



CANADA NICKEL
COMPANY



Stantec

Crawford Nickel Project Impact Statement

Table of Contents and Abbreviations



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Canada Nickel Company

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| | |
|-------------------|--|
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Acronyms and Abbreviations

| | |
|-------|--|
| AADT | Average Annual Daily Traffic |
| AAF | Avoidance Alternatives Form |
| AAFC | Agricultural and Agri-Food Canada |
| AAQC | Ambient Air Quality Criteria |
| ABA | Acid Base Accounting |
| AC | Assimilative Capacity |
| ACA | Average Crustal Abundance |
| ACS | Assimilative Capacity Study |
| ADD | Average Daily Dose |
| AET | Actual Evapotranspiration |
| AGM | Annual General Meeting |
| AHS | Autonomous Haulage System |
| AHT | Autonomous Haul Trucks |
| Al | aluminum |
| ALS | ALS Global |
| amsl | Above Mean Sea Level |
| ANSI | American National Standards Institute |
| AP | Acid Potential |
| AP-42 | US Environmental Protection Agency Compilation Of Air Pollution Emission Estimation Factors Document |

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| | |
|----------|--|
| APV | Aquatic Protection Values |
| AQMP | Air Quality Management Plan |
| ARD | Acid Rock Drainage |
| ARU | Autonomous Recording Unit |
| ASDB | Archaeological Sites Database |
| asl | Above Sea Level |
| ATI | Antecedent Temperature Index |
| ATV | All-Terrain Vehicle |
| B(a)P | Benzo(a)pyrene |
| BAT | Best Available Technology |
| BAU | Business As Usual |
| BBS | Breeding Bird Survey |
| BC | Birds Canada |
| BC | Base Cation |
| BC MECCS | British Columbia Ministry Of Environment And Climate Change Strategy |
| BCI | Bat Conservation International |
| BCR | Bird Conservation Region |
| BEP | Best Environmental Practice |
| BFI | Baseflow Index |
| bgs | Below Ground Surface |
| BHA | Bait Harvest Areas |

| | |
|-------------------|---|
| BMA | Bear Management Area |
| BML | Biotic Ligand Model |
| BMZ | Bait Management Zone |
| BS | Base Saturation |
| C\$B | billions of Canadian dollars |
| C\$M | millions of Canadian dollars |
| Ca | calcium |
| CAAQS | Canadian Ambient Air Quality Standards |
| CAC | Criteria Air Contaminants |
| CaCO ₃ | calcium carbonate |
| CADC | Climate Adjusted Design Criteria |
| CAGR | Compound Annual Growth Rate |
| CALA | Canadian Association for Laboratory Accreditation |
| CanSIS | Canadian Soil Information System |
| CARB | California Air Resources Board |
| CAS | Chemical Abstracts Service |
| CBC | Christmas Bird Count |
| CBD | Convention on Biological Diversity |
| CCME | Canadian Council of Minister of the Environment |
| CCO | Cancer Care Ontario |
| CCRA | Climate Change Resilience Assessment |

| | |
|-----------------|---|
| cd | candela, SI unit of luminance or luminous intensity |
| CDA | Canadian Dam Association |
| CDSSAB | Cochrane District Social Services Administration Board |
| CEC | Cation Exchange Capacity Centimetre |
| CEGEP | Collège d'enseignement général et professionnel |
| CEPP | Construction Environmental Protection Plan |
| CFDC | Community Futures Development Corporation |
| CHSR | Cultural Heritage Screening Report |
| CH ₄ | methane |
| CIE | Commission Internationale de L'Éclairage or International Commission on Illumination |
| CIE 150:2017 | CIE 150:2017 Technical Report: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations, 2nd Edition. Outdoor Lighting Guideline Document. |
| CIRNAC | Crown-Indigenous Relations and Northern Affairs Canada |
| Class EA | Class Environmental Assessment |
| CMHA | Canadian Mental Health Association Cochrane-Timiskaming |
| CMHA-CT | Canadian Mental Health Association of Cochrane-Timiskaming |
| CMHC | Canada Mortgage Housing Corporation |
| CMIP | Coupled-Model Intercomparison Project |
| CN | Curve Number |
| CNWA | <i>Canadian Navigable Waters Act, 2019</i> |

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| | |
|---------------------|--|
| CO | carbon monoxide |
| CO ₂ | carbon dioxide |
| CO ₂ e | carbon dioxide equivalent |
| CO ₃ -NP | neutralization potential measured from carbonate content |
| CoC | Chain of Custody |
| CoPC | Contaminants of Potential Concern |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| COSSARO | Committee on the Status of Species at Risk in Ontario |
| C-PAF | C-Permit Application |
| CPOM | Coarse Particulate Organic Matter |
| CPUE | Catch Per Unit Effort |
| CRSD | Cubed Root Scaled Distance |
| CSA | Canadian Standards Association |
| CSD | Census Subdivision |
| CSI | Crime Severity Index |
| CSP | Corrugated Steel Pipe |
| CSQG | Canadian Sediment Quality Guidelines |
| CUC | Crawford Ultramafic Complex |
| CVHI | Cultural heritage value or interest |
| CVS | Commercial Vehicle Survey |

| | |
|----------|--|
| CWQG FAL | Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater Aquatics Long Term |
| DAC | Direct Air Capture |
| DARM | Drainage-Area Ratio Method |
| dB | un-weighted decibels |
| dBA | A-weighted decibels |
| dBAI | impulsive A-weighted decibels |
| dbh | diameter-at-breast-height |
| dB L | linear (unweighted) decibels |
| DEF | Diesel Exhaust Fluid |
| DEM | Digital Elevation Model |
| DFO | Department of Fisheries and Oceans Canada |
| DHV | Design Hourly Volume, For Roadway Geometric Design |
| DL | Detection Limit |
| DNR | Department of Natural Resources |
| DO | dissolved oxygen |
| DOC | United States Department of Commerce |
| DOC | dissolved organic carbon |
| DOE | United States Department of Energy |
| DOM | dead organic matter |
| DPD | Detailed Project Description |

| | |
|------|--|
| DQO | Data Quality Objective |
| DS | Downstream |
| DSB1 | District School Board Ontario North East |
| dwt | Dry Weight |
| EC | Environment Canada |
| ECA | Environmental Compliance Approval |
| ECC | Environmental Consequence Classification |
| ECCC | Environment and Climate Change Canada |
| ECE | Early Childhood Educators |
| eDNA | Environmental DNA |
| EDF | Environmental Design Flood |
| EEM | Environmental Effects Monitoring |
| EFAP | Employee Family Assistance Program |
| ELC | Ecological Land Classification |
| END | Endangered |
| EPA | Environmental Protection Act |
| EPC | Exposure Point Concentration |
| EPM | Equivalent Porous Media |
| EPRP | Emergency Preparedness and Response Plan |
| EPT | Ephemeroptera, Plecoptera, and Trichoptera |
| ERA | Ecological Risk Assessment |

| | |
|--------|---|
| ESA | <i>Endangered Species Act, 2007</i> |
| ESC | Erosion and Sediment Control |
| ESG | Environmental, Social, and Governance |
| EV | Electrical Vehicle |
| EZ | East Zone |
| FCM | Federation of Canadian Municipalities |
| FDC | Flow Duration Curve |
| FDP | Final Discharge Point |
| FedNor | Federal Economic Development Agency of Northern Ontario |
| FEQG | Federal Environmental Quality Guidelines |
| FHWA | Federal Highway Administration |
| FMP | Forest Management Plan |
| FMU | Forest Management Unit |
| FMZ | Fisheries Management Zone |
| FNETB | Far Northeast Training Board |
| FPIC | Free, Prior and Informed Consent |
| FPOM | Fine Particulate Organic Matter |
| FQI | Floristic Quality Index |
| FRI | Forest Resources Inventory |
| FRL | Forest Resource Licence |
| FS | Feasibility Study |

| | |
|----------|--|
| FTA | Federal Transit Administration |
| FTE | Full-Time Equivalent |
| FWCA | <i>Fish and Wildlife Conservation Act, 1997</i> |
| GBA Plus | Gender-Based Analysis Plus |
| GCDWQ | Guidelines for Canadian Drinking Water Quality |
| GCM | Global Climate Models |
| GDP | Gross Domestic Product |
| GHB | General Head Boundary |
| GHG | Greenhouse Gas |
| GIS | Geographical Information System |
| GISTM | Global Industry Standards on Tailings Management |
| GLC | Ground Level Concentrations |
| GOC | Government of Canada |
| GRT | Government Review Team |
| GS | Generating Station |
| GWP | Global Warming Potential |
| H:V | Horizontal:Vertical Slope |
| HA | Highly Annoyed |
| HADD | Harmful Alteration, Disruption, Or Destruction |
| HAP | Hazardous Air Pollutants |
| HBC | Hudson's Bay Company |

| | |
|---------|--|
| HCM | Highway Capacity Manual |
| HCT | Humidity Cell Test |
| HDPE | High Density Polyethylene |
| HEC-HMS | Hydrologic Engineering Centre, Hydrologic Modelling System |
| HEP | Habitat Evaluation Procedures |
| HFB | Horizontal Flow Barrier |
| HHERA | Human Health and Ecological Risk Assessment |
| HMSP | Health and Medical Services Plan |
| HQ | Hazard Quotient |
| HSI | Habitat Suitability Indices |
| HU | Habitat Unit |
| HVAC | Heating, Ventilation And Air Conditioning |
| HYDAT | Hydrometric Data |
| HYFRAN | Hydrological frequency analysis |
| Hz | Hertz |
| IA | Impact Assessment |
| IAA | <i>Impact Assessment Act</i> , 2019 |
| IAAC | Impact Assessment Agency of Canada |
| IBA | Impact and Benefit Agreement |
| ICA | Intersection Capacity Analysis |
| ICP-MS | Inductively coupled plasma mass spectrometry |

| | |
|-----------------|--|
| ID | Identification |
| IDF | Intensity Duration Frequency, or Inflow Design Flood |
| IEA | International Energy Agency |
| IEK | Indigenous Ecological Knowledge |
| IEPP | Indigenous Engagement and Partnership Plan |
| IGF | Information Gathering Form |
| IK | Indigenous knowledge |
| ILCR | Incremental Lifetime Cancer Risk |
| IPCC | Intergovernmental Panel on Climate Change |
| IPD | Initial Project Description |
| IPIOM | Interprovincial Input-Output Model |
| IPT | In-Process Tailings |
| ISD | Intersection Site Distance |
| ISO | International Organization For Standardization |
| ISQG | Interim Sediment Quality Guidelines |
| ITRB | Independent Tailings Review Board |
| K | thousand |
| kHz | kilohertz |
| kPa | kilopascal |
| km ² | square kilometres |
| KMGBF | Kunming-Montreal Global Biodiversity Framework |

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| | |
|--------------------------|--|
| kt | kilotonnes |
| kt/d | kilotonnes per day |
| kV | kilovolt |
| kW | kilowatt |
| kWp | kilowatts peak |
| L _d | Daytime Sound Level (Defined as 07:00 – 22:00 by Health Canada) |
| L _{dn} | Day-Night Sound Level |
| LEL | Lowest Effect Level |
| L _{eq (n-hour)} | Equivalent Sound Level Over 'n' Hour(s) |
| LiDAR | Light Detection and Ranging |
| LIO | Land Information Ontario |
| LIO | Land Information Ontario |
| L _{LM} | Logarithmic Mean Sound Level |
| L _{max} | Maximum Sound Level |
| L _n | Nighttime Sound Level (Defined as 22:00 to 07:00 by Health Canada) |
| LNG | Liquefied Natural Gas |
| LOM | Life Of The Mine |
| LOS | Life Of Service |
| LQ | Location quotients |
| LRIA | <i>Lakes and Rivers Improvement Act</i> |
| LRU | Land and Resource Use |

| | |
|-------------------------|---|
| LSA | Local Study Area |
| Lux | Lux (lx), SI unit of illuminance, 1 lux = 1 lumen/m ² |
| M | million |
| m amsl | metres above mean sea level |
| m bgs | metres below ground surface |
| m/s | metres per second |
| m ³ | cubic metres |
| MAF | Mean Annual Flow |
| mag/arcsec ² | Sky Glow in Magnitudes Per Square Arcsecond |
| masl | metres above sea level |
| MBCA | <i>Migratory Birds Convention Act</i> |
| MBR | Migratory Birds Regulations, 2022 |
| MCM | Ministry of Citizenship and Multiculturalism |
| MDL | Method Detection Limit |
| MDMER | Metal and Diamond Mining Effluent Regulations |
| MECP | Ministry of the Environment, Conservation and Parks (formerly Ministry of Energy [MOE]; Ministry of Environment and Climate Change [MOECC]) |
| MEND | Mine Environment Neutral Drainage Program |
| meq | milliequivalent |
| MFL | million fibres per litre |
| Mg | magnesium |

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| | |
|-----------------|---|
| mg/kg dwt | milligrams per kilogram dry weight |
| mg/kg wwt | milligrams per kilogram wet weight |
| mg/L | milligram per litre |
| MGOC | Morris Group of Companies |
| MINES | Ministry of Mines |
| ML | Metal Leaching |
| ML/ARD | Metal Leaching and Acid Rock Drainage |
| mm/s | millimetres per second |
| Mm ³ | million cubic metres |
| MMB | Modelled Mine Boundary |
| MMF | Mean Monthly Flow |
| MMIWG | Missing Murdered Indigenous Women and Girls |
| MND | Ministry of Northern Development |
| MNR | Ministry of Natural Resources (formerly Ministry of Natural Resources and Forestry [MNR]) |
| MNRF | Ministry of Natural Resources and Forestry (now the Ministry of Natural Resources [MNR]) |
| MP | Management Plan |
| MRCA | Mattagami Region Conservation Authority |
| MSA | Mutual Support Agreement |
| MSC | Meteorological Service of Canada |
| Mt | million tonnes |

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| | |
|------------------|-------------------------------------|
| Mt/a | million tonnes per annum |
| MTO | Ministry of Transportation |
| MVA | mega volt amp |
| MWMA | Mine Waste Management Area |
| MZ | Main Zone |
| N/A | not applicable |
| N ₂ O | nitrous oxide |
| NAD | North American Datum |
| NAG | Net Acid Generation |
| NAPS | Nishnawbe Aski Police Services |
| NAPS | National Air Pollution Surveillance |
| n.d. | No date |
| ND | not detected |
| NEH | National Engineering Handbook |
| ng | nanogram |
| NGO | Non-governmental Organization |
| NHIC | Natural Heritage Information Centre |
| Ni | nickel |
| Ni Eq | nickel equivalent |
| NIHB | Non-Insured Health Benefits |
| NIR | National Inventory Report |

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| | |
|-----------------|--|
| NNADAP | National Native Alcohol and Drug Abuse Program |
| NO ₂ | nitrogen dioxide |
| NOAA | National Oceanic and Atmospheric Administration |
| Noble | Noble Mineral Exploration Inc. |
| NOC | National Occupational Classification |
| NORCAT | The Northern Centre for Advanced Technology |
| NO _x | nitrogen oxides |
| NP | Neutralization Potential |
| NPA | <i>Navigation Protection Act</i> |
| NPAG | Not Potentially Acid Generating |
| NPC | Noise Pollution Control |
| NPI | National Pollutant Inventory |
| NPP | Navigable Protection Program |
| NPR | Neutralization potential ratio |
| NPRI | National Pollutant Release Inventory |
| NRCan | Natural Resources Canada |
| NRCS | National Resources Conservation Service (formerly Soil Conservation Service) |
| NSA | Noise Sensitive Area |
| NSE | Nash-Sutcliffe Efficiency |
| NWWG | National Wetlands Working Group |

| | |
|----------------|--|
| O&M | Operation And Maintenance |
| O.Reg. | Ontario Regulation |
| O ₃ | ozone |
| OAHS | Ontario Aboriginal Housing Services |
| OBA | Ontario Butterfly Atlas |
| OBBA | Ontario Breeding Bird Atlas |
| ODWQS | Ontario Drinking Water Quality Standards |
| OFSC | Ontario Federation of Snowmobile Clubs |
| OFNTSC | Ontario First Nation Technical Services Corp. |
| OGS | Ontario Geological Survey |
| OLA | Outdoor Living Area |
| OM | Organic Matter |
| OMAFRA | Ontario Ministry of Agriculture, Food, and Rural Affairs (now referred to as the Ministry of Agriculture, Food and Agribusiness and Ministry of Rural Affairs) |
| OMS | Operations, Maintenance and Surveillance |
| ONR | Ontario Northland Railway |
| ONSA/DVTC | Ontario Network of Sexual Assault/Domestic Violence Treatment Centres |
| ONTC | Ontario Northland Transportation Commission |
| ONWA | Ontario Native Women's Association |
| OP | Official Plan |
| OPP | Ontario Provincial Police |

| | |
|-------|---|
| OPSS | Ontario Provincial Standard Specifications |
| ORP | Oxidation Reduction Potential |
| OSAP | Ontario Stream Assessment Protocol |
| OSSD | Ontario Secondary School Diploma |
| OWIT | Ontario Watershed Information Tool |
| OWRA | Ontario Water Resources Act |
| P/R | Production to Respiration Ratio |
| PA | Project Area |
| PAG | Potentially Acid Generating |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PCIC | Pacific Climate Impacts Consortium |
| PDEM | Provincial Digital Elevation Model |
| PEL | Probable Effect Level |
| PET | Potential Evapotranspiration |
| PHU | Porcupine Health Unit |
| PHV | Peak Hour Volume |
| PIC | Public Information Centre |
| PIEVC | Public Infrastructure Engineering Vulnerability Committee |
| PIN | Project Identification Number |
| PM | Particulate Matter (also referred to as SPM) |
| PM10 | Particulate Matter less than 10 µm in diameter |

| | |
|-------|--|
| PM2.5 | Particulate Matter less than 2.5 µm in diameter. |
| PMP | Probable Maximum Precipitation |
| PoPC | Parameter of Potential Concern |
| PPV | Peak Particle Velocity |
| PRF | Peak Rate Factor |
| PSQG | Provincial Sediment Quality Guidelines |
| PSW | Provincially Significant Wetland |
| PTS | Permanent Threshold Shift |
| PTTW | Permit to Take Water |
| PWQMN | Provincial Water Quality Monitoring Network |
| PWQO | Provincial Water Quality Objectives |
| PWQQ | Ontario Provincial Water Quality Objectives |
| PY | Person Year |
| QA/QC | Quality assurance/quality control |
| qPCR | Quantitative Polymerase Chain Reaction |
| RAC | Railway Association of Canada |
| RBA | Relationship Building Agreement |
| RCM | Regional Climate Model |
| RCP | Representative Concentration Pathway |
| RDL | Reportable Detection Limit |
| RH | Relative Humidity |

| | |
|----------|---|
| RHO | Regional Historical Overview |
| RIV | River Boundary |
| RMS | Root Mean Square |
| RMSE | Root Mean Square Error |
| ROM | Run of Mine |
| ROW | Right-of-Way |
| RPD | Relative percent difference |
| RQD | Rock Quality Designation |
| RSA | Regional Study Area |
| RUSLEFAC | Revised Universal Soil Loss Equation for Application in Canada |
| SACC | Strategic Assessment of Climate Change |
| SADT | Summer Average Daily Traffic |
| SAG | Semi-Autogenous |
| SAR | Species at Risk |
| SARA | <i>Species at Risk Act</i> , 2002 |
| SARO | Species at Risk in Ontario |
| SC | Special Concern |
| SCC | Supreme Court of Canada |
| SCS | Soil Conservation Service (now referred to as Natural Resources Conservation Service) |
| SCWG | Soil Classification Working Group |

| | |
|-----------------|---|
| SDI | Simpson's Diversity Index |
| SEI | Simpson's Evenness Index |
| SEL | Severe Effect Level |
| SFE | Shake Flask Extraction |
| SFL | Sustainable Forest Licence |
| SGHI | Sweetgrass Health Centre |
| SI | Slope Inclinometers |
| SI | International System of Units |
| SIL | Survey Intensity Level |
| SMR | Small Modular Reactor |
| SO ₂ | sulphur dioxide |
| SOCC | Species of Conservation Concern |
| SOMC | Species of Management Concern |
| SOP | Standard Operating Procedure |
| SPA | Source Protection Area |
| SPM | Suspended Particulate Matter (also referred to as PM) |
| SQM-L | SQM-L Sky Quality Meter with Lens |
| S-rank | Provincial Sub-National Rank |
| SSP | Shared Socioeconomic Pathway |
| Stage 1 AA | Stage 1 Archaeological Assessment |
| Stage 2 AA | Stage 2 Archaeological Assessment |

| | |
|-----------------------|--|
| Stage 3 AA | Stage 3 Archaeological Assessment |
| std. dev. (SD) | standard deviation |
| STI | Sexually Transmitted Infections |
| SWH | Significant Wildlife Habitat |
| t | tonnes |
| t CO ₂ e | tonnes of carbon dioxide equivalent |
| t CO ₂ e/y | tonnes of carbon dioxide equivalent per year |
| TAC | Transportation Association of Canada |
| TCU | True Colour Unit |
| TDR | Technical Data Report |
| TEDC | Timmins Economic Development Corporation |
| Testmark | Testmark Laboratories |
| 'the Minister' | Minister of the Environment and Climate Change |
| THR | threatened |
| TIS Guidelines | Tailored Impact Statement Guidelines |
| TKLU | Traditional Knowledge and Land Use |
| TKN | Total Kjeldahl nitrogen |
| TMF | Tailings Management Facility |
| TNM | Traffic Noise Model |
| TOC | Total Organic Carbon |
| TP | total phosphorus |

| | |
|--------|--|
| tpd | tonnes per day |
| TPS | Timmins Police Service |
| TRCC | Truth and Reconciliation Commission of Canada |
| TR-55 | Technical Release for urban hydrology for Small Watersheds |
| TRV | Toxicity Reference Value |
| TSS | Total Suspended Solids |
| TTS | Temporary Threshold Shift |
| TWG | Technical Working Group |
| UNB | University of New Brunswick |
| UNDRIP | United Nations Declaration on the Rights of Indigenous Peoples |
| UNEP | United Nations Environment Programme |
| URT | Upper Risk Threshold |
| US EPA | United States Environmental Protection Agency |
| USACE | US Army Corps of Engineers |
| USDA | United States Department of Agriculture |
| USGS | United States Geological Survey |
| UTM | Universal Transverse Mercator |
| v/c | volume to capacity |
| VC | Valued Component |
| VOC | Volatile Organic Compounds |
| VPA | Victor Power Airport, Timmins |

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| | |
|-------------|---|
| VWP | Vibrating Wire Piezometers |
| WHO | World Health Organization |
| WMO | World Metrological Organization |
| WMU | Wildlife Management Unit |
| WQG | Water Quality Guideline |
| WQG-FAL | Water Quality Guidelines for the Protection of Freshwater Aquatic Life |
| WSC | Water Survey of Canada |
| WSCA | Wildlife Scientific Collector's Authorization |
| wt. % | Percent by Weight |
| WWR | Water Well Record |
| wwt | Wet Weight |
| ZOI | Zone of Influence |
| µg | microgram |
| µg/L | micrograms per litre |
| µm | micrometre |
| µS | microsiemens |
| 2SLGBTQQIA+ | two-spirit, lesbian, gay, bisexual, transgender, queer, questioning, intersex, asexual, and all other sexual orientations and genders |
| 7Q10 | 10-year low flow, 7-day average |
| 7Q20 | 20-year low flow, 7-day average |
| 7Q20 | 7-day low flow, 20-year return period |