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INDIAN AND NORTHERN AFFAIRS
CANADA

GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

VOLUME 2: ISLAND INVENTORY

FINAL REPORT

MARCH 1995

KLOHN-CRIPPEN

PA 2695 0301

KLOHN-CRIPPEN

Our File: PA 2695 0301
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March 31, 1995

Indian and Northern Affairs Canada
Les Terrases de la Chaudière
Ottawa, Ontario
K1A 0H4

Mr. Bob Gowan

GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

Dear Mr. Gowan:

We are pleased to submit 25 copies of Volume 2 of our report on the Granular Resource Potential of Beaufort Artificial Islands. This volume contains paper copies of information collated for the artificial island inventory.

This report should be read in conjunction with Volume 1, titled Main Report and dated March 31, 1995.

Yours very truly,

KLOHN-CRIPPEN CONSULTANTS LTD.

Brian T. Rogers, P.Eng.
Director, Geotechnical Division

BTR/ll
Encls. (25)

INDIAN AND NORTHERN AFFAIRS CANADA

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Klohn-Crippen

GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

VOLUME 2 : ISLAND INVENTORY

PREPARED FOR

INDIAN AND NORTHERN AFFAIRS, CANADA

PREPARED BY

KLOHN-CRIPPEN CONSULTANTS LTD.

IN ASSOCIATION WITH

B.D. WRIGHT & ASSOCIATES
CHALLENGER SURVEYS & SERVICES
CANADIAN SEABED RESEARCH

PA 2695 03 01

MARCH 1995
UPDATE OF MARCH 1993

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1. INTRODUCTION

1.1 Study Objectives

Since the early 1970's, approximately 40 million cubic metres of granular material have been dredged within the Canadian Beaufort continental shelf to create artificial islands or subsea berms for caisson retained islands and drilling barges. These islands were constructed to provide temporary drilling structures for hydrocarbon exploration. Upon completion of exploratory drilling and after removal of equipment and consumables, these islands have generally been abandoned to natural erosion, or partially scalped and reused at alternate exploration sites.

The purpose of this study was to provide the following:

- An up-to-date and easily accessible summary of the location, type, quantity and quality of granular materials present in the artificial islands and berms in the area of the Canadian Beaufort Sea bounded by latitudes 69° and 70°30' North, and longitudes 131° and 137° West.
- Selected examples of island erosion and sediment transport rates which can illustrate the importance of material type, water depth range, and environment conditions on the potential change in the resource potential of the artificial islands with time.
- An evaluation of the constraints to possible utilization of these granular materials as a resource for future development in the Canadian Beaufort Sea.

This study was carried out on behalf of the Department of Indian and Northern Affairs, Canada, as part of the Northern Oil and Gas Action Program (NOGAP) Project A4 - Granular Resources Inventory and Management. One of the main factors in the evaluation of potential changes in the resource potential of the islands over time is information on island erosion dynamics. This topic is also of interest to the Geological Survey of Canada (GSC), from the perspective of utilization of island erosion information for estimating regional sediment transport rates and directions. Therefore, the GSC provided partial funding, under the Panel on Energy Research and Development (PERD) Committee 6.3.1 - Beaufort Offshore Geotechnics, for the study.

Mr. Bob Gowan was the scientific officer for the project and terms and conditions for the contract are outlined in Contract 38ST.A7134-2-0039. The work was carried out by a project team comprised of Klohn-Crippen Consultants Ltd. as project manager, with specialist input from B.D. Wright and Associates, Challenger Surveys and Services Ltd. and Canadian Seabed Research. Mr. Steve Blasco of the Geological Survey of Canada also provided direction for this work, in particular for the work on island erosion dynamics.

1.2 Organization of Report

The results from this study are presented in three volumes. Volume 1 titled "Main Report" presents a summary of the work carried out during the project. Section 1 provides an introduction to the study, and Section 2 presents an historical overview of island construction in the Canadian Beaufort Sea highlighting significant incidents which occurred during the period. Section 3 describes the granular resource inventory of the artificial islands, and summarizes the use of the Infocus/Quickmap/FoxPro2 software. The appropriate electronic data disks for Infocus/Quickmap/FoxPro2 data reporting are contained in the Appendix. Section 4 introduces regional environmental conditions in the continental shelf, and the effect of ice and waves on the erosion of the islands. A summary of island erosion dynamics is given in Section 5. Project conclusions and recommendations are presented in Section 6.

Volume 2 (this volume) contains a hard copy summary of information entered into the database. Section 1 provides the introduction to the project. Section 2 presents the database and discusses the use of FoxPro2 and Infocus/Quickmap. Section 3 summarizes the availability of granular resources in the artificial islands. Separate sections are then provided in Appendix I for each of the 37 artificial islands summarizing available information.

Volume 3 is the report by Canadian Seabed Research on island erosion dynamics entitled "Sediment Transport at Artificial Island Sites, Canadian Beaufort Sea". A study of selected islands over time was used to determine potential changes to the resource

potential of the old artificial islands. This information is also useful for estimating regional sediment transport rates and directions.

1.3 Information Search

Data gathering for this project was undertaken during the period January to March 1993. A list of sources of information is presented in Table 1, together with the contact name and telephone number. The most complete sources of data remain the operators files, in particular Esso Resources, Gulf Canada and Amoco. For this project, only the Gulf

Table 1 - Information Sources

Agency/Company	Contact/Phone Number
1. National Energy Board (NEB) Calgary, Alberta	Mr. Stephen Lord (403) 299-2797
2. Department of Fisheries & Oceans Sidney, B.C.	Mr. Brian Smiley (604) 363-6551
3. Department of Indian and Northern Affairs Canada Yellowknife, NWT	Mr. Jim Umpherson (403) 920-8184
4. Environmental Protection Service (EPS) Yellowknife, NWT	Ms. Laura Johnson (403) 873-3456
5. Canadian Hydrographic Services (CHS) Sidney, B.C.	Mr. Dan Dobson (604) 363-6360
6. Imperial Oil Resources Ltd. Calgary, Alberta	Mr. Peter Meyer (403) 237-2139
7. Gulf Canada Resources Ltd. Calgary, Alberta	Mr. Ken Gaida (403) 233-3949
8. Amoco Canada Ltd. Calgary, Alberta	Mr. Kevin Hewitt (403) 298-3500
9. Challenger Surveys & Services Ltd. Calgary, Alberta	Mr. Dave Thomson (403) 253-8101
10. CES Surveys Ltd. Edmonton, Alberta	Mr. Rae Sutherland (403) 438-1336
11. Zeeland Ltd. (ex. Volker Stevin) Calgary, Alberta	Mr. John Wainwright (403) 234-7890

data has been looked at in detail. Due to heavy work loads at Esso, permission to directly access Esso reports had not been obtained by the end of March 1993. However Esso have made available the information obtained from surveys of old islands in 1990. This data set is a major input for the assessment of the granular resource potential of the abandoned islands.

The Canadian Hydrographic Service (CHS) in Sydney, B.C. was requested for an inventory of bathymetric data available from their records. The CHS mission was to survey navigable waters for the purpose of identifying hazards which may exist to vessels in the area. Information available at each island site largely consists of a minimum depth and location. Limited bathymetric detail of each site is available from this source.

Data was also obtained from existing government reports, conference proceedings and engineering literature. The key documents that provided background information included:

- EBA Engineering Consultants et al, 1984. Abandonment of Offshore Artificial Islands in the Beaufort Sea. Report submitted to Environmental Protection Services, Environment Canada.
- Taylor, DA, Reed MG, Simley BD and Floyd GS, 1985. Arctic Industrial Activities Compilation Volume 1. Beaufort Sea: Marine Dredging Activities 1959 to 1982. Canadian Data Report of Hydrography and Ocean Sciences No. 32 (Vol. 1)
- Shinde SB, Crooks, JHA, James DA and Williams Fitzpatrick S, 1986. Geotechnical Design for Beaufort Sea Structures. 3rd Canadian Conference on Marine Geotechnical Engineering, St. John's, Newfoundland.
- Jefferies MG, Rogers BT, Stewart HR, Shinde S, James D and William Fitzpatrick S, 1988. Island Construction in the Canadian Beaufort Sea. ASCE Specialty Conference on Hydraulic Fill Structures, Fort Collins, Colorado. Geotechnical Special Publication No. 21.

2. DATABASE

This study has documented 37 artificial islands that have been constructed in the Canadian Beaufort Sea between 1972 and 1989, as summarized in Table 2. The location plan for the islands is presented as Figure 1.

A database of information on the artificial islands was developed using Infocus/Quickmap/FoxPro2 software. Information on the database, and the magnetic disks are contained in Volume 1 of this report. Hard copy information contained within this artificial islands inventory is presented for each island in this volume.

The information within the FoxPro2 database has been summarized on two sheets for each island entry. The information entered is discussed below.

Island Identification

- The first line on both sheets identifies the site name, the operator, the original water depth at the site, and a reference number for the island.

Location

- The island centre location is also provided on both sheets in both UTM Zone 8 coordinates and geographic latitude and longitude.

Island Type

- Identifies the type of island constructed at the site, as discussed in Section 2.

Construction Method

- A brief description of the construction method is included in the database. Only the first part of the description is shown on the data sheet.

Borrow Site

- All locations used as borrow sources are identified, starting with the source providing the majority of the granular material.

Fill Material

- Again a listing of material types is entered, starting with the most common material type. This is followed by the range of material D_{50} and fines content.

Island Dimensions

- Information on island geometry, freeboard and total fill quantity has been entered for each available survey. Not all the data from each survey has been disseminated at this time.

Description

- This section contains a brief historical description of the island construction sequence, the drilling activities, and notes any significant occurrences at the site.

Dates

- When available, dates have been entered for the construction period, the date of rig release after drilling, and for abandonment of the island.

Seabed Conditions

- Site conditions have been summarized in terms of physiographic region and surficial soil types. An entry line has been provided for the identification of the nearest borehole, which it is understood can be accessed through another DIAND database.

Ice Zone

- Defines the ice environment characterizing the particular island or berm location in winter (i.e. landfast or transition zone). Very shallow locations (2 m or less) have been identified as being in the bottom fast ice zone, since the ice grows to the seafloor.

Freeze-Up

- The median, twenty and eighty percentile dates when new ice greater than 5/10ths in concentration covers the general vicinity of the location, established from 15 years of AES ice chart information (1977 to 1991).

Landfast Ice Occurrences

- The approximate time period is given when landfast ice normally stabilizes at the locations.

Rubble Formation and Extent

- Whether grounded rubble formations are commonly seen at these locations and their extent, based upon a review of SAR and SLAR imagery that is available during the fall and winter periods and on various field observations collected over a number of years.

- The small, moderate and large rubble extent categories refer to approximate rubble field widths of tens of metres, one hundred to several hundred metres and more than several hundred metres, respectively.

Exposure to Significant Moving Winter Ridge Keels

- An indication of the potential for significant scour action from moving ice during the winter period is given in qualitative "risk" categories which include insignificant, low, moderate and high.

Break-Up

- The median, twenty and eighty percentile dates when ice concentrations fall to 3/10ths or less in the general vicinity of the location, established from 15 years of AES ice chart information (1977 to 1991).

Open Water Days

- The median number of days of open water at the island location.

Summer Ice Intrusions

- The number of years (in 15) that significant ice intrusions have occurred in the vicinity of the location, defined as ice concentrations of 5/10th or more, comprised of thick first year, second year or old ice types. Again, these major ice intrusion "statistics" are based upon AES ice chart information from 1977 to 1991.

Wave Conditions

- Exposure to extreme storm waves is presented qualitatively as low, medium and high exposure categories, which are largely based upon wave height limitations related to wave breaking.

- Storm wave events were defined by measured significant wave height occurrences that exceeded 2 m in the general region. The available information base covered the 1974 to 1988 period, with the number of storm events experienced by each island or berm specified as the number of storm events over its lifetime until the end of the 1988 open water season.

Reference Numbers

- The lease, license and COGLA file number is entered as the final data entry. Data on the lease number has not yet been received from DIAND Yellowknife.

The two page summary of data entered in FoxPro2 is followed by a schematic cross section of the island. This figure is in DXF AutoCAD format, and is presently not in the Infocus/Quickmap system.

All available contour information has been entered into the Infocus/Quickmap system. These are presented as figures identified by the island number (for example Itiyok I-27 is number 24) and A for the earliest survey, B for the next date, continuing on until the 1990 survey data.

3. INVENTORY OF GRANULAR RESOURCES

The estimated as built fill quantities used in island construction and the respective borrow sources are summarized in Table 3. A summary of approximate quantities of granular material remaining in abandoned islands is presented in Table 4.

This study has identified that approximately four (4) million cubic metres of sand and gravel are available as a resource in three of the abandoned offshore islands, Tarsiut N-44, Nipterk I-19 and Minuk I-53. An additional 200,000 m^3 of gravel is present in four

older gravel filled islands constructed in the 1970's. Seven (7) million cubic metres of Ukalerk type sand are available in eight (8) of the abandoned berms that were used for the CRI, Molikpaq and SSDC deployments. This material represents a delineated source of high quality sand that can be readily used for future construction activities related to exploration or development in the Canadian Beaufort Shelf.

Fourteen (14) million cubic metres of finer gradation sandfill remain in place in sandbag retained and sacrificial beach abandoned islands. This material was typically obtained from local borrow sources, and is not likely to be transported for use in construction of islands at new exploration sites. However, the sandfill does represent a valuable base resource for potential development at each of the individual exploration sites.

Yours very truly,

KLOHN-CRIPPEN CONSULTANTS LTD.

Signature
Date Mar 31/95
PERMIT NO. P 438
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Marcia E. MacLellan, P.Eng.
Geotechnical Engineer

for Brian T. Rogers, P.Eng.
Director, Geotechnical Division

BTR/ll

Table 2 - Summary of the Canadian Beaufort Artificial Islands

No	Island Name	Island Type	Latitude	Longitude	Water Depth (m)	Construction Date
1	Immerk B-48	Sacrificial Beach Island	69.618972	135.180750	3.0	1972-73
2	Adgo F-28	Sandbag Retained Island	69.454611	135.854388	2.1	1973
3	Pullen E-17	Gravel Fill Island	69.771111	134.328055	1.5	1973-74
4	Unark L-24	Gravel Fill Island	69.558389	134.616694	1.3	1973-74
5	Pelly B-35	Barge Cored Island	69.569722	135.390833	2.0	1974
6	Netserk B-44	Sandbag Retained Island	69.550833	135.932778	4.6	1974
7	Adgo P-25	Sandbag Retained Island	69.415833	135.841667	1.5	1974
8	Adgo C-15	Gravel Fill Island	69.403611	135.817500	1.5	1975
9	Netserk F-40	Sandbag Retained Island	69.656389	135.905833	7.0	1975
10	Sarpik B-35	Gravel Fill Island	69.401944	135.386111	4.3	1975-76
11	Ikkatok J-17	Sandbag Retained Island	69.277944	136.303611	1.5	1975
12	Kugmallit H-59	Sandbag Retained Island	69.639167	133.463611	5.3	1976
13	Adgo J-27	Sandbag Retained Island	69.441778	135.847444	1.8	1976
14	Arnak L-30	Sacrificial Beach Island	69.829028	133.872528	8.5	1976
15	Kannerk G-42	Sacrificial Beach Island	70.023306	131.215583	8.5	1976
16	Isserk E-27	Sacrificial Beach Island	69.938889	134.369667	13.0	1977
17	Issungnak O-61	Sacrificial Beach Island	70.016806	134.313306	19.0	1978-79
18	Issungnak 2-O-61	Sacrificial Beach Island	70.016694	134.313444	19.0	1980
19	Alerk P-23	Sacrificial Beach Island	69.882500	132.839440	11.6	1980-81
20	North Protection Island	Sacrificial Beach Island	-	-	4.6	1980-81

Table 2 - Summary of the Canadian Beaufort Artificial Islands

No	Island Name	Island Type	Latitude	Longitude	Water Depth (m)	Construction Date
21	West Atkinson L-17	Sacrificial Beach Island	69.776083	132.075666	6.0	1981-82
22	Tarsiut N-44	Caisson Retained Island	69.896139	136.193470	21.0	1981-82
23	Uviluk P-66	Single Steel Drilling Caisson	70.263444	132.313280	29.7	1981-82
24	Itiyok I-27	Sacrificial Beach Island	69.944417	134.088670	15.0	1981-82
25	Nerlerk B-67	Single Steel Drilling Caisson	70.433444	133.324556	45.1	1982-83
26	Kogyuk N-67	Single Steel Drilling Caisson	70.113722	133.328220	28.1	1982-83
27	Kadluk O-07	CRI	69.780083	136.021250	14.0	1989
28	Amerk O-09	CRI	69.982333	133.514778	27.0	1983-84
29	Adgo H-29	Sandbag Retained Island	69.479444	135.839528	3.0	1984
30	Nipterk L-19	Sacrificial Beach Island	69.810583	135.298094	11.7	1983-84
31	Tarsiut P-45	Molikpaq	69.915444	136.418000	25.5	1984
32	Minuk I-53	Sacrificial Beach Island	69.709639	136.458860	14.7	1982-85
33	Amauligak I-65	Molikpaq	70.077694	133.804556	31.0	1985
34	Arnak K-06	Sacrificial Beach Island	69.761222	133.772361	7.2	1985
35	Kaubvik I-43	CRI	69.875833	135.422028	17.9	1983-86
36	Amauligak F-24	Molikpaq	70.054833	133.630250	32.0	1985-87
37	Isserk I-15	Molikpaq	69.912361	134.299222	11.8	1989

Table 3 - As-Built Fill Quantities of Beaufort Artificial Islands

No	Island Name	Island Type	Fill Quantity (m^3)	Borrow Site	Primary Fill Material	Secondary Fill Material
1	Immerk B-48	Sacrificial Beach Island	180,000	Local	sand	gravel
2	Adgo F-28	Sandbag Retained Island	46,000	Local, Immerk area	silt	gravel cap
3	Pullen E-17	Gravel Fill Island	65,000	Onshore, Yaya Lakes	gravel	
4	Unark L-24	Gravel Fill Island	44,000	Onshore, Yaya Lakes	gravel	
5	Pelly B-35	Barge Cored Island	35,000	Local, Yaya Lakes	silt	gravel cap
6	Netserk B-44	Sandbag Retained Island	306,000	Pelly Island	sand	
7	Adgo P-25	Sandbag Retained Island	27,000	Local	silt	gravel cap
8	Adgo C-15	Gravel Fill Island	70,000	Onshore, Yaya Lakes	gravel	
9	Netserk F-40	Sandbag Retained Island	291,000	Pelly Pit, Garry Harbour and Spit	sand	
10	Sarpik B-35	Gravel Fill Island	118,000	Onshore, Adgo C-15 area	gravel	
11	Ikkatok J-17	Sandbag Retained Island	38,000	Local	sand	
12	Kugmallit H-59	Sandbag Retained Island	236,000	Tufts Point	sand	
13	Adgo J-27	Sandbag Retained Island	69,000	Local, Netserk B-44 area	silt	gravel cap
14	Arnak L-30	Sacrificial Beach Island	1,150,000	Local	sand	
15	Kannerk G-42	Sacrificial Beach Island	1,150,000	Local	sand	
16	Isserk E-27	Sacrificial Beach Island	1,908,000	Local, Tufts Point	sand	
17	Issungnak O-61	Sacrificial Beach Island	4,100,000	Local, Tufts Point	sand	
18	Issungnak 2-O-61	Sacrificial Beach Island	4,900,000	Issungnak O-61	sand	
19	Alerk P-23	Sacrificial Beach Island	2,670,000	Local	sand	
20	North Protection Island	Sacrificial Beach Island	2,000,000	Local	sand	

Table 3 - As-Built Fill Quantities of Beaufort Artificial Islands

No	Island Name	Island Type	Fill Quantity (m^3)	Borrow Site	Primary Fill Material	Secondary Fill Material
21	West Atkinson L-17	Sacrificial Beach Island	1,000,000	Local	sand	
22	Tarsiut N-44	Caisson Retained Island	1,800,000	Ukalerk, Issigak, Isserk, Herschel	sand	gravel
23	Uviluk P-66	Single Steel Drilling Caisson	1,900,000	Local, Ukalerk, Isserk, Kagluk, Issigak	sand	gravel cap
24	Itiyok I-27	Sacrificial Beach Island	1,943,000	Local, Ukalerk	sand	
25	Nerlerk B-67	Single Steel Drilling Caisson	4,000,000	Ukalerk, Local	sand	
26	Kogyuk N-67	Single Steel Drilling Caisson	1,450,000	Ukalerk, Uviluk P-66, Banks Island, Rufus River	sand	gravel cap
27	Kadluk O-07	CRI	450,000	Ukalerk	sand	
28	Amerk O-09	CRI	1,700,000	Ukalerk	sand	
29	Adgo H-29	Sandbag Retained Island	75,000	Adgo J-27, Sarpik B-35, Kadluk O-07	sand	gravel cap
30	Nipterk L-19	Sacrificial Beach Island	1,500,000	Issigak, Ukalerk	gravel	sand
31	Tarsiut P-45	Molikpaq	350,000	Ukalerk, Tarsiut N-44, Kogyuk N-67	sand	gravel
32	Minuk I-53	Sacrificial Beach Island	2,000,000	Ukalerk, Issigak, Isserk, Kadluk O-07	gravel	sand
33	Amauligak I-65	Molikpaq	1,410,000	Ukalerk, Kogyuk N-67, Amerk O-09, Issigak	sand	gravel toe
34	Arnak K-06	Sacrificial Beach Island	700,000	Local	sand	
35	Kaubvik I-43	CRI	565,000	Ukalerk, Isserk, Issigak	sand	gravel toe
36	Amauligak F-24	Molikpaq	2,000,000	Ukalerk, Amauligak I-65, Minuk I-53	sand	gravel toe
37	Isserk I-15	Molikpaq	72,000	Amauligak I-65	sand	

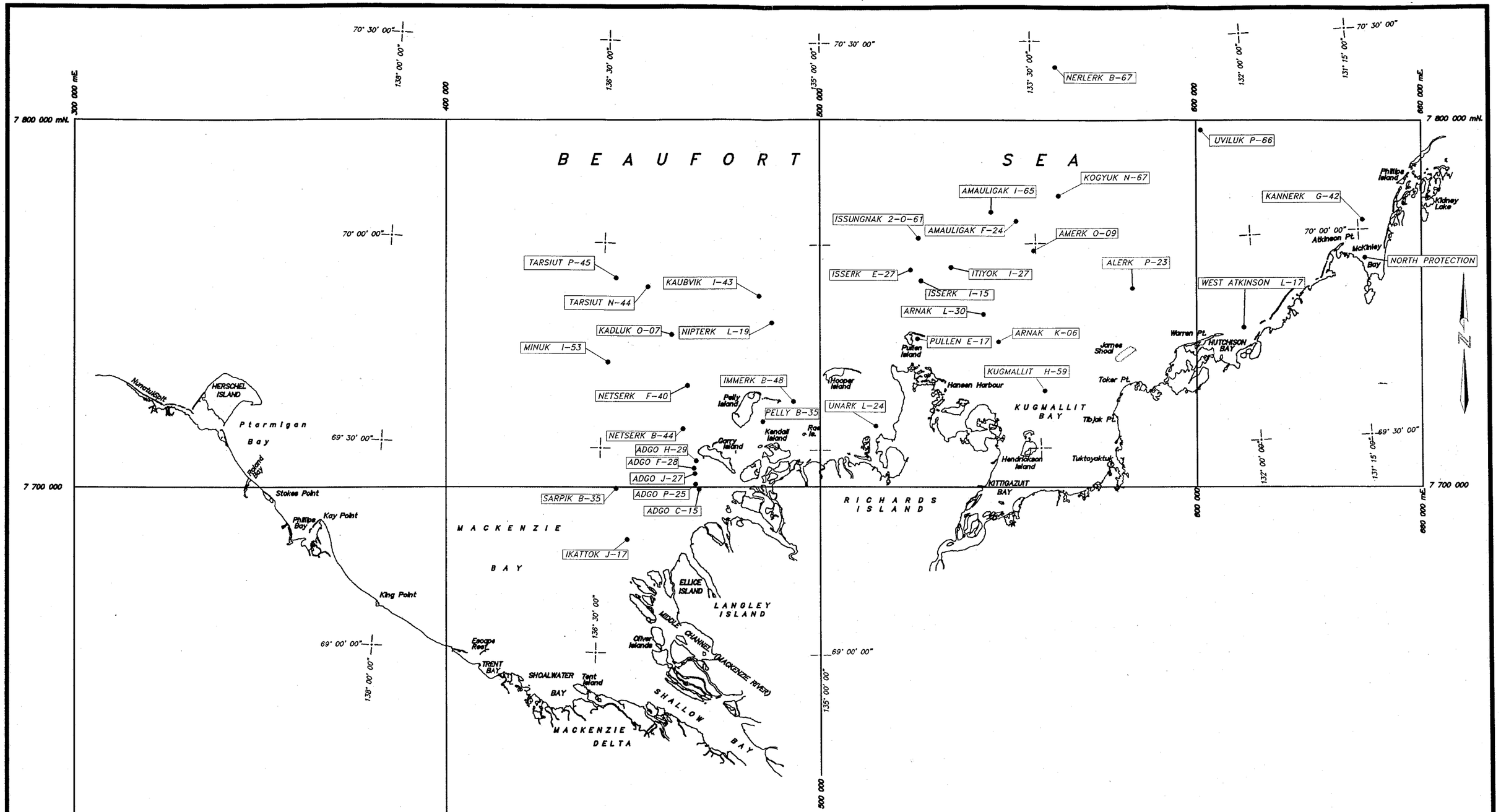
Table 4 - Latest Survey Quantities

No	Island Name	Island Type	Fill Quantity (m^3)	Fill Material	Date	Depth to Island (m)	Water Depth (m)
1	Immerk B-48	Sacrificial Beach Island	<180,000	sand	-	-	3.0
2	Adgo F-28	Sandbag Retained Island	n.a.	silt	-	-	2.1
3	Pullen E-17	Gravel Fill Island	50,000	gravel	-	-	1.5
4	Unark L-24	Gravel Fill Island	30,000	gravel	-	-	1.3
5	Pelly B-35	Barge Cored Island	n.a.	silt	-	-	2.0
6	Netserk B-44	Sandbag Retained Island	250,000	sand	08/06/85	2.2	4.6
7	Adgo P-25	Sandbag Retained Island	n.a.	silt	-	-	1.5
8	Adgo C-15	Gravel Fill Island	50,000	gravel	-	-	1.5
9	Netserk F-40	Sandbag Retained Island	250,000	sand	07/90	4.6	7.0
10	Sarpik B-35	Gravel Fill Island	70,000	gravel	-	-	4.3
11	Ikkatok J-17	Sandbag Retained Island	n.a.	sand	-	-	1.5
12	Kugmallit H-59	Sandbag Retained Island	100,000	sand	08/90	2.7	5.3
13	Adgo J-27	Sandbag Retained Island	n.a.	silt	-	-	1.8
14	Arnak L-30	Sacrificial Beach Island	1,000,000	sand	08/90	3.5	8.5
15	Kannerk G-42	Sacrificial Beach Island	1,000,000	sand	08/90	3.2	8.5
16	Isserk E-27	Sacrificial Beach Island	1,500,000	sand	07/90	5.0	13.0
17	Issungnak O-61	Sacrificial Beach Island	n.a.	sand	n.a.	n.a.	19.0
18	Issungnak 2-O-61	Sacrificial Beach Island	3,800,000	sand	07/90	4.0	19.0
19	Alerk P-23	Sacrificial Beach Island	2,000,000	sand	07/90	3.1	11.6
20	North Protection Island	Sacrificial Beach Island	2,000,000	sand	n.a.	above msl	4.6

Table 4 - Latest Survey Quantities

No	Island Name	Island Type	Fill Quantity (m^3)	Fill Material	Date	Depth to Island (m)	Water Depth (m)
21	West Atkinson L-17	Sacrificial Beach Island	800,000	sand	08/90	2.1	6.0
22	Tarsiut N-44	Caisson Retained Island	1,000,000	sand & gravel	09/14/84	6.5	21.0
23	Uviluk P-66	Single Steel Drilling Caisson	1,500,000	sand	-	>9	29.7
24	Itiyok I-27	Sacrificial Beach Island	1,500,000	sand	07/90	4.0	15.0
25	Nerlerk B-67	Single Steel Drilling Caisson	2,000,000	sand	1983	20	45.1
26	Kogyuk N-67	Single Steel Drilling Caisson	1,000,000	sand, gravel cap	08/29/85	8.0	28.1
27	Kadluk O-07	CRI	300,000	sand	-	?	14
28	Amerk O-09	CRI	1,000,000	sand	09/10/85	9.0	27.0
29	Adgo H-29	Sandbag Retained Island	<75,000	sand	-	-	3.0
30	Nipterk L-19	Sacrificial Beach Island	1,000,000	gravel & sand	07/90	2.0	11.7
31	Tarsiut P-45	Molikpaq	300,000	sand	1985	>10	25.5
32	Minuk I-53	Sacrificial Beach Island	1,000,000	sand & gravel	07/90	awash	14.7
33	Amauligak I-65	Molikpaq	900,000	sand	08/17/89	16.0	31.0
34	Arnak K-06	Sacrificial Beach Island	600,000	sand	08/90	2.5	7.2
35	Kaubvik I-43	CRI	400,000	sand, gravel toe	07/90	4.5	17.9
36	Amauligak F-24	Molikpaq	1,600,000	sand, gravel toe	08/17/89	10	32.0
37	Isserk I-15	Molikpaq	60,000	sand	1990	10	11.8

FIGURE



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	LOCATION PLAN
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	FIGURE 1
REV.	

2695e070.dwg

APPENDIX I

1. IMMERK B-48
2. ADGO F-28
3. PULLEN E-17
4. UNARK L-24
5. PELLY B-35
6. NETSERK B-44
7. ADGO P-25
8. ADGO C-15
9. NETSERK F-40
10. SARPIK B-35
11. IKATTOK J-17
12. KUGMALLIT H-59
13. ADGO J-27
14. ARNAK L-30
15. KANNERK G-42
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21. WEST ATKINSON L-17
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APPENDIX I

(continued)

32. MINUK I-53
33. AMAULIGAK I-65
34. ARNAK K-06
35. KAUBVIK I-43
36. AMAULIGAK F-24
37. ISSERK I-15

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Immerk B-48 Operator: Esso Water Depth: 3.0m No: 1

Location

UTM N:	7723210	Latitude:	69.618972
UTM E:	492972	Longitude:	135.180750

Island Type: Sacrificial Beach Island
Construction Method: Cutter suction dredge placed with floating
Borrow Site: local
Fill Material: sand, gravel
D50: 0.075 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1973			
Freeboard (m):	4.3			
Surface Area (m):	90 dia			
Base Area (m):				
Slopes (ave.):	5-20:1			
Subcut Depth (m):				
Total Fill Quantity (m3):	180000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Immerk B-48 was the first artificial island built in the Beaufort Sea. It was built by Imperial Oil Limited, now operating as Esso Resources Canada Limited, (Esso), in the 1972 and 1973 open water seasons. This island, located in about 3 m of water was a sacrificial beach island composed of sand and gravel dredged from an in situ borrow pit and placed using a floating pipeline. A working surface 90 m in diameter was created with a 4.3 m freeboard and 145 m diameter waterline. Side slopes of 5H:1V (5 horizontal to 1 vertical) were maintained above the waterline while the beach had a 20H:1V slope. In total, 180,000 m3 of fill was placed during construction. The island was abandoned in the spring of 1973 and eroded to the waterline in 1979.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Immerk B-48 Operator: Esso Water Depth: 3.0m No: 1

Location

UTM N: 7723210 Latitude: 69.618972
UTM E: 492972 Longitude: 135.180750

Date (mm/dd/yy)

Construction: 1972-73
Rig Release: 12/22/73
Abandoned: spr 1974

Physiographic Location: Ikit Trough
Seabed Conditions: sand and silt
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 15

Landfast Ice Formation: mid Oct
Rubble Formation: yes
Extent: small
Ice Scour Potential: insignificant

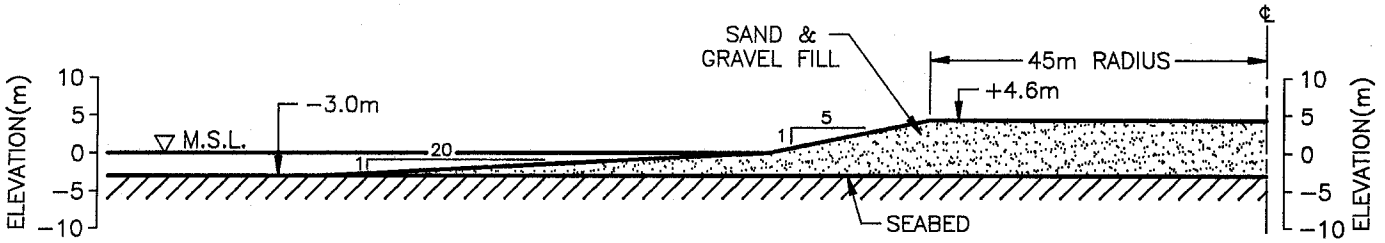
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): July 9

Open Water Days (median): 109
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 61 in 15 yrs

Lease No.:
License:
COGLA file: 69-40-135-00



IMMERK B-48 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

0 20 40m

(1:1000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: IMMERK B-48			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-01	REV.

2695w004.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo F-28 Operator: Esso Water Depth: 2.1m No: 2

Location

UTM N:	7705112	Latitude:	69.454611
UTM E:	466536	Longitude:	135.854388

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed local silt within retaining dyke.
Borrow Site: local, Immerk area
Fill Material: silt, gravel cap
D50: 0.001 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1973			
Freeboard (m):	1.0			
Surface Area (m):	45x180			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	46000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Built by Esso in 1973, Adgo F-28 was a sandbag retained island located in 2.1 m of water. A sandbag retaining dyke was founded on the seabed, infilled with clamshell-placed silt excavated from the adjacent seabed, and capped with gravel. It required 46,000 m3 of fill to construct this island with a 1 m freeboard and 45 m x 180 m working surface. The island was abandoned in the spring of 1974, and subsequently eroded to the waterline in the fall of 1976.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo F-28 Operator: Esso Water Depth: 2.1m No: 2

Location

UTM N: 7705112 Latitude: 69.454611
UTM E: 466536 Longitude: 135.854388

Date (mm/dd/yy)

Construction: 1973
Rig Release: 03/19/74
Abandoned: spr 1974

Physiographic Location: Mackenzie Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

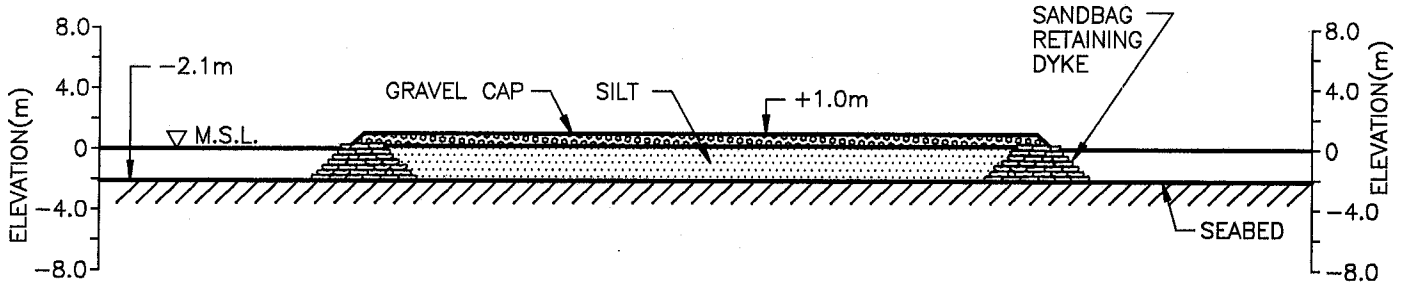
Break-up (median): July 2
Break-up (earliest): June 8
Break-up (latest): July 9

Open Water Days (median): 111
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 61 in 15 yrs

Lease No.:
License: W1020
COGLA file: 69-30-135-45



ADGO F−28 − SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 10 20m

(1:500)

TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ADGO F−28			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A−2695−03−02	REV.

2695w005.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Pullen E-17 Operator: Esso Water Depth: 1.5m No: 3

Location

UTM N:	7740302	Latitude:	69.771111
UTM E:	525907	Longitude:	134.328055

Island Type: Gravel Fill Island
Construction Method: Truck hauled gravel from onshore site in winter
Borrow Site: onshore, Yaya Lakes
Fill Material: gravel,
D50: 5.000 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1974			
Freeboard (m):	3.0			
Surface Area (m):	70x115			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	65000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Pullen E-17 was the first gravel fill island, constructed by Esso over the winter of 1973-74 in 1.5 m of water. Blocks of ice were cut and removed from the site, and 65,000 m3 of gravel trucked from the Yaya Lakes onshore borrow source was placed in the subsequent holes to create an island with a 70 m x 115 m working surface and 3.0 m freeboard. Sandbags were used above the waterline to provide erosion protection during the open water season. The island was abandoned in the spring of 1976, and in 1980 was still awash.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Pullen E-17 Operator: Esso Water Depth: 1.5m No: 3

Location

UTM N: 7740302 Latitude: 69.771111
UTM E: 525907 Longitude: 134.328055

Date (mm/dd/yy)

Construction: 1973-74
Rig Release: 07/11/74
Abandoned: 07/76

Physiographic Location: Akpak Plateau
Seabed Conditions: sand and silt
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

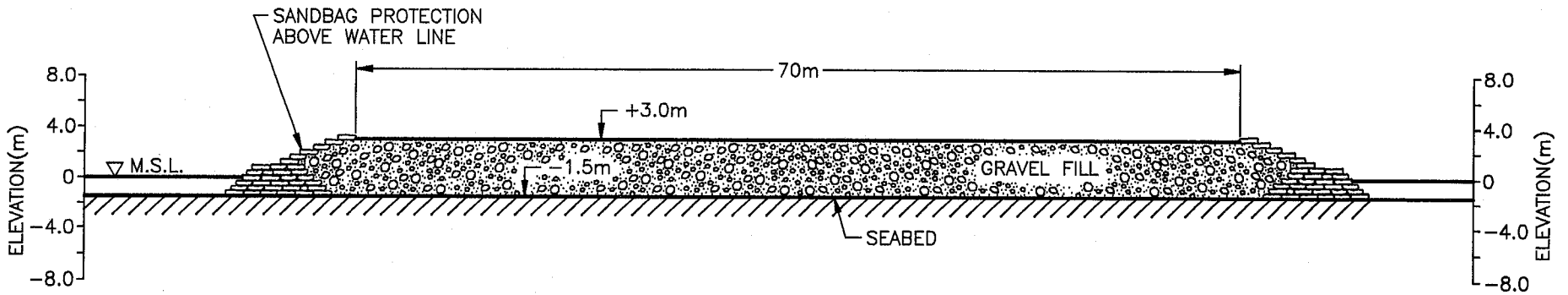
Break-up (median): July 9
Break-up (earliest): July 2
Break-up (latest): July 30

Open Water Days (median): 98
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 61 in 15 yrs

Lease No.:
License:
COGLA file: 69-50-134-15



PULLEN E-17 – GRAVEL FILL ISLAND

OPERATOR: ESSO

0 10 20m

(1:500)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: PULLEN E-17			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-03	REV.

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GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Unark L-24 Operator: Sun Water Depth: 1.3m No: 4

Location

UTM N:		Latitude:	69.558389
UTM E:		Longitude:	134.616694

Island Type:	Gravel Fill Island
Construction Method:	Truck hauled gravel from onshore site in winter
Borrow Site:	onshore, Yaya Lakes
Fill Material:	gravel,
D50:	5.000 to 75.000mm
Fines:	n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1974			
Freeboard (m):	3.7			
Surface Area (m):	60x120			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	44000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Sun Oil Company Ltd. (Sun), built Unark L-24, a gravel fill island in 1.3 m of water, by cutting and removing ice and subsequently placing gravel in the holes. A total of 44,000 m3 of gravel was hauled by truck from the Yaya Lakes onshore site to create an island with a 60 m x 120 m working surface and 3.7 m freeboard. The island was abandoned in the summer of 1977, and had not eroded to the waterline by 1980.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Unark L-24 Operator: Sun Water Depth: 1.3m No: 4

Location

UTM N:
UTM E:

Latitude: 69.558389
Longitude: 134.616694

Date (mm/dd/yy)

Construction: 1973-74
Rig Release: 05/24/75
Abandoned: sum 1977

Physiographic Location: Ikit Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 15

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

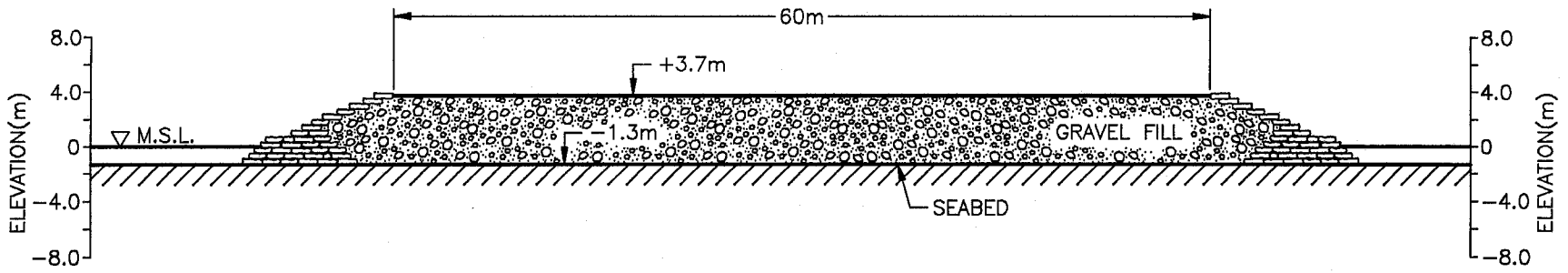
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): July 9

Open Water Days (median): 105
Summer Intrusions (in 15): 0 in 15

Wave Conditions

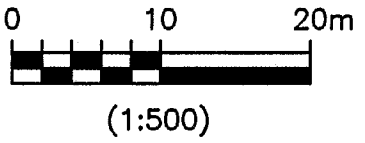
Exposure: low
Extreme Storm Events: 61 in 14 yrs

Lease No.:
License:
COGLA file: 69-40-134-30



UNARK L–24 – GRAVEL FILL ISLAND

OPERATOR: SUN



TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: UNARK L–24			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A–2695–03–04	REV.

2695w007.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Pelly B-35 Operator: Sun Water Depth: 2.0m No: 5

Location

UTM N: Latitude: 69.569722
UTM E: Longitude: 135.390833

Island Type: Barge Cored Island
Construction Method: Grounded barge with protected berm built of sand
Borrow Site: local, Yaya lakes
Fill Material: silt, gravel cap
D50: 0.001 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1974			
Freeboard (m):	2.4			
Surface Area (m):	85x155			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	35000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Sun Oil company Ltd. constructed Pelly B-35 in 1974 by grounding a drill rig equipped barge in 2.0 m of water and building a protective berm around it. The berm was built of sandbag-filled gabion baskets and the space between the barge and the berm infilled with clamshell placed local silt. In the spring, a portion of the berm and silt was removed and the barge was refloated. In 1980, the island had not yet eroded to the waterline.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Pelly B-35 Operator: Sun Water Depth: 2.0m No: 5

Location

UTM N:
UTM E:

Latitude: 69.569722
Longitude: 135.390833

Date (mm/dd/yy)

Construction: 1974
Rig Release: 02/14/75
Abandoned: sum 1976

Physiographic Location: Ikit Trough
Seabed Conditions: soft clays and silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 15

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

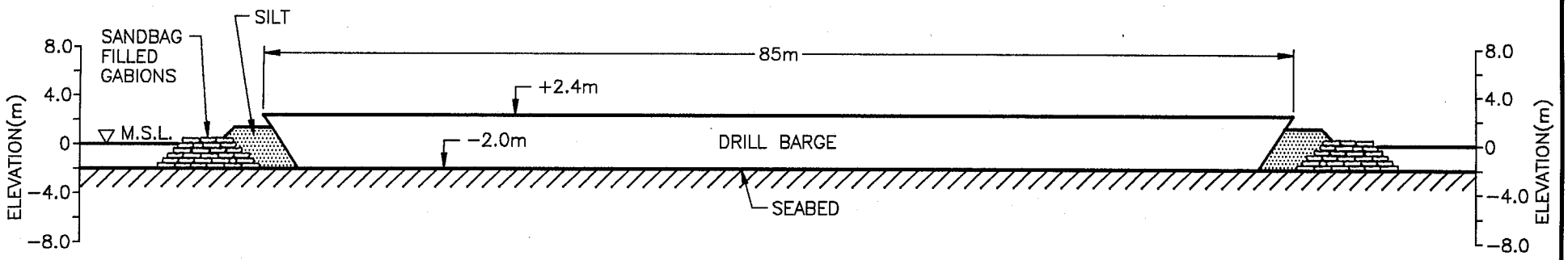
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): July 9

Open Water Days (median): 109
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 61 in 14 yrs

Lease No.:
License:
COGLA file: 69-40-135-15



PELLY B−35 − BARGE CORED ISLAND

OPERATOR: SUN

0 10 20m

(1:500)

TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: PELLY B−35			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A−2695−03−05	REV.

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GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Netserk B-44 Operator: Esso Water Depth: 4.6m No: 6

Location

UTM N:	7715886	Latitude:	69.550833
UTM E:	463632	Longitude:	135.932778

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed sand fill hauled by barge.
Borrow Site: Pelly Island
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES		
Date:	1974	08/06/85		
Freeboard (m):	4.6	-2.2		
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):		100-50:1		
Subcut Depth (m):				
Total Fill Quantity (m3):	306000	250000		
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Esso constructed Netserk B-44, a sandbag retained sand fill island in the 1974 open water season. The island, located in 4.6 m of water, was built using 306,000 m3 of clamshell-placed sand fill hauled by a barge from Pelly Island. The completed island had a working surface 100 m in diameter and a freeboard of 4.6 m. The island was abandoned in the summer of 1976, and by 1978, the island eroded to the waterline.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Netserk B-44 Operator: Esso Water Depth: 4.6m No: 6

Location

UTM N: 7715886 Latitude: 69.550833
UTM E: 463632 Longitude: 135.932778

Date (mm/dd/yy)

Construction: 1974
Rig Release: 06/08/75
Abandoned: 07/76

Physiographic Location: Kringalik Plateau
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: late Oct
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: insignificant

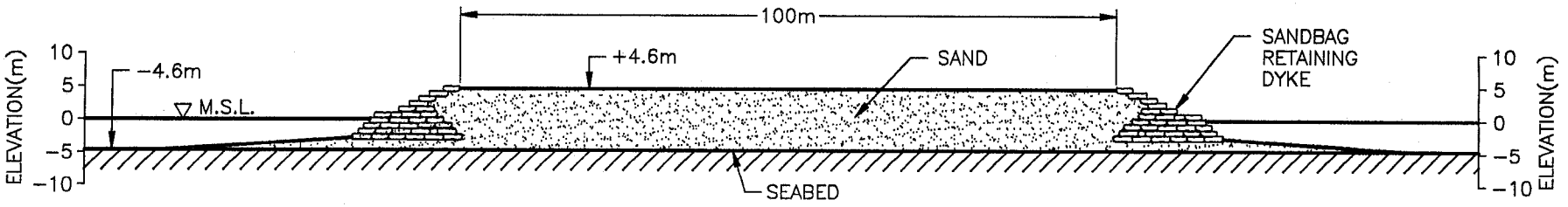
Break-up (median): July 2
Break-up (earliest): June 18
Break-up (latest): July 9

Open Water Days (median): 111
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low to moderate
Extreme Storm Events: 61 in 14 yrs

Lease No.:
License:
COGLA file: 69-40-135-45



NETSERK B-44 – SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 20 40m

(1:1000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: NETSERK B-44			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-06	REV.

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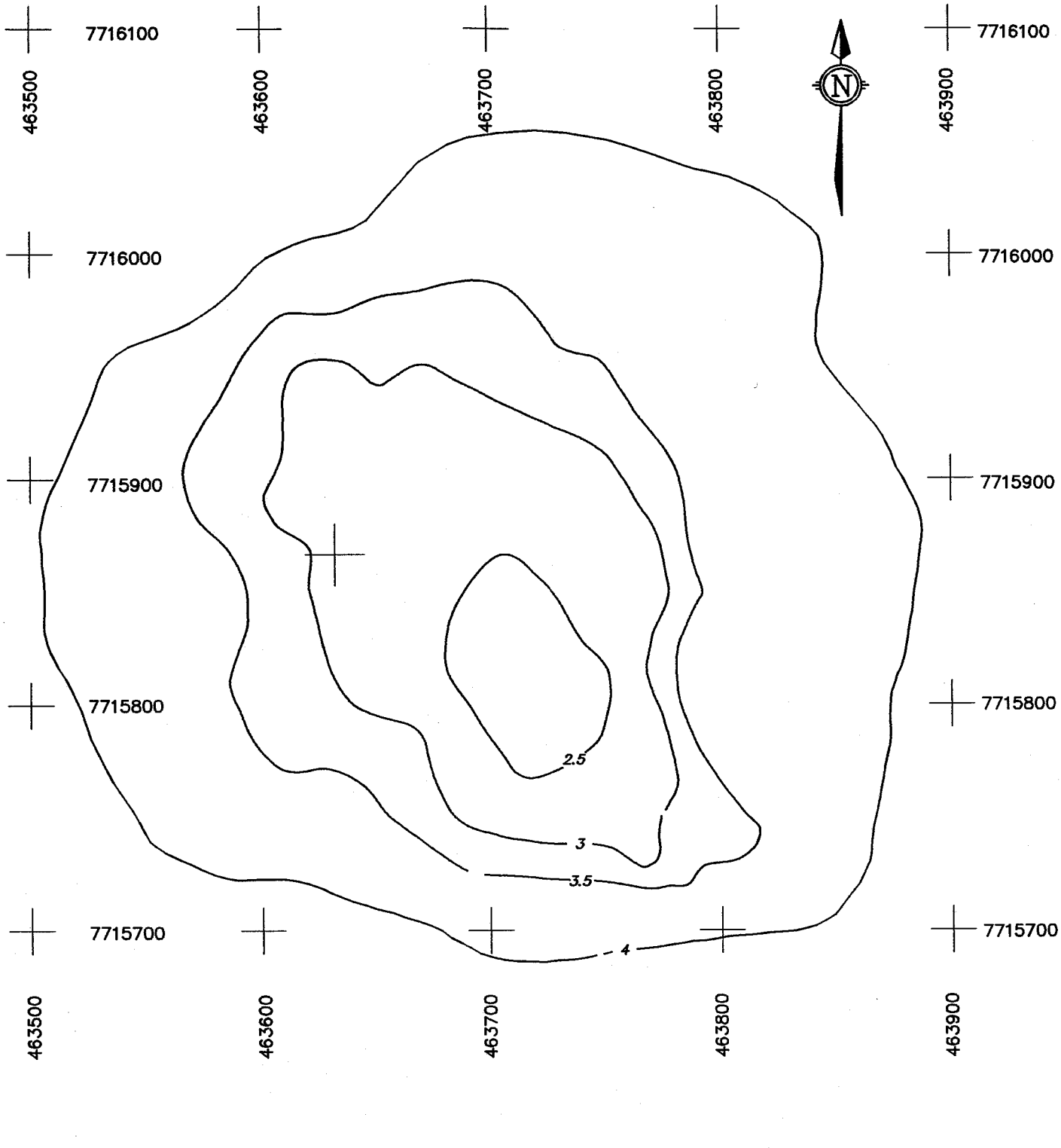


2695w064.dwg

ORIGINAL SEABED : 4.6m BELOW MSL.
DATE OF SURVEY : AUGUST 1985, CANADIAN ENGINEERING SURVEYS CO. LTD.
TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2500

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: NETSERK–B44 (AUG, 1985)			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-06	REV.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo P-25 Operator: Esso Water Depth: 1.5m No: 7

Location

UTM N:	7700778	Latitude:	69.415833
UTM E:	466961	Longitude:	135.841667

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed local silt within sandbag
Borrow Site: local
Fill Material: silt, gravel cap
D50: 0.001 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1974			
Freeboard (m):	1.0			
Surface Area (m):	70x145			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	27000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Located in 1.5 m of water, Adgo P-25 was a sandbag retained silt fill island with a gravel cap. It was constructed by Esso in the 1974 open water season with 27,000 m3 of clamshell-placed local silt within a sandbag retaining dyke. The island had a 70 m x 145 m surface and 1.0 m freeboard. Drilling took place over the winter of 1974-75, and the island was abandoned in the spring of 1975. The island remained above the waterline in a 1980 survey.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo P-25 Operator: Esso Water Depth: 1.5m No: 7

Location

UTM N: 7700778 Latitude: 69.415833
UTM E: 466961 Longitude: 135.841667

Date (mm/dd/yy)

Construction: 1974
Rig Release: 03/28/75
Abandoned: spr 1975

Physiographic Location: Mackenzie Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

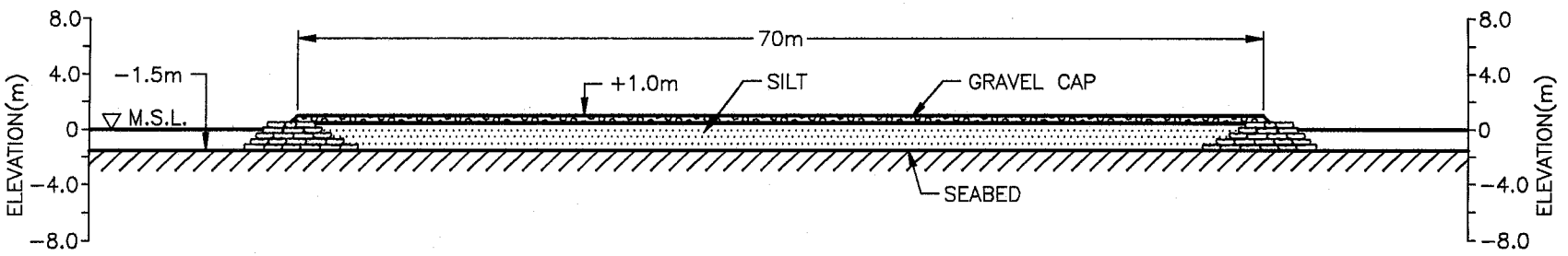
Break-up (median): July 2
Break-up (earliest): June 8
Break-up (latest): July 9

Open Water Days (median): 111
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 61 in 14 yrs

Lease No.:
License:
COGLA file: 69-30-135-45



ADGO P−25 − SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 10 20m

(1:500)

TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ADGO P−25			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-07	REV.

2695w010.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo C-15 Operator: Esso Water Depth: 1.5m No: 8

Location

UTM N:	7699396	Latitude:	69.403611
UTM E:	467902	Longitude:	135.817500

Island Type: Gravel Fill Island
Construction Method: Truck hauled gravel from onshore site in winter.
Borrow Site: onshore, Yaya Lakes
Fill Material: gravel,
D50: 5.000 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1975			
Freeboard (m):	3.0			
Surface Area (m):	55x155			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	70000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Adgo C-15 was a gravel-fill island constructed by Esso in 1.5 m of water over the winter of 1975. Blocks of ice were removed and 70,000 m3 of truck hauled gravel from an onshore site was placed in the holes. A working surface 55 m x 155 m was created with a freeboard of 3.0 m. The island was used for drilling during the spring of 1975, and was abandoned in the summer 1975. By 1980, the island had not yet eroded to the waterline.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo C-15 Operator: Esso Water Depth: 1.5m No: 8

Location

UTM N: 7699396 Latitude: 69.403611
UTM E: 467902 Longitude: 135.817500

Date (mm/dd/yy)

Construction: 1975
Rig Release: 07/05/75
Abandoned: spr 1975

Physiographic Location: Mackenzie Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

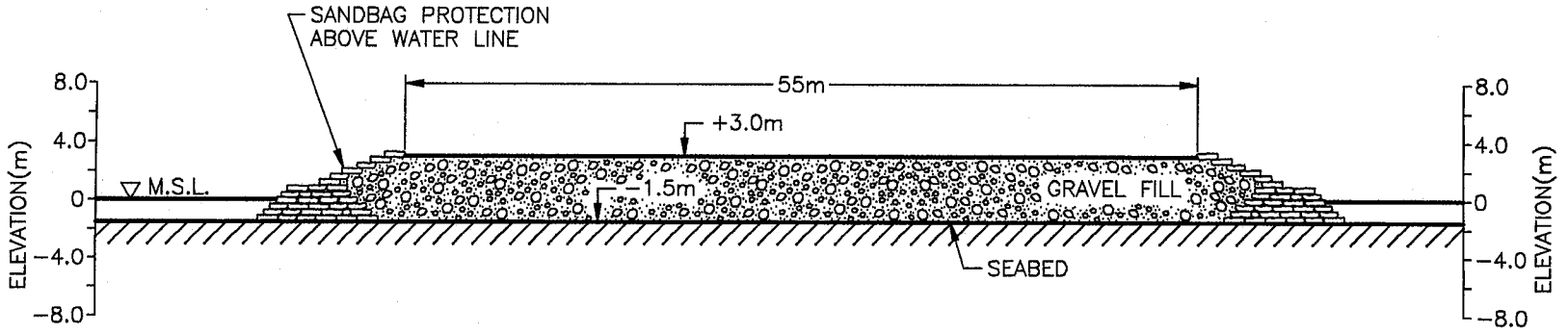
Break-up (median): July 2
Break-up (earliest): June 8
Break-up (latest): July 9

Open Water Days (median): 111
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 59 in 13 yrs

Lease No.:
License:
COGLA file: 69-30-135-45



ADGO C-15 – GRAVEL FILL ISLAND

OPERATOR: ESSO

0 10 20m

(1:500)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ADGO C-15			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-08	REV.

2695w011.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Netserk F-40 Operator: Esso Water Depth: 7.0m No: 9

Location

UTM N: 7727631 Latitude: 69.656389
UTM E: 464854 Longitude: 135.905833

Island Type: Sandbag Retained Island
Construction Method: Sand hauled by barge and clamshell placed within
Borrow Site: Pelly Pit, Garry Harbour & Spit
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	Esso	CSS
Date:	1975	08/26/81	1983	1990
Freeboard (m):	4.6	-2.4	-3.0	-4.6
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):		40-10:1		50-25:1
Subcut Depth (m):				
Total Fill Quantity (m3):	291000			250000
Subcut Fill Quantity (m3):				
No Targets:				31
Survey Quality:				excellent

Description

Esso constructed Netserk F-40, a sandbag retained sand fill island in 1975. It was located in 7.0 m of water, on a soft clay and loose silt seabed on the Kringalik Plateau. Sand fill was hauled by a barge and clamshell placed within the dyke. A total of 291,000 m3 of sand was used to construct and island 100 m in diameter with a 4.6 m freeboard. The island was abandoned in the summer of 1976 and had eroded to the waterline by 1978. Challenger Surveys and Surveys Ltd (Challenger), surveyed the island in 1990. The island surface had eroded to 4.6 m below sea level. Side scan sonar identified 31 targets on the island surface.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Netserk F-40 Operator: Esso Water Depth: 7.0m No: 9

Location

UTM N: 7727631 Latitude: 69.656389
UTM E: 464854 Longitude: 135.905833

Date (mm/dd/yy)

Construction: 1975
Rig Release: 05/09/76
Abandoned: sum 1976

Physiographic Location: Kringalik Plateau
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

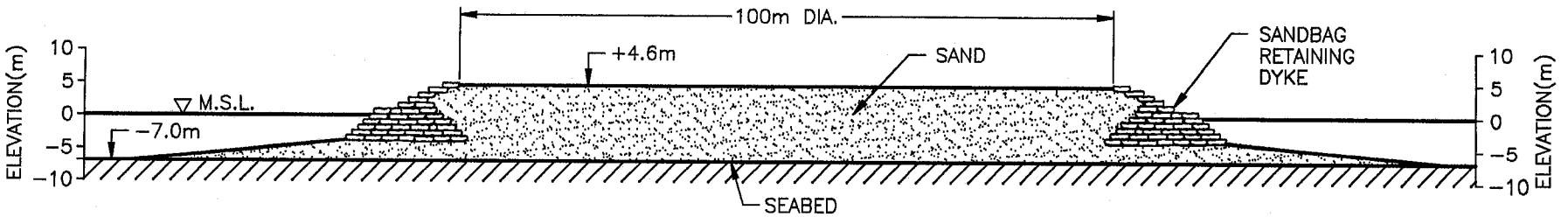
Break-up (median): July 9
Break-up (earliest): June 25
Break-up (latest): July 23

Open Water Days (median): 97
Summer Intrusions (in 15): 2 in 15

Wave Conditions

Exposure: moderate
Extreme Storm Events: 59 in 13 yrs

Lease No.:
License:
COGLA file: 69-40-135-45



NETSERK F-40 – SANDBAG RETAINED ISLAND

OPERATOR: ESSO

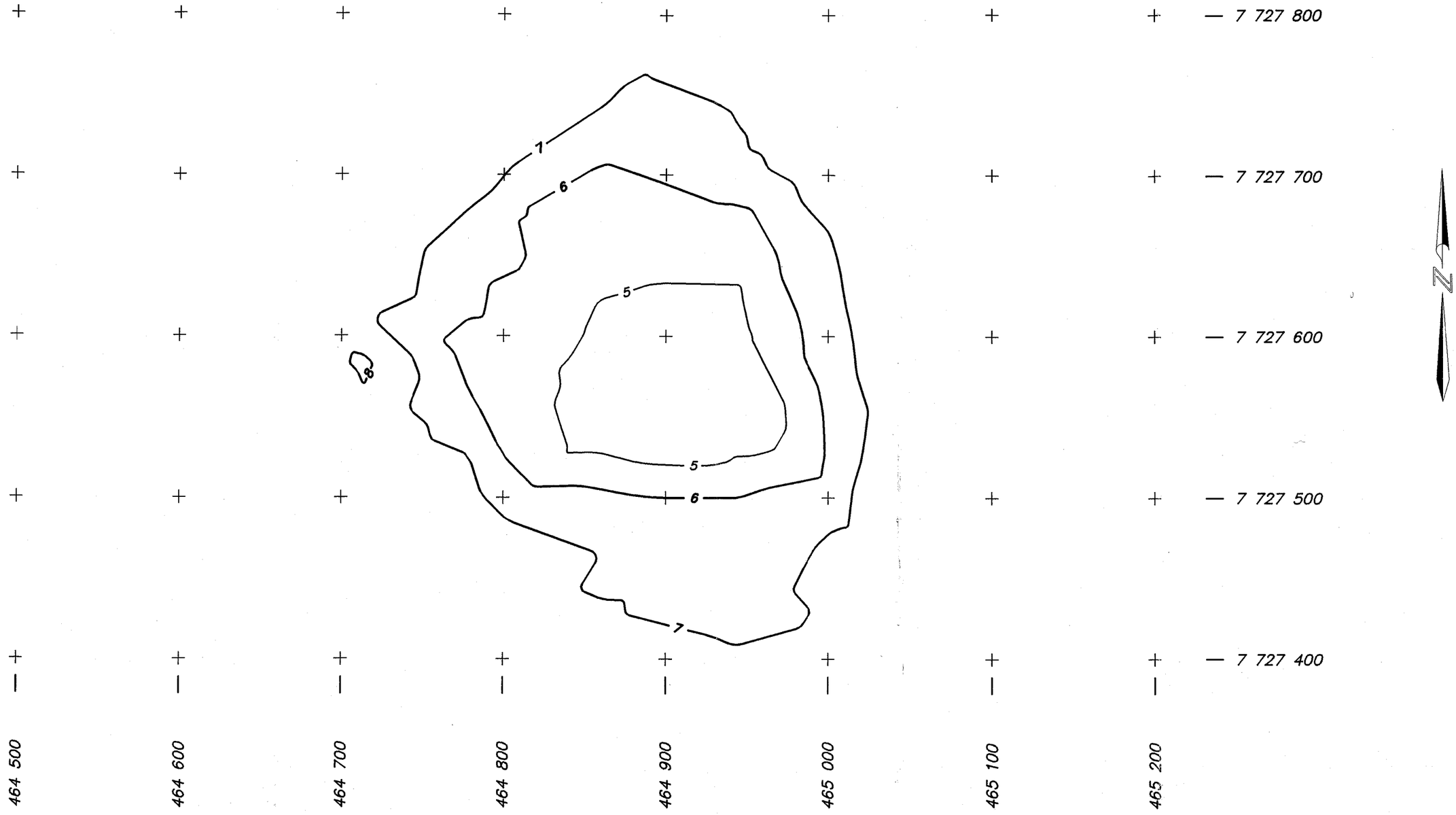
0 20 40m

(1:1000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: NETSERK F-40			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-09	REV.

2695w012.dwg



ORIGINAL SEABED : 7.0m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2500

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: NETSERK F-40 (JUL., 1990)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-09B	

APPROVED

2695w051.dwg

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2500

ORIGINAL SEABED : 7.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1981, CANADIAN ENGINEERING SURVEYS CO. LTD.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: NETSERK F-40 (AUG., 1981)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-09A	

APPROVED

2695w097.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Sarpik B-35 Operator: Esso Water Depth: 4.3m No: 10

Location

UTM N: 7699621 Latitude: 69.401944
UTM E: 445579 Longitude: ~~135~~.386111
136

Island Type: Gravel Fill Island
Construction Method: Truck hauled gravel from onshore site in winter
Borrow Site: onshore, Adgo C-15 area
Fill Material: gravel,
D50: 5.000 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1976			
Freeboard (m):	3.0			
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	118000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Sarpik B-35 was a gravel fill island constructed over the winter of 1975-76 by Esso in 4.3 m of water on soft clays and silts of the Mackenzie Trough. The island was constructed by cutting and removing ice from the site and placing truck hauled gravel from onshore in the resultant holes. The completed island was 100 m in diameter with a 3 m freeboard, requiring 118,000 m3 of gravel fill. Drilling took place over the summer of 1976, and the island was abandoned in September 1976. The island eroded to the waterline in 1979.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Sarpik B-35 Operator: Esso Water Depth: 4.3m No: 10

Location

UTM N: 7699621 Latitude: 69.401944
UTM E: 445579 Longitude: 135.386111

Date (mm/dd/yy)

Construction: 1975-76
Rig Release: 09/04/76
Abandoned: 1977

Physiographic Location: Mackenzie Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 15

Landfast Ice Formation: late Oct
Rubble Formation: yes
Extent: small
Ice Scour Potential: insignificant

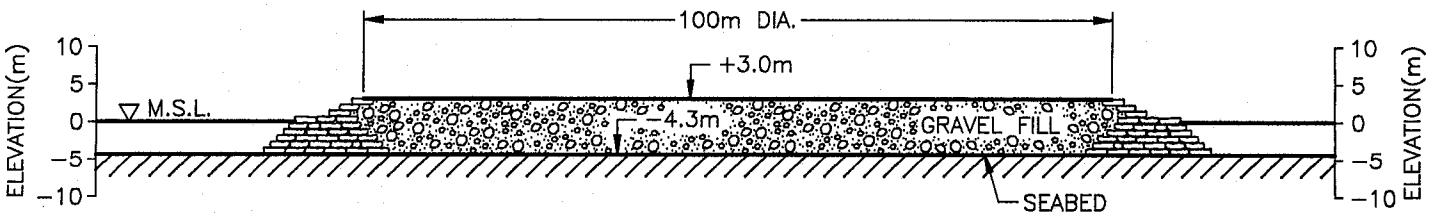
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): July 9

Open Water Days (median): 109
Summer Intrusions (in 15): 0 in 15

Wave Conditions

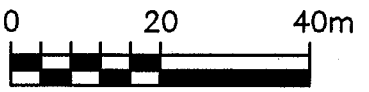
Exposure: low to moderate
Extreme Storm Events: 59 in 13 yrs

Lease No.:
License:
COGLA file: 69-30-135-15



SARPIK B-35 – GRAVEL FILL ISLAND

OPERATOR: ESSO



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TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: SARPIK B-35			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-10	REV.

2695w013.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Ikattok J-17 Operator: Esso Water Depth: 1.5m No: 11

Location

UTM N:	7685723	Latitude:	69.277944
UTM E:	448527	Longitude:	136.303611

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed local silt or sand (EBA) within
Borrow Site: local
Fill Material: sand,
D50: 0.001 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1975			
Freeboard (m):	2.0			
Surface Area (m):	45x130			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	38000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Ikattok J-17 was constructed by Esso in 1975 as a sandbag retained sand island in 1.5 m of water on a soft clay and loose silt seabed in the Mackenzie Trough. Local sand, totalling 38,000 m3, was placed with a clamshell within a sandbag retaining dyke, creating an island with a 45 m x 130 m working surface and 2.0 m freeboard. The island was abandoned in the summer of 1976, and had not eroded to the waterline by 1980.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Ikattok J-17 Operator: Esso Water Depth: 1.5m No: 11

Location

UTM N: 7685723 Latitude: 69.277944
UTM E: 448527 Longitude: 136.303611

Date (mm/dd/yy)

Construction: 1975
Rig Release: 02/27/76
Abandoned: sum 1976

Physiographic Location: Mackenzie Trough
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: bottom fast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 15

Landfast Ice Formation: mid Oct
Rubble Formation: no
Extent: none
Ice Scour Potential: insignificant

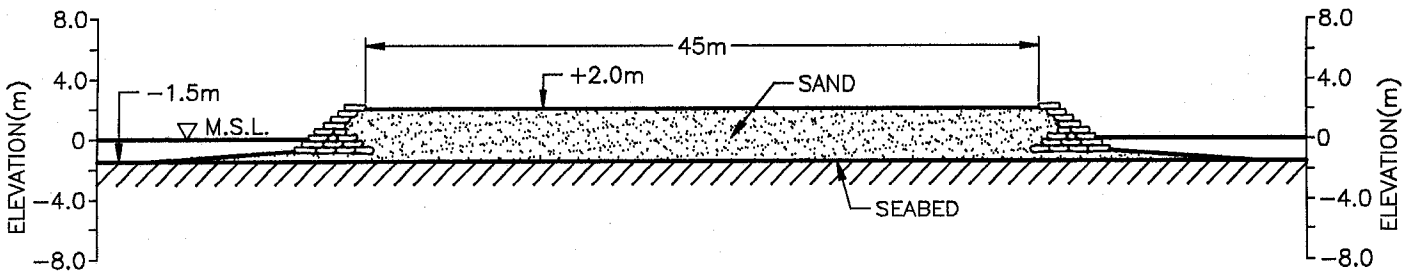
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): July 2

Open Water Days (median): 114
Summer Intrusions (in 15): 0 in 15

Wave Conditions

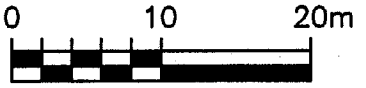
Exposure: low
Extreme Storm Events: 59 in 13 yrs

Lease No.:
License:
COGLA file: 69-20-136-15



IKATTOK J–17 – SANDBAG RETAINED ISLAND

OPERATOR: ESSO



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TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: IKATTOK J–17			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A–2695–03–11	REV.

2695w014.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kugmallit H-59 Operator: Esso Water Depth: 5.3m No: 12

Location

UTM N:	7726225	Latitude:	69.639167
UTM E:	559655	Longitude:	133.463611

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed sand fill hauled by barge from
Borrow Site: Tuft Pt.
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	Esso	CSS
Date:	1976	08/24/82	1983	1990
Freeboard (m):	4.6	-2.0	-3.0	-2.7
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):		30-20:1		50-35:1
Subcut Depth (m):				
Total Fill Quantity (m3):	236000			100000
Subcut Fill Quantity (m3):				
No Targets:				11
Survey Quality:				excellent

Description

A sandbag retained sand island, Kugmallit H-59, was constructed by Esso in 1976 in 5.3 m of water on soft clays and silts over sand in Kugmallit channel. The 100 m diameter island required 236,000 m3 of sand fill to achieve a 4.6 m freeboard. Sand fill was hauled by barge from Tuft Point and clamshell placed within the sandbag retaining dyke. The drilling program proceeded over the fall months, and the island was abandoned in the summer of 1977. By 1979, it had eroded to the waterline, and in 1990, was surveyed by Challenger Services and Surveys Ltd. at 2.7 m below sea level. Side scan sonar delineated 11 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kugmallit H-59 Operator: Esso Water Depth: 5.3m No: 12

Location

UTM N:	7726225	Latitude:	69.639167
UTM E:	559655	Longitude:	133.463611

Date (mm/dd/yy)

Construction:	1976
Rig Release:	11/10/76
Abandoned:	sum 1977

Physiographic Location:	Kugmallit Channel
Seabed Conditions:	soft clays and silts over sand
Nearest Hole:	

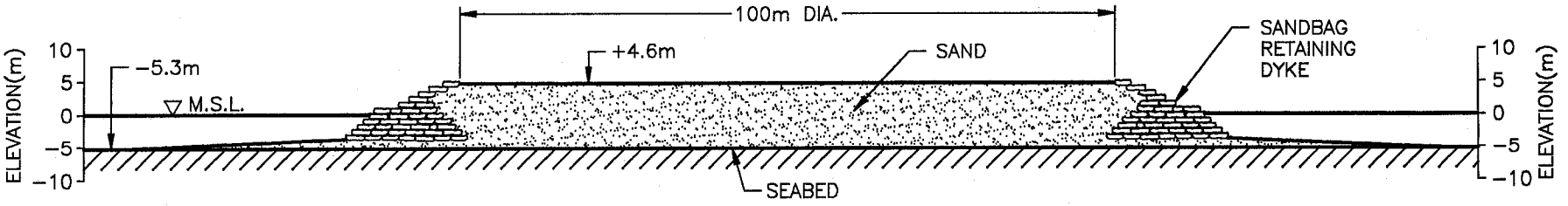
Ice Conditions

Ice Zone:	landfast
Freeze-up (median):	Oct 8
Freeze-up (earliest):	Sept 24
Freeze-up (latest):	Oct 22
Landfast Ice Formation:	late Oct
Rubble Formation:	yes
Extent:	moderate
Ice Scour Potential:	insignificant
Break-up (median):	July 9
Break-up (earliest):	June 25
Break-up (latest):	July 23
Open Water Days (median):	100
Summer Intrusions (in 15):	0 in 15

Wave Conditions

Exposure:	low to moderate
Extreme Storm Events:	56 in 12 yrs

Lease No.:	
License:	
COGLA file:	69-40-133-15



KUGMALLIT H-59 – SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 20 40m

(1:1000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS				
TITLE: KUGMALLIT H-59				
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-12	REV.
	APPROVED:			

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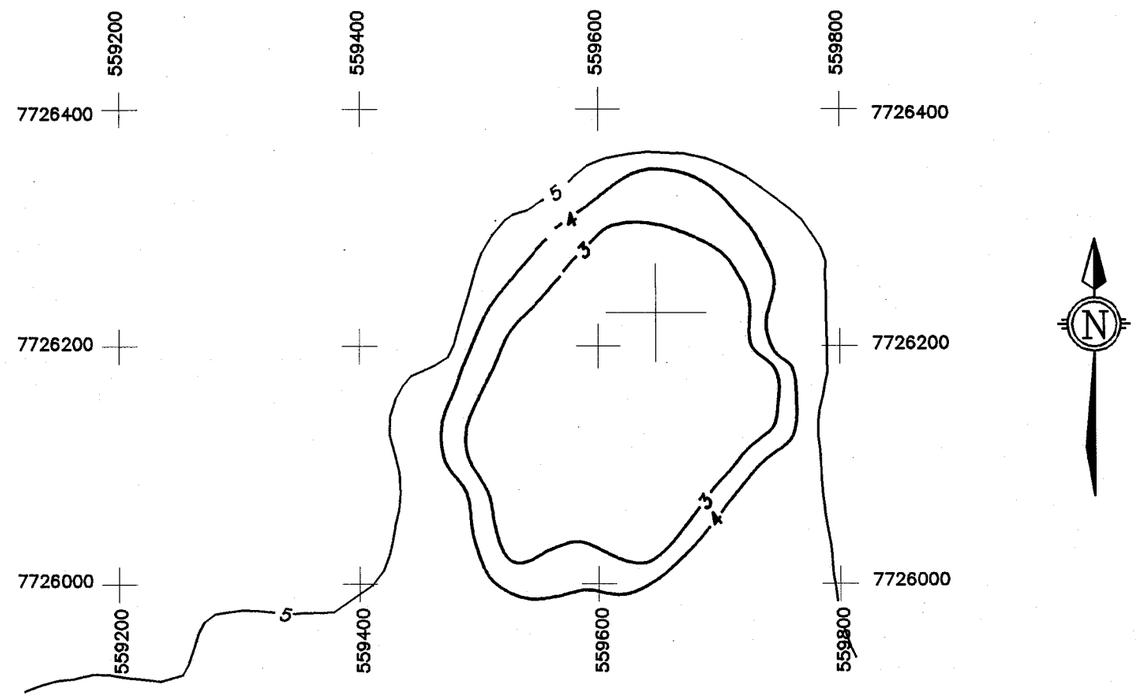

ORIGINAL SEABED : 5.3m BELOW MSL.

DATE OF SURVEY : AUGUST 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: KUGMALLIT H-59 (AUG., 1982)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-12A	1

APPROVED

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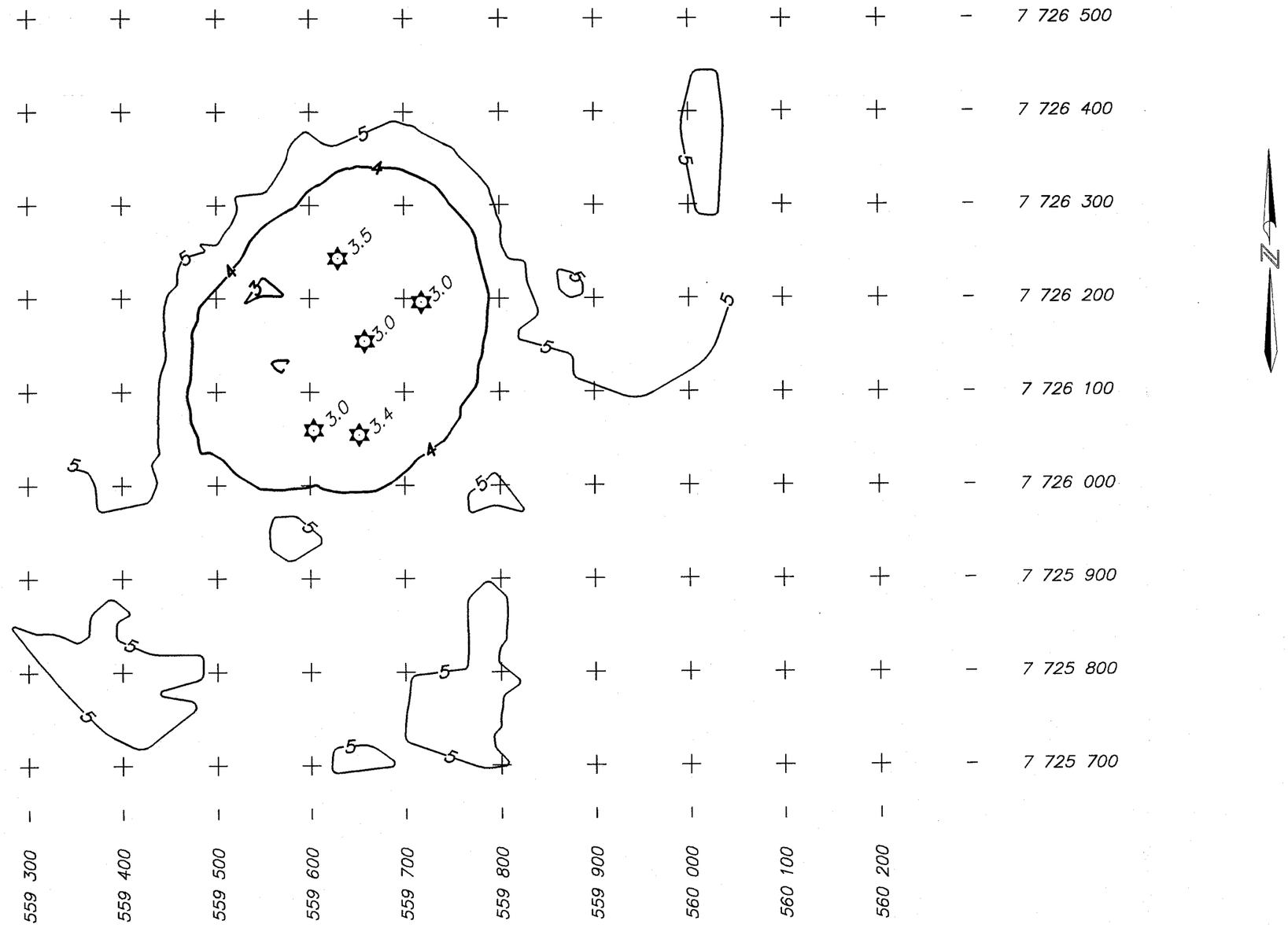

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 5.3m BELOW MSL.

DATE OF SURVEY : AUGUST 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: KUGMALLIT H-59 (AUG., 1990)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-12B	

APPROVED

2695w053.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo J-27 Operator: Esso Water Depth: 1.8m No: 13

Location

UTM N:	7703675	Latitude:	69.441778
UTM E:	466787	Longitude:	135.847444

Island Type: Sandbag Retained Island
Construction Method: Clamshell placed local silt within sandbag dyke,
Borrow Site: local, Netserk B-44 area
Fill Material: silt, gravel cap
D50: 0.001 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1976			
Freeboard (m):	1.0			
Surface Area (m):	50x105			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	69000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Esso constructed Adgo J-27, a gravel capped sandbag retained silt island, in 1976. The island is located in 1.8 m of water on soft clays and loose silts of the Mackenzie Trough. A clamshell placed 69,000 m3 of local silt within the sandbag dyke to create a gravel capped island 50 m x 105 m with a freeboard of 1.0 m. The island was abandoned in September 1977, and by 1980 had not been eroded to the waterline.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo J-27 Operator: Esso Water Depth: 1.8m No: 13

Location

UTM N:	7703675	Latitude:	69.441778
UTM E:	466787	Longitude:	135.847444

Date (mm/dd/yy)

Construction:	1976
Rig Release:	08/07/79
Abandoned:	09/79

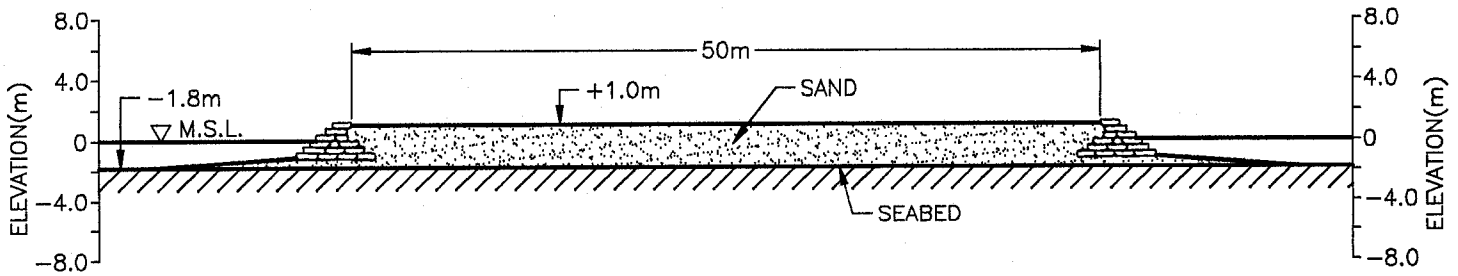
Physiographic Location:	Mackenzie Trough
Seabed Conditions:	soft clays and loose silts
Nearest Hole:	

Ice Conditions

Ice Zone:	bottom fast
Freeze-up (median):	Oct 8
Freeze-up (earliest):	Sept 24
Freeze-up (latest):	Oct 22
Landfast Ice Formation:	mid Oct
Rubble Formation:	no
Extent:	none
Ice Scour Potential:	insignificant
Break-up (median):	July 2
Break-up (earliest):	June 8
Break-up (latest):	July 9
Open Water Days (median):	111
Summer Intrusions (in 15):	0 in 15

Wave Conditions

Exposure:	low
Extreme Storm Events:	56 in 12 yrs
Lease No.:	
License:	W1020
COGLA file:	69-30-135-45



ADGO J−27 − SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 10 20m

(1:500)

TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ADGO J−27			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A−2695−03−13	REV.

2695w016.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Arnak L-30 Operator: Esso Water Depth: 8.5m No: 14

Location

UTM N:	7747019	Latitude:	69.829028
UTM E:	543381	Longitude:	133.872528

Island Type: Sacrificial Beach Island
Construction Method: Stationary cutter suction dredged sand,
Borrow Site: local
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	CES	CSS
Date:	1976	1984	1989	1990
Freeboard (m):	5.2	-2.7	-3.0	-3.5
Surface Area (m):	111x122			
Base Area (m):				
Slopes (ave.):	20:1	40-10:1	50-20:1	40-15:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1150000			1000000
Subcut Fill Quantity (m3):				
No Targets:				19
Survey Quality:				good

Description

Esso revived the sacrificial beach island concept in 1976 to construct Arnak L-30. It was located in 8.5 m of water on soft clays and loose silts in the Kugmallit Channel. During the 1976 open water season, 1,150,000 m3 of sand fill was extracted from an adjacent borrow pit using a stationary cutter suction dredge and placed using a floating pipeline. The island had a 122 m x 111 m working surface, 210 m diameter waterline dimension and 5.2 m freeboard. The sacrificial beach was maintained at a 20H:1V slope; despite this, the island experienced erosion at a rate of 3 m/day. Drilling activities took place over the 1976-77 winter season, and the island was abandoned in August 1977. By 1979, the island had eroded to the waterline. Challenger surveyed the island in 1990, and showed that the surface had eroded to 3.5 m below sea level. Side scan sonar identified 19 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Arnak L-30 Operator: Esso Water Depth: 8.5m No: 14

Location

UTM N: 7747019 Latitude: 69.829028
UTM E: 543381 Longitude: 133.872528

Date (mm/dd/yy)

Construction: 1976
Rig Release: 03/16/77
Abandoned: 08/77

Physiographic Location: Akpak Plateau
Seabed Conditions: soft clays and loose silts
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: early Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

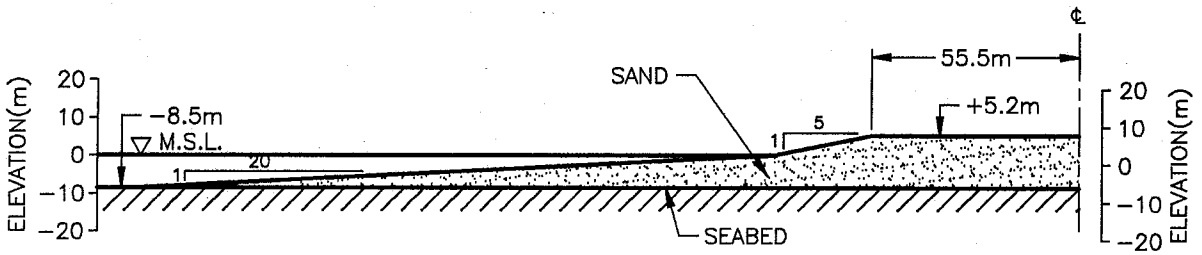
Break-up (median): July 9
Break-up (earliest): July 2
Break-up (latest): July 23

Open Water Days (median): 98
Summer Intrusions (in 15): 1 in 15

Wave Conditions

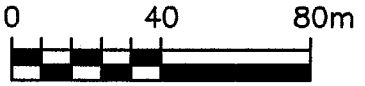
Exposure: moderate
Extreme Storm Events: 56 in 12 yrs

Lease No.:
License:
COGLA file: 69-50-133-45



ARNAK L–30 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO



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TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ARNAK L–30			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No. PA2695.03	DWG. No. A–2695–03–14	REV.

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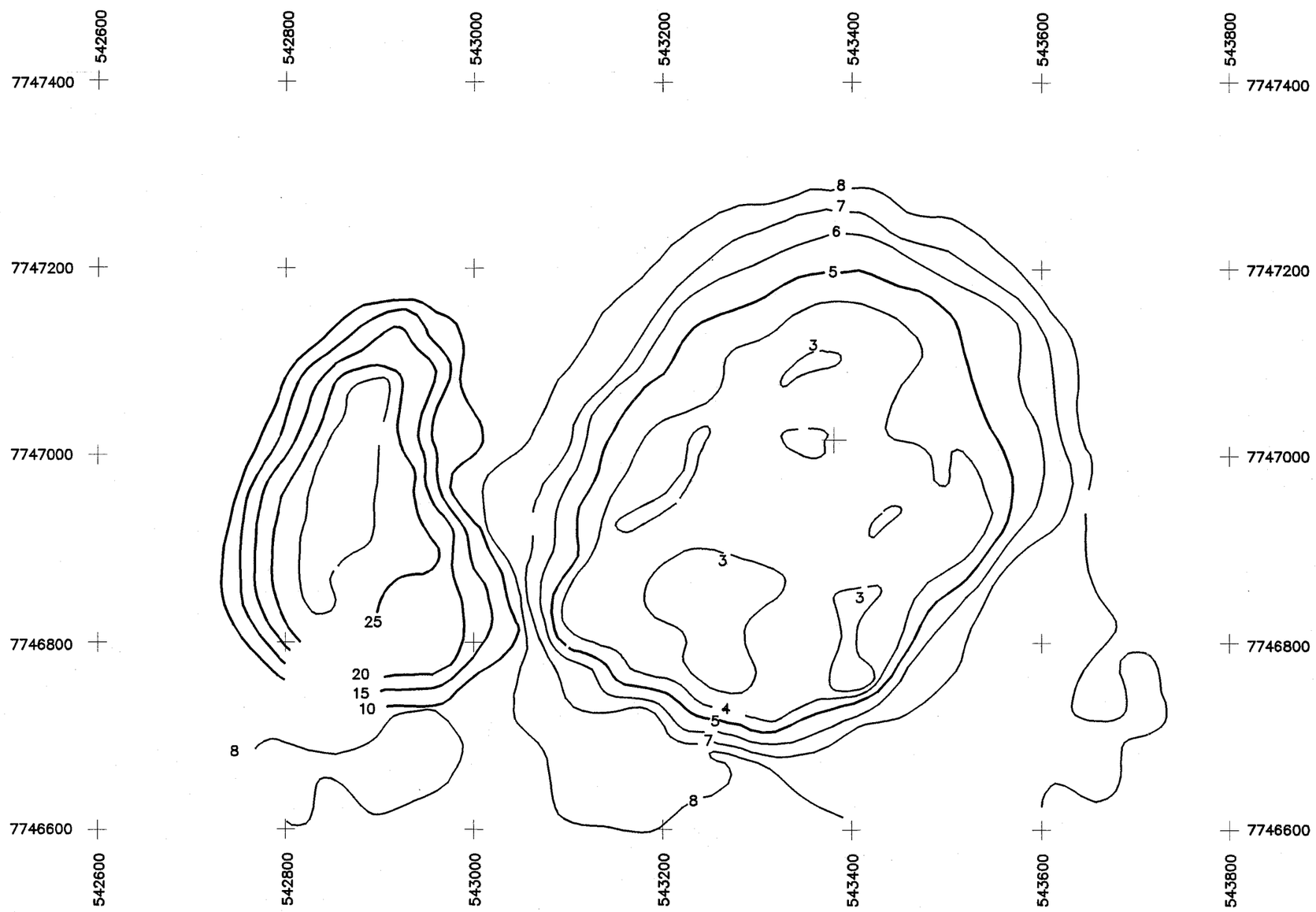

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : JULY 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ARNAK L-30 (JUL., 1982)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-14A
REV.	

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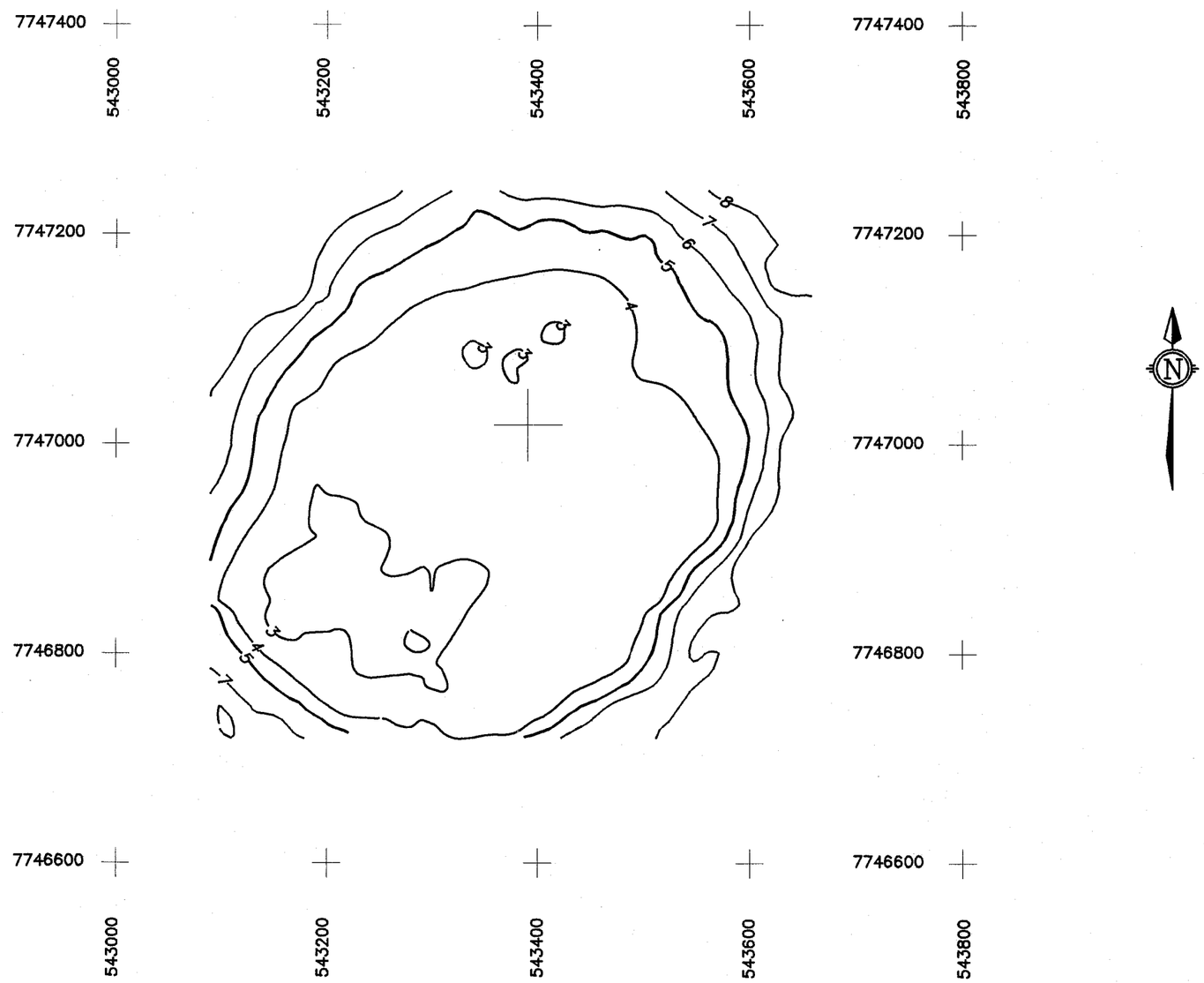

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : AUGUST 1984, CANADIAN ENGINEERING SURVEYS CO. LTD.

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ARNAK L-30 (AUG., 1984)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-14B	

APPROVED

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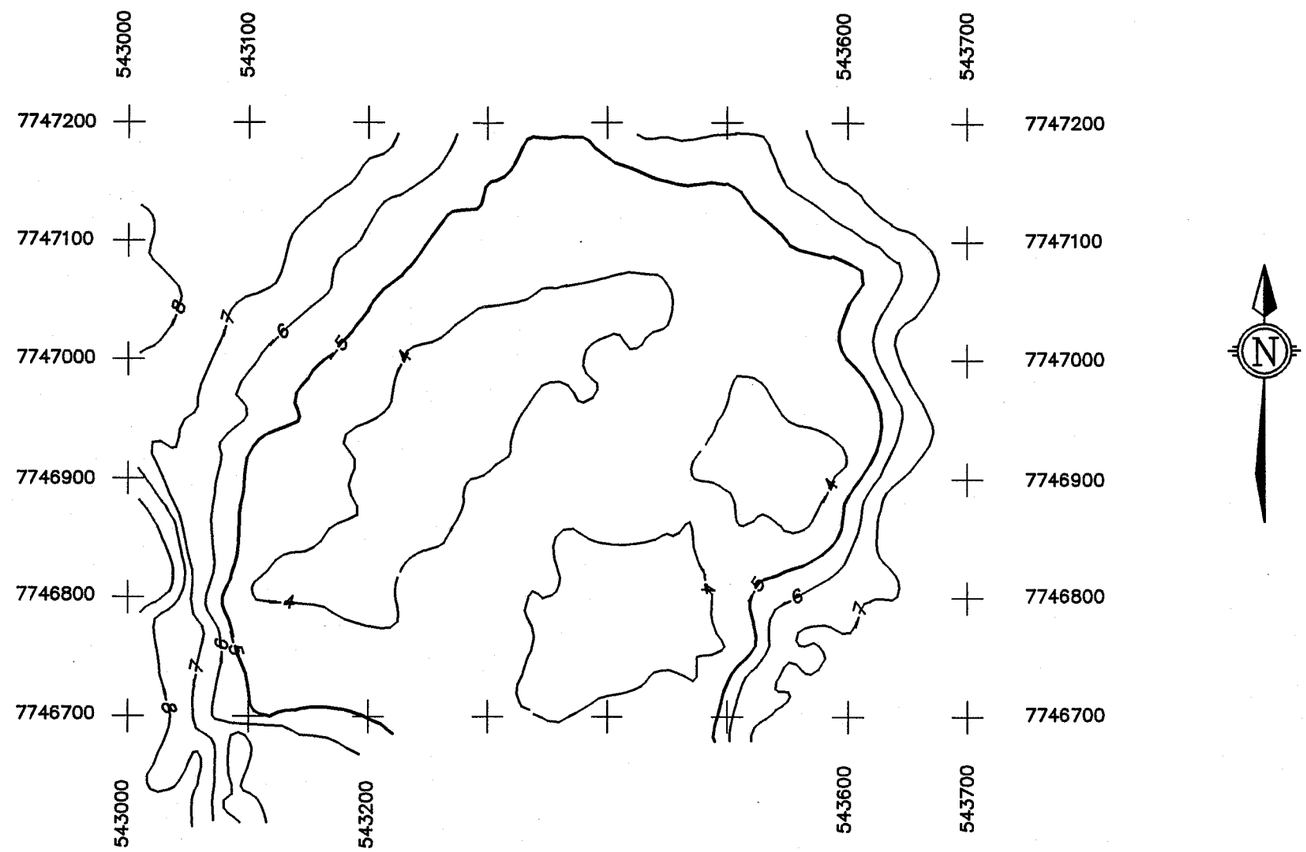

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1989, CANADIAN SEABED RESEARCH LTD.

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SCALE 1 : 5000

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ARNAK L-30 (SEP. 1989)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-14C	

APPROVED

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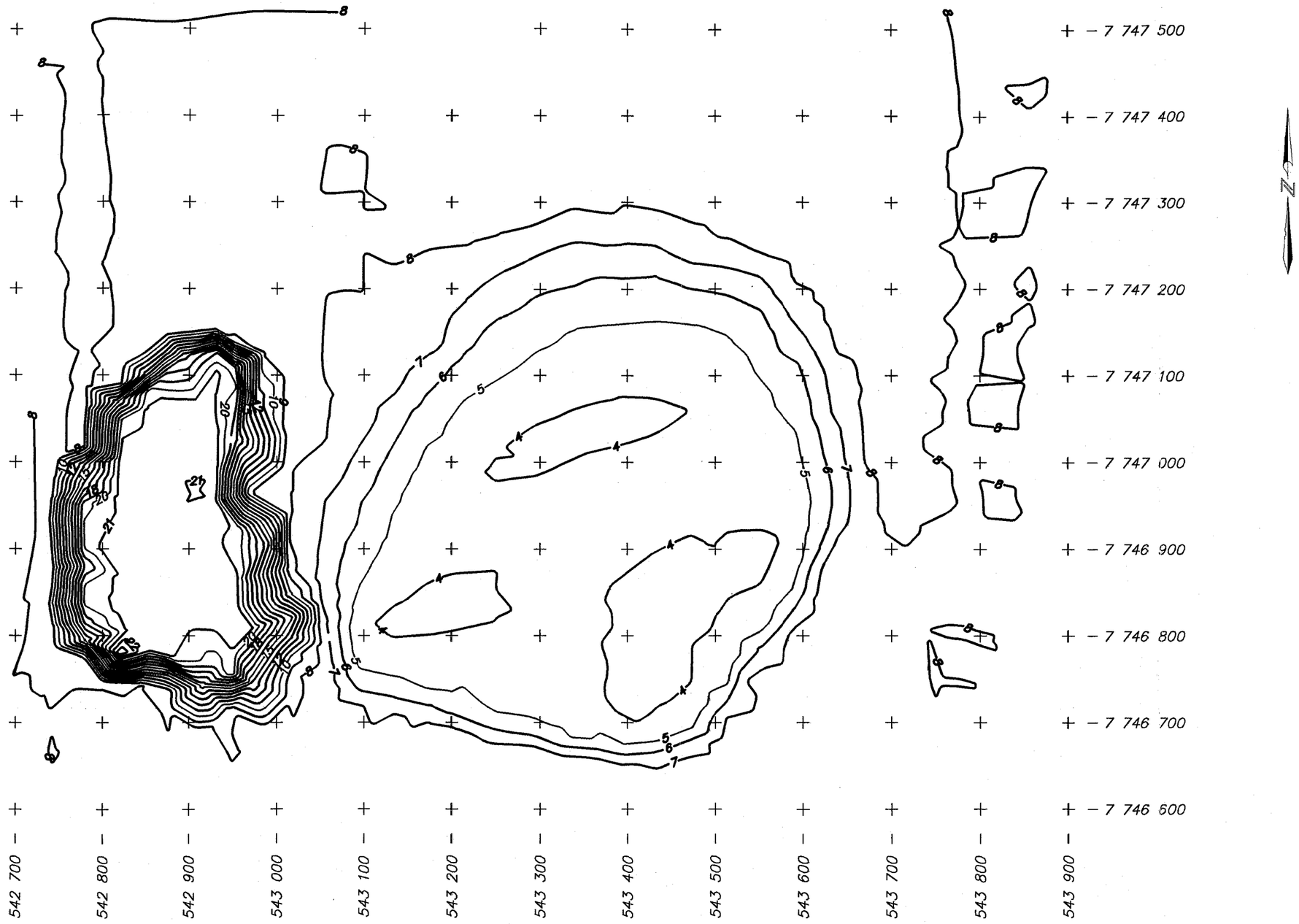

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : AUGUST 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ARNAK L-30 (AUG., 1990)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-14D	

APPROVED

2695w044.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kannerk G-42 Operator: Esso Water Depth: 8.5m No: 15

Location

UTM N:	7769814	Latitude:	70.023306
UTM E:	415533	Longitude:	131.215583

Island Type: Sacrificial Beach Island
Construction Method: Pipeline dredged, hydraulically placed sand.
Borrow Site: local
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	Esso	CSS
Date:	1976	09/05/82	1983	1990
Freeboard (m):	5.2	-2.2	-4.0	-3.2
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):		40-12:1		50-10:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1150000			1000000
Subcut Fill Quantity (m3):				
No Targets:				17
Survey Quality:				good-exec

Description

Kannerk G-42 was built as a sacrificial beach island by Esso in the 1976 open water season in 8.5 m of water on sand of the Kaglulik Plain. Local sand, totalling 1,150,000 m3, was dredged with a stationary cutter suction dredge and placed with a floating pipeline to create an island surface 100 m in diameter with a 5.2 m freeboard. Drilling activities were carried out on the island over the 1976-77 winter months. The island was subsequently abandoned in the summer of 1977, and had eroded to the waterline by 1978. A survey conducted by Challenger in 1990 indicated the island had eroded to 3.2 m below sea level, while side scan sonar delineated 17 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kannerk G-42 Operator: Esso Water Depth: 8.5m No: 15

Location

UTM N: 7769814 Latitude: 70.023306
UTM E: 415533 Longitude: 131.215583

Date (mm/dd/yy)

Construction: 1976
Rig Release: 05/14/77
Abandoned: sum 1977

Physiographic Location: Kaglulik Plain
Seabed Conditions: sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

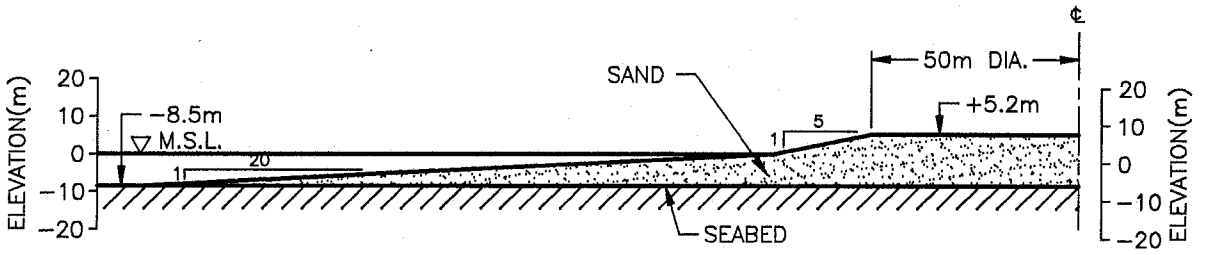
Break-up (median): July 9
Break-up (earliest): June 4
Break-up (latest): Aug 13

Open Water Days (median): 101
Summer Intrusions (in 15): 2 in 15

Wave Conditions

Exposure: moderate
Extreme Storm Events: 56 in 12 yrs

Lease No.:
License:
COGLA file: 70-10-131-00



KANNERK G−42 − SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

0 40 80m

(1:2000)

TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: KANNERK G−42			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A−2695−03−15	REV.

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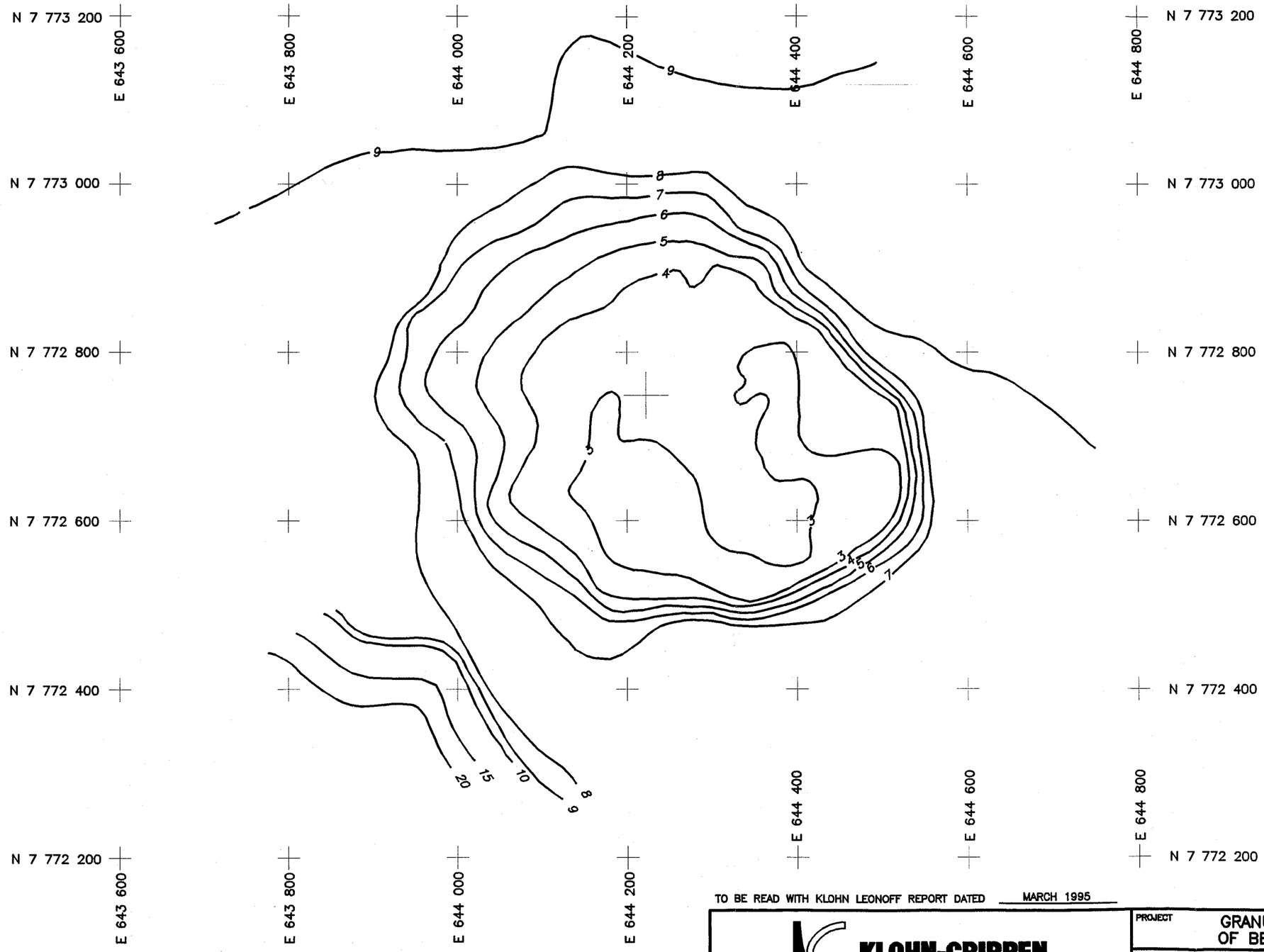

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: KANNERK G-42 (SEP. 5, 1982)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-15A	1

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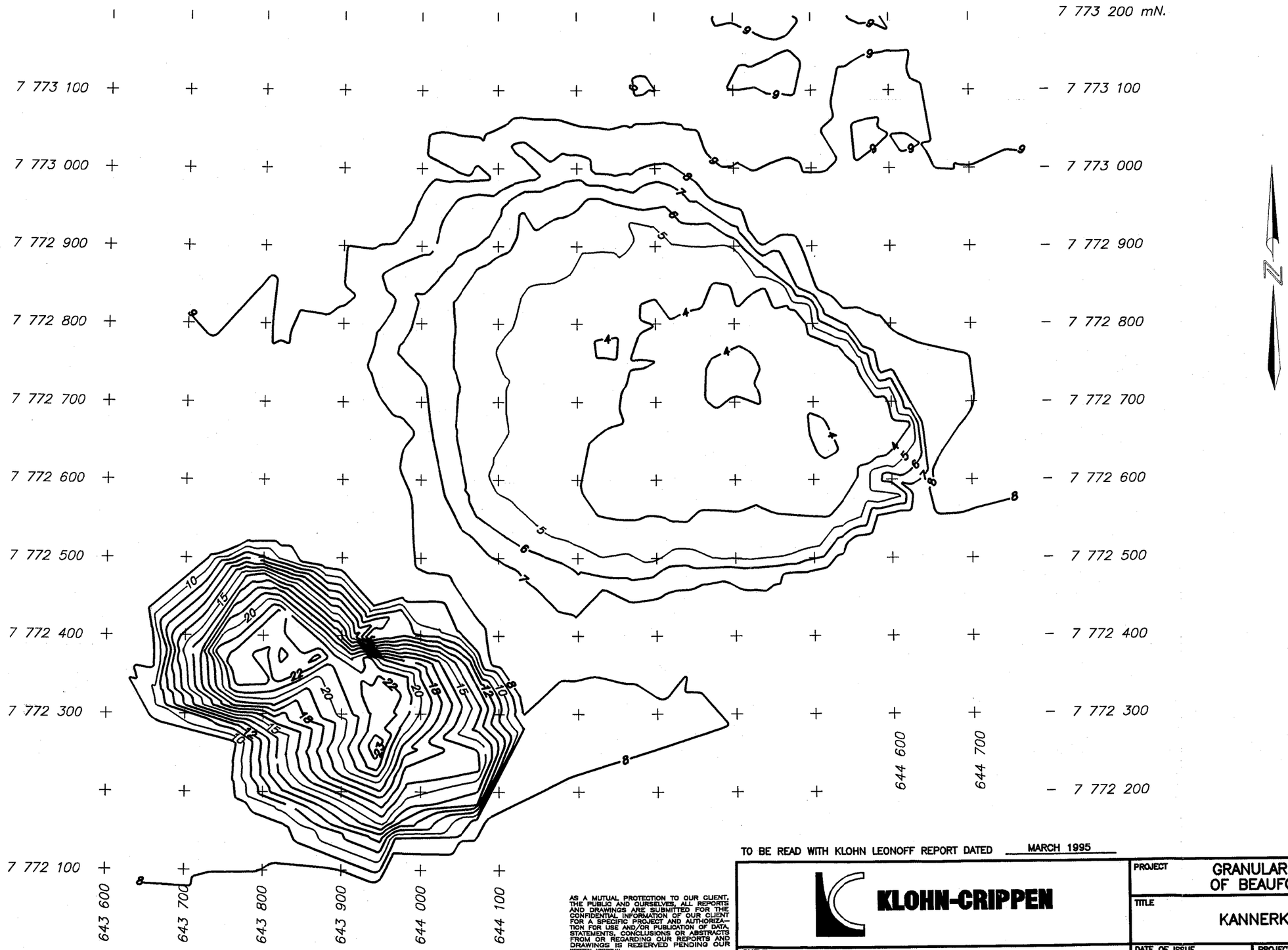

ORIGINAL SEABED : 8.5m BELOW MSL.

DATE OF SURVEY : AUGUST 1990, CHALLENGER SURVEYS AND SERVICES LTD.

2695w056.dwg

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KANNERK G-42 (AUG., 1990)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-15B
REV.	

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Isserk E-27 Operator: Esso Water Depth: 13.0m No: 16

Location

UTM N:	7758902	Latitude:	69.938889
UTM E:	524131	Longitude:	134.369667

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand, dredged with pipeline.
Borrow Site: local, Tuft Pt.
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	Esso	CSS
Date:	1977	07/23/82	1983	1990
Freeboard (m):	5.0	-4.5	-4.5	-5.0
Surface Area (m):	100 dia			
Base Area (m):				
Slopes (ave.):		40-12:1		40-16:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1908000			1500000
Subcut Fill Quantity (m3):				
No Targets:				39
Survey Quality:				poor

Description

Esso constructed Isserk E-27, a sacrificial beach island, in the 1977 open water season. The island is located on the Akpak Plateau in 13.0 m of water on a seabed consisting of a veneer of soft clay overlying sand. Sand was dredged using a stationary suction cutter dredge and placed with a floating pipeline. Additional sand was acquired from Tufts Point. The finished island, requiring 1,908,000 m3 of fill, had a working surface 100 m in diameter, a waterline dimension of 227 m, and a 5.0 m freeboard. The island was abandoned in July, 1978, following a winter drilling program, and eroded to the waterline in the same year. A survey conducted in 1990 by Challenger indicated the island had further eroded to 5.0 m below sea level, while side scan sonar delineated 39 possible targets.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Isserk E-27 Operator: Esso Water Depth: 13.0m No: 16

Location

UTM N: 7758902 Latitude: 69.938889
UTM E: 524131 Longitude: 134.369667

Date (mm/dd/yy)

Construction: 1977
Rig Release: 03/29/78
Abandoned: 07/78

Physiographic Location: Akpak Plateau
Seabed Conditions: veneer of soft clay over sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: large
Ice Scour Potential: low to modera

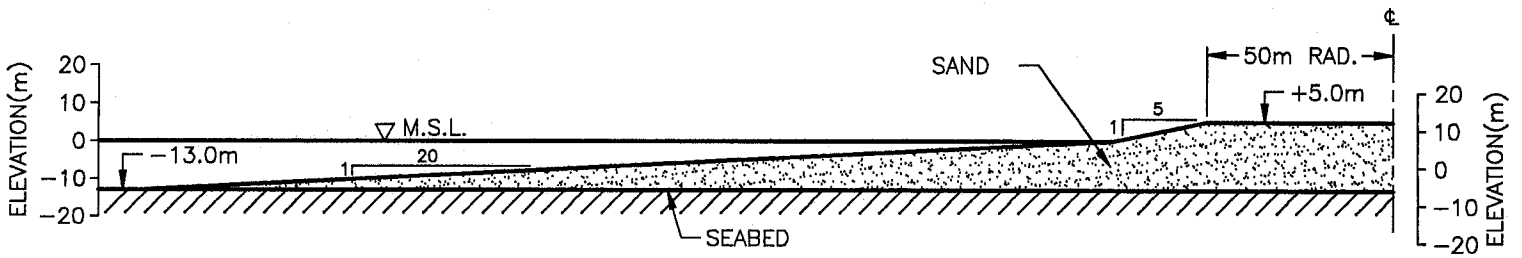
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 1 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 46 in 11 yrs

Lease No.:
License:
COGLA file: 70-00-134-15



ISSERK E-27 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ISSERK E-27			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-16	REV.

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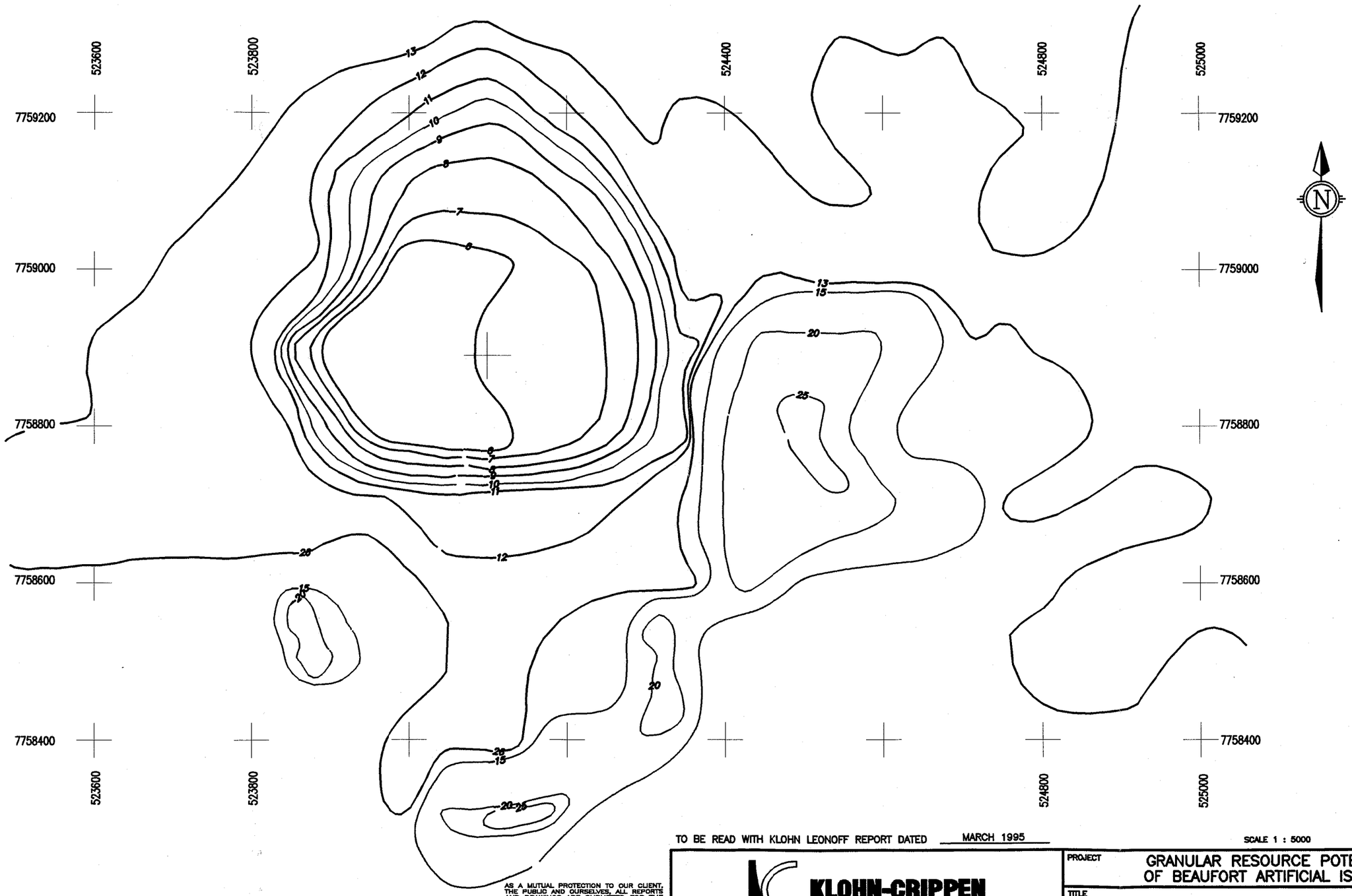

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SCALE 1 : 5000

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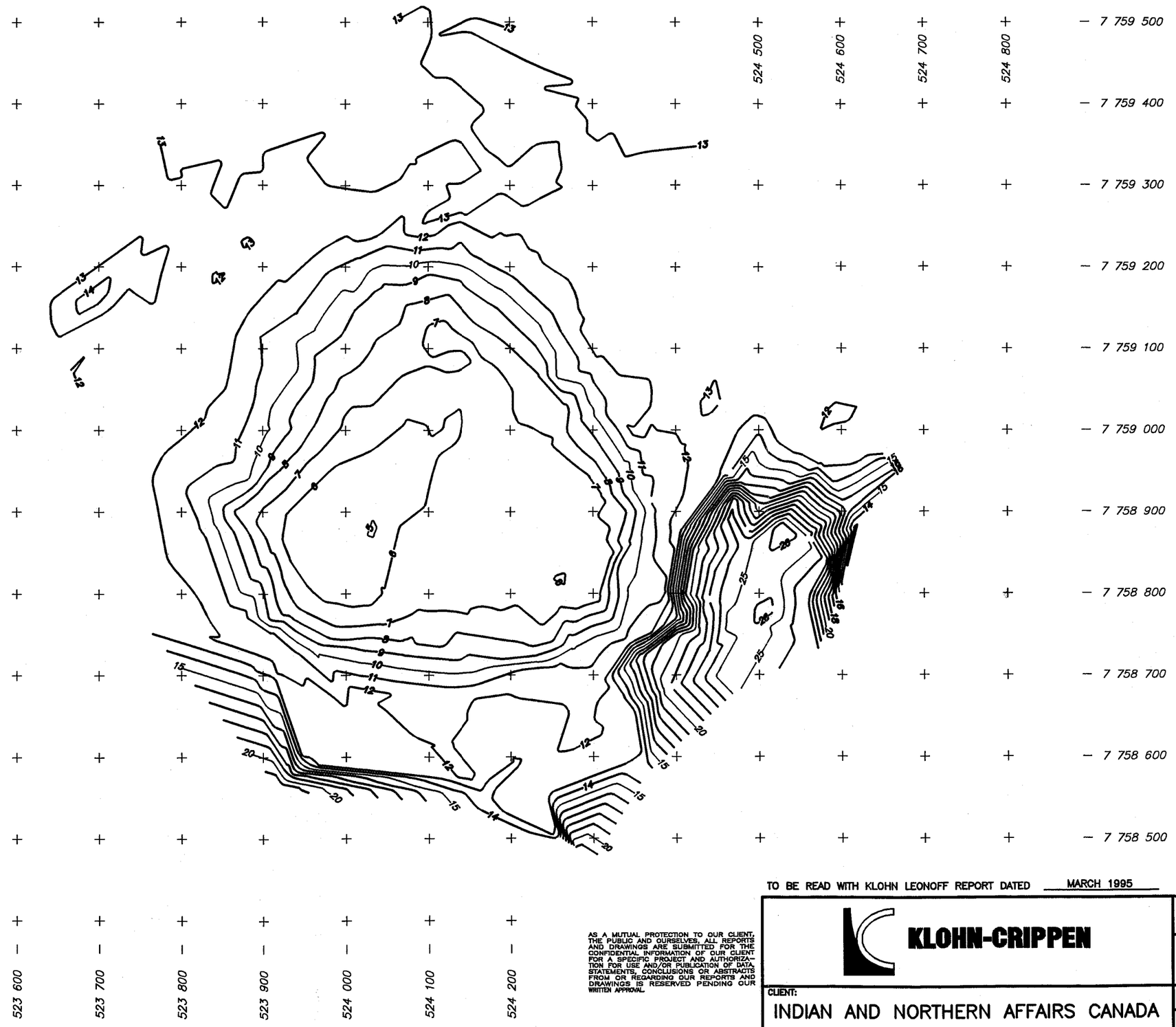
ORIGINAL SEABED : 13.0m BELOW MSL.

DATE OF SURVEY : JULY 1982, CANADIAN ENGINEERING SURVEY CO. LTD.

2695w067.dwg

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ISSERK E-27 (JUL, 1982)			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: B-2695-03-16A	REV.



ORIGINAL SEABED : 13.0m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ISSERK E-27 (JUL., 1990)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-16B	

APPROVED

2695w055.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Issungnak O-61 Operator: Esso Water Depth: 19.0m No: 17

Location

UTM N:	7767726	Latitude:	70.016806
UTM E:	526213	Longitude:	134.313306

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand. Below water line, fill
Borrow Site: local, Tuft Pt.
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1979	Sepstorm		
Freeboard (m):	5.0	1.2		
Surface Area (m):	100 dia			
Base Area (m):	800 dia			
Slopes (ave.):	15-25-3:1			
Subcut Depth (m):				
Total Fill Quantity (m3):	4100000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Issungnak O-61 was constructed by Esso in 19.0 m of water during the 1978-79 open water seasons on stiff clay overlying sand on the Akpak Plateau. It was a sacrificial beach island requiring 4.1 million m3 of sand fill acquired mostly by suction cutting from a local pit and placing hydraulically on the site. Sand above the waterline was hauled by dump barge from Tufts Point and placed hydraulically. The working surface was 100 m in diameter, with a 5.0 m freeboard. Side slopes of 3H:1V were maintained above water, while the beach sloped at 20H:1V to a base 800 m on diameter. In September 1979, as the island neared completion, it was damaged by two storms that eroded the island to 1.5 m above sea level, redistributing the sand in a 100 m apron around the working surface. This acted as a breakwater, and drilling proceeded over the winter months as planned. The following summer, the island was rebuilt 40 m to the west, and renamed Issungnak 2-O-61.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Issungnak O-61 Operator: Esso Water Depth: 19.0m No: 17

Location

UTM N: 7767726 Latitude: 70.016806
UTM E: 526213 Longitude: 134.313306

Date (mm/dd/yy)

Construction: 1978-79
Rig Release:
Abandoned:

Physiographic Location: Akpak Plateau
Seabed Conditions: stiff clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Dec
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

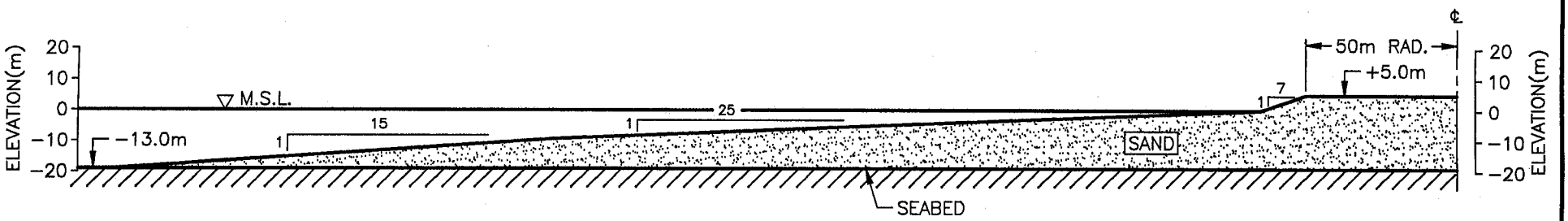
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 1 in 15

Wave Conditions

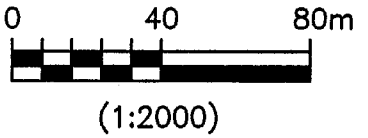
Exposure: high
Extreme Storm Events: 33 in 9 yrs

Lease No.:
License: W2285
COGLA file: 70-10-134-00



ISSUNGNAK O-61 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO



TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ISSUNGNAK O-61			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-17	REV.

2695w020.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Issungnak 2-O-61 Operator: Esso Water Depth: 19.0m No: 18

Location

UTM N: 7767705 Latitude: 70.016694
UTM E: 526151 Longitude: 134.313444

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand, reclaimed from O-61
Borrow Site: Issungnak O-61
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CES	CSR	CSS
Date:	1979	08/81	1989	1990
Freeboard (m):	5.0	-2.2	-3.1	-4.0
Surface Area (m):	100 dia			
Base Area (m):	800 dia			
Slopes (ave.):	10-15:1	14-9:1	22-5:1	17-5:1
Subcut Depth (m):				
Total Fill Quantity (m3):	4900000			3800000
Subcut Fill Quantity (m3):				
No Targets:				27
Survey Quality:				poor

Description

Issungnak O-61 was constructed by Esso in 19.0 m of water during the 1978-79 open water seasons on stiff clay overlying sand on the Akpak Plateau. It was a sacrificial beach island requiring 4.1 million m3 of sand fill acquired mostly by suction cutting from a local pit and placing hydraulically on the site. Sand above the waterline was hauled by dump barge from Tufts Point and placed hydraulically. The working surface was 100 m in diameter, with a 5.0 m freeboard. Side slopes of 3H:1V were maintained above water, while the beach sloped at 20H:1V to a base 800 m on diameter. In September 1979, as the island neared completion, it was damaged by two storms that eroded the island to 1.5 m above sea level, redistributing the sand in a 100 m apron around the working surface. This acted as a breakwater, and drilling proceeded over the winter months as planned. The following summer, the island was rebuilt 40 m to the west, and renamed Issungnak 2-O-61.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Issungnak 2-O-61 Operator: Esso Water Depth: 19.0m No: 18

Location

UTM N: 7767705 Latitude: 70.016694
UTM E: 526151 Longitude: 134.313444

Date (mm/dd/yy)

Construction: 1980
Rig Release: 08/13/81
Abandoned: 09/81

Physiographic Location: Akpak Plateau
Seabed Conditions: stiff clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Dec
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

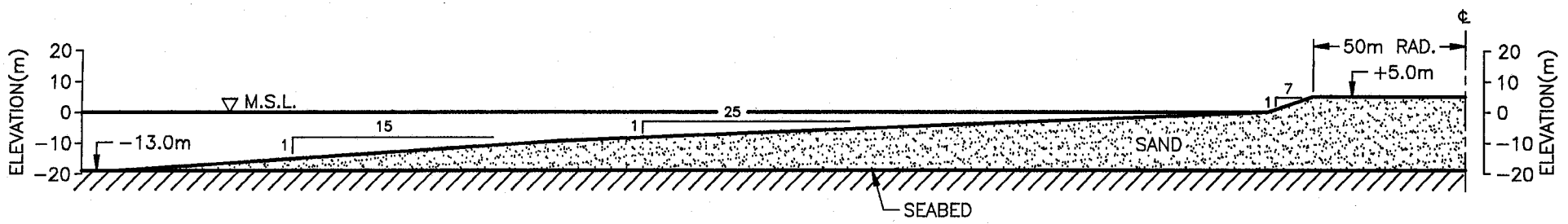
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 1 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 31 in 8 yrs

Lease No.:
License:
COGLA file: 70-10-134-00



ISSUNGNAK 2-O-61 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

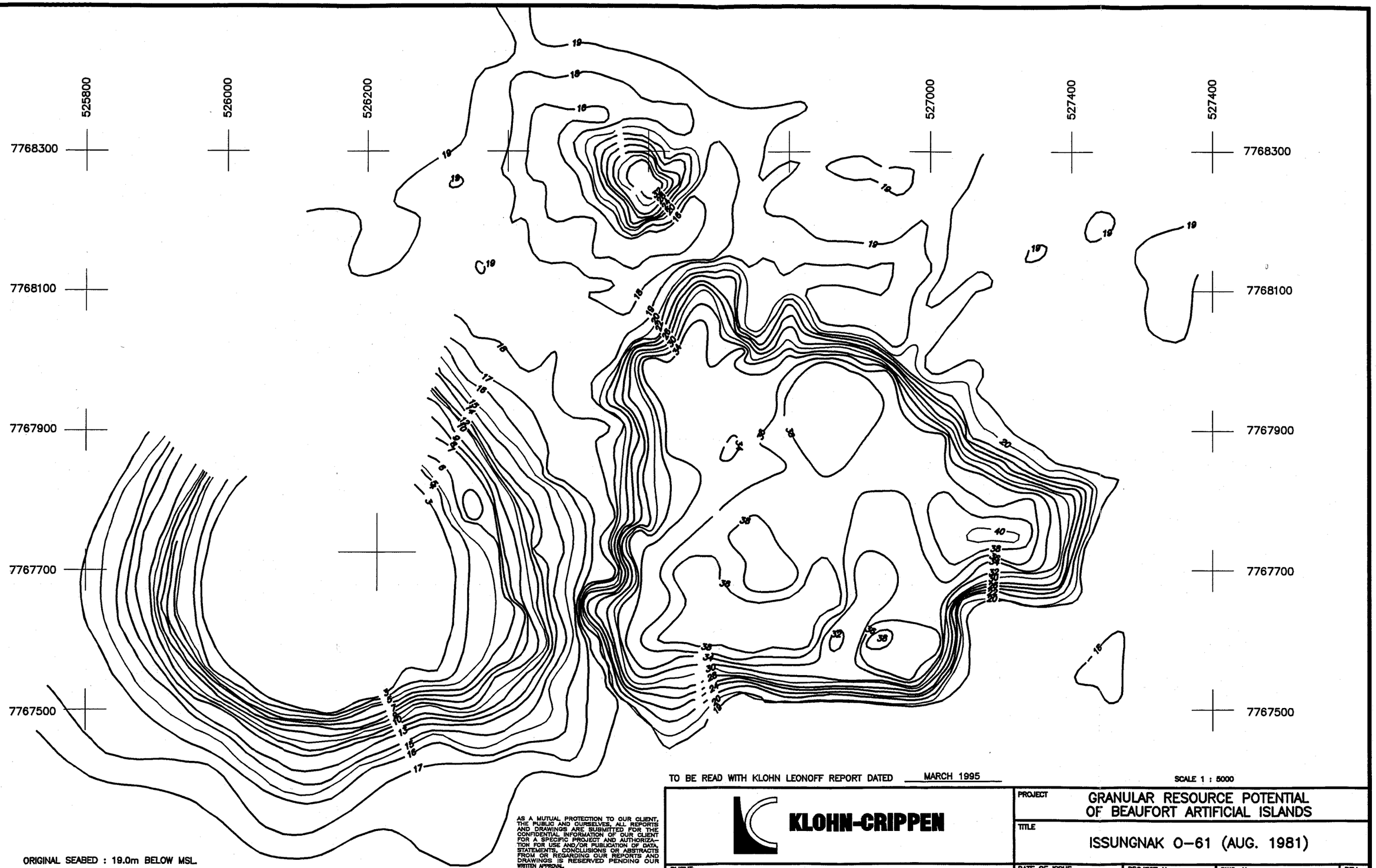
0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ISSUNGNAK 2-O-61			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-18	REV.

2695w021.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 19.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1981, CANADIAN ENGINEERING SURVEYS CO. LTD.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ISSUNGNAK O-61 (AUG. 1981)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-18A	

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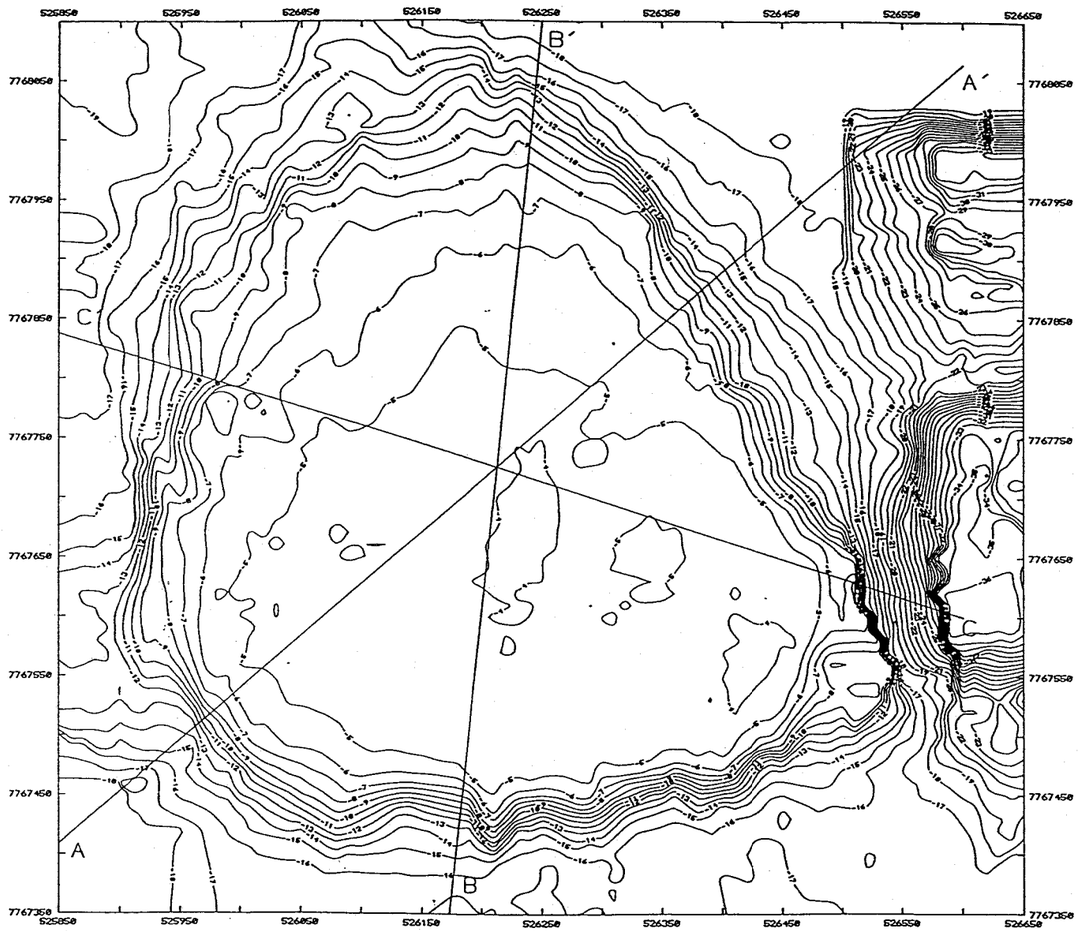
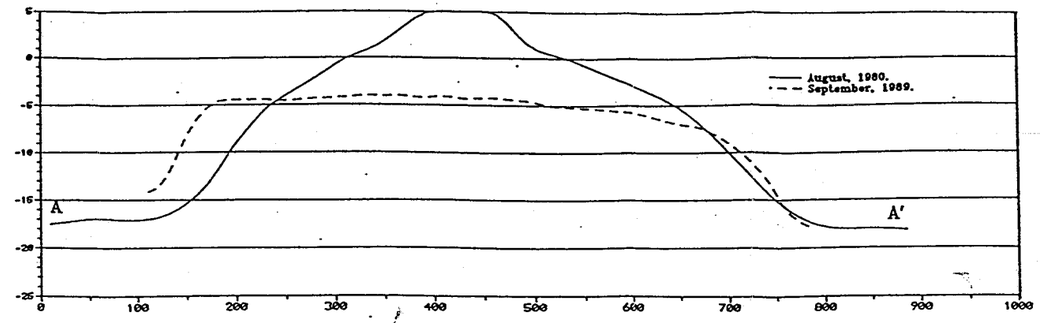
2695w101.dwg

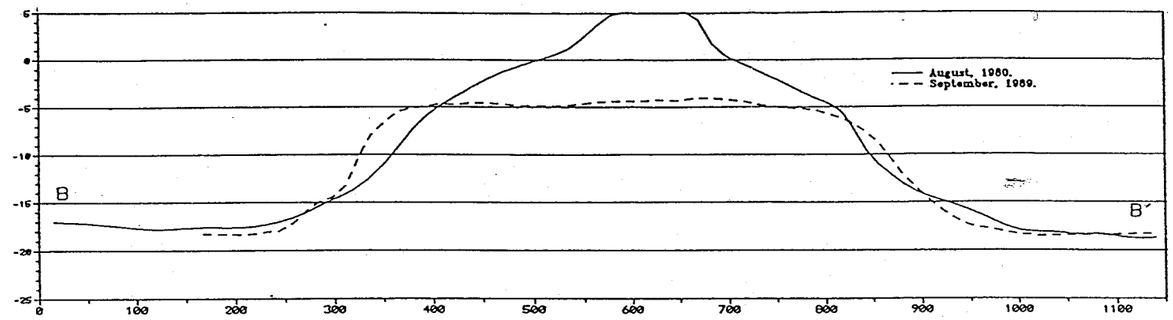
ISSUNGNAK O-61 - SEPTEMBER, 1989.



ISSUNGNAK O-61 CROSS SECTION A-A'



ISSUNGNAK O-61 CROSS SECTION B-B'



ISSUNGNAK O-61 CROSS SECTION C-C'

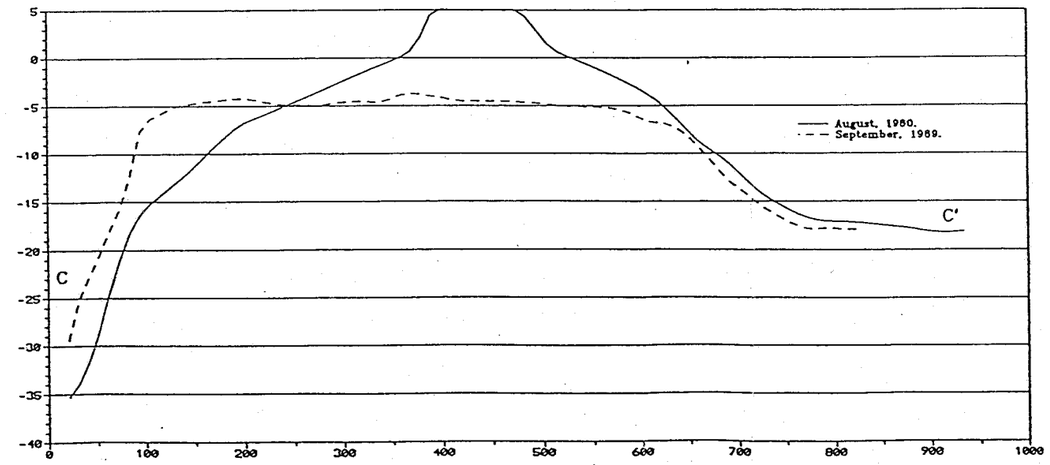


Figure 5.12 Cross sections A-A', B-B', C-C' of the Issungnak 0-61 artificial island for the years 1980 and 1989.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ISSUNGNAK O-61 (1980 & 1989)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-18B	

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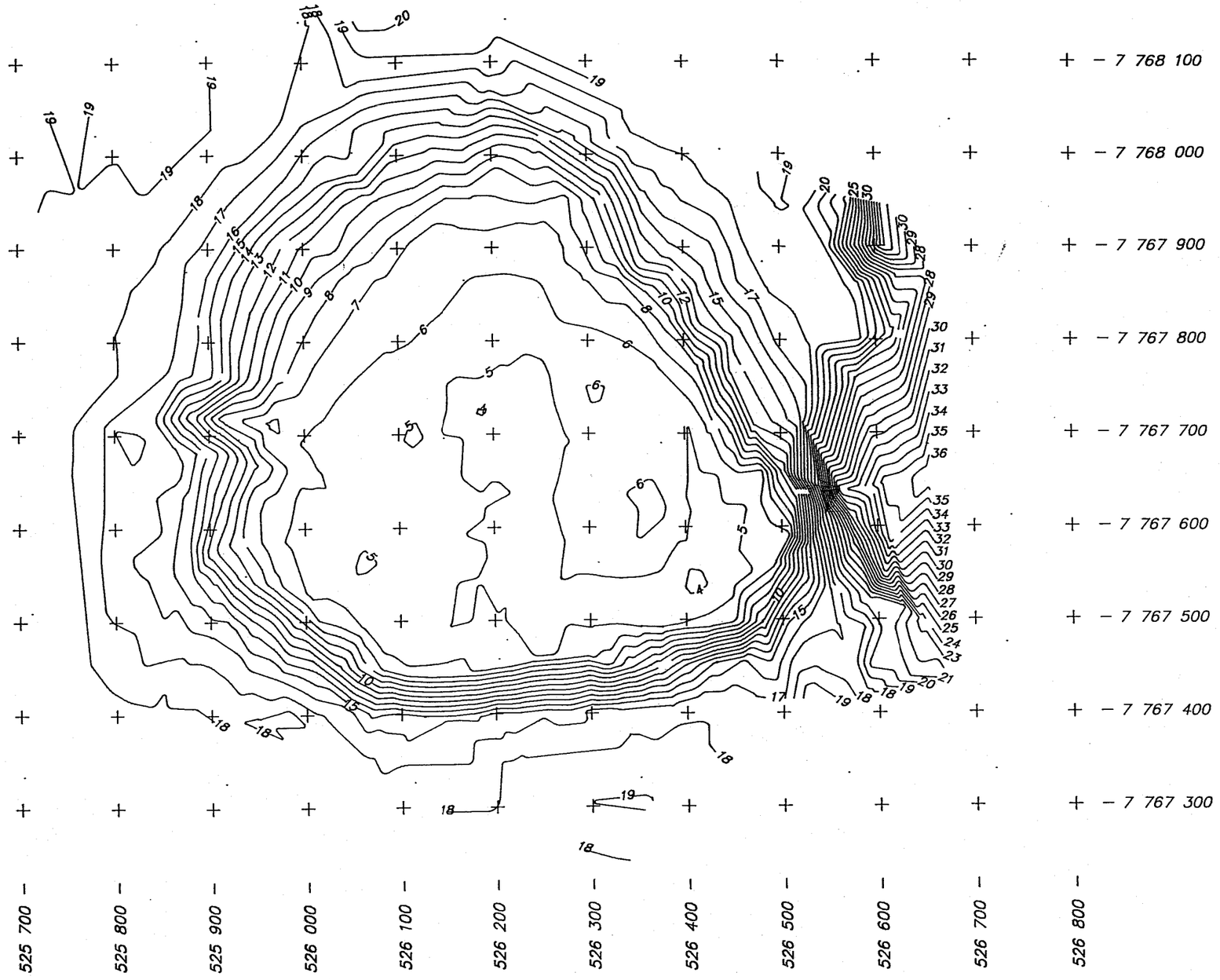
2695w105.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

ORIGINAL SEABED : 19.0m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ISSUNGNAK O-61 (JUL., 1990)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-18C
REV.	

2695w102.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Alerk P-23 Operator: Esso Water Depth: 11.6m No: 19

Location

UTM N:	7754063	Latitude:	69.882500
UTM E:	582939	Longitude:	132.839440

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand, dredged on site, placed
Borrow Site: local
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES		CSS
Date:	10/12/81	08/08/82		1990
Freeboard (m):	4.5	-2.3		-3.1
Surface Area (m):	119 dia			
Base Area (m):	729 dia			
Slopes (ave.):	15-25-7:1	18-6:1		45-9:1
Subcut Depth (m):				
Total Fill Quantity (m3):	2670000			2000000
Subcut Fill Quantity (m3):				
No Targets:				26
Survey Quality:				excellent

Description

Esso constructed Alerk P-23, a sacrificial beach island, in 10.5 m of water on a veneer of clay overlying sand on the Tingmiark Plain. Construction spanned the 1980-81 open water seasons to build the 100 m diameter working surface with a 4.5 m freeboard. A stationary suction cutter dredge excavated 1.5 million m3 of sand placed with a floating pipeline from an onsite borrow pit. Drilling activities were carried out in the 1981 winter months, and the island was abandoned in 1982. A survey was completed in 1990 by Challenger, indicating the island had eroded to 3.1 m below sea level. Side scan sonar delineated 26 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Alerk P-23 Operator: Esso Water Depth: 11.6m No: 19

Location

UTM N: 7754063 Latitude: 69.882500
UTM E: 582939 Longitude: 132.839440

Date (mm/dd/yy)

Construction: 1980-81
Rig Release: 12/24/81
Abandoned: 1982

Physiographic Location: Tingmiark Plain
Seabed Conditions: veneer of clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

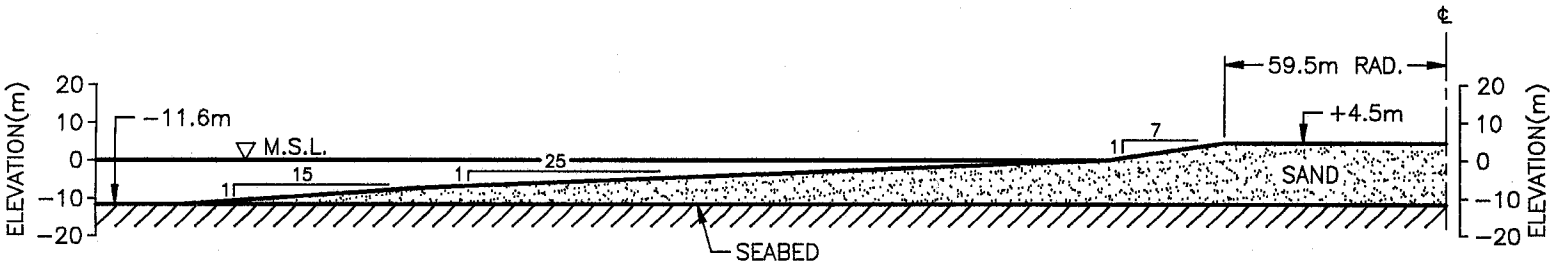
Break-up (median): June 11
Break-up (earliest): June 4
Break-up (latest): Aug 27

Open Water Days (median): 114
Summer Intrusions (in 15): 2 in 15

Wave Conditions

Exposure: moderate to high
Extreme Storm Events: 23 in 7 yrs

Lease No.:
License: W1064
COGLA file: 70-00-132-45



ALERK P–23 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

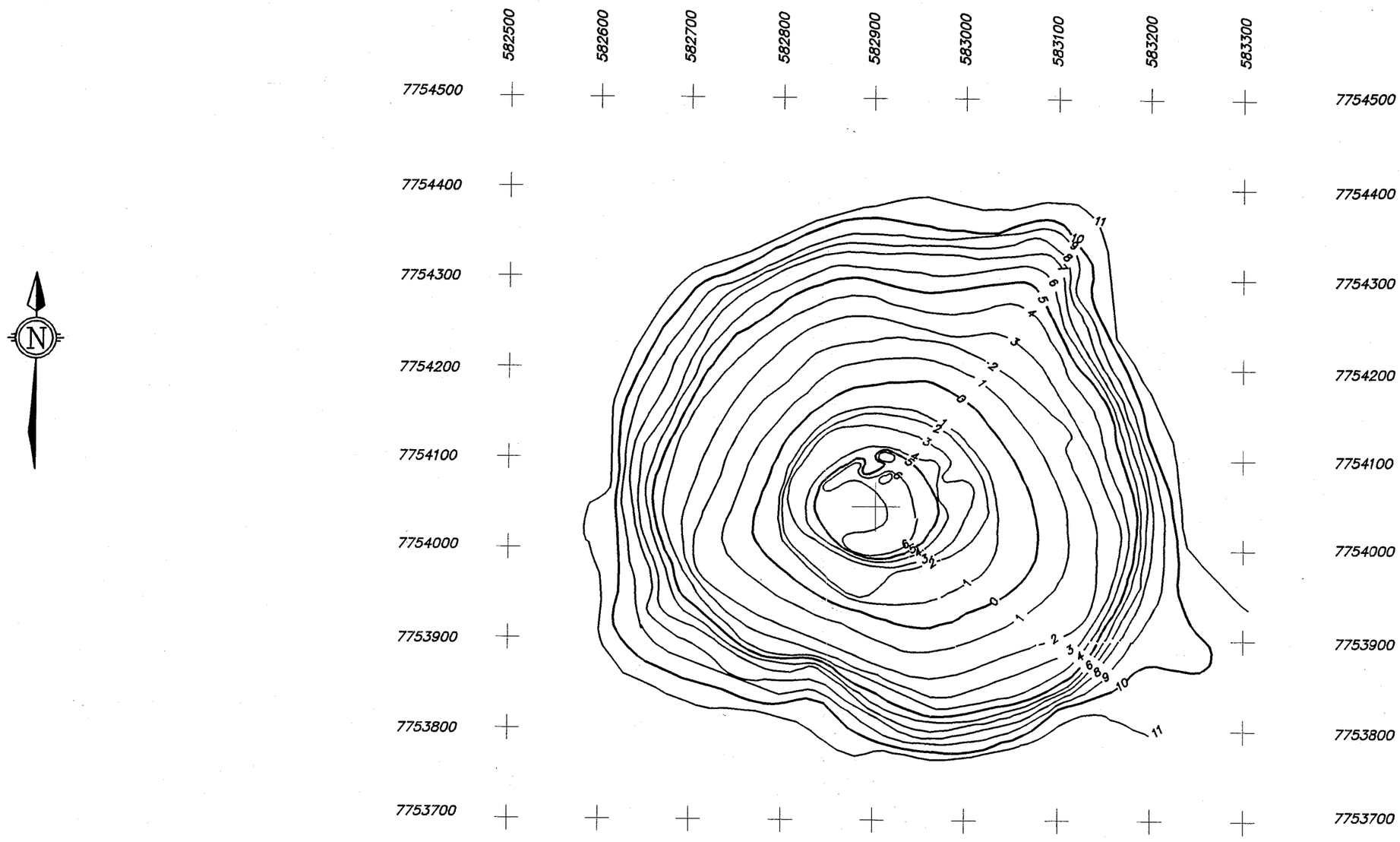
0 40 80m

(1:2000)

TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ALERK P–23			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No. PA2695.03	DWG. No. A–2695–03–19	REV.

2695w022.dwg



ORIGINAL SEABED : 11.6m BELOW MSL.

DATE OF SURVEY : OCTOBER 1981, CANADIAN ENGINEERING SURVEYS CO. LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

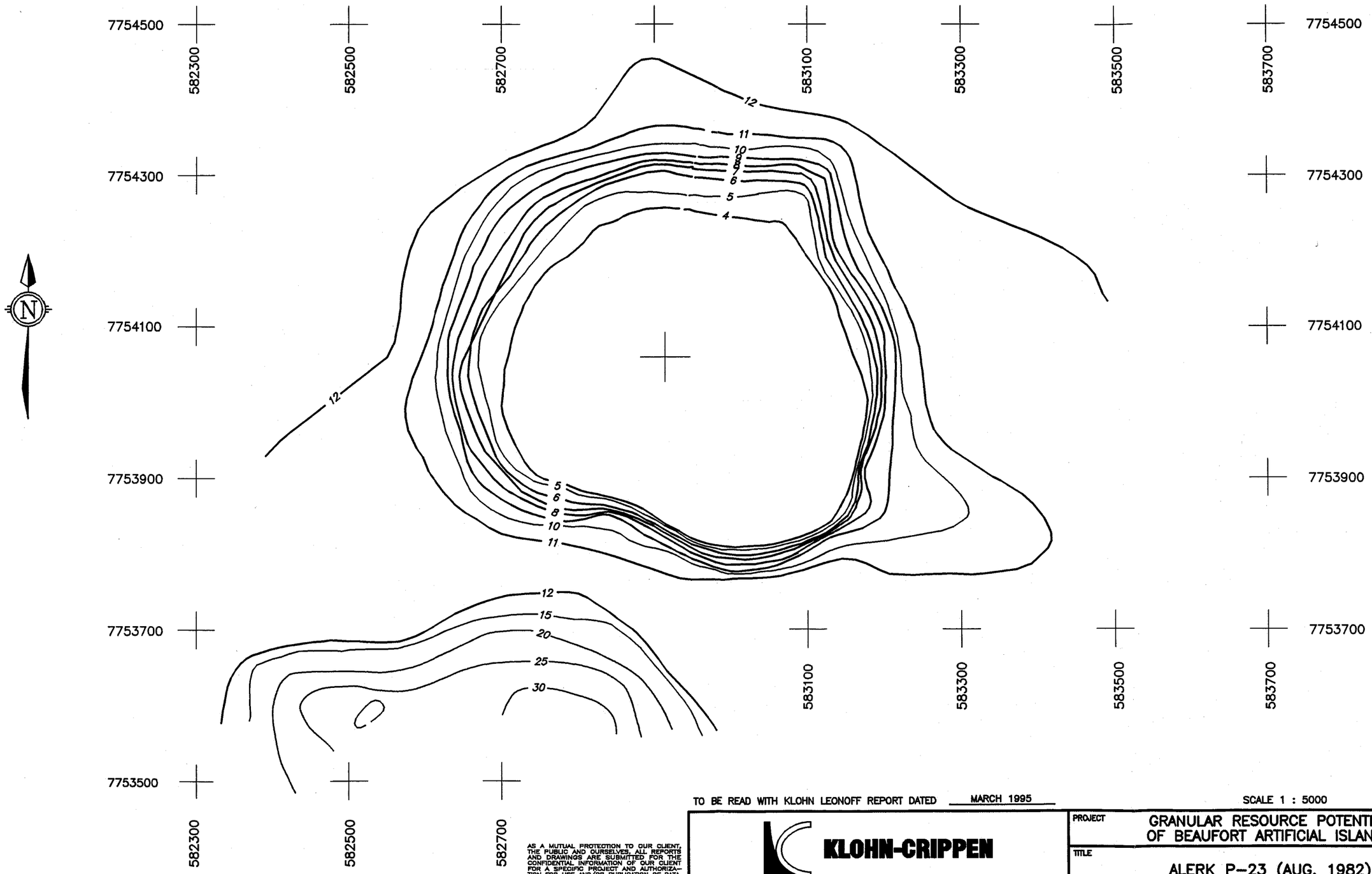
TITLE: ALERK P-23 (OCT., 1981)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-19A	

APPROVED

2695w062.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 11.6m BELOW MSL.

DATE OF SURVEY : AUGUST 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

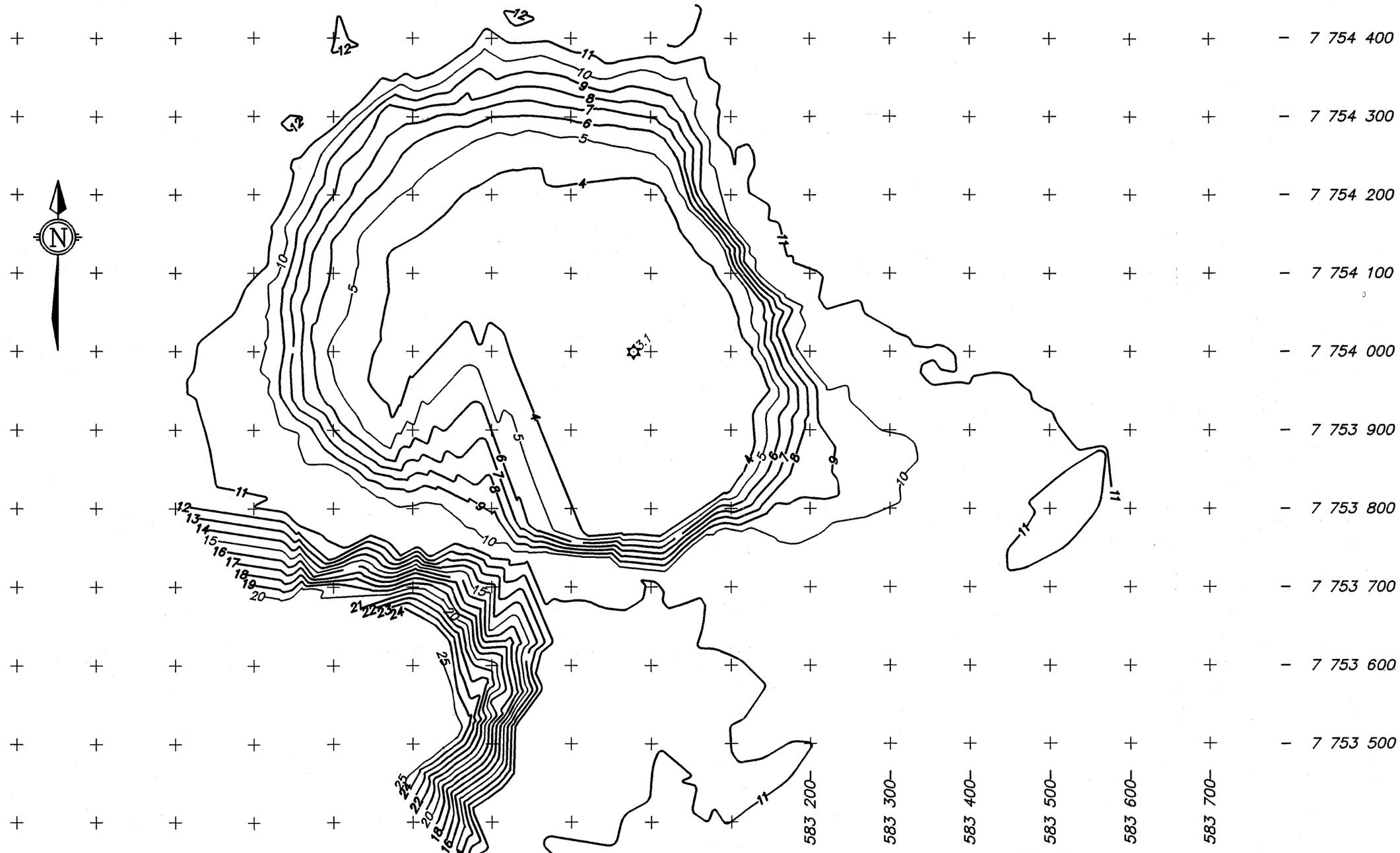
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ALERK P-23 (AUG, 1982)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-19B	

APPROVED

2695w103.dwg



ORIGINAL SEABED : 11.6m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ALERK P-23 (JUL., 1990)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-19C	

APPROVED

2695w049.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: N. Protection Is Operator: Dome Water Depth: 4.6m No: 20

Location

UTM N: Latitude:
UTM E: Longitude:

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand, dredged on site, placed
Borrow Site: local
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:				
Freeboard (m):	4.0			
Surface Area (m):	350x1200			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	2000000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Dome Petroleum Ltd. constructed the North Protection Island to provide a sheltered harbour for a marine base within McKinley Bay. The island contained an airstrip, camp facilities and a temporary dock. A total of 2 million m3 of spoil was placed using spoil obtained during dredging of access channels and mooring basins within McKinley Bay. The spoil formed an island of about 350 x 1200 m, with a 4 m freeboard. No slope protection was placed around the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: N. Protection Is Operator: Dome Water Depth: 4.6m No: 20

Location

UTM N: Latitude:
UTM E: Longitude:

Date (mm/dd/yy)

Construction: 1980-81
Rig Release:
Abandoned:

Physiographic Location:
Seabed Conditions: sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: late Oct
Rubble Formation: yes
Extent: small
Ice Scour Potential: insignificant

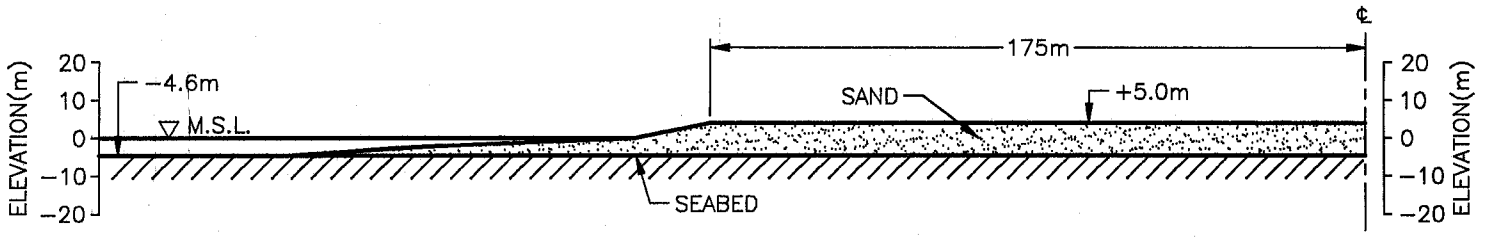
Break-up (median): July 9
Break-up (earliest): July 2
Break-up (latest): July 23

Open Water Days (median): 97
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low to moderate
Extreme Storm Events: 23 in 7 yrs

Lease No.:
License:
COGLA file:



NORTH PROTECTION ISLAND – SACRIFICIAL BEACH ISLAND

OPERATOR: DOME

0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	NORTH PROTECTION ISLAND
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	A-2695-03-20
REV.	

2695w023.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: W. Atkinson L-17 Operator: Esso Water Depth: 6.0m No: 21

Location

UTM N:	7743427	Latitude:	69.776083
UTM E:	612790	Longitude:	132.075666

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand.
Borrow Site: local
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES			CSS
Date:	09/25/82			1990
Freeboard (m):	4.5			-2.1
Surface Area (m):	111 dia			
Base Area (m):	517 dia			
Slopes (ave.):	4-6:1			75-15:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1000000			800000
Subcut Fill Quantity (m3):				
No Targets:				13
Survey Quality:				excellent

Description

West Atkinson L-17 was constructed by Esso in the 1981-82 open water seasons as a sacrificial beach island in 7.5 m of water on a seabed of soft clay overlying sand. One million m3 of sand fill was hydraulically placed from a local borrow pit to create a 100 m diameter island with a 4.5 m freeboard. The island was abandoned in 1982 following drilling activities. A survey conducted by Challenger in 1990 indicated the island had eroded to 2.1 m below sea level, and side scan sonar delineated 13 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: W. Atkinson L-17 Operator: Esso Water Depth: 6.0m No: 21

Location

UTM N: 7743427 Latitude: 69.776083
UTM E: 612790 Longitude: 132.075666

Date (mm/dd/yy)

Construction: 1981-82
Rig Release: 06/25/82
Abandoned: 1982

Physiographic Location: Kaglulik Plain
Seabed Conditions: soft clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: early Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

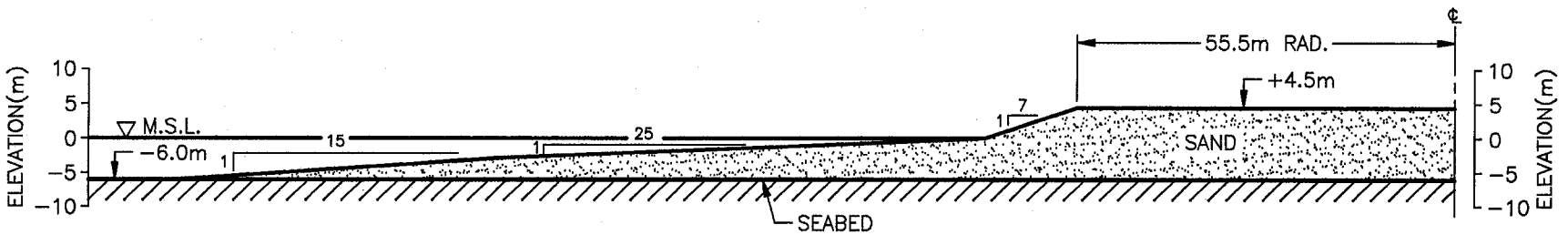
Break-up (median): July 9
Break-up (earliest): July 2
Break-up (latest): July 23

Open Water Days (median): 97
Summer Intrusions (in 15): 1 in 15

Wave Conditions

Exposure: moderate
Extreme Storm Events: 23 in 7 yrs

Lease No.:
License: W1039
COGLA file: 9413-J1-1-1



ATKINSON L–17 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

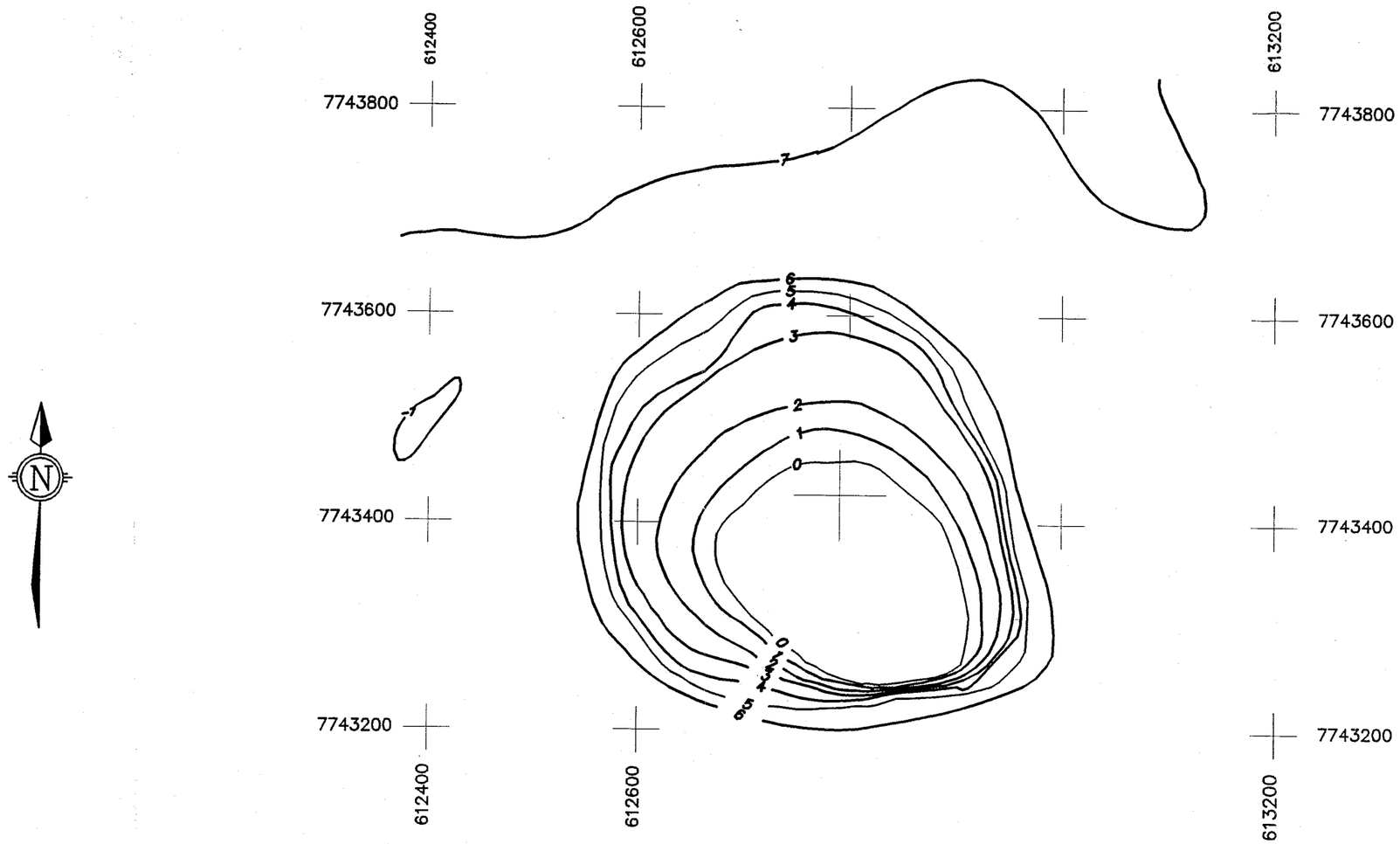
0 20 40m

(1:1000)

TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: W. ATKINSON L–17			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A–2695–03–21	REV.

2695w024.dwg



ORIGINAL SEABED : 6.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

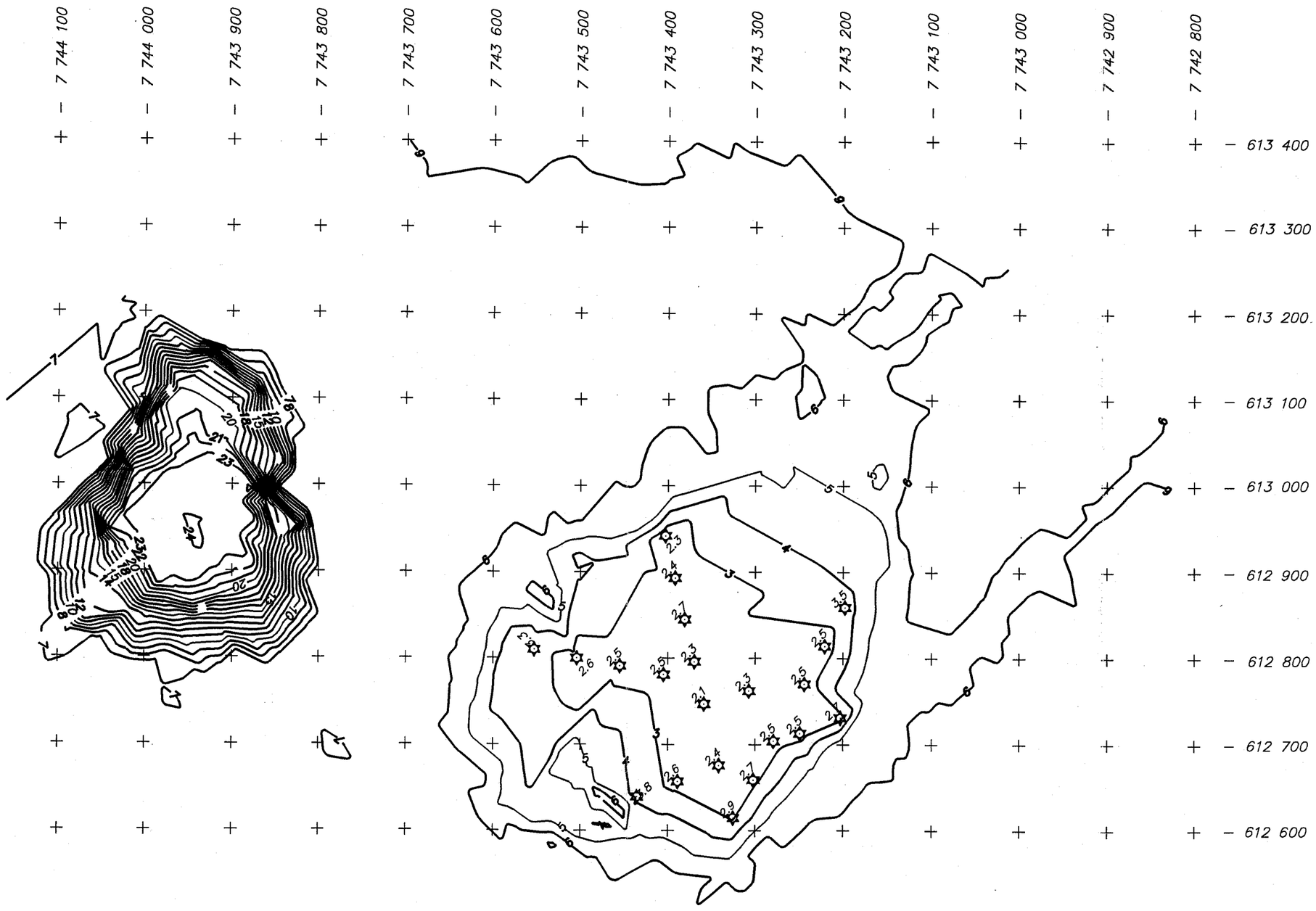
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: WEST ATKINSON L-17 (SEP., 1982)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-21A	

APPROVED

2695w088.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 6.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1990, CHALLENGER SURVEY AND SERVICES LTD.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: WEST ATKINSON L-17 (AUG., 1990)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-21B	

APPROVED

2695w046.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Tarsiut N-44 Operator: Gulf Water Depth: 21.0m No: 22

Location

UTM N:		Latitude:	69.896139
UTM E:		Longitude:	136.193470

Island Type: Caisson Retained Island
Construction Method: Seabed subcut, barge and hopper hauled sandfill,
Borrow Site: Ukalerk, Issigak, Isserk, Herschel
Fill Material: sand, gravel
D50: 0.250 to mm
Fines: 1.0 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		Dome		
Date:	1981	09/82	09/14/84	
Freeboard (m):	-6.5		-6.5	
Surface Area (m):	170 dia			
Base Area (m):				
Slopes (ave.):			14-5:1	
Subcut Depth (m):	3.0			
Total Fill Quantity (m3):	1800000		1000000	
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Tarsiut N-44 was the first sub-sea berm in the Beaufort Sea, built by Dome Petroleum Ltd. in 1981. Caissons to retain a core zone of sand were placed on the berm to provide erosion protection and a working surface. The berm was built in 21.0 m of water on the Kringalik Plateau. The local seabed consisted of soft clay overlying stiff clay and silt. A 3 m subcut was required to remove the soft clay from the foundation area. The berm was constructed using 1.8 million m3 of both sand and gravel excavated from the Issigak borrow area and sand from the Ukalerk borrow pit, bottom dumped on the site. Gravel from Herschel Island was placed on the 170 m diameter berm as a 1 m cap. The finished berm was 6.5 m below sea level, and reported to contain 5% clay ball contamination. The caissons were placed on the berm to retain the sand hauled from the Ukalerk borrow pit, creating the working surface. The berm was upgraded in 1982, by adding 10 000 m3 of riprap scour rock with an average size of 1 m diameter around the berm to protect it from wave action. The island was abandoned in 1984.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Tarsiut N-44 Operator: Gulf Water Depth: 21.0m No: 22

Location

UTM N:
UTM E:

Latitude: 69.896139
Longitude: 136.193470

Date (mm/dd/yy)

Construction: 1981-82
Rig Release: 06/07/82
Abandoned: 1984

Physiographic Location: Kringalik Plateau
Seabed Conditions: soft clay over stiff clay&silt
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Dec
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

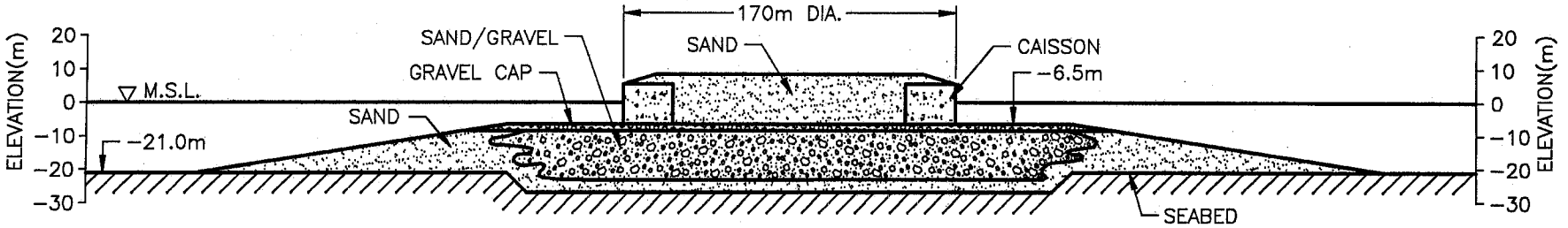
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Aug 13

Open Water Days (median): 102
Summer Intrusions (in 15): 3 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 23 in 7 yrs

Lease No.:
License: A2243
COGLA file: 9414-G1-1-1



TARSIUT N-44 - CAISSON RETAINED ISLAND

OPERATOR: GULF

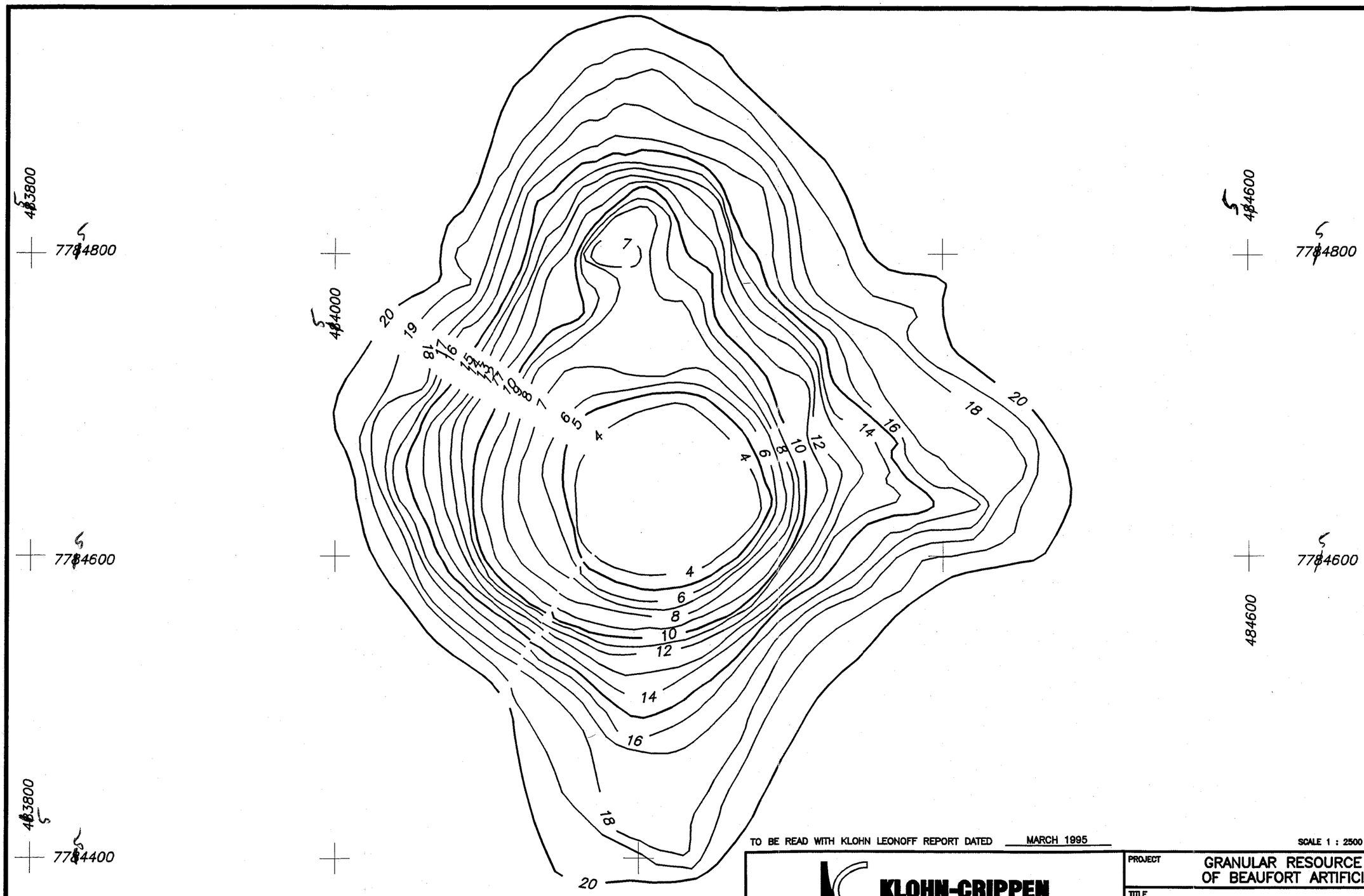
0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: TARSIUT N-44			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-22	REV.

2695w025.dwg



ORIGINAL SEABED : 21.0m BELOW MSL.

DATE OF SURVEY : OCTOBER 1981, DOME SURVEY

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2500

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

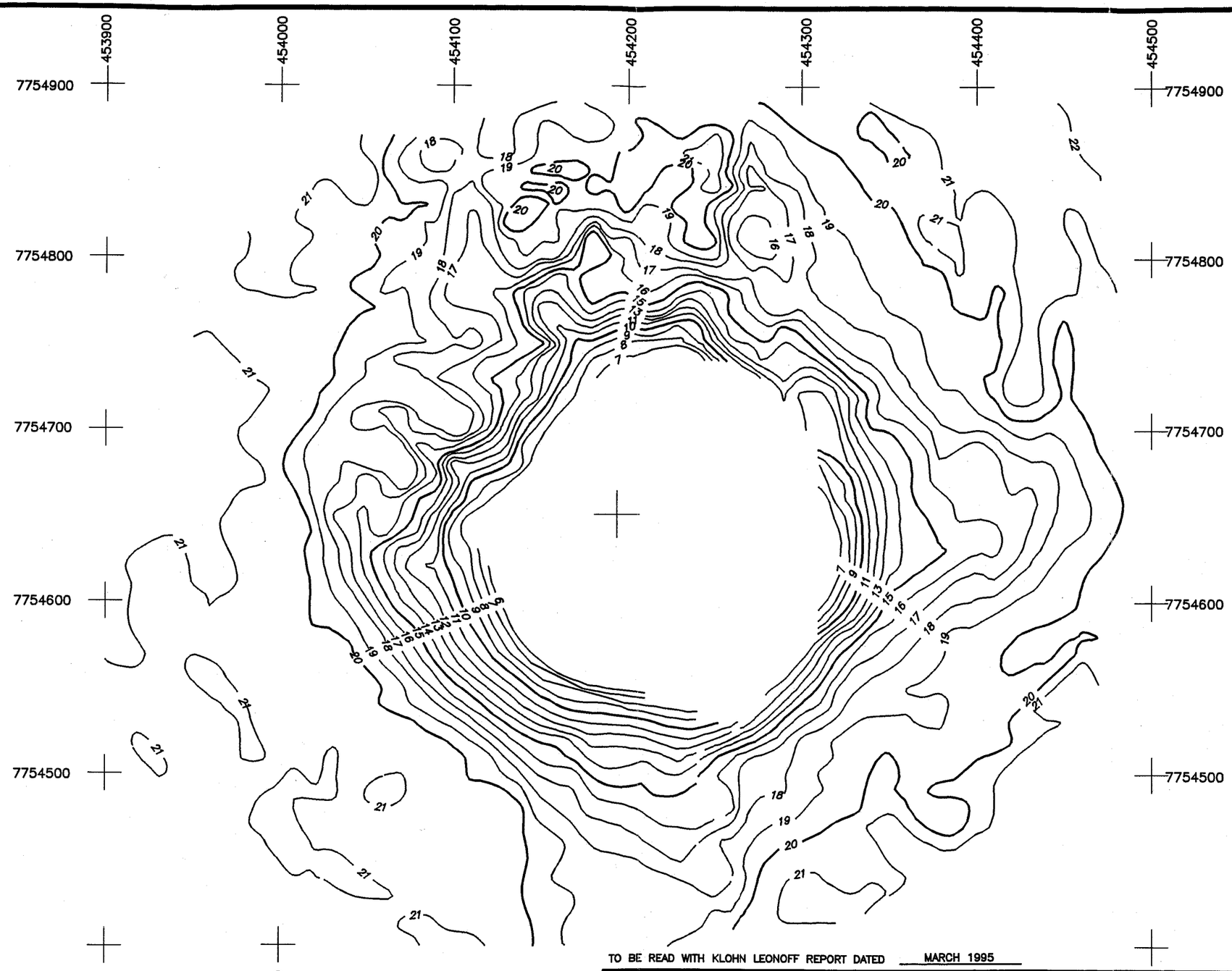
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: TARSIUT N-44 (OCT., 1981)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-22A	

APPROVED

2695w093.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2500

2695w094.dwg

ORIGINAL SEABED : 21.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1984, CANADIAN ENGINEERING SURVEYS CO LTD.

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: TARSIUT N-44 (SEP, 1984)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-22B	

APPROVED

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Uviluk P-66 Operator: Dome Water Depth: 29.7m No: 23

Location

UTM N:		Latitude:	70.263444
UTM E:		Longitude:	132.313280

Island Type:	Single Steel Drilling Caisson
Construction Method:	Hydraulically placed sand berm, gravel capped,
Borrow Site:	local, Ukalerk, Isserk, Kagluk, Issigak
Fill Material:	sand, gravel cap
D50:	5.000 to 75.000mm
Fines:	n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1982			
Freeboard (m):	-9.0			
Surface Area (m):	103x212			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	1900000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Dome Petroleum constructed an underwater berm at Uviluk P-66 to accommodate a single steel drilling caisson (SSDC) during the 1981-82 open water seasons. The berm was built in 29.7 m of water on a sandy seabed. Sand dredged from local sources, as well as Isserk, Kaglulik South and the Ukalerk borrow, was hydraulically placed to create a berm 103 m x 212 m. Gravel hauled from Issigak, Banks Island, and Herschel Island was used as a cap on the berm, which rose to 8.0 m below sea level. A total of 1.9 million m3 of fill was used to construct the berm. The SSDC was placed on the berm, and underfilled with sand and gravel for erosion protection. Drilling activities continued over the winter, and following completion, the SSDC was released and the island abandoned.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Uviluk P-66 Operator: Dome Water Depth: 29.7m No: 23

Location

UTM N:
UTM E:
Latitude: 70.263444
Longitude: 132.313280

Date (mm/dd/yy)

Construction: 1981-82
Rig Release: 05/21/83
Abandoned: 1983

Physiographic Location: Tingmiark Plain
Seabed Conditions: sand
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 15
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: high

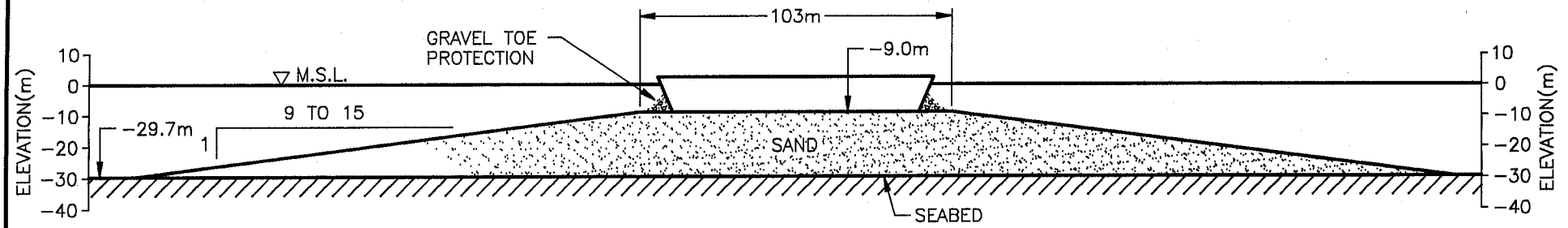
Break-up (median): June 18
Break-up (earliest): June 4
Break-up (latest): Aug 6

Open Water Days (median): 117
Summer Intrusions (in 15): 5 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 17 in 6 yrs

Lease No.:
License: A4693
COGLA file: 9414-D3-1-1



UVILUK P-66 – SINGLE STEEL DRILLING CAISSON

OPERATOR: DOME

0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: UVILUK P-66			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-23	REV.

2695w026.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Itiyok I-27 Operator: Esso Water Depth: 15.0m No: 24

Location

UTM N:	7759760	Latitude:	69.944417
UTM E:	534880	Longitude:	134.088670

Island Type: Sacrificial Beach Island
Construction Method: Hydraulically placed sand, dredged onsite with
Borrow Site: local, Ukalerk
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES	CES	CSS
Date:	10/10/82	08/17/84	09/10/89	1990
Freeboard (m):	4.0		-3.7	-4.0
Surface Area (m):	108 dia			
Base Area (m):	560 dia			
Slopes (ave.):	31-18-2:1	12-5:1	20-10:1	20-6:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1943000			1500000
Subcut Fill Quantity (m3):				
No Targets:				25
Survey Quality:				poor

Description

Itiyok I-27 was constructed by Esso in the 1982 open water season on a sandy seabed in 15.0 m of water. This sacrificial beach island required 1,943,000 m3 of sand fill dredged from an onsite borrow pit and placed using a floating pipeline. The island had a 108 m diameter working surface, 4.5 m freeboard, and 560 m base. Slopes were maintained at 9H:1V. The island was abandoned in September 1983, and surveyed in 1990 by Challenger. The island had eroded to 4 m below sea level, and 25 targets were identified on the surface.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Itiyok I-27 Operator: Esso Water Depth: 15.0m No: 24

Location

UTM N: 7759760 Latitude: 69.944417
UTM E: 534880 Longitude: 134.088670

Date (mm/dd/yy)

Construction: 1981-82
Rig Release: 05/02/83
Abandoned: 08/83

Physiographic Location: Akpak Plateau
Seabed Conditions: sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

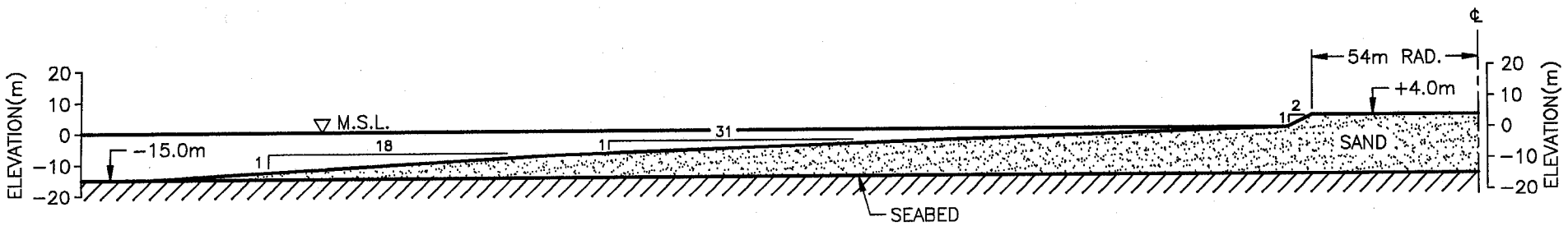
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 4 in 15

Wave Conditions

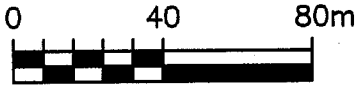
Exposure: high
Extreme Storm Events: 17 in 6 yrs

Lease No.:
License:
COGLA file: 9413-J1-1-3



ITIYOK I–27 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO



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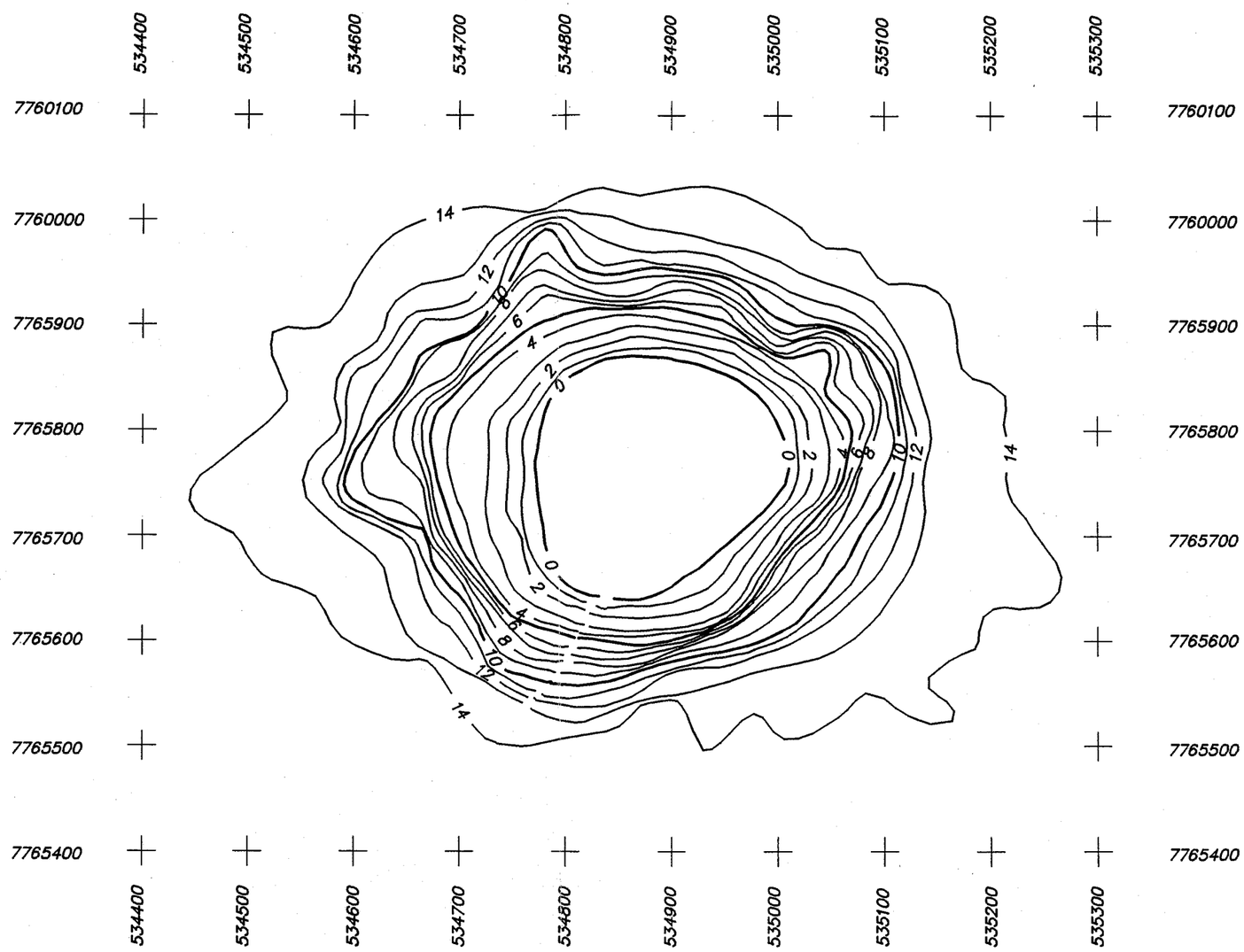
TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ITIYOK I–27			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-24	REV.

2695w027.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 15.0m BELOW MSL.

DATE OF SURVEY : OCTOBER 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

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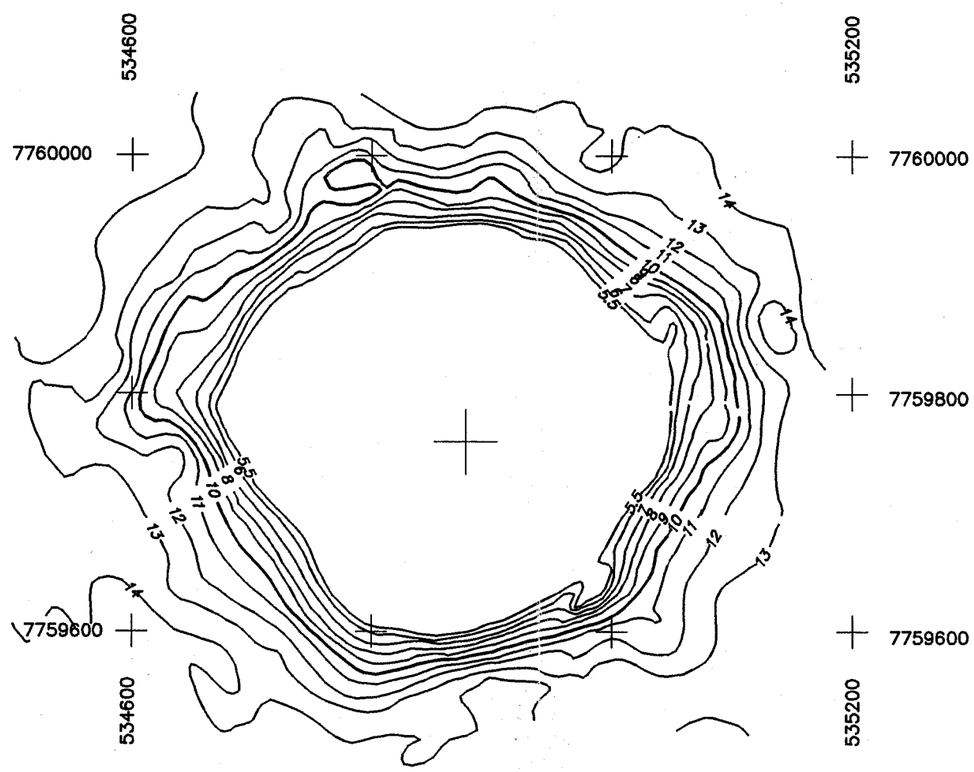
KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ITIYOK I-27 (OCT., 1982)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-24A
REV.	

2695w075.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 15.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1984, CANADIAN ENGINEERING SURVEYS CO. LTD.

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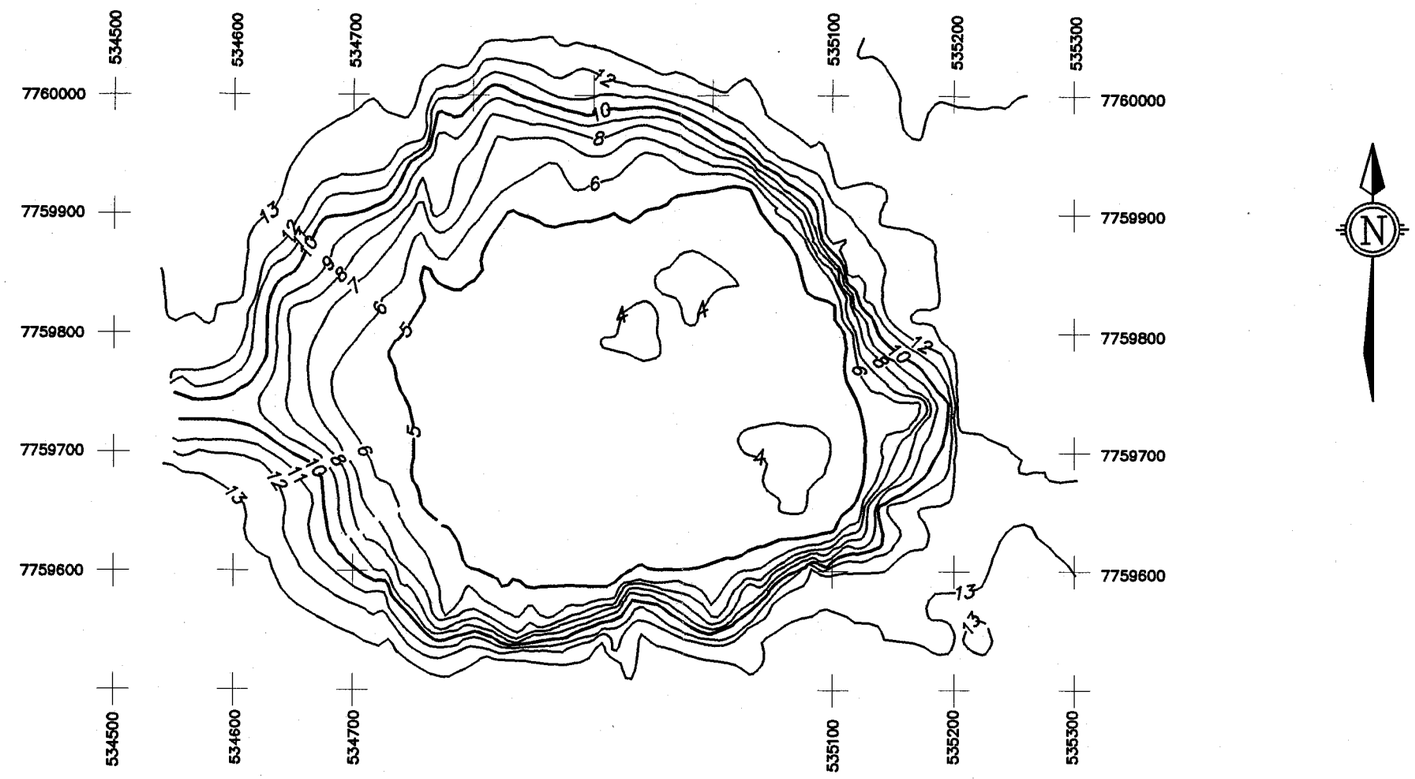
KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ITIYOK I–27 (AUG, 1984)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-24B
REV.	

2695w074.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 5000

ORIGINAL SEABED : 15.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1989, CDN. SEABED RESEARCH LTD.

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

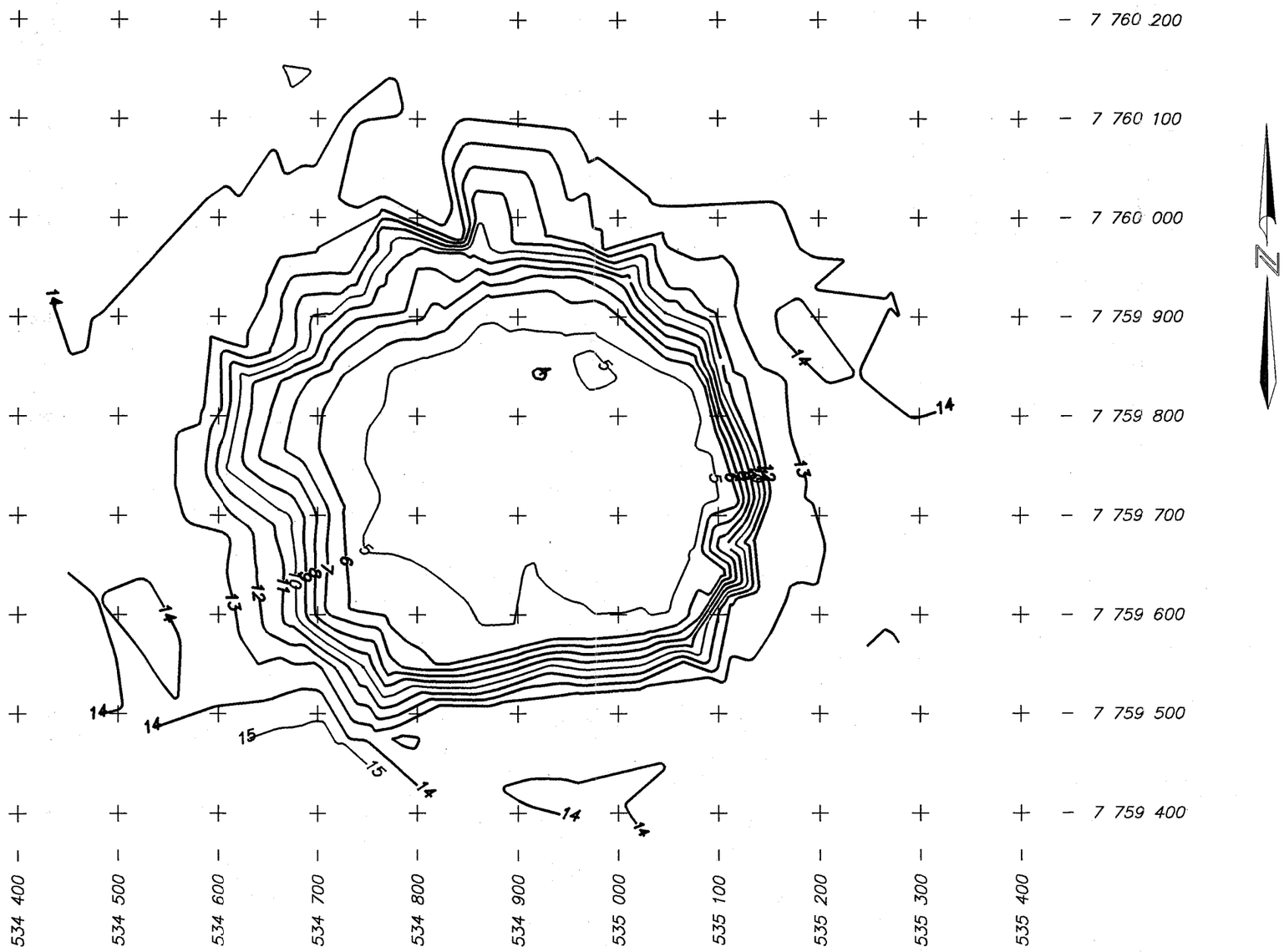
TITLE: ITIYOK I-27 (SEP. 1989)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-24C	

APPROVED

2695w076.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

ORIGINAL SEABED : 15.0m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ITIYOK I-27 (JUL., 1990)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-24D
REV.	

2695w045.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Nerlerk B-67 Operator: Dome Water Depth: 45.1m No: 25

Location

UTM N:	7814900	Latitude:	70.433444
UTM E:	562620	Longitude:	133.324556

Island Type: Single Steel Drilling Caisson
Construction Method: Hydraulically and hopper placed sand berm.
Borrow Site: Ukalerk, local
Fill Material: sand,
D50: 0.295 to mm
Fines: 2.5 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	Canmar			
Date:	08/29/83			
Freeboard (m):	-9.0			
Surface Area (m):				
Base Area (m):				
Slopes (ave.):	9-15:1			
Subcut Depth (m):				
Total Fill Quantity (m3):	4000000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Nerlerk B-67 was a berm constructed by Dome in the 1982-83 open water seasons in 45.1 m of water that was intended to support the SSDC unit. A number of slope failures were observed in the latter part of construction, and the berm was abandoned. A second berm, Nerlerk 2 Site, was attempted adjacent to the original location, but was also abandoned because cone tests indicated the berm was not sufficiently dense. A third berm was attempted, but abandoned just as construction started. The berm was founded on soft clay and silt overlying sand interbedded with silt and clay, which in turn overlay clean sand, physiographically on the Tingmiark Plain. Hopper dredges collected sand from the Ukalerk borrow area, and bottom dumped the sand on the berm. Sand fill was also excavated using a stationary suction cutter dredge from the nearby Nerlerk borrow area, and placed using a floating pipeline. The initial sand dredged from the local pit was contaminated with the surficial clay. A total of 4 million m3 of sand fill was deposited at the site creating a berm which rose to within 9 m of sea level. Side slopes varied from 9H:1V to 15H:1V prior to the slope failures. The second berm (Nerlerk 2 Site) was attempted approximately 1 km south southwest of the original island. A total of 2.1 million m3 of sand was dredged from various sites, including the abandoned berm. Sandfill did not meet the appropriate density requirements, and construction was abandoned. Nerlerk 3 was attempted, but abandoned after placing 8000 m3 of sand fill.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Nerlerk B-67 Operator: Dome Water Depth: 45.1m No: 25

Location

UTM N: 7814900 Latitude: 70.433444
UTM E: 562620 Longitude: 133.324556

Date (mm/dd/yy)

Construction: 1982-83
Rig Release:
Abandoned:

Physiographic Location: Tingmiark Plain
Seabed Conditions: soft clay&silt overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: no
Extent: none
Ice Scour Potential: high

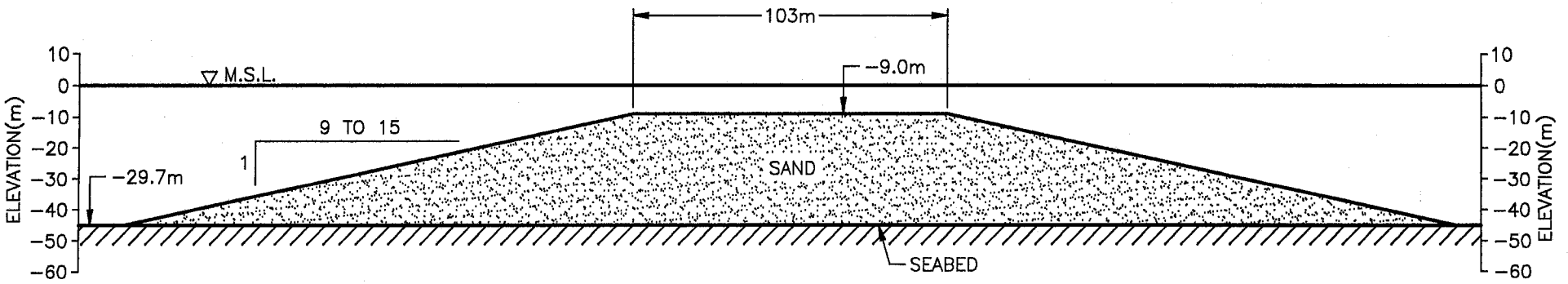
Break-up (median): July 9
Break-up (earliest): June 11
Break-up (latest): none

Open Water Days (median): 83
Summer Intrusions (in 15): 6 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 16 in 5 yrs

Lease No.:
License:
COGLA file:



NERLERK B-67 – SINGLE STEEL DRILLING CAISSON

OPERATOR: DOME

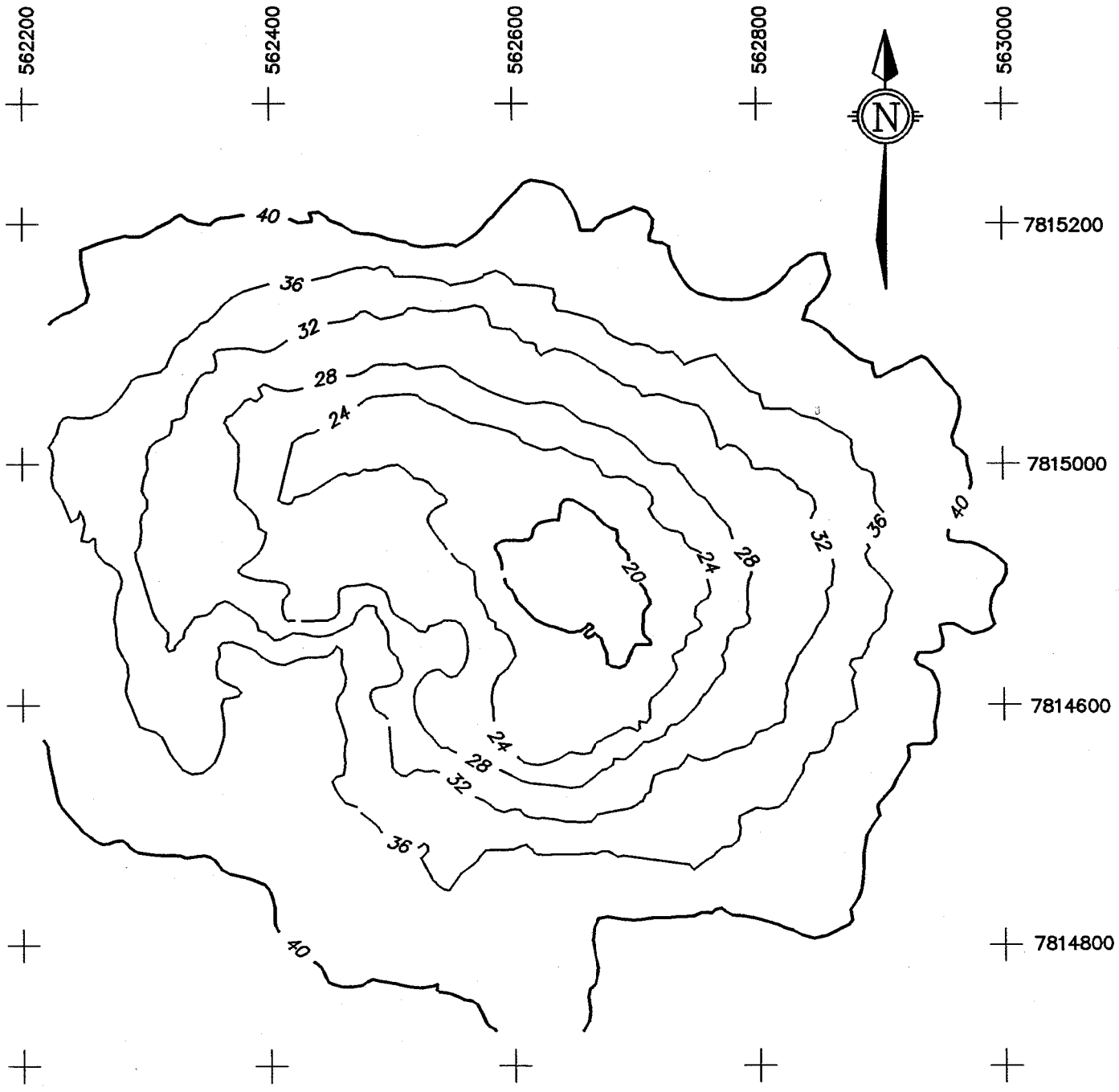
0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1993

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: NERLERK B-67			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 93 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-25	REV.

2695w028.dwg



2695W065.dwg

ORIGINAL SEABED : 45.1m BELOW MSL.

DATE OF SURVEY : AUGUST 1983, DOME SURVEY

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

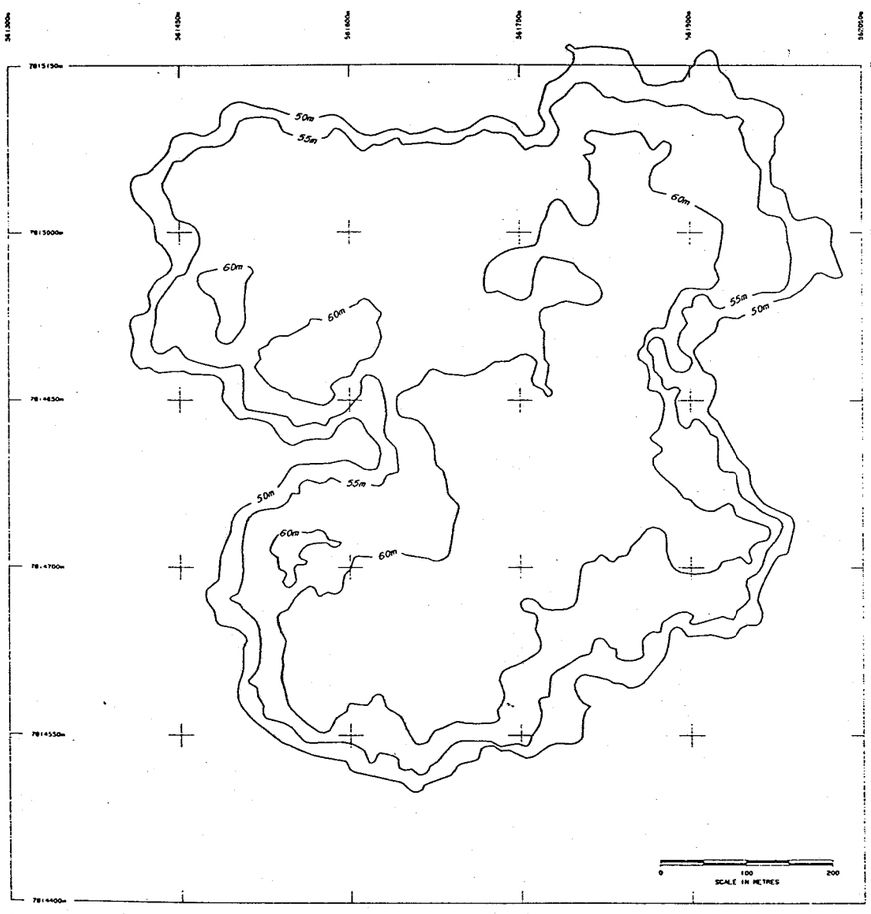
SCALE 1 : 5000

KLOHN-CRIPPEN

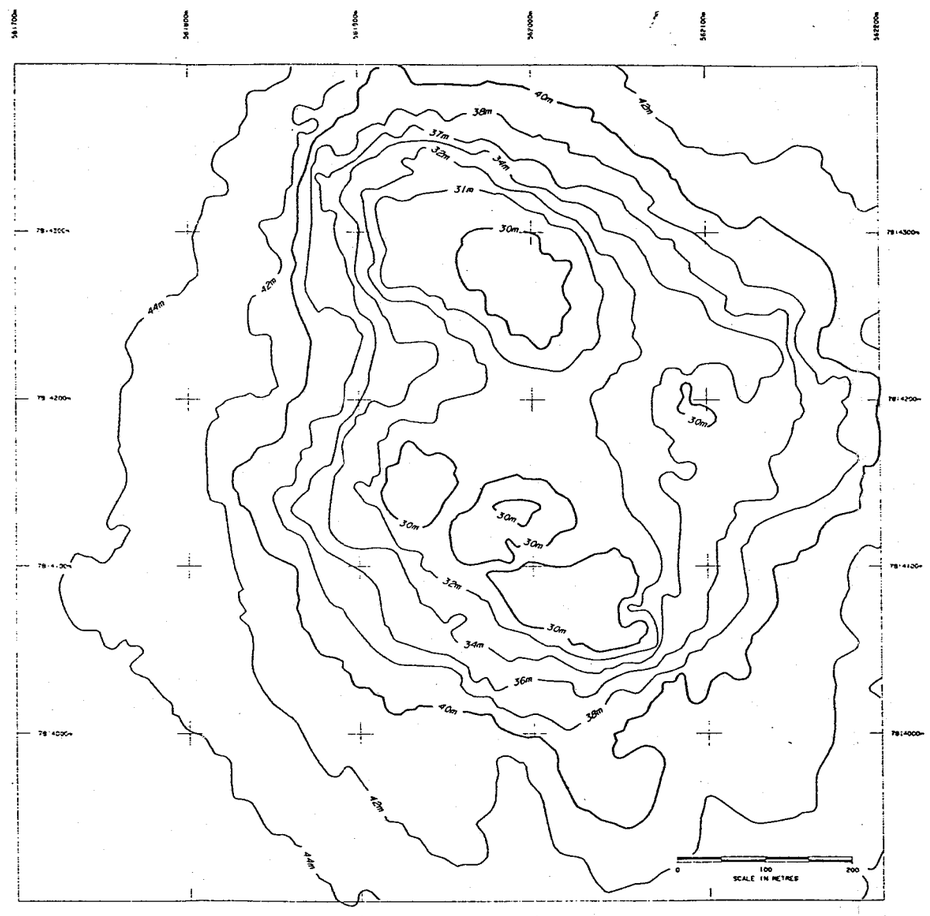
PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	NERLERK B-67 (AUG., 1983)

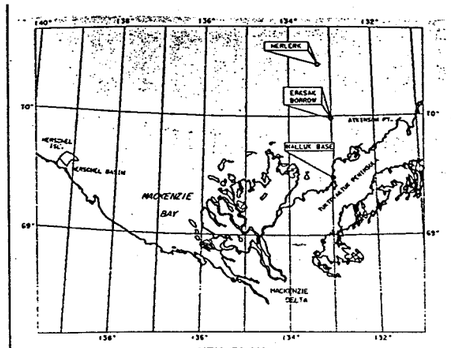
CLIENT:	DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
INDIAN AND NORTHERN AFFAIRS CANADA	MARCH 95	PA2695.03	A-2695-03-25A	
	APPROVED			

NERLERK BORROW PIT
FINAL 1983 SURVEY



NERLERK 2
FINAL 1983 SURVEY





KEY PLAN

NOTES:

1. WATER DEPTHS NOT CORRECTED FOR EFFECTS OF WIND OR TIDE. POSSIBLE SEA LEVEL FLUCTUATIONS OF ±1 METRE.
2. ALL COORDINATES ARE REFERRED TO NA 1927 DATUM WESTERN AERODIST 1972 ADJUSTMENTS (CNS MAY 1972) COORDINATES SHOWN ARE UTM ZONE 8, CENTRAL MERIDIAN 135°W LONG.
3. NERLERK B-67 BERM CENTRE CO-ORDINATES 7814932mN 562622mE

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: NERLERK 2 AND NERLERK BORROW AREA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-25B	

APPROVED

2695w106.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kogyuk N-67 Operator: Gulf Water Depth: 28.1m No: 26

Location

UTM N:	7779286	Latitude:	70.113722
UTM E:	563404	Longitude:	133.328220

Island Type: Single Steel Drilling Caisson
Construction Method: Subcut 1.5m of clay. Mostly hopper placed sand
Borrow Site: Ukalerk,Uviluk P-66,Banks Is,Rufus River
Fill Material: sand, gravel cap
D50: 0.310 to mm
Fines: 1.0 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES		
Date:	10/10/82	08/29/85		
Freeboard (m):	-10.0	-8.0		
Surface Area (m):	103x212			
Base Area (m):	320 dia			
Slopes (ave.):	10-5:1	10-6:1		
Subcut Depth (m):	1.5			
Total Fill Quantity (m3):	1450000	1000000		
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Kogyuk N-67 berm was initially constructed by Gulf Canada Resources Inc. (Gulf) in the 1982 open water season in 28.1 m of water to support the Molikpaq. In 1983 the berm was raised to support Canmar's SSDC. The Single Steel Drilling Caisson (SSDC) was ballasted onto the sand berm constructed to within 9 m of the water line. The seabed conditions consisted of surficial clay overlying sand. Clay was removed from under the foundation by subcutting 1.5 m into the seabed over a 180 m square. The sand berm was constructed by dredging the Ukalerk borrow pit, and hopper placing the fill with pump-out perimeter buds. Edges were placed using the "constructor" method. A total of 1,450,000 m3 of sand was placed creating a berm surface 103 m x 212 m with 5H:1V and 10H:1V slopes. Average D50 of the sand was 310 m, with a fines content of 1%. Gravel was used as berm topping and toe protection after the SSDC was in place. Gravel was excavated from Issigak, Banks Island, Rufus River and the abandoned Uviluk P-66 berm. Drilling activities were conducted over the winter of 1983-84, and the island was abandoned in 1984. A bathymetric survey by Canadian Engineering Surveys Co. Ltd. (CES) in August, 1985 indicated the berm surface was 8 m below sea level.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kogyuk N-67 Operator: Gulf Water Depth: 28.1m No: 26

Location

UTM N: 7779286 Latitude: 70.113722
UTM E: 563404 Longitude: 133.328220

Date (mm/dd/yy)

Construction: 1982-83
Rig Release: 01/30/84
Abandoned:

Physiographic Location: Kugmallit Channel
Seabed Conditions: sand
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: high

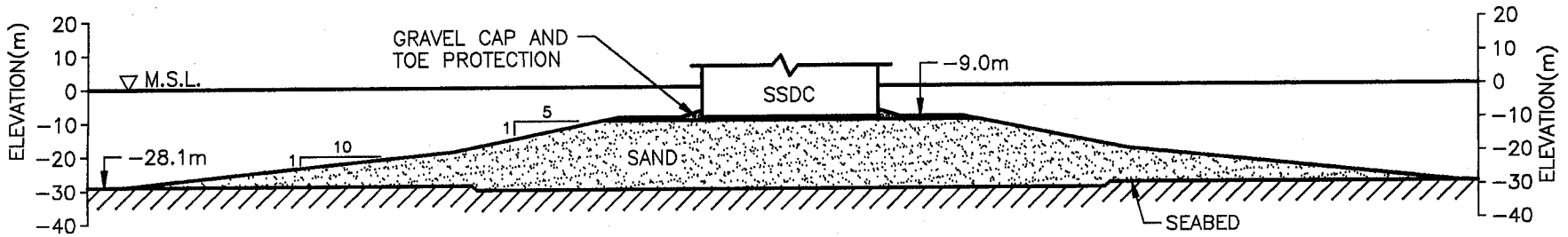
Break-up (median): June 11
Break-up (earliest): June 4
Break-up (latest): Aug 27

Open Water Days (median): 114
Summer Intrusions (in 15): 4 in 15

Wave Conditions

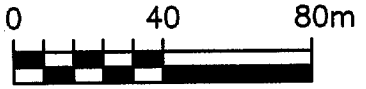
Exposure: high
Extreme Storm Events: 16 in 5 yrs

Lease No.:
License: W4688
COGLA file: 9414-G1-3-1



KOGYUK N−67 − SINGLE STEEL DRILLING CAISSON

OPERATOR: GULF



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TO BE READ WITH KLOHN−CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: KOGYUK N−67

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	A−2695−03−26	

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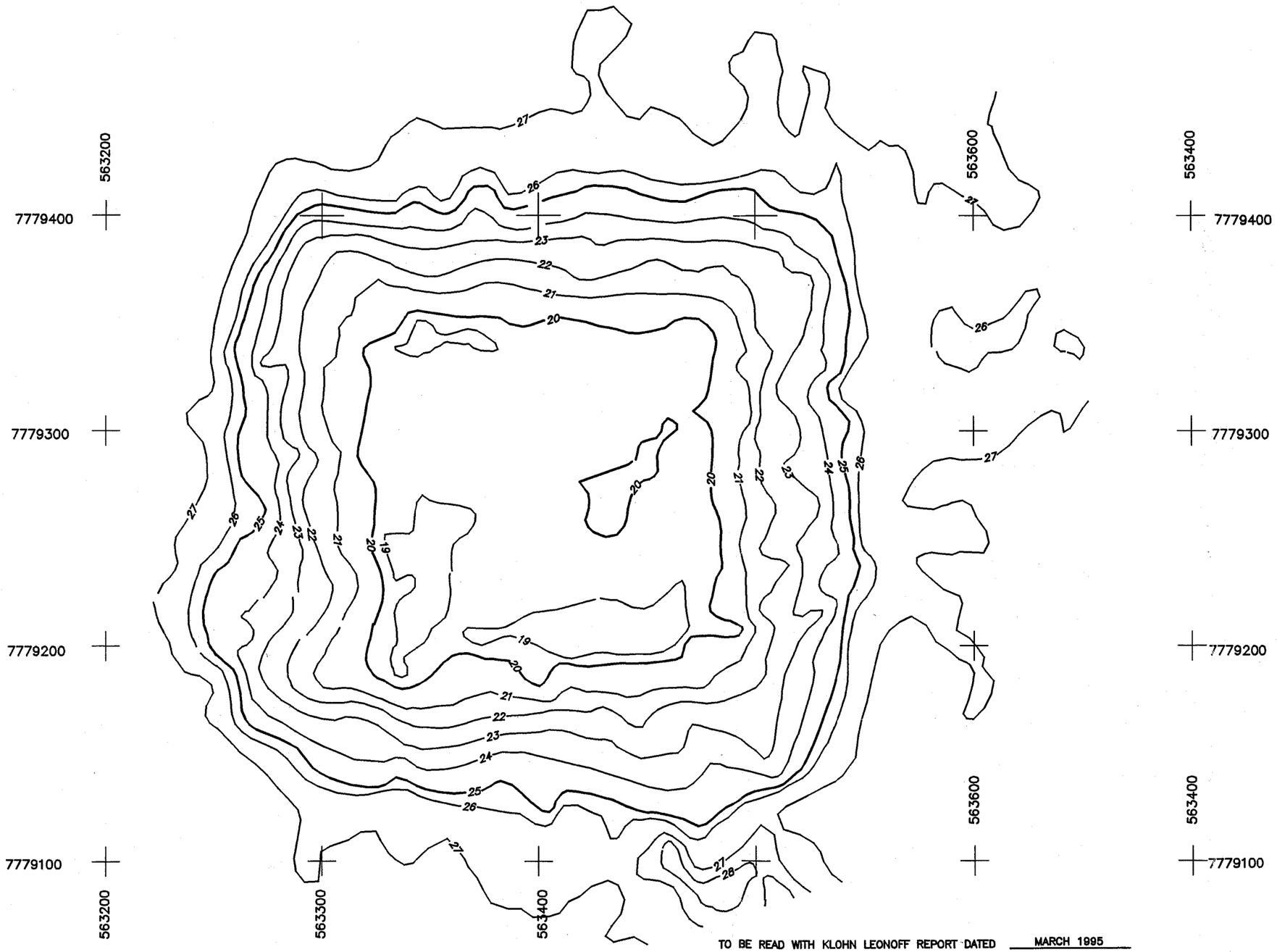

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SCALE 1: 2000

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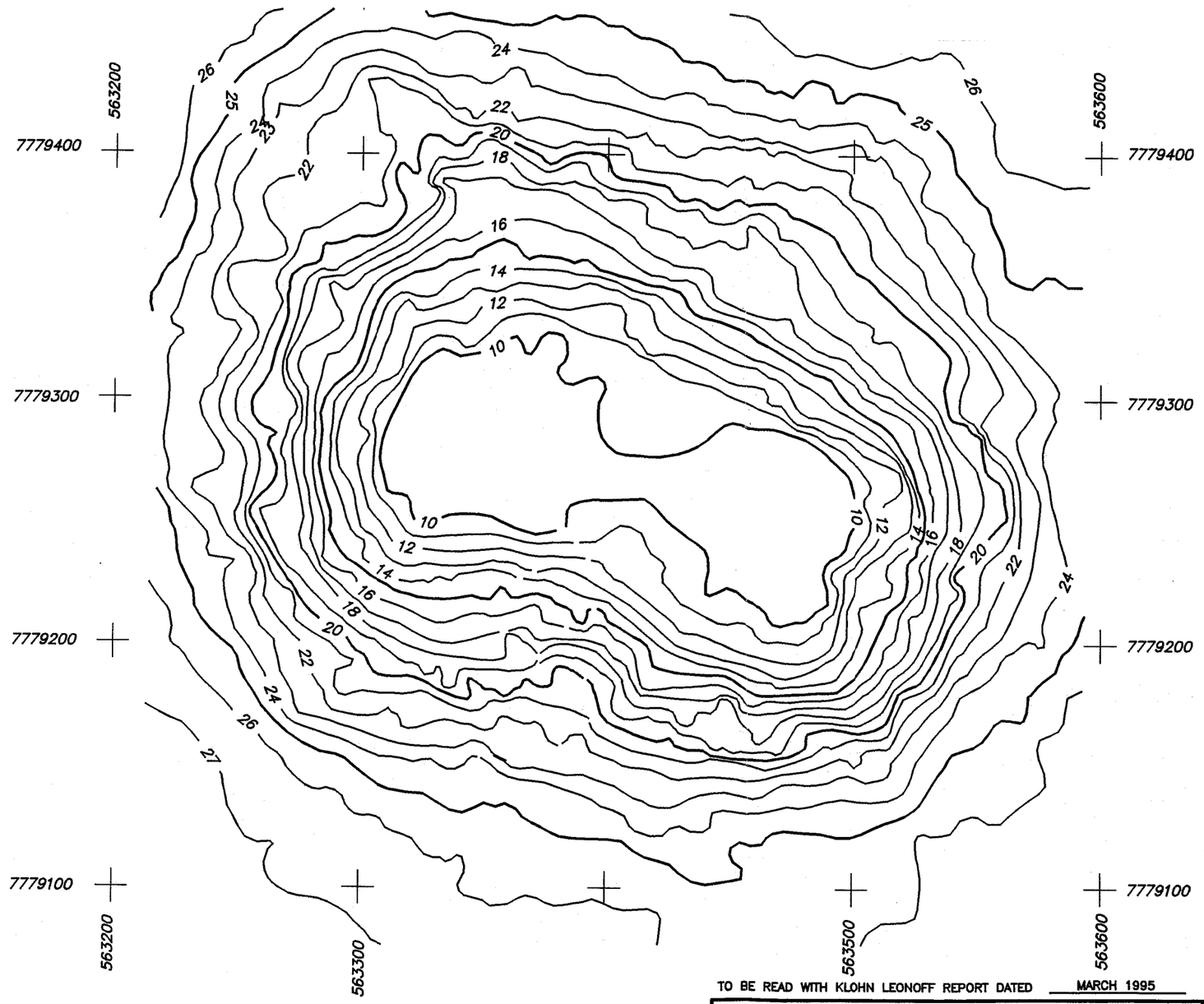
ORIGINAL SEABED : 28.1m BELOW MSL.

DATE OF SURVEY : OCTOBER, 1982, CANADIAN ENGINEERING SURVEYS CO. LTD.

2695w096.dwg

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KOGYUK N-67 (SEP., 1982)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-26A
REV.	



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2000

ORIGINAL SEABED : 28.1m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1983, DOME SURVEY

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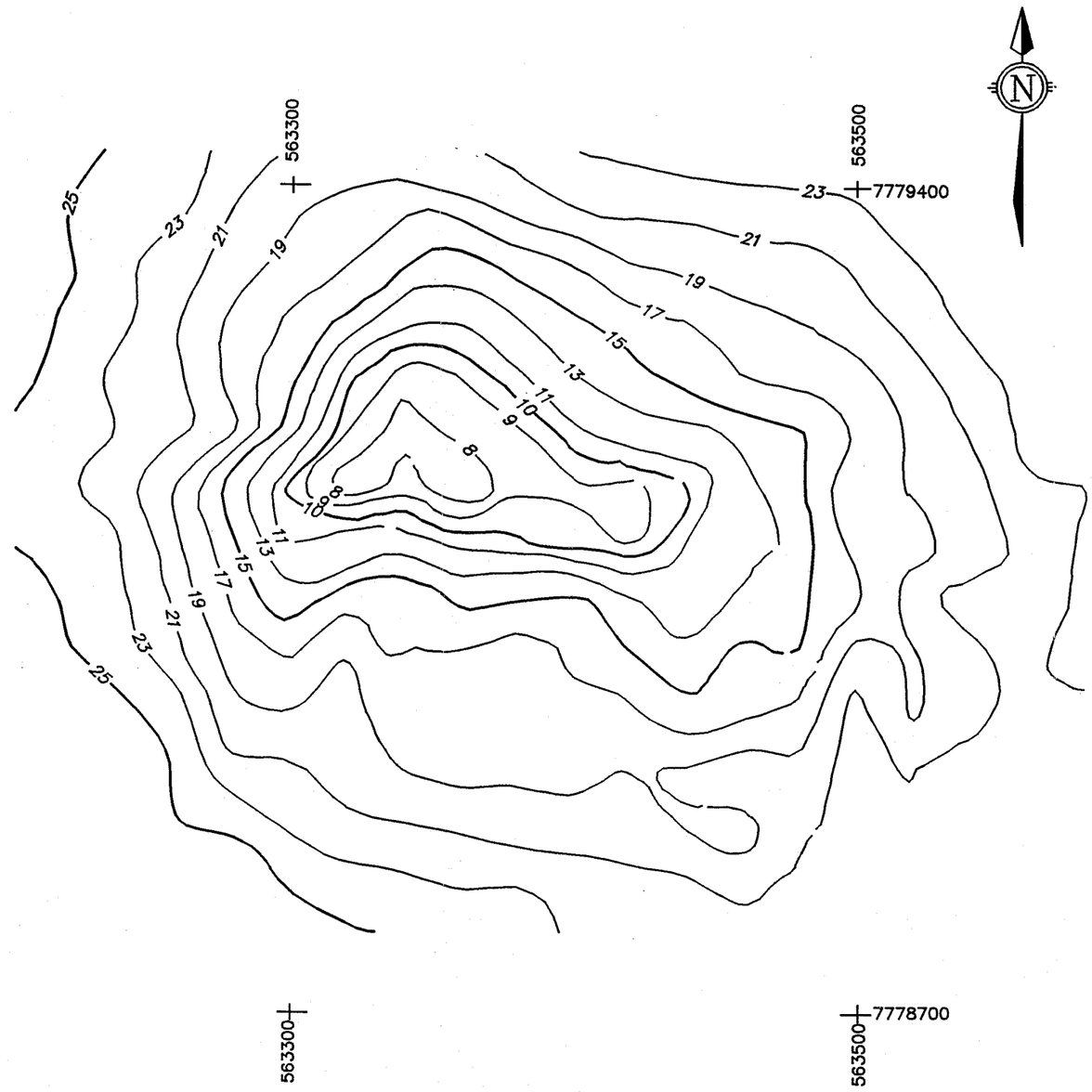
KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KOGYUK (SEP., 1983)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-26B
REV.	

2695w086.dwg



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2000

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ORIGINAL SEABED : 28.1m BELOW MSL.

DATE OF SURVEY : AUGUST 1985, CANADIAN ENGINEERING SURVEYS CO. LTD.

2695w095.dwg

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: KOGYUK N-67 (AUG., 1985)			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: B-2695-03-26C	REV.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kadluk O-07 Operator: Esso Water Depth: 14.0m No: 27

Location

UTM N:	7741506	Latitude:	69.780083
UTM E:	460636	Longitude:	136.021250

Island Type: CRI
Construction Method: Hopper-placed sand berm with steel caissons.
Borrow Site: Ukalerk
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES			
Date:	08/19/83			
Freeboard (m):	3.0			
Surface Area (m):	90 sq			
Base Area (m):				
Slopes (ave.):	24:1			
Subcut Depth (m):				
Total Fill Quantity (m3):	450000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Kadluk O-07 was constructed by Esso in the 1983 open water season in 14.5 m of water, on soft clay overlying firm clay in the Ikit Trough. A sand berm was built to within 9 m of the waterline, and Esso's CRI was placed on the berm and infilled with sand. A total of 450,000 m3 of sand fill was dredged from the Ukalerk borrow pit and hopper placed on the site. Drilling activities took place over the winter of 1983-84 and the island was subsequently abandoned, with the removal of the CRI.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kadluk O-07 Operator: Esso Water Depth: 14.0m No: 27

Location

UTM N: 7741506 Latitude: 69.780083
UTM E: 460636 Longitude: 136.021250

Date (mm/dd/yy)

Construction: 1983
Rig Release: 04/24/84
Abandoned: 1983

Physiographic Location: Ikit Trough
Seabed Conditions: soft clay overlying firm sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: moderate

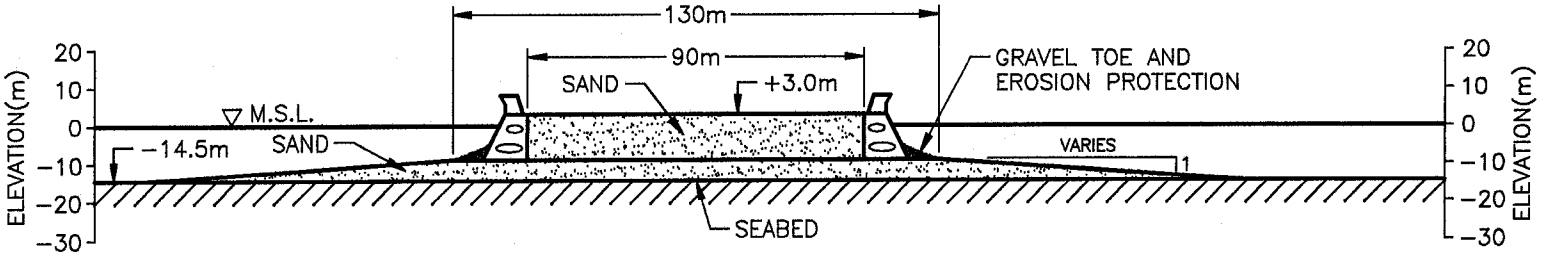
Break-up (median): July 9
Break-up (earliest): June 25
Break-up (latest): July 30

Open Water Days (median): 97
Summer Intrusions (in 15): 2 in 15

Wave Conditions

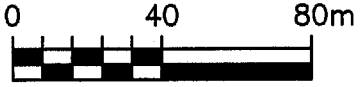
Exposure: high
Extreme Storm Events: 16 in 5 yrs

Lease No.:
License:
COGLA file: 9414-J1-1-1



KADLUK O-07 – CAISSON RETAINED ISLAND

OPERATOR: ESSO



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TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: KADLUK O-07			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-27	REV.

2695w030.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amerk O-09 Operator: Esso Water Depth: 27.0m No: 28

Location

UTM N:	7764420	Latitude:	69.982333
UTM E:	556767	Longitude:	133.514778

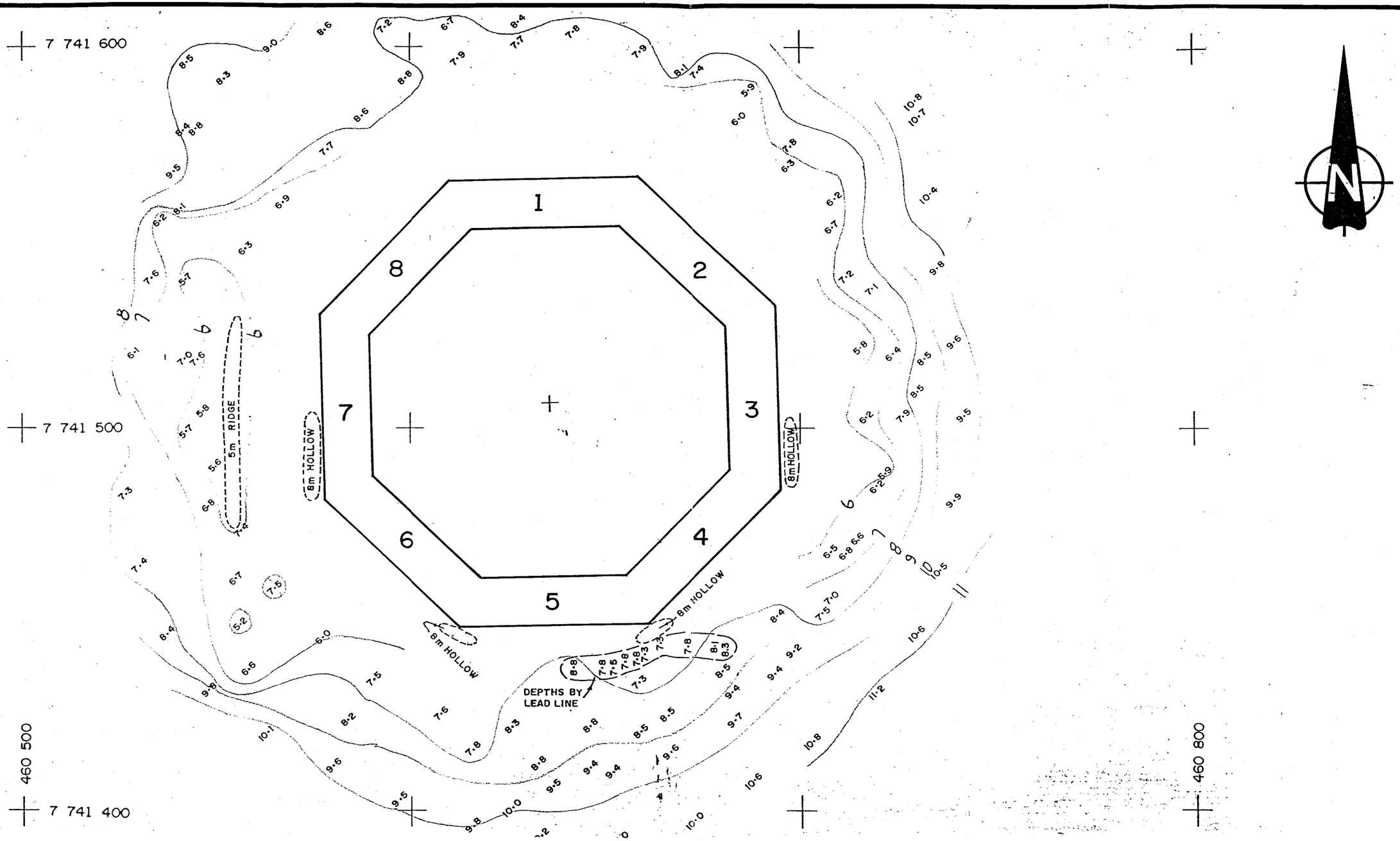
Island Type: CRI
Construction Method: Caisson retained sand on sand berm placed by
Borrow Site: Ukalerk
Fill Material: sand,
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES		
Date:	10/84	09/10/85		
Freeboard (m):	3.0	-9.0		
Surface Area (m):	90 sq			
Base Area (m):				
Slopes (ave.):		12-5:1		
Subcut Depth (m):	9.0			
Total Fill Quantity (m3):	1500000	1000000		
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Amerk O-09, originally called Amerk P-09, was renamed when the location of the caisson retained island was changed in favour of better site conditions. The island was built by Esso in 27.0 m of water in the Kugmallit Channel on a seabed originally consisting of soft clay overlying sand. Extensive subcutting was necessary to expose the sand bottom. Construction of the berm took place over the 1983-84 open water seasons, during which 1.5 million m3 of sand fill was excavated from the Ukalerk borrow area and placed by hopper suction dredge on the site. The berm rose to within 9 m of sea level and had a top surface 128 m in diameter. The CRI was placed on the berm, and the centre was filled with sand. After drilling over the 1984-85 winter season, the rig was released in March 1985, and the island was subsequently abandoned with the removal of the CRI.



ORIGINAL SEABED: 14.0 m BELOW MSL
DATE OF SURVEY: 26 AUGUST, 1983 CES

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 1000

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KADLUK 0-07 (AUG 1983)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-27
REV.	

2695w107.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amerk O-09 Operator: Esso Water Depth: 27.0m No: 28

Location

UTM N: 7764420 Latitude: 69.982333
UTM E: 556767 Longitude: 133.514778

Date (mm/dd/yy)

Construction: 1983-84
Rig Release: 03/03/85
Abandoned:

Physiographic Location: Kugmallit Channel
Seabed Conditions: soft clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: late Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: high

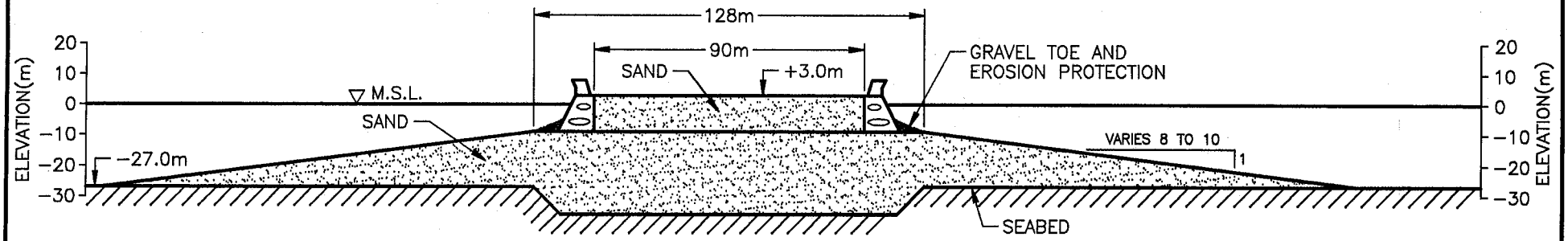
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Aug 6

Open Water Days (median): 104
Summer Intrusions (in 15): 4 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License: EA106
COGLA file: 9414-J1-1-2



AMERK O-09 – CAISSON RETAINED ISLAND

OPERATOR: ESSO

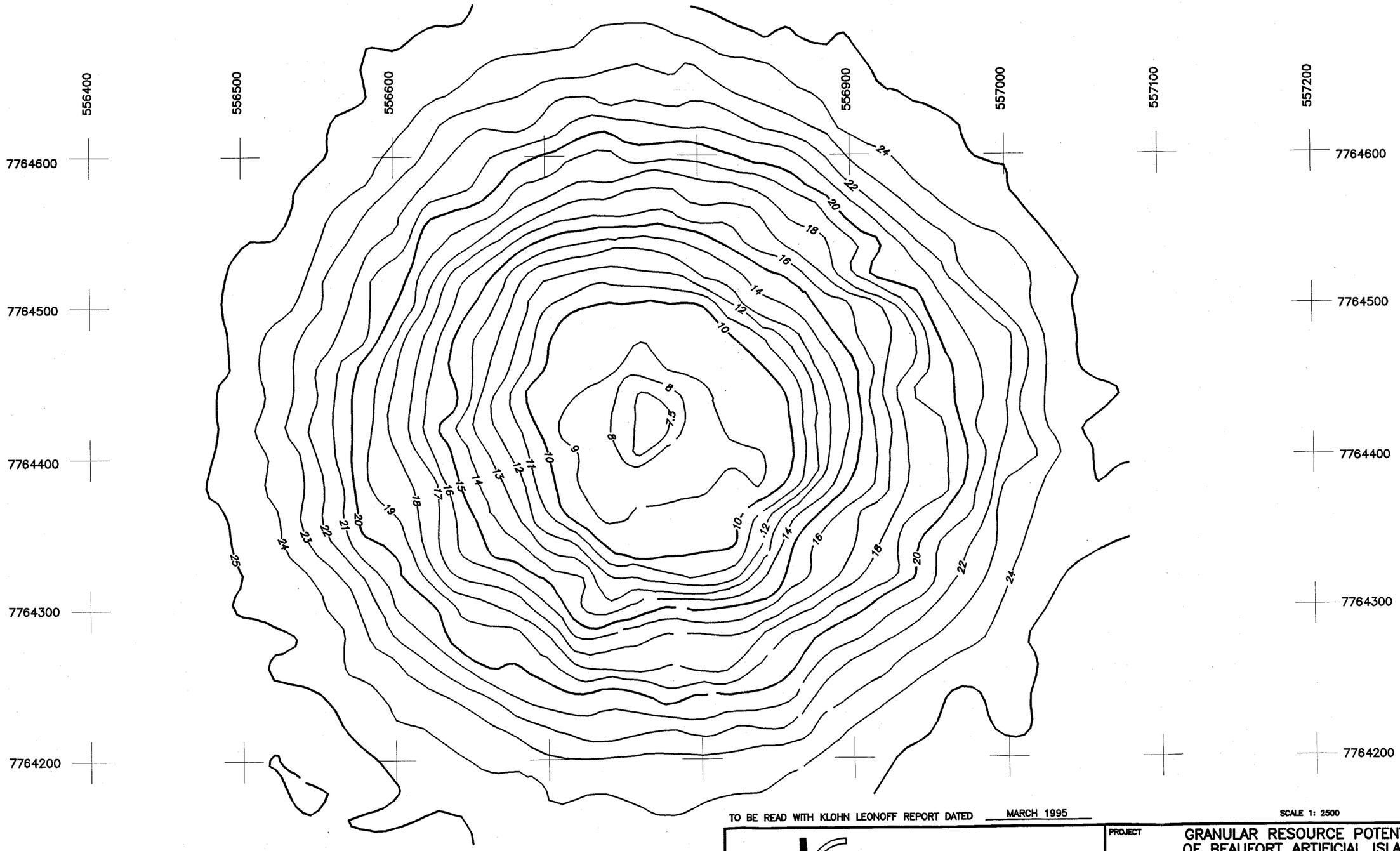
0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: AMERK O-09			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-28	REV.

2695w032.dwg



ORIGINAL SEABED : 27.0m BELOW MSL.

DATE OF SURVEY : JULY 1984, CANADIAN ENGINEERING SURVEYS CO. LTD.

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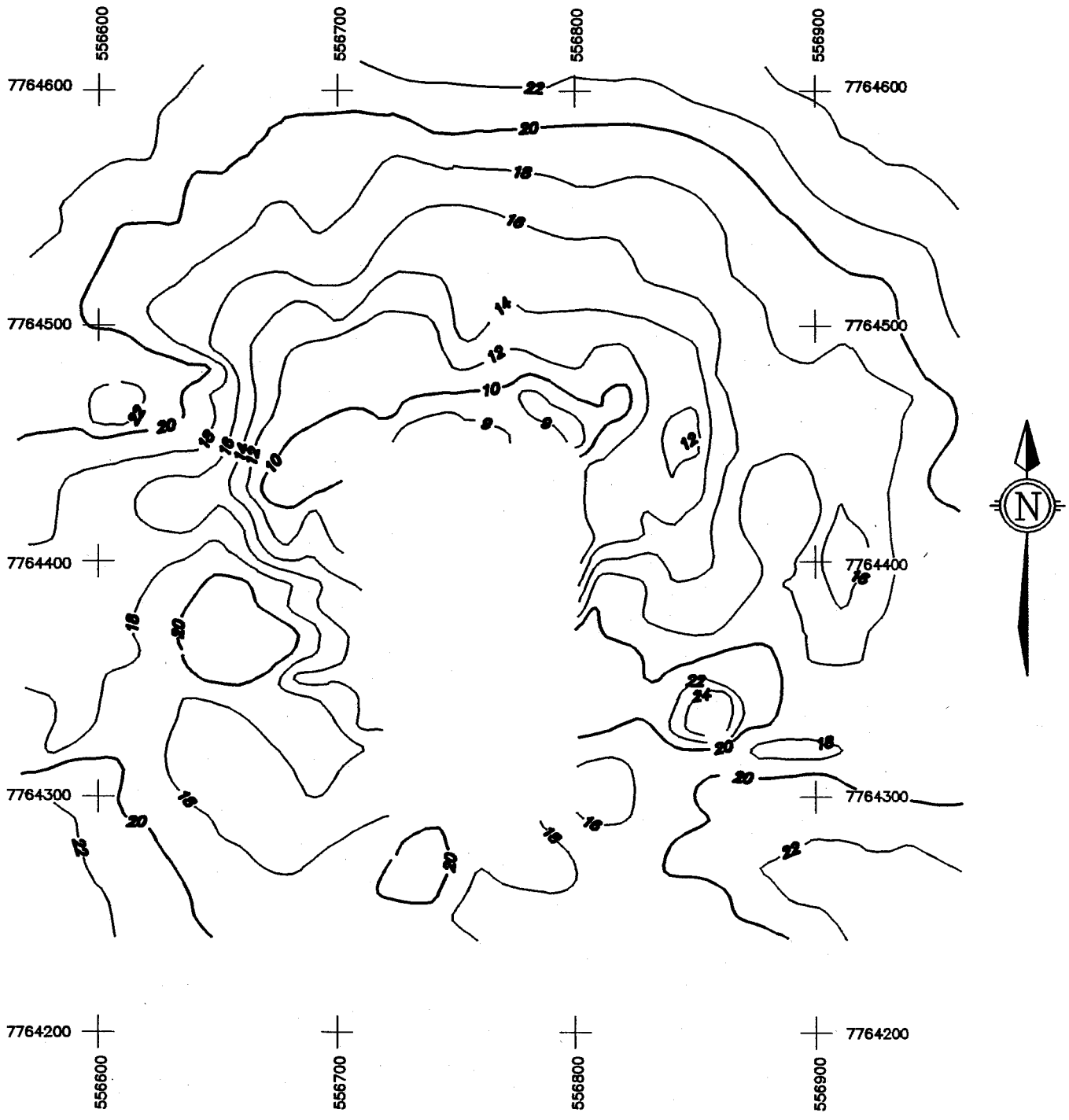
TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2500

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	AMERK O–09 (JUL., 1984)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-28A
REV.	

2695w100.dwg



2695w099.dwg

ORIGINAL SEABED : 27.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1985, CANADIAN ENGINEERING SURVEYS CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2000

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: AMERK O-09 (SEP., 1985)			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-28B	REV.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo H-29 Operator: Esso Water Depth: 3.0m No: 29

Location

UTM N: Latitude: 69.479444
UTM E: Longitude: 135.839528

Island Type: Sandbag Retained Island
Construction Method:
Borrow Site: Adgo J-27, Sarpik B-35, Kadluk O-07
Fill Material: sand, gravel cap
D50: 0.075 to 5.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:				
Date:	1984			
Freeboard (m):	3.0			
Surface Area (m):	70 dia			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):				
Total Fill Quantity (m3):	75000			
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Amerk O-09, originally called Amerk P-09, was renamed when the location of the caisson retained island was changed in favour of better site conditions. The island was built by Esso in 27.0 m of water in the Kugmallit Channel on a seabed originally consisting of soft clay overlying sand. Extensive subcutting was necessary to expose the sand bottom. Construction of the berm took place over the 1983-84 open water seasons, during which 1.5 million m3 of sand fill was excavated from the Ukalerk borrow area and placed by hopper suction dredge on the site. The berm rose to within 9 m of sea level and had a top surface 128 m in diameter. The CRI was placed on the berm, and the centre was filled with sand. After drilling over the 1984-85 winter season, the rig was released in March 1985, and the island was subsequently abandoned with the removal of the CRI.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Adgo H-29 Operator: Esso Water Depth: 3.0m No: 29

Location

UTM N:
UTM E:

Latitude: 69.479444
Longitude: 135.839528

Date (mm/dd/yy)

Construction: 1984
Rig Release: 01/13/85
Abandoned:

Physiographic Location: Mackenzie Trough
Seabed Conditions:
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Oct
Rubble Formation: yes
Extent: small
Ice Scour Potential: insignificant

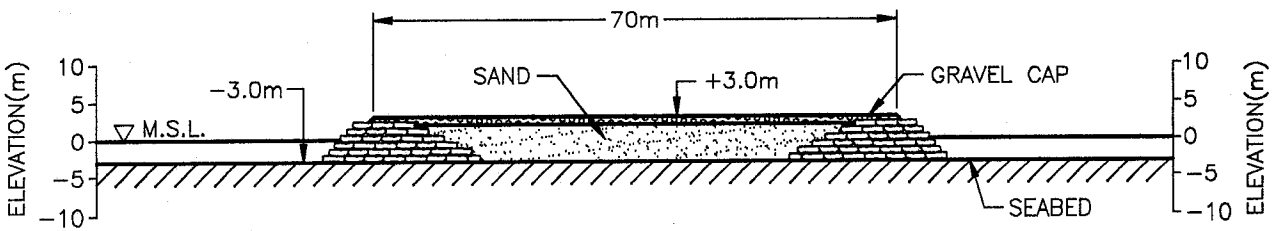
Break-up (median): July 2
Break-up (earliest): June 8
Break-up (latest): July 9

Open Water Days (median): 111
Summer Intrusions (in 15): 0 in 15

Wave Conditions

Exposure: low
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License:
COGLA file: 9413-J1-2-1



ADGO H-29 – SANDBAG RETAINED ISLAND

OPERATOR: ESSO

0 20 40m

(1:1000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ADGO H-29			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-29	REV.

2695w034.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Nipterk L-19 Operator: Esso Water Depth: 11.7m No: 30

Location

UTM N:	7744610	Latitude:	69.810583
UTM E:	487230	Longitude:	135.298194

Island Type: Sacrificial Beach Island
Construction Method: Hopper placed sand, sand and gravel used below the
Borrow Site: Issigak, Ukalerk
Fill Material: gravel, sand
D50: 0.075 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES			CSS
Date:	10/14/84			1990
Freeboard (m):	5.0			-2.0
Surface Area (m):	110 dia			
Base Area (m):	370 dia			
Slopes (ave.):	3-8-4:1			23-4:1
Subcut Depth (m):				
Total Fill Quantity (m3):	1000000			1000000
Subcut Fill Quantity (m3):				
No Targets:				10
Survey Quality:				good

Description

Nipterk L-19 was a sacrificial beach island built by Esso in the 1983-84 open water seasons. Located in 13.0 m of water in the Ikit Trough, the seabed consisted of soft clay overlying firm clay. Ukalerk sand and Issigak sand and gravel totalling 1 million m3 was hopper placed to create an island with a 110 m diameter working surface at a 5 m freeboard, a 170 m diameter at waterline, and 370 m diameter base area. Slopes of 3H:1V were maintained above waterline, while the beach and base had 8H:1V and 4H:1V slopes, respectively. Two wells were drilled from this platform over the 1984-85 winter and spring seasons. The island was originally named Nipterk I-19, but was renamed when the site was changed based on re-evaluated seismic data.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Nipterk L-19 Operator: Esso Water Depth: 11.7m No: 30

Location

UTM N: 7744610 Latitude: 69.810583
UTM E: 487230 Longitude: 135.298194

Date (mm/dd/yy)

Construction: 1983-84
Rig Release: 03/23/85
Abandoned:

Physiographic Location: Ikit Trough
Seabed Conditions: soft clay overlying firm clay
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

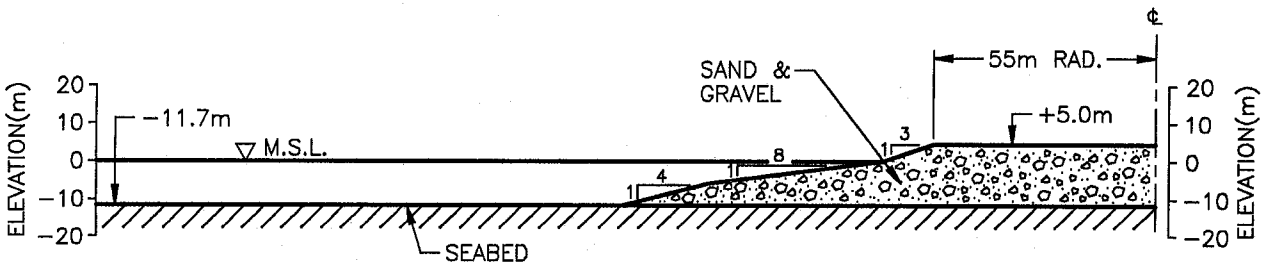
Break-up (median): July 9
Break-up (earliest): June 25
Break-up (latest): July 23

Open Water Days (median): 100
Summer Intrusions (in 15): 2 in 15

Wave Conditions

Exposure: moderate to high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License:
COGLA file: 9413-J1-1-4



NIPTERK L–19 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

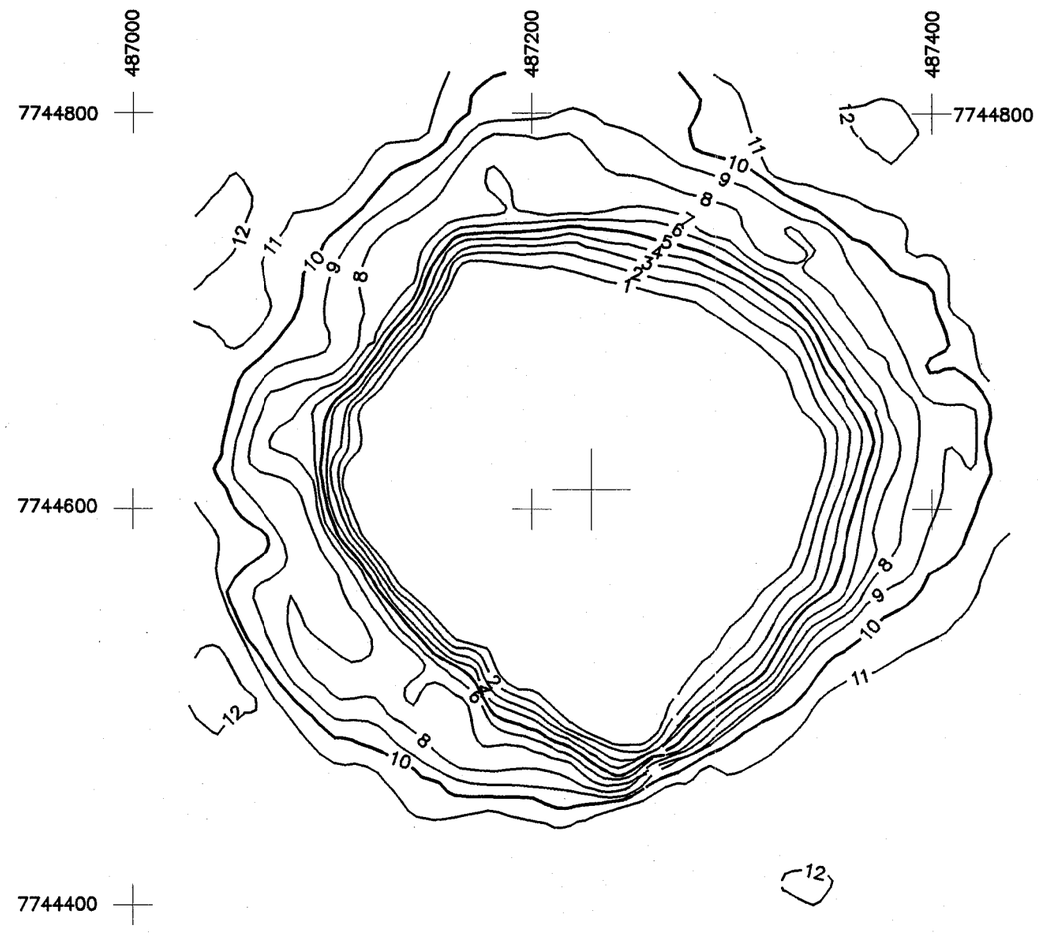
0 40 80m

(1:2000)

TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: NIPTERK L–19			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-30	REV.

2695w033.dwg



ORIGINAL SEABED : 11.7m BELOW MSL.

DATE OF SURVEY : OCTOBER 1984, CANADIAN ENGINEERING SURVEYS CO. LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 3000

KLOHN-CRIPPEN

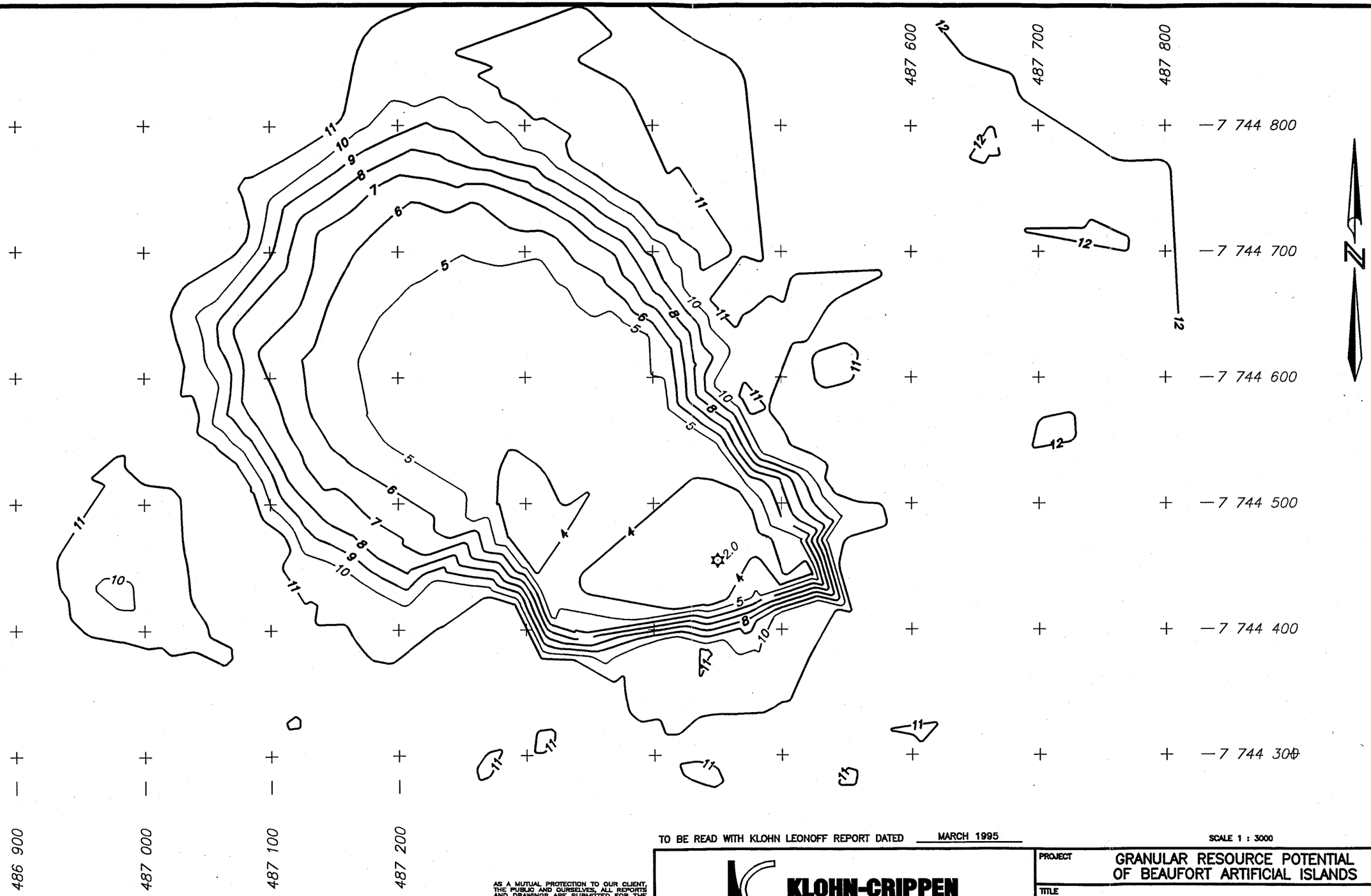
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: NIPTERK I-19 (OCT. 14, 1984)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-30A	

APPROVED



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 3000

ORIGINAL SEABED : 11.7m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	NIPTERK I-19 (JUL., 1990)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-30B
REV.	

2695w052.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Tarsiut P-45 Operator: Gulf Water Depth: 25.5m No: 31

Location

UTM N:	7756908	Latitude:	69.915444
UTM E:	445662	Longitude:	136.418000

Island Type: Molikpaq
Construction Method: Excavation of subcut required removing 113830m3 of
Borrow Site: Ukalerk, Tarsiut N-44, Kogyuk N-67
Fill Material: sand,
D50: 0.365 to mm
Fines: 1.5 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES		
Date:	09/18/84	09/14/85		
Freeboard (m):	2.0	-1		
Surface Area (m):	73 sq			
Base Area (m):				
Slopes (ave.):	7-15:1			
Subcut Depth (m):	3.5	3.5		
Total Fill Quantity (m3):	400000	300000		
Subcut Fill Quantity (m3):	113830			
No Targets:				
Survey Quality:				

Description

Tarsiut P-45 was the first deployment site for Gulf's Molikpaq drilling structure. The Molikpaq, a reusable 110 m square steel caisson, was infilled with sand on a pre-constructed berm. The berm was built in 1984 in 25.5m of water on the Kringalik Plateau with original seabed conditions consisting of stiff clay and silt overlain by soft clay. A total of 113,830 m3 of soft clay was subcut from the foundation area by trailer suction hopper dredges. A total of 400,000 m3 of sandfill was bottom discharged to fill the subcut, to create the 140 m square berm and infill the Molikpaq core. The berm surface was 19.5 m below sea level and had slopes ranging from 7H:1V to 15H:1V. Ukalerk borrow and the abandoned islands Tarsiut N-44 and Kogyuk N-67 were dredged for sand fill. The sand typically contained 1.5% fines and had a D50 of 365 microns. The island was used for drilling over the 1984 winter, and was abandoned in September 1985 when the Molikpaq was removed and towed to the newly constructed berm at Amauligak I-65.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Tarsiut P-45 Operator: Gulf Water Depth: 25.5m No: 31

Location

UTM N: 7756908 Latitude: 69.915444
UTM E: 445662 Longitude: 136.418000

Date (mm/dd/yy)

Construction: 1984
Rig Release: 12/24/84
Abandoned:

Physiographic Location: Kringalik Plateau
Seabed Conditions: soft clay over stiff clay&silt
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: no
Extent: none
Ice Scour Potential: high

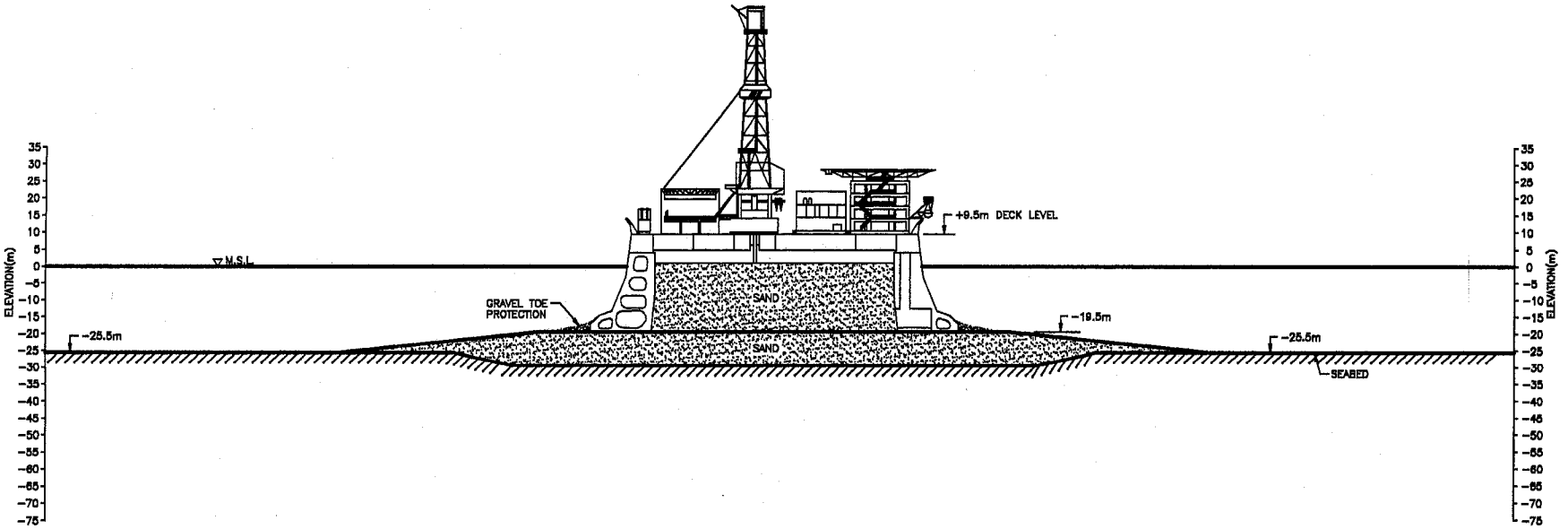
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Aug 13

Open Water Days (median): 102
Summer Intrusions (in 15): 4 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License: W2244
COGLA file: 9414-G1-2-1



TARSIUT P–45 – MOLIKPAQ

OPERATOR: GULF

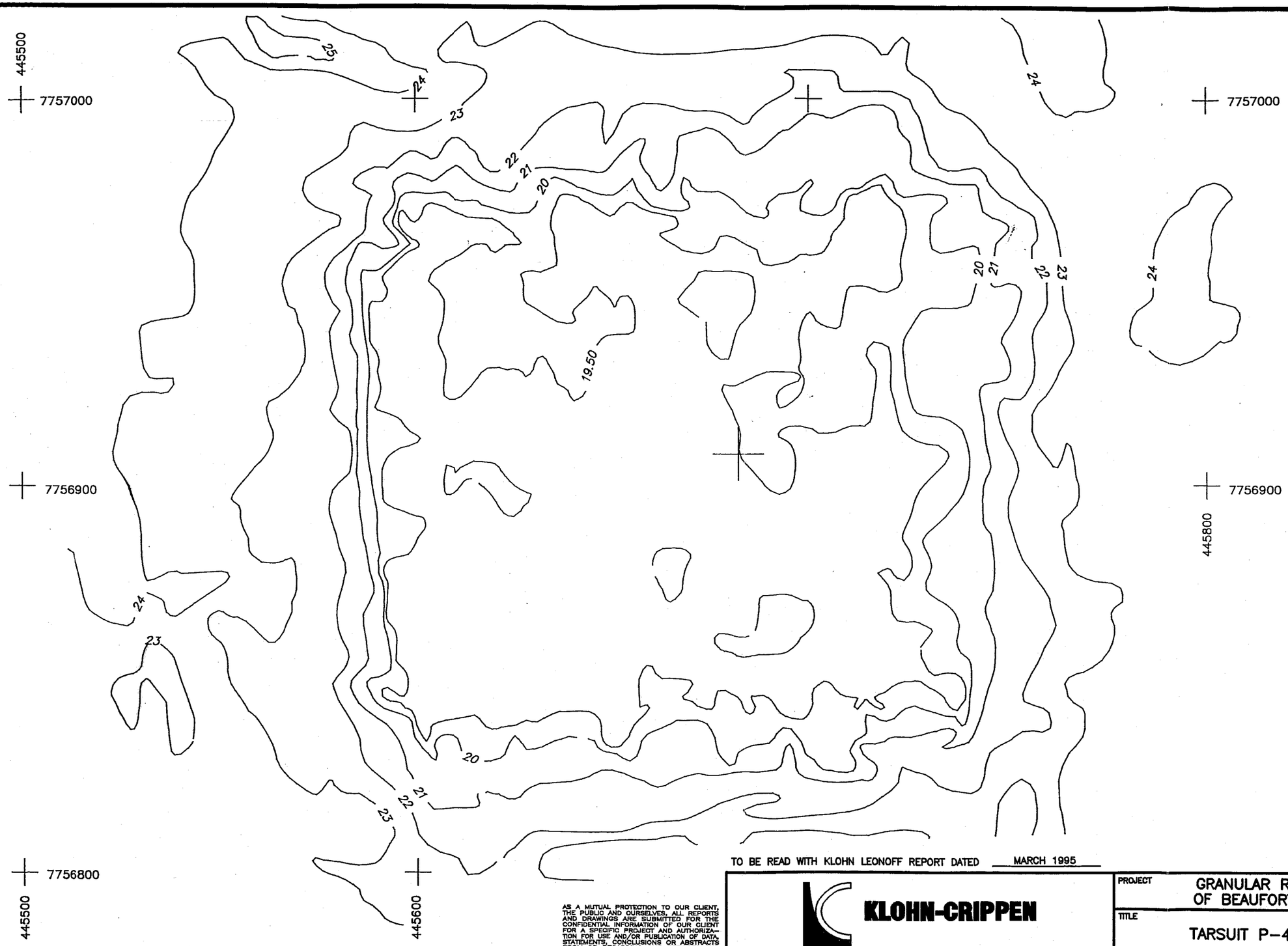
0 40 80m

(1:2000)

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: TARSIUT P–45			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-31	REV.

2695w110.dwg



ORIGINAL SEABED : 21.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1984, CANADIAN ENGINEERING SURVEYS CO. LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 1000

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: TARSUIT P-45 (SEPT. 18, 1984)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-31A	

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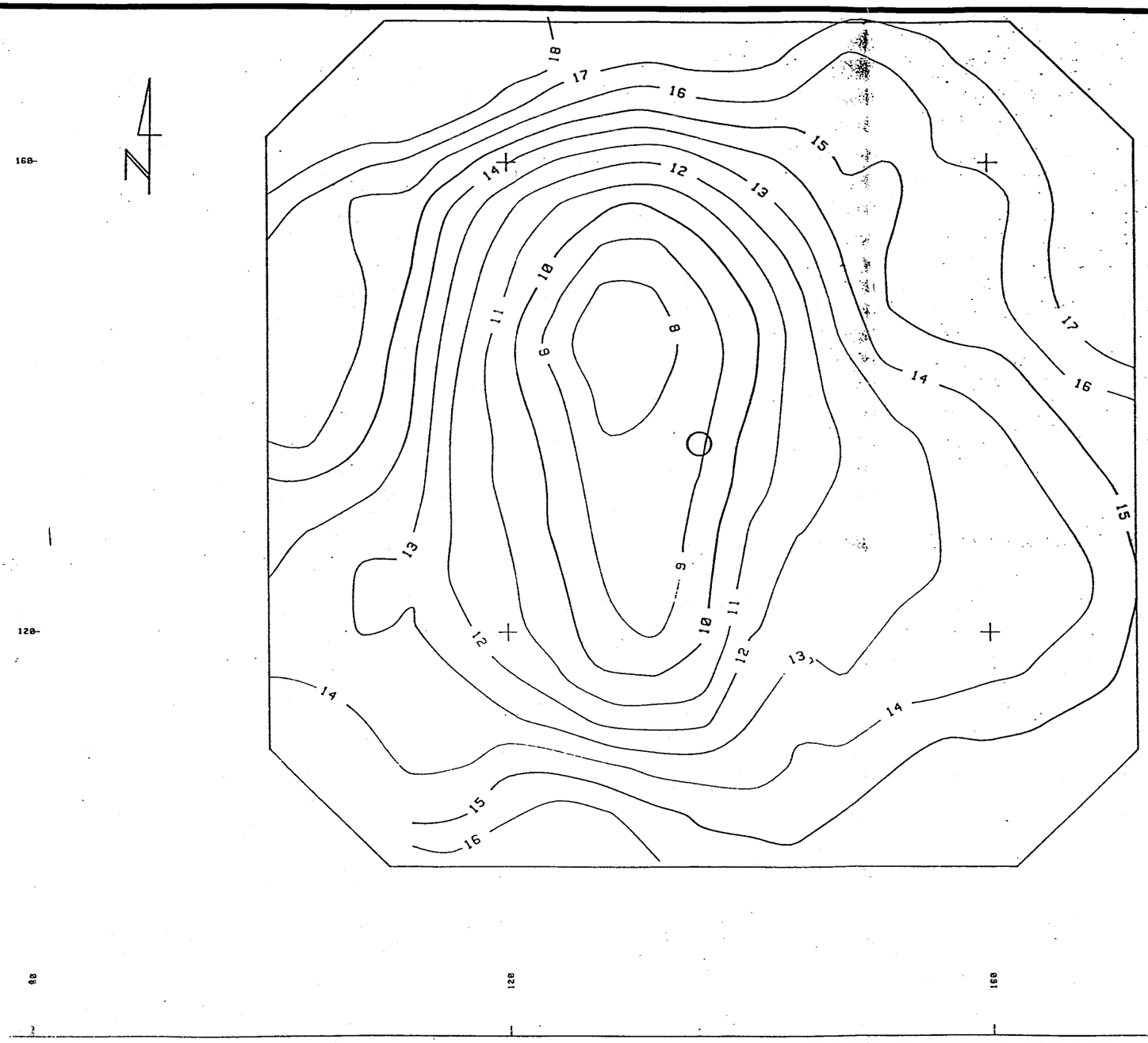

NOTES:

1. POLYGON 1 — REPRESENTS THE INNER TOP OF THE CORE OF MOLIKPAQ WITH MAIN DIMENSION OF 72m.
2. CIRCLE : — 2m DIA REFERENCE CIRCLE IN THE CENTRE OF THE POLYGON.
3. SURVEY DATE: — ON OR ABOUT SEPTEMBER 14, 1985.
4. TYPE OF SURVEY: — LEADLINE SOUNDINGS FROM 2 DIFFERENT DATUM ELEVATIONS.
   INTERIOR GRID LINES : 28.4m ABOUT CAISSON BASE
   PERIMETER: 23.8m ABOVE CAISSON BASE.
5. PLOTTING DATUM: — SOUNDINGS CONVERTED TO COMMON ELEVATIONS ABOVE CAISSON BASE WITH CAISSON BASE SET TO "0" ELEVATION.
6. PLOTTING COORDINATES: — LOCAL COORDINATES USED WITH CHART CAISSON CENTER AT N 136 AND E 136.
7. CONTOURS: — REPRESENT UNIFORM ELEVATION LEVEL ABOVE CAISSON BASE. CONTOURS PLOTTED EVERY METER.
8. DRAWN BY: — N. MANSELL GEO X POST PROCESSING.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: MOLIKPAQ CORE – TARSUIT P–45

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-31B	

APPROVED

2695w113.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Minuk I-53 Operator: Esso Water Depth: 14.7m No: 32

Location

UTM N:	7734003	Latitude:	69.709639
UTM E:	443442	Longitude:	136.458860

Island Type: Sacrificial Beach Island
Construction Method: Hopper placed sand using WD Gateway, Cornelus
Borrow Site: Ukalerk, Issigak, Isserk, Kadluk O-07
Fill Material: gravel, sand
D50: 0.275 to mm
Fines: 2.0 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:		CSS		CSS
Date:	1985	08/22/87		1990
Freeboard (m):	5.0			
Surface Area (m):	110 dia			
Base Area (m):				
Slopes (ave.):	15-6-2:1			25-3:1
Subcut Depth (m):				
Total Fill Quantity (m3):	2000000			1000000
Subcut Fill Quantity (m3):				
No Targets:				23
Survey Quality:				better

Description

Construction at Minuk I-53 started in September, 1982 and continued in the 1983 open water season. Esso built this sacrificial beach island in 14.7 m of water on soft clay overlying firm clay on the Kringalik Plateau. Sand was dredged from the Ukalerk and Issigak borrow pits and hopper placed on site. The island and drilling equipment were damaged in a severe storm in 1985. The island was repaired in the 1985 open water season and drilling was carried out over the 1985-86 winter. Requiring 2 million m3 of sand and gravel fill, the finished island had a 110 m diameter gravel capped working surface, and 5 m freeboard with slopes of 2H:1V. The beach sloped at 15H:1V and was protected with gravel. The island was subsequently abandoned in 1986.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Minuk I-53 Operator: Esso Water Depth: 14.7m No: 32

Location

UTM N: 7734003 Latitude: 69.709639
UTM E: 443442 Longitude: 136.458860

Date (mm/dd/yy)

Construction: 1982-85
Rig Release: 05/02/86
Abandoned:

Physiographic Location: Kringalik Plateau
Seabed Conditions: soft clay overlying firm clay
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: mid Nov
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

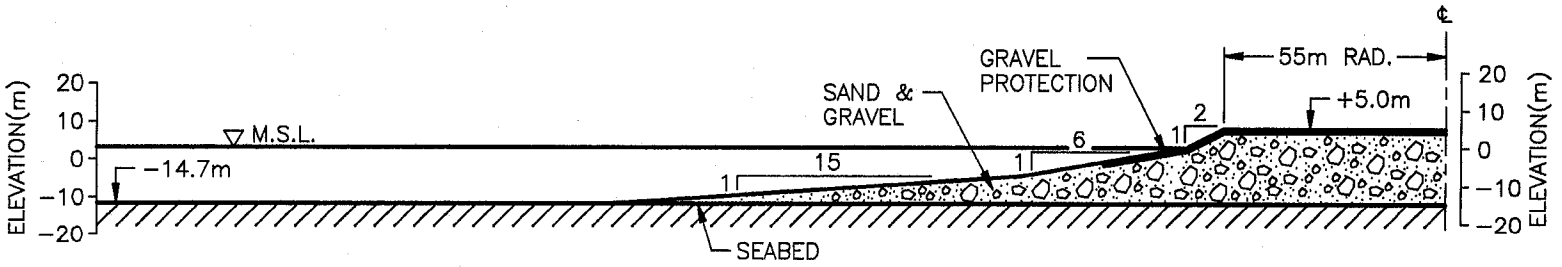
Break-up (median): July 9
Break-up (earliest): June 25
Break-up (latest): July 30

Open Water Days (median): 97
Summer Intrusions (in 15): 2 in 15

Wave Conditions

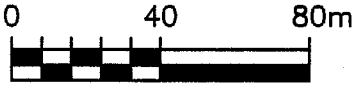
Exposure: high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License: EA104
COGLA file: 9413-J1-1-8



MINUK I–53 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO



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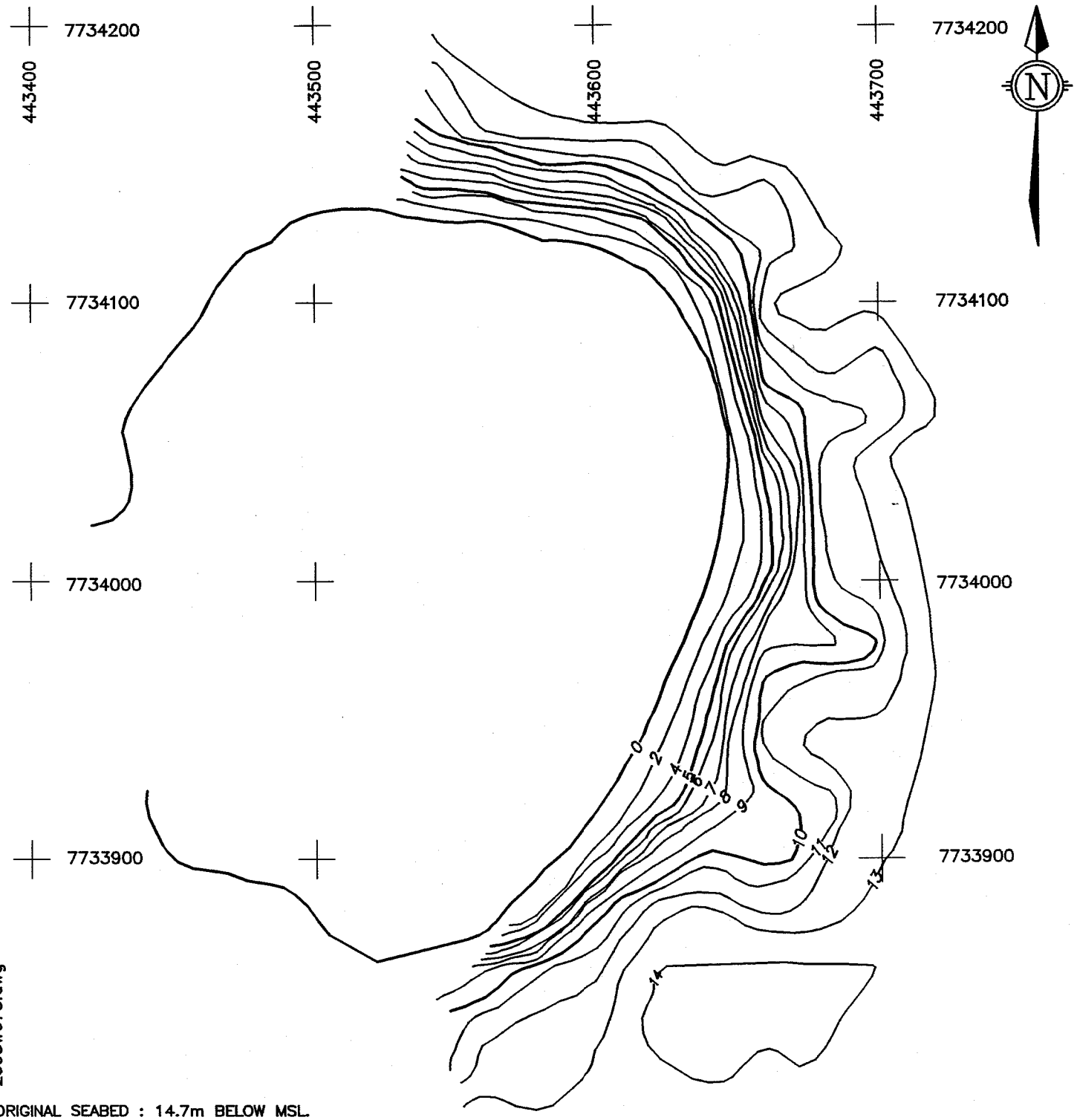
TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: MINUK I–53			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A–2695–03–32	REV.

2695w031.dwg



2695w078.dwg

ORIGINAL SEABED : 14.7m BELOW MSL.

DATE OF SURVEY : OCTOBER 1985, CANADIANB ENGINEERING SURVEYS CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2000

KLOHN-CRIPPEN

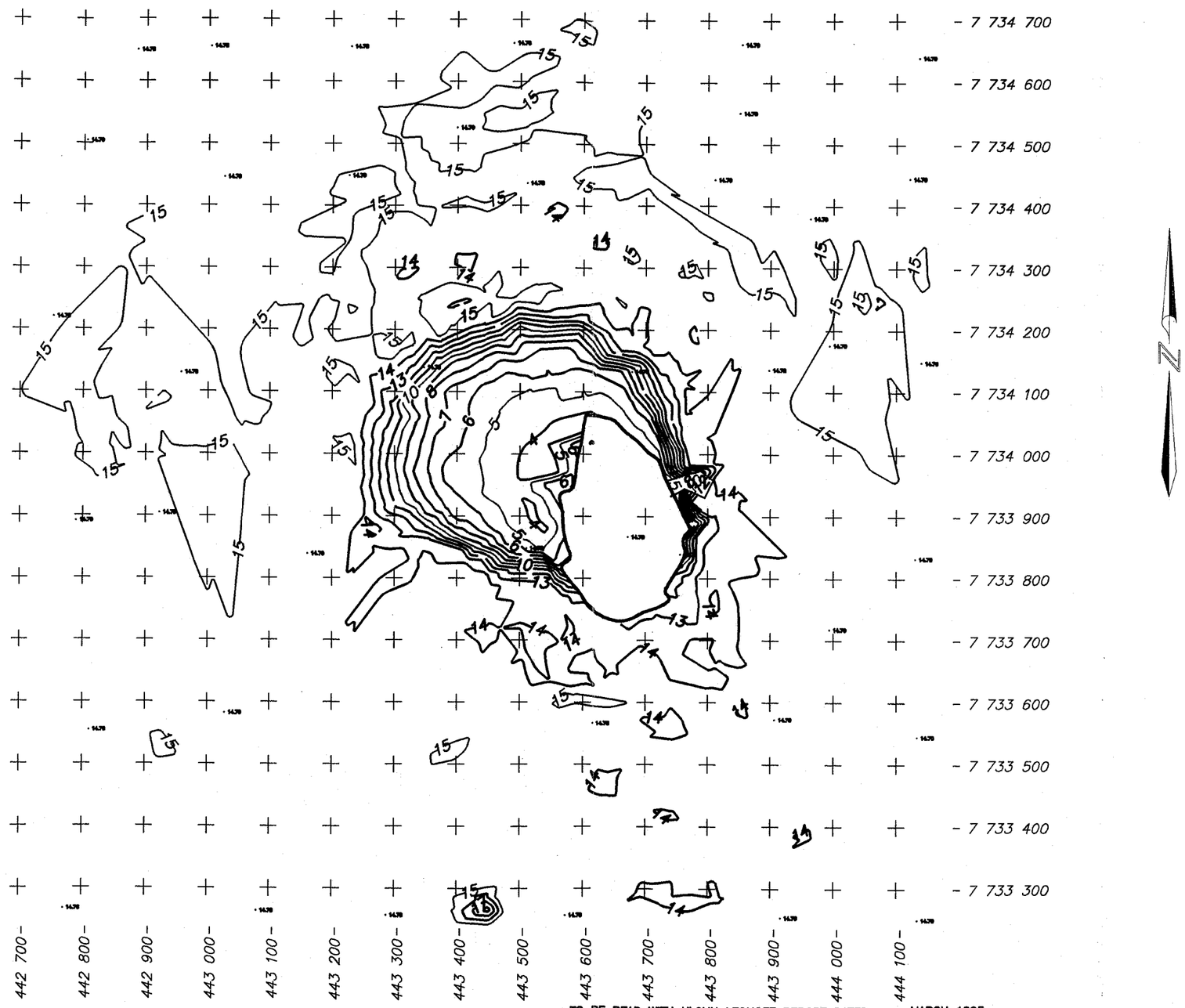
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: MINUK I-53 (OCT., 1985)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-32A	

APPROVED



TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 7500

ORIGINAL SEABED : 14.7m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

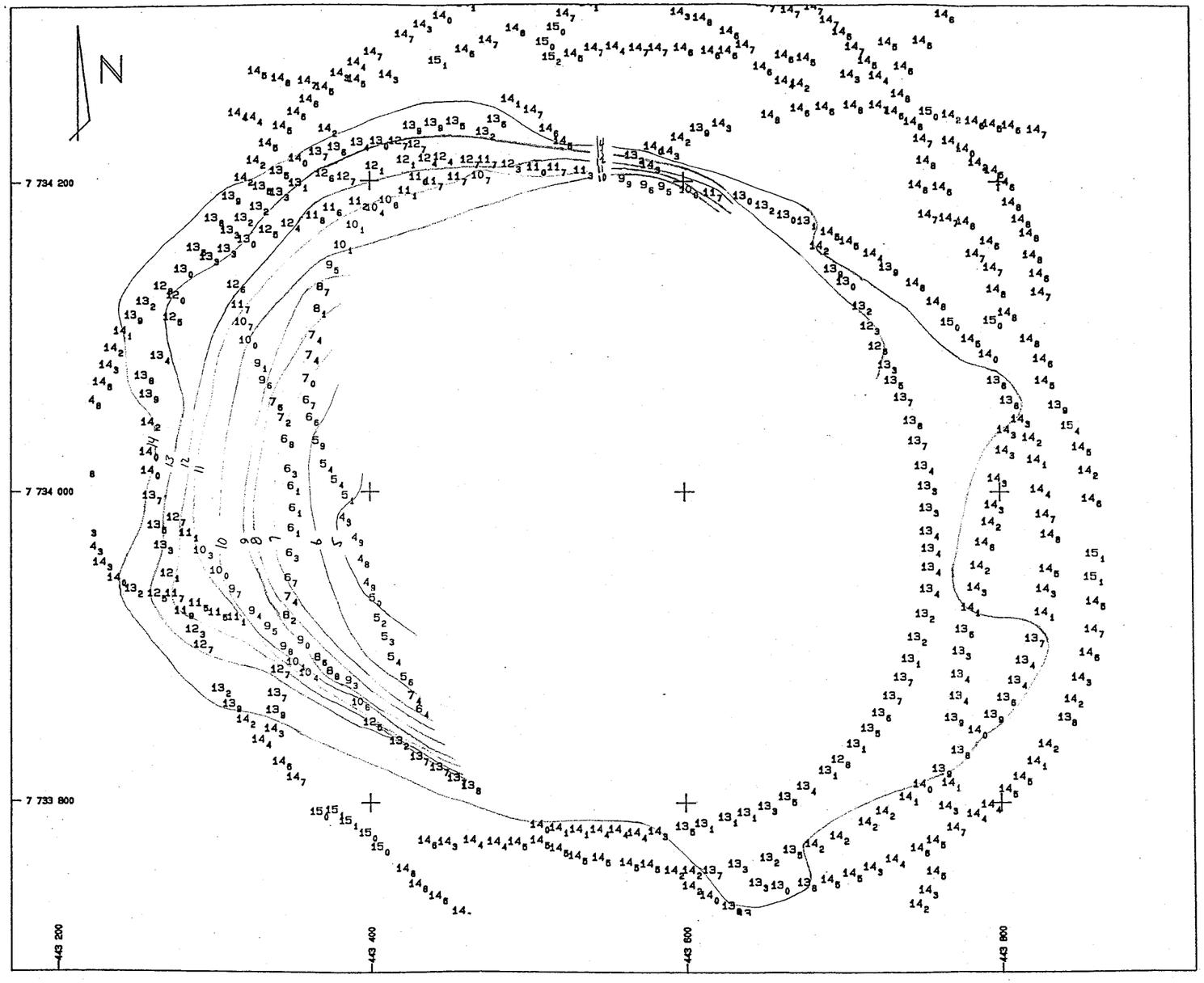
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: MINUK I-53 (JUL., 1990)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-32B	

APPROVED

2695w048.dwg



LEGEND & NOTES

1. SURVEY WAS DONE ON AUGUST 22, 1987
2. SURVEY TIMES: 15:24 TO 16:47
3. SEA STATE 1 METER.
4. SOUNDER - ATLAS DESO 20 - 210Khz TRANSDUCER
5. POSITIONS DERIVED FROM SIGNALS GENERATED BY STATIONS LOCATED ON GARRY AND PULLEN IS.
6. BATHYMETRY COLOR CODE - 4.0-6.9 GREEN
   7.0-8.9 RED
   9.0-10.9 ORANGE
   11.0-12.9 BLUE
   13.0-14.9 BLACK
   15.0-17.0 PURPLE

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

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KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	SURVEY 1 – MINUK ISLAND
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-32C
REV.	

2695w114.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amauligak I-65 Operator: Gulf Water Depth: 31.0m No: 33

Location

UTM N:	7774812	Latitude:	70.077694
UTM E:	545462	Longitude:	133.804556

Island Type: Molikpaq
Construction Method: Subexcavation of 9m of weak foundation clay
Borrow Site: Ukalerk, Kogyuk N-67, Amerk O-09,Issigak
Fill Material: sand, gravel toe
D50: 0.320 to mm
Fines: 1.5 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES	CES	CES	
Date:	09/19/85	12/25/85	08/17/89	
Freeboard (m):	1.5		-16.0	
Surface Area (m):	73 sq			
Base Area (m):				
Slopes (ave.):	7:1		11-8:1	
Subcut Depth (m):	9.0			
Total Fill Quantity (m3):	1408000		900000	
Subcut Fill Quantity (m3):	440000			
No Targets:				
Survey Quality:				

Description

A berm at Amauligak I-65 was built by Gulf in the 1985 open water season to support the Molikpaq drilling structure. The island was built in 31.0 m of water in the Kugmallit Channel physiographic region. Site conditions included surficial soft clay overlying fine sand. A total of 440,000 m3 of soft clay was subcut from the foundation area using trailer suction hopper dredges. A total of 1,408,000 m3 of fill was used to fill the subcut, build the berm and infill the core. Sand was dredged from the Ukalerk borrow area and the abandoned Kogyuk N-67 and Amerk O-09 islands. The sand contained 1 to 1.5% fines and averaged a D50 of 320 microns. The completed berm has a 140 m square surface 19.5 m below the waterline, sloping away at 7H:1V to the seabed. The Molikpaq was placed on the berm and the core infilled with sand to 1.5 m above sea level. Gravel excavated from the Issigak borrow was used as toe protection. Due to adverse ice conditions and an accelerated schedule, four dredges, the Geopotes X, IX, WD Gateway, and Cornelis Zanen were used. Several wells were drilled from this platform in 1985 and 1986 before abandonment. The Molikpaq was released from Amauligak I-65 in September 1986. Amauligak I-65 was used as a borrow source for Molikpaq core fill at Amauligak F-24 and Isserk I-15.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amauligak I-65 Operator: Gulf Water Depth: 31.0m No: 33

Location

UTM N: 7774812 Latitude: 70.077694
UTM E: 545462 Longitude: 133.804556

Date (mm/dd/yy)

Construction: 1985
Rig Release: 09/19/86
Abandoned:

Physiographic Location: Kugmallit Channel
Seabed Conditions: soft clay over sand
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: no
Extent: none
Ice Scour Potential: high

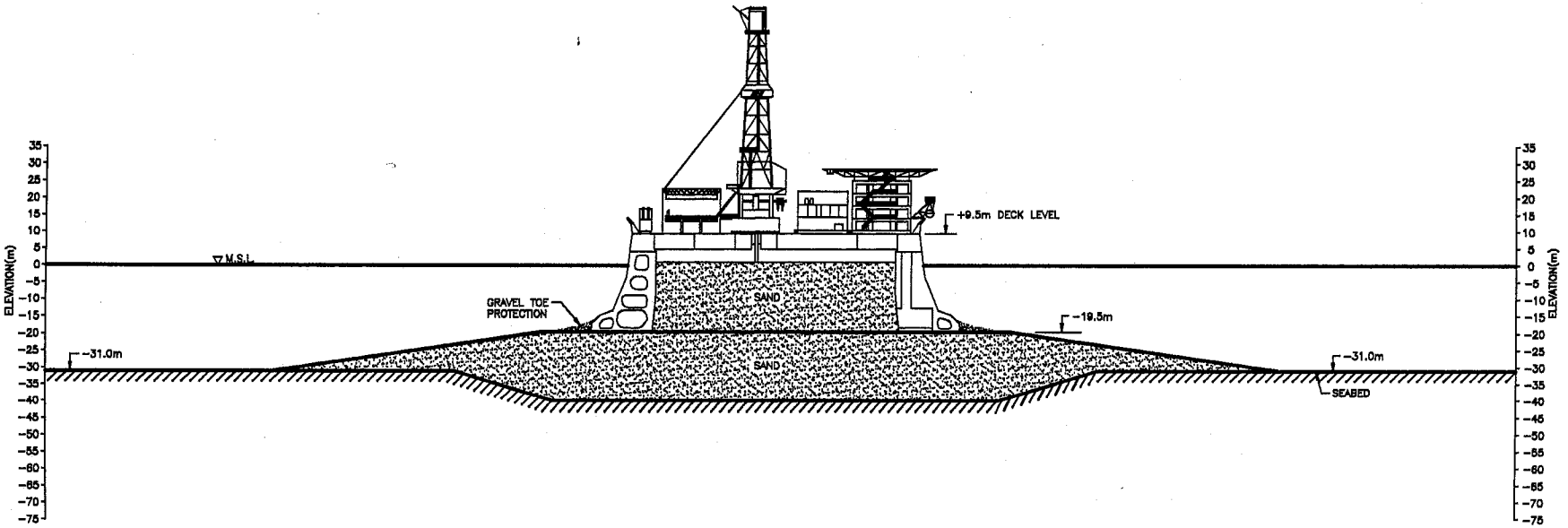
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 4 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License: W2284
COGLA file: 9414-G1-2-2



AMAULIGAK I-65 – MOLIKPAQ

OPERATOR: GULF

0 40 80m

(1:2000)

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	AMAULIGAK I-65
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	A-2695-03-33
REV.	

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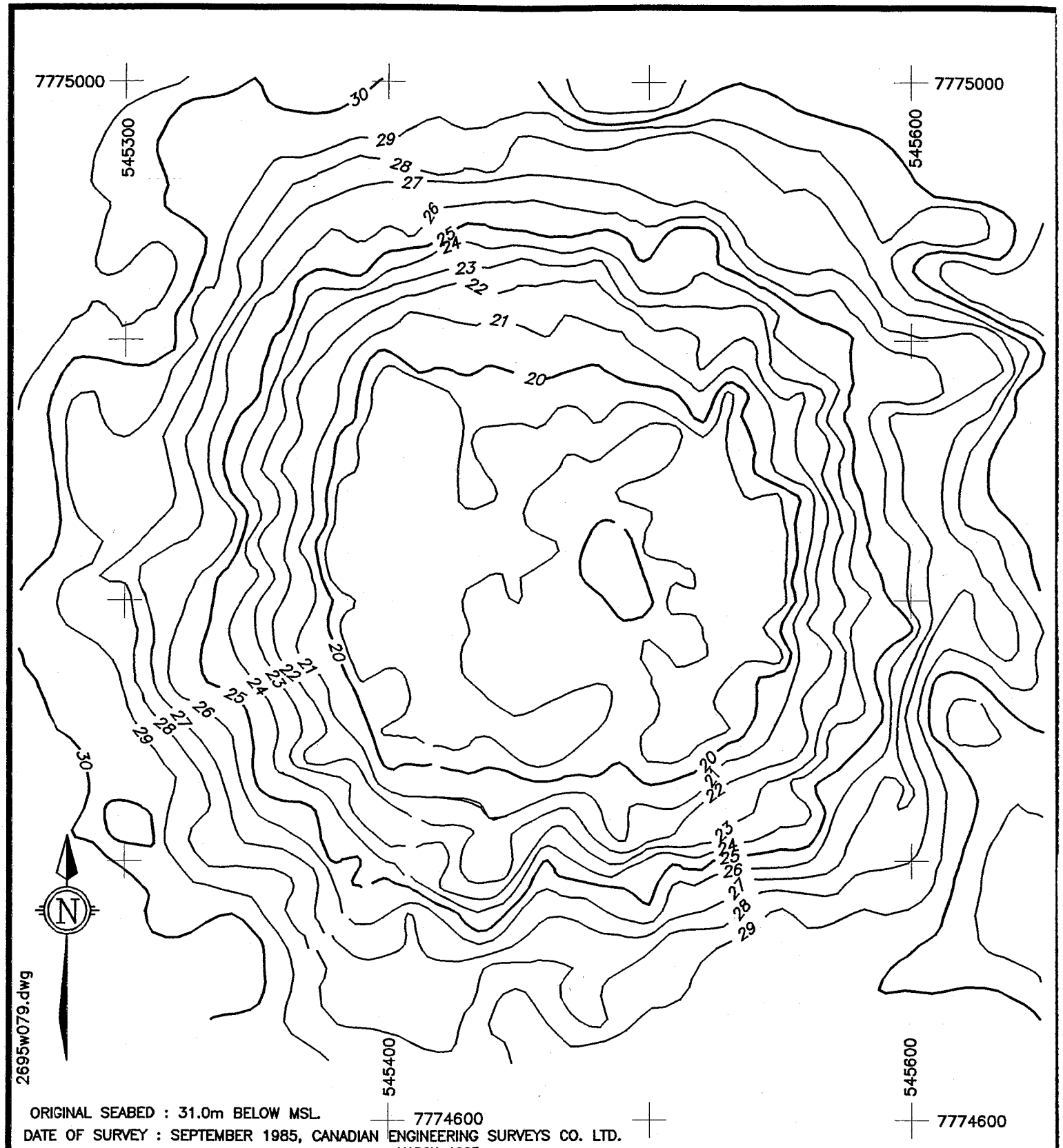


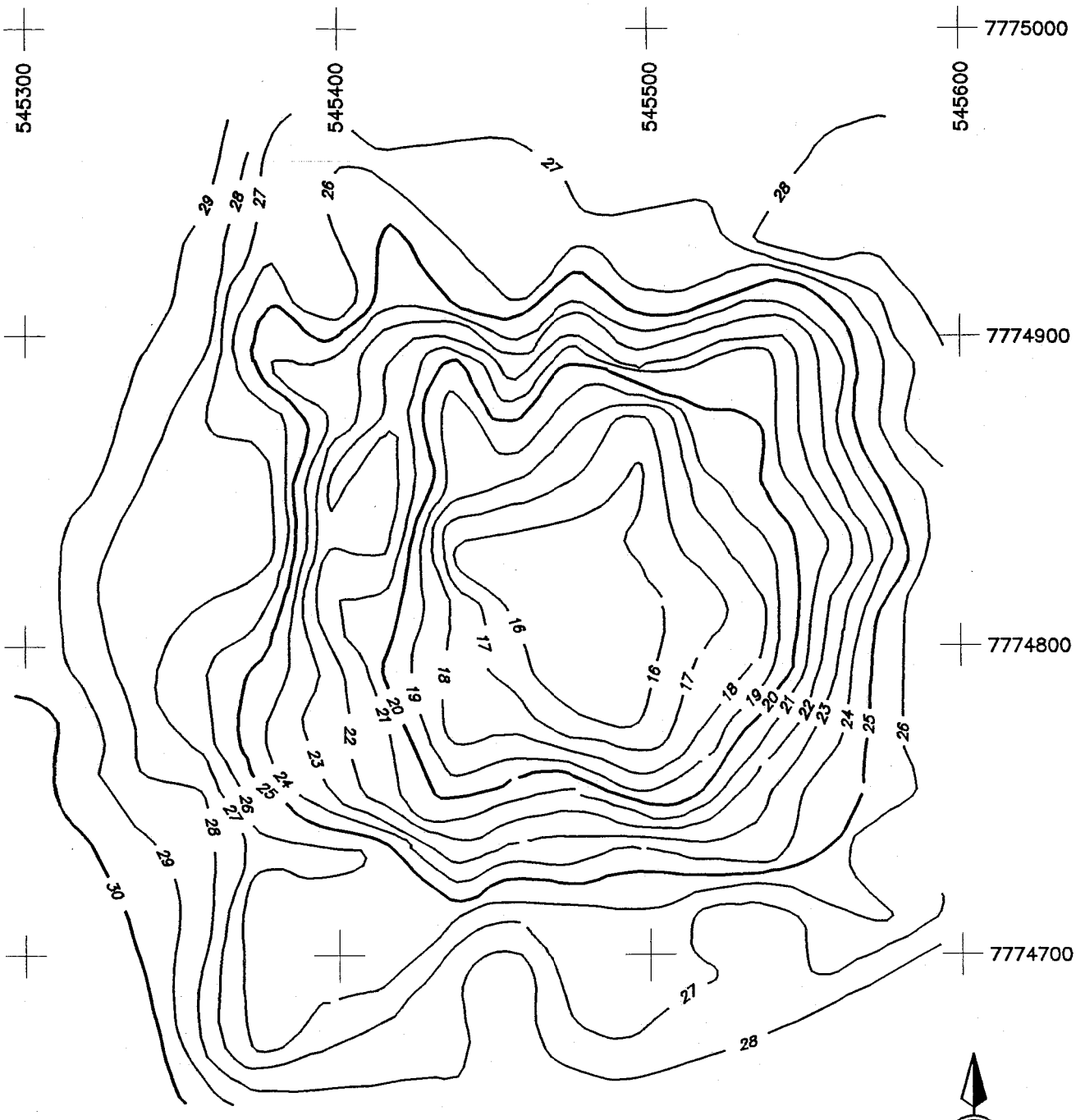
ORIGINAL SEABED : 31.0m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1985, CANADIAN ENGINEERING SURVEYS CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2000

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: AMAULIGAK I-65 (1985)			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-33A	REV.



2695w080.dwg

ORIGINAL SEABED : 31.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1989, CANADIAN ENGINEERING SURVEYS CO. LTD.

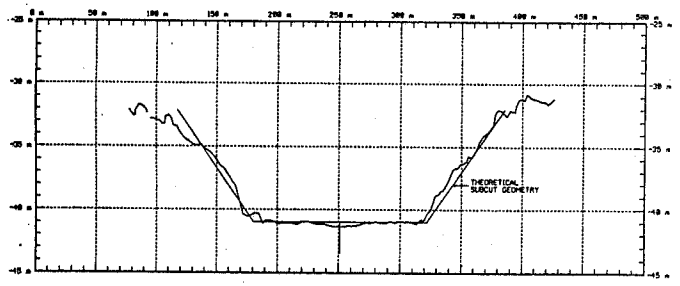
TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2000

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	AMAULIGAK I-65 (AUG. 17, 1989)

CLIENT:	DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
INDIAN AND NORTHERN AFFAIRS CANADA	MARCH 95	PA2695.03	A-2695-03-33B	
	APPROVED			



POST SUBCUT N - S CROSS SECTION
SURVEY NO. 08
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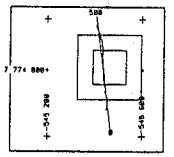
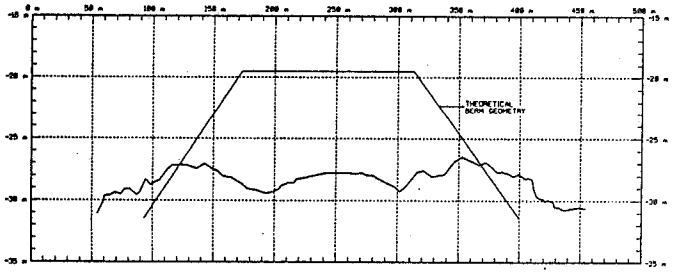
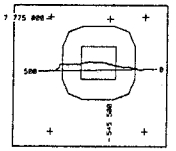
VERTICAL SCALE = 1:200



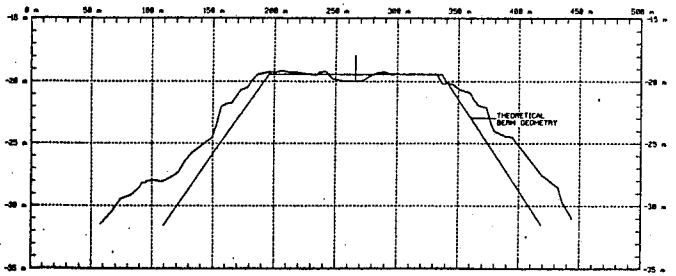
KEY PLAN
SCALE 1:20000



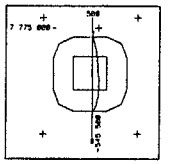
BERM CONSTRUCTION E - W CROSS SECTION
SURVEY NO. 18
HORIZONTAL SCALE = 1:2000
VERTICAL SCALE = 1:200



KEY PLAN
SCALE 1:20000



POST LEVELLING N -S CROSS SECTION
SURVEY NO. 31A
HORIZONTAL SCALE = 1:2000
VERTICAL SCALE = 1:200

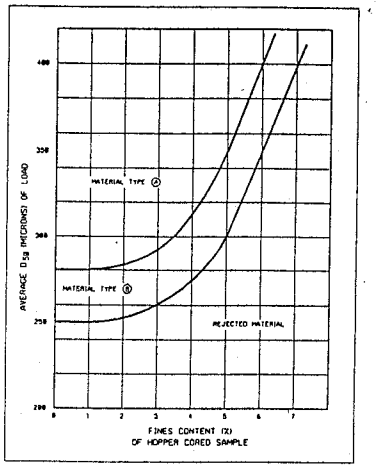


KEY PLAN
SCALE 1:20000

CONSTRUCTION METHOD STATEMENT

1. EXCAVATE SUBCUT TO REMOVE CLAY.
2. INFILL SUBCUT WITH SAND BY BOTTOM DISCHARGE METHOD.
3. CONSTRUCT PERIMETER SAND BUND, WITH DREDGE DRAG ARM, ACCORDING TO PREDETERMINED PLACEMENT PROCEDURE.
4. INFILL BERM WITH SAND BY BOTTOM DISCHARGE METHOD.
5. REPEAT SEQUENCE (3) & (4) FOR SECOND LIFT. FOLLOWING PREDETERMINED PLACEMENT PROCEDURE.
6. PLACE FINAL LIFT ENTIRELY BY BOTTOM DISCHARGE TO -18.5m. PRIOR TO LEVELLING.
7. BERM TO BE LEVELLED TO -19.5m UTILIZING MODIFIED DRAG HEAD TO REMOVE EXCESS SAND.

NORTH



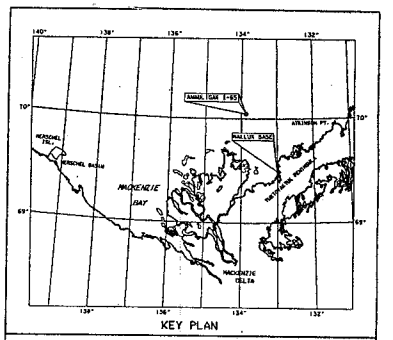
GRANULAR FILL SPECIFICATION

OPERATION	DESIGN	ACTUAL
SUBCUT	380,000	437,810
SUBCUT INFILL	380,000	437,810
BERM	662,063	825,750
CORE	110,000	140,862
TOTAL	1,152,063	1,404,422

VOLUMES

FILL ZONE	MATERIAL TYPE
SUBCUT, BERM INFILL AND TOP LAYER	(A)
EXTERIOR BUNDS	(A) OR (B)
MOLIKPAQ CORE -19.5m TO -18m	(A)
MOLIKPAQ CORE -18m TO +2m	(A) OR (B)

MATERIAL TYPES



KEY PLAN

NOTES:

1. BERM CENTRE COORDINATES
   GEOGRAPHIC 70° 04' 39.8"N 133° 48' 16.3"W
   UTM (ZONE 8) 7774812N 545462E
2. FOR SAND FILL MATERIAL REFER TO THE SPECIFICATIONS.
3. CONSTRUCTION TOLERANCES IN BERM DIMENSIONS ARE DETAILED IN THE SPECIFICATIONS.
4. SURVEY REQUIREMENTS:
   - TRACK CHART OF DREDGE DURING DISCHARGE
   - CONTOUR PLOT OF BERM AFTER EACH DREDGE LOAD
   - DIFFERENTIAL CONTOUR INDICATING INCREMENTAL CONTOUR CHANGE FOR EACH NEW CONTOUR SURVEY
   - INVERSE CONTOUR PLOT INDICATING REQUIRED BERM CONTOURS TO DESIGN FOR EACH NEW CONTOUR SURVEY
5. FINAL HEIGHT OF BOTTOM DISCHARGE INFILL SECTIONS TO BE DETERMINED ON SITE BY ENGINEER'S REPRESENTATIVE
6. THIS DRAWING SHOULD BE READ IN CONJUCTION WITH DWGS:
   AM-85-002 AS BUILT PLAN
   AM-85-003 BERM CONTOURS
7. PREDETERMINED PLACEMENT PROCEDURE WAS USED DUE TO LIMITED TIME AVAILABLE FOR SURVEYING AND HEAVY ICE CONDITIONS. THIS RESULTED IN PRIMARILY THE OVERPLACEMENT OF MATERIAL, VISIBLE BETWEEN THE THEORETICAL (DESIGN) GEOMETRY AND THE AS BUILT GEOMETRY.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: AMAULIGAK 1-65 - AS BUILT

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	A-2695-03-33C	

APPROVED

2695w115.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Arnak K-06 Operator: Esso Water Depth: 7.2m No: 34

Location

UTM N:		Latitude:	69.761222
UTM E:		Longitude:	133.772361

Island Type:	Sacrificial Beach Island
Construction Method:	Hydraulically placed sand.
Borrow Site:	local
Fill Material:	sand,
D50:	0.075 to 5.000mm
Fines:	n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES			CSS
Date:	08/26/85			1990
Freeboard (m):	5.0			-2.5
Surface Area (m):	110 dia			
Base Area (m):				
Slopes (ave.):	6-12:1			30-10:1
Subcut Depth (m):				
Total Fill Quantity (m3):	700000			600000
Subcut Fill Quantity (m3):				
No Targets:				19
Survey Quality:				excellent

Description

Arnak K-06 was constructed by Esso in the summer of 1985 as a sacrificial beach island in 7.2 m of water. Seabed conditions consist of soft clay overlying compact sand and silty sand of the Akpak Plateau. Requiring 700,000 m3 of sand fill, the island had a working surface 110 m in diameter and 5 m freeboard. Slopes ranged from 6H:1V to 12H:1V or flatter. The island was used as a drilling platform in the 1986 and subsequently abandoned. A survey by Challenger in 1990 indicated the island had eroded to 2.5 m below sea level. Side Scan Sonar revealed 33 targets on the island.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Arnak K-06 Operator: Esso Water Depth: 7.2m No: 34

Location

UTM N:
UTM E:

Latitude: 69.761222
Longitude: 133.772361

Date (mm/dd/yy)

Construction: 1985
Rig Release: 08/12/86
Abandoned:

Physiographic Location: Akpak Plateau
Seabed Conditions: clay overlying sand
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 22

Landfast Ice Formation: late Oct
Rubble Formation: yes
Extent: moderate
Ice Scour Potential: low

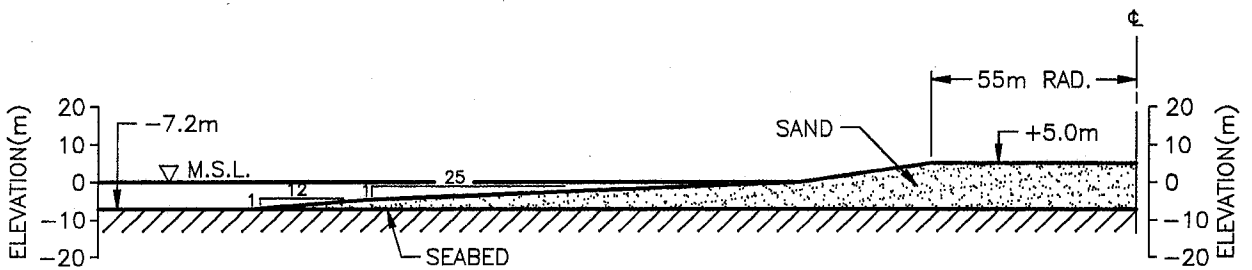
Break-up (median): July 9
Break-up (earliest): July 2
Break-up (latest): July 30

Open Water Days (median): 98
Summer Intrusions (in 15): 1 in 15

Wave Conditions

Exposure: moderate
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License: W1046
COGLA file: 9413-J1-2-3



ARNAK K–06 – SACRIFICIAL BEACH ISLAND

OPERATOR: ESSO

0 40 80m

(1:2000)

TO BE READ WITH KLOHN–CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: ARNAK K–06			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED:	PROJECT No.: PA2695.03	DWG. No.: A–2695–03–34	REV.

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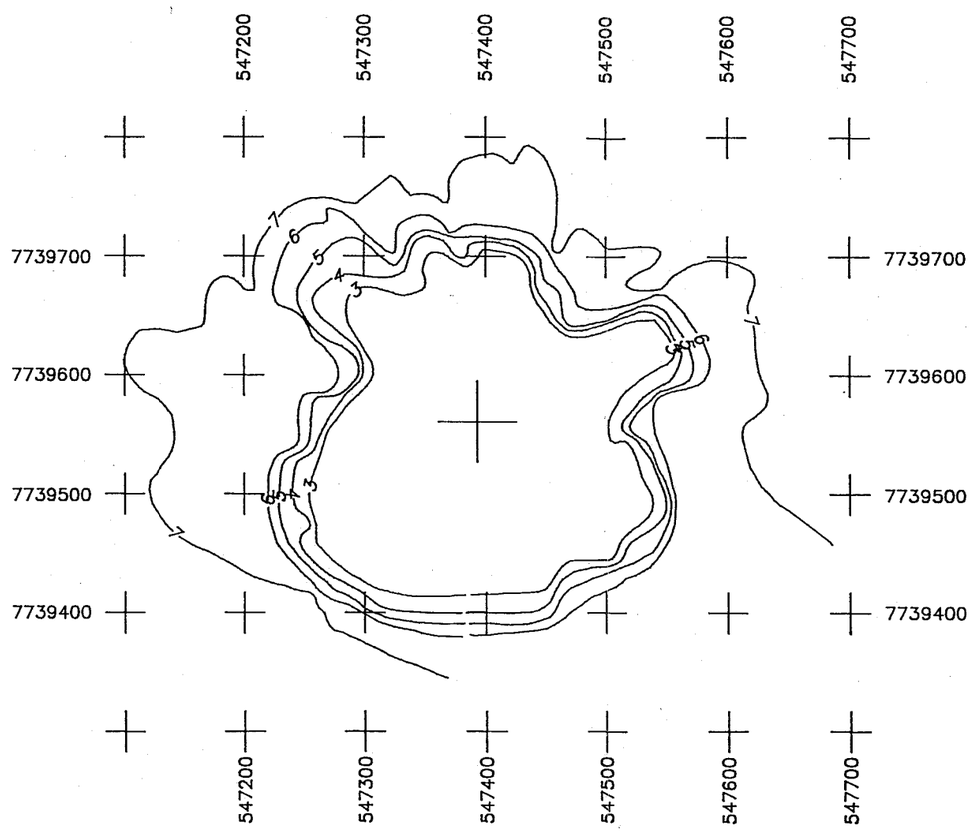

ORIGINAL SEABED : 7.2m BELOW MSL.

DATE OF SURVEY : AUGUST 1985, CANADIAN ENGINEERING SURVEYS CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

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KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ARNAK K-06 (AUG. 26,1985)

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-34A	

APPROVED

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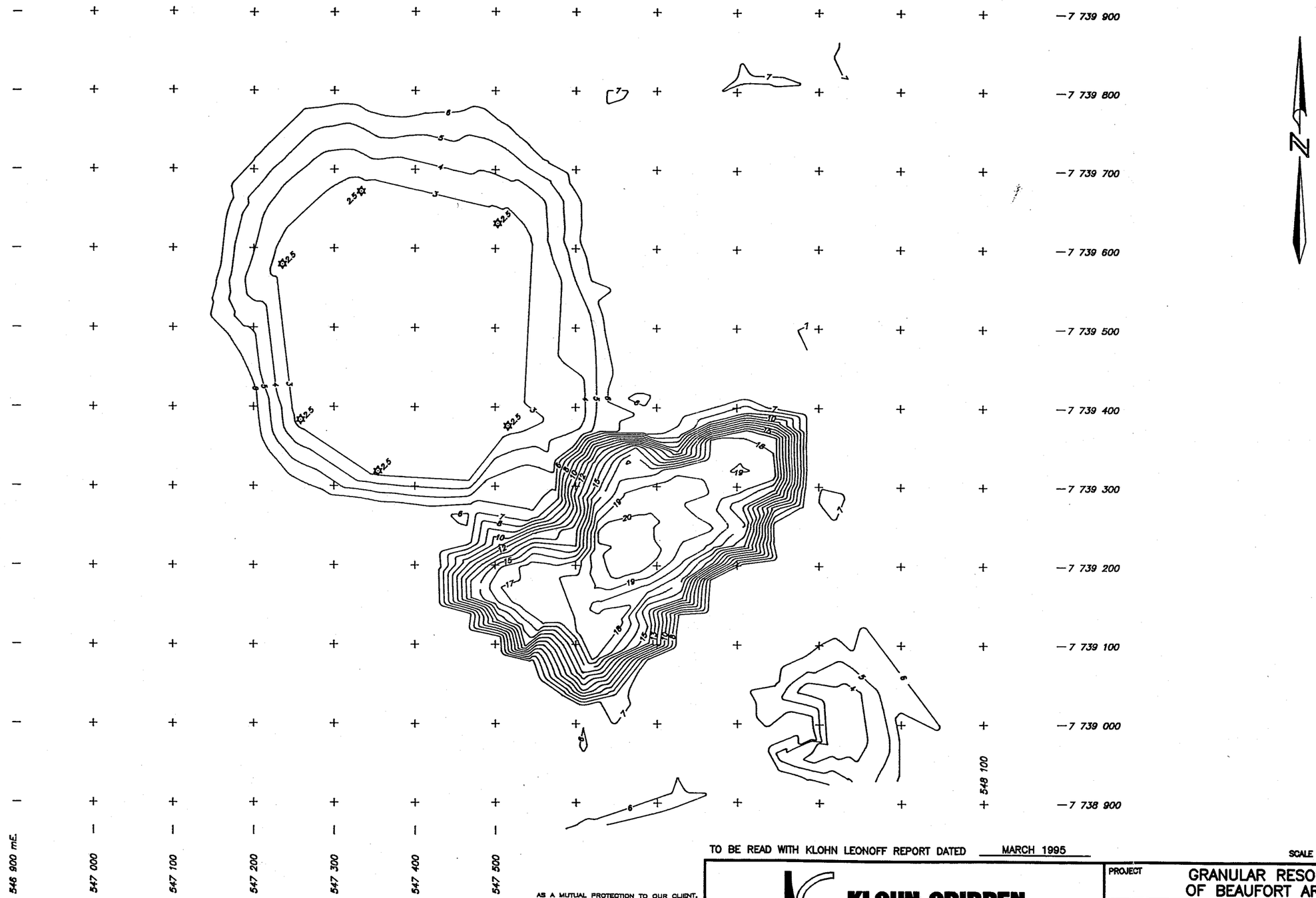

ORIGINAL SEABED : 7.2m BELOW MSL.

DATE OF SURVEY : AUGUST 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 5000

KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: ARNAK K-06 (AUG.,1990)

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-34B	

APPROVED

2695w117.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kaubvik I-43 Operator: Esso Water Depth: 17.9m No: 35

Location

UTM N:	7751919	Latitude:	69.875833
UTM E:	483776	Longitude:	135.422028

Island Type: CRI
Construction Method: Glory hole excavated prior to berm construction.
Borrow Site: Ukalerk, Isserk, Issigak
Fill Material: sand, gravel toe
D50: 0.075 to 75.000mm
Fines: n/a %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES		CES	CSS
Date:	08/18/86	1987	09/89	1990
Freeboard (m):	3.0	-1.0	-3.6	-4.5
Surface Area (m):	90 sq	caisson		
Base Area (m):		removal		
Slopes (ave.):	1:12		11-5:1	15-6:1
Subcut Depth (m):	16.0			
Total Fill Quantity (m3):	566000			400000
Subcut Fill Quantity (m3):				
No Targets:				11
Survey Quality:				poor

Description

Esso constructed Kaubvik I-43, a caisson retained island, during the 1983 to 1986 open water seasons in 17.9 m of water. Located in the Ikit Trough, the local seabed consists of soft silty clay overlying firm clay. A glory hole was previously excavated in the seabed prior to berm construction. Sand and gravel totalling 566,000 m3 was dredged from the Ukalerk, Issigak and Isserk borrow pits using trailing suction hopper dredges and bottom dumped on the site. The berm was built to within 9 m of the waterline with a top surface 91 m in diameter. Slopes of 12H:1V were maintained. The caissons were ballasted to the berm and infilled with sand to a level 3 m above the waterline. The island was used for drilling over the winter of 1986, and abandoned in 1987. During deballasting, the sand core was partially removed, leaving a berm 1 m below the waterline. The island was surveyed in September 1989 by Canadian Engineering Surveys (CES). The survey indicated the island had eroded to 3.6 m below sea level, and that a possible slope failure had occurred on the southeast side, (CSR 1990).

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Kaubvik I-43 Operator: Esso Water Depth: 17.9m No: 35

Location

UTM N: 7751919 Latitude: 69.875833
UTM E: 483776 Longitude: 135.422028

Date (mm/dd/yy)

Construction: 1983-86
Rig Release: 01/10/87
Abandoned: 08/87

Physiographic Location: Ikit Trough
Seabed Conditions: soft silty clay over firm clay
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: late Nov
Rubble Formation: yes
Extent: large
Ice Scour Potential: moderate

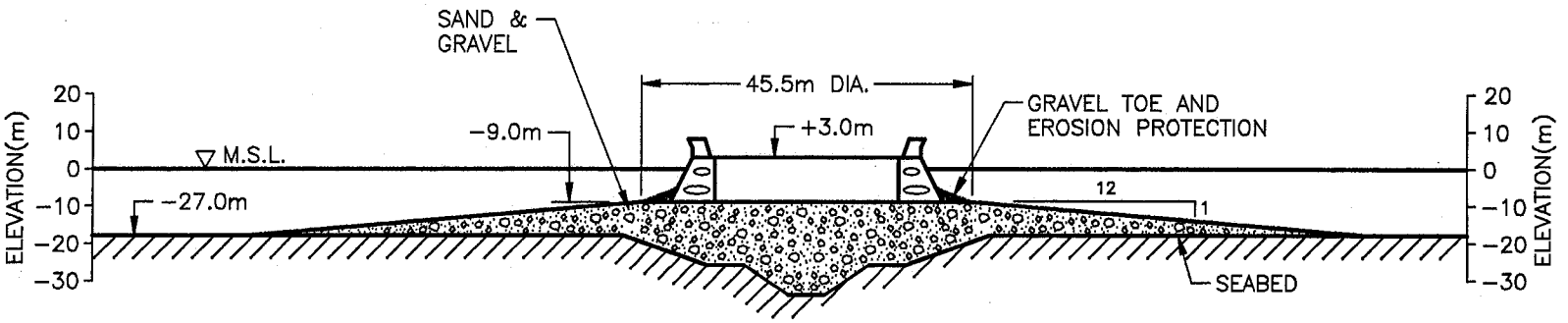
Break-up (median): July 2
Break-up (earliest): June 11
Break-up (latest): Aug 6

Open Water Days (median): 103
Summer Intrusions (in 15): 5 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 15 in 4 yrs

Lease No.:
License:
COGLA file: 9414-J1-2-1



KAUBVIK I-43 – CAISSON RETAINED ISLAND

OPERATOR: ESSO

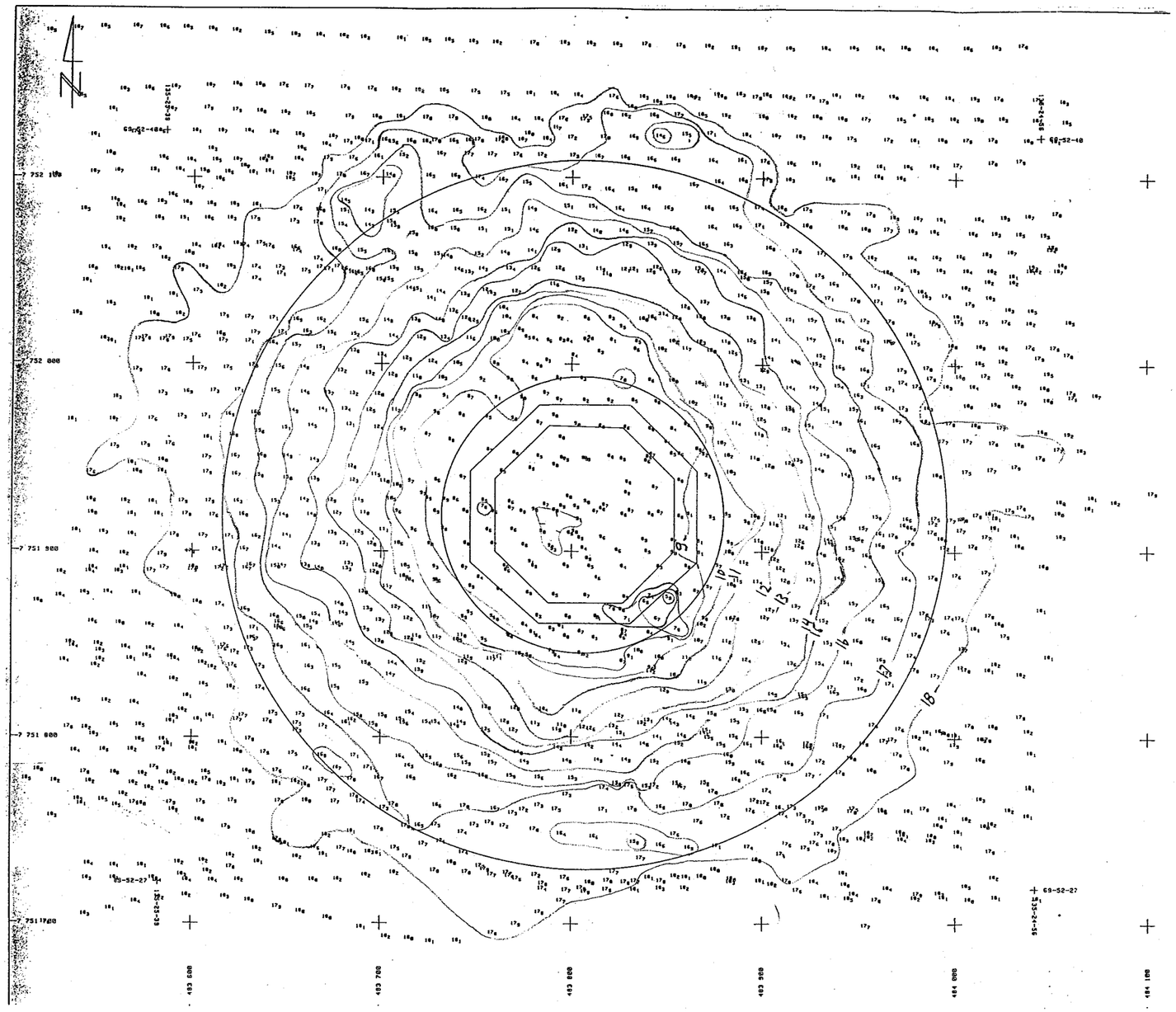
0 40 80m

(1:2000)

TO BE READ WITH KLOHN-CRIPPEN REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: KAUBVIK I-43			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No.: PA2695.03	DWG. No.: A-2695-03-35	REV.

2695w035.dwg



NOTES:

1. SURVEY VESSEL : M/V "ARCTIC NANABUSH"

2. SURVEYOR : R. DICK(P. ENG.)
   DRAWN BY : D. ROBERTS(SURVEYOR)

3. DATA DISK REFERENCE : 86_KAU_N_06 / KAU007

4. DATE SURVEYED : 05, 06-AUGUST-86.
   TIME SURVEYED : 01:00 TO 07:24

5. LAST DREDGE DUMP : W. D. GATEWAY ; LEVELING

6. GEODESY : UNIVERSAL TRANSVERSE MERCATOR (U.T.M.)
   CO-ORDINATE SYSTEM, ZONE 8, CENTRAL MERIDIAN
   135 WEST LONGITUDE, CLARKE 1866 SPHEROID,
   NORTH AMERICAN DATUM (N.A.D.) 1927.

7. EQUIPMENT : SURVEY SYSTEM; SYLEDIS SR3 (COMBINER)
   DESO 20 DEPTH SOUNDER
   HECO 10 HEAVE COMPENSATOR
   HP9835A COMPUTER
   HP7475A PLOTTER
   HP2671G PRINTER
   POST-PROCESSING SYSTEM; HP9836A COMPUTER
   HP7580B DRUM PLOTTER
   HP2671G PRINTER
   RMS RADIO MODEMS

8. SHORE STATIONS : " U " SIGNIFIES THE STATIONS USED.
   " A " ACTIVE; " F " FORWARD; " R " REVERSE

	TOKER	C-83-3	N 7 726 105.20	E 501 337.00	HT 42m
UAFR	PULLEN	C-84-2	N 7 740 869.70	E 523 090.70	HT 38m
UAFR	PELLY	C-3	N 7 723 592.60	E 483 209.50	HT 57m
UFR	PITT	CES #2	N 7 672 329.50	E 452 647.10	HT 23m

   ALL OF THE ABOVE CO-ORDINATES WERE DERIVED FROM TRANSLOCATION DOPPLER SATELLITE SURVEYS.

9. BATHYMETRY : DEPTHS ARE SHOWN IN METRES AND DECIMETRES

10. BENCHMARK DATUM IS REFERENCED TO THE SEA BOTTOM AT 18.5m.
    BENCHMARK AREA : N 7 751 837
    E 482 200
    BENCHMARK LINE, START : N 7 751 865
    E 482 191
    END : N 7 751 809
    E 482 210
    AVERAGE OBSERVED DATUM DEPTH = 18.25m.
    AVERAGE CONSTANT APPLIED TO ALL DEPTHS = +0.25m

11. SEA STATE : 1.0 TO 2.0 METRES

12. WEATHER : O'CAST, 8 DEGREES CELCIUS

13. WIND : EASTERLY, 20 -25 KNOTS

14. ISLAND CENTRE : N 7 751 919
    E 483 806

15. DESIGN PARAMETERS : TOP RADIUS = 74m
    BOTTOM RADIUS = 190m

16. PLAN LOWER LEFT : N 7 751 652
    E 483 506

17. GRIDDED DATA CELL SIZE = N/A

18. PLAN DRAWN ONBOARD THE M/V "ARCTIC NANABUSH".

19. TARGETED CAISSON MOORING POSITION SHOWN ON BERM.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

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KLOHN-CRIPPEN

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

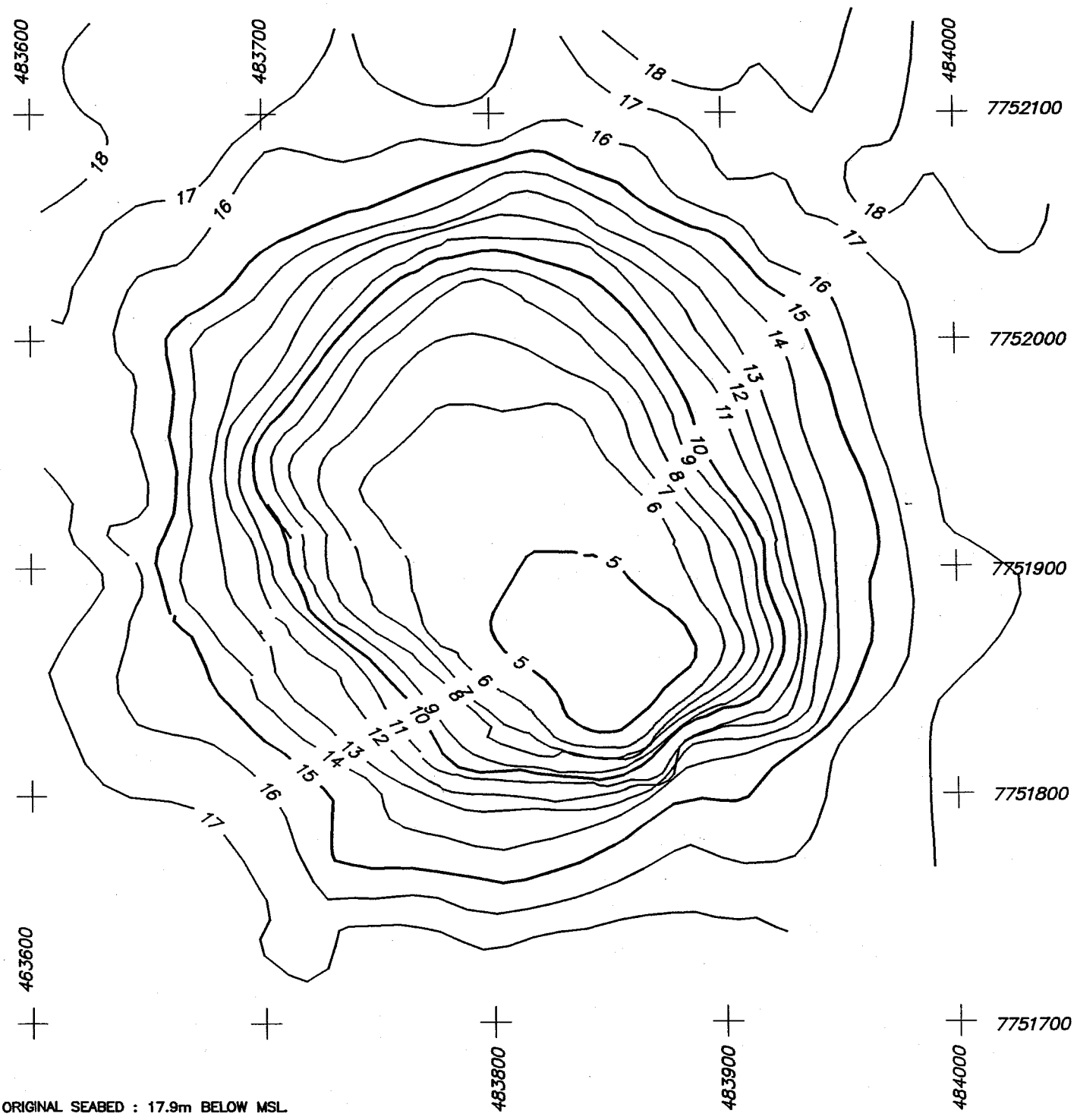
TITLE: KAUBVIK I-43

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-35A	

APPROVED

2695w118.dwg



2695w077.dwg

ORIGINAL SEABED : 17.9m BELOW MSL.

DATE OF SURVEY : SEPTEMBER 1989, CANADIAN SEABED RESEARCH LTD.

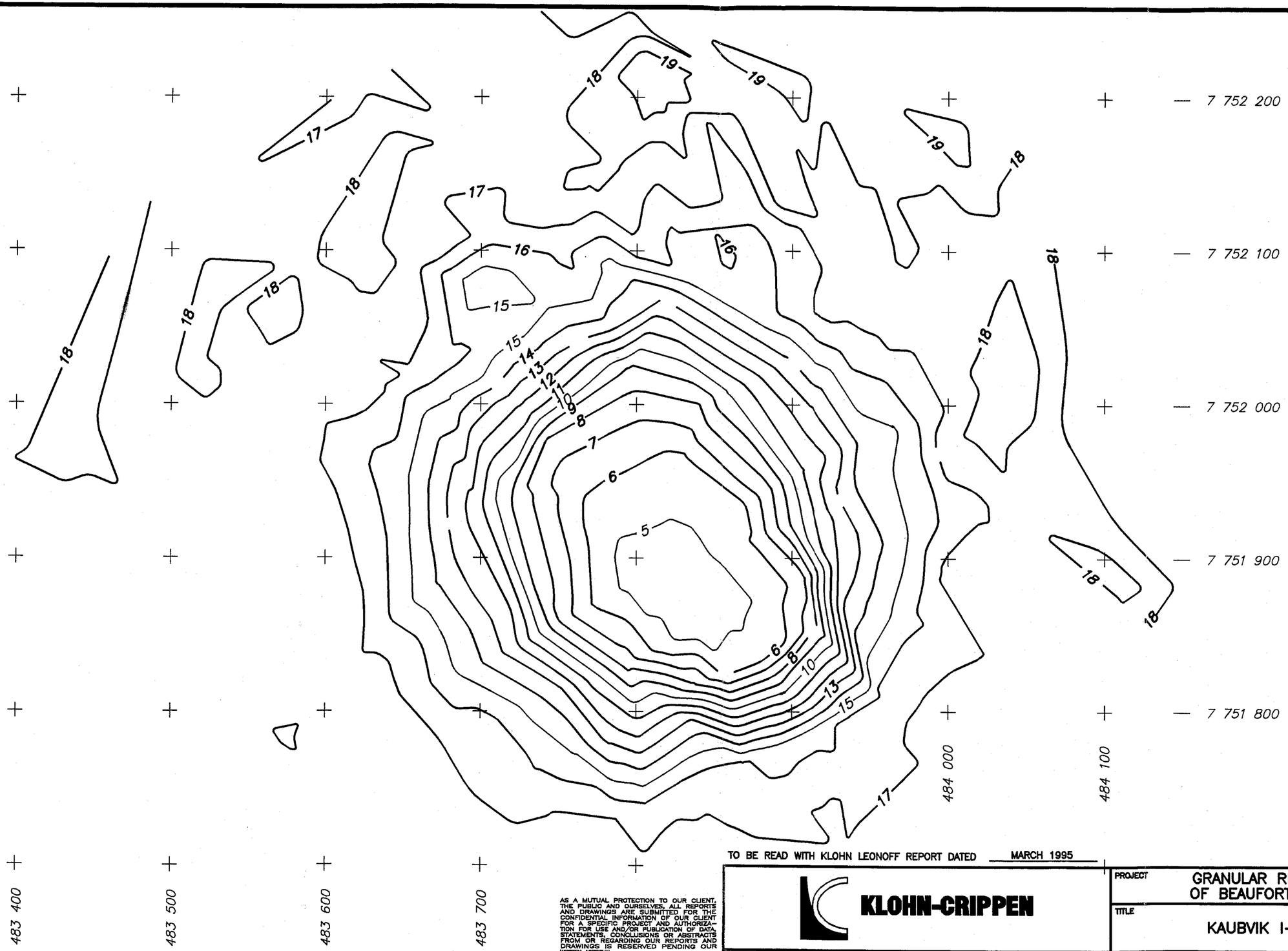
TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2500

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KAUBVIK I-43 (SEP., 1989)

CLIENT:	DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
INDIAN AND NORTHERN AFFAIRS CANADA	MARCH 95	PA2695.03	B-2695-03-35B	
	APPROVED			



ORIGINAL SEABED : 17.9m BELOW MSL.

DATE OF SURVEY : JULY 1990, CHALLENGER SURVEYS AND SERVICES LTD.

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TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1 : 2500

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	KAUBVIK I-43 (JUL., 1990)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	B-2695-03-35C
REV.	

2695w054.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amauligak F-24 Operator: Gulf Water Depth: 32.0m No: 36

Location

UTM N:	7772400	Latitude:	70.054833
UTM E:	552150	Longitude:	133.630250

Island Type: Molikpaq
Construction Method: Subcut 12m at 5:1 into clay for a total of
Borrow Site: Ukalerk,Amauligak I-65,Minuk I-53
Fill Material: sand, gravel toe
D50: 0.310 to 0.360mm
Fines: 1.7 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES		CES	
Date:	1985		08/17/89	
Freeboard (m):	4.8		-10.2	
Surface Area (m):	73 sq		150 dia	
Base Area (m):				
Slopes (ave.):	7:1		9:1	
Subcut Depth (m):	12.0			
Total Fill Quantity (m3):	2000000		1600000	
Subcut Fill Quantity (m3):	806605			
No Targets:				
Survey Quality:				

Description

Gulf constructed Amauligak F-24 over the 1985 to 1987 open water seasons. A berm was built in 32.0 m of water to support the Molikpaq structure. Located in the Kugmallit Channel, foundation conditions consisted of soft clay overlying fine sand. A 12 m deep subcut with 5H:1V side slopes was required to remove 806,605 m3 of clay from the foundation area. Sand from the Ukalerk borrow area was hydraulically placed to create the 140 m square berm. The Molikpaq was placed on the berm which rose to within 15.8 m of the waterline, and infilled with sand dredged from the Amauligak I-65 abandoned island. The sand in the core was 4.8 m above sea level. Two million m3 of sand was required for the subcut, berm and core. The sand in the berm contained 1.7% fines and had a D50 of 310 microns, while the core had sand with 0.5% fines and a D50 of 360 microns. Gravel from Minuk I-53 was used as toe protection. The rig was released in September 1988, and the island was abandoned by removing core sand and refloating the Molikpaq. A survey by CES on August 17, 1989 indicated that the abandoned berm surface was at 10.2 m below sea level.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Amauligak F-24 Operator: Gulf Water Depth: 32.0m No: 36

Location

UTM N: 7772400 Latitude: 70.054833
UTM E: 552150 Longitude: 133.630250

Date (mm/dd/yy)

Construction: 1985-87
Rig Release: 09/07/88
Abandoned:

Physiographic Location: Kugmallit Channel
Seabed Conditions: soft clay overlying firm clay
Nearest Hole:

Ice Conditions

Ice Zone: transition

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: moving
Rubble Formation: no
Extent: none
Ice Scour Potential: high

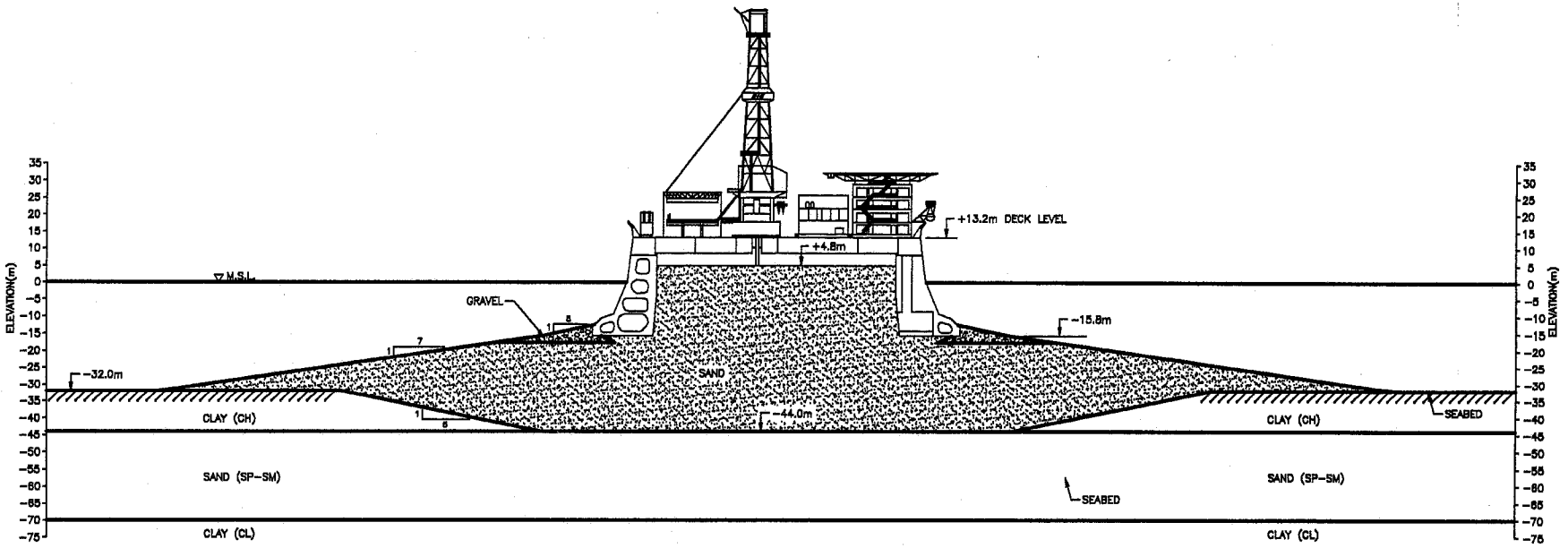
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 4 in 15

Wave Conditions

Exposure: high
Extreme Storm Events: 9 in 1 yr

Lease No.:
License: EA148
COGLA file: 9414-G1-2-5



AMAULIGAK F-24 – MOLIKPAQ

OPERATOR: GULF

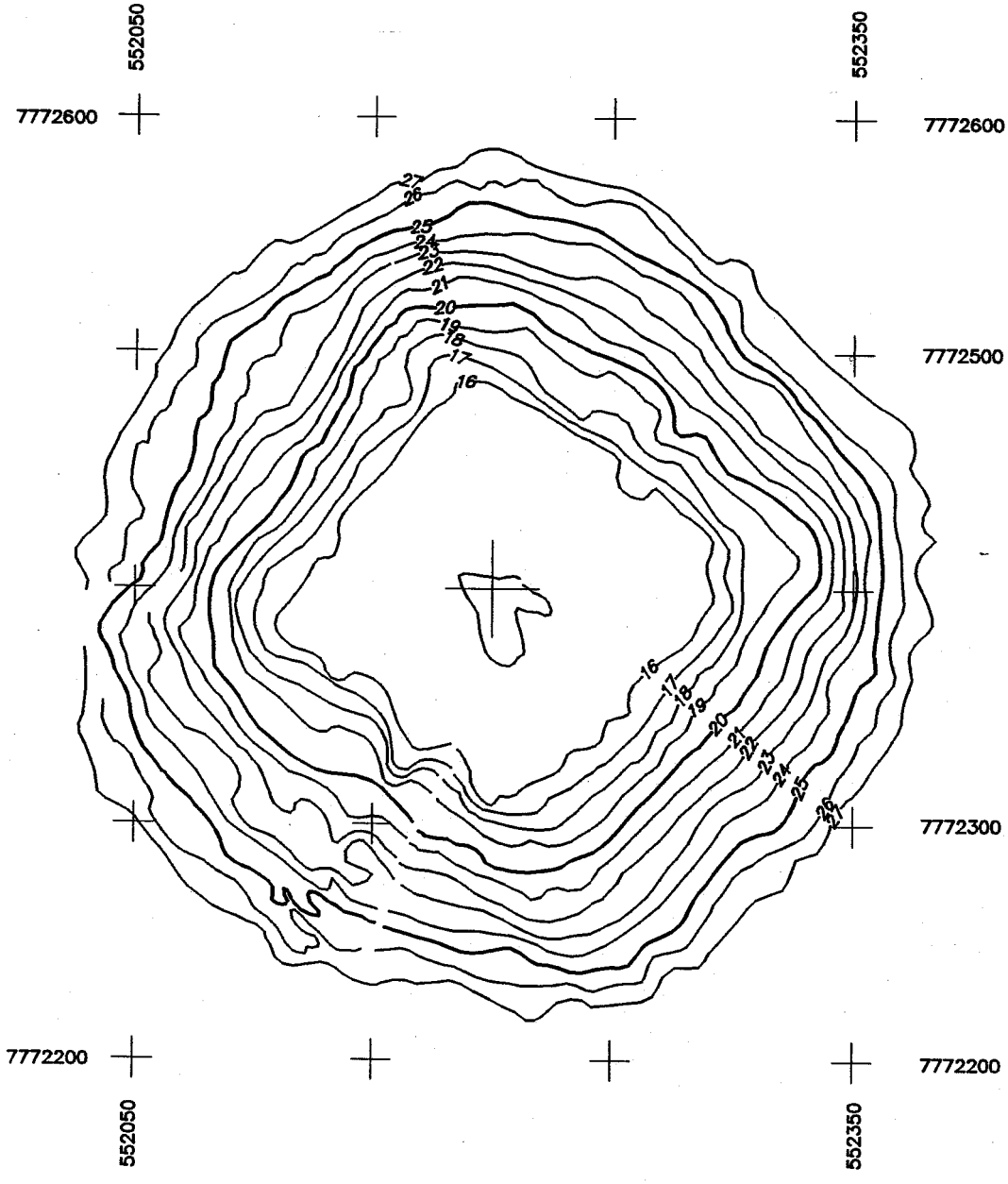
0 40 80m

(1:2000)

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN	PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS			
	TITLE: AMAULIGAK F-24			
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA	DATE OF ISSUE: MARCH 95 / APPROVED	PROJECT No. PA2695.03	DWG. No. A-2695-03-36	REV.

2695w105.dwg



2695w068.dwg

ORIGINAL SEABED : 32.0m BELOW MSL.

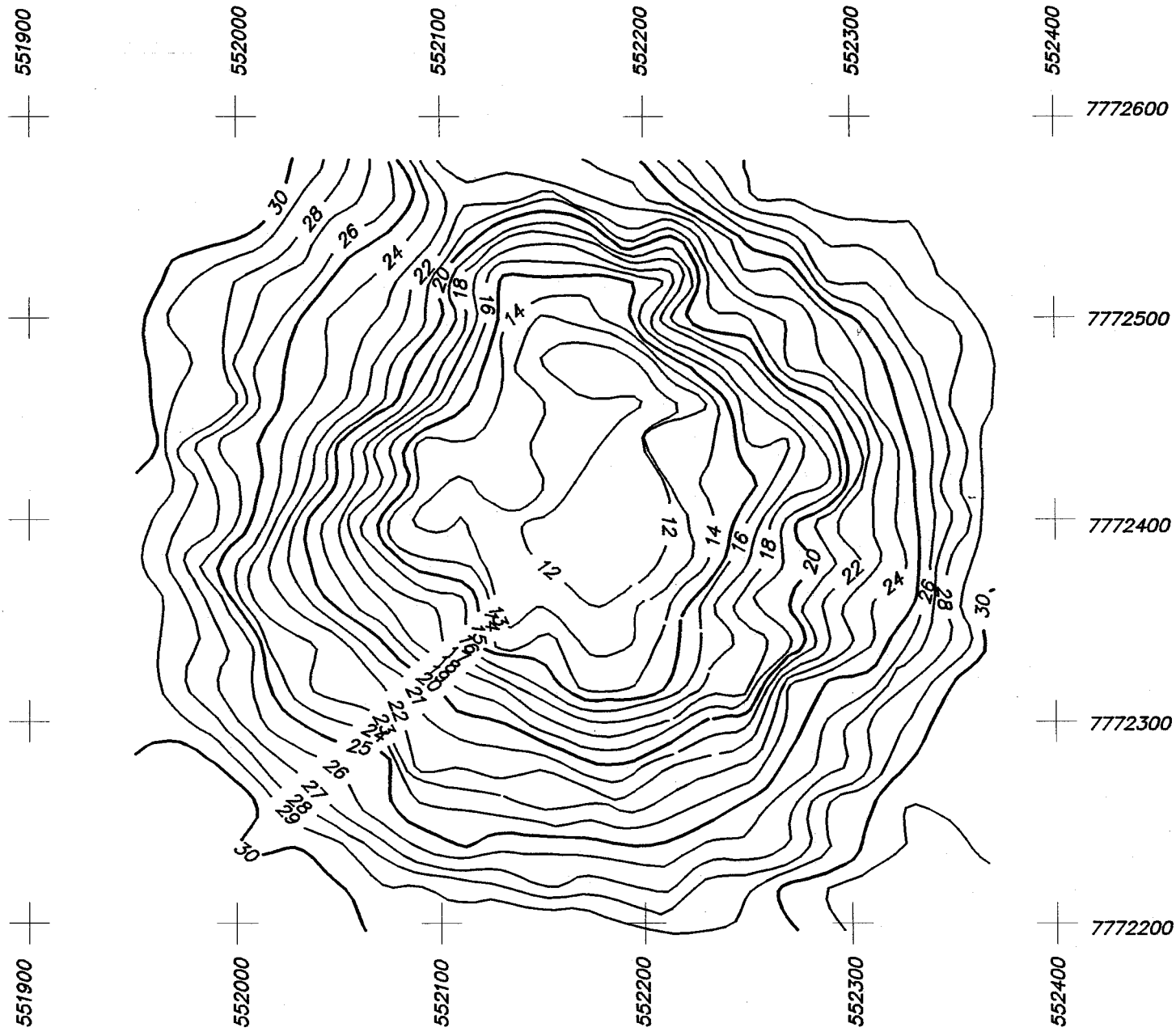
DATE OF SURVEY : AUGUST 1986,

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 2000

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	AMAULIGAK F–24 (AUG., 1986)
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	A-2695-03-36A
REV.	



2695w069.dwg

ORIGINAL SEABED : 32.0m BELOW MSL.

DATE OF SURVEY : AUGUST 1989, CANADIAN ENGINEERING SERVICES CO. LTD.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

SCALE 1: 3000

KLOHN-CRIPPEN

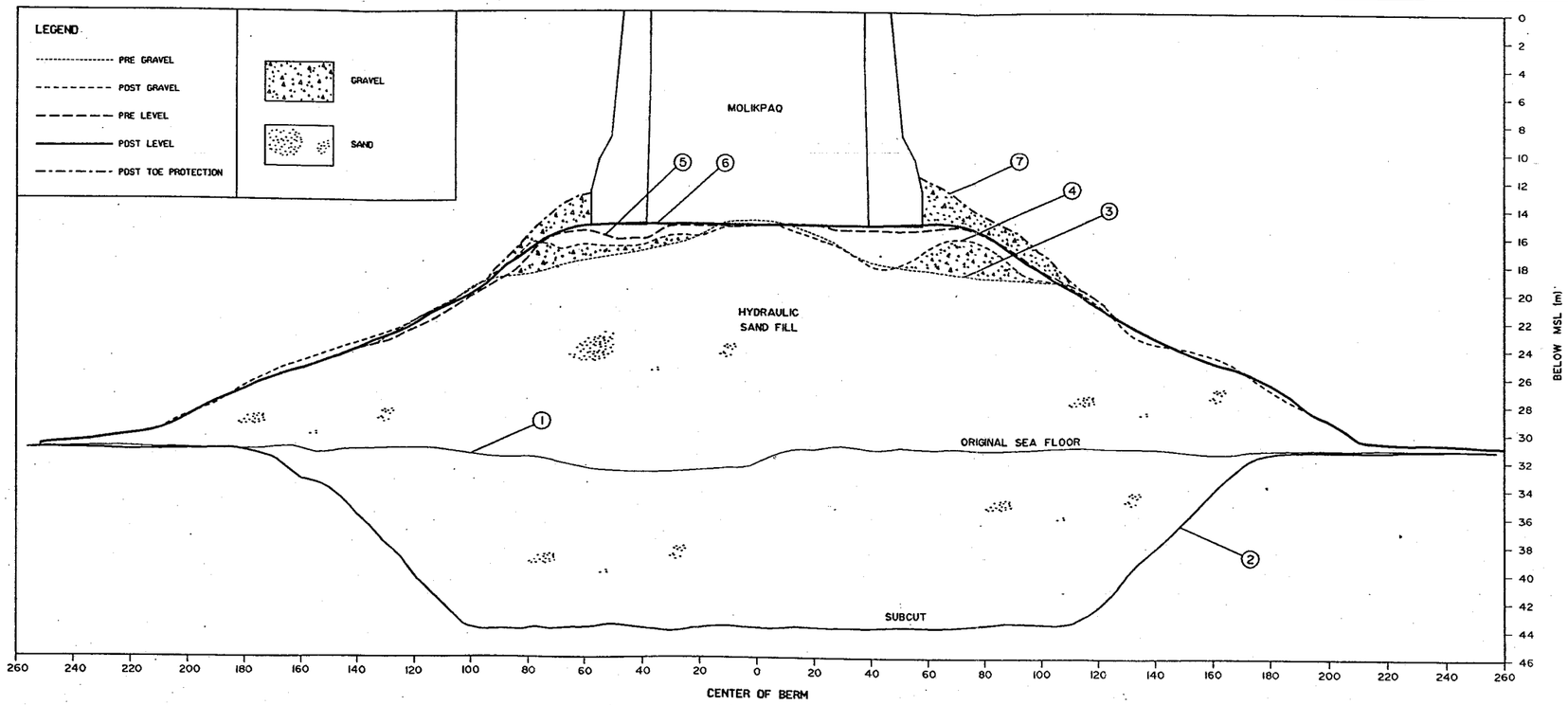
PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: AMAULIGAK F-24 (AUG., 1989)

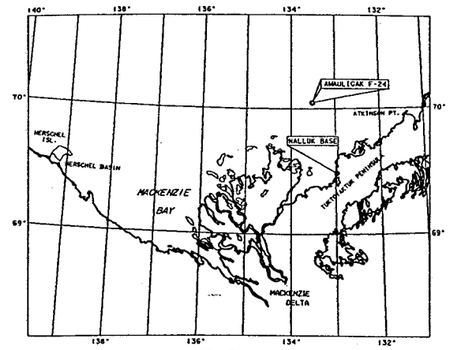
CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	A-2695-03-36B	

APPROVED



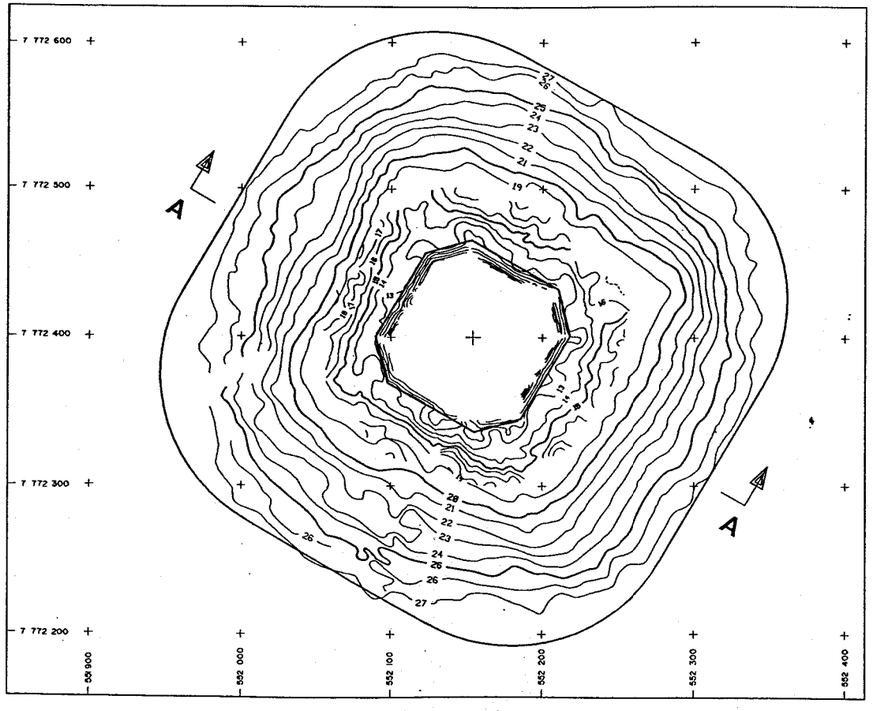
CROSS SECTION A-A



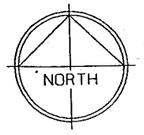
KEY PLAN

NOTES:

1. BERM CENTER COORDINATES :
   GEOGRAPHIC : 70° 03' 17.4"N 133° 37' 48.5"W
   UTM : 7 772 400 N: 552 150 E
2. MAP PROJECTION - UNIVERSAL TRANSVERSE MERCATOR ZONE 8, CM135
3. POSITION DERIVED FROM SYLEDIS MR3 RANGE MEASUREMENTS TO 3 OR 4 SHORE STATIONS LOCATED AT PULLEN ISLAND, TOKER POINT, ATKINSON POINT AND HENDRICKSON ISLAND.
4. SHORE CONTROL BASED ON GEODETIC SURVEY OF CANADA PUBLISHED COORDINATES.
5. ORIGINAL SEA BED SURVEY PERFORMED BY CANADIAN ENGINEERING SURVEYS. (1985)
6. ALL OTHER SURVEYS DONE BY CHALLENGER SURVEYS. (1987)



FINAL BERM SURVEY



PROGRESS SUMMARY

SEQUENCE	DATE	SURVEY NO.	LOAD NO.	CUMULATIVE VOLUME PLACED (ADJUSTED HOPPER)	COMMENTS
* 1	SEPT 28	1	-	-	PRE EXCAVATION 1985
2	JULY 8	1	(216)	(736,958)	PRE SUBCUT FILLING 1987 (VOLUME) IS HOPPER MEASURED EXCAVATED
3	SEPT 3	39	303	1,978,979	PRE GRAVEL
4	SEPT 11	48	314	2,029,858	POST GRAVEL
5	SEPT 13	51	319	2,058,353	PRE LEVEL
6	SEPT 14	53	319	2,058,353	POST LEVEL
7	SEPT 26	57	343	2,284,318	POST TOE PROTECTION (COMBINED WITH OSPS) (INCLUDES 125,255 IN CORE)

* SURVEY PERFORMED BY CANADIAN ENGINEERING SURVEYS

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CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: AMAULIGAK F-24 AS-BUILT

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-36C	

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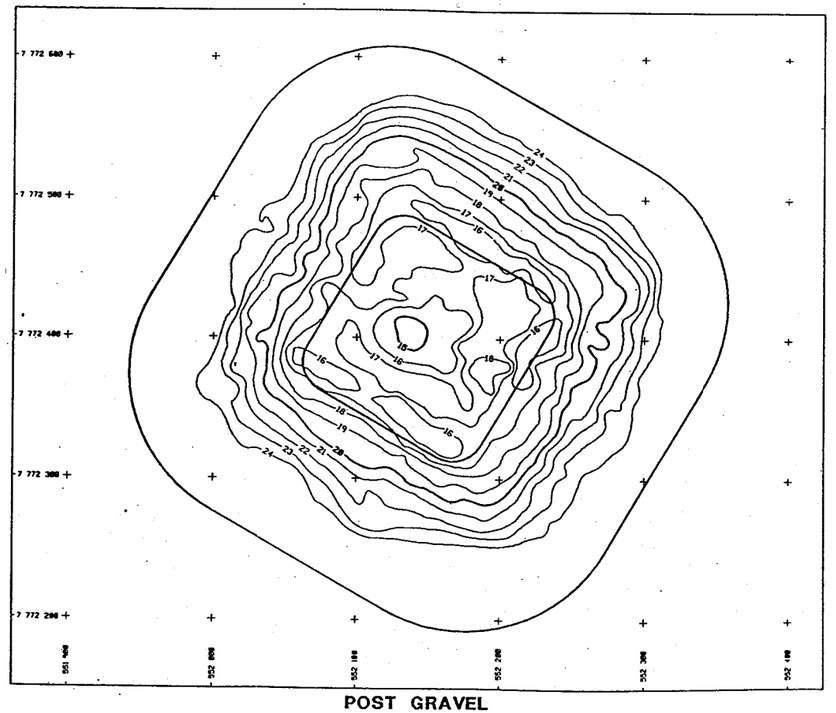
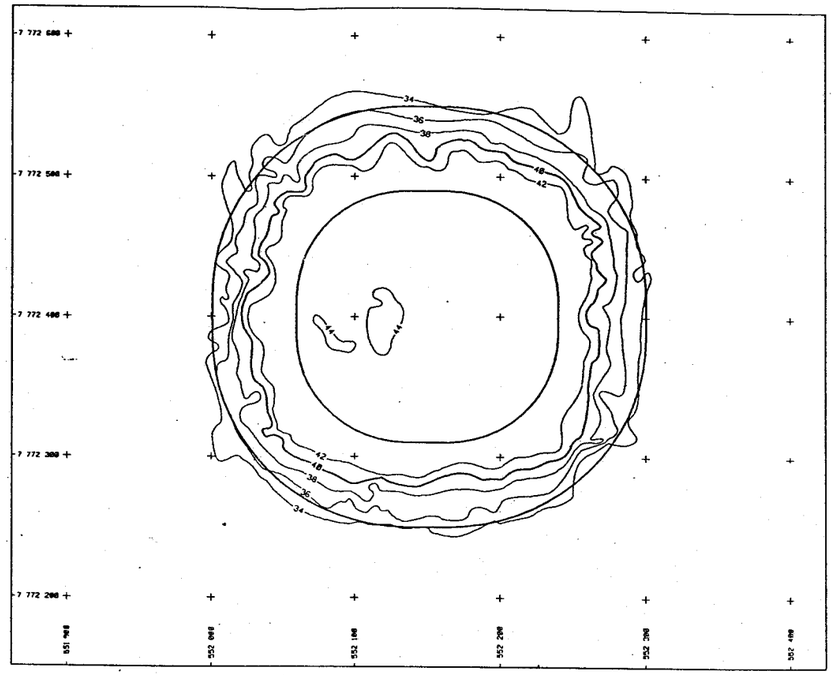
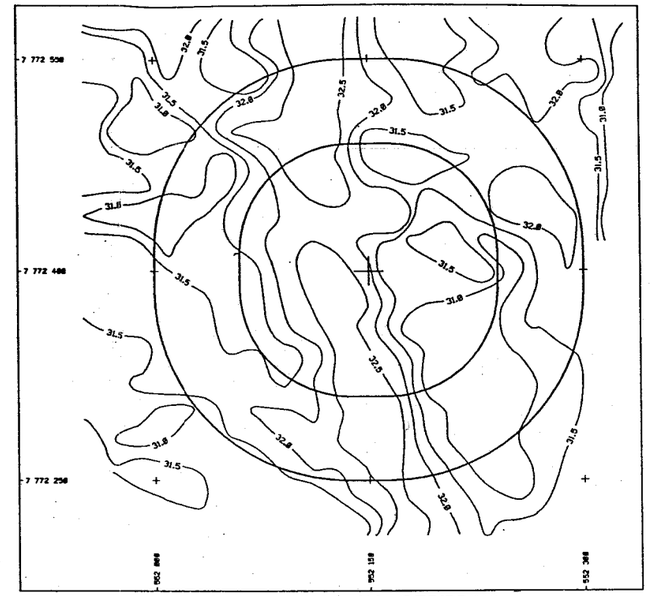
2695w119.dwg



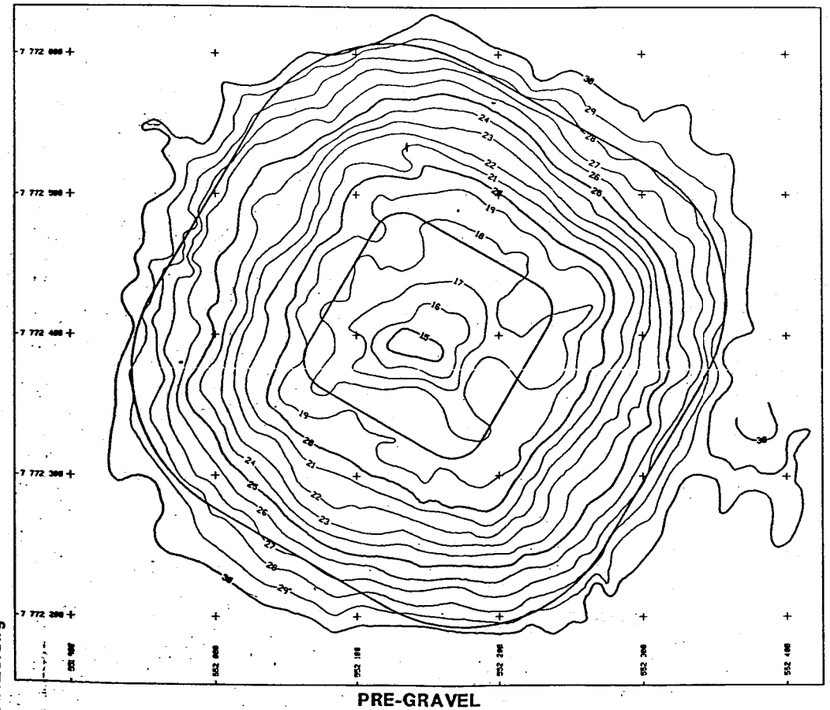
POST GRAVEL
SURVEY NO. 48



AFTER SUBCUT
SURVEY NO. 1

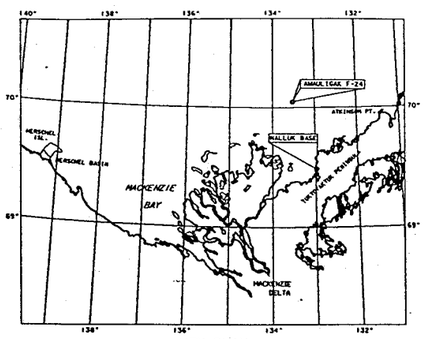


BERM SITE PRIOR TO STRIPPING
SEABED SURVEY NO. 01



PRE-GRAVEL
SURVEY NO. 39

METRES 20 0 20 40 60 80 100



KEY PLAN

NOTES:

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PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: AMAULIGAK F-24 AS-BUILT

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-36D	

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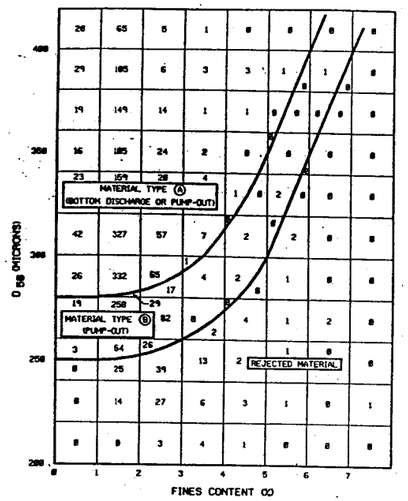
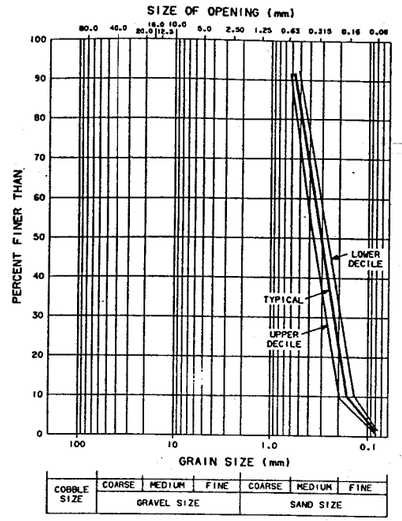
2695w120.dwg



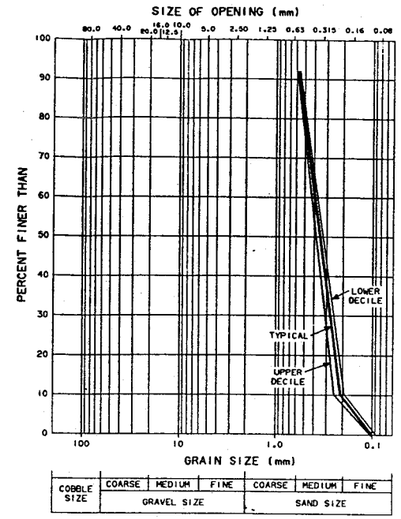
SAND FILL OBSERVATIONS

SEE NOTE No.2



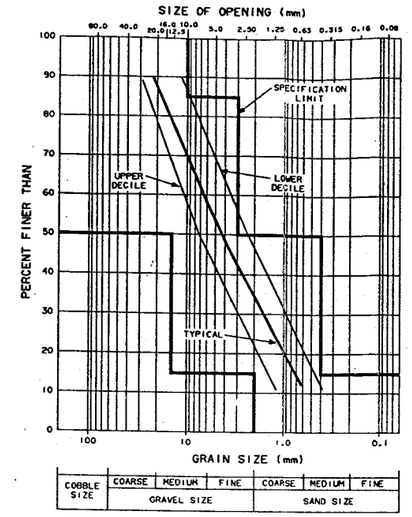
TYPICAL GRADATION OF SAND PLACED IN BERM AND SUBCUT

MEAN D50 = 0.310mm
MEAN FINES = 1.6%



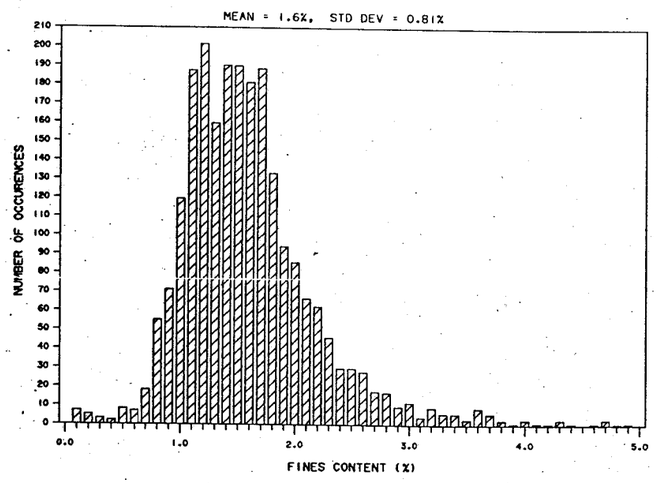
TYPICAL GRADATION OF SAND PLACED IN CORE OF MAC

MEAN D50 = 0.36mm
MEAN FINES = 0.5%

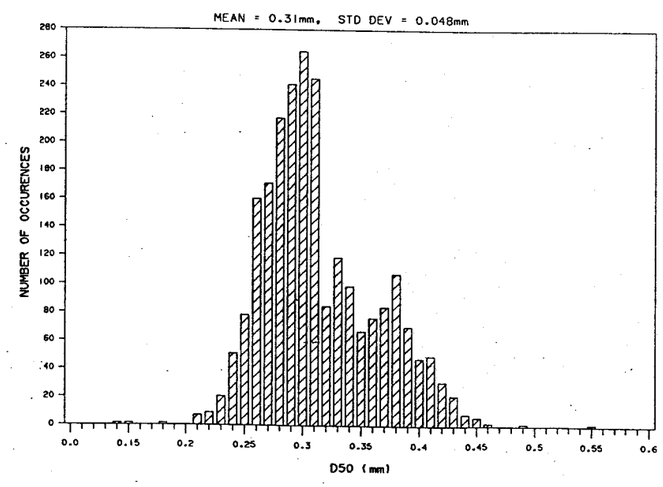


TYPICAL GRADATION OF GRAVEL PLACED IN BUND

MEAN D50 = 4.63mm



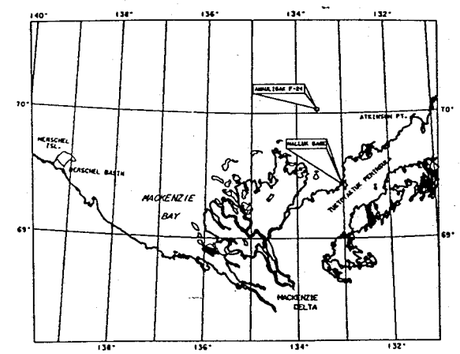
FINES OF BERM SAND: 2334 TESTS



D50 OF BERM SAND: 2334 TESTS

SUMMARY OF LOAD TYPE

LOADS TESTED SAND	327
LOADS ACCEPTED SAND	321
CLASS "A" LOADS	301
CLASS "B" LOADS	20
LOADS GRAVEL ACCEPTED	15



KEY PLAN

BERM CONSTRUCTION ACTIVITIES AND QUANTITIES

ACTIVITY	TIME / DATE	VOLUMES (m^3)	DREDGE LOAD NO.	BORROW SOURCE
INITIAL SUBCUT SURVEY	19:10 JULY 8 - 23:00 JULY 8	-	-	-
SUBCUT 'PROOFING'	18:15 JULY 9 - 18:45 JULY 10	(1,000)*	-	-
SUBCUT INFILLING	18:45 JULY 10 - 24:00 JULY 31	806,605	1 TO 129	ERKSAK
BERM CONSTRUCTION	00:00 AUG 1 - 04:00 SEPT 3	1,207,847	130 TO 303	ERKSAK
GRAVEL BUND PLACEMENT	04:00 SEPT 3 - 23:15 SEPT 11	43,901	304, 307, 309 TO 315,318	MINUK 19.
FINAL SAND INFILL TOPPING OFF	23:15 SEPT 11 - 03:30 SEPT 13	35,473	305,306, 308, 316, 317, 319	ERKSAK/ AMAL. 1-65
LEVELLING	03:30 SEPT 13 - 21:00 SEPT 14	(1,237)*	-	-
BERM VERIFICATION	21:00 SEPT 14 - 06:00 SEPT 17	-	-	-

* PARENTHESES INDICATE EXCAVATION QUANTITIES - NOT ACCOUNTED FOR IN BERM QUANTITIES

NOTES:

1. BERM CENTER COORDINATES:
   GEOGRAPHIC: 70° 03' 17.4"N 133° 37' 48.5"W
   UTM (ZONE 8): 7 772 400 N; 552 150 E
2. 56 OF 2349 OBSERVATIONS WERE OUTSIDE THE BOUNDARIES OF THE PLOT; 49 DUE TO HIGH D_{50}; 7 DUE TO EITHER FINES OR LOW D_{50}
3. SAMPLES WERE OBTAINED BY THE FOLLOWING METHODS:
   i) DISCHARGE THROUGH CHUTE VALVE OFF THE STARBOARD DELIVERY PIPE.
   ii) BUCKET SAMPLES THROUGH SOUNDING TUBES.
   iii) VIBRATORY CORING THROUGH THE LOADED HOPPER.
4. EXAMPLE TESTING PROCEDURE
   - DRY SAMPLE FROM DECK FOR 8 TO 9 MINUTES IN THE MICROWAVE
   - WEIGH DRIED SAMPLES ON TRIPLE-BEAM BALANCE
   - WASH THROUGH 0.088mm SEIVE
   - DRY WASH SAMPLE FOR 10 TO 12 MINUTES IN THE MICROWAVE
   - WEIGH WASHED, DRIED SAMPLE
   - SHAKE SAMPLE FOR 15 TO 20 MINUTES, DEPENDING ON THE THE SIEVE SHAKER USED
   - WEIGH FRACTIONS RETAINED ON EACH SEIVE
   - ENTER DATA AND REDUCE ON THE COMPUTER

AS A MUTUAL PROTECTION TO OUR CLIENT, THE PUBLIC AND OURSELVES, ALL REPORTS AND DRAWINGS ARE SUBMITTED FOR THE CONFIDENTIAL INFORMATION OF OUR CLIENT FOR A SPECIFIC PROJECT AND AUTHORIZATION FOR USE AND/OR PUBLICATION OF DATA, STATEMENTS, CONCLUSIONS OR ABSTRACTS FROM OR REGARDING OUR REPORTS AND DRAWINGS IS RESERVED PENDING OUR WRITTEN APPROVAL.

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN

CLIENT: INDIAN AND NORTHERN AFFAIRS CANADA

PROJECT: GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS

TITLE: AMAULIGAK F-24 AS-BUILT

DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
MARCH 95	PA2695.03	B-2695-03-36E	

APPROVED

2695w121.dwg

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Isserk I-15 Operator: Chevron Water Depth: 11.8m No: 37

Location

UTM N: 7756080 Latitude: 69.912361
UTM E: 526860 Longitude: 134.299222

Island Type: Molikpaq
Construction Method: 2m subcut, Molikpaq setdown on subcut, and partial
Borrow Site: Amauligak I-65
Fill Material: sand,
D50: 0.250 to 0.600mm
Fines: 2 %

Island Dimensions

	As Built	Interim	Interim	Present
Survey:	CES			
Date:	09/28/89			1990
Freeboard (m):	-3.8			-10.0
Surface Area (m):	73 sq			
Base Area (m):				
Slopes (ave.):				
Subcut Depth (m):	2.0			
Total Fill Quantity (m3):	72000			60000
Subcut Fill Quantity (m3):				
No Targets:				
Survey Quality:				

Description

Isserk I-15 was drilled from the Molikpaq structure during the 1989-1990 winter season for Chevron et al. A 2 m deep subcut was excavated in the surficial soft clay at the site prior to setdown of the Molikpaq. The caisson was partially filled with 72,000 m3 of sandfill from the abandoned Amauligak I-65 berm. The rig was released in January 1990, and was subsequently removed from site in the open water season.

GRANULAR RESOURCE POTENTIAL OF THE BEAUFORT ARTIFICIAL ISLANDS

Name: Isserk I-15 Operator: Chevron Water Depth: 11.8m No: 37

Location

UTM N:
UTM E:

Latitude: 69.912361
Longitude: 134.299222

Date (mm/dd/yy)

Construction: 1989
Rig Release: 01/08/90
Abandoned:

Physiographic Location: Akpak Plateau
Seabed Conditions: soft clays over clayey silt-
Nearest Hole:

Ice Conditions

Ice Zone: landfast

Freeze-up (median): Oct 8
Freeze-up (earliest): Sept 24
Freeze-up (latest): Oct 29

Landfast Ice Formation: early Nov
Rubble Formation: yes
Extent: large
Ice Scour Potential: low

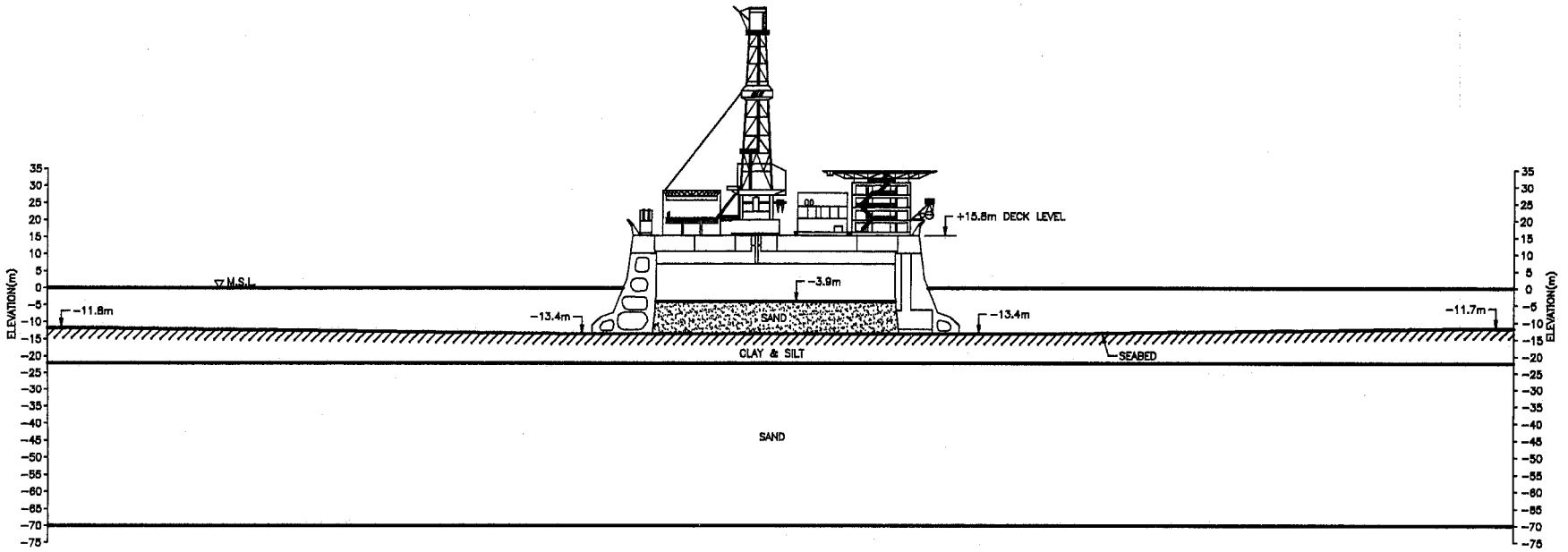
Break-up (median): June 25
Break-up (earliest): June 11
Break-up (latest): Sept 10

Open Water Days (median): 104
Summer Intrusions (in 15): 3 in 15

Wave Conditions

Exposure: moderate to high
Extreme Storm Events: n/a

Lease No.:
License: EL344
COGLA file: 9414-J1-3-1



ISSERK I-15 – MOLIKPAQ

OPERATOR: CHEVRON

0 40 80m

(1:2000)

TO BE READ WITH KLOHN LEONOFF REPORT DATED MARCH 1995

KLOHN-CRIPPEN

PROJECT	GRANULAR RESOURCE POTENTIAL OF BEAUFORT ARTIFICIAL ISLANDS
TITLE	ISSERK I-15
CLIENT:	INDIAN AND NORTHERN AFFAIRS CANADA
DATE OF ISSUE	MARCH 95
APPROVED	
PROJECT No.	PA2695.03
DWG. No.	A-2695-03-37
REV.	

2695w109.dwg