



Resource and Lands Management

PO Box 1500

Yellowknife, NT X1A 2R3

March 21, 2022

Wek'èezhii Land and Water Board

#1 - 4905 48th Street

Yellowknife, NT X1A 3S3

Attn: Ms. Meghan Schnurr

**RE: Nighthawk Gold Corporation – CIRNAC Technical Intervention
Draft Land Use Permit: W2021C0009
Draft Water Licence: W2021L2-0005**

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) is providing the following technical intervention regarding the Nighthawk Gold Corporation application for Land Use Permit and Federal Water Licence related to ongoing mineral exploration at the Indin Lake Gold Property.

CIRNAC reviewed the RECLAIM estimate prepared by Nighthawk and identified areas where revisions are recommended specifically related to costs associated with chemicals, buildings and equipment, and mobilization. The revisions result in an increase in the total federal security of approximately \$159,479 compared to Nighthawk's RECLAIM estimate. The summary table is provided below showing the breakdown of direct and indirect costs. The full RECLAIM estimate is also attached, the activities where revisions are recommended are highlighted for ease of review.

CIRNAC intends to continue discussions with Nighthawk Gold Corporation and the Government of the Northwest Territories in regards to the final amount and the appropriate split of the security required for the project.





SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT		\$0	\$0	\$0
UNDERGROUND MINE		\$0	\$0	\$0
TAILINGS FACILITY		\$0	\$0	\$0
ROCK PILE		\$0	\$0	\$0
BUILDINGS AND EQUIPMENT		\$108,301	\$108,301	\$0
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT		\$165,214	\$82,607	\$82,607
SURFACE AND GROUNDWATER MANAGEMENT		\$0	-	\$0
INTERIM CARE AND MAINTENANCE		\$0	-	\$0
INFLATION (2014 to 2022)	14%	\$39,395	\$27,499	\$11,895
SUBTOTAL: Capital Costs		\$312,970	\$218,467	\$94,503
PERCENT OF SUBTOTAL			70%	30%

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMobilIZATION		\$101,708	\$112,879	\$48,828
POST-CLOSURE MONITORING AND MAINTENANCE		\$0	\$0	\$0
INFLATION (2014 TO 2022)	14%	\$23,288	\$18,255	\$7,031
ENGINEERING	5%	\$15,848	\$10,923	\$4,725
PROJECT MANAGEMENT	5%	\$15,848	\$10,923	\$4,725
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	1%	\$3,130	\$2,185	\$945
BONDING/INSURANCE	1%	\$3,130	\$2,185	\$945
CONTINGENCY	25%	\$78,242	\$54,617	\$23,628
MARKET PRICE FACTOR ADJUSTMENT	0%	\$0	\$0	\$0
SUBTOTAL: Indirect Costs		\$300,792	\$209,967	\$90,826

TOTAL COSTS		\$613,762	\$428,434	\$185,328
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CIRNAC would like to thank the Wek'èezhii Land and Water Board for the opportunity to provide recommendations on this Project. Should you have any questions or concerns, please do not hesitate to contact myself Megan Larose at megan.larose@rcaanc-cirnac.gc.ca or Tim Morton tim.morton@rcaanc-cirnac.gc.ca.

Sincerely,

Megan Larose
Environmental Specialist
Resource and Land Management
Crown Indigenous Relations and Northern Affairs Canada

Attachments: Draft Federal RECLAIM Estimate (Excel)



SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
	OPEN PIT	\$0	\$0	\$0
	UNDERGROUND MINE	\$0	\$0	\$0
	TAILINGS FACILITY	\$0	\$0	\$0
	ROCK PILE	\$0	\$0	\$0
	BUILDINGS AND EQUIPMENT	\$108,361	\$108,361	\$0
	CHEMICALS AND CONTAMINATED SOIL MANAGEMENT	\$165,214	\$82,607	\$82,607
	SURFACE AND GROUNDWATER MANAGEMENT	\$0	-	\$0
	INTERIM CARE AND MAINTENANCE	\$0	-	\$0
	INFLATION (2014 to 2022)	14% \$39,395	\$27,499	\$11,895
	SUBTOTAL: Capital Costs	\$312,970	\$218,467	\$94,503
	PERCENT OF SUBTOTAL		70%	30%
INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
	MOBILIZATION/DEMobilIZATION	\$161,708	\$112,879	\$48,828
	POST-CLOSURE MONITORING AND MAINTENANCE	\$0	\$0	\$0
	INFLATION (2014 TO 2022)	14% \$23,286	\$16,255	\$7,031
	ENGINEERING	5% \$15,648	\$10,923	\$4,725
	PROJECT MANAGEMENT	5% \$15,648	\$10,923	\$4,725
	HEALTH AND SAFETY PLANS/MONITORING & QA/QC	1% \$3,130	\$2,185	\$945
	BONDING/INSURANCE	1% \$3,130	\$2,185	\$945
	CONTINGENCY	25% \$78,242	\$54,617	\$23,626
	MARKET PRICE FACTOR ADJUSTMENT	0% \$0	\$0	\$0
	SUBTOTAL: Indirect Costs	\$300,792	\$209,967	\$90,826
	TOTAL COSTS	\$613,762	\$428,434	\$185,328
	NIGHTHAWK SECURITY ESTIMATE (FEDERAL)	\$454,283	\$303,128	\$151,155
	DIFFERENCE	\$159,479	\$125,306	\$34,173

Statistics Canada inflation rate for YK from January 2014 (Consumer Price Index 127.0) to 145.3 January 2022 for inflation of 14.4%. (<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000401>)

USED SAME CONTINGENCY AS NIGHTHAWK (25%)

1

Open Pit Name:

Pit # 1

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost	Land Cost	Water Cost
CONTROL ACCESS								
Fence		m		#N/A	\$0.00	\$0	\$0	\$0
Signs		each		#N/A	\$0.00	\$0	\$0	\$0
Berm at crest		m3		#N/A	\$0.00	\$0	\$0	\$0
Block roads		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
STABILITY STUDY								
Conduct stability and setback study		allow		#N/A	\$0.00	\$0	\$0	\$0
STABILIZE SLOPES								
Off-load crest, soil A		m3		#N/A	\$0.00	\$0	\$0	\$0
Off-load crest, soil B		m3		#N/A	\$0.00	\$0	\$0	\$0
Doze/trim overburden at crest		m3		#N/A	\$0.00	\$0	\$0	\$0
Drill & blast pit crest		m3		#N/A	\$0.00	\$0	\$0	\$0
Buttress slope		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
COVER/CONTOUR SLOPES								
Place fill, soil A		m3		#N/A	\$0.00	\$0	\$0	\$0
Place fill, soil B		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate slopes		ha		#N/A	\$0.00	\$0	\$0	\$0
Vegetate pit floor		ha		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT DIVERSION DITCHES								
Excavate ditches -soil		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate ditches -rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap in channel base		m3		#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT SPILLWAY								
Excavate channel		m3		#N/A	\$0.00	\$0	\$0	\$0
Concrete		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
RECLAIM QUARRIES								
Contour slopes		m3		#N/A	\$0.00	\$0	\$0	\$0
Place overburden		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate		m3		#N/A	\$0.00	\$0	\$0	\$0
FLOOD PIT-Captital								
Remove stationary equipment (sump pumps)		each		#N/A	\$0.00	\$0	\$0	\$0
Remove dewatering pipeline		m		#N/A	\$0.00	\$0	\$0	\$0
Remove power lines		each		#N/A	\$0.00	\$0	\$0	\$0
Construct diversion ditches		m3		#N/A	\$0.00	\$0	\$0	\$0
-Ditch, mat'l A		m3		#N/A	\$0.00	\$0	\$0	\$0
-Ditch, mat'l B		m3		#N/A	\$0.00	\$0	\$0	\$0
Construct embankment/dam		m3		#N/A	\$0.00	\$0	\$0	\$0
Supply/install pump station		each		#N/A	\$0.00	\$0	\$0	\$0
Supply/install piping system		m		#N/A	\$0.00	\$0	\$0	\$0
Remove pump post-closure		each		#N/A	\$0.00	\$0	\$0	\$0
Remove pipeline post-closure		m		#N/A	\$0.00	\$0	\$0	\$0
FLOOD PIT-Annual Cost								
Operate pumps (power)		m3		#N/A	\$0.00	\$0	\$0	\$0
Maintain pump/pipeline		allow		#N/A	\$0.00	\$0	\$0	\$0
Labour:fuel management, comissioning/decom		\$/h		#N/A	\$0.00	\$0	\$0	\$0
Chemical addition, _____ kg/m3 of water		tonne		#N/A	\$0.00	\$0	\$0	\$0
Chemicals, purchase and shipping		tonne		#N/A	\$0.00	\$0	\$0	\$0
Passive/biological additives		\$/ha		#N/A	\$0.00	\$0	\$0	\$0
Passive additives purchase and shipping		tonne		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
						Annual pumping costs	\$0	
Number of years of pump flooding		years						
						Total pumping costs	\$0	\$0 \$0
						Total	\$0	\$0 \$0
						% of Total		0% 0%

1	Underground Mine Name	UG Mine # 1						
ACTIVITY/MATERIAL	Notes	Unit	Qty	Code	Cost	Cost Land	Cost	Cost
CONTROL ACCESS								
Fence		m		#N/A	\$0.00	\$0	\$0	\$0
Signs		each		#N/A	\$0.00	\$0	\$0	\$0
Block roads		m3		#N/A	\$0.00	\$0	\$0	\$0
Berm		m3		#N/A	\$0.00	\$0	\$0	\$0
Concrete wall in portals		m3		#N/A	\$0.00	\$0	\$0	\$0
Backfill portal #1		m3		#N/A	\$0.00	\$0	\$0	\$0
Backfill portal #2		m3		#N/A	\$0.00	\$0	\$0	\$0
Cap raise # 1		m3		#N/A	\$0.00	\$0	\$0	\$0
Cap raise #2		m3		#N/A	\$0.00	\$0	\$0	\$0
Cap shaft #1		m3		#N/A	\$0.00	\$0	\$0	\$0
Cap shaft #2		m3		#N/A	\$0.00	\$0	\$0	\$0
Backfill adits		m3		#N/A	\$0.00	\$0	\$0	\$0
Backfill open stope		m3		#N/A	\$0.00	\$0	\$0	\$0
Concrete cap over open stope		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
REMOVE HAZARDOUS MATERIALS								
Remove hazardous materials, U/G labor		mandays		#N/A	\$0.00	\$0	\$0	\$0
Remove/decontam. stationary & elect. equip		mandays		#N/A	\$0.00	\$0	\$0	\$0
Remove/decontam. mobile equipment		each		#N/A	\$0.00	\$0	\$0	\$0
Remove misc. haz. mat & explosives		kg		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
INSTALL BULKHEADS								
Bulkheads to control water flow		each		#N/A	\$0.00	\$0	\$0	\$0
Grout bulkhead		m3		#N/A	\$0.00	\$0	\$0	\$0
FLOOD MINE								
Supply/install pump		each		#N/A	\$0.00	\$0	\$0	\$0
Supply/install piping system		each		#N/A	\$0.00	\$0	\$0	\$0
Operate pumps to flood workings		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m2		#N/A	\$0.00	\$0	\$0	\$0
Install pumping wells		m3		#N/A	\$0.00	\$0	\$0	\$0
Install pumps/pipelines/power supply		LS		#N/A	\$0.00	\$0	\$0	\$0
SPECIALIZED ITEMS								
Install water quality monitoring pipes		each		#N/A	\$0.00	\$0	\$0	\$0
Install permanent pumping system		each		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
Total						\$0	\$0	\$0
% of Total							0%	0%

1 Tailings Impoundment Name:

Pond # 1

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost Land	Land Cost	Water Cost
CONTROL ACCESS								
Fence		m		#N/A	\$0.00	\$0	\$0	\$0
Signs		each		#N/A	\$0.00	\$0	\$0	\$0
Berm		m3		#N/A	\$0.00	\$0	\$0	\$0
Block roads		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
STABILIZE EMBANKMENT(S)								
Toe buttress, drainage layer		m3		#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, bulk fill		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0	\$0	\$0
Raise crest		m3		#N/A	\$0.00	\$0	\$0	\$0
Flatten slopes		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
COVER TAILINGS								
Grade/shape tailings surface		m3		#N/A	\$0.00	\$0	\$0	\$0
Liner bedding		m3		#N/A	\$0.00	\$0	\$0	\$0
Subgrade preparation - compact		m2		#N/A	\$0.00	\$0	\$0	\$0
Supply geotextile/geosynthetic		m2		#N/A	\$0.00	\$0	\$0	\$0
Install geotextile/geosynthetic		m2		#N/A	\$0.00	\$0	\$0	\$0
Soil cover		m3		#N/A	\$0.00	\$0	\$0	\$0
Rock cover		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate		m2		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
BURY PAG ROCK								
Relocate PAG rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Place cover over PAG rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Raise crest of dam		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
STABILIZE DECANT SYSTEM								
Excavate and replace		m3		#N/A	\$0.00	\$0	\$0	\$0
Plug/backfill with concrete or clay		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
REMOVE TAILINGS DISCHARGE								
Cyclones		m3		#N/A	\$0.00	\$0	\$0	\$0
Pipe		m3		#N/A	\$0.00	\$0	\$0	\$0
Remove reclaim barge		allow		#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT DIVERSION DITCHES								
Excavate ditches -soil		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate ditches -rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap in channel base		m3		#N/A	\$0.00	\$0	\$0	\$0
FLOOD TAILINGS								
Doze tailings to final contour		m3		#N/A	\$0.00	\$0	\$0	\$0
Raise crest of dam		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
UPGRADE SPILLWAY								
Excavate channel, rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate channel, soil		m3		#N/A	\$0.00	\$0	\$0	\$0
Concrete		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT SEEPAGE COLLECTION POND								
Excavate seepage collection pond		m3		#N/A	\$0.00	\$0	\$0	\$0
Doze & spread excavated material		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate spread material		ha		#N/A	\$0.00	\$0	\$0	\$0
Bedding layer		m3		#N/A	\$0.00	\$0	\$0	\$0
Supply geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Erosion protection layer		m3		#N/A	\$0.00	\$0	\$0	\$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m3		#N/A	\$0.00	\$0	\$0	\$0
Install pumping wells		m3		#N/A	\$0.00	\$0	\$0	\$0
Install pumps/pipelines/power supply		LS		#N/A	\$0.00	\$0	\$0	\$0
SPECIALIZED ITEMS								
Install permanent instrumentation, supply & technician		each		#N/A	\$0.00	\$0	\$0	\$0
Install permanent instrumentation, drilling		each		#N/A	\$0.00	\$0	\$0	\$0
TREAT SEEPAGE - see "Water Management" and "Water Treatment"								
TREAT SUPERNATANT								
Pump water (to pit, U/G)		m3		#N/A	\$0.00	\$0	\$0	\$0
Equipment maintenance and parts		allow		#N/A	\$0.00	\$0	\$0	\$0
Supply reagents		tonne		#N/A	\$0.00	\$0	\$0	\$0
					Annual treatment costs	\$0		
Number of years of treatment		years			Total treatment costs	\$0		\$0
					Total	\$0	\$0	\$0
					% of Total		0%	0%

* for construction of passive treatment system refer to "Water Management"

1 **Rock Pile Name:**

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost	Land Cost	Water Cost
STABILIZE SLOPES								
Flatten slopes with dozer		m3		#N/A	\$0.00	\$0	\$0	\$0
Flatten "bubble dump" areas		m3		#N/A	\$0.00	\$0	\$0	\$0
Divert runoff, ditch mat'l A		m3		#N/A	\$0.00	\$0	\$0	\$0
Divert runoff, ditch mat'l B		m3		#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, drain mat'l		m3		#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, fill mat'l A		m3		#N/A	\$0.00	\$0	\$0	\$0
Toe buttress, fill mat'l B		m3		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
COVER ROCK PILE								
Subgrade preparation - doze surface		m3		#N/A	\$0.00	\$0	\$0	\$0
Soil cover - excavate,haul,spread&compact		m3		#N/A	\$0.00	\$0	\$0	\$0
Rock cover - excavate,haul & spread		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate downslope drainage channel & chute		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap drainage channel and chute		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
VERY LOW PERMEABILITY COVER (in addition to above)								
Liner subgrade preparation - compact		m2		#N/A	\$0.00	\$0	\$0	\$0
Supply geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Protective cover - excavate,haul,spread&compact		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0	\$0	\$0
Install infiltration/seepage instrumentation		allow		#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT DIVERSION DITCHES								
Excavate ditches -soil		m3		#N/A	\$0.00	\$0	\$0	\$0
Excavate ditches -rock		m3		#N/A	\$0.00	\$0	\$0	\$0
Rip rap in channel base		m3		#N/A	\$0.00	\$0	\$0	\$0
CONSTRUCT SEEPAGE COLLECTION POND								
Excavate seepage collection pond		m3		#N/A	\$0.00	\$0	\$0	\$0
Doze & spread excavated material		m3		#N/A	\$0.00	\$0	\$0	\$0
Vegetate spread material		ha		#N/A	\$0.00	\$0	\$0	\$0
Bedding layer		m3		#N/A	\$0.00	\$0	\$0	\$0
Supply geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane		m2		#N/A	\$0.00	\$0	\$0	\$0
Erosion protection layer		m3		#N/A	\$0.00	\$0	\$0	\$0
INSTALL GROUNDWATER COLLECTION SYSTEM								
Excavate/install sumps		m3		#N/A	\$0.00	\$0	\$0	\$0
Install pumping wells		m3		#N/A	\$0.00	\$0	\$0	\$0
Install pumps/pipelines/power supply		allow		#N/A	\$0.00	\$0	\$0	\$0
RELOCATE DUMPS								
Load, haul, dump or doze		m3		#N/A	\$0.00	\$0	\$0	\$0
Add lime		tonne		#N/A	\$0.00	\$0	\$0	\$0
Contour reclaimed area		ha		#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
SPECIALIZED ITEMS								
Install permanent instrumentation		each		#N/A	\$0.00	\$0	\$0	\$0
Install permanent instrumentation, drilling		each		#N/A	\$0.00	\$0	\$0	\$0
TREAT ROCK PILE SEEPAGE - see "Water Management"								
HEAP LEACH SEEPAGE TREATMENT - Cyanide Detox								
Cyanide destruction water treatment pumping		m3		#N/A	\$0.00	\$0	\$0	\$0
Reagents		tonnes		#N/A	\$0.00	\$0	\$0	\$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	\$0.00	\$0	\$0	\$0
Equipment maintenance and parts		allow		#N/A	\$0.00	\$0	\$0	\$0
						Annual treatment costs	\$0	
Number of years of treatment		years						
						Total treatment costs	\$0	\$0
HEAP LEACH SEEPAGE TREATMENT - ARD/ML**								
Upgrade/modify pumping system - report to WTP		allow		#N/A	\$0.00	\$0		\$0
						Total	\$0	\$0
						% of Total		0%

* For construction of passive treatment system refer to "Water Management". ARD/ML seepage treatment becomes post-closure water treatment cost

**Heap leach ARD/ML seepage treatment becomes post-closure water treatment cost

1 Chemicals/Soil Area Name:

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost	Land Cost	Water Cost	
HAZARDOUS MATERIALS AUDIT									
Hazardous materials audit		mandays		#N/A	\$0.00	\$0	\$0	\$0	
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS									
Environmental technician/coordinator		mandays	18	ENVCOL	\$74.16	\$1,335	50%	\$667	\$667
Decontaminate: oil, fuel		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Decontaminate maintenance shop		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Decontaminate power plant		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Decontaminate bulk fuel storage		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Decontaminate ANFO plant		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Decontaminate offices/warehouse/accom		mandays		#N/A	\$0.00	\$0	\$0	\$0	
Removal of asbestos siding on buildings		m2		#N/A	\$0.00	\$0	\$0	\$0	
Removal of friable asbestos on equipment		m2		#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
HAZARDOUS MATERIALS REMOVAL									
Waste oils		litre	500	ORH	\$1.20	\$600	50%	\$300	\$300
Waste fuel	10% OF TOTAL STORAGE	litre	125583	ORH	\$1.20	\$150,700	50%	\$75,350	\$75,350
Waste batteries		kg		#N/A	\$0.00	\$0	\$0	\$0	
Assay & environmental lab reagents		kg		#N/A	\$0.00	\$0	\$0	\$0	
Machine shop paints, solvents etc		litre		#N/A	\$0.00	\$0	\$0	\$0	
Glycol		litre		#N/A	\$0.00	\$0	\$0	\$0	
Process reagents		kg		#N/A	\$0.00	\$0	\$0	\$0	
Nuclear sources		allow		#N/A	\$0.00	\$0	\$0	\$0	
Other hazardous materials		allow		#N/A	\$0.00	\$0	\$0	\$0	
HAZARDOUS MATERIALS									
Transportation to disposal facility		allow		#N/A	\$0.00	\$0	\$0	\$0	
Disposal fees		allow		#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
CONTAMINATED SOILS									
Contam. soil investigation - Phase 1		each	1	CS1L	\$7,500.00	\$7,500	50%	\$3,750	\$3,750
Contam. soil investigation - Phase 2		each		#N/A	\$0.00	\$0	\$0	\$0	
CONTAMINATED SOIL REMOVAL									
Excavate and transport to onsite facility		m3		#N/A	\$0.00	\$0	\$0	\$0	
Manage hydrocarbon remediation at facility		m3		#N/A	\$0.00	\$0	\$0	\$0	
Reagents/stabilizing agent		m2		#N/A	\$0.00	\$0	\$0	\$0	
Excavate and transport to offsite facility		m3	100	CSRL	\$47.00	\$4,700	50%	\$2,350	\$2,350
Contour decontaminated area		m3	100	DSH	\$3.80	\$380	50%	\$190	\$190
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER									
Supply geomembrane, HDPE, ES3, GCL		m2		#N/A	\$0.00	\$0	\$0	\$0	
Upper and lower bedding layers		m3		#N/A	\$0.00	\$0	\$0	\$0	
Install geomembrane, HDPE, ES3, GCL		m2		#N/A	\$0.00	\$0	\$0	\$0	
Erosion protection layer		m3		#N/A	\$0.00	\$0	\$0	\$0	
Vegetate		m2		#N/A	\$0.00	\$0	\$0	\$0	
Install infiltration/seepage instrumentation		allow		#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
OTHER				#N/A	\$0.00	\$0	\$0	\$0	
						Total	\$165,214	\$82,607	\$82,607
						% of Total		50%	50%

USED ENVIRONMENTAL COORDINATOR RATE INSTEAD OF ENGINEER. USED HALF OF NIGHTHAWK ESTIMATE (50/50 SPLIT BETWEEN GNWT & FEDERAL)

USED HIGH RATE INSTEAD OF LOW RATE - SHIP TO YK
USED HIGH RATE INSTEAD OF LOW RATE - SHIP TO YK

WILL THERE BE ANY GLYCOL OR OTHER CHEMICALS ONSITE THAT WILL HAVE TO BE SHIPPED OUT?

ASSUME ONE PHASE I ESA ON FEDERAL LAND. USED PHASE 1 RATE INSTEAD OF WATER ANALYSIS/REPORTING

USED 100 M3 INSTEAD OF 200 M3 TO ACCOUNT FOR FEDERAL/GNWT SPLIT
USED 100 M3 INSTEAD OF 200 M3 TO ACCOUNT FOR FEDERAL/GNWT SPLIT

1 Building / Equip Name:		Bldg / Equip #: 1							
ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost	Land Cost	Water Cost	
DISPOSE MOBILE EQUIPMENT									
Ship off-site Light vehicles	SxS, quads, snowmobiles, boats		3	#N/A	\$4,500.00	\$13,500	100%	\$13,500	\$0
Ship off-site Heavy equipment	loader, gensets, drills (7 drills, 1 loader, 2 gensets)		6	#N/A	\$4,500.00	\$27,000	100%	\$27,000	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
REMOVE BUILDINGS - see note below									
Accommodation Complex	50 Weatherheaven type tent structures (3.5	m2	735	BRWL	\$27.50	\$20,213	100%	\$20,213	\$0
Buildings (Plywood)	34 Plywood buildings on average 20m2	m2	680	BRWL	\$27.50	\$18,700	100%	\$18,700	\$0
Process Facilities		m2		#N/A	\$0.00	\$0		\$0	\$0
Offices, Repair, Lab, Warehouse		m2		#N/A	\$0.00	\$0		\$0	\$0
Storage Facilities		m2		#N/A	\$0.00	\$0		\$0	\$0
Water and Wastewater Treatment Facilities		m2		#N/A	\$0.00	\$0		\$0	\$0
U/G Heating Plant		m2		#N/A	\$0.00	\$0		\$0	\$0
Emulsion Plant		m2		#N/A	\$0.00	\$0		\$0	\$0
AN Storage Facility		m2		#N/A	\$0.00	\$0		\$0	\$0
Warehouse, Shops and Other		m2		#N/A	\$0.00	\$0		\$0	\$0
Storage Facility at Laydown/Airstrip		m2		#N/A	\$0.00	\$0		\$0	\$0
Fuel tanks	3 - 75,000L Fuel Tanks	m2	3	#N/A	\$4,500.00	\$13,500	100%	\$13,500	\$0
sea containers	2 Sea Containers	m2	2	#N/A	\$4,500.00	\$9,000	100%	\$9,000	\$0
Freshwater intake		m2		#N/A	\$0.00	\$0		\$0	\$0
Reclaim pumps		m2		#N/A	\$0.00	\$0		\$0	\$0
Outfall & Diffuser		m2		#N/A	\$0.00	\$0		\$0	\$0
Airstrip lighting, navigation, electrician		mandays		#N/A	\$0.00	\$0		\$0	\$0
Airstrip lighting, navigation, mechanical		mandays		#N/A	\$0.00	\$0		\$0	\$0
Break foundation slabs	total of all buildings	m2		#N/A	\$0.00	\$0		\$0	\$0
Consolidate & dump boneyard debris		m3		#N/A	\$0.00	\$0		\$0	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
LANDFILL FOR DEMOLITION WASTE									
Place rock cover		m3		#N/A	\$0.00	\$0		\$0	\$0
Place soil cover		m3		#N/A	\$0.00	\$0		\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0		\$0	\$0
GRADE AND CONTOUR PADS									
Accommodation Complex		ha		#N/A	\$0.00	\$0		\$0	\$0
Process Facilities		ha		#N/A	\$0.00	\$0		\$0	\$0
Offices, Repair, Lab, Warehouse		ha		#N/A	\$0.00	\$0		\$0	\$0
Storage Facilities		ha		#N/A	\$0.00	\$0		\$0	\$0
Water and Wastewater Treatment Facilities		ha		#N/A	\$0.00	\$0		\$0	\$0
U/G Heating Plant		ha		#N/A	\$0.00	\$0		\$0	\$0
Emulsion Plant		ha		#N/A	\$0.00	\$0		\$0	\$0
Warehouse, Shops and Other		ha		#N/A	\$0.00	\$0		\$0	\$0
Place rock cover		m3		#N/A	\$0.00	\$0		\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0		\$0	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
PUNCTURE LINED SUMPS									
Puncture liner and place soil cover		m3		#N/A	\$0.00	\$0		\$0	\$0
RECLAIM ROADS									
Remove culverts		each		#N/A	\$0.00	\$0		\$0	\$0
Remove bridges		each		#N/A	\$0.00	\$0		\$0	\$0
Scarify and install water breaks		ha		#N/A	\$0.00	\$0		\$0	\$0
Scarify airstrip		ha		#N/A	\$0.00	\$0		\$0	\$0
Scarify laydown areas		ha		#N/A	\$0.00	\$0		\$0	\$0
Vegetate		ha		#N/A	\$0.00	\$0		\$0	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
SPECIALIZED ITEMS									
Cut off Casings - Legacy Drill Holes	Assume half of drill holes on federal land	HR	130	LAB-SH	\$49.60	\$6,448	100%	\$6,448	\$0
Dispose of misc. debris and laydown area refuse				#N/A	\$0.00	\$0		\$0	\$0
						Total		\$108,361	\$108,361
						% of Total		100%	0%

It is CIRNAC's understanding that both the sea containers and fuel tanks will be hauled to the Colomac site and therefore should be included in the federal estima
It is CIRNAC's understanding that both the sea containers and fuel tanks will be hauled to the Colomac site and therefore should be included in the federal estima

AGREE WITH GNWT ASSUMTION ON DRILL HOLE NUMBERS - CLARIFY NEED FOR HIGHER RATE (\$49.60 VS \$41.00)

Note: Unit costs are based on 3m high, single storey building. Scale larger building areas accordingly. E.g. 10m high building multiply area by 3.3 (10/3)

1 Capital Expenditures and Short Term Water Treatment identified in 'Instructions' worksheet

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
BREACH DYKE EMBANKMENT						
Remove fill		m3		#N/A	\$0.00	\$0
Contour water intake area		m3		#N/A	\$0.00	\$0
STABILIZE SEDIMENT PONDS/WATER MANAGEMENT PONDS						
Place soil cover		m3		#N/A	\$0.00	\$0
Doze & spread excavated material		m3		#N/A	\$0.00	\$0
Vegetate spread material		ha		#N/A	\$0.00	\$0
Rip rap in channel base		each		#N/A	\$0.00	\$0
REDIRECT RUNOFF/CONSTRUCT DIVERSION DITCHES						
Excavate ditches -soil		m3		#N/A	\$0.00	\$0
Excavate ditches -rock		m3		#N/A	\$0.00	\$0
Stabilize side slopes		m3		#N/A	\$0.00	\$0
Rip rap in channel base		m3		#N/A	\$0.00	\$0
BREACH DITCHES						
Excavate breaches		m3		#N/A	\$0.00	\$0
Backfill/recontour		m3		#N/A	\$0.00	\$0
Install flow dissipation		m3		#N/A	\$0.00	\$0
Vegetate remainder of ditch		m2		#N/A	\$0.00	\$0
DECOMMISSION FRESH WATER SUPPLY						
Breach embankment		m		#N/A	\$0.00	\$0
Remove pump		LS		#N/A	\$0.00	\$0
Remove pipeline		m		#N/A	\$0.00	\$0
WATER CONTROL IN RECLAMATION QUARRY						
Install pumping system		LS		#N/A	\$0.00	\$0
Remove pumping system		LS		#N/A	\$0.00	\$0
REMOVE PIPELINES						
Remove pipes		m		#N/A	\$0.00	\$0
Concrete plug deep pipes		m3		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
GROUNDWATER COLLECTION SYSTEM						
Excavate/install sumps		m3		#N/A	\$0.00	\$0
Install pumping wells		m3		#N/A	\$0.00	\$0
Install pumps/pipelines/power supply		LS		#N/A	\$0.00	\$0
CONSTRUCT CONTAMINATED WATER STORAGE POND						
Excavate pond		m3		#N/A	\$0.00	\$0
Doze & spread excavated material		m3		#N/A	\$0.00	\$0
Vegetate spread material		ha		#N/A	\$0.00	\$0
Bedding layer		m3		#N/A	\$0.00	\$0
Supply geomembrane		m2		#N/A	\$0.00	\$0
Install geomembrane		m2		#N/A	\$0.00	\$0
Erosion protection layer		m3		#N/A	\$0.00	\$0
CONSTRUCT PASSIVE TREATMENT SYSTEM (e.g. Constructed Wetland)						
Construct access roads		km		#N/A	\$0.00	\$0
Install HDPE piping system from collection pond		m		#N/A	\$0.00	\$0
Inter-cell flow structures		allow		#N/A	\$0.00	\$0
Install liners		m2		#N/A	\$0.00	\$0
Install growth media		m3		#N/A	\$0.00	\$0
Wetland vegetation		ha		#N/A	\$0.00	\$0
CONSTRUCT WATER TREATMENT PLANT						
Build treatment plant		LS		#N/A	\$0.00	\$0
Build sludge containment facility		LS		#N/A	\$0.00	\$0
				Total		\$0

For cost of long-term/post-closure water treatment see "WATER TREATMENT" Worksheet"

1 Post Closure Water Treatment - Identified as long term/post-closure in 'Instructions' worksheet

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
ADDITION OF REAGENTS TO WTP						
H2O2		kg		#N/A	\$0.00	\$0
lime		kg		#N/A	\$0.00	\$0
ferric sulphate		kg		#N/A	\$0.00	\$0
ferrous sulphate		kg		#N/A	\$0.00	\$0
flocculents		kg		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
LABOUR AND SUPPLIES						
Annual fuel		litres		#N/A	\$0.00	\$0
Annual power		kW-h		#N/A	\$0.00	\$0
Electrician/mechanic to maintain treatment plant		allow		#N/A	\$0.00	\$0
Equipment maintenance and parts		allow		#N/A	\$0.00	\$0
Misc. supplies, hoses, tools		allow		#N/A	\$0.00	\$0
Communications		allow		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
WTP WATER SAMPLING AND ANALYSES						
Sampling equipment		allow		#N/A	\$0.00	\$0
Analyses		allow		#N/A	\$0.00	\$0
Shipping to laboratory		allow		#N/A	\$0.00	\$0
Reporting		allow		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
SITE ACCESS						
Road maintenance (incl. snow removal)		allow		#N/A	\$0.00	\$0
Winter road tariff		allow		#N/A	\$0.00	\$0
Truck rental		allow		#N/A	\$0.00	\$0
Air support		allow		#N/A	\$0.00	\$0
Annual water treatment costs						\$0
Number of years of water treatment		years			Total	\$0

1 Interim Care and Maintenance

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
on-site caretaker		manmonths		#N/A	0	\$0
extra personnel		manmonths		#N/A	0	\$0
-electrician		manmonths		#N/A	0	\$0
-mechanic		manmonths		#N/A	0	\$0
annual fuel		litre		#N/A	0	\$0
misc. supplies		allow		#N/A	0	\$0
pick-up truck		each		#N/A	0	\$0
small dozer		allow		#N/A	0	\$0
small excavator		allow		#N/A	0	\$0
snow machine		allow		#N/A	0	\$0
communications		allow		#N/A	0	\$0
SNP/AEMP water sampling & reporting	ASSUME 2 YEARS - 2 VISITS PER YEAR	each	1	WSH	10000	\$10,000
geotechnical assessment		each		#N/A	0	\$0
interim water treatment				#N/A		\$0
other		each		#N/A	0	\$0
				Annual Interim C&M Cost		\$10,000
Number of years of ICM		years	\$0	Total		\$0

ASSUME NO ICM REQUIRED ON FEDERAL LAND

IS WATER SAMPLING UNIT COST ALL INCLUSIVE? OR SHOULD TRANSPORTATION AND FIELD PERSONNEL COSTS BE CONSIDERED AS WELL?

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MONITORING & INSPECTIONS						
Annual geotechnical inspection		each		#N/A	\$0.00	\$0
Survey inspection		each		#N/A	\$0.00	\$0
Regulatory costs*	ANNUAL REPORTS	each	1	#N/A	#####	\$5,000
Site water monitoring (AEMP and SNP)		each	1	WSH	#####	\$10,000
- Active closure and flooding		each		#N/A	\$0.00	\$0
- Post pit flooding		each		#N/A	\$0.00	\$0
Air Quality Monitoring Program (AQMP)		each		#N/A	\$0.00	\$0
Wildlife Effects Monitoring Program (WEMP)		each		#N/A	\$0.00	\$0
Vegetation Monitoring		each		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
COVER MAINTENANCE						
Repair erosion - infill gullies		allow		#N/A	\$0.00	\$0
Repair erosion - upgrade diversion ditches		allow		#N/A	\$0.00	\$0
Remove problem vegetation		allow		#N/A	\$0.00	\$0
Repair animal damage		allow		#N/A	\$0.00	\$0
Repair/upgrade access controls		allow		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
SPILLWAY MAINTENANCE						
Repair erosion		m3		#N/A	\$0.00	\$0
Clear spillway		each		#N/A	\$0.00	\$0
CWTS MAINTENANCE						
Maintain flow, restore vegetation		allow		#N/A	\$0.00	\$0
POST-CLOSURE WATER TREATMENT						
Annual water treatment cost, from "Water Treatment"						\$0
Subtotal, Annual post-closure costs						\$15,000
Discount rate for calculation of net present value of post-closure cost, %				0.00%		
Number of years of post-closure activity				0 years		
Present Value of payment stream						\$0

ASSUME NO POST CLOSURE MONITORING & MAINTENANCE REQUIRED ON FEDERAL LAND

*Regulatory costs - annual reporting, management plans, progress reports etc.

1 Mobilization/Demobilization:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
Excavators	13T X 400 KM (200 FOR SPLIT)	each	2600	M-HERL	3.4	\$8,840
Dump trucks	10 T X 400 KM (200 FOR SPLIT)	each	2000	M-HERL	3.4	\$6,800
Dozers	10 T X 400 KM (200 FOR SPLIT)	each	2000	M-HERL	3.4	\$6,800
Demolition shears		each		#N/A	0	\$0
Crane		each		#N/A	0	\$0
Loader	8 T X 400 KM (200 FOR SPLIT)	each	1600	M-HERL	3.4	\$5,440
Compactor		each		#N/A	0	\$0
Light duty vehicles	4 @ 3 T X 400 KM (200 FOR SPLIT)	each	2400	M-HERL	3.4	\$8,160
MOBILIZE MISC. EQUIPMENT						
Pump shipping		each		#N/A	0	\$0
Pipe shipping		m		#N/A	0	\$0
Minor tools and equipment		allow		#N/A	0	\$0
Truck tires		allow		#N/A	0	\$0
Other				#N/A	0	\$0
MOBILIZE CAMP						
Reclamation activities		allow	0		0	\$0
Long term reclamation activities (eg pump flooding)		allow		#N/A	0	\$0
MOBILIZE WORKERS						
Reclamation activities - transport		each	2	MVH	9100	\$9,100
Reclamation activities - travel time		manhours	64	SUPERH	91.84	\$2,939
Long term reclamation activities (eg pump flooding) - transport		each		#N/A	0	\$0
Long term reclamation activities (eg pump flooding) - travel time		each		#N/A	0	\$0
Monitoring Airfare		each		#N/A	0	\$0
WORKER ACCOMMODATIONS						
Reclamation activities		manmonths	490	ACCM	100	\$24,000
Long term reclamation activities (eg pump flooding)		manmonths		#N/A	0	\$0
MOBILIZE FUEL						
Fuel freight - reclamation activities	COST FOR FUEL	litre	5000	FCDH	1.39	\$3,475
FUEL FREIGHT	COST FOR MOBILIZATION	litre	5000	FCMH	0.42	\$1,050
Fuel freight - long term reclamation activities		litre		#N/A	0	\$0
Fuel freight accommodations	COST FOR HEATING FUEL	litre	5000	FCDH	1.39	\$3,475
FUEL FREIGHT	COST FOR MOBILIZATION	litre	5000	FCMH	0.42	\$1,050
WINTER ROAD						
Construction and operation		km	30	WRCL	2000	\$30,000
Limited winter use		km		#N/A	0	\$0
Winter road tariff		km		#N/A	0	\$0
DEMOLIBIZE HEAVY EQUIPMENT						
Excavators	13T X 400 KM (200 FOR SPLIT)	km	2600	M-HERL	3.4	\$8,840
Dump trucks	10 T X 400 KM (200 FOR SPLIT)	km	2000	M-HERL	3.4	\$6,800
Dozers	10 T X 400 KM (200 FOR SPLIT)	km	2000	M-HERL	3.4	\$6,800
Demolition shears		km		#N/A	0	\$0
Crane		km		#N/A	0	\$0
Loader	8 T X 400 KM (200 FOR SPLIT)	km	1600	M-HERL	3.4	\$5,440
Compactor		each		#N/A	0	\$0
Light duty vehicles	4 @ 3 T X 400 KM (200 FOR SPLIT)	km	2400	M-HERL	3.4	\$8,160
Other		km		#N/A	0	\$0
DEMOLIBIZE CAMP						
		allow	1	#N/A	5000	\$2,500
DEMOLIBIZE WORKERS						
crew travel time		mandays	64	SUPERH	91.84	\$2,939
crew transportation		each	2	MVH	9100	\$9,100
WINTER ROAD						
Construction and operation		km		#N/A	0	\$0
Limited winter use		km		#N/A	0	\$0
Winter road tariff		km		#N/A	0	\$0
Total						\$161,708

*ALL COSTS SPLIT IN HALF - ASSUME FEDERAL & GNWT 50/50 SPLIT

ASSUME 400 KM INSTEAD OF 300KM FOR TRAVEL TO SITE FROM YELLOWKNIFE. ASSUME 50/50 SPLIT GNWT & FEDERAL SO ONLY USED 200KM IN CALCULATION.

USED LOW RATE (\$3.40). IS THERE A CASE FOR THE HIGHER RATE (\$10.25)?

Assume camp infrastructure already in place. NIGHTHAWK ESTIMATE IS 4000 GNWT SLIGHTLY HIGHER

ASSUME 2 FLIGHTS WITH LARGER PLANE TO CARRY 8 WORKERS PLUS GEAR. DIFFERENT APPROACH USED THAN GNWT. COST FOR TRANSPORTATION NOT INCLUDED IN NIGHTHAWK ESTIMATE. ASSUME 8 WORKERS - 4 HOURS TRAVEL FOR EACH FLIGHT (8 TOTAL) WORKERS WILL BE OF VARIOUS TYPES, USED HIGHER SUPERVISOR RATE AS AN AVERAGE HOURLY RATE. DIFFERENT APPROACH THAN GNWT.

ASSUMES 8 WORKERS ONSITE FOR 60 DAYS. LONGER DURATION THAN NIGHTHAWK ESTIMATE AND DIFFERENT APPROACH THAN GNWT ESTIMATE.

ASSUMES ONLY 5000 ADDITIONAL LITRES OF FUEL WILL BE REQUIRED FOR EQUIPMENT. COST TO MOBILIZE FUEL TO SITE NOT INCLUDED IN NIGHTHAWK ESTIMATE.

ASSUMES ONLY 5000 ADDITIONAL LITRES OF FUEL WILL BE REQUIRED FOR HEATING. COST TO MOBILIZE FUEL TO SITE NOT INCLUDED IN NIGHTHAWK ESTIMATE.

SAME ASSUMPTIONS AS EQUIPMENT MOBILIZATION
USED LOW RATE (\$3.40). IS THERE A CASE FOR THE HIGHER RATE (\$10.25)?

NIGHTHAWK ESTIMATE IS \$4000. UNCLER HOW VALUE IS CALCULATED. GNWT ESTIMATE IS SLIGHTLY HIGHER THAN \$4000 SO MOVED TO A ROUND NUMBER.

SAME ASSUMPTIONS AS WORKER MOBILIZATION. COST FOR TRANSPORTATION NOT INCLUDED IN NIGHTHAWK ESTIMATE.

Unit Cost Table (for refining unit costs see "Estimator" worksheet)

Filter by unit

ITEM	Detail	CUSI CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	COMMENTS
Accommodation							
		ACCM	manday	100.00	175.00		
Buildings - Decontaminate							
	Asbestos	BDA	m2	25.60	51.20		Low: removal of asbestos siding & flooring; High: removal of insulated pipes, friable asbestos
Buildings - Remove							
	Wood	BRW	m2	27.50	41.00		Unit costs are based on 3m high, single storey building. Scale areas accordingly.
	Concrete	BRC	m2	40.00	65.00	6.00	Specified: puncture concrete foundation slabs
	Steel - tear-down	BRS1	m2	45.00	65.00		
	Steel - for salvage	BRS2	m2	67.00	100.00		
Concrete work							
	Small pour	CSF	m3	426.50	639.75		Low: YK; High: 1.5xLow
	Large pour	CLF	m3	353.50	530.25	2,130.00	Specified: concrete crown pillar
Contaminated Soils							
	ESA Phase 1	CS1	each	7500.00			Low: small, "clean" site
	ESA Phase 1	CS2	each	50000.00			Low: small, "clean" site
	Remediate on site	CSR	m3	47.00	146.00		
Dozing							
	doze rock piles	DR	m3	1.05	2.40		Low cost: doze crest off dump
	doze overburden/soil piles	DS	m3	0.95	3.80		High cost: push up to 300 m
Excavate Rock; Low Spec's and QA/QC							
	drill/blast/load/short haul	RB1	m3	11.40	17.05		Low: quarry operations for bulk fill
	drill/blast/load/long haul	RB2	m3	12.05	17.80		
	RB1 + spread and compact	RB3	m3	12.05	17.80		
	RB2 + spread and compact	RB4	m3	12.50	30.75		
	Specified activity	RBS	m3				(e.g. ditch/spillway excavation)
Excavate Rock; High Spec's and QA/QC							
	drill/blast/load/short haul	RC1	m3	12.05	17.80		Low: foundation excavation; High: spillway excavation
	drill/blast/load/long haul	RC2	m3	12.70	18.40		
	RC1 + spread and compact	RC3	m3	12.70	18.40		e.g. cover construction
	RC2 + spread and compact	RC4	m3	13.50	19.20		e.g. cover construction
	Specified activity	RCS	m3			175.00	Specified-drift excavation
Excavate Rip Rap							
	drill/blast/load/short haul/place	RR1	m3	13.50	17.75		High: quarry & place rip rap in channel
	drill/blast/load/long haul/place	RR2	m3	14.20	20.65		
	source is waste dump/short haul	RR3	m3	7.00			cost includes sorting
	source is waste dump/long haul	RR4	m3	7.60			
	Specified activity	RRS	m3				
Excavate Soil; Low Spec's and QA/QC							
	clear & grub	SBC	m2	3.40	5.00		
	excavate/load/short haul	SB1	m3	4.30	5.90		
	excavate/load/long haul	SB2	m3	4.60	7.30		
	SB1 + spread and compact	SB3	m3	5.10	8.90		Low: non-engineered; High: engineered
	SB2 + spread and compact	SB4	m3	5.50	11.00		Low: non-engineered; High: engineered
	Specified activity	SBS	m3	3.20	6.30		Low: rehandle waste rock dump by dozing; High: rehandle waste rock by hauling
	Tailings	SBT	m3	1.35	3.70	15.50	High: contour surface - wet or frozen; Specified: haul/place wet fill
Excavate Soil; High Spec's and QA/QC							
	excavate/load/short haul	SC1	m3	6.80	9.30		
	excavate/load/long haul	SC2	m3	7.10	11.75		
	SC1 + spread and compact	SC3	m3	8.90	14.20		Low: non-engineered; High: engineered
	SC2 + spread and compact	SC4	m3	9.30	23.20		Low: non-engineered; High: engineered (e.g. complex covers, low volume dam construction)
	Specified activity	SCS	m3			18.80	Backfill add with waste rock
Fence							
		FNC	m	13.55	203.00		
Fuel and Electricity							
	Fuel cost - gas	FCG	litre	1.05	1.40		
	Fuel cost - diesel	FCD	litre	0.99	1.39		
	Fuel mobilization	FCM	litre	0.22	0.42		High: winter road usage
	Electricity	FCE	kWh	0.17	0.19	0.49	Low and High: Yellowknife; Specified: diesel generator
Geo-Synthetics							
	geotextile	GST	m2	3.44			Supply and install
	geogrid	GS	m2	5.75			
	liner, HDPE	GSHDPE	m2	7.95			Supply and install; large quantity
	liner, ESS	GSES	m2	20.20			FOB Yellowknife
	geosynthetic installation	GSI	m2	3.16	14.00		Low: geotextile; High: ESS or HDPE
	berlonite soil amendment	GSA	tonne	308.30	348.50		FOB Edmonton, add shipping & mixing
Grouting (m3 of rock grouted)							
	grout	GR	m3	236.55	286.75		High: cement, FOB Yellowknife
Labour & Equipment Rates							
	Site manager	smn	\$/hr	125.00	152.00		
	Supervisor	super	\$/hr	52.00	91.84		
	Registered engineer	eng	\$/hr	95.00	220.00		
	Environmental coordinator	envco	\$/hr	74.16	130.00		
	Environmental technologist	envtech	\$/hr	36.00			
	Electrician	elec	\$/hr	74.00	95.00		
	Journeyman - various	journey	\$/hr	44.00	71.79		
	Labour - skilled	lab-s	\$/hr	41.00	49.60		
	Labour - unskilled	lab-us	\$/hr	31.00	43.98		
	Equipment operator	oper	\$/hr	41.00	65.00		
	Heavy duty mechanic	mech	\$/hr	49.00	72.86		
	Water treatment plant operator	oper-wt	\$/hr	41.00	59.86		
	Security / first aid	safety	\$/hr	36.00	66.97		
	Administrative staff	admin	\$/hr	38.00	57.89		
	Equipment rates include operator and fuel						
	Loader - 4 cu.yd (3.06m3)	load-s	\$/hr	175.00			
	Loader - 7 cu.yd (5.35m3)	load-l	\$/hr	315.00			
	Excavator - 28.76-30.84 tonnes	exc-s	\$/hr	190.00			
	Excavator - 68.95+tonnes	exc-l	\$/hr	420.00			
	Grader	grad	\$/hr	190.00			
	Dump truck off hwy 30-50 tonnes	truck-s	\$/hr	225.00			
	Dump truck off hwy 55-75 tonnes	truck-l	\$/hr	300.00			
	dozer, small	dozers	\$/hr	205.00	260.00		
	dozer, large	dozerl	\$/hr	490.00	565.00		
	smooth drum compactor	comp	\$/hr	155.00			
	scoottram, 6yd3 bucket	scoop	\$/hr	170.00			
	flat bed truck with hiab	hiab	\$/hr	155.00			
	fuel truck	fruck	\$/hr	150.00			
	water truck	wtruck	\$/hr	58.00	150.00		
Mobilize Heavy Equipment							
	Road access	MHER	kmtonne	3.40	10.25		
	Air access	MHEA	kmtonne	12.00			cargo rate=500lb
Mobilize Camp							
	Road access	MCR	each	50000.00			refurbish existing camp
Mobilize Workers							
	flight	MW	each	4500.00	9100.00		Low: e.g. 8 passenger; High: Dash 7
Oil Removal							
	oil removal	OR	litre	0.43	1.20		Low: waste oil heater; High: ship offsite
PCB Removal							
	Remove from site	PCBR	litre	40.20	46.90		Low: shipping, handling & disposal from Yellowknife
Pipes, small (<6in dia.)							
	remove/dispose on site	PSR	m	1.00	24.00		Low: remove/dispose on site; High: remove/re-use
	supply	PSS	m	6.10	11.10		Low: supply; High: supply and ship
	install	PSI	m	25.00			
Pipes, large (>6in dia.)							
	remove/dispose on site	PLR	m	22.00	72.00		Low: remove/dispose on site; High: remove/re-use
	supply	PLS	m	129.00	143.00		Low: supply; High: supply and ship
	install	PLI	m	50.00			
Power Lines							
	remove/dispose on site	POWR	m	25.50			
Process Chemicals							
	Remove from site	PCR	kg	0.45	2.50		Low: shipping, handling & disposal from Yellowknife
Pumps							
	Pump capital cost	PC	each	195000.00			
	Pump shipping	PS	each	2500.00			
	Pump operating cost	POC	m3	0.12			pump operating costs should be calculated based on pump capacity, fuel costs, etc.
	Pump maintenance	PM	allow	25000.00			
Pump sand Backfill							
		PBF	m3	85.00	300.00		
Scarify - road/mine site							
		SCFY	ha	4300	6030	2150	
Shaft, Raise & Portal Closures							
	Shaft & Raises	SR	m2	645.00	2132.00		Low: pre-cast concrete slabs, little site prep. Area=shaft*1m all around
	Portals	POR	m3	18.80	250.00	1200.00	Low: unit cost code SCS; High: excavate & backfill collapsed portal; Spec: installed pressure plug
Site Inspection Report							
		RPT	each	10000.00	20000.00		
SpillWay - Clear							
		SW	each	3000.00	7000.00		
Survey/Instrumentation							
		SI	each	1800.00	3600.00		2 person crew
Treatment Plant - Construct							
	Small (< 1000 m3/d)	TPS	lump sum	9000000	15000000		
	Large (> 1000 m3/d)	TPL	lump sum	15000000	46000000		
	Constructed Wetland	CWTS	ha	200000	300000		
Treatment Plant - Operate							
		TPO	m3	0.35	2.00		
Treatment Chemicals							
	ferric sulphate	ferric	kg	1.19			
	ferrous sulphate	ferrous	kg	1.32			
	lime	lime	kg	0.56			
	hydrogen peroxide, 35%	hperox	kg	1.50			
	Sodium Metabisulfate	Nametab	kg	1.18			
	Caustic soda, 50%	caustic	kg	0.74			
	Sulfuric acid, 93%	sulfuric	kg	0.31			
	floculant	floc	kg	6.00			
	copper sulphate	copper	kg				
	shipping	shipping	kg	0.20			
Vegetation							
	Hydroseed, Flat	VHF	ha	4000.00			
	Hydroseed, Sloped	VHS	ha	4500.00			
	Veg. blankets/erosion mat	VB	ha	13000.00			
	Tree planting	VT	ha	2600.00	6000.00		
	Wetland species	VW	ha			47.72	Specified= /m3, Wetland Growth Media Substrate mixed and installed (sand, biochar and fertilizer, woodchips)
Water Sampling/Analysis/Reporting							
		WS	each	7000.00	10000.00		
Winter Road							
	Construction	WRC	km	2000.00	11500.00		
	Usage	WRU	kmtonne	0.29			