



FOX-C Ekalugad Fjord Intermediate DEW Line Site Mid-Station Dump Lobe B “Excavation”





Indian and Northern
Affairs Canada

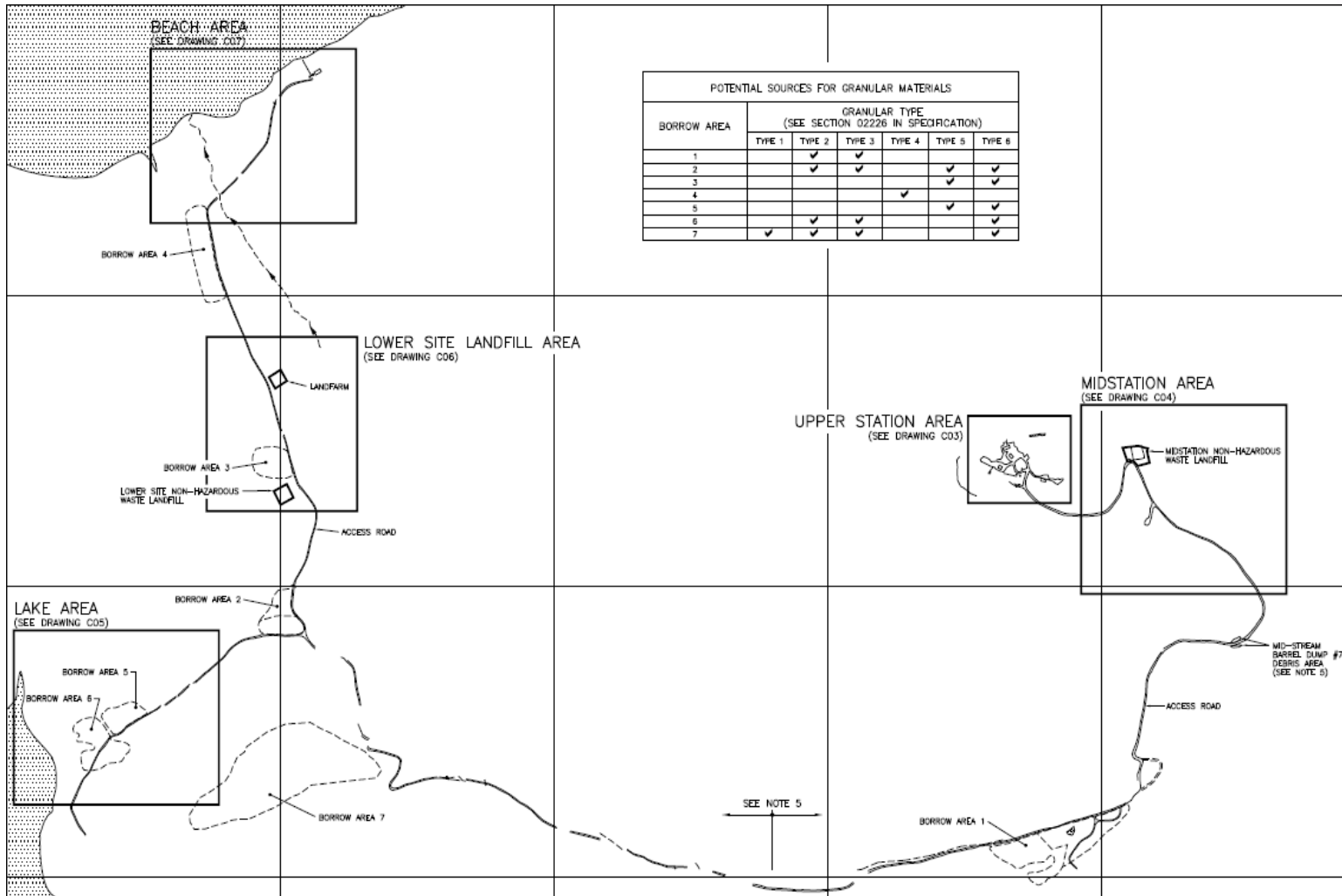
Affaires indiennes
et du Nord Canada

Project Location





Site Overview





Introduction

- Intermediate DEW Line Site built in 1957 and closed in 1963
- Buildings and equipment were abandoned
- Throughout the 1980s & 1990s site assessments were completed to identify the contaminants
- In 2003 the site was identified as a priority by the Federal Contaminated Sites Accelerated Action Plan
- In 2004 INAC completed the final assessment phase





Introduction (continued)

- In June 2005 the camp & remediation contracts were awarded to Qikiqtaaluk Corporation
- In September 2005 equipment was mobilized to site via sealift
- Remediation was completed over 3 field seasons
 - June-September (2006, 2007 & 2008)
- In September 2008 the project was completed and equipment and hazmat were demobilized via sealift





Work Completed

- Community Consultations
- Road repair & construction
- Drum testing, cleaning & disposal
- Removal of hazardous materials from buildings (PCBs & Asbestos)
- Building Demolition
- Construction of non-hazardous waste landfill (NHWL)
- Debris collection and disposal





Work Completed (continued)

- Excavation of contaminated soil
- Landfarm operation
- In-situ landfarm operation (Water Lake)
- **Mid-Station Dump Excavation (Lobe B)**
- Regrading
- Hazmat shipping/disposal





Lobe B Characteristics

- North facing slope
- Elevation of 650-663 metres
- Estimated to be 0.2-3 metres deep (~3400m³)
- Contents unknown (mostly non-hazardous debris)





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Characteristics (continued)





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Characteristics (continued)





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Characteristics (continued)





Lobe B Original Methodology

- Excavate using heavy equipment
 - This was to be completed in steps by removing the surface materials and scraping down to the frozen area, allowing it to thaw, and then repeating the process.
- Once removed the material was to be taken to the Material Processing Area (MPA) sorted, sampled and handled as follows:
 - Non-hazardous debris – placed in the non-hazardous waste landfill (NHWL)
 - Tier I soil – placed in the NHWL (as intermediate fill)
 - Tier II soil – packaged and shipped off site for disposal
 - Hazardous materials – depending on the item it may be treated on site or packaged and shipped off site for disposal



Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Original Methodology (continued)





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Original Methodology (continued)





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Original Methodology (continued)





Lobe B Original Methodology (continued)

- Results
 - Very slow process
 - Material frozen (north slope, 2-3 weeks snow free)
 - Based on the progress made in 2007 projections were made on how long it would take to complete the work remaining at Lobe B
 - It was estimated at around 90 days
 - The typical field season at FOX-C is around 70-75 days
 - **An alternative approach would be required if we wanted to complete the project in 2008**



Lobe B Alternatives

- Alternative approaches considered:
 - Using additional heavy equipment
 - Snow removal early in the season
 - Heating
 - piping system
 - hot air
 - black tarps
 - Addition of salt water
 - Loosening the material with explosives
- These options were reviewed and discussed amongst the project team (INAC, PWGSC, UMA, QC)



Lobe B Alternatives

- Consideration given to:
 - Limited access (Helicopter or Sealift)
 - Available equipment (on-site)
 - Cost
 - Permitting
 - Scheduling

- Upon completing the review it was decided that the use of explosives to loosen the material would give us the best opportunity to complete the project in 2008
 - ✓ Loosening the material with explosives





Lobe B Alternative Methodology

- Procedure was to have a qualified explosives contractor:
 - Drill boreholes at least 1 m deeper than the depth of the material to be loosened (minimum of 1.2 m deep)
 - The quantity of dynamite to be used for each blast was to be adjusted on-site but a general rule of thumb was to use 0.5 kg of dynamite per cubic metre of material
- Once loosened the material was to be excavated and sorted
 - Non-hazardous debris to go directly to the NHWL
 - Soil trucked to a Material Processing Area (MPA)
 - Thawed, sorted & sampled
 - Any hazardous materials identified were to be packaged and disposed of as per proper procedures
- Disposal procedures were the same as originally plan



Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Alternative Methodology (continued)





Lobe B “Blasting Plan”

- Comprehensive “Blasting Plan” was developed. It included information and procedures for:
 - Transportation of dynamite (1,700 kg) & blasting caps (50 kg)
 - Dewar Lakes then to FOX-C (plane/helicopter)
 - Storage of dynamite & blasting caps at site
 - Two empty barge containers lined with wood (one for dynamite & one for blasting caps) placed at least 15 m apart, marked with all required warning panels
 - Located near the lake, over 2 km from the camp (regulations require storage at least 1,600 m from camp)
 - Locked at all times



Lobe B “Blasting Plan” (continued)

- Work method
- Handling of unused explosives
- Identification of risks and mitigative measures
 - Special precautions for drilling
 - Spill response team & spill kits
 - Booms, absorbent, pump, empty drums
 - Spill containment area set up below the work area
 - Monitored during drilling operations & for 1 hour following all blasts
 - Spill team, kits, and containment area were designed to be able to deal with most likely worst case scenario:
 - Instantaneous release of 5 full drums of hazardous materials



Permits and Licences

- Blasting Permits (including storage, transportation & handling) were held by Kudlik Construction
- Land Use Permit
 - Amendment application submitted
 - Nunavut Impact Review Board (NIRB) distributed the request to interested parties and communities for review & comment
 - Approval received
 - Terms & conditions of the original licence still applicable
 - New requirement added regarding the Transportation of Dangerous Goods (TDG)



Results

- Schedule
 - Blasting & excavating (~16 days)
 - Sampling including confirmatory (~8 days)
 - Sorting & packaging (~24 days)
 - Landfilling (~40 days)
 - Regrading & reshaping (~6 days)
 - Total ~50 days





Results (continued)

- Blasting Process & Information
 - Started at top centre of area, then worked around the edges & down the slope
 - 4 blast events were completed
 - Each followed by 2-3 days of excavation
 - ~800 kg of explosives used
 - No spills or incidents





Results (continued)

- Total volume of material removed was ~2,200 m³
 - Most non-hazardous debris went directly to NHWL
 - 51 piles of soil created in the MPAs
 - Non-hazardous = ~900 m³
 - Tier I = ~200 m³
 - Tier II = ~500 m³
 - Hazmat = ~20 m³





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Before & After Pictures





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Before & After Pictures





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Before & After Pictures





Indian and Northern
Affairs Canada

Affaires indiennes
et du Nord Canada

Lobe B Before & After Pictures





Acknowledgements

- Cathy Corrigan UMA Engineering
- Rob Nichol UMA Engineering
- Greg Johnson Qikiqtaaluk Corporation
- Brad Thompson Public Works and Government Services
Canada