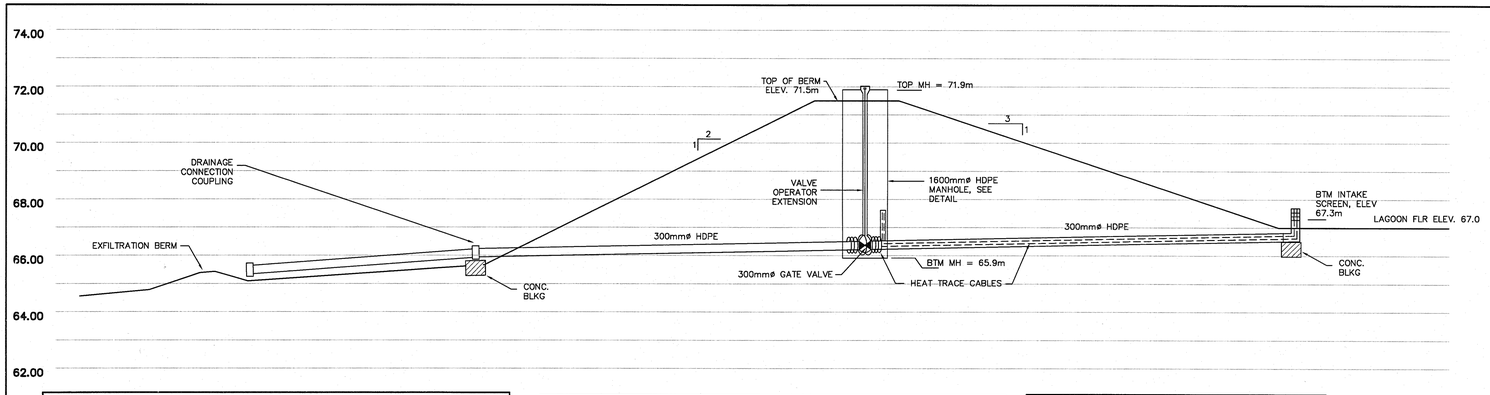
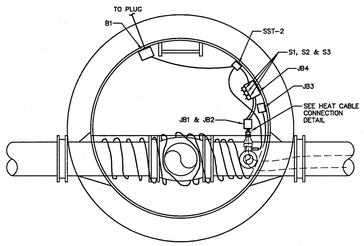
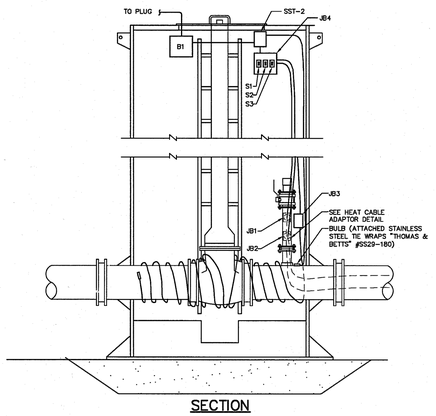




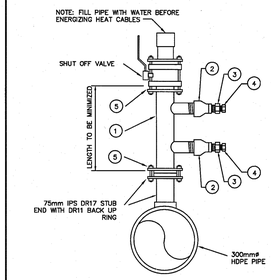
PLAN VIEW



SECTION

MANHOLE DETAIL
NTS

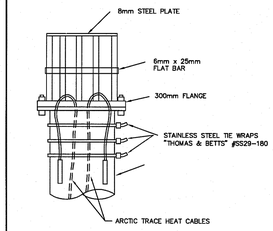
NOTE:
INSTALL HEAT TRACING CABLE AND COMPONENTS ACCORDING TO MANUFACTURER RECOMMENDATIONS.



MATERIALS BY FUSIONEX

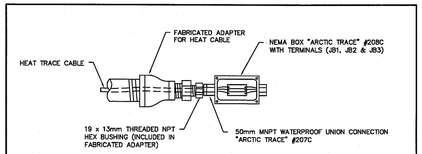
1. FABRICATED STAINLESS STEEL 304 GAUGE 11 TRANSITION TO INSERT HEAT CABLES
2. 50 x 32mm THREADED NPT REDUCER SS 304
3. 32 x 19mm THREADED NPT HEX BUSHING SS 304
4. 19 x 13mm THREADED NPT HEX BUSHING SS 304
5. BACK UP RING AND BOLTS

HEAT CABLE ADAPTER DETAIL
NTS

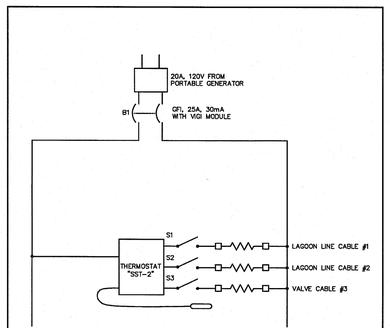


INTAKE SCREEN DETAIL
NTS

NOTE: HEAT TRACE CABLES TO BE TIE WRAPPED TO EXTERIOR OF INTAKE PIPE



HEAT CABLE CONNECTION DETAIL
NTS



HEAT TRACE SCHEMATIC
NTS

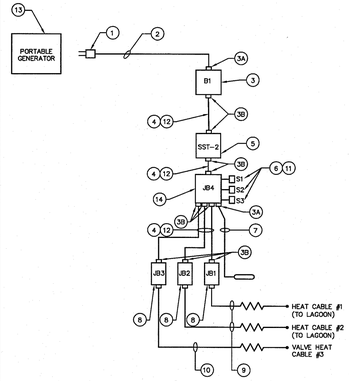
RECOMMENDED OPERATION

A TOTAL OF 3 HEAT TRACE CABLES ARE PROVIDED:

ONE CABLE IS PROVIDED AROUND THE EXTERIOR OF THE VALVE AND PIPE WITHIN THE MANHOLE, ENERGIZE THIS CABLE ONLY AFTER THE LAGOON DRAINAGE PIPE IS FREE OF ICE.

TWO CABLES ARE ALSO PROVIDED WITHIN THE LAGOON DRAINAGE PIPE, EACH BEING ADEQUATELY DESIGNED TO THAW THE ICE WITHIN IT.

ENERGIZE THE SECOND LAGOON DRAINAGE HEAT TRACE CABLE ONLY WHEN THE FIRST IS INSUFFICIENT TO THAW THE ICE WITHIN A REASONABLE LENGTH OF TIME



HEAT TRACE WIRING DIAGRAM
NTS

PARTS LIST

1	MALE PLUG 120V 15/20A	1	1
2	FLEXIBLE CABLE "CABTIRE" HEAVY DUTY 2 #12	10 METRES	1
3	GFI BREAKER 25A "SCHEIDER" TYPE C60 WITH IECL RATED C60 VIGI MODULE MOUNTED ON DIN RAIL IN NEMA 4X JUNCTION BOX 200x200x100mm	1	
3A	FLEXIBLE CORD CONNECTOR, T&B CI-SLR-21-04	2	
3B	FLEXIBLE METALLIC "LIQUID TIGHT" CONDUIT CONNECTOR, T&B C161-04	10	
4	19mm FLEXIBLE METALLIC "LIQUID TIGHT" CONDUIT	40m	
5	ADJUSTABLE HEAT TRACING THERMOSTAT (-40 to 55°C)	1	3
6	MANUAL ON/OFF SWITCH INCLUDING THE FOLLOWING PASS AND SEYMOUR COMPONENTS: BOX MBP23, SWITCH PS20AC2-MP, COVER 4515-FS	3	2
7	CABLE, NEC CLASS 2 CCT FOR TEMPERATURE SENSOR	1	3
8	NEMA BOX "ARCTIC TRACE" #208C WITH TERMINALS	3	3
9	HEAT TRACE CABLE FOR LAGOON TO MANHOLE DISCHARGE LINE, ARCTIC TRACE #2120512SSTL, 5 WATT/m 120VAC, WT ONE END FACTORY SEALED WITH #305C END SEAL	2 CABLES OF 25m	3
10	HEAT TRACE CABLE FOR EXTERIOR OF PIPE AND VALVE ARCTIC TRACE #2120512SSTL, 5 WATT/m 120VAC, WITH ONE END FACTORY SEALED WITH #305C END SEAL	15m	3
11	IDENTIFICATION OF HEAT CABLE SWITCHES	3	
12	#12 AWG WIRE	AS REQ'D	
13	20A, 120V PORTABLE GENERATOR	1	
14	NEMA 4X JUNCTION BOX, SIZED TO SUIT	1	

NOTES

1. ITEMS 1 AND 2 ARE TO BE STORED IN THE MANHOLE AND BROUGHT OUTSIDE TO CONNECT TO PORTABLE GENERATOR OUTSIDE
2. SHOP MOUNT SWITCHES ON THE JB4, PROVIDE ALL REQUIRED HARDWARE
3. MANUFACTURER: DU ALASKA INC. GREENWOOD ST., #1
   ANCHORAGE ALASKA 99518
   PHONE: (907) 522-3004
   FAX: (907) 349-1023
   EMAIL: DUALASKA@ALASKA.NET

HEAT CABLES SPECIFICATION

HEAT CABLES #1 & #2 HEAT TRACING CABLE (50m).
DISTANCE ON DRAWING = 25m

HEAT CABLES TO BE "ARCTIC TRACE" #2120512SSTL 5 WATTS/m, 120 VAC, ONE END TERMINATED AT FACTORY WITH #305C END SEAL.

HEAT CABLES AND ACCESSORIES CAN BE PURCHASED FROM:

DU ALASKA INC.
6706 GREENWOOD ST., #1
ANCHORAGE ALASKA 99518
PHONE: (907) 522-3004
FAX: (907) 349-1023
EMAIL: DUALASKA@ALASKA.NET

SPECIFICATION FOR ELECTRICAL WORK

GENERAL

1. THIS SPECIFICATION COVERS ALL ELECTRICAL WORK AND CONTROL WIRING FOR THE SUPPLY AND INSTALLATION OF ELECTRICAL HEAT TRACING FOR THE LAGOON DISCHARGE LINE.
2. ALL ELECTRICAL WORK AND CONTROL WIRING IS THE RESPONSIBILITY OF THE CONTRACTOR. THE FABRICATED ADAPTER FOR THE HEAT CABLE IS TO BE SUPPLIED BY THE CONTRACTOR.

CODES AND STANDARDS

1. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST CSA EDITION AND THE LOCAL ELECTRICAL CODE EXCEPT WHERE SPECIFIED OTHERWISE.

SHOP DRAWINGS, PRODUCTS DATA AND SAMPLES

1. SUBMIT SHOP DRAWINGS AND PRODUCT DATA TO ENGINEER IN PDF FORMAT
2. INDICATE DETAILS OF WIRING DIAGRAMS, CONSTRUCTION, DIMENSIONS, CAPACITIES, WEIGHTS AND ELECTRICAL PERFORMANCE CHARACTERISTICS OF EQUIPMENT OR MATERIAL.

OPERATION AND MAINTENANCE DATA

1. PROVIDE OPERATION AND MAINTENANCE DATA FOR INCORPORATION INTO MAINTENANCE MANUAL.
2. PROVIDE 3 COPIES OF OPERATION AND MAINTENANCE DATA.
3. DATA TO INCLUDE DETAILS OF DESIGN ELEMENTS, CONSTRUCTION FEATURES, COMPONENT FUNCTION AND MAINTENANCE REQUIREMENTS TO PERMIT EFFECTIVE STARTUP, OPERATION, MAINTENANCE, REPAIR, MODIFICATION, EXTENSION AND EXPANSION OF ANY PORTION OR FEATURE OF INSTALLATION.
4. TECHNICAL DATA IS TO INCLUDE PRODUCT DATA, SUPPLEMENTED BY BULLETINS, COMPONENT ILLUSTRATIONS, EXPLODED VIEWS, TECHNICAL DESCRIPTIONS OF ITEMS AND PARTS LISTS. ADVERTISING OR SALES LITERATURE NOT ACCEPTABLE.
5. WIRING DIAGRAMS ARE TO BE INCLUDED AS PART OF OPERATION AND MAINTENANCE DATA.
6. NAMES AND ADDRESSES OF LOCAL SUPPLIERS OF COMPONENTS TO BE INCLUDED IN MAINTENANCE MANUALS

MAINTENANCE MATERIALS

1. PROVIDE MAINTENANCE MATERIALS LIST IN MAINTENANCE MANUAL.

OPERATION AND STARTUP

THE FOLLOWING ITEMS SHALL BE COMPLETED AS A MINIMUM, TO ENSURE THAT THE WORK SHALL BE FREE OF DEFECTS AND FLAWS

1. PROVIDE INSTRUCTION TO ONSITE OPERATING PERSONNEL IN THE OPERATION CARE AND MAINTENANCE OF EQUIPMENT
2. PROVIDE ONE SET OF MARKED UP DRAWINGS TO THE ENGINEER FOR PREPARATION OF AS-BUILT DRAWINGS.

VOLTAGE RATINGS

1. OPERATING VOLTAGES: TO CSA ELECTRICAL CODE C22.2

MATERIALS AND EQUIPMENT

1. EQUIPMENT AND MATERIAL TO BE NEW, CSA CERTIFIED, AND MANUFACTURED TO STANDARDS QUOTED IN ORDER TO MEET THE PERFORMANCE SPECIFIED
2. WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT THAT IS NOT CSA CERTIFIED, OBTAIN SPECIAL APPROVAL FROM THE AUTHORITIES HAVING JURISDICTION.
3. CONTROL PANELS AND COMPONENT ASSEMBLIES TO BE FACTORY ASSEMBLED

FINISHES

1. CLEAN AND TOUCH UP SURFACES OF SHOP-PAINTED EQUIPMENT SCRATCHED OR MARRED DURING SHIPMENT OR INSTALLATION TO MATCH ORIGINAL PAINT
2. CLEAN, PRIME AND PAINT EXPOSED HANGERS, RACKS AND FASTENINGS TO PREVENT RUSTING.

EQUIPMENT IDENTIFICATION

1. IDENTIFY ELECTRICAL EQUIPMENT WITH NAMEPLATES
2. NAMEPLATES: LAMICOID 3mm THICK PLASTIC ENGRAVING SHEET, BLACK FACE, WHITE CORE, SELF-ADHESIVE UNLESS SPECIFIED OTHERWISE

   NAMEPLATE SIZES SIZE 1: 12 x 50mm 1 LINE 3mm HIGH LETTERS
   SIZE 2: 19 x 90mm 1 LINE 6mm HIGH LETTERS

WIRING IDENTIFICATION

1. IDENTIFY WIRING WITH PERMANENT INDELIBLE IDENTIFYING MARKINGS WITH EITHER NUMBERED OR COLORED PLASTIC TUBES ON BOTH ENDS OF PHASE CONDUCTORS OF FEEDERS, BRANCH CIRCUIT WIRING AND CONTROL WIRING. GUMMED TAPE IS UNACCEPTABLE
2. COLOUR CODE: TO CSA

WIRING TERMINATIONS

1. LUGS, TERMINALS AND SCREWS USED FOR TERMINATION OF WIRING TO BE SUITABLE FOR COPPER.

MANUFACTURERS AND CSA LABELS

1. MANUFACTURERS NAMEPLATES AND CSA LABELS TO BE VISIBLE AND LEGIBLE AFTER EQUIPMENT IS INSTALLED

WARNING SIGNS

1. PROVIDE WARNING SIGNS, AS PER CSA FOR EACH HEAT CABLE. YELLOW TAGS SHALL BE SUPPLIED BY THE HEAT CABLE SUPPLIER

MOUNTING HEIGHTS

1. MOUNTING HEIGHT OF EQUIPMENT IS FROM FINISHED FLOOR TO CENTRELINE OF EQUIPMENT UNLESS SPECIFIED OR INDICATED OTHERWISE.

CONDUIT AND CABLE INSTALLATION

1. INSTALL FLEXIBLE 'LIQUID TIGHT' CONDUITS INSIDE MANHOLE AND ANCHOR TO MANHOLE WALLS, ENSURING THE SCREWS DO NOT PERFORATE HDPE WALLS

TESTING

1. MEGGER ALL HEAT TRACE CABLES BEFORE AND AFTER PULLING INTO THE WATER LINES.
2. MEGGER TEST CIRCUITS, FEEDERS AND EQUIPMENT UP TO 350V WITH A 500V INSTRUMENT.
3. TEST OPERATION OF HEAT TRACING CONTROLS BY SIMULATION OF A FROZEN LINE WHILE MEASURING CURRENT ON HEAT CABLE
4. PROVIDE INSTRUMENTS, METERS, EQUIPMENT AND PERSONNEL REQUIRED TO CONDUCT TESTS DURING COMMISSIONING.
5. SUBMIT TEST RESULTS TO THE ENGINEER.
6. ENSURE CIRCUIT PROTECTIVE DEVICES SUCH AS OVER CURRENT TRIPS, RELAYS, AND FUSES ARE INSTALLED TO THE VALUES AND SETTINGS AS INDICATED.

CLEANING

1. PERFORM A FINAL CLEANING UPON COMPLETION OF THE WORK
2. REMOVE ALL DEBRIS FROM INSIDE OF MANHOLE AND FROM THE PROJECT SITE

SCOPE OF WORK

1. THE PERFORMANCE SPECIFICATION PRESENTED COVERS THE DESIGN, SUPPLY, FABRICATION, INSTALLATION AND STARTUP OF THE FOLLOWING WORKS: INSTALLATION OF HEAT TRACING CABLES IN THE LAGOON DISCHARGE LINE.
   - -USE FISHING EQUIPMENT TO PULL THE HEAT TRACING CABLES THROUGH THE PIPES
   - -ATTACH THE HEAT CABLES TO THE INTAKE SCREEN IN THE LAGOON
   - -INSTALL THE FABRICATED ADAPTER FOR HEAT CABLE AND PULL THE HEAT CABLE THROUGH
   - -TEST THE HEAT CABLE AND MEGGER TEST BEFORE CUTTING THE HEAT CABLE TO THE CORRECT LENGTH
   - -INSTALL THE CONTROLLERS, SENSORS WIRING AND JUNCTION BOXES.
   - -TEST THE WHOLE SYSTEM WITH THE PORTABLE GENERATOR

DEFINITION OF AREAS

1. MANHOLE: WET LOCATION: CORROSION PROOF EQUIPMENT REQUIRED

CONDUITS, FITTINGS, JUNCTION BOXES AND FASTENERS

1. ALL CONDUITS IN THE MANHOLE SHALL BE LIQUID TIGHT, NON-METALLIC.
2. CONDUIT FASTENERS TO BE RUST PROOF.

POWER AND CONTROL WIRING

1. ALL POWER WIRES TO BE RW90 OR T90 NYLON
2. ALL WIRES TO BE COPPER
3. ALL CONDUCTORS TO BE STRANDED TYPE
4. WIRES AND CABLES TO BE IDENTIFIED WITH EQUIPMENT NUMBER, AS DETAILED ON THE LIST OF CONTROL AND SENSOR POINTS. USE THERMO ENGRAVED TUBES.

GROUNDING

1. EQUIPMENT AND CIRCUITS TO BE GROUNDED AS PER ELECTRICAL SAFETY CODE

HEAT TRACING EQUIPMENT

1. ALL PARTS RELATED TO THE HEAT TRACING ARE SPECIFIED ON THE DRAWINGS

No.	Issue / Revision	Date
1	Client Review and Approval (Detailed Design)	Feb 10, 2006
2	Client Review and Approval (Construction Documents)	Apr 13, 2006
3	Client Review and Approval (Construction Documents)	May 8, 2006
4	Issued for Tender	Jun 6, 2006
5	Redesign of Discharge Arrangement	May 15, 2009
6	As Built	January 2010

NOTE: AS-BUILT
This drawing has been prepared by "Nuna Burnside Engineering and Environmental Ltd." based solely on information provided by a third party that reflects the constructed conditions of the system and is believed to be correct. Those relying on this information are advised to obtain independent verification as to its accuracy before applying it for any purpose.

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Client
GOVERNMENT OF NUNAVUT
COMMUNITY AND
GOVERNMENT SERVICES
P.O. BOX 379
POND INLET, NUNAVUT
X0A 0S0

Drawing Title
WATER RESERVOIR, SEWAGE LAGOON AND LANDFILL IMPROVEMENTS
QIKIQTARJUAQ, NUNAVUT
SEWAGE LAGOON DETAILS

Drawn By	Checked By	Drawing No.
J. Randall	M. O'Hara / M. Paznar	10
Scale: N.T.S	Project No.: N-0 09439	

W:\FOE08983 SEWAGE LAGOON DETAILS_AA5192.dwg
Oct 21, 2010 - 11:30am