	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-275	2021-07-12	Approved
5B-KBTP-135	Active	Risk Review Session	Environment	Soil Disturbance	Bulk Excavation	Erosion of a slope because of failure to control surface water across land resulting in uncontrolled deposition into a watercourse	3-Rare	2-Moderate		6 Conduct environmental Inspection Environmental Manager will verify compliance with KBP's EPP, PSSP, SWPS, SOPs, JHAs, FLHAs and TMEP SOPs regarding Erosion Control Environmental Manager will provide Awareness and Training (reminder of importance in Safety Meetings, Toolbox etc.) - Construction Manager will verify daily weather forecast monitoring - Superintendent will verify completion of Site specific erosion and sediment control measures - Superintendents will include erosion control measures in Detailed Work Planning of activities - Superintendent will include alternative methods of water removal from site (e.g., pump to Secondary Containment) - Foreman will ensure avoidance of water discharge across land - Superintendent will verify timely reclamation - Foreman will verify monitoring during discharge -Project persons will receive environmental / ESC training	3-Rare	1-Minor	3	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to day & night shift activities	2021-06-10	Approved
5B-KBTP-077	Inactive	Risk Review Session	Environment	Extreme Weather	Clearing	Tracks and implement striking rock have the potential of creating sparks that can trigger a wildfire causing impact to the environment	3-Rare	3-Major		9 GCC will consider reducing the activity when there is a high fire risk or even eliminating. These restrictions in activity will be based on of the BC Wildfire Act - "Schedule 3 - Restrictions on High Risk Activities." Project managers will determine the risks and apply restrictions based on this and the Project Wildfire Management Plan	3-Rare	3-Major	9	Craig Ratcliffe	Gary Shorthouse	NOC	No clearing activities will be conducted during night shift	2021-06-10	Approved

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5B-KBTP-272	Active	Risk Review Session	Environment	Wildlife & Aquatic Habitats	Clearing	Inadvertent take of a migratory bird nest or egg during the migratory bird nesting season resulting from construction activities	3-Rare	3-Major		9 EPP - Clearing activities will be completed outside of migratory bird nesting season as practicable. For clearing or work within the migratory bird nesting season, complete nest sweeps as per the EPP and EFG: Nesting Bird Risk Assessment and Mitigation Plan If nests are identified, adhere to site-specific controls as outlined by the Resource Specialist per EPP and EFG: Complete daily review of nest sweep tracker and map with crews during morning tailgates as per EFG Respect and adhere to all nest buffers installed by the RS No work to occur unless a valid Work Authorization with appropriate nest sweep areas vetted against the sweep maps is present on site Ensure all Contractor personnel coming to site receive adequate training regarding nest mitigation	3-Rare	3-Major	9	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTPN-020	Active	Risk Review Session	Health and Safety	Communication	Clearing	There is potential of miscommunication between the machinery operator and workers involved in clearing that can result in impact/injury to the workers	4-Occasional	4-Critical		16 Verify prior to mobilization that all equipment meets the BC OHS Regulations for Forestry approved equipment. Workers on the ground and the mobile equipment operator must acknowledge each other's presence before workers moving to the dangerous area Use a signaler/spotter located in a safe position Inspection by the operator on foot, of the immediate area. Ensure radio communication between ground crews and operators Review signals with the operator to ensure communication and signals are clear.	3-Rare	4-Critical	12	Chad Gardiner	Wade Medley	NOC	No clearing activities will be conducted during night shift Former Risk ID was 5B-KBTP-065	2021-06-10	Approved
5B-KBTPN-046	Active	Risk Review Session	Health and Safety	Dropped objects	Clearing	Clearing has the potential of timber falling on workers	3-Rare	4-Critical		12 Before the start of felling operations, a certified Dangerous Tree and Wildlife tree assessor will inspect any trees in the work area suspected of posing a danger to workers or equipment. Only a competent feller will remove any danger trees. All chainsaw operators must be competent Fellers must wear required PPE and be equipped with proper communication devices. Fellers must move to a predetermined safe zone once the tree starts to fall. All vehicles and equipment must be parked at least 100 m (330 ft) from the felling area All equipment working in the felling area must have a rollover protection system and a falling object protection system. Workers will use drip trays or absorbent pads when refuelling chain saws. Refuelling is not permitted within 100 m (330 ft) of a waterbody. Install goal posts and signage on both sides of overhead power lines, use spotters as required. Cut top to bottom when possible keeping trees on down hill side of machine to avoid contact with machines. All equipment has Fall over protection systems. Operators will be trained and designated. All equipment has ROPS (Rollover Protection System)	2-Unlikely	3-Major	6	Chad Gardiner	Wade Medley	NOC	No clearing activities will be conducted during night shift Former Risk ID was 5B-KBTP-009	2021-06-10	Approved
5B-KBTPN-096	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Clearing	Equipment moving along the ROW have the potential of metal to metal contact causing operator's injury	4-Occasional	3-Major		12 Establish clear radio communication protocol between equipment operators. Kilometre markers to help indicate positions on the ROW Reinforce communication protocol during tailgate meeting. Use signaler stationed in a safe position to guide equipment operators.	3-Rare	3-Major	9	Chad Gardiner	Wade Medley	NOC	No clearing activities will be conducted during night shift Former Risk ID was 5B-KBTP-066	2021-06-10	Approved
5B-KBTPN-106	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Clearing	Worker injury from tree cutting machinery due to proximity to tree cutting machinery	1-Extremely Unlikely	4-Critical		4 Proximity rule enforced that when the Operator sees any person within the restricted limits of approach, they stop the machine until the person returns to the safe work limit. Specific crew training when working with tree cutting equipment. High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection. Reverse alarms.	1-Extremely Unlikely	4-Critical	4	Stefano Liut	Wade Medley	NOC	No clearing activities will be conducted during night shift Former Risk ID was 5B-KBTP-197	2021-06-10	Approved
5B-KBTP-105	Active	Risk Review Session	Environment	Invasive weed/Uncontrolled seeds	Clearing, grubbing and topsoil stripping	Propagation of invasive vegetation due to uncontrolled seed transfer caused by ROW or other construction activities	3-Rare	2-Moderate		6 - Identification of invasive regions prior to disturbance - Environmental alignment sheets - Excavation equipment cleanup before and after sites - Awareness training - Biosecurity Stations - Level 1 cleaning stations at access/egress points - Pre-entry inspections - Top soil containment areas - Exclusion zone/quarantine areas/signage - as per requirements of the EAS and Features Maps - Spraying program - Mechanical removal	2-Unlikely	2-Moderate	4	Heather Ferguson	Gary Shorthouse	NOC		2021-06-10	Approved
5B-KBTP-119	Active	Risk Review Session	Environment	Protected & Rare Vegetation	Clearing, grubbing and topsoil stripping	Machine contact with rare plants due to ROW construction activities results in destruction of that rare plant	1-Extremely Unlikely	2-Moderate		2 Identify Locations where this may be a potential issue (environmental alignment sheets / LRSMT) Pre-construction survey by RS / EI / CEC Qualified specialists available to assess sites and provide mitigation plans if required Worker orientation shall include information on vegetation management Rare species contingency Plan shall be available and followed as required Establish Exclusion Zone, signage, flagging any any identified areas as per the TMEP EFG on environmental flagging Transplanting should be considered as an option should avoidance not be possible	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	NOC		2021-06-10	Approved

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5B-KBTP-120	Active	Risk Review Session	Environment	Protected Sites	Clearing, grubbing and topsoil stripping	Machine contact with traditional land use features, sacred sites due to pipeline construction activities	2-Unlikely	2-Moderate		4 Indigenous monitors to present as per TMEP requirements Archaeological assessment pre-construction to be completed - stay out of no-go zones Pre-planning work to utilize the EAS / LRSMT / Archy red/green maps to ensure no trespass KBTP Environmental Hazard Analysis to be used in planning stage to ensure areas are identified in work plans Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones Have available and use as required the Heritage and TLU chance find contingency plans	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	NOC			2021-06-10	Approved
5B-KBTP-134	Active	Risk Review Session	Environment	Soil Disturbance	Clearing, grubbing and topsoil stripping	Admixing topsoil from different locations during brushing, clearing, stripping, trenching, backfilling or reclaiming and other ROW construction activities	4-Occasional	3-Major		12 Conduct environmental inspection to ensure soils are properly segregated Environmental Protection Plan Environmental Alignment Sheets and Resource Specific Mitigation Tables Biosecurity/cleaning stations for equipment and vehicles TD: Dedicated soil stockpiles Signage on all stockpiles Trained excavator operator Soils handling training ES: Ship topsoil offsite and remove the risk	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to day and night shift activities	2021-06-10	Approved	
5B-KBTPN-289	Active	Risk Review Session	Health and Safety	Toxic Fluid/Solvents	Coating	Worker's skin coming in contact with chemicals causing skin burns/irritation	4-Occasional	3-Major		12 Proper gloves and basic PPE (Tyvec suits) Have readily available Safety Data Sheets Trained personnel doing coating Copy of SDS for cleaning/washing recommendations to prevent burns	4-Occasional	3-Major	12	Stefano Liut	Wade Medley	AOC	No coating activities will be conducted during night shifts Former Risk ID was 5B-KBTP-277	2021-07-12	Approved	
5B-KBTP-104	Inactive	Risk Review Session	Environment	Hydrocarbons	Construction Lifecycle	For Night Shift - Hydrocarbon release to a watercourse from leaking/damaged construction equipment or permanent works resulting in impacts to aquatic life and habitat.	3-Rare	2-Moderate		6 Superintendent will be familiar with and ready to implement the KBP Emergency Spill Response Plan Adequate spill response supplies will be onsite FLGP shall have an environmental section that identifies the process required for spill response Operators will complete a pre-work inspection of their equipment Lighting, delineation, and reflective strips on stationary equipment as well as any other mitigations shall be used in locations designated by field supervision to provide a safe environment for the operation and to identify obstructions that could damage equipment resulting in a spill or release	2-Unlikely	2-Moderate	4	Heather Ferguson	Gary Shorthouse	NOC	Applicable to night shift activities	2021-06-10	Approved	
5B-KBTP-116	Active	Risk Review Session	Environment	Buried Services	Construction Lifecycle	Hydrocarbon product release resulting from a ruptured pipeline due to high external loading caused by unauthorized crossings of mobile equipment overtop of a TMEP pipeline	1-Extremely Unlikely	3-Major		3 -Construction Manager will ensure compliance with the TMEP Damage Prevention Plan (including assigned and approved GD Supervisor) -Superintendent will verify completion of and that crews are following Detailed Work Planning and sequencing of activities -Foreman will obtain approved Ground Disturbance Permit (KBP and TMEP ) and verify that crew is following all requirements -Superintendent that all crews involved in operation have current Ground Disturbance Level II Training - Foreman will verify compliance with the Ground disturbance Checklist - Ground Disturbance Supervisor will ensure completion of Daily Pre-work inspections -Foreman will have ready a list of all Emergency Contact numbers - Construction Manager will verify completion of Engineering review for crossing pressure (TCSD) - Construction Manager will verify Utility Crossing or proximity agreement requirements are completed - Foreman will verify placement of all required signage concerning pipeline crossings - Superintendent will verify use of proper Rig Matting for better load distribution	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to night shift activities	2021-06-10	Approved	
5B-KBTP-154	Active	Risk Review Session	Environment	Wildlife & Aquatic Habitats	Construction Lifecycle	Destruction of active bird nest in a construction zone	4-Occasional	3-Major		12 Work Authorizations vetted against the TMEP nesting maps Nesting bird EFG - review and understand the current REV Preferred Clearing during least risk nesting window requirement Bird nest sweeps to be conducted as per the EFG, and associated buffers to be installed No work in areas without a valid nest sweep Respect all installed buffers Retain resource specialist for mitigation Best practice to park equipment away from native vegetation	3-Rare	3-Major	9	Craig Ratcliffe	Gary Shorthouse	NOC			2021-06-10	Approved
5B-KBTPN-062	Active	Risk Review Session	Health and Safety	Dropped objects	Crushing Operations	There is potential of falling rocks when feeding the crusher with the loader as well as aggregate coming off the conveyor causing worker injury (raw material)	3-Rare	4-Critical		12 •Delineate no-go-zone around the feeder to prevent workers injuries (barricades) •Add signage warning people of danger zone •Train workers on rock crusher and review rock crusher SWP	3-Rare	4-Critical	12	Mark Piercy	Wade Medley	NOC	No crushing operations during night shift Former Risk ID was 5B-KBTP-651	2021-08-17	Approved	
5B-KBTPN-093	Inactive	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Crushing Operations	Fix plant operator working around the crushing operations, where the crusher is mostly fed by the excavator, has the potential of suffering injuries when the worker is occupying the same workspace.	3-Rare	4-Critical		12 Establish clear radio communication protocol between equipment operators and plant operator. Establish traffic plan for the loader and all heavy equipment involved in crushing operations Ensure spotters are in place when necessary and train ground personnel on equipment blind spots. Use proper hand signals or communication when working with equipment Implements will be grounded, machine in park prior to approaching equipment	3-Rare	4-Critical	12	Mark Piercy	Wade Medley	NOC	No crushing operations during night shift Former Risk ID was 5B-KBTP-647	2021-08-17	Approved	
5B-KBTPN-103	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Crushing Operations	When the crusher is in operation, there are a lot of moving parts and crushing points (conveyor, crushing chamber, engine, etc.) that can cause worker injuries	3-Rare	4-Critical		12 Ensure safety guards are installed to ensure no access is possible to those moving parts/crushing points Warning signs installed to make aware of hazards ("moving parts", "high-voltage", etc) Training on equipment	3-Rare	3-Major	9	Mark Piercy	Wade Medley	NOC	No crushing operations during night shift Former Risk ID was 5B-KBTP-649	2021-08-17	Approved	

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/N OC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-104	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Crushing Operations	When the crusher is stopped for maintenance, there is a potential of worker injury if the crusher is restarted and workers are still in areas with moving parts/crushing points	3-Rare	4-Critical		12 Lockout/tagout is mandatory during maintenance operations (locking out prevents unintentional activation of motors) Ensure all stored energy is controlled during LOTO process. Testing of motor circuits and controls to ensure they are inactive. Confined space attendant for confined space work, along with Confined Space Plan	2-Unlikely	4-Critical	8	Mark Piercy	Wade Medley	NOC	No crushing operations during night shift Former Risk ID was 5B-KBTP-653	2021-08-17	Approved
5B-KBTPN-024	Active	Risk Review Session	Health and Safety	Construction Dust	Drilling	Worker injury due to excess rock dust generated by drilling operations	4-Occasional	3-Major		12 Ensure that the drill's dust collecting system is functioning properly. Wear specilized PPE (respirators with appropriate filter) when silica exposure is a potential. Based on wind direction, set-up work area to avoid worker exposure to dust. Delineation and/or signage to keep workers out of high dust areas (including any required Silica exposure related signage).	3-Rare	3-Major	9	James Goggans	Wade Medley	NOC	No Blasting on Night Shift Former Risk ID was 5B-KBTP-006	2021-06-10	Approved
5B-KBTPN-095	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Drilling	Worker injury due to manipulation of drill steel, bits, and drill steel rotation.	4-Occasional	3-Major		12 No workers around drill mast while in operation. Ensure rotation of drill steel has stopped and bits are screwed on by hand and not by using the rotation of the drill.	3-Rare	3-Major	9	James Goggans	Wade Medley	NOC	Not applicable to night shift Former Risk ID was 5B-KBTP-037	2021-06-10	Approved
5B-KBTPN-210	Active	Risk Review Session	Health and Safety	Ground Conditions - Steep Slope	Drilling	Worker injury due to drill or other equipment tipping over or unintentionally sliding down rock slope.	4-Occasional	4-Critical		16 Ensure drills are tied off to an approved anchor point Tether top-hammer rock drill as required per Section 57 and Appendix G of the HSMP. Position body/Equipment to work up and down slopes never sideways Tool and equipment competency Proper PPE	3-Rare	3-Major	9	James Goggans	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-096	2021-06-10	Approved
5B-KBTPN-071	Active	Risk register re-issue	Health and Safety	Electricity/High Voltage	Drilling and Blasting	Electrical current contacts magazines and silos igniting explosives (e.g. not grounded) resulting in worker injury	1-Extremely Unlikely	5-Extreme		5 Metal magazines will be grounded and equipped with electrical bonding connections between all conductive portions, so the entire structure is at the same electrical potential. Regular inspections will take place to ensure proper grounding is completed	1-Extremely Unlikely	5-Extreme	5	Matthew Praine	James Goggans	AOC		2022-05-23	Approved
5B-KBTPN-120	Active	Risk register re-issue	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Drilling and Blasting	Drill operator and/or other workers injured by drill rod or caught in rotating auto loading drill stem drive (e.g. Trammimg remote controlled drill and loading drill rod & drilling)	3-Rare	4-Critical		12 No workers around drill mast while in operation. A safe zone will be established and spotters will be used to prevent anyone from entering the danger zone The safe zone will be reviewed and discussed in the PTI prior to starting work and captured on the FLRA Ensure rotation of drill steel has stopped and bits are screwed on by hand and not by using the rotation of the drill. A competent person shall be designated the responsibility for maintaining surveillance on the work area to alert other workers.	3-Rare	4-Critical	12	Matthew Praine	James Goggans	NOC		2022-05-23	Approved
5B-KBTPN-171	Active	Risk register re-issue	Health and Safety	Fit for Duty	Drilling and Blasting	Explosives improperly stored (e.g. close to ignition sources) causing a fire/explosion	2-Unlikely	5-Extreme		10 Housekeeping and signage will be upkept in storage areas Ventilation is required in all storage areas to prevent combustion The explosives shall be stored in their own containers (boxes) held within magazines. Separation of combustible material (Warning Signage) Stacking requirements will be in accordance to the material storage plan Low volume of explosives will be stored at any given time. Explosive material storage areas and magazines including nitrate storage areas shall be kept clean and clear of rubbish, brush, dry grass, and trees for 25 feet in all directions Other combustibles will not be allowed to accumulate within 50 feet of these magazines.	2-Unlikely	4-Critical	8	Matthew Praine	James Goggans	NOC		2022-05-23	Approved
5B-KBTPN-172	Active	Risk register re-issue	Health and Safety	Fit for Duty	Drilling and Blasting	Improper handling of explosive (e.g. explosive not pre-inspected, not following procedures, using incorrect tools) resulting in a fire/explosion.	3-Rare	5-Extreme		15 SME Training on appropriate equipment/tools will be used (Blaster certification) Training on appropriate material handling Fit duty controls/assessments to ensure workers are fit for duty on a daily basis Regular inspections to ensure proper handling procedures are being followed	3-Rare	5-Extreme	15	Matthew Praine	James Goggans	NOC		2022-05-23	Approved
5B-KBTPN-173	Active	Risk register re-issue	Health and Safety	Fit for Duty	Drilling and Blasting	Unauthorized worker entering a blast zone during a planned detonation (e.g. miscommunication) (1/4)	3-Rare	4-Critical		12 Warning Airhorns Exclusion zone, fencing, barricades, signage Physical spotters/guards in place to prevent people from walking into blast zone	2-Unlikely	3-Major	6	Matthew Praine	James Goggans	NOC		2022-05-23	Approved
5B-KBTPN-183	Active	Risk register re-issue	Health and Safety	Flammable Substances	Drilling and Blasting	A member of public hits the explosives (e.g. a person with a gun) and ignites the storage unit.	1-Extremely Unlikely	5-Extreme		5 Magazines engineered design specifications to minimized explosion Magazine sites must be labeled with appropriate warning signs that indicate the contents and are visible from each approach. The signs shall be placed so that a bullet passing through them will not strike the magazine Metal magazines will be grounded and equipped with electrical bonding connections between all conductive portions, so the entire structure is at the same electrical potential.	1-Extremely Unlikely	4-Critical	4	Matthew Praine	James Goggans	AOC		2022-05-23	Approved
5B-KBTPN-184	Active	Risk register re-issue	Health and Safety	Flammable Substances	Drilling and Blasting	Authorized personnel (e.g. maintenance workers, blasting worker) working within a blast zone (e.g. rectifying a misfire) resulting in injury.	2-Unlikely	5-Extreme		10 Blast site shall be barricaded with berms and/or 28" green cones and posted with explosive signs to prevent unauthorized entry at a minimum of 30'. Blaster & Blast foreman will not allow any unauthorized persons to enter an area charged with explosives. Exclusion zone, fencing, barricades, signage Physical spotters/guards Service blaster training 3 certification	1-Extremely Unlikely	4-Critical	4	Matthew Praine	James Goggans	AOC		2022-05-23	Approved
5B-KBTPN-185	Active	Risk register re-issue	Health and Safety	Flammable Substances	Drilling and Blasting	Combustible dust igniting (e.g improper storage) causing a fire/explosion	2-Unlikely	4-Critical		8 Housekeeping and signage will be upkept in storage areas Ventilation is required in all storage areas to prevent combustion The explosives shall be stored in their own containers (boxes) held within magazines Separation of combustible material Stacking requirements will be in accordance to the material storage plan Low volume of explosives will be stored at any given time.	1-Extremely Unlikely	3-Major	3	Matthew Praine	James Goggans	AOC		2022-05-23	Approved
5B-KBTPN-186	Active	Risk register re-issue	Health and Safety	Flammable Substances	Drilling and Blasting	Stored contaminated cardboard boxes (used for transporting/delivery of explosives) being recycled instead of destroyed resulting in a fire.	2-Unlikely	3-Major		6 All explosive containers (cardboard boxes) will be thoroughly inspected to insure no product remains Empty boxes shall be completely dismantled prior to being disposed of at the dumpsite. Proper training will be conducted for anyone handling blasting material A detailed catalogue will be kept of all blasting materials to ensure everything is accounted for	1-Extremely Unlikely	3-Major	3	Matthew Praine	James Goggans	NOC		2022-05-23	Approved

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5B-KBTPN-322	Active	Risk register re-issue	Health and Safety	Construction Dust	Drilling and Blasting	Inhalation of silica dust or particulate during drilling, rock crushing, and blasting operation	4-Occasional	3-Major	12	Ensure that the drill's dust collecting system is functioning properly. Wear respirators as required. Complete Silica Assessment Conduct silica awareness training Install signs and barricades to prevent unauthorized entry/warning into high risk areas Follow guidelines/procedures set out in the SECP	4-Occasional	3-Major	12	Chris Marchand	Ameer Balouch	AOC		2022-09-15	Approved
5B-KBTPN-323	Active	Risk register re-issue	Health and Safety	Toxic Gases	Drilling and Blasting	Worker prematurely enters blast area, post blast, causing inhalation of NOx gases created by the explosion	3-Rare	2-Moderate	6	Blast site shall be barricaded with berms and/or 28” green cones and posted with explosive signs to prevent unauthorized entry at a minimum of 30’ Blaster & Blast foreman will not allow any unauthorized persons to enter an area until offgases have cleared Exclusion zone, fencing, barricades, signage Physical spotters/guards Service blaster training 3 certification	1-Extremely Unlikely	1-Minor	1	Matt Praine	James Goggans	AOC		2022-05-23	Approved
5B-KBTPN-261	Active	Risk Review Session	Health and Safety	Roadway - Traffic	Driving ROW	Vehicles traffic on roadways have the potential of collision on roads resulting in worker's injury	5-Expected	3-Major	15	Make sure slow traffic speeds are posted and adhered to Adjust driving speed to road conditions Conduct vehicle inspection Driver is well rested and fit for duty Right-of-Way maintenance to help ensure roadway is safe for travel. Pull-off locations on ROW to allow traffic to get to a safe distance to yield to larger equipment or other vehicles.	4-Occasional	3-Major	12	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-123	2021-06-10	Approved
5B-KBTP-102	Inactive	Risk Review Session	Environment	Hydrocarbons	Environmental for each category	There is potential of leaks caused by defective equipment leading to soil contamination.	4-Occasional	2-Moderate	8	- All persons to be trained in spill response - Superintendent will be familiar with and ready to implement the KBTP Emergency Response Plan - Superintendent will verify the completion of detailed advanced planning of all near water activity and equipment - Superintendent will verify adequate spill response supplies are on site at all times - this includes drip trays and adequate secondary containments, spill kits, spill response trailers, extra pads and absorbents -Crews will be familiar with the KBTP fueling procedure and apply it at all times -Fit for duty/training shall be conducted by the safety department -All equipment shall be inspected and documented daily as per KBTP policy -Secondary containment will be utilized as per the KBTP policies and TMEP requirements	4-Occasional	1-Minor	4	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to night shift activities	2021-06-10	Approved
5B-KBTPN-100	Active	HSE	Health and Safety	Equipment/Heavy Machinery	Equipment	Inadequate rigging or lifting devices resulting in a worker being struck by or caught between load /equipment	3-Rare	4-Critical	12	Designated lifting zones Certified Lifting Equipment Rigger training Competency Assessemnts and worker training LOF Campaigns Daily inspections on rigging and documented inspections on lifting devices. load calculations to ensure WLL is adequate for all components completed by a trained rigger Tag lines to be used on lifted loads to keep ground personnel out of LOF. Rigging components to be stored out of open to prevent rain, mud, snow, etc from affecting the integrity of the equipment.	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-337, 5B-KBTP-619	2021-04-20	Approved
5B-KBTPN-132	Active	Risk Review Session	Health and Safety	Extreme Weather	Equipment	Equipment implements such as buckets, tracks etc. could cause sparks by striking rocks and trigger a wildfire casuing injury.	3-Rare	4-Critical	12	Ensure equipment is equipped with a fire extinguisher (in good working order with a UL Rating of at least 4-A:60-B:C) that is outside of the cab. A number of workers will receive the S100 Fire Boss training for proper response to potential wildfires. Wildfire Prevention Plan. Have Wildfire fighting tools and equipment readily available. (Water cannon etc.) Radio available to immediately communicate emergency situation. Water down areas when/where practical in high risk areas to prevent chance of wildfire	2-Unlikely	4-Critical	8	Ethan Leigh	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-068	2021-06-10	Approved
5B-KBTPN-241	Active	MACRO Risk Workshop	Health and Safety	Noise	Equipment	The risk of worker exposure to excessive noise due to proximity to loud machines, tools or equipment resulting in hearing losses	3-Rare	3-Major	9	Ear plugs/muffs (Double hearing protection) Signage Engineering controls (quieter tools, generators, noise isolation materials) Field audio metric testing/inspections on equipment to ensure proper PPE is being worn	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-170, 5B-KBTP-452	2021-01-06	Approved
5B-KBTPN-204	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions	Excavation/Trenches	The Risk of contact (or burial) by slumping soil due to unstable trench walls.	2-Unlikely	4-Critical	8	Proper sloping Ground Disturbance Safety Training and Hazard Communication Excavation Entry Checklist Engineering assessments where required. Engineering controls (sloping, shoring or shield) Geotechnical assessment (Soil Classification)	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-074, 5B-KBTP-356	2021-01-06	Approved
5B-KBTPN-276	Active	Risk Review Session	Health and Safety	Security - Theft	Explosives Storage	Theft of explosive materials that could be used for malicious intent leading to injury of workers or members of the public	2-Unlikely	5-Extreme	10	Separate lockable storage location for explosive materials. Ensure all explosives are stored in authorized explosive magazines when not in use and properly secured. Documentation for storage and transfer of explosive material. Documentation for all personnel accessing explosive material. (logs kept) Report any shortage or missing explosives to management and local law enforcement	2-Unlikely	4-Critical	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination CM:Comment not applicable Former Risk ID was 5B-KBTP-087	2021-06-10	Approved

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5B-KBTP-143	Active	Risk Review Session	Environment	Vibration	Foundation Construction	Hydrocarbon release resulting from a ruptured pipeline due to high vibration caused by construction activities	1-Extremely Unlikely	3-Major		3 - Construction Manager will ensure compliance with the TMEP Damage Prevention Plan (including assigned and approved GD Supervisor) -Superintendent will verify completion of and that crews are following Detailed execution planning and sequencing of activities to avoid excessive vibration near pipeline -Superintendent that all crews involved in operation have current Ground Disturbance Level II Training - Ground Disturbance Supervisor will ensure completion of Daily Pre-work inspections - Construction Manager will verify completion of Engineering review for vibration monitoring plan - Foreman will verify placement of all required signage concerning pipeline ROW	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	NOC			2021-06-10	Approved
5B-KBTPN-228	Active	Lesson Learned	Health and Safety	Harmful Micro-organisms	Full Cycle	Allergic Reaction to natural micro organism or insect bites/ stings	4-Occasional	4-Critical		16 Issue and Use Insect Repellent Proper Clothing i.e. Long sleeves, pants, leather leggings Disclosure of Medical Conditions to Supervision. Medical Alert Cards Those with known allergies to carry rescue medication on person Site Inspections, Buddy System, and Self Checks Signage	3-Rare	4-Critical	12	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-293, 5B-KBTP-575	2021-01-23	Approved	
5B-KBTPN-193	Active	Risk Review Session	Health and Safety	Ground Conditions	General	Equipment/vehicles can get stuck in the mud or the snow in access roads/ROW causing operator's injury	5-Expected	1-Minor		5 Prepare yourself and your vehicle for winter conditions Obey all road closures and signage Have tow trucks available Snow rated tires (as required for mountain route access in BC) Maintenance team will assess and assist in recovery of equipment and vehicles. Plows and graders on access roads - maintaining good access.	4-Occasional	1-Minor	4	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-045	2021-06-10	Approved	
5B-KBTPN-194	Active	Risk Review Session	Health and Safety	Ground Conditions	General	Workers have the potential of trips and falls while mounting and dismounting equipment causing worker injury	4-Occasional	3-Major		12 Three points of contact at all times, do not jump off equipment Grip tape on equipment steps. Treads and handrails in place and maintained.	4-Occasional	2-Moderate	8	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-046	2021-06-10	Approved	
5B-KBTP-296	Active	Risk Workshop	Environment	Groundwater	General Construction	Damage to a water well from blasting	3-Rare	2-Moderate		6 Monitor registered or known potable water wells located in close proximity of any blasting prior to and following blasting. Monitoring will include measurement of well yields, static and pumping water levels, as well as water sampling in accordance with Guidelines for Canadian Drinking Water Quality (Health Canada 2012). This will be performed as per the recommendation of the TMEP RS. Locations of wells will be identified on the TMEP Right of Way Preconstruction Form	2-Unlikely	2-Moderate	4	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-014 Second re-eval. 2022-05-22	2021-01-06	Approved	
5B-KBTP-323	Inactive	Risk Workshop	Environment	Wildlife & Aquatic Habitats	General Construction	Uncontrolled removal of a beaver dam could result in surge flooding, debris and sediment deposition, and erosion that could negatively impact fish and fish habitat	1-Extremely Unlikely	3-Major		3 Submit a notification to the BC OGC at least 45 days prior to beaver dam removal, as per Section 11 of the WSA. Conduct a self-assessment in accordance with DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013) to determine if the removal of a beaver dam will result in serious harm to fish. Consult a qualified Fish Biologist to assist in the self-assessment. Consider performing this work im more favorable conditions such as frozen or dry to eliminate hazard and risk.	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-041	2021-01-06	Approved	
5B-KBTP-338	Active	Risk Workshop	Environment	Extreme Weather	General Construction	Extreme weather including high winds, hail and heavy rain can cause environmental damage such as flooding, erosion and sedimentation.	4-Occasional	2-Moderate		8 Check weather reports daily to allow for schedule changes and contingency planning. Have the site assessed by a certified ESC lead and install required ESC measure as per their assessment. Install additional drainage, erosion and sediment control measures prior to or during wet conditions and extreme weather events, to ensure the protection of sensitive environments. Utilize means and methods the ensure clean stormwater does not enter the work site - these may include diversion berms, rock lined swales, flumes, or similar as dictated by the site specific configuration.	4-Occasional	1-Minor	4	Andreas Silva	Dave Hazen	AOC	Former Risk ID was 5B-MCRO-056	2021-01-06	Approved	
5B-KBTP-375	Active	Risk Workshop	Environment	Protected Sites	General Construction	TLU features not previously identified are found during construction exposing them to potential damage or destruction.	1-Extremely Unlikely	4-Critical		4 Indigenous monitors to present as per TMEP requirements Archaeological assessment pre-construction to be completed - stay out of no-go zones Pre-planning work to utilize the EAS / LRSMT / Archy red/green maps to ensure no trespass KBTP Environmental Hazard Analysis to be used in planning stage to ensure areas are identified in work plans Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones Have available and use as required the Heritage and TLU chance find contingency plans The Heritage Resource Specialist and the Aboriginal Monitor will assess the site and develop an appropriate mitigation plan using the information listed above.	1-Extremely Unlikely	4-Critical	4	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-093	2021-01-06	Approved	
5B-KBTP-391	Active	Risk Workshop	Environment	Protected Sites	General Construction	Surface disturbance resulting in adverse impact to Heritage Resources	2-Unlikely	3-Major		6 • Sites to be identified during planning phase of work using LRSMT / EAS • Planning phase to use Environmental hazard assessment to ensure any sites in work areas are identified prior to mobilization *Employees will be trained and adhere to the "TRADITIONAL LAND USE SITES DISCOVERY CONTINGENCY PLAN" • Flag or fence off the previously unidentified TLU site. • Work at that location may not resume until the following measures are conducted. • Notify an Environmental Inspector, who will notify the Construction Manager or designate, the Aboriginal Monitor and the Heritage Resource Specialist. • The Heritage Resource Specialist and the Aboriginal Monitor will assess the site and develop an appropriate mitigation plan using the information listed above.	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-109	2021-01-06	Approved	

TABLE 1: KBTP CHRR

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/N OC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTP-392	Active	Risk Workshop	Environment	Invasive weed/Uncontrolled seeds	General Construction	The spread of soil pathogens, crop diseases, or invasive plants to other locations.	3-Rare	2-Moderate		6 -Refer to the LRSMTs and EAS for known locations. -Refer to the EPP, the Biosecurity Management Plan for specific measures to be implemented. - Ensure adequate signage is in place - Equipment cleaning prior to access - Level 3 cleaning - Identification of invasive regions prior to disturbance - Awareness training - Pre/Post-entry inspections at level 1 cleaning stations - Top soil containment areas - stake piles as per EPP requirements - Exclusion zone/quarantine areas - Mechanical removal as required	2-Unlikely	2-Moderate	4	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-110	2021-01-06	Approved
5B-KBTP-402	Active	Risk Workshop	Environment	Noise	General Construction	Noise emissions that may impact wildlife, livestock or residents	4-Occasional	2-Moderate		8 -EPP & Noise Mgmt. Plan; Schedule intermittent noise-producing events to avoid sensitive periods for wildlife, livestock and residents, where feasible. -Adhere to applicable Federal, Provincial, and Municipal guidelines and legislation regarding noise management. Noise abatement equipment and construction scheduling will be considered at noise-sensitive locations (e.g., neighboring residents) and during noise-sensitive periods. -Enforce vehicle speed limits and inform truck drivers that engine retarder braking in urban areas is prohibited. ---- - Maintain equipment in good working condition and in accordance with manufacturer guidelines - this shall be documented on Daily Inspection Reports - Maintain noise suppression equipment (e.g., silencers or mufflers) on applicable construction machinery and vehicles. - Ensure that tools and equipment utilized are proportionate to the activity being conducted to limit excessive noise resulting from construction. - Locate compressors and generators away from noise receptors to the extent feasible.	3-Rare	1-Minor	3	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-120	2021-01-06	Approved
5B-KBTP-403	Active	Risk Workshop	Environment	Noise	General Construction	Stress to wildlife caused by blasting activities on the ROW	4-Occasional	2-Moderate		8 If wildlife is spotted within the blasting area, use measures recommended by a Resource Specialist to displace wildlife prior to blasting. The RS will conduct wildlife sweeps as required in areas identified by the RS that are of high potential to wildlife being present Utilize warning sirens, blasting mats, blasting controls and monitoring to reduce potential injury to wildlife and humans.	4-Occasional	1-Minor	4	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-121	2021-01-06	Approved
5B-KBTP-406R	Active	Risk Workshop	Environment	Fit for Duty	General Construction	Inadvertent harm to rare plants or rare ecological communities	4-Occasional	3-Major		12 Refer to the RSMTs and EAS for known locations. Flagging and signage. Refer to the Rare Ecological Community and Rare Plant Mitigation Plan (Appendix G of the EPP) for mitigation measures to be used during construction. Review mitigation with an Environmental Inspector in advance of construction. Supervisor Training and Worker Awareness. 01-13283-GG-0000-EV-PRO-0002 R6 Attachment C-3 - Environmental Requirements Pre-construction walk through with construction and Environment to review presence of known environmental features and required mitigation	3-Rare	3-Major	9	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-124R	2021-01-06	Approved
5B-KBTP-414	Active	Risk Workshop	Environment	Wildlife & Aquatic Habitats	General Construction	Unplanned encounters with livestock on the Project footprint leading to harm or stress to the animal.	2-Unlikely	1-Minor		2 -Work with landowner to understand any livestock present and on how to ensure it is looked after during the works -Reference the line list for site-specific requirements -Ensure all gates are closed -Report livestock encountered on the pipeline construction footprint to the field Land Agent, who will contact the applicable landowner, land authority and/or occupant. -Consult the Agricultural Management Plan (Appendix G of the EPP). Install temporary fences or barriers where livestock are present, if requested by the landowner or occupant, to prevent entry onto the pipeline construction footprint during construction.	2-Unlikely	1-Minor	2	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-132	2021-01-06	Approved
5B-KBTP-421	Active	Risk Workshop	Environment	Culture	General Construction	Improper adherence to biosecurity protocols resulting in transfer of invasive species/impact to agricultural activities	2-Unlikely	2-Moderate		4 Contractor Execution Plans shall be developed that address bio-security Environmental Protection Plan (Sec. 6.0 & 7.0), shall be adhered to Biosecurity Mgmt. Plan shall be adhered to Training and Orientation shall include information of bio-security Flagging/Signage Cleaning Stations to be installed and maintained ant access/egress points ENV Inspectors/Coordinators monitoring sites to ensure compliance	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-139	2021-01-06	Approved
5B-KBTP-422	Active	Risk Workshop	Environment	Invasive weed/Uncontrolled seeds	General Construction	Improper adherence to biosecurity protocols resulting in transfer of seeds	2-Unlikely	2-Moderate		4 Pre-planning work to utilize the EAS / LRSMT and identify high weed density areas KBTP Environmental Hazard Analysis to be used in planning stage to ensure these areas are identified in work plans Refer to and follow Environmental Protection Plan (Sec. 6.0 & 7.0), Biosecurity Mgmt. Plan, Training and Orientation to include invasive plants and the Bio-security execution plan Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones Ensure the required cleaning stations are installed in the field prior to work ENV Inspectors/Coordinators monitoring All new work areas to be walked by CECs and EIs prior to mobilization	2-Unlikely	2-Moderate	4	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-140	2021-01-06	Approved
5B-KBTP-423	Active	Risk Workshop	Environment	Protected & Rare Vegetation	General Construction	Inadvertent harm to rare plants and rare ecological communities.	2-Unlikely	3-Major		6 Suspend activity and implement the Rare Ecological Communities or Rare Plant Species Discovery Contingency Plan (Appendix B of the EPP). Pre-planning work to utilize the EAS / LRSMT and identify Rare Plant areas KBTP Environmental Hazard Analysis to be used in planning stage to ensure these areas are identified in work plans Training and Orientation to include sensitive vegetation Ensure all identified areas are flagged in the field prior to mobilization - i.e. Establish Signage/exclusion zones All new work areas to be walked by CECs and EIs prior to mobilization CECs and EIs to monitor work on an ongoing basis in the field	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-141	2021-01-06	Approved

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5B-KBTP-448	Inactive	Risk Workshop	Environment	Fit for Duty	General Construction	Inadvertent deleterious impacts to the environment through the misapplication of herbicides	2-Unlikely	2-Moderate		4 Restrict the application of herbicides to licenced applicators. Prohibit the use of herbicides or any chemicals on organic farm lands. Notify the potentially affected Indigenous groups prior to the use of herbicides. Restrict the application of herbicide within 30 m of known rare plant populations or rare plant communities. Follow all regulatory requirements for herbicide use adjacent to waterbodies and water wells.	1-Extremely Unlikely	2-Moderate		2	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-166	2021-01-06	Approved
5B-KBTP-470	Active	Risk Workshop	Environment	Soil Disturbance	General Construction	Loss of soil capacity/productivity and increased potential for loss of soil through wind or water erosion	5-Expected	2-Moderate		10 Adhere to Topsoil Material Handling and Grading mitigation measures provided in Section 10.0 of the EPP regarding topsoil salvage, soil segregation, wet/thawed soils contingencies etc.  Utilize ESC measures to retain material in place so they are not lost; apply poly and or seed to temp soil piles to stabilize them. Ensure all persons are trained in the required top-soil handling and mitigation protocols for the project.	5-Expected	1-Minor		5	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-188	2021-01-06	Approved
5B-KBTP-489	Active	Risk Workshop	Environment	Toxic Fluid/Solvents	General Construction	Potential to disturb heritage resources not previously identified which are found during construction.	2-Unlikely	3-Major		6 EPP Sec 7 & Appendix B; Suspend work in proximity to archaeological or paleontological sites (e.g., arrowheads, modified bone, pottery fragments and fossils) discovered during construction and notify an Environmental Inspector and Construction Manager, who will contact the Environmental Manager. Implement contingency measures identified in the Heritage Resources Discovery Contingency Plan. No work at that particular location shall continue until permission is granted by the Environmental Manager or designate in consultation with a Resource Specialist, and, if warranted, the Appropriate Government Authority; Els and IMs.	2-Unlikely	3-Major		6	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-207	2021-01-06	Approved
5B-KBTP-498	Active	Risk Workshop	Environment	Waste Material	General Construction	Presence of people, vehicles, equipment and increased activity throughout the spread resulting in wildlife stress	4-Occasional	2-Moderate		8 EPP Sec. 7; scheduling, work windows, maintain a tight spread. Ensure all wildlife sweeps are conducted as per the ERDs and LRSMT All areas are to be pre-activity walked with CEC/EI with consultation to RS team to ensure wildlife impacts are considered and mitigated	3-Rare	2-Moderate		6	Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-216	2021-01-06	Approved
5B-KBTP-501	Active	Risk Workshop	Environment	Waste Material	General Construction	Release of solid waste material to the environment	3-Rare	2-Moderate		6 Collect all waste debris associated with project activities (e.g., welding rods, oil cans, ropes, bands, timbers and caps, food waste, recyclables) and other waste materials on a regular basis and dispose of at a Trans Mountain-approved waste disposal facility and in accordance with the Waste Management Plan and the Spill Contingency Plan. Ensure wastes are recycled where practical. Install waste collection receptacles and portable toilets off organic farm lands and organic transitional lands where practical. Ensure waste containers accompany each working unit. Prohibit waste disposal in the trench. Ensure the construction site is left in a tidy and organized condition at the end of each day. Store all garbage in wildlife-proof containers where potential wildlife/human conflicts may occur.	3-Rare	1-Minor		3	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-219	2021-01-06	Approved
5B-KBTP-504	Active	Risk Workshop	Environment	Wildlife & Aquatic Habitats	General Construction	An encounter with wildlife during construction, either at the construction site or on the commute to and from the construction site, that could result in harm to the animal through a collision or habituation of wildlife.	4-Occasional	4-Critical		16 Wildlife Conflict Management Plan. Scheduling, education, awareness, signage, speed limits, waste management, elimination of attractants, incident reporting. For species of concern, implement the Wildlife Species of Concern Encounter and Discovery Contingency Plan.	2-Unlikely	2-Moderate		4	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-222	2021-01-06	Approved
5B-KBTP-506	Active	Risk Workshop	Environment	Soil Disturbance	General Construction	Deposition of sediment within a fish bearing stream, causing negative impact to water quality and habitat alteration	2-Unlikely	4-Critical		8 Environmental Protection Plan. Implement appropriate precautions to prevent deleterious substances from entering watercourses, wetlands or lakes. Cleaning, fuelling, and servicing of equipment are to be conducted in an area, or in a manner, where spills or wash water will not contaminate surface water or groundwater resources. An emergency spill kit appropriate for the work being conducted is to be available on-site at all times. ENV Supervisor Training / Worker Orientation. Signage. FLRA, Safety meetings	2-Unlikely	4-Critical		8	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-224	2021-01-06	Approved
5B-KBTP-508	Active	Risk Workshop	Environment	Wildlife & Aquatic Habitats	General Construction	Discovery of an individual or population of an at-risk species, or species of concern that was not otherwise identified that may be impacted by construction activities.	2-Unlikely	4-Critical		8 Notify the Environmental Inspector. Implement the applicable Environmental Management Plans and Contingency Plan (see Appendix G & B within the EPP). Regular Environmental field inspections. Environmental Awareness Training. Any chance finds will follow the applicable chance find contingency plan as per EPP appendix B	2-Unlikely	4-Critical		8	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-226	2021-01-06	Approved
5B-KBTP-537	Active	Risk Workshop	Environment	Invasive weed/Uncontrolled seeds	General Construction	The spread of aquatic or riparian plants and pests from an affected area to an unaffected area.	2-Unlikely	4-Critical		8 - Pre-access cleaning of equipment. - Clean equipment after construction within a watercourse or wetland where aquatic pests are present. - Refer to the Biosecurity Management Plan (appendix G in EPP) for additional mitigation measures and cleaning requirements when working in watercourses or wetlands with aquatic pests. -Do not transfer water, soil or other host material from a watercourse or wetland where aquatic pests are present to unaffected areas (e.g., water for hydrostatic tests, sumps). - Identification of invasive regions prior to disturbance via Environmental alignment sheets - Excavation equipment cleanup before and after sites - Awareness training - Biosecurity Stations - Pre-entry inspections - Top soil containment areas and signage on soils type - Exclusion zone/quarantine areas/signage indicating the environmental constraint - Mechanical removal	1-Extremely Unlikely	3-Major		3	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-255	2021-01-06	Approved
5B-KBTP-541	Active	Risk Workshop	Environment	Wildlife & Aquatic Habitats	General Construction	Unnecessary damage to riparian areas, including area of disturbance and timing/duration of disturbance.	2-Unlikely	3-Major		6 Refer to the EPP, RSMT and EAS for info on location of riparian zones and size of buffers surrounding watercourse and wetlands. Locate ETWS outside of riparian areas. See the mitigation measures under the heading Riparian Areas in the EPP. Post signs 100 m from each watercourse or wetland or at the top of the approach slope, whichever is greater, following clearing to alert construction personnel of the upcoming watercourse or wetland and the re-fuelling and servicing restrictions within the watercourse/wetland buffer. Identify riparian buffer areas associated with watercourse and wetland crossings. All area need for pipeline installation will be grubbed just prior to pipeline construction. Use natural re-generation, seeding and planting of rooted plant materials as specified in the Reclamation Management Plan and Riparian Habitat Management section of the EPP.	2-Unlikely	3-Major		6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-259	2021-01-06	Approved

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5B-KBTPN-002	Active	MACRO Risk Workshop	Health and Safety	Air Quality/Smoke	General Construction	Work group cut off/trapped by fast moving wildfire causing worker injury/burn/smoke inhalation etc.	3-Rare	3-Major		9 Wildfire Prevention Plan & Wild Fire Preparedness Plan, Fire Permit, Fire drills Fire Suppression/Fighting Equipment Extinguisher training Emergency Response Training S-100 Training (Supervision/Designates) Fire watch (as required) Forest Fire Prevention Plan Fire Boss: Daily monitoring, (Weather, Danger Rating) Liaise with BC FLNRO	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-010, 5B-KBTP-292  CDN - Controls adjusted to reflect qualifiable content, negligible comments removed.	2021-01-06	Approved
5B-KBTPN-003R	Active	MACRO Risk Workshop	Health and Safety	Air Quality/Smoke	General Construction	Workers exposed to the dangers of Temporary Structure (i.e. office, lunch, warehouse trailers) or non-collision related Equipment/Vehicle Fire on site causing burn and smoke inhalation injuries.	2-Unlikely	5-Extreme		10 Fire Alarms, Detectors, Fire Suppression Equipment Extinguisher training Emergency Response training Fire Permit, Fire watch for maintenance on buildings Sufficient spacing and blacken of perimeter ERP Drills	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-011R 5B-KBTP-293R	2021-01-06	Approved
5B-KBTPN-004	Active	MACRO Risk Workshop	Health and Safety	Air Quality/Smoke	General Construction	Potential for landowners and/or occupants to be affected by air quality impacts from construction	1-Extremely Unlikely	1-Minor		1 Restrict the duration that vehicles and equipment can sit and idle, unless air temperature is less than 0°C. Abide by Municipal non-idling bylaws, where applicable. Conduct burning in accordance with burning permit requirements and A Smoke Management Framework for BC (BC MOE 2011).	1-Extremely Unlikely	1-Minor	1	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-258, 5B-KBTP-540  CDN - No burning on site, is reduction in air quality sufficient for risk?	2021-01-06	Approved
5B-KBTPN-013	Active	MACRO Risk Workshop	Health and Safety	Buried Services	General Construction	Construction - Vehicles crossing over buried utilities causing damage.	3-Rare	3-Major		9 Approved Traffic Managemnt Plan Crossing permit Install signage Conduct utility locates at crossing points Install protective barriers (Jersey barrier, plates, additional ground cover) at crossing plates.	2-Unlikely	2-Moderate	4	K. Mather	Sky Mitchell	NOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-021 5B-KBTP-303	2021-01-06	Approved
5B-KBTPN-014R	Active	MACRO Risk Workshop	Health and Safety	Buried Services	General Construction	Contact with live buried utilities (Electrical, Gas, Petroleum, Communication, Water) causing loss to people, machinery, environment and loss/harm to reputation	3-Rare	4-Critical		12 Training - GD Level 201 for supervisors and all operators of PME that conduct ground disturbance tasks. Secondary Sweeps Dedicated DPI Inspector Crossing agreements Signage Regular Inspection of personnel and crews Daylighting TP- Signage - MACRO-TMEP Damage Prevention Program Dedicated DPI Inspector 01-13283-S5B-M002-HS-ERP-0001 R1C Site Specific Emergency Response Plan89 MACRO PSSP Rev 3.0 - 01-13283-S5B-M002-HS-PLN-0002_3_IFU_2021-01-19_01 Rev 3.0 - 01-13283-S5B-M002-HS-PLN-0002_3_IFU_2021-01-19_01	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	NOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-022R Former Risk ID was 5B-KBTP-304R	2021-01-06	Approved
5B-KBTPN-022	Active	MACRO Risk Workshop	Health and Safety	Communication	General Construction	Loss of communication with others in an emergency resulting in escalation of the severity of an injury	3-Rare	4-Critical		12 Local radio SME consulted and used in planning, equipment selection Hardwired Truck Mounted Radios for enhanced coverage 5w Handheld radios with upgraded attentats Medic Staged for a maximum of 10 minutes surface travel time Cell phone with booster will be provided to supervisor Poor receptions zone in project area identified and documented Manual Communication Relay Use of digital repeater towers 2 mock ERP drills per year, implement learnings from drills Supervisor to confirm radio communication or nearest access to radio communication through ways of radio checks when arriving to sites known to have poor service.	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-242, 5B-KBTP-524	2021-01-06	Approved
5B-KBTPN-029R	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Non engineered modification to mobile heavy equipment or static winch resulting in Near Miss, Injury and or Loss of Life Incident.	3-Rare	4-Critical		12 Equipment users must follow manufacturers specifications and not modify any equipment Modifications are not allowed unless engineered and approved by the manufacturer. If any equipment is found to be modified without approvals it must be tagged out and taken out of service immediately. PM program	3-Rare	4-Critical	12	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-003R, 5B-KBTP-285R	2021-01-06	Approved
5B-KBTPN-030	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Personnel become complacent with repeated Daily Hazard Assessments and Tail Gate Meeting discussions, tune out and miss key information or directions resulting in Near Miss, Injury and or Loss of Life Incident(s).	2-Unlikely	4-Critical		8 PSSP, HSE team to provide meeting topics that are relevant and encourage two way communication. Supervisor training on presenting effective safety meetings. Safety meeting observation and supervisor coaching feedback by HSE team. Positive recognition moments during meetings Crew members to present portions of the meetings to increase engagement. Regular inspection and performance management. Supervisors monitoring workers fitness for duty. Fatigue Management.	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-018 5B-KBTP-300	2021-01-06	Approved
5B-KBTPN-031	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Delay medical treatment while working in a Bell Hole excavation resulting in further injuries.	2-Unlikely	4-Critical		8 Install Trench box or shoring system (e.g. Install davit arm with 4:1 rescue winch, rescue team, provide recue plan) Assess bell holes before entry utilize excavation checklist verify safe access/egress, both sides Install Adequate stairs, ladders or chicken run for better access	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-024, 5B-KBTP-306	2021-01-06	Approved
5B-KBTPN-032R	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Deviation from TMEP accepted Steep Slope Work Plan results in Near Miss, Injury and or Loss of Life Incident(s).	2-Unlikely	5-Extreme		10 Change Management process to address new issues identified during work. Pre task review with crew, daily FLRA Steep Slope Management Plan to identify hazards. Communicate to crew to stop work when conditions or hazards change. GCC Steep Slope Supervisor present and ensuring all plans are followed. Ongoing internal inspections by Mgt and Safety. Steep Slope Management Plan (SSP) reviewed by Subject Matter Experts from the GCC & TMEP. SSP to be available in the field at work location. Preventative Maintenance	1-Extremely Unlikely	5-Extreme	5	K. Mather	Sky Mitchell	AOC	A deviation is a behavioral issue. Former Risk ID was 5B-MCRO-029R 5B-KBTP-311R	2021-01-06	Approved

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5B-KBTPN-033R	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Traffic Mgt system is deployed incorrectly creating driver confusion resulting in collisions	2-Unlikely	5-Extreme	10	Mgt of Change - changes to system to be authorised by GCC traffic control supervisor. Daily Inspection of traffic control system to ensure it complies with TMP and conditions have not changed. GCC Traffic Supervisor to attend daily supervisor schedule meetings	1-Extremely Unlikely	5-Extreme	5	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-032R 5B-KBTP-314R	2021-01-06	Approved
5B-KBTPN-034R	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Exceeding manufacturer specifications on mobile or stationary heavy equipment, static winch systems, tooling or hydraulic systems resulting in worker injury	3-Rare	4-Critical	12	Training/review on manufacturer Specs Ensure all safety alarms are in proper working condition Complete operator designation/competency on equipmnet Focused Inspections on equipment operation	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-064R, 5B-KBTP-346R	2021-01-06	Approved
5B-KBTPN-035	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	The risk of workplace violence, harassment, bullying (verbal / physical) with coworkers resulting in injury or fatality.	3-Rare	3-Major	9	Safety Orientation, Awareness, Safety Meeting topics Education on procedure to deal with incidents of verbal or physical abuse. Progressive discipline policy Security Officer and/or Police response to help deescalate tempers,F30	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-171, 5B-KBTP-453	2021-01-06	Approved
5B-KBTPN-036R	Active	MACRO Risk Workshop	Health and Safety	Culture	General Construction	Hazards assessed in the development of the TMEP accepted Steep Slope Work Plan found to be incorrect or incomplete and contributing factor in Near Miss, Injury and or Loss of Life Incident.	2-Unlikely	4-Critical	8	Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Pause work during significant rain events. Inspect prior to resuming work. Site assessment and maintenance Frequent hazard communication, FLHA, Tailgate meeting reminders Operator Competency, berms/lock blocks. Traffic Control Plan during excavation activity Review of steep slope plans by SMEs throughout steep slope plan lifecycle.	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-230R, 5B-KBTP-512R	2021-01-06	Approved
5B-KBTPN-037R	Active	Macro Risk Workshop	Health and Safety	Culture	General Construction	Superintendent, Foreman, Assistant Foreman or co-worker intimidation or peer pressure to take unacceptable risks or to not comply with Steep Work Plan, Contractor Safe Work Standards, Practices and or Procedure results in Near Miss, Injury and or Loss of Life Incident.	3-Rare	4-Critical	12	Orientation to cover right to refuse unsafe work Supervisors to set a safety culture that encourages workers to speak up and raise concerns Orientation to cover right to refuse unsafe work Supervisors to set a safety culture that Supervisor Safety Training Safety Observations by Sr. Mgt, H&S team. Workplace conduct Provide TMEP ethics hotline to personnel during indoctrination and provide decal as reminder	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-254R, 5B-KBTP-536R	2021-01-06	Approved
5B-KBTPN-056	Active	Risk Review Session	Health and Safety	Dropped objects	General Construction	Overhead items (e.g. equipment and tools) falling on worker (e.g. setting up and dismantling trailers, knocked down a slope, warehouses and shops).	2-Unlikely	2-Moderate	4	Barricade zones below areas where there is a dropped object potential Prevent crew stacking when applicable	2-Unlikely	1-Minor	2	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-159	2021-06-10	Approved
5B-KBTPN-068	Active	MACRO Risk Workshop	Health and Safety	Electricity/High Voltage	General Construction	Contact / Arcing with Overhead Electrical Utility lines or due to proximity to high voltage electrical equipment causing electrocution injuries or worker fatality	3-Rare	4-Critical	12	Subcontractor/ contractor Safe work permits File for BC Hydro Permits (30M33) Relocate Low Lines Goal posts Spotters Rubber Tire Vehicles Signage Appropriate set backs SOP and training Arc Flash training Certified Electricians as needed Electrical Engineer for all lines/ crossings Thermal monitoring Lock out / tag out Maintain "Limits of Approach" from electrical lines	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-039, 5B-KBTP-321	2021-01-06	Approved
5B-KBTPN-128	Active	MACRO Risk Workshop	Health and Safety	Ergonomic - Repetitive work	General Construction	Repetitive use of power tools (i.e. grinders) causes repetitive strain injury.	3-Rare	2-Moderate	6	Adjust position during task, purchase ergo friendly tools, Anti vibe wrap/gloves, Stretching Job rotation Micro breaks Hydration reminders (Extra water in field)	2-Unlikely	2-Moderate	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-112, 5B-KBTP-394	2021-01-06	Approved
5B-KBTPN-136	Active	MACRO Risk Workshop	Health and Safety	Extreme Weather	General Construction	Extreme weather event causes landslide along project causes injury to TMEP Personnel or Contractors.	2-Unlikely	4-Critical	8	Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Monitor Daily Weather Conditions post flooding event/heavy rain inspection.	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-055, 5B-KBTP-337	2021-01-06	Approved
5B-KBTPN-137R	Active	MACRO Risk Workshop	Health and Safety	Extreme Weather	General Construction	Vehicle impact with construction vehicles in pullout areas during heavy fog	1-Extremely Unlikely	5-Extreme	5	Construction vehicles to move to alternate staging areas to wait until Fog conditions improve. Utilize BC Drive Safe to receive real time weather updates prior to field deployment Active monitoring by Traffic Supervisor/ Inspectors with frequent report outs, changes made as needed	1-Extremely Unlikely	5-Extreme	5	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-069R 5B-KBTP-351R	2021-01-06	Approved
5B-KBTPN-138	Inactive	MACRO Risk Workshop	Health and Safety	Extreme Weather	General Construction	High water levels causing floods along the project resulting in injury to workers	2-Unlikely	4-Critical	8	EHS-THA-Weather Conditions Active monitoring by Traffic Supervisor/ Inspectors with frequent report outs, changes made as needed Liaise with and abide by weather-specific directives from MOTI Work shut down in the flooded areas Radio communication Daily Visual Inspections Weather review in pre-task instruction	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-231, 5B-KBTP-513	2021-01-06	Approved
5B-KBTPN-148	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Aggressive Public drivers dangerous driving leading to injuries or fatalities.	3-Rare	4-Critical	12	Traffic Management Plan to be approved by TMEP and MOTI for implementation. Training on diffusing aggressive behaviour, TC Person, signs, flagging, delineators, speed reduction spacing. Monitoring and compliance verification Speed reader signs Police reporting of dangerous driving incidents Digital speed reduction zone sign (120kph to 90/60 kph) Crash trucks placed ahead of TCP in high risk TMEP controlled work areas Traffic cones, barricades.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-058, 5B-KBTP-340	2021-01-06	Approved

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5B-KBTPN-149	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Project Vehicles - Aggressive Driving (i.e. Speeding) and Distracted Driving (i.e. cell phone use) causing collision - injury/fatality.	3-Rare	3-Major		9 Traffic Management Plan Drivers abstracts reviewed during hiring process Trained and competent TCPrss Monitoring and compliance verification Speed zone reduction on Hwy 5 - 120kph to 90/60 kph Speed reader signs Communication with CVSE Disciplinary Program for Traffic Violations Crash trucks placed ahead of TCP in high risk TMEP controlled work areas Traffic cones, barricades.	2-Unlikely	2-Moderate	4	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-059, 5B-KBTP-341	2021-01-06	Approved
5B-KBTPN-151R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Distracted Operator, signaller/spotter or worker found to be contributing factor in Near Miss, Injury or Loss of Life Incident.	2-Unlikely	4-Critical		8 Green Hand / New Young Worker Program Signage Beacons Airhorns Focused Inspections Supervision and Inspectors Pre-job tailgate in pre-flight procedure 6m workspace zone will be established Rigger Training Pre-use rigging inspections Use of Spotter(s) Signalling Procedures known (Spotter training) Use of Beacons and backup alarms PPE - Hi visibility clothing Focus Inspections Awareness sharing- Daily Safety Bulletin Equipment Walkaround Mandatory	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-065R, 5B-KBTP-347R	2021-01-06	Approved
5B-KBTPN-152	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Rigging failure causes load falling / swinging load due to improper rigging caused by worker ignorance, inexperience (including new or young workers) or inattentiveness (fatigue or impairment).	4-Occasional	4-Critical		16 Lift Plan and Lowering-in Plan, Winching and Tethering Plan Rigging pre-use inspections, Equipment Inspection Line of Fire awareness Proper use of catch off equipment Lowering In Operator Competency Rigging Training Third Party Communication with operator Tag Lines Perform a test prior to lift Setup exclusion zone	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-072, 5B-KBTP-354	2021-01-06	Approved
5B-KBTPN-153R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Risk of injury or loss due to worker being impaired or unfit for duty (e.g. prescription medicine, illicit drugs and alcohol)	3-Rare	5-Extreme		15 Alcohol and Drug Testing process (Site Access, Post Incident, Reasonable Cause) Fit For Duty assessments daily in PTI Supervisor Fit For duty training Employee Family Assistance Plan DSB Reminders for fit for duty	2-Unlikely	5-Extreme	10	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-073R, 5B-KBTP-355R	2021-01-06	Approved
5B-KBTPN-154	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	The Risk of hand/arm contact with a sharp surface due to an exposed pipe cut or steel fabrication activities.	4-Occasional	2-Moderate		8 Use grinder/files to clean up and deburr edges Provide selection of gloves suitable to hazard. Pipe Edge guards/cap to remain in place where possible to reduce exposure to sharp edge	4-Occasional	1-Minor	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-075, 5B-KBTP-357	2021-01-06	Approved
5B-KBTPN-155	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Traffic control mis-guidance (incorrect signs/ messaging) causes collision.	4-Occasional	5-Extreme		20 Traffic Management Plan Trained and competent TCPrs Monitoring and compliance verification Speed zone reduction on Hwy 5 - 120kph to 90/60 kph Speed reader signs Communication with CVSE Third Party Traffic Control Contractor Field audits for correct signage	4-Occasional	5-Extreme	20	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-076, 5B-KBTP-358	2021-01-06	Approved
5B-KBTPN-156R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Risk of injury or loss due to worker being fatigued/tired	3-Rare	4-Critical		12 Fit for Duty policy, awareness, education during safety meetings. Peer to Peer observation. Shift schedule optimisation, Health and Wellness education ( i.e. Shifting to Wellness topics) Schedule higher risk tasks-during ideal daylight and weather Supervisors monitoring workers fitness for duty. GCC (signage, speed limits, TCP, improve access points) Hours of Service, Shift Schedule adjustment (Fatigue Mgt plan). Ongoing risk communication at safety meetings.	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-079R, 5B-KBTP-361R	2021-01-06	Approved
5B-KBTPN-157R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Workers driving on public roads, experience fatigue from long shifts leading to an incident with another vehicle or object resulting in worker / community injuries / fatalities.	3-Rare	5-Extreme		15 GCC (signage, speed limits, TCP, improve access points) Hours of Service, Shift Schedule adjustment (Fatigue Mgt plan). Ongoing risk communication at safety meetings. Peer to peer observation Supervisor awareness training for identifying Fatigue Hours of Service compliance for commercial drivers Shift schedule optimisation	2-Unlikely	5-Extreme	10	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-080R, 5B-KBTP-362R	2021-01-06	Approved
5B-KBTPN-158R	Active	Macro Risk Workshop	Health and Safety	Fit for Duty	General Construction	Public - Distracted Driving (i.e. cell phone use) causes collision	4-Occasional	5-Extreme		20 Targeted Police Enforcement on distracted drivers during construction periods. Traffic Control Plans (speed zone reductions, signage, Communication). FLRA, Daily Safety Flash communication Kickoffs/ Monthly Meetings-Senior mgt to reinforce importance of this high risk hazard. Consider extra Traffic-spotting personnel during high hazard periods Traffic Supervisor/ Inspector monitoring of high risk/ high volume areas Crash trucks placed ahead of TCP if feasible in high risk areas that are identified Establish hard barriers such as jersey barriers in areas where permitted and practicable Use of AFADS	3-Rare	4-Critical	12	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-125R, 5B-KBTP-407R	2021-01-06	Approved

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5B-KBTPN-159	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Worker injury from chemical exposure to toxic gas or solvents resulting from improper handling	3-Rare	4-Critical		12 Site specific hazardous material storage Proper PPE Respiratory Protection Fit Testing Ventilation Training Conduct visual inspections/testing, Tailgate meeting to review procedure Use appropriate PPE to protect against liquid splash/spray Position workers to be out of "line of fire" in the event of accidental discharge, splash or spray Safety Data Sheets Use of designated work areas including barriers Workplace labels on chemicals for proper identification	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-209, 5B-KBTP-491	2021-01-06	Approved
5B-KBTPN-160	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Worker is Impaired while driving causing a vehicle collision resulting in fatalities	3-Rare	5-Extreme		15 Alcohol and Drug Testing process (Site Access, Post Incident, Reasonable Cause) Fit For Duty assessments Employee Family Assistance Plan Audit of program adherence Training & Awareness in Managing Alcohol & Drugs Management & Fit for Work Focus Inspection - Fit For Duty	2-Unlikely	5-Extreme	10	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-221R, 5B-KBTP-503	2021-01-06	Approved
5B-KBTPN-161	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Misuse of lifting equipment caused by worker ignorance, inexperience (including new or young workers) or inattentiveness (fatigue or impairment) leading to worker injuries / fatality	4-Occasional	4-Critical		16 Lift Plan and Lowering-in Plan, Winching and Tethering Plan Line of Fire awareness Proper use of catch off equipment Lowering In Operator Competency Rigging Training Third Party Communication with operator Tag Lines, Equipment Inspections Rotate Workers, swapping out as needed to reduce risk of strains and fatigue	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-248, 5B-KBTP-530	2021-01-06	Approved
5B-KBTPN-162R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	General Construction	Safety Critical Worker (Steep slope crew, Equipment Operators) suffer debilitating health emergency resulting in secondary Near Miss or Injury.	2-Unlikely	4-Critical		8 Daily fit for duty and awareness assessment by supervisor. Fit For Duty policy Health and Wellness education ( i.e. Shifting to Wellness topics) Fatigue management program, limits hours worked in a day to reduce strain and fatigue	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-252R, 5B-KBTP-534R	2021-01-06	Approved
5B-KBTPN-163	Active	Lessons Learned	Health and Safety	Fit for Duty	General Construction	Mobile Equipment or Light Duty vehicle backing up into ground workers, due to inattentiveness of operator or ground crew	3-Rare	4-Critical		12 Signage Back up alarms, air horns Barriers, fencing, and signage as needed Daily safety meetings, SWP, Focus Inspections Worksite Inspections Spotter used where needed Human Equipment Interaction Awareness	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-263, 5B-KBTP-545	2021-01-06	Approved
5B-KBTPN-169	Active	Risk Review Session	Health and Safety	Fit for Duty	General Construction	Worker injury resulting from contact with moving machinery or flying machinery components due to mis-use of machinery caused by worker inexperience or inattentiveness	4-Occasional	4-Critical		16 Designated Operator Program Staying out of line of fire Proper PPE Do not approach within an excavator’s swing radius (approx.15m), Do not approach a dozer / rocktruck / packer within 15m without the operator stopping and acknowledging you Do not approach a machine from its blind side.Blind side is where you can’t see the operator from where you are approaching (right side of all equipment) Receive positive communication from the operator that they see you; Hand or Verbal signal from operator Equipment implements are grounded, Operator turns off hydraulics When radio communication is planned while working with equipment, the crew will use radios which are on the same channel. Verbal contact with supervisor and operator. Spotter training Operator 360 walk around Consistent radio communication standard for area construction sites and operators Appropriate use of hand signals for communication with operators. Blind spot/safe distance delineation standards and restricted access standards Clear indication of when it is safe to approach equipment (e.g., blade down, hands off) Site arrangement standards for reducing personnel interface (work area delineation map) inclusive of any subcontractors	2-Unlikely	4-Critical	8	Jesi Neil	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-656	2021-08-19	Approved
5B-KBTPN-176	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	General Construction	General - Equipment roll over, due to operator error caused by fatigue, causing injury/fatality to operator and/or ground crew.	3-Rare	4-Critical		12 Equipment Selection Steep Slope Management Plan Anchoring/tethering Training, Steep Slope Operator competency Log books and equipment inspections Rollover protection systems (ROPS), Inspections and audits, Increased Supervisor presence.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-086, 5B-KBTP-368	2021-01-06	Approved
5B-KBTPN-180	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	General Construction	Loss of control of machinery, due to equipment failure / loss of traction / anchor or rigging component failure, while working on steep and/or unstable slopes, resulting in injuries /fatalities.	3-Rare	4-Critical		12 Training and Competency Assessment, Steep Slope Management Plan Engineered Anchor / Rigging plans, Increased operator evaluations, Seat Belts, ROPS (Roll Over Protection System), PM program, Daily inspection, Equipment Maintenance.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-246, 5B-KBTP-528	2021-01-06	Approved
5B-KBTPN-205R	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions	General Construction	Tire damage caused by ground conditions causes collision resulting in a injury or fatality	2-Unlikely	5-Extreme		10 Vehicle inspection Pre-trip walk around PM program Install 10 ply tires ROW Speed limit control and signage	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-092R, 5B-KBTP-374R	2021-01-06	Approved

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5B-KBTPN-212	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction	Unstable fill slopes potential to collapses impacting worksite causing injury or fatality.	2-Unlikely	4-Critical		8 Soil compaction and/or stabilisation measures and reinforcement. Geotechnical Engineer Inspections of Slopes above and below work areas. Post flooding event/heavy rain, inspection of area before work resumes.	2-Unlikely	3-Major		6 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-007, 5B-KBTP-289	2021-01-06	Approved
5B-KBTPN-213R	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction	Steep Slopes complicate/delay ability to promptly provide medical treatment and rescue injured workers.	3-Rare	4-Critical		12 Steep slope rescue plans Steep slope rescue teams on standby Mock Drills Heli landing/meeting points. Valley Helicopters notified in advance of steep slope operations	2-Unlikely	4-Critical		8 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-047R, 5B-KBTP-329R	2021-01-06	Approved
5B-KBTPN-215	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction	Unsecured tool, material or equipment rolls down steep slope striking ground workers causing injury or fatality	3-Rare	4-Critical		12 Berms, Barriers, Breakers, Temporary fencing "Line of Fire" awareness and daily evaluation. Use of Spotter as appropriate. Steep Slope Competency Requirements met- workers and supervisors Communication /Daily Safety Flash/ Foremans Meeting	3-Rare	3-Major		9 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-078, 5B-KBTP-360	2021-01-06	Approved
5B-KBTPN-223	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction	The risk of a worker fall from a rock face due to proximity to edge, slippery ground conditions, poor housekeeping resulting in injury or a fatality.	2-Unlikely	4-Critical		8 Stay back 6 feet from edge (Fall restraint PPE) Fall Protection Plan and PPE Fall Hazard Training Temporary barriers and warning signage where applicable Extreme housekeeping to be maintained/ frequently audited	2-Unlikely	4-Critical		8 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-103, 5B-KBTP-385	2021-01-06	Approved
5B-KBTPN-227	Active	MACRO Risk Workshop	Health and Safety	Harmful Micro-organisms	General Construction	Worker contact with harmful plants such as Nettles, Asian Black Berry, Poison Ivy, Devils Club) resulting in injuries.	3-Rare	1-Minor		3 Proper Clothing i.e. Long sleeves, pants, leather leggings Disclosure of Medical Conditions to Supervision. Medical Alert Cards Those with known allergies to carry rescue medication on person Site Inspections, Buddy System, and Self Checks Signage	2-Unlikely	1-Minor		2 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-156, 5B-KBTP-438	2021-01-06	Approved
5B-KBTPN-229	Active	MACRO Risk Workshop	Health and Safety	Housekeeping	General Construction	Site housekeeping creates hazardous conditions causing near misses or injuries.	2-Unlikely	3-Major		6 Inspection program Daily Safety Meetings, FLRA, Sufficient bear proof waste bins. Safety Management tours LSR field inspections Extreme housekeeping campaigns	2-Unlikely	2-Moderate		4 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-095, 5B-KBTP-377	2021-01-06	Approved
5B-KBTPN-236	Active	MACRO Risk Workshop	Health and Safety	Lighting	General Construction	Low light levels in various work areas (yards, offices, ROW) could cause personal injury.	5-Expected	2-Moderate		10 Temporary lighting Light level measurements Emergency Back up Lighting	4-Occasional	2-Moderate		8 K. Mather	Sky Mitchell	NOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-116, 5B-KBTP-398	2021-01-06	Approved
5B-KBTPN-238	Active	MACRO Risk Workshop	Health and Safety	Manual Handling	General Construction	Workers involved in heavy manual handling (i.e. lifting cribbing, cradles) resulting in worker musculoskeletal (MSI) injuries	5-Expected	2-Moderate		10 Ergonomics Safe Lifting Education, Load Limits, 2 person lifts, Use Mechanical Lifting devices where possible Stretch and flex program Micro breaks and hydration	5-Expected	1-Minor		5 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-118 5B-KBTP-400	2021-01-06	Approved
5B-KBTPN-243	Active	MACRO Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	General Construction	Anchoring/Tethering - Mobile or static winch failure attributed to mechanical failure or frayed winch cable resulting in Near Miss, Injury and or Loss of Life Incident.	1-Extremely Unlikely	4-Critical		4 Green Hand / New Young Worker Program Contractor Competency Assessment Program Contractor Quality Management program Beacons Airhorns Focused Inspections Supervision and Inspectors	1-Extremely Unlikely	4-Critical		4 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-122R, 5B-KBTP-404R	2021-01-06	Approved
5B-KBTPN-251	Active	MACRO Risk Workshop	Health and Safety	Harmful Micro-organisms	General Construction	Illness or death to worker due to exposure to blood born pathogens or disease - injury or fatality.	2-Unlikely	5-Extreme		10 Multiple qualified Emergency Medical professionals to be used in the event of illness or injury Site Clinic/First aid room is equipped with extra PPE for Emergency Medical Professionals and First aid attendants Adequate First aid requirements as per WorkSafe BC First aid guidelines at all times Project is equipped with multiple Emergency Transport Vehicles, stocked with supplies and equipment	1-Extremely Unlikely	5-Extreme		5 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-233R 5B-KBTP-515R	2021-01-06	Approved
5B-KBTPN-255	Active	MACRO Risk Workshop	Health and Safety	Radio interference	General Construction	Workers not being able to call for assistance in emergency situation due to extreme dead spots	3-Rare	4-Critical		12 Radio SME consulted and used in planning, equipment selection Toolbox / FLHA completed prior to task commencing Vehicles will be fitted with 20w radio (higher power/range) 5w Handheld radios will get upgraded antennas Cell phone will be provided to supervisor Cell phone boosters will be provided to each supervisor Poor receptions zone in project area identified and documented If needed, GPS location devices will be provided to each supervisor SAT Phones to be purchased and placed in areas where none of the above measures work	3-Rare	3-Major		9 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-154, 5B-KBTP-436	2021-01-06	Approved
5B-KBTPN-257	Inactive	MACRO Risk Workshop	Health and Safety	Railway Crossings	General Construction	Working in proximity to train tracks, effecting train operations causing derailment, injury or fatality(s).	2-Unlikely	5-Extreme		10 Communication with rail authority Permit required for work within railway easement, Limits of Approach CN/CP Orientations Supervisor training Track control person Warning barriers to prevent worker from entering danger zone	1-Extremely Unlikely	5-Extreme		5 K. Mather	Sky Mitchell	AOC	No work scope above, below of adjacent to train tracks. Former Risk ID was 5B-MCRO-158, 5B-KBTP-440	2021-01-06	Approved
5B-KBTPN-268	Active	MACRO Risk Workshop	Health and Safety	Roadway - Traffic	General Construction	Motor vehicle collision with wildlife on highway (sudden presence, low light) resulting in collision causing injury or fatality	2-Unlikely	3-Major		6 Driver Competency Wildlife Reporting Seatbelts Airbags Defensive driver training Proper vehicle maintenance (lights, brakes etc.) Sitewide communication on wildlife collision awareness	1-Extremely Unlikely	3-Major		3 K. Mather	Sky Mitchell	NOC	Cannot control Wildlife movements Former Risk ID was 5B-MCRO-050, 5B-KBTP-332	2021-01-06	Approved

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5B-KBTPN-274	Active	MACRO Risk Workshop	Health and Safety	Security - Protesting	General Construction	The risk of civil disobedience (e.g. blocking access, intimidation) due to protestors outside of the construction work area resulting in violence/injury	4-Occasional	3-Major		12 TMEP security plans and patrols, equipment checks, removal of keys and tools, access Control, CCTV and or cameras Security patrols / briefings from TMEP Security Security fence Thermal cameras/audio warning - Clustering equipment for security cameras Signage with injunction info posted in key areas Equipment checks CCTV/ cameras - Access control Daily equipment checks prior to use Enhanced equipment inspection based on security feedback/ monitoring as required video footage as required Training on response to deescalate situation Cultural sensitivity training PR contact cards to refer public to TMEP communications group	3-Rare	2-Moderate	6	Dan Bond	Dan Bond	AOC	Delete this item as protests and civil disobedience are out of TMEP/Macro control. Applicable to overnight activity Former Risk ID was 5B-MCRO-176, 5B-KBTP-458	2021-01-06	Approved
5B-KBTPN-277	Active	MACRO Risk Workshop	Health and Safety	Security - Theft	General Construction	Worker catching a thief in the act of stealing results in threats, harassment or assault with a weapon	4-Occasional	4-Critical		16 Third Party Security Contractor Security Plan & Patrols, Regular communication to crews with areas of risk and methods to report suspicious activity Training orientation (TMEP Awareness and planning of placements of security resources (people/equipment) Cameras, Listen Devices strategically Placed on ROW Dispute resolution training for supervision.	3-Rare	4-Critical	12	Dan Bond	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-117R, 5B-KBTP-399R	2021-01-06	Approved
5B-KBTPN-278	Active	MACRO Risk Workshop	Health and Safety	Security - Theft	General Construction	Compromised equipment used on project (Theft of fuel, equipment, parts, copper wire, materials) resulting in injury	4-Occasional	4-Critical		16 Third Party Security Contractor Security Plan, Patrols, Regular communication to crews with areas of risk and methods to report suspicious activity Introduce at orientation Awareness and planning of placements of security resources (people/equipment) Pre-use Equipment Inspection Dispute resolution training for supervision.	2-Unlikely	4-Critical	8	Dan Bond	Dan Bond	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-200R, 5B-KBTP-482R	2021-01-06	Approved
5B-KBTPN-279	Active	MACRO Risk Workshop	Health and Safety	Security - Trespass	General Construction	Traditional recreational users of land (camping, ATV, Hiking etc.) within ROW being disrupted resulting in harassment, threats, violence	4-Occasional	3-Major		12 Security Plan & Security Patrol Video Surveillance Fencing & Physical Barriers (rocks, blocks, ditches) Lighting & Signage Police Community engagement Worker & Supervisor Security training.	3-Rare	2-Moderate	6	Dan Bond	Dan Bond	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-247, 5B-KBTP-539	2021-01-06	Approved
5B-KBTPN-281	Active	MACRO Risk Workshop	Health and Safety	Security - Vandalism	General Construction	Sabotage of equipment, pipeline etc. by protestors resulting in multiple fatalities	3-Rare	5-Extreme		15 Security patrols Security fence Thermal cameras/audio warning - Clustering equipment for security cameras Equipment checks CCTV/ cameras Access control Daily equipment checks prior to use Enhanced equipment inspection based on security feedback/ monitoring as required Video footage as required	2-Unlikely	4-Critical	8	Dan Bond	Dan Bond	AOC	Delete this item as protests and civil disobedience are out of TMEP/Macro control. Former Risk ID was 5B-MCRO-175, 5B-KBTP-457	2021-01-06	Approved
5B-KBTPN-282	Active	MACRO Risk Workshop	Health and Safety	Security - Vandalism	General Construction	Squatters living long term on project footprint and access points being displaced resulting in harassment, threats, violence or vandalism resulting in injury	4-Occasional	3-Major		12 Public Communication Plan Security Plan, Patrols, Dispute resolution training for supervision.	3-Rare	3-Major	9	Dan Bond	Dan Bond	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-212, 5B-KBTP-494	2021-01-06	Approved
5B-KBTPN-284	Active	MACRO Risk Workshop	Health and Safety	Soil Disturbance	General Construction	Uncontrolled debris flow (mud slides) on public road/Hwy causing fatalities	3-Rare	5-Extreme		15 Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Pause work during significant rain events (As indicated by local weather warnings). Inspect prior to resuming work. Site assessment and maintenance Frequent hazard communication, FLHA, Tailgate meeting reminders Operator Competency, berms/lock blocks.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-111, 5B-KBTP-393	2021-01-06	Approved
5B-KBTPN-285	Active	MACRO Risk Workshop	Health and Safety	Soil Disturbance	General Construction	Inadequate ROW drainage on steep slope results vehicle/equipment sliding off road (e.g. in muddy conditions, water accumulation, increased risk of slope failure)	4-Occasional	4-Critical		16 Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Pause work during significant rain events (As indicated by local weather warnings). Inspect prior to resuming work. Site assessment and maintenance Frequent hazard communication, FLHA, Tailgate meeting reminders Design Proper drainage	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-151, 5B-KBTP-433	2021-01-06	Approved
5B-KBTPN-286	Inactive	MACRO Risk Workshop	Health and Safety	Soil Disturbance	General Construction	Land/mud slide causing injury/fatality in work and driving areas.	2-Unlikely	3-Major		6 Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Pause work during significant rain events (As indicated by local weather warnings). Inspect prior to resuming work. Rockfall/ slope spotters during work. Pause work during significant rain events. Inspect prior to resuming work. Site assessment and maintenance Frequent hazard communication, FLHA, Tailgate meeting reminders Focus Inspections	1-Extremely Unlikely	2-Moderate	2	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-187, 5B-KBTP-469	2021-01-06	Approved
5B-KBTPN-287	Active	MACRO Risk Workshop	Health and Safety	Soil Disturbance	General Construction	Snow Shed / Avalanche causing Injury due to burial from snow and debris	3-Rare	5-Extreme		15 Geotechnical Engineer Inspections of Slopes above and below work areas. Frequent avalanche hazard communication, FLHA, Tailgate meeting reminders. Avalanche assessments, forecasts, and hazard identifications by competent individuals. Avalanche rescue equipment (shovels, probes, and personal beacons) Work planning for Avalanche season to avoid high risk avalanche zones.	3-Rare	5-Extreme	15	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-195, 5B-KBTP-477	2021-01-06	Approved

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5B-KBTPN-290	Active	MACRO Risk Workshop	Health and Safety	Toxic Fluid/Solvents	General Construction	Hazardous materials storage and handling could result in illness, injury or fatality	3-Rare	4-Critical		12 Review Product SDS/GHS Signage GHS /TDG competency for handling and transport of Flammable materials Focused Inspections Explosion and Fire Resistant Storage Units Remove all ignition sources Gas monitoring Fire Watch Proper PPE (Gloves, masks, double eye protection etc.) Spill containment/kits Safe spacing Eye wash stations	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-107, 5B-KBTP-389	2021-01-06	Approved
5B-KBTPN-291	Active	MACRO Risk Workshop	Health and Safety	Toxic Fluid/Solvents	General Construction	Mobile Equipment failure releasing hot fluids (oil, coolant) causing personal injury.	2-Unlikely	3-Major		6 Daily equipment operator inspection Heightened operator monitoring of equipment systems PM program PPE Daily Safety Meeting, FLRA. Focus Inspections Worksite Inspections	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-202, 5B-KBTP-484	2021-01-06	Approved
5B-KBTPN-299	Active	MACRO Risk Workshop	Health and Safety	Vibration	General Construction	Vibration from use of power tools leads to worker injuries - Hand Arm Vibration Syndrome (white finger disease).	3-Rare	3-Major		9 PPE (anti vibration gloves, wraps) Purchase low vibration tools Ergonomic assessments if required Task rotation to limit exposure	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-009, 5B-KBTP-291	2021-01-06	Approved
5B-KBTPN-303	Active	MACRO Risk Workshop	Health and Safety	Wildlife & Aquatic Habitats	General Construction	Risk of attack by dangerous animals (Bears, Cougars, Coyotes, Wolves, Snakes) due to their proximity to and/or provocation resulting in injury	2-Unlikely	4-Critical		8 Noise deterrents, bear spray Eliminate attractants, wildlife proof waste containers Notify ENV team if wildlife become problematic Fish and Wildlife has traps set for nuisance wildlife Wildlife training Wildlife hazard assessment performed by a 3rd party SME. Wildlife monitors to be dispatched with crews in high risk areas.	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-251R, 5B-KBTP-533R	2021-01-06	Approved
5B-KBTPN-309	Active	MACRO Risk Workshop	Health and Safety	Working at Height	General Construction	Public member falling into an open excavation resulting injury or fatality (e.g. municipal and high use areas along ROW)	4-Occasional	4-Critical		16 Security Plan, Security Patrols. Community project hazard announcements Minimise the time that excavation is open. Signage, snow fence, temp fence, warning tape. Assessment to be completed prior to mobilization to an area that is used by the public	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-174, 5B-KBTP-456	2021-01-06	Approved
5B-KBTPN-314	Active	MACRO Risk Workshop	Health and Safety	Workplace Congestion	General Construction	Ground workers contacted by mobile equipment on ROW due to close proximity.	3-Rare	4-Critical		12 Training Use of Spotter(s) Signalling Procedures known (Spotter training) Use of Beacons and backup alarms PPE - Hi visibility clothing Focus Inspections Awareness sharing- Daily Safety Bulletin Equipment Walkaround Mandatory	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-042R, 5B-KBTP-324R	2021-01-06	Approved
5B-KBTPN-315	Active	MACRO Risk Workshop	Health and Safety	Workplace Congestion	General Construction	The Risk of contact with machinery crush points (cables, draw-works, booms, rotating parts, tracks, winches) due to proximity of ground worker.	2-Unlikely	4-Critical		8 Safe Work Procedures Guarding Visual Warning labels, colour coding, Tag lines Training Spotters Radio Communication PPE - High Visibility Clothing LOTO procedures followed during maintenance.	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-211, 5B-KBTP-493	2021-01-06	Approved
5B-KBTPN-316	Active	Risk Workshop	Health and Safety	Toxic Fluid/Solvents	General Construction	Potential for landowners and/or occupants to be affected by dust emissions from construction	5-Expected	1-Minor		5 EPP Sec 7; Consult with a Land Agent to provide opportunity to report on issues and implement corrective actions, if warranted. Identify suitable water withdrawal locations for use as dust suppression prior to water withdrawal. Water down the pipeline construction footprint, when warranted, to reduce or avoid the potential for dust emissions due to soil pulverization. Increase the frequency of watering roads and sites during periods of high-risk (e.g., high winds). Additional dust abatement measures (e.g., covering topsoil windrows, applying a tackifier) will be implemented, when warranted and approved by the Environmental Inspector. Conduct dust control measures near berry farms and other agricultural crops susceptible to dust damage as per Line List requirements.	4-Occasional	1-Minor	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-206, 5B-KBTP-488	2021-01-06	Approved
5B-KBTPN-327	Active	Risk register re-issue	Health and Safety	Fit for Duty	General Construction	Public Driver Fatigue as they approach construction zones causing collision.	3-Rare	5-Extreme		15 Make sure slow traffic speeds are posted and adhered to using traffic control personnel Place concrete barricades where required to prevent contact with workers Illuminate areas when required with light plants/street lights Use traffic cones and equipment with reflective features/strips Personnel working at night will have reflective tape on their hard hats and will wear class 3 retroreflective vests as a minimum. Utilize AFADS when required to slow and control the flow of traffic Train workers and follow the TCP "Slow-Roll" procedures utilizing Truck Mounted Attenuators (TMA) Communication with local Police for strategic placement of speed limit enforcement	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Public traffic behaviour is beyond MACRO-TMEP control Applicable to overnight activity Former Risk ID was 5B-MCRO-070, 5B-KBTP-352	2021-01-06	Approved

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5B-KBTPN-051	Active	Risk Review Session	Health and Safety	Dropped objects	General Construction - Steep Slope	There is potential of materials rolling downhill while working on steep slopes that could result in worker injuries if there are activities below steep slope	3-Rare	5-Extreme	15	Never have working activities below steep slope, personal injury and equipment damage can result from rolling/sliding material from above. Set up barriers to prevent material from rolling into other work zones or equipment. Signage posted Ensure all stored material is chocked and blocked to prevent any rolling Geotechnical Engineer Inspections of slopes above and below work areas. Rock Scaling, Rock fall netting, Soil Stabilisation, Engineered Barriers to contain or divert material. Operator Competency, berms/lock blocks. Traffic Control Plan during excavation activity. Monitoring of rain gauges and snowmelt as required	3-Rare	3-Major	9	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-014	2021-06-10	Approved
5B-KBTPN-166R	Active	Lessons Learned	Health and Safety	Fit for Duty	General Construction - Steep slope	Operator fails to secure himself in cab of powered mobile equipment while working at height or on a steep slope - Operator strikes or struck by object - Injury or Fatality	3-Rare	4-Critical	12	Equipment inspections, equipment log books Operator competency assessment Informal/formal H&S and Supervisor inspections Signage Anchors, tethers, and winching Barriers and fencing Remove or secure loose materials from cab Seatbelt/Equipment campaigns	2-Unlikely	2-Moderate	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-292R, 5B-KBTP-574R	2021-01-23	Approved
5B-KBTPN-216	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Dry Gulch - Drilling and Blasting equipment working on steep slope, potential for rollover, loss of control	3-Rare	4-Critical	12	Anchoring, tethering of machinery. Specialised steep slope equipment	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-084, 5B-KBTP-366	2021-01-06	Approved
5B-KBTPN-217	Inactive	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Dry Gulch - Specialised mobile equipment (spider excavator) operating on steep slope, potential for rollover, loss of control	3-Rare	4-Critical	12	Anchoring, tethering of excavator on steep slope. Stove Pipe construction method Specialised steep slope equipment	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-085, 5B-KBTP-367	2021-01-06	Approved
5B-KBTPN-218	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Dry Gulch - access/egress on Steep Slopes may cause a worker to lose balance, slip and/or fall down the slope resulting in recordable injury.	4-Occasional	3-Major	12	Cable Crane installation will provide material handling. Stairs, ramps, slope stabilisation work.	4-Occasional	2-Moderate	8	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-096, 5B-KBTP-378	2021-01-06	Approved
5B-KBTPN-219	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Employee slips, trips or falls while ascending / descending steep slopes; resulting in recordable injury.	4-Occasional	3-Major	12	Proper footwear and traction aids, Designated paths, FLHA, Encourage planning Planned travel paths Sanding/Sand available as needed Rope handrails, stairs, ramps, where appropriates	3-Rare	2-Moderate	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-097, 5B-KBTP-379	2021-01-06	Approved
5B-KBTPN-220	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	General - Steep side slopes result in machine instability causing a rollover or uncontrolled movement resulting in serious injury/fatality,	3-Rare	4-Critical	12	Geotechnical Engineer Design of Slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Anchoring, Operator Competency. Grade Plan Steep slope wrok training Proper steep slope equipment	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-099, 5B-KBTP-381	2021-01-06	Approved
5B-KBTPN-221	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	General - access/egress on Steep Slopes may cause a worker to lose balance, slip and/or fall down the slope resulting in injury.	4-Occasional	3-Major	12	Dedicated pathways- communicate to workers Fit for duty assessments Proper footwear (good tread, laced up, heals, traction aids). Rope handrail. Temp staircases where appropriate.	4-Occasional	2-Moderate	8	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-100, 5B-KBTP-382	2021-01-06	Approved
5B-KBTPN-222	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Logging operations on steep slopes - skidder/feller buncher could roll over or sliding down slope causing injury or fatality.	2-Unlikely	4-Critical	8	Heli Logging in place of ground operations Highline cable system. Steep Slope Plan. WSBC compliant Logging Steep Slope Plan. Daily Safety Meeting, FLRA.	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-102, 5B-KBTP-384	2021-01-06	Approved
5B-KBTPN-224	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Shylock KP 1015-1013.6 - unstable sandy slope - Geo Hazards - Injury due to contact with or burial from boulders, rockslide, collapsing soil and debris impacting worksite - gabion baskets, active slide area, directly above Hwy - (both sides of the road)	3-Rare	5-Extreme	15	Geotechnical Engineer Inspections of Slopes above and below work areas. Rock Scaling Soil Stabilisation (wire mesh) prior to excavation Engineered Barriers (gabion baskets) to contain or divert material.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-146, 5B-KBTP-428	2021-01-06	Approved
5B-KBTPN-225	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Side by Side (SXS) loses control or roll-over on steep slopes results in Near Miss, Injury and or Loss of Life Incident.	3-Rare	4-Critical	12	UTV Training certificate, Competency Assessment by supervisor. Operate UTV within Manufacturers specifications. Proper PPE (helmets), seat belt, ROPS.	3-Rare	3-Major	9	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-147, 5B-KBTP-429	2021-01-06	Approved
5B-KBTPN-226	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	General Construction - Steep slope	Rockslide, collapsing soil and debris impacting worksite resulting in worker injury (e.g. burial)	4-Occasional	5-Extreme	20	Geotechnical Engineer Inspections of slopes above and below work areas. Rock Scaling, Soil Stabilisation, Engineered Barriers to contain or divert material. Weather/Rainfall monitoringacro to pause work during significant rain events. Inspection of rain gauges takes place prior to work. Rockfall spotters	4-Occasional	4-Critical	16	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-201, 5B-KBTP-483	2021-01-06	Approved
5B-KBTP-133	Active	Risk Review Session	Environment	Soil Disturbance	Grading	Rutting or compacting of topsoil on ROW from repeated heavy equipment of vehicle travel	2-Unlikely	2-Moderate	4	Conduct environmental inspection Environmental Protection Plan Environmental Alignment Sheets and Resource Specific Mitigation Tables Access Mats - Inspection Limiting access and number of vehicles/equipment Remove and replace soil Scarify soil post construction to remove ruts Site grading Para-tilling (only applicable to agricultural settings) Eco-tilling - Cultivation	2-Unlikely	1-Minor	2	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to day and night shift activities	2021-06-10	Approved
5B-KBTPN-027	Active	Risk Review Session	Health and Safety	Construction Dust	Grading	Pedestrian injury resulting from construction debris (e.g rocks, dirt, construction debris) left on public roads or walkways by construction equipment such as haul trucks	4-Occasional	2-Moderate	8	Street sweeper will be available to keep roads clean and free of debris. Environmental controls of cleaning the equipment before it leaves site (e.g. wheel wash stations) Designated walkways in high traffic locations Scheduled road maintenance	2-Unlikely	2-Moderate	4	Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-658	2021-08-19	Approved
5B-KBTPN-297	Active	Risk Review Session	Health and Safety	Toxic Gases	Grading	Worker exposure to toxic vapours due to proximity to exhaust streams from engines or burners caused by idling equipment	4-Occasional	3-Major	12	Ensure proper ventilation when working near running engines Idling is strictly prohibited on project. Maintenance troubleshooting should only take place in well ventilated areas. Use of gas detection monitors when situation deems suitable.	4-Occasional	3-Major	12	Jesi Neil	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-659	2021-08-19	Approved

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5B-KBTPN-049	Active	Risk Review Session	Health and Safety	Dropped objects	Grubbing and Stripping	There is potential of stored energy rock outcrops that can result in worker injury	2-Unlikely	3-Major		6 Use caution as to not pull/roll rocks onto pioneer machines. Utilize thumb on excavators to remove and place rocks. Site assessments prior to start of work to identify hazardous outcrop areas.	2-Unlikely	2-Moderate	4	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-012	2021-06-10	Approved
5B-KBTPN-143	Active	Risk Review Session	Health and Safety	Fit for Duty	Grubbing and Stripping	There is potential of stored energy from removing stumps, broken trees, and tree limbs than can cause worker injury	1-Extremely Unlikely	3-Major		3 Remove hazard of stored energy by removing material around stumps before pulling them from ground. Delineation and/or signage to keep ground personnel from entering the active work areas. Guards on equipment to prevent material from entering cab through windshield. Radios available to operators and ground personnel to allow communication from a safe distance.	1-Extremely Unlikely	2-Moderate	2	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-121	2021-06-10	Approved
5B-KBTPN-300	Inactive	Risk Review Session	Health and Safety	Waste Material	Grubbing and Stripping	Piling of stumps/slash have the potential of rolling that can lead to worker injury	4-Occasional	3-Major		12 Pile in a location material is not going to roll. Construct berms to hold in place material If there is a danger of material rolling.	4-Occasional	3-Major	12	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-144	2021-06-10	Approved
5B-KBTP-466	Inactive	Risk Workshop	Environment	Soil Disturbance	Hydrostatic Testing	Impact to soil or water from the inadvertent release of fuel or lubricants from equipment failure, malfunction or human error.	3-Rare	3-Major		9 EPP Sec. 15; isolate test pumps, generators and fuel storage tanks with secondary containment to capture and retain any spills/leaks of fuels or lubricants; Els.	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-184	2021-01-06	Approved
5B-KBTPN-237	Active	Risk Review Session	Health and Safety	Manual Handling	Loading & Blasting	Worker injury due to overstressed joints, tendons, or muscles as a result of heavy manual lifting caused worker inexperience, inattentiveness, or repetitive work. These risks are increased while working on steep and uneven surfaces.	5-Expected	2-Moderate		10 Mandatory stretch and flex program 50 lb. rule (per worker) Proper lifting technique awareness ES: Use equipment whenever feasible	4-Occasional	2-Moderate	8	James Goggans	Wade Medley	NOC	No blasting activities will be conducted during night shifts  Former Risk ID was 5B-KBTP-107	2021-06-10	Approved
5B-KBTPN-048	Inactive	Risk Review Session	Health and Safety	Dropped objects	Loading/Unloading Material	Logs falling off trucks during transportation have the potential crushing objects/workers in the vicinity	2-Unlikely	4-Critical		8 Operator ensures loads are properly secured and tied down. Use of cables or straps to secure load for transportation. Daily Visual Inspections are completed on equipment (records kept). KBTP will ensure that all workers involved have the required training (maintain training records)	1-Extremely Unlikely	4-Critical	4	Seth Farnsworth	Wade Medley	NOC	Not on night shift Former Risk ID was 5B-KBTP-011	2021-06-10	Approved
5B-KBTPN-054	Active	Risk Review Session	Health and Safety	Dropped objects	Loading/Unloading Material	There is potential of hitting persons or equipment during loading/unloading materials (i.e., pipe)	4-Occasional	4-Critical		16 Loading/unloading flags on truck and spotter to keep people/equipment out of work area. Ensure lifting plans and inspection are performed. Review signals with the operator to ensure communication and signals are clear. Rigging used for loads must be certified and inspected. Tag lines or approved pipe handles to be used on lifted material.	3-Rare	3-Major	9	Seth Farnsworth	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-111	2021-06-10	Approved
5B-KBTPN-260	Inactive	Risk Review Session	Health and Safety	Roadway - Traffic	Log Haul Out	There is potential of log truck overturning while in transit to the worksite resulting in worker injury	4-Occasional	3-Major		12 Maintenance of roads to avoid problematic areas where tipping can be an issue Reduce driving speed to road/weather conditions Inspection and Maintenance of trucks Ensure truck driver is rested and fit for duty	3-Rare	3-Major	9	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-122	2021-06-10	Approved
5B-KBTPN-010	Active	MACRO Risk Workshop	Health and Safety	Airborne Debris	Logging, Brushing	The Risk of contact with flying debris due to proximity to tree felling / land clearing machinery operations	3-Rare	4-Critical		12 Safe Work Plans (clearing plan). Controlled Work zone, signage and delineation (as needed) Brush guards Third party training for workers involved with brushing/clearing activities Radio communication Spotter / guard to prevent people from entering zone Matting	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-020, 5B-KBTP-302	2021-01-06	Approved
5B-KBTPN-021R	Active	MACRO Risk Workshop	Health and Safety	Communication	Logging, Brushing	Communication issues to ground crews during operation (Heli-logging)	3-Rare	4-Critical		12 Flight crew will be in constant communication with ground crew/landing area supervisor Flight crew will have ability to communicate any loose debris, size of load, and hazards related to the turn Work will stop if radio fails, until replacement found Aircraft is configured to pick up logs without the use of ground workers at the pickup site. If any riggers/hooks are used, they will use international hand safety signals and use them Communication must be understood by all workers at the landing (JSA review) Ground personnel must call aircraft by name or designation when calling on radio Radio frequencies established, tested and documented Pilots will understand and acknowledge signals of ground personnel Ensure JSA/JHA includes all those involved vresus only ""off the shelf JSA"" Monitoring?"	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-023R, 5B-KBTP-305R	2021-01-06	Approved
5B-KBTPN-059R	Active	MACRO Risk Workshop	Health and Safety	Dropped objects	Logging, Brushing	Rotor blade down wash-causing trees, branches or other debris to fall on workers below.	3-Rare	4-Critical		12 Pre- Assessment led by Logging foreman of areas where workers will or may be, in consultation with qualified Danger Tree Assessors to ensure areas are 'windfirm' Clearing/falling (removal) of all danger trees ahead of operations as needed Loose debris on cliff faces with potential to impact workers or property to be assessed and removed or effectively controlled (if applicable) Pilot/ Co-pilot walkdowns of service landing areas, familiarization flights Safe work area will be established, workers will be prohibited to enter, unless under controlled conditions and permitted to do so by supervisor Drop zones to be laid out to ensure that it can accommodate the size and volume of wood to be delivered. Safe zones to be established and acknowledged through JSA review Provider to ensure helicopter must be able to bring in a turn to landing area without clipping adjacent trees Clearance for heavy equipment and any ground workers at landing area of at least 1.5 tree lengths Pilot/ Co-pilot walkdowns of service landing areas, familiarization flights Provider to ensure helicopter must be able to bring in a turn to landing area without clipping adjacent trees	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-035R, 5B-KBTP-317R	2021-01-06	Approved
5B-KBTPN-086R	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Logging, Brushing	Aircraft Malfunction - Helicopter(s) - Aircraft Incident - injury/fatality	3-Rare	5-Extreme		15 Third Party Aircraft Contractor (Vender pre-qualification and assessment) Regular maintenance of aircraft Aircraft Maintenance Engineers (AME) onsite at all times Pre-flight checks Inventory of replacement parts at service landing/ nearby	2-Unlikely	5-Extreme	10	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-081R, 5B-KBTP-363R	2021-01-06	Approved

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5B-KBTPN-087R	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Logging, Brushing	Dropped load due to equipment malfunction that causes injury of fatality	3-Rare	4-Critical		12 Only competent personnel will operate equipment Pre-use inspections of equipment, clamp and hydraulic system Workers will never be under the load at any time Safe zones to be established and acknowledged through JSA review Spotter, Beacons, Radio communication PME Assurance program for all equipment Spotter awareness Equipment Manufactures manual	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-083R, 5B-KBTP-365R	2021-01-06	Approved
5B-KBTPN-107R	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Logging, Brushing	Unexpected interface with other aircraft in the area	4-Occasional	5-Extreme		20 Heli logging provider to file NOTAMs (Notice to Airmen) as per Transport Canada, and ensure pilots review Monitoring and transmitting on appropriate frequency for area (position reports to others when movement occurs) GCC to advise local separate helicopter provider and Hope Airport as additional measure (in addition to provider-filed NOTAM) Pilots responsibility to check NOTAMs in addition to filling them Ground monitors in area with comms Signage posted and designated work zones and times	3-Rare	5-Extreme	15	K. Mather	Sky Mitchell	AOC	Third Party Helicopter providers & Regional Air traffic Control managed function Former Risk ID was 5B-MCRO-129R, 5B-KBTP-411R CDN - Disagree with likelihood, due to the heavily regulated industry and inherent safe-guards.	2021-01-06	Approved
5B-KBTPN-150R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty	Logging, Brushing	Dropped load due to operator error (belly hook/ Long Line system/ hydraulic clamp)	3-Rare	4-Critical		12 Only competent/authorizedpersonnel will operate equipment Instruction/ User manual read and acknowledged prior to field useLoads will never be flown over persons, motorways, utilities Dedicated lift calculation personnel (pilot) Loads will be calculated on every turn of log haul/ hoist Pre-job tailgate in pre-flight procedure 6m workspace zone will be established Rigger Training Pre-use rigging inspections Use of Spotter(s) Signalling Procedures known (Spotter training) Use of Beacons and backup alarms PPE - Hi visibility clothing Focus Inspections Awareness sharing- Daily Safety Bulletin Equipment Walkaround Mandatory	1-Extremely Unlikely	3-Major	3	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-061R, 5B-KBTP-343R	2021-01-06	Approved
5B-KBTPN-179	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	Lowering-in	Unintended release of pipe section, due to single or multiple side-boom roll over or dragged into ditch, as a result of side-boom Operator(s) loss of control in a multi joint section, multi side-boom sequenced pipe lowering in exercise	1-Extremely Unlikely	4-Critical		4 Green Hand / New Young Worker Program Contractor Competency Assessment Program Contractor Quality Management program Beacons Airhorns Focused Inspections Supervision and Inspectors	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-130, 5B-KBTP-412	2021-01-06	Approved
5B-KBTPN-181	Active	Risk Review Session	Health and Safety	Fit for Duty - Loss of Control	Lowering-in	Worker injury resulting from contact with the ground or the interior of a machinery cab due to loss of control (and roll-over) casued by worker ignorance or inexperience	3-Rare	4-Critical		12 Designated operator Training Competency and sign off Seat belt enforcement PPE Schedule Specific operators for High Risk operations Roll over Training Operator and seatbelt awareness campaigns	2-Unlikely	4-Critical	8	Jesi Neil	Wade Medley	NOC	No lowering-in activities will be conducted during night shifts Former Risk ID was 5B-KBTP-663	2021-08-19	Approved
5B-KBTPN-019	Active	Risk Review Session	Health and Safety	Communication	Maintenance	Equipment/Maintenance - Equipment operator makes contact with a ground worker leading to worker injury (work activity takes place in a remote area)	4-Occasional	4-Critical		16 Competent spotter and signal person Pre-movement meeting Review signals with the operator to ensure communication and signals are clear. All trainee signal personnel shall be accompanied by direct supervision. Ensure reflective decals are visible and install new reflective decals as needed Light plants will be used in areas of low light - Work and parking areas. Stationary/mobile equipment in work area will have delineation around them to better mark location/clearances. Personnel working at night will have reflective tape on their hard hats and will wear class 3 retrorreflective vests as a minimum. Remote Work - Medic readily available Delineation and/or signage to prevent unauthorized ground crew access to line of fire work areas.	3-Rare	4-Critical	12	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-051	2021-06-10	Approved
5B-KBTPN-052	Active	Risk Review Session	Health and Safety	Dropped objects	Maintenance	Workers performing equipment maintenance have the potential of getting injured from equipment falling or rolling off blocking	3-Rare	3-Major		9 When working under equipment the worker will follow the LOTO procedure and de-energize system. Blocking. Wheel chocks will be placed to prevent equipment movement.	3-Rare	2-Moderate	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-015	2021-06-10	Approved
5B-KBTPN-065	Active	Risk Review Session	Health and Safety	Electricity/High Voltage	Maintenance	Using electrical cords have the potential of causing worker getting electrocuted, shocked or burned	3-Rare	3-Major		9 Roll up cords and store properly when not in use. Inspect cords prior to use. Lay out cords in a safe area, covering with cord dogs in traffic areas and elevation the cord off the ground when possible. Never route a cord in or near water or wet areas. Tag and remove damaged cords. Use Ground Fault Circuit Interrupter (GFCI) to prevent workers from getting electricuted when cables are fualty.	3-Rare	2-Moderate	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-025	2021-06-10	Approved
5B-KBTPN-073	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Maintenance	Equipment assembly/disassembly has the potential of causing worker injury from body or extremities being caught in crush or pinch points of assembly components	3-Rare	4-Critical		12 Use of appropriate lifting devices, rigging and procedures. All rigging to have up-to-date inspection tags. Use of On The Spot Lift Plan. Use of proper alignment tooling. Use of tag lines and trained spotters with designated signal person Method of communication between signal/spotter and operator (ex. handheld radio, hand signals)	2-Unlikely	3-Major	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-031	2021-06-10	Approved
5B-KBTPN-077	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Maintenance	Equipment/Maintenance - Worker injury from a truck pneumatic tire blow out	4-Occasional	3-Major		12 Ensure trucks' pneumatic tires are inspected and maintained Maintenance schedule for vehicles (includinge tires)	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-049	2021-06-10	Approved

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5B-KBTPN-078	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Maintenance	There is potential of Spotter/Signal person suffering injury when guiding equipment operators.	3-Rare	4-Critical	12	2 points of tie off with 1 continuous required Spotter to stay in safe position, spotter and equipment operator to acknowledge each other's presence before moving to dangerous area Review signals with the operator to ensure communication and signals are clear. Use radios for communication if visual communication not possible. Delineation and/or signage to prevent unauthorized ground crew access to line of fire work areas.	3-Rare	4-Critical	12	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-052	2021-06-10	Approved
5B-KBTPN-079	Inactive	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Maintenance	Equipment/maintenance - worker injured operating an aerial work platform	3-Rare	4-Critical	12	Worker to wear appropriate fall protection All guarding will be in place and in good working order. A pre-use inspection will be performed. Operator to be trained and certified in the use of aerial work platform. Worker tied-off in AWP to prevent launch from aerial platform. Worker to not operate in vicinity of overhead powerlines. Worker to ensure to wear approved hard hat in vicinity of overhead hazards.	2-Unlikely	4-Critical	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-054	2021-06-10	Approved
5B-KBTPN-080	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Maintenance	Workers performing equipment maintenance have the potential of injuries if the equipment is not properly grounded or lockouted/tagged out	4-Occasional	3-Major	12	Worker to follow/perform equipment LOTO procedure as required. Make sure all implements are grounded. When accessing equipment use manufacturer access points. Use blocks or equivalent support methods to prevent the equipment from rolling/moving during maintenance Use only approved rigging and that has current inspection tag. Use approved equipment (e.g. ladders) to gain appropriate access to avoid strains. Use the appropriate tools to complete the task (Right tool for the job) Complete maintenance as per the manufactures recommendations Wear the appropriate PPE for the task Disconnect any power sources such as the battery when required	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-057	2021-06-10	Approved
5B-KBTPN-109	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Maintenance	There is potential of worker being crushed while removing belly pans from equipment	4-Occasional	4-Critical	16	Use belly pan stand jacks Two slings connected to a crane All rigging material inspected with current tag. Delineation and/or signage to keep unauthorized personnel from work area.	4-Occasional	3-Major	12	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-060	2021-06-10	Approved
5B-KBTPN-115	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Pressure (high/low)	Maintenance	Equipment/Maintenance - Worker injury from hydraulic injection	4-Occasional	4-Critical	16	LOTO procedure will be in place. If a leak is suspected do not use hand to find the source. Inspections performed by experienced maintenance personnel. Proper hand protection - gloves	4-Occasional	4-Critical	16	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-048	2021-06-10	Approved
5B-KBTPN-123	Active	Risk Review Session	Health and Safety	Ergonomic - Hot/Cold Surfaces	Maintenance	Equipment/Maintenance - worker injury from hot fluids	4-Occasional	2-Moderate	8	Worker to wear appropriate PPE (e.g., gloves, safety goggles, etc.). Allow equipment to cool down prior to working on or testing systems. Use heat detection device to determine if safe to touch.	3-Rare	2-Moderate	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-072	2021-06-10	Approved
5B-KBTPN-124	Active	Risk Review Session	Health and Safety	Ergonomic - Hot/Cold Surfaces	Maintenance	Worker injury from burns or explosion while operating or setting up oxy/acetylene torches	4-Occasional	4-Critical	16	Specilized PPE to be used (Fire Resistant rating) Ensure the work area is clear and free of tripping hazards before starting the operation. Inspect all equipment and surroundings. Ensure clear, level ground, free of any combustable material. Use blocks or jacks to support parts, pieces, or sections being removed. Place floor jack in the center of the load to support weight. Use delineation or signage to ensure no unauthorized workers are in the line of fire. Lower the belly pan as close to the floor as possible before rolling it out from under the machine.	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-086	2021-06-10	Approved
5B-KBTPN-125	Active	Risk Review Session	Health and Safety	Ergonomic - Repetitive work	Maintenance	Equipment/Maintenance - There is potential of work injury while performing minor repairs	4-Occasional	2-Moderate	8	Make sure implements are grounded and operator is clear of controls. Walk around inspection to make sure the area is clear. Tool guards installed and in good condition Use approved equipment (e.g. ladders) to gain appropriate access to avoid strains.	3-Rare	1-Minor	3	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-058	2021-06-10	Approved
5B-KBTPN-126	Active	Risk Review Session	Health and Safety	Ergonomic - Repetitive work	Maintenance	Equipment/Maintenance - Worker injury from towing stuck equipment	4-Occasional	3-Major	12	Worker will find or make a better access for performing work. Worker will take micro breaks. Utilize creepers, knee pads, cushions or other supplies to improve access.	4-Occasional	2-Moderate	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-075	2021-06-10	Approved
5B-KBTPN-139	Active	Risk Review Session	Health and Safety	Fit for Duty	Maintenance	Equipment/Maintenance - Worker injury from operating shop tooling, caught in or by moving parts	4-Occasional	2-Moderate	8	Worker will notify supervisor before work if they are not fit for duty. Supervisor to ensure worker is fit for duty. A pre task meeting will help supervision assess if workers are impaired. Worker will not operate heavy machinery if directed by doctor or medication All relevent tool guards inspected and installed correctly.	3-Rare	2-Moderate	6	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-055	2021-06-10	Approved
5B-KBTPN-140	Active	Risk Review Session	Health and Safety	Fit for Duty	Maintenance	Equipment/Maintenance - Workers injures themselves or another person when impaired on drugs, alcohol, lack of sleep or medication	5-Expected	2-Moderate	10	Supervisor observes workers (e.g., behavior, movements)during the stretch and flex. Workers are not allowed to wear sun glasses at the start of their shift. Alcohol and drug test administered to suspected workers if deemed within right to administer.	4-Occasional	2-Moderate	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-056	2021-06-10	Approved
5B-KBTPN-141	Inactive	Risk Review Session	Health and Safety	Fit for Duty	Maintenance	E-Rad gun torqueing/loosening fasteners - Workers involved in maintenance of equipment/machinery may suffer extreme crush/amputation points between reaction arm and nuts. Rotating/moving parts. Faulty defective tooling	4-Occasional	4-Critical	16	Only qualified personnel with training in the safe operation of the E-Rad tool system should operate this tool. Follow torque sequence according to specs, inspect gasket, nuts, and studs prior to torqueing. Inspect E-Rad tool, Controller, connector cables and reaction arm prior to any use. If defects are found on any portion of the system tag out and notify supervisor of the damage or defective tooling. Ensure reaction arm and snap ring are properly seated and secured on to the spline or serpentine fitting. Be aware of the direction of travel and the travel path of the reaction arm.	3-Rare	4-Critical	12	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-062	2021-06-10	Approved

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5B-KBTPN-174	Active	Risk Review Session	Health and Safety	Fit for Duty - Loss of Control	Maintenance	Workers may be injured from stored energy in high pressure equipment failing (e.g. inflated tire, wire from steel belts, flying debris while balancing tires, tanks)	4-Occasional	3-Major		12 Leather gauntlet gloves, tinted face shield, fire resistant outer clothing, ear plugs. Inspect torch, hoses, tanks and all connections prior to each use. Keep a fire extinguisher within 25 feet of the cutting activity. Set up your cutting area, remove combustibles, set up welding screens or fire blanket to protect others in high traffic areas and cover any permanent material. Set up cord covers over the hoses. Avoid wearing clothing made from synthetic materials that easily burn or melt. Ensure the area has adequate ventilation to reduce a buildup of fumes. If possible, secure the work piece to the fab table with c-clamp or Bessy clamp. Purge torch and hoses before disconnecting them from tanks after each use. Only maintenance dept. to balance tires with proper gear (cages etc.) Follow manufacturers recommendations for proper air pressure, use tire air pressure gauge to check	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-059	2021-06-10	Approved
5B-KBTPN-187	Active	Risk Review Session	Health and Safety	Flammable Substances	Maintenance	Storage and handling compressed gas may result in fire or explosion causing workers injury	3-Rare	4-Critical		12 Tanks must be stored in accordance with WHIMS regulations in a cool well ventilated designated area. Storage area must have the appropriate signage. Tanks must be handled with care and secured when not being handled.	2-Unlikely	4-Critical	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-085	2021-06-10	Approved
5B-KBTPN-230	Active	Risk Review Session	Health and Safety	Hydrocarbons	Maintenance	Worker suffering injuries during fueling operations.	4-Occasional	2-Moderate		8 Worker will be trained on the fuel truck operation. Use the buddy system to spot the truck in for best access, pulling out fuel hose and passing up the hose onto equipment. Have a plan with operators to relocate unit when fueling. Supervision to have route plan for truck. Stage equipment with easy access points for re-fueling appropriate PPE when completing task in well lit areas for safer access/egress	4-Occasional	2-Moderate	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-100	2021-06-10	Approved
5B-KBTPN-231	Active	Risk Review Session	Health and Safety	Hydrocarbons	Maintenance	Worker dispensing fuel may suffer injuries due chemical contact with skin or burns if the work area is close to ignition sources	3-Rare	3-Major		9 Prior to starting smaller engines (e.g., portable generators, concrete saws, gas concrete vibrators) worker must add fuel to last your full shift to avoid fueling a hot engine, increasing the risk of a fire. Conduct a pre-inspection of the fuel system and its components (i.e. top-fill nozzle and approved hose(s) are in working order, and spill prevention equipment is in place. Leakage, deterioration or damage on the equipment must be immediately tagged, reported and removed from service. Refueling must occur at a minimum distance of 3 m (10 ft.) away from any live source of ignition (i.e. running engines, smoking, etc.). Should any equipment approach within the 3 m (10 ft.) perimeter, the fueling operation is to cease immediately, and will not proceed onwards until the approaching equipment is outside the perimeter or shut off. Trigger locks on dispensing nozzles must not be used. Place a drip tray under the refueling point and any other possible leakage sources. Ensure that a volume-appropriate spill kit and fire extinguisher is readily available on the equipment. Always hold the nozzle at all times and never walk away while fueling is in progress – stay focused on the task. Continuously scan the area adjacent to the fueling operation for possible leaks or spills. Ensure workers are wearing appropriate PPE for the task (Gloves, long sleeves etc. to prevent burns, chemical contact.) Dispose and replace any PPE which may have become soiled with chemicals in the appropriate manner Allow equipment time to cool down before re-fueling	2-Unlikely	2-Moderate	4	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-101	2021-06-10	Approved
5B-KBTPN-288	Active	Risk Review Session	Health and Safety	Toxic Fluid/Solvents	Maintenance	Ergonomic - Equipment/Maintenance - worker injury from equipment chemical exposure	4-Occasional	2-Moderate		8 Specialized PPE; gloves, face shields, etc Heat detection device (where applicable) Have all WHMIS information available at location. Eye wash station, rinse off station All batteries will be stored in proper containment. Workers will wear appropriate gloves and PPE when handling batteries - Due to potential chemical exposure	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-071	2021-06-10	Approved
5B-KBTPN-304	Active	Risk Review Session	Health and Safety	Working at Height	Maintenance	Worker injury from falling off equipment while performing maintenance	4-Occasional	3-Major		12 All equipment to have manufacturer supplied access components and safety guarding installed and in working order. 3 points contact when accessing equipment. Fall protection required when accessing outside of handrail. Install guarding	4-Occasional	2-Moderate	8	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-047	2021-06-10	Approved
5B-KBTPN-305	Inactive	Risk Review Session	Health and Safety	Working at Height	Maintenance	Equipment/Maintenance - there is a potential of worker falling out of Aerial Work Platform	4-Occasional	4-Critical		16 Fall protection Secure all loose items before raising the platform to eliminate the risk of falling objects. Set up exclusion zones under the machine, and if possible, do not use the machine above people or structures to avoid injuries if an item falls from the platform Set up fall protection device to ensure people or items of equipment do not fall to the ground Worker to have a spotter when traveling unit or have a ground person as necessary. Foreman or Supervisor to ensure AWP access is flat and free of pot holes or steps. Worker tied-off in AWP to prevent launch from aerial platform.	3-Rare	3-Major	9	Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-053	2021-06-10	Approved
5B-KBTPN-011	Active	Risk Review Session	Health and Safety	Airborne Debris	Material Handling	Worker injury from contact by escaping gas jets and/or flying cylinder fragments due to the failure of (and proximity to) a compressed gas cylinder caused by damage done during transport and/or handling	4-Occasional	3-Major		12 Proper handling with bottle dolly Storage cap in place during movement Strapped/secured while in use and during transport Safe work Practice - handling Compressed Gas cylinders All workers involved in "Transportation of Dangerous Goods" are trained/certified.	3-Rare	3-Major	9	Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-665	2021-08-19	Approved

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5B-KBTPN-042	Active	Risk Review Session	Health and Safety	Culture	Material Handling	Worker injury or fatality resulting from contact by a falling/swinging load resulting from worn or broken components on material handling equipment (i.e. crane, excavator, forklift, zoomboom etc) that were undetected, poorly maintained or unrepaired	3-Rare	4-Critical		12 Daily Visual inspection Annual inspection as required equipment Manufacturer recommendations Use taglines when moving Any materials with rigging multiple if required Keep Control of Area Using Red Flagging and tags No personnel to go beneath Overhead loads for Any reason Everyone in the are is to know and understand the lift Plan prior to performing the lift	2-Unlikely	4-Critical	8	Jesi Neil	Wade Medley	AOC	Former Risk ID was 5B-KBTP-664	2021-08-19	Approved
5B-KBTPN-063	Active	Risk Review Session	Health and Safety	Dropped objects	Material Handling	Worker injury or fatality from being crushed by materials falling off of a telehandler or forklift due to the load not being adequately secured for transport or the equipment being overloaded	3-Rare	5-Extreme		15 Designated Operator Program (Competency) - PPE - Ensure all loads are properly secured with ratchet straps, chocking and deck pins to prevent material instability - Do not overload the equipment over the rated load capacity. Substitution of PME required when over the rated capacity - A spotter must give the Operator clear signals for offloading	2-Unlikely	5-Extreme	10	Jesi Neil	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-667	2021-08-19	Approved
5B-KBTPN-094	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Material Handling	A lack of safety clip on lifting hook or trailer hitch results in Near Miss, Injury and or Loss of Life Incident.	2-Unlikely	4-Critical		8 Daily Visual inspection includes checking for Safety clip Pre-use inspection for every time you make a lift or hook a trailer. Safety chains on tow-behind trailers, if feasible. Equipment missing any safety feature is removed from service until repaired.	1-Extremely Unlikely	3-Major	3	Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-668	2021-08-19	Approved
5B-KBTPN-070	Active	Lessons Learned	Health and Safety	Electricity/High Voltage	Mobilization	The risk of short-circuit or overheating or igniting electrical equipment Outcome: Electrical Fire Consequence: Injury / Fatality	3-Rare	4-Critical		12 Use 3 prong plugs as per OEM requirements Use GFCI cords and circuits when possible Install Proper Grounding and Bonding (as required) Adhere to Electrical Safety Regulation of BC dated 01 Jan 2020 Pre Use Electrical inspections of Cords, Plugs, and Sockets Employ licensed electricians for electrical work	3-Rare	2-Moderate	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-277, 5B-KBTP-559	2021-01-22	Approved
5B-KBTPN-025	Active	Risk Review Session	Health and Safety	Construction Dust	Overburden Load/Haul Place Off-road Hauling	Overburden Load/Haul activities have the potential of generating dust impacting visibility/air quality	5-Expected	2-Moderate		10 Use water trucks when necessary to suppress dust and increase driver visibility. Reduce speeds on haul routes when dust is present. Haul truck operator to slow down, or stop when driving by other operations or ground personnel to avoid "Dusting out" area. Already listed in line 1 (consider deltion)	4-Occasional	2-Moderate	8	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-018	2021-06-10	Approved
5B-KBTPN-064	Active	Risk Review Session	Health and Safety	Electricity/High Voltage	Overburden Load/Haul Place Off-road Hauling	There is potential of equipment/machinery making contact with overhead power lines causing operator's injury	3-Rare	4-Critical		12 •Equipment will not cross under an overhead utility if it comes within 10 ft. (3 m) within the lowest hanging line. •Overhead power lines will be marked with goal posts and proper signage to indicate the maximum height when crossing underneath •Use of qualified spotters in the vicinity of overhead utilities. •Powerline permits and utility representatives present when encroaching on powerlines	3-Rare	4-Critical	12	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-019	2021-06-10	Approved
5B-KBTPN-097	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Overburden Load/Haul Place Off-road Hauling	There is potential of machinery rollover at the dump location causing workers' injury	4-Occasional	4-Critical		16 Continued dump site maintenance (Dozer, Loader, or Blade) to grade out ruts caused by truck turning. Setup dump areas and stockpiles in level areas (when possible) Informal inspection of area to identify hazards. Use designated spotters to help identify ground conditions. Delineation and/or signage to identify proper dumping location. Do not allow trucks to dump on slopes horizontally on a verticle slope	3-Rare	3-Major	9	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-069	2021-06-10	Approved
5B-KBTPN-262	Active	Risk Review Session	Health and Safety	Roadway - Traffic	Overburden Load/Haul Place Off-road Hauling	There is potential of vehicle incidents when using roadways/access roads to worksite(s) causing worker injury	5-Expected	3-Major		15 Follow the KBP Traffic control plan and site specific access point traffic plans. Use of seatbelt is required on all roadways and vehicles. Drivers are to follow the posted speed limits. Roadway and access maintenance to allow safe access on and of site. (Grading, snow removal, hole repair, etc) Construction signage on public roads to make drivers aware of potential hazards. Use of Automated Flagger Assistance Device (AFAD) to keep workers out of the line of fire (where applicable)	4-Occasional	3-Major	12	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-125	2021-06-10	Approved
5B-KBTPN-265	Active	Risk Review Session	Health and Safety	Roadway - Traffic	Overburden Load/Haul Place Off-road Hauling	Equipment moving G190along the ROW have the potential of metal to metal contact causing operator's injury	4-Occasional	3-Major		12 Light vehicles are to yield to equipment Loaded haul trucks have the right of way over unloaded trucks. All vehicles driving on the alignment will follow to posted speed limits	3-Rare	3-Major	9	Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-141	2021-06-10	Approved
5B-KBTPN-312R	Active	Risk Review Session	Health and Safety	Workplace Congestion	Overburden Load/Haul Place Off-road Hauling	Human Equipment Interface - Equipment and Human beings occupying the same work space increases dramatically the potential of serious worker injury	4-Occasional	4-Critical		16 Haul truck operator to stay in the equipment during the loading process Personnel and equipment should remain clear of trench operations, only approach when clear communication has been achieved between equipment operators and workers on the ground. No entry into swing radius of equipment unless worker and equipment operator acknowledge each other's presence before the worker proceeds through the danger area. Implements to be grounded before approaching Review signals with the operator to ensure communication and signals are clear. Proximity Detection	3-Rare	4-Critical	12	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-032R	2021-06-10	Approved
5B-KBTPN-069	Active	MACRO Risk Workshop	Health and Safety	Electricity/High Voltage	Power equipment setup	Worker electrocution during power equipment setup ( i.e. generators) due to damaged power cables, faulty equipment causing electrical shock injury or fatality.	2-Unlikely	5-Extreme		10 Use 3 prong plugs as per OEM requirements Use GFCI cords and circuits when possible Install Proper Grounding and Bonding (as required) Adhere to Electrical Safety Regulation of BC dated 01 Jan 2020 Pre Use Electrical inspections of Cords, Plugs, and Sockets Employ licensed electricians for electrical work	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-157,5B-KBTP-439	2021-01-06	Approved
5B-KBTPN-099	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Pressure test	Pressure Test Equipment failure due to overpressure resulting in crush points leading to potential fatality	4-Occasional	4-Critical		16 Engineered systems and Certification QA/QC oversight on installation (i.e. correct flange torque values) Training and Competency assessment, experienced testing personnel. Exclusions zones, ROW ackees controlled - no access Proper signage for access points. Monitor pressure during test. Testing Plan	2-Unlikely	4-Critical	8	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-217, 5B-KBTP-499	2021-01-06	Approved

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5B-KBTPN-117	Active	MACRO Risk Workshop	Health and Safety	Equipment/Machinery - Pressure (high/low)	Pressure washing, line location, hydro excavating activities	Contact by high pressure water jet due to worker proximity to an uncontrolled lance during pressure washing, line location, or hydro excavating activities resulting in injuries.	2-Unlikely	3-Major		6 Hydrovac procedures Barricading Inspections and assessments Safety guards Equipment design Training Awareness PSSP, Contractor Safety Program SOPs PPE, Emergency shut off for Hydrovac lances.	2-Unlikely	2-Moderate		4 K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-049 5B-KBTP-331	2021-01-06	Approved
5B-KBTPN-294	Active	Risk Review Session	Health and Safety	Toxic Gases	Reactivation activities	Exposure to an oxygen deficient environment due to displacement of oxygen caused by the release of another vapor (i.e. nitrogen)	3-Rare	3-Major		9 Barricades and signage to keep people at a safe distance Air monitoring/gas detection Proper PPE when required Training & competency for workers completing purging Warning signs	2-Unlikely	2-Moderate		4 Stefano Liut	Wade Medley	N/A	Applicable to night shift activities Former Risk ID was 5B-KBTP-193	2021-07-12	Approved
5B-KBTP-288	Active	Risk Workshop	Environment	Air Quality/Smoke	Reclamation	Reclamation activities could enhance risk of wildfire due to placement of roll back vegetation (CWD, slash), which increase risk of wildfire from additional available fuel.	3-Rare	3-Major		9 Ensure slash berms are set back from roads and adhere to the appropriate fire codes Keep the piles as small as is practicable Restore RoW and replace the CWD as soon as possible so it's not sitting there	3-Rare	3-Major		9 Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-006	2021-01-06	Approved
5B-KBTPN-060	Active	MACRO Risk Workshop	Health and Safety	Dropped objects	Roadway/Traffic	Unsecure loads from light or commercial vehicles cause material or debris to impact or create a hazard to other motorists resulting in injury or fatality.	3-Rare	4-Critical		12 PSSP, Fleet Safety Program Commercial Driver training on load securement Frequent Inspection of housekeeping and securement devices. Netting, storage boxes, straps, canopies. Designated Fleet Safety Assistant/ Monitor, Safety Inspections, Focus Observations.	2-Unlikely	3-Major		6 K. Mather	Sky Mitchell	AOC	Applicable to overnight activity Former Risk ID was 5B-MCRO-038, 5B-KBTP-320	2021-01-06	Approved
5B-KBTPN-023	Active	Risk Review Session	Health and Safety	Construction Dust	Rock Load/Haul Place Off-road Hauling	Traffic of vehicles/equipment may create dusty conditions impacting visibility/air quality	3-Rare	1-Minor		3 Use water trucks when necessary to suppress dust and increase driver visibility. Reduce speeds on haul routes when dust is present. Haul truck operator to slow down, or stop when driving by other operations or ground personnel to avoid "Dusting Out" area. Signage to slow down	2-Unlikely	1-Minor		2 Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-001	2021-06-10	Approved
5B-KBTPN-050	Active	Risk Review Session	Health and Safety	Dropped objects	Rock Load/Haul Place Off-road Hauling	There is potential of materials shifting and making contact with hauling equipment while being loaded to flatbed trucks resulting in worker injury	3-Rare	3-Major		9 Two way radio communication Flatbed truck or truck and flatbed will include a cab guard or a bulkhead or another effective means to prevent contact of shifted load that would endanger the occupants of the cab	3-Rare	2-Moderate		6 Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-013	2021-06-10	Approved
5B-KBTPN-192	Active	Risk Review Session	Health and Safety	Ground Conditions	Rock Load/Haul Place Off-road Hauling	There is potential of machine rollover at the dump location resulting in operator injury	5-Expected	3-Major		15 Continued dump site maintenance (Dozer, Loader, or Blade) to grade out ruts caused by truck turning. Setup dump areas and stockpiles in level areas (when possible). Equipment daily visual inspections completed to help ensure safe operation. Have spotters or signage to indicate approved dump locations. Roll-over-protection-system (ROPS) installed on all required equipment	4-Occasional	2-Moderate		8 Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-039	2021-06-10	Approved
5B-KBTPN-263	Active	Risk Review Session	Health and Safety	Roadway - Traffic	Rock Load/Haul Place Off-road Hauling	Vehicles traveling along the ROW have the potential of making contact equipment/machinery causing worker injury	5-Expected	3-Major		15 Light vehicles are to yield to equipment. Loaded haul trucks have the right of way over unloaded trucks. All vehicles driving on the ROW will follow to posted ROW speed limit. Ensure clear delineation, as per traffic plan	3-Rare	3-Major		9 Justin Calabrese	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-126	2021-06-10	Approved
5B-KBTPN-009	Active	Risk Review Session	Health and Safety	Airborne Debris	Sandblast	Workers exposed to airborne particles (including metal and silica) while performing sandblasting causing health risk to eyes and lungs.	4-Occasional	3-Major		12 Training to sandblaster Proper fitted respirators with filters Approved blast helmet (with approved fresh air hose/fresh air supply, approved cape/blast suit, approved gloves) Warning signage Maintain manometers, hoses and compressors in good condition	3-Rare	3-Major		9 Stefano Liut	Wade Medley	AOC	No sandblasting activities will be conducted during night shifts Former Risk ID was 5B-KBTP-279	2021-07-12	Approved
5B-KBTPN-240	Active	Risk Review Session	Health and Safety	Noise	Sandblast	Workers expose to high noise when performing sandblasting affecting workers' hearing	4-Occasional	3-Major		12 Training and competency for sandblaster use Proper fitted respirators with filters, double hearing protection for equal or higher 105 dB, approved blast helmet with approved fresh air hose/fresh air supply, approved cape/blast suit, approved gloves) Warning signage Maintain manometers, hoses and compressors in good condition Put up physical barriers (Tarps, plywood etc.) if going to impact others in the area	3-Rare	3-Major		9 Stefano Liut	Wade Medley	AOC	No sandblasting activities will be conducted during night shifts Former Risk ID was 5B-KBTP-280	2021-07-12	Approved
5B-KBTPN-203	Active	Risk Review Session	Health and Safety	Ground Conditions	Seasonal	A slip and fall due to a slippery surface caused by ice accumulation.	2-Unlikely	3-Major		6 Project Specific Safety Plan (PSSP), SWP's, Fit For Duty Program, Fatigue Management Program, Mentorship Program, Training, Orientation, FLHA, Awareness campaigns to be aware of foot placement when walking. Proper foot wear that has ankle support and anti slip attachments. Footwear appropriate for the conditions ES: Shoveling and/or scraping of icy walkways. Sanding and/or other means of reducing the risk of slipping in icy surfaces applied when and where required if possible	1-Extremely Unlikely	3-Major		3 Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-226	2021-06-10	Approved
5B-KBTPN-105	Inactive	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Shoring	Worker inadvertently caught in pinch point during shoring set up, hooking, lifting, pushing or pulling activities results in Near Miss, Injury and or Loss of Life Incident.	4-Occasional	4-Critical		16 Personal Protective Equipment: High Vis Vest Spotters are in place and properly trained Multiple spotters used if required. Clear area of any personnel prior to moving equipment Operator is designated and trained on the specific equipment Eye contact with equipment operator before approaching them Riggers must have certified training (Rigger 1, Rigger 2, %26 Practical Training) All rigging must be inspected prior to use	2-Unlikely	4-Critical		8 Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-669	2021-08-19	Approved
5B-KBTPN-028	Active	Risk Review Session	Health and Safety	Culture	Slopes Crossing	Human equipment interface has the potential of causing injury to the public who access areas for camping areas in the summer/fall and/or ATV/UTV travellers at high speeds that frequently travel through UTV trails that will be KBTP ROW or close to the ROW	4-Occasional	3-Major		12 ROW will be blocked using gates, fence, barricades etc. to prevent UTV travellers from entering ROW. Areas where the trail is outside, but below ROW will have a berm built to prevent material from going on the trails or UTVs from entering the ROW. Spotters will be used when moving equipment in areas where equipment and the public migh interface. Ensure applicable warning signage and barricades are in place.	3-Rare	1-Minor		3 Stefano Liut	Wade Medley	AOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-274	2021-06-10	Approved

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5B-KBTPN-058	Active	TMEP Executive Review	Health and Safety	Dropped objects	Steep Slope	Equipment rolling over causing injury to ground personnel or members of the public	1-Extremely Unlikely	5-Extreme		5 Safe approach guidelines Delinated work areas Not in public access areas Signage Sandwich board style - sign boards indicating personnel if you want to approach with contact person Tethering and winching Proximity detection.	1-Extremely Unlikely	3-Major	3	Kirk Rich	Wade Medley	AOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-282	2021-07-29	Approved
5B-KBTPN-076	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Steep Slope	There is potential of equipment/machinery rolling over causing equipment operator injury	3-Rare	4-Critical		12 Winch assist is required above 21 degrees. Follow steep slope work plan in steep conditions Do not get the tracks of the equipment perpendicular to the slope. Access soil conditions for stability. make sure working areas are free of large boulders or rocks that will cause the machine to slide. Complete work area inspection and ensure steep slope plans. Designated operator program to ensure competency of operator.	2-Unlikely	4-Critical	8	Kirk Rich	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-044	2021-06-10	Approved
5B-KBTPN-196	Active	Risk Review Session	Health and Safety	Ground Conditions	Steep Slope	Workers involved in hooking up cables/shackles on a steep slope may result on workers' sprains/strains due to awkward/prolonged body positions	5-Expected	3-Major		15 Workers wearing proper footwear with ankle support (6") Follow stretch and Flex program daily Get help when needed. Micro breaks when required Stay haydrated (reminders and signage posted in various locations) Campaigns or PTI's on importance of MSI/Stretch and flex/hydration Use machine power to drag cables.	4-Occasional	2-Moderate	8	Kirk Rich	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-093	2021-06-10	Approved
5B-KBTPN-211	Active	Risk Review Session	Health and Safety	Ground Conditions - Steep Slope	Steep Slope	Equipment and workers conducting activities on steep slopes have the potential of being struck by loose rocks or above rock face that fall causing injury to workers.	3-Rare	4-Critical		12 Ensure that the rock face is mechanically scaled as material is excavated Ensure that catch berms are installed at the bottom of rock walls that have not been signed off by TMEP Representative. Have Geotech inspect and either approve wall or demand geo-hazard mitigation measures (i.e., mobile equipment must be restrained by a wire rope or synthetic rope, which may include webbing, or another machine that is suitable for restraining) Equipment Operator will be protected against any reasonably foreseeable hazards from falling, flying or intruding objects or materials by means of cabs, windows, screens, grills, shields, deflectors, or guards Install physical barriers to protect workers from loose material that could fall towards the work area (Retaining walls, Safety Net, Mountain mesh etc). Dangertape/red rope off high risk areas to prevent people from entering fall zones. Place signange in high risk areas warning of workers of potential falling debris	2-Unlikely	2-Moderate	4	James Goggans	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-097	2021-06-10	Approved
5B-KBTPN-306	Active	Risk Review Session	Health and Safety	Working at Height	Steep Slope	Falling off top of rock slope while scaling or installing geo-hazard mitigation measures	3-Rare	4-Critical		12 Ensure to have proper fall protection PPE when working near the edge over 6 ft. high Harness/gear for fall protection Proper training and competency to perform task Complete Fall protection plan Complete/review rescue plan	3-Rare	4-Critical	12	James Goggans	Wade Medley	NOC	No work on steep slopes will be conducted during night shift Former Risk ID was 5B-KBTP-155	2021-06-10	Approved
5B-KBTPN-085R	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Stringing	Pipe stringing equipment (slow moving, wide turns, overlength) while delivering pipe to the ROW causes hazard to Public that may collide with our equipment.	4-Occasional	5-Extreme		20 •Traffic Management Plan, Site Specific TCP •Pilot trucks and Advance warning signs / flashing lights to highlight these access points for the construction vehicles and the public. •Roadside digital message board with appropriate messaging. • Complete/Communicate Pre planned haul routes and times •Communication with MOTI, maintenance contractor, Emergency Response organizations, community and local businesses. •Access design work to maintain truck movements within single lane •Traffic Control Monitoring	3-Rare	5-Extreme	15	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-044R, 5B-KBTP-326R	2021-01-06	Approved
5B-KBTPN-088R	Active	MACRO Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Stringing	Unintended release of single joint of pipe during stove piping works resulting in Near Miss, Injury and or Loss of Life Incident.	1-Extremely Unlikely	4-Critical		4 Daily equipment inspection, log book completed PM plan in place and equipment up to date Operator competency Steep Slope Plan Communication to ensure all people are aware who is the person giving direction. Dedicated radio channel Ensure Rigging supervisor is involved with hazard assessment and plan development. PME Assurance program for all equipment Spotter awareness Tag lines and barricades (where required) to keep people at a distance from the operation	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-131R, 5B-KBTP-413R	2021-01-06	Approved
5B-KBTPN-175R	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	Stringing	Side-boom Operator loss of control when lowering single joint of pipe during stove pipe works on steep slope resulting in Near Miss, Injury and or Loss of Life Incident.	1-Extremely Unlikely	4-Critical		4 Daily equipment inspection, log book completed PM plan in place and equipment up to date Operator competency Steep Slope Plan Communication to ensure all people are aware who is the person giving direction. Dedicated radio channel Ensure Rigging supervisor is involved with hazard assessment and plan development. Lifing plan in place for operation Only use competent persons as spotters for operation Signage and delineation for control zones (as needed)	1-Extremely Unlikely	4-Critical	4	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-040R 5B-KBTP-322R	2021-01-06	Approved
5B-KBTPN-177	Active	MACRO Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	Stringing	Loss of control during loading/unloading Pipe from a transport vehicle due to failure or improper use of lifting equipment resulting in worker injuries / fatality.	3-Rare	4-Critical		12 Equipment Selection Anchoring/tethering Training, Steep Slope Operator competency Log books and equipment inspections Rollover protection systems (ROPS), Inspections and audits, Increased Supervisor presence. Fatigue Mgt Plan. Line of Fire. FLRA. Steep Slope Management Plan	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-089, 5B-KBTP-371	2021-01-06	Approved

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5B-KBTPN-178R	Active	Macro Risk Workshop	Health and Safety	Fit for Duty - Loss of Control	Stringing	Miscommunication between Tie-In Foreman, signal relay person, side-boom Operator(s), mobile winch or static winch Operator causing loss of control and resulting in Near Miss, Injury and or Loss of Life Incident.	2-Unlikely	4-Critical		8 Pre task meeting, Tailgate When planning ensure communication is discussed and identify who is giving signals. Dedicated radio Channel Conduct radio checks prior to task starting. Install lighting for optimal light during tasks Maintain 6m Danger zone around Powered Mobile Equipment (PME). Only essential personnel to the task to be in the exclusion zone. PME in a state of Zero energy when personnel in 6m exclusion zone until proper understanding of plans and controls are understood by all workers	1-Extremely Unlikely	4-Critical		4 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-090R, 5B-KBTP-372R	2021-01-06	Approved
5B-KBTPN-206	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions	Stringing	Unstable ditch, poor ground conditions or equipment too close to edge of excavation, results in sudden ditch slump causing equipment roll-over or slide into ditch resulting in Injury and or other loss	2-Unlikely	4-Critical		8 Geotechnical Engineer Site investigation ahead of excavation, Inspections of Slopes above and below work areas. Sloping, setback of material, minimise time trench is left open. Operator Competency Ground Disturbance Level 2 Safety Training and Hazard Communication Excavation Entry Checklist Engineering assessments where required. Engineering controls (sloping, shoring or shield) Barricades to prevent equipment from getting to close to excavations where applicable	1-Extremely Unlikely	3-Major		3 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-094, 5B-KBTP-376	2021-01-06	Approved
5B-KBTPN-214	Active	MACRO Risk Workshop	Health and Safety	Ground Conditions - Steep Slope	Stringing	Pipe stringing and temporary pipe storage on steep slope locations - equipment incapability to access certain areas resulting in rollover or load securement concerns causing injury or fatality.	2-Unlikely	4-Critical		8 Conduct assessment and select appropriate equipment to ground conditions to transport from laydown to staging points as per accepted steep slope work plans. Pipe should not be stored or strung on a slope >= 8 degrees. Additional measures will be required Daily Safety Meeting, FLRA Seat belts to be worn at all times, Equipment inspections, Equipment log books. Securement of loose materials in cab, Steep Slope Plan, JHA, FLRA Operator competency assessment, Site Inspection Barriers and Fencing Signage	1-Extremely Unlikely	3-Major		3 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-068, 5B-KBTP-350	2021-01-06	Approved
5B-KBTPN-242	Active	MACRO Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Stringing	Kinetic or Potential Energy in pipeline or equipment components during lifting, lowering in, creating line of fire hazard - injury/fatality.	3-Rare	4-Critical		12 Lift Plan and Lowering-in Plan, Winching and Tethering Plan Line of Fire awareness Proper use of catch off equipment Lowering In Operator Competency Rigging Training Third Party Communication with operator Pre-use/lift equipment and rigging inspection	2-Unlikely	4-Critical		8 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-046R, 5B-KBTP-328R	2021-01-06	Approved
5B-KBTPN-244R	Active	MACRO Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Stringing	Cribbing/Skid Pile failure - Uncontrolled movement of pipe resulting in worker injury	4-Occasional	4-Critical		16 Pre-use inspection of cribbing material to identify defects Inspection of skid piles Procurement of quality cribbing material Discard damaged skids. Non-compliant skids are clearly marked so they are not used elsewhere No edging of skids or other unapproved modification Focus inspections of cribbing by HSE and Supervisors Awareness Training for Cribbing Structures	3-Rare	4-Critical		12 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-123R, 5B-KBTP-405R	2021-01-06	Approved
5B-KBTPN-245	Active	MACRO Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Stringing	Thermal expansion causes pipe to move off the skids causing injury or fatality.	4-Occasional	4-Critical		16 Place skids as per plan, increased number of skids in bends. Cribbing plan and safe work procedures reviewed with labourers. use of dirt piles to secure pipe.	3-Rare	3-Major		9 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-256, 5B-KBTP-538	2021-01-06	Approved
5B-KBTPN-310	Active	MACRO Risk Workshop	Health and Safety	Working at Height	Stringing	Worker fall into pipe trenches resulting in fatality	3-Rare	4-Critical		12 Signage, snow fencing Barriers, fall protection for >6 fall hazards. Assess soil conditions, ongoing inspection, undermined excavation. 1m setback, no tripping hazards, good housekeeping, crumbing the edge and stairs. Proper access ramps for workers (chicken runs). Rope handrail system if necessary. Focus Inspections Worksite Inspections	2-Unlikely	3-Major		6 K. Mather	Sky Mitchell	AOC	Former Risk ID was 5B-MCRO-261, 5B-KBTP-543	2021-01-06	Approved
5B-KBTP-369	Active	Risk Workshop	Environment	Wildlife & Aquatic Habitats	Stringing, Welding, Trenching and Lowering-in	Inadvertent wildlife entrapment or confinement in open trench, or within the pipe	4-Occasional	2-Moderate		8 EPP Section 11; Working within appropriate work windows; end caps for overnight, inspecting trench at the start of the day, keeping trench backfill close to lowering-in crews. Coordinate recovery with EI and use Resource Specialist as necessary.	4-Occasional	2-Moderate		8 Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-087	2021-01-06	Approved
5B-KBTP-387	Active	Risk Workshop	Environment	Groundwater	Stringing, Welding, Trenching and Lowering-in	Releasing or spreading of existing contamination related to trench excavation.	2-Unlikely	2-Moderate		4 Prevent the pipeline trench from being a conduit for potentially contaminated groundwater from areas adjacent to the pipeline construction footprint by installing trench plugs to contain water to the site or backfilling the trench with imported clay to prevent contaminant migration. Ensure contaminated soil and water are not transported off-site or disposed until analytical results have been received	1-Extremely Unlikely	2-Moderate		2 K. Mather	Dean Letendre	AOC	Former Risk ID was 5B-MCRO-105	2021-01-06	Approved
5B-KBTP-461	Active	Risk Workshop	Environment	Soil Disturbance	Stringing, Welding, Trenching and Lowering-in	General drainage, erosion and sedimentation	3-Rare	2-Moderate		6 Adhere to mitigation measures provided in section 11.0 of the EPP including the use of diversion berms, trench plugs, sediment fences, and dewatering practices.	3-Rare	1-Minor		3 Craig Ratcliffe	Gary Shorthouse	NOC	Former Risk ID was 5B-MCRO-179	2021-01-06	Approved

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/N OC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTP-502	Active	Risk Workshop	Environment	Waste Material	Stringing, Welding, Trenching and Lowering-in	Releasing or spreading of existing contamination related to trench excavation.	5-Expected	3-Major	15	Ensure a Resource Specialist directs the assessment of potential contamination indicators (i.e., groundwater sheen and adjacent soil staining) during trench excavation in areas where there is high potential for encountering contamination (e.g., known areas of existing contamination) as identified in the Contamination Identification and Assessment Plan ( Appendix G of the EPP) and the EAS. Where soil or groundwater contamination is suspected, implement the Contaminated Sites Discovery Contingency Plan (Appendix B). Prevent the pipeline trench from being a conduit for potentially contaminated groundwater from areas adjacent to the pipeline construction footprint by installing trench plugs to contain water to the site or backfilling the trench with imported clay to prevent contaminant migration. Ensure contaminated soil and water are not transported off-site or disposed until analytical results have been received as per Federal and Provincial requirements. The Construction Manager and an Environmental Inspector will provide notification as to when and if excavations involving suspect materials can be backfilled.	5-Expected	2-Moderate	10	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-220	2021-01-06	Approved
5B-KBTP-527R	Active	Risk Workshop	Environment	Fit for Duty	Stringing, Welding, Trenching and Lowering-in	Inadvertent entrapment or confinement of an at-risk species, or species of concern in open trench, or within the pipe.	4-Occasional	3-Major	12	EPP Section 11; Species at Risk-Specific Management Plans; working within appropriate work windows; end caps for overnight, inspecting trench at the start of the day, keeping trench backfill close to lowering-in crews. Coordinate recovery with EI and use involve Resource Specialist as necessary.	4-Occasional	3-Major	12	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-245R	2021-01-06	Approved
5B-KBTP-388	Active	Risk Workshop	Environment	Harmful Micro-organisms	Survey and Clearing	Forest Health Impacts - Conditions that support the potential for infection and spread of forest health pathogens	2-Unlikely	2-Moderate	4	Report and track the potential discovery of any forest health concerns encountered during construction to an Environmental Inspector, who will consult a qualified Timber Resource Specialist if required. Schedule hauling of timber potentially infected by a forest parasite (e.g., mountain pine beetle) for the period either before or after the beetle flight period (May 1 to September 30), to the extent feasible. Avoid stacking fallen infested trees near healthy standing or felled trees.	2-Unlikely	2-Moderate	4	K. Mather	Dean Letendre	AOC	Former Risk ID was 5B-MCRO-106	2021-01-06	Approved
5B-KBTP-463	Active	Risk Workshop	Environment	Soil Disturbance	Survey and Clearing	Harm to riparian areas from grubbing and clearing	2-Unlikely	3-Major	6	Refer to RSMT and EAS for riparian zones crossed by the pipeline construction footprint. Leave the vegetative ground mat and root structure intact within riparian buffer areas, except for the area of a vehicle crossing, when pre-clearing is necessary. Grub all remaining area needed for pipeline installation just prior to pipeline construction. Reduce disturbance to streambanks, beds and adjacent trees during riparian clearing. Any trees, debris and soil inadvertently deposited within the current water mark will be promptly removed in a manner that avoids or reduces disturbance of the bed and banks.	1-Extremely Unlikely	3-Major	3	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-181	2021-01-06	Approved
5B-KBTP-464	Active	Risk Workshop	Environment	Soil Disturbance	Survey and Clearing	Harm to watercourses from clearing and grubbing leading to erosion or sedimentation.	2-Unlikely	3-Major	6	Refer to RSMT and EAS for riparian zones crossed by the pipeline construction footprint. Leave the vegetative ground mat and root structure intact within riparian buffer areas, except for the area of a vehicle crossing, when pre-clearing is necessary. Grub all remaining area needed for pipeline installation just prior to pipeline construction. Reduce disturbance to streambanks, beds and adjacent trees during riparian clearing. Any trees, debris and soil inadvertently deposited within the current water mark will be promptly removed in a manner that avoids or reduces disturbance of the bed and banks.	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-182	2021-01-06	Approved
5B-KBTP-467	Active	Risk Workshop	Environment	Soil Disturbance	Survey and Clearing	Increased erosion due to grubbing.	4-Occasional	3-Major	12	Postpone grubbing until immediately prior to salvaging of topsoil along segments of the pipeline construction footprint where there is a potential for soil erosion to occur, due to sloping terrain and erodible soils. Restrict root grubbing to areas where soil removal is necessary (e.g., trench line and areas to be graded) to reduce surface disturbance and encourage re-sprouting/natural re-generation of trees and shrubs. Where grubbing and grading are necessary, salvage stumps for rollback and grub surface vegetation (i.e., shrubs and small trees) to ground level to preserve topsoil and establish a smooth working surface. Restrict root grubbing on steep erosion prone slopes, unless safety is a concern, in order to reduce soil disturbance and erosion. Cut vegetation close to the ground and maintain root structure within 2 m of the edge of the pipeline construction footprint and grade cut, where feasible. Adhere to mitigation measures provided in he EPP (Sections 8 & 14) regarding maintaining buffers, clearing and grubbing within the vicinity of watercourses and wetlands. Reduce vegetation removal, and particularly riparian vegetation removal for bridges, to only that which is necessary for safety and operational needs. Adhere to the measures provided in the EPP related to the maintenance of a vegetative mat within the riparian buffer zone on both sides of watercourse or wetland crossings. Ensure disturbance of the pipeline construction footprint is reduced within the functional riparian area of any watercourse or wetland.	2-Unlikely	3-Major	6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-185	2021-01-06	Approved
5B-KBTP-542	Active	Risk Workshop	Environment	Soil Disturbance	Survey and Clearing	Unnecessary harm to wetlands from clearing and Grubbing	4-Occasional	2-Moderate	8	Reduce the removal of vegetation in wetlands to the area necessary to complete the crossing. Maintain low vegetation or vegetated ground mat within the riparian buffer zone of wetlands by clearing only trees and walking-down low vegetation so low-lying vegetation remains intact. Within the riparian buffer zone, limit grubbing only to the trench line and work side area needed for the vehicle crossing to protect riparian areas. Adhere to mitigation outlined in the Wetland Survey and Mitigation Plan (Appendix G of the EPP).	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-260	2021-01-06	Approved
5B-KBTPN-053	Inactive	Risk Review Session	Health and Safety	Dropped objects	Temporary Bridge & Culverts	The installation of culvert has the potential of making contact with the worker (crushing/pinching) causing worker injury	3-Rare	4-Critical	12	Ensure workers are not in the line of fire Clearly delineate the danger zone with barricades and warning sign Ensure no workers are positioned under suspended loads Wear proper gloves for the task All critical work activities will be supervised	2-Unlikely	4-Critical	8	Ethan Leigh	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-017	2021-06-10	Approved

TABLE 1: KBTP CHRR

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-055	Active	Risk Review Session	Health and Safety	Dropped objects	Temporary Bridge & Culverts	Dropped object has the potential of causing worker injury	4-Occasional	4-Critical		16 Review the proper lift plan with the team prior to the operation start Lift calculations forms are specific to the equipment being used. Calculations are prepared by the operation foreman, sign off by everyone involved in the lift and verified and signed off by the Superintendent (squad check). For critical lifts (for mobile cranes, critical lifts are any lift that will pose additional risk to personnel, the public or negatively impact the project schedule), a more stringent process is required. Critical lift plans and calculations require to be developed and submitted for review and approval no less than 180 days as these require review and sign off by Regional Equipment Manager or his/her designate. If feasible, delineate areas at risk of dropped items or materials. Use rigging that is certified and has current inspection tag. Use tag lines on suspended loads. Ensure that workers are trained & qualified rigging person	3-Rare	3-Major	9	Chad Gardiner	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-114	2021-06-10	Approved
5B-KBTPN-197	Active	Risk Review Session	Health and Safety	Ground Conditions	Temporary Bridge & Culverts	There is potential of loose rocks or above rock face that fall onto worker causing worker injury	4-Occasional	4-Critical		16 Ensure that the work site has a safe access for equipment Have Geotech inspect working to ensure that it is stable Geotech inspect to either approve wall or demand geo-hazard mitigation measures Mobile equipment must be restrained by a wire rope or synthetic rope, which may include webbing, or another machine that is suitable for restraining Cabs, windows, screens, grills, shields, deflectors, or guards when feasible to protect operators from falling debris Install physical barriers to protect workers from loose material that could fall towards the work area (Retaining walls, Safety Net, Mountain mesh etc). Dangertape/red rope off high risk areas to prevent people from entering fall zones Place signange in high risk areas warning of workers of potential falling debris	3-Rare	3-Major	9	Chad Gardiner	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-094	2021-06-10	Approved
5B-KBTPN-198	Active	Risk Review Session	Health and Safety	Ground Conditions	Temporary Bridge & Culverts	There is potential of workers slips, trips and fall when walking/working on uneven ground causing worker's injury	5-Expected	3-Major		15 Ensure extreme housekeeping before the start of the operation Ensure that the workers wears proper safety footwear and boots are tied When working night shift, ensure proper lighting Complete visual inspection to ensure all workers are fit for duty and wearing the appropriate PPE prior to starting task Remove slip/trip/fall hazards by safing out work areas (gravel, sand, snow/ice clearing, backblading ruts etc.) Walking is working campaigns Pretask stretch and flex program	4-Occasional	2-Moderate	8	Chad Gardiner	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination When working night shift, ensure proper lighting Former Risk ID was 5B-KBTP-130	2021-06-10	Approved
5B-KBTPN-108	Active	Risk Review Session	Health and Safety	Equipment/Machine ry - Moving/Rotating Parts	Temporary Bridge & Culverts - Trenching	Excavator or haul truck have the potential of rollover due unstable ground conditions causing operator injury.	5-Expected	4-Critical		20 G/SD: Restrain mobile equipment by a wire rope or by a synthetic rope which may include webbing or another machine that is suitable for restraining the mobile equipment. Perform a rollover risk assessment and implement control measures such as Rollover Protection System. Daily visual inspection of equipment (records kept) TP: Steep Slope Operator competency, Inspections and audits TP: Increased Supervisor presence. Line of Fire G/SD: Anchoring/tethering G/SD: Equipment Selection, Rollover protection systems Level work area as much as feasible.	5-Expected	3-Major	15	Ethan Leigh	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-033	2021-06-10	Approved
5B-KBTPN-090	Active	Lessons learned	Health and Safety	Equipment/Heavy Machinery	Trench Box/Excavation Support System	Slide Rail shoring system collapse/movement due to component failure,damaged components, Cave-in impact, equipment impact, with workers inside. Scenario requested by TMEP.	4-Occasional	5-Extreme		20 Backfill trench box on each side to grade to prevent movement from cave-in Use only Manufacturers components with adequate rating Follow Manufacturers Installation Requirements Follow Manufacturers Tabulated Data depth rating for applicable soil classification Emergency Response Plan Trench box Assembly JSA Daily Trench box Inspection (Daily Excavation & Trenching Inspection) Fatigue Management Program Trench Box training, (United Academy Level 1 & 2) ESS Competency & Inspection evaluation Crain, Hoist and Rigging Safe Job Procedure Trained and Qualified Operators, Spotters, and Riggers Follow Manufacturers Tabulated Data requirements Must meet requirements for all engineering specifications for excavations, and specs must be readily avaiailable on site.	3-Rare	5-Extreme	15	K. Mather	Sky Mitchell	AOC	TMEP-MACRO is not using a rail shoring system currently Former Risk ID was 5B-MCRO-276, 5B-KBTP-558	2021-01-22	Approved
5B-KBTPN-326	Active	Risk register re-issue	Health and Safety	Equipment/Heavy Machinery	Trench Box/Excavation Support System	Trench Box, that is already installed, has collapse/movement due to component failure, damaged components, Cave-in impact, equipment impact, with workers inside.	4-Occasional	5-Extreme		20 Use only Manufacturers components with adequate rating Follow Manufacturers Installation Requirements Daily Trench box Inspection (Daily Excavation & Trenching Inspection) Trench Box specific training for each type/style ESS Competency & Inspection evaluation Rigging is inspected prior to use, and only use engineered connection points, to avoid damage to trench box components Trained and Qualified Operators, Spotters, and Riggers during installation process and when using equipment near installed trench boxes All trench boxes used are engineer stamped and approved prior to arrival on site Review and engineered trench box systems which reduce human interface issue during assesebly and installation.	3-Rare	5-Extreme	15	K. Mather	Sky Mitchell	AOC		2021-01-22	Approved

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5B-KBTP-103	Inactive	Risk Review Session	Environment	Hydrocarbons	Trench Excavation	Release of a foreign product to the receiving environment due to a rupture of a foreign pipeline or utility caused by unauthorized excavation	4-Occasional	2-Moderate		8 - Damage Prevention Plan - Ground Disturbance Permit (KLTP and TMEP - separate permit) - Ground Disturbance Level II Training - Ground disturbance Checklist - Daily Pre-work inspections - Emergency Contact numbers - Ground Disturbance Supervisor Full Time - Use of Spotters - Workers will be assessed for fitness of duty during daily PTI meetings - Crews will be familiar with the EPP requirements - CECs will observe and inspect work to insure compliance	3-Rare	2-Moderate		6	Linda Pawson	Wade Medley	NOC	Applicable to night shift activities	2021-06-10	Approved
5B-KBTPN-043	Active	Risk Review Session	Health and Safety	Culture	Trench Excavation	Worker injury or fatality during assembly/disassembly of trench boxes due to inexperience, not following procedures, incorrect methodology.	4-Occasional	4-Critical		16 Where possible trench boxes shall not be assembled or disassembled on site. All workers involved in Assembly / Disassembly of Trench Boxes are to be trained and deemed competent Procedures for assembly/disassembly shall be reviewed signed off and followed by the crew involved. Trained and Qualified Operators, Spotters, and Riggers Tag Lines will be used to fully control suspended loads Trench box checklist/inspection & manufactures assembly guidelines followed by all involved workers Review and engineered trench box systems which reduce human interface issue during assesebly and installation.	4-Occasional	4-Critical		16	Jesi Neil	Wade Medley	NOC		2022-09-15	Approved
5B-KBTPN-170	Active	Risk Review Session	Health and Safety	Fit for Duty	Trench Excavation	Worker injury from falling from height off trench edge due to loss of balance, missed step, or missed handhold (railing) caused by worker inattentiveness	3-Rare	4-Critical		12 Signage, snow fencing Barriers, fall protection for >6 fall hazards. Approved/Certified Fall Protection Equipment, inspected and used Assess soil conditions, ongoing inspection, undermined excavation. 1m setback, no tripping hazards, good housekeeping, crumbing the edge and stairs. Proper access ramps for workers (chicken runs). Rope handrail system if necessary. Focus Inspections Worksite Inspections	2-Unlikely	3-Major		6	Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-671  Note* Worksite inspections capture the completion of the "Excavation Inspection" required as the side walls could deteriorate with changing weather conditions at spread 5B. Consistent inspections are relative to barrier distance from ditch edge.	2021-08-19	Approved
5B-KBTPN-208	Active	Incidents	Health and Safety	Ground Conditions	Trench Excavation	Worker falling through a hole (e.g. hydro vac hole, small excavation, manhole)	4-Occasional	3-Major		12 Perimeter Fencing or Barriers Signage Marked Hole Covers Site Inspections Lighting Fall Arrest Fall Prevention Hydrovac and Daylight Hotlines	3-Rare	2-Moderate		6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-290 5B-KBTP-572	2021-01-23	Approved
5B-KBTPN-209	Active	Risk Review Session	Health and Safety	Ground Conditions	Trench Excavation	Worker injury from falling into an open excavation	3-Rare	4-Critical		12 Sufficient lighting for excavations in low light conditions. signs Barricades Handrails must be used at all times when ascending or descending stairs (if applicable) Do not carry materials while using ladders. Access stairs or ramps or secured ladders into excavations.	3-Rare	4-Critical		12	Jesi Neil	Wade Medley	NOC	Former Risk ID was 5B-KBTP-672	2021-08-19	Approved
5B-KBTPN-075	Inactive	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Trench Overburden Excavation to Expose Rock	There is potential of equipment making contact other machinery in the worksite resulting in operator injury	4-Occasional	4-Critical		16 •While equipment is working together, practice working on each others good side to prevent any blind spots. •Utilize radio communication between operators. •Utilize horn signals to indicate when trucks are to stop to eliminate the risk of a bucket hitting the machine. •Use spotters where applicable, and when safe to have ground crew in area •Clean reflective decals on equipment, install additional reflective decals as needed. •Light plants used to increase lighting in work and parking areas. •Daily Visual Inspection to help ensure equipment in safe working condition. (Documented) •Delineation or signage for work area to limit ground crew access, preventing operators focus to be removed from task •Signage indicating communication method (Radio channel) in work area.	3-Rare	4-Critical		12	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-043  CDN: Added "...and when safe to have ground crew in area"; "...preventing operators focus to be removed from task"; "Signage indicating communication method (Radio channel) in work area.". Removed "Night shift - reflective tape on their hard hats and will wear class 3 retrorreflective vests as a minimum." as it is irrilvent if talking about operators in cabs.	2021-06-10	Approved
5B-KBTPN-074	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Trench Rock Test Pits	Human machine interface - Equipment and Human beings occupying the same work space increases dramatically the potential of serious worker injury	4-Occasional	4-Critical		16 Workers to maintain safe distance from excavation. Establish clear communication protocol between equipment operator and workers on the ground. Delineation or equivient around open holes/pits. Signage indicating communication method in work area.	3-Rare	4-Critical		12	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-040	2021-06-10	Approved
5B-KBTPN-188	Active	Risk Review Session	Health and Safety	Flammable Substances	Trench Rock Test Pits	Misfires, cutoffs, and unexploded explosives - Excavator has the potential of finding unexploded explosives while excavating the test blast	3-Rare	4-Critical		12 If there is evidence of cutoffs and unexploded explosives, metallic equipment must not be used during misfire procedures. Equipment operators and foreman trained to identify signs of misfired explosives and shut down the site immediately if any signs are noticed. Safeguard scene with a 50 m perimeter then call Safety, Management and Explosives Compliance Manager (Verify if this role exists) Have Geotech inspect work to ensure that it is stable Complete regular inspections/sweeps during the scope of work to ensure no unexploded or misfire expolsives were missed	3-Rare	4-Critical		12	James Goggans	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-091	2021-06-10	Approved
5B-KBTPN-195	Active	Risk Review Session	Health and Safety	Ground Conditions	Trench Rock Test Pits	Workers have the potential of slips, trips and falls when working on uneven ground and/or trenches causing worker injury.	5-Expected	2-Moderate		10 Proper safety footwear with ankle support (6") Stretch and flex Stay back from exposed edges as edges can slough. ES: Slope sides . 4:1 if over 42" to reduce cave in.	5-Expected	2-Moderate		10	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities Former Risk ID was 5B-KBTP-090	2021-06-10	Approved

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5B-KBTPN-283	Inactive	Risk Review Session	Health and Safety	Soil Disturbance	Trench Rock Test Pits	Personnel crushed or buried in open slope excavation failure	4-Occasional	4-Critical	16	Use delineation and/or signage to keep workers from enter unsafe areas. Rescue personnel on-site whenever high risk operations are commencing. Workers recieve training, to help ensure they understand the hazards and risks of excavations/open holes/trenches. Geotechnical engineers to assess any slope or trench material prior to workers being permitted to enter certain areas.	4-Occasional	4-Critical	16	Kirk Rich	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-131	2021-06-10	Approved
5B-KBTPN-016	Inactive	Risk Review Session	Health and Safety	Buried Services	Trenchless Crossing	Worker injury or fatality from utility strike as a result of misdirection or misalignment of trenchless crossing equipment coming in contact with a known utility (TMPL Line 1 etc.).	3-Rare	4-Critical	12	Ground disturbance supervisor will ensure area sweeps and scans completed, documented, and reviewed in accordance with TMEP Damage Prevention Plan Construction manager will ensure all workers receive Ground Disturbance Awareness training during onboarding, Construction manager and HSE will ensure relevant worker tickets GD II are current, HS will ensure employees have Gas Monitor Training in case of line strike Construction manager will ensure workers have Safety Watch Training, Construction Manager and Supervisor to ensure Ground Disturbance Permits in place, Supervisors will develop Task Specific JHA and hold pre-job Tailgate, Construction Manager and HS will ensure HDD contractor competency review and assessment, Damage Prevention / Ground disturbance monitors (Team5B & TMEP) present while excavating, boring Install barriers where needed to prevent unauthorized or unneeded personnel in area Marking, Staking Direction Asmith	2-Unlikely	3-Major	6	Jesi Neil	Wade Medley	NOC	supplied air apparatus. Former Risk ID was 5B-KBTP-677	2021-08-19	Approved
5B-KBTPN-017	Active	Risk Review Session	Health and Safety	Buried Services	Trenchless Crossing	Worker injury or fatality from utility strike causing pipeline rupture/explosion or electrical shock after failing to obtain a Ground Disturbance permit for utility excavation work and not being aware of such utilities' presence.	3-Rare	4-Critical	12	TMEP Damage Prevention Plan Competency Task specific JHA Pre-job task specific toolbox Supervisor to ensure strict adherence to DPP procedures, Construction manager and supervisor to ensure worker competency, Supervisor to ensure control zone and signage are setup as appropriate, Supervisor to develop a task specific JHA, Supervisor to develop and participate in a pre-job task specific toolbox.	3-Rare	4-Critical	12	Jesi Neil	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-678	2021-08-19	Approved
5B-KBTPN-114	Active	Risk Review Session	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Trenchless Crossing	Worker injury or fatality from getting caught in rotating trenchless drilling equipment	2-Unlikely	5-Extreme	10	Stay clear of the drill line during operation Good communication protocol amongst all crew members who are operating the equipment. Use radios as needed to ensure communciation is maintained. All personel to stay out of the front of the rotational auger zone while in operation Delineation and/or signage to keep workers out of hazardous areas	1-Extremely Unlikely	5-Extreme	5	Jesi Neil	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-675	2021-08-19	Approved
5B-KBTP-689	Inactive	Pre-Task Meeting	Health and Safety	Cement	Tunneling, Drill & Shoot	Worker injury due to Silica exposure when mixing the grout for the drill and shoot tunnels (CT bolts, spiles, pre-excavation grouting, etc.) and spraying shotcrete	5-Expected	3-Major	15	- Development of a tunnel-specific Silica Exposure Control Plan by an Industrial Hygienist with input from the tunneling Contractor (Kiewit) - Tunnel Superintendent and Foremen will ensure that crews follow the Silica Exposure Control Plan - Tunnel Superintendent will verify that engineering controls are in place - Tunnel Manager will control access to the tunnels work areas and all workers entering the tunnel will review and understand the procedures - Batch grout outside the tunnel when possible - Ensure ventilation system is functional and maintained properly - Perform air quality and quantity monitoring and testing at planned frequency - Have proper assortment of approved PPE including respirators available on-site, perform respirator fit testing, and follow WorkSafeBC requirements.	5-Expected	2-Moderate	10	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-690	Inactive	Pre-Task Meeting	Health and Safety	Construction Dust	Tunneling, Drill & Shoot	Worker injury due to Silica exposure due to disturbance of rock in the drill and shoot tunnels as a result of drilling and blasting	5-Expected	3-Major	15	- Development of a tunnel-specific Silica Exposure Control Plan by an Industrial Hygienist with input from the tunneling Contractor (Kiewit) - Tunnel Superintendent and Foremen will ensure that crews follow the Silica Exposure Control Plan - Tunnel Superintendent will verify that engineering controls are in place - Tunnel Manager will control access to the tunnels work areas and all workers entering the tunnel will review and understand the procedures - Use water to mitigate dust when able (Equipment have dust suppression systems installed) - Ensure ventilation system is functional and maintained properly - Perform air quality monitoring and testing at planned frequency - Have proper assortment of approved PPE including respirators available on-site, perform respirator fit testing, and follow WorkSafeBC requirements.	5-Expected	1-Minor	5	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-691	Inactive	Pre-Task Meeting	Health and Safety	Equipment/Heavy Machinery	Tunneling, Drill & Shoot	Worker injury from being struck by heavy equipment when near/inside tunnel (drill jumbos, muckers, scissor decks, loaders, excavators, skid steers, telehandlers, haul trucks)	4-Occasional	4-Critical	16	- Restricted and controlled access to the tunnels work areas and all workers entering the tunnel review and understand the rescue procedure. - Access into the tunnel is restricted by a visible red beacon and/or physical barriers when the mucker is trammng in/out of the tunnel during muck cycle to notify personnel that no access is permitted. - All heavy civil equipment will be equipped with the ScanLink detection system to identify personnel and fixed hazards; all workers and visitors will have RFID tags in their hard hat - Competent spotters in place when working in tight areas - A barricaded control zone will keep personnel away from truck loading/unloading operations - Designated operator and competency - Designated pedestrian pathways at the aboveground work areas	3-Rare	4-Critical	12	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved

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5B-KBTP-692	Inactive	Pre-Task Meeting	Health and Safety	Air Quality/Smoke	Tunneling, Drill & Shoot		3-Rare	3-Major		9 - Restricted and controlled access to the tunnels work areas and all workers entering the tunnel review and understand the rescue procedure. - Dedicated air monitors at the face for monitoring potential flammable or explosive conditions - Suitable fire extinguishers available at any location where a fire may occur - Proper storage of combustible or flammable liquids, oil, and grease - Equipment refueling to take place aboveground, as well as repairs when able - Required equipment equipped with a multinozzle fire suppression system per WSBC - Hardwired communications via mine phone at all times - Personal 10-minute self-rescuers accessible for each worker and visitors - Self-Contained Breathing Apparatus as required by WSBC available on-site	2-Unlikely	2-Moderate		Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-694	Inactive	Pre-Task Meeting	Health and Safety	Ground Conditions	Tunneling, Drill & Shoot	Worker injury or fatality from falling rock(s) in the tunnel due to loss of tunnel stability as a result of geotechnical conditions	3-Rare	5-Extreme	15	- The equipment and means and methods selected allow work in unsupported ground to be performed by equipment as much as possible - No personnel foot access into unsupported ground (physical barricade with signage) - Follow portal and in-tunnel geotechnical instrumentation and monitoring requirements - Daily geotechnical mapping and assessment of ground class/ground conditions - Ensure ground support is installed per the design per the engineer's determined ground class - Install overhead mesh (barrier) in all ground classifications for worker safety during tunneling - This also includes rock bolting patterns, mesh and concrete - Monitoring/Inspection of water ingress	3-Rare	4-Critical	12	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-695	Inactive	Pre-Task Meeting	Health and Safety	Toxic Gas	Tunneling, Drill & Shoot	Worker injury or fatality due to hazardous atmosphere inside of the tunnel	4-Occasional	5-Extreme	20	- Restricted and controlled access to the tunnels work areas and all workers entering the tunnel review and understand the rescue procedure. - Air monitors at the face for monitoring potential hazardous conditions - Properly operating and maintained ventilation system to remove hazardous gases from inside the tunnel and provide fresh air to the tunnel heading - Visual indicators to identify failure of ventilation system - Air velocity and air quality testing and monitoring at required intervals - WSBC approval of all equipment to be used underground - Implement Tunnel Rescue Team with SCBA equipment as required by WSBC	3-Rare	4-Critical	12	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-696	Inactive	Pre-Task Meeting	Health and Safety	Ground Cinditions	Tunneling, Drill & Shoot		3-Rare	4-Critical	12	- No personnel access underneath freshly applied overhead shotcrete (physical barricade with signage) - Utilize accelerator admixture when applying shotcrete to achieve early strength - Verify early strength of shotcrete before allowing access under overhead shotcrete, inspect for signs of delamination, cracking or spalling.	3-Rare	3-Major	9	Chris Marchand	Ben Seling	NOC		2022-09-03	Approved
5B-KBTP-316	Active	Risk Workshop	Environment	Hydrocarbons	Water Crossing	Release of fuel or lubricant from generators or pumps used for the construction of isolated watercourse crossing	3-Rare	3-Major	9	Ensure that generators on pumps used for the construction of isolated watercourse crossings and/or trench dewatering have secondary containment that can hold a capacity of 125% (minimum) of the fuel tank when stationed, operated or re-fueled within 100 m of a watercourse.	2-Unlikely	2-Moderate	4	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-034	2021-01-06	Approved
5B-KBTP-426R	Active	Risk Workshop	Environment	Soil Disturbance	Water Crossing	Ongoing or excessive water quality impairment through sedimentation, turbidity or increased suspended solids causing harm to fish & fish habitat.	2-Unlikely	3-Major	6	Monitor equipment/vehicle crossings to ensure that sediment and/or erosion control measures (such as silt fence and diversion berms) are adequate, and streamflow is not disrupted. Monitor water quality (i.e., turbidity, total suspended solids [TSS]), when and where warranted in accordance with the monitoring measures provided in the Water Quality Monitoring Management section in the EPP. Where water monitoring reveals that turbidity is approaching or exceeding water quality objectives, the Water Quality Monitors will notify the on-site Environmental Inspector and QAES/QEP who, in consultation with the Construction Manager or designate and Contractor, will develop corrective actions; which may include shutting down operations. Ensure a QAES/QEP is on-site prior to commencement of crossing of fish-bearing watercourses and wetlands identified on the EAS and as per permit and/or approval Conditions. Assign a QAES/QEP with expertise in the containment and clean-up of inadvertent release of drilling mud and clean-up to monitor trenchless activities (see the Bentonite Fluid Release Contingency Plan provided in Appendix B). Report to the Appropriate Government Authorities as outlined in the Water Quality Monitoring Management Plan (Appendix G of the EPP) if WQM fails to meet the parameters of established guidelines and is not in compliance with regulatory requirements.	1-Extremely Unlikely	2-Moderate	2	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-144R	2021-01-06	Approved
5B-KBTP-496	Active	Risk Workshop	Environment	Toxic Fluid/Solvents	Water Crossing	Trenchless activities lead to inadvertent surface mud release and significant environmental impact to water resources.	3-Rare	3-Major	9	Assign a monitor with expertise in the containment and clean-up of inadvertent release of drilling mud and clean-up to monitor trenchless activities. Implement the Bentonite Fluid Release Contingency Plan. Pressure control monitoring limiting release volumes. Report to the Appropriate Government Authorities as outlined in the Water Quality Monitoring Management Plan (Appendix G of the EPP) if WQM fails to meet the parameters of established guidelines and is not in compliance with regulatory requirements. Develop Site Specific Trenchless Crossing Plans - consider the possibility of adding casing on the entry/exit, design of drill so that you are not drilling in weak material if this is feasible and deemed necessary	3-Rare	2-Moderate	6	Craig Ratcliffe	Gary Shorthouse	AOC	Former Risk ID was 5B-MCRO-214	2021-01-06	Approved
5B-KBTPN-018	Inactive	Risk Review Session	Health and Safety	Cement	Water Crossings	Worker injury during cementing activities through prolonged contact with cement/concrete/rock dust	2-Unlikely	2-Moderate	4	Project Specific Safety Plan (PSSP), JHA's, FLHA's, Fit for Duty, Fatigue Management Program, Signage, respiratory protection, High visibility apparel, Gloves suitable for the task, safety boots, hard hats with side protection. Training of Silica and its dangers, communication Barriers	2-Unlikely	1-Minor	2	Stefano Liut	Wade Medley	AOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-247	2021-06-10	Approved

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTP-136	Inactive	Risk Review Session	Environment	Soil Disturbance	Watercourse Construction	Sediment release into a water body due to disturbance of sediments during instream construction activities.	4-Occasional	2-Moderate		8 Conduct environmental Inspection of water course with construction personnel Follow the Site Specific Water Crossing Execution Plan (SSWCEP) Follow Environmental Protection Plan (EPP) Measures and Mitigation Isolate the stream crossing and pump over or flume Work in dry season or when the stream is frozen to the bottom (if possible) Use clean washed equipment Detailed assessments on the water courses Conduct Trenchless Crossing Isolate the work area Design seasonally appropriate timelines for the crossings (low flow periods) Coordinate Construction of the Crossing with Dry Weather Water Filtration Systems for Grey Trench Water	3-Rare	1-Minor		3 Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to day & night shift activities	2021-06-10	Approved
5B-KBTPN-005	Active	Risk Review Session	Health and Safety	Airborne Debris	Welding	There is potential of worker injury from flying debris or particulates entering the workers eye as a result of cutting or grinding activities.	3-Rare	2-Moderate		6 Must wear sealed eye wear protection, double eye protection when grinding, when cutting with torch, must wear appropriate shade number. Use welding screens/tents to block sparks, Use fire blankets to control sparks. Ensure a fire extinguisher is in the work area. Obtain and adhere to Hot Work Permit. Keep flammable and combustible materials away from the work area. Visual inspection of tools prior to use - Ensure tool guards are installed and in good condition. Verify grinding wheels are in good condition without cracks or damage. Use delineators and/or signage to control the work area. Workers to choose best position to grind away from themselves/others as per the SWP.	2-Unlikely	1-Minor		2 Jeff Sorenson	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-003	2021-06-10	Approved
5B-KBTPN-041	Active	Risk Workshop	Health and Safety	Culture	Welding	Inadequate training/certification during welding operation leading to uneducated choices which could result in injury up to and including a fatality.	3-Rare	4-Critical		12 QC verifies resumes & credentials - WCB Red seal certificate & B-Pressure Pipe Welding certification Training department verifies credentials Site specific training and orientation Where do I stand - spotter training Trench box training Avalanche training Advanced Rigging Training Test welding to verify competency Review skidding/cribbing plan before starting work	3-Rare	4-Critical		12 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-339, 5B-KBTP-621	2021-04-20	Approved
5B-KBTPN-066	Active	Risk Review Session	Health and Safety	Electricity/High Voltage	Welding	There is potential of worker injury resulting from contact with cutting, drilling, grasping, rotating and/or electrical components of hand tools due to misuse of the hand tools	4-Occasional	2-Moderate		8 Pre-Use Inspection of tools Staying out of Line of Fire SWPs for each tool to be reviewed and signed off my crew Equipment guards and handles Small tools training (Competency) Proper PPE (Face shields, gloves etc.) Tag out defective tools for repair	3-Rare	1-Minor		3 Jeff Sorenson	Wade Medley	NOC	No welding activities during night shift Former Risk ID was 5B-KBTP-027	2021-06-10	Approved
5B-KBTPN-072	Active	Risk Review Session	Health and Safety	Equipment/Heavy Machinery	Welding	There is potential of worker injury caused by electrical shock due to welding machines not being properly grounded	4-Occasional	3-Major		12 Complete welding rig inspections prior to being mobilized in the field to ensure the machines are grounded, in good working order, regularly maintained etc Prior to use Inspect welding machine, tools and cords/cables prior to use and replace and damaged equipment (i.e. grinders, welding leeds, cords etc) Ensure welders are equipped with GFI's.	4-Occasional	2-Moderate		8 Jeff Sorenson	Wade Medley	NOC	No welding activities during night shift Former Risk ID was 5B-KBTP-026	2021-06-10	Approved
5B-KBTPN-101	Active	Risk Workshop	Health and Safety	Equipment/Heavy Machinery	Welding	Lining up pipe with clamps and equipment - internal & external - Injury to worker(s) hands/extremities caught between clamps and pipe	3-Rare	4-Critical		12 Certified Lifting Equipment and operators Rigger training Competency Assessemnts and worker training LOF Campaigns Use of pipe magnets to keep hands out of line of fire.	3-Rare	3-Major		9 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-345, 5B-KBTP-627	2021-04-20	Approved
5B-KBTPN-118	Active	Incidents	Health and Safety	Equipment/Machinery - Pressure (high/low)	Welding	Unintended pressure release from improper storage gas or pressurized tank, cylinder or container	3-Rare	4-Critical		12 Review Product SDS/GHS Signage GHS /TDG competency for handling and transport of pressurized tanks, cylinders, or containers. Focused Inspections Cargo Management Program Chain down cylinders stored in yard racks Gas monitoring Double Flash back arrestors Cylinder Caps on all cylinders not in use Cargo Management Program Hazardous Communications Signage	3-Rare	3-Major		9 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-284, 5B-KBTP-566	2021-01-22	Approved
5B-KBTPN-119	Active	Risk Workshop	Health and Safety	Equipment/Machinery - Pressure (high/low)	Welding	Being struck by unsecured air hose when air compressor are in use.	3-Rare	3-Major		9 Whip Checks Pre-use inspections of hoses and equipment Proper PPE	3-Rare	2-Moderate		6 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-354 5B-KBTP-636	2021-04-20	Approved
5B-KBTPN-129	Active	Risk Workshop	Health and Safety	Ergonomic - Repetitive work	Welding	Strains on knees and back due to prolonged bending/kneeling while working on installations and welding - Worker Muscle Skeletal Injury	3-Rare	3-Major		9 Stretch and flex prior to starting work Use of micro breaks to help prevent strains Worker rotation during high strain activities Knee pads and other PPE to help prevent strain	3-Rare	3-Major		9 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-351, 5B-KBTP-633	2021-04-20	Approved
5B-KBTPN-167	Active	Risk Workshop	Health and Safety	Fit for Duty	Welding	Improper pipe rigging leading to workers being in the line of fire of crush points.	3-Rare	5-Extreme		15 Spotting Vehicles & Equipment Complete lift plan to identify centers and proper lift points Utilize tag lines or magnets to keep workers out of the line of fire MAG examination Load indicator alarm in cab of equipment Control zone, Signage, On the spot lift plans completed by trained riggers Center of gravity identified by trained riggers All rigging to be done by qualified trained riggers Pre use inspection on all rigging components by qualified riggers	3-Rare	4-Critical		12 K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-340, 5B-KBTP-622	2021-04-20	Approved

Risk ID	Risk Status	Risk Source	Consequence Category	Hazard Category	Project Lifecycle	Risk Description	Inherent Likelihood	Inherent Consequence	Inherent Risk	Controls	Residual Likelihood	Residual Consequence	Residual Risk	Risk Owner	Controls Owner	AOC/NOC	Additional Notes	Date Risk Registered	Risk Stage
5B-KBTPN-168	Active	Risk Workshop	Health and Safety	Fit for Duty	Welding	Worker being exposed to an unknown hazardous atmosphere while inside a confined or restricted space due to failure to test atmospheric conditions or air tester malfunction - Worker exposed oxygen deficient atmosphere - worker injured	3-Rare	5-Extreme	15	Supervisors to ensure that workers treat Confined Space as potentially IDLH until otherwise proven safe by air quality testing. Confined space hazard assessment to be completed by a competent person as defined by WorkSafeBC. Confined space rescue plan in place. Use of appropriate respirators for exposure type HSE to ensure gas monitors are calibrated and bump tested.	2-Unlikely	5-Extreme	10	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-352, 5B-KBTP-634	2021-04-20	Approved
5B-KBTPN-233	Active	Risk Review Session	Health and Safety	Lighting	Welding	There is potential of workers being exposed to bright ultraviolet (UV) light from welding torches causing flash burn affecting the worker's eyes.	4-Occasional	2-Moderate	8	Training to not look at Arc Welding Mask Install welding screen/barrier to prevent others from exposure to arc Require people to wear PPE in proximity to welders (i.e. welder helper)	4-Occasional	2-Moderate	8	Jeff Sorenson	Wade Medley	NOC	No welding activities during night shift  Former Risk ID was 5B-KBTP-106	2021-06-10	Approved
5B-KBTPN-246	Active	Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Welding	Grinder kickback during welding/grinding activities contacting workers body - Worker Injury	3-Rare	3-Major	9	Properly rated discs or wheels OEM 120 degree guard & handle if so equipped Double eye protection including face shield Small Tool training & competency	3-Rare	3-Major	9	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-344, 5B-KBTP-626	2021-04-20	Approved
5B-KBTPN-247	Active	Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Welding	Activation of internal clamps, clamps roll out of pipe, worker is caught in line of fire - Injury to worker(s) in the line of fire - struck by internal clamp	3-Rare	4-Critical	12	Exclusion Zone Barrier Whip checks on all airlines Properly rated pressure and seasonal hoses & fitting	3-Rare	4-Critical	12	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-346, 5B-KBTP-628	2021-04-20	Approved
5B-KBTPN-248	Active	Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Welding	Cutting pipe, release of stored energy - pipe can move suddenly - Worker in line of fire, struck by pipe - worker(s) injured	3-Rare	3-Major	9	Ensure pipe is secured prior to cutting to prevent stored energy Place barricades with flagging and tagging to prevent people from entering danger zone Use additional cribbing where necessary to support pipe	3-Rare	2-Moderate	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-356 5B-KBTP-638	2021-04-20	Approved
5B-KBTPN-249	Active	Risk Workshop	Health and Safety	Object - Stress/tension (high/low)	Welding	Tie-in sections in ditch - stored energy - pipe could move without warning - Worker in the line of fire - worker(s) struck and injured	3-Rare	4-Critical	12	Catch off tractor control lateral movement Critical Lift Plan Keep workers out of the line of fire (barricades, rope, flagging etc. where required)	3-Rare	3-Major	9	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-359, 5B-KBTP-641	2021-04-20	Approved
5B-KBTPN-258	Active	Risk Review Session	Health and Safety	Restricted/Confined Space	Welding	Worker exposure toxic fumes within a confined space	2-Unlikely	3-Major	6	Active ventilation, atmospheric monitoring, signage, communication, confined space watch welding barriers, respiratory protection	1-Extremely Unlikely	1-Minor	1	Stefano Liut	Wade Medley	NOC	Applicable to night shift activities; Additional control illumination Former Risk ID was 5B-KBTP-249	2021-06-10	Approved
5B-KBTPN-293	Active	Risk Workshop	Health and Safety	Toxic Fluid/Solvents	Welding	Cutting Pipe or Pre-heat pipe using a tiger torch/cutting tools inhalation burns from super heated air or burn to skin	2-Unlikely	4-Critical	8	Welding blankets post pre-heat/weld wear appropriate PPE (Leather gloves, Leather bibs/vests) Open air ventilation and respirator when required Personnel not directly involved in preheating/cutting will not be in the viscosity while preheating/cutting	2-Unlikely	3-Major	6	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-343, 5B-KBTP-625	2021-04-20	Approved
5B-KBTPN-296	Active	Risk Workshop	Health and Safety	Toxic Gases	Welding	Inhalation of noxious fumes produced during welding & cutting process of piping or structural steel in enclosed spaces	4-Occasional	4-Critical	16	Positive Air Welding Helmets 3m Respirator Welding hoods (indoor) Air movers (enclosed spaces)	4-Occasional	3-Major	12	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-355, 5B-KBTP-637	2021-04-20	Approved
5B-KBTPN-325	Active	Risk register re-issue	Health and Safety	Equipment/Machinery - Moving/Rotating Parts	Welding	Injury to worker - fingers, hands struck by/caught/in the line fire between hand tools/high-low wedges (e.g Hitting your hand with a hammer)	2-Unlikely	2-Moderate	4	Impact resistant gloves Training and competency for workers involved Hand safety awareness - safety communications	2-Unlikely	2-Moderate	4	K. Mather	Sky Mitchell	NOC	Former Risk ID was 5B-MCRO-347, 5B-KBTP-629	2021-04-20	Approved
5B-KBTP-132	Active	Risk Review Session	Environment	Soil Disturbance	Working near watercourses	There is potential of runoff into water ways that may lead to sedimentation in waterways affecting aquatic habitat	3-Rare	2-Moderate	6	Environmental Protection Plan Erosion and Sediment control (ESC) will be used in areas where loose material could get into water ways Follow the Site Specific Water Crossing Execution Plan (SSWCEP) Follow Environmental Protection Plan (EPP) Measures and Mitigation Course Woody Debris (CWD) where appropriate Riparian Zone Buffers left intact until construction of the crossing is initiated Conduct Regular Environmental Inspections During Precipitation events	2-Unlikely	1-Minor	2	Craig Ratcliffe	Gary Shorthouse	NOC	Applicable to day & night shift activities	2021-06-10	Approved