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QIKIQTAALUK ENVIRONMENTAL

Signature

Date January 12th, 2009

PERMIT NUMBER: P 530

The Association of Professional Engineers, Geologists and Geophysicists of the NWT / NU

REGISTERED PROFESSIONAL ENGINEER
G.S. JOHNSON
LICENSEE
NWT/NU

QIKIQTAALUK ENVIRONMENTAL

General Notes:

Legend:

No.	DATE	REVISION	REVISION	APPR.

Qikiqtaaluk Logistics Inc.

PROJECT - PROJET: CAPE CHRISTIAN, NUNAVUT

TRADE - METIER: SITING		DATE: 2008-12-15
SCALE - ECHELLE: NOT TO SCALE		

SUBJECT - SUJET: CAPE CHRISTIAN REMEDAITION PROJECT SITE DETAILS

PRODUCTION	CONCURRENCE - ASSENTIMENT
DESIGNED ETUDIE	Greg Johnson
DRAWN DESSINE	Greg Johnson
CHECKED VERIFIE	Phillppe Simon
COORDINATION	REVIEWED - REVU

DWG. NO. - DESSIN NO.: QESin 2007 P6-2008-01

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Signature _[signature]_
Date January 12th, 2009
PERMIT NUMBER: P 530
The Association of Professional Engineers, Geologists and Geophysicists of the NWT / NU

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G.S. JOHNSON
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QIKIQTAALUK ENVIRONMENTAL

General Notes:

1. The location of the construction camp and the sewage lagoon are not based on survey data and may be adjusted based on conditions found on the field.
2. The exact dimensions of the lagoon may be adjusted once a survey of the existing terrain at the planned location is completed and the type and properties of the soil to be used for construction of the berms are known.
3. Distances shown are the minimum distances to be respected from water courses, water bodies and the construction camp.
4. The berms will be constructed in lifts of 250 mm of loose material and each lift will be compacted to 95 percent of Maximum Dry Density in accordance with ASTM D698.

Legend:

No.	DATE	REVISION	APPR.

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Qikiqtaaluk Logistics Inc.

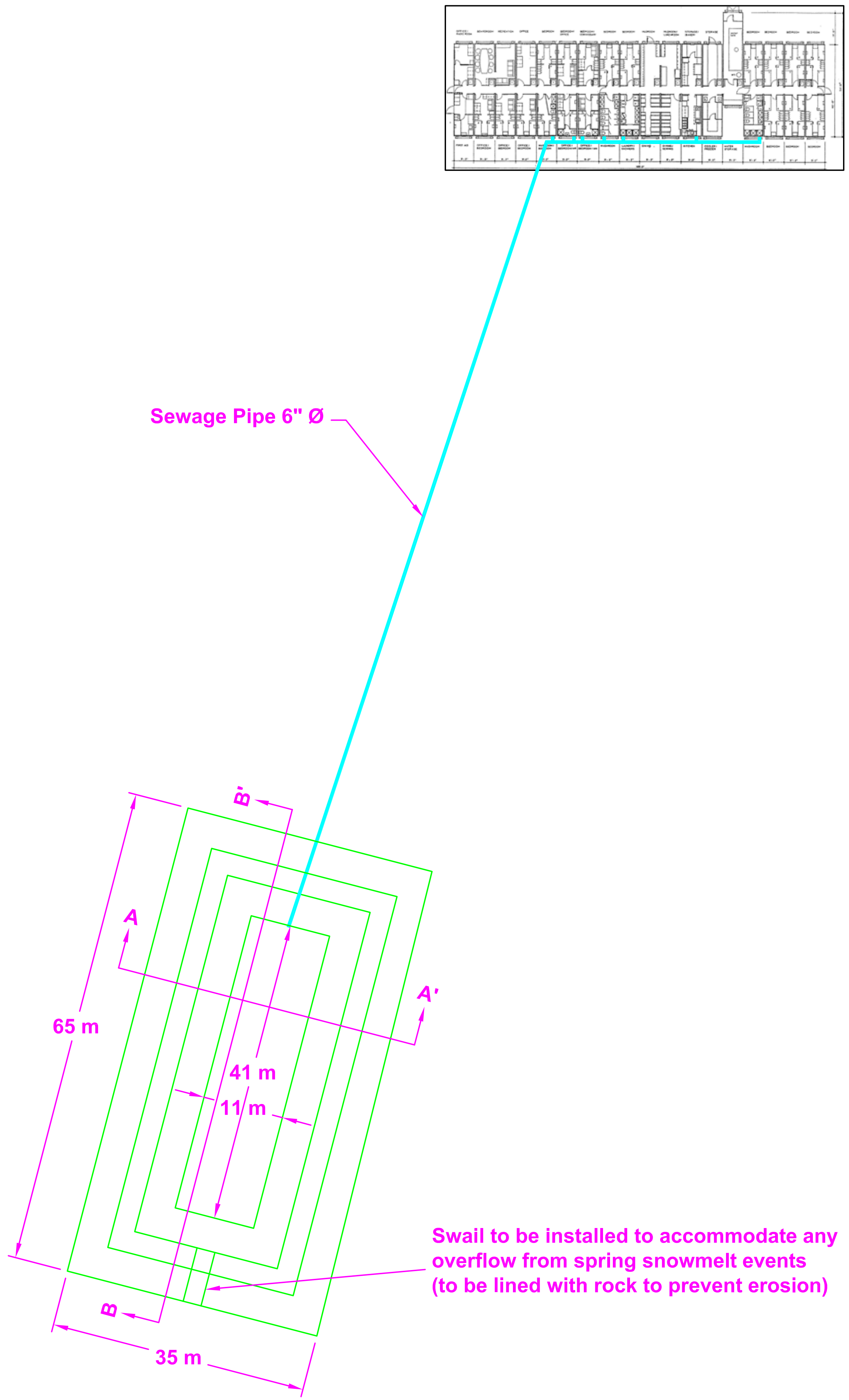
PROJECT - PROJET
CAPE CHRISTIAN, NUNAVUT

TRADE - METIER	SITING	DATE	2008-12-15
SCALE - ECHELLE	NOT TO SCALE		

SUBJECT - SUJET
CAPE CHRISTIAN REMEDAITION PROJECT
APPROXIMATE LOCATION OF THE SEWAGE LAGOON

PRODUCTION	CONCURRENCE - ASSENTIMENT
DESIGNED ETUDIE	Greg Johnson
DRAWN DESSINE	Greg Johnson
CHECKED VERIFIE	Phillppe Simon
COORDINATION	REVIEWED - REVU

DWG. NO. - DESSIN NO.
QESin 2007 P6-2008-02



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Date January 12th, 2009
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General Notes:

1. The location of the construction camp and the sewage lagoon are not based on survey data and may be adjusted based on conditions found on the field.
2. The exact dimensions of the lagoon may be adjusted once a survey of the existing terrain at the planned location is completed and the type and properties of the soil to be used for construction of the berms are known.
3. The berms will be constructed in lifts of 250 mm of loose material and each lift will be compacted to 95 percent of Maximum Dry Density in accordance with ASTM D698.
4. Cross-sections of the sewage lagoon are shown on drawing QESin 2007 P6-2008-003.

Legend:

No.	DATE	REVISION	REVISION	APPR.

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PROJECT - PROJET	CAPE CHRISTIAN, NUNAVUT
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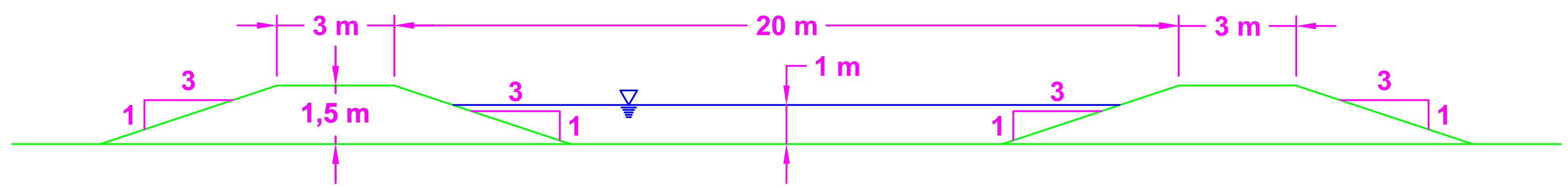
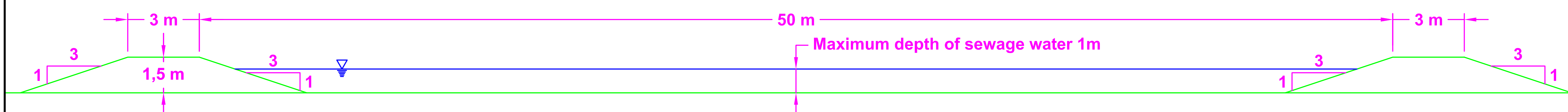
TRADE - METIER	SITING
DATE	2008-12-15
SCALE - ECHELLE	NOT TO SCALE
SUBJECT - SUJET	CAPE CHRISTIAN REMEDIATION PROJECT SEWAGE LAGOON DETAILS
PRODUCTION	CONCURRENCE - ASSENTIMENT
DESIGNED ETUDIE	Greg Johnson
DRAWN DESSINE	Greg Johnson
CHECKED VERIFIE	Phillippe Simon
COORDINATION	REVIEWED - REVU
DWG. NO. - DESSIN NO.	QESin 2007 P6-2008-03



Cross-Section A-A'



Cross-Section B-B'

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QIKIQTAALUK ENVIRONMENTAL

General Notes:

1. The exact dimensions of the lagoon may be adjusted once a survey of the existing terrain at the planned location is completed and the type and properties of the soil to be used for construction of the berms are known.

2. The berms will be constructed in lifts of 250 mm of loose material and each lift will be compacted to 95 percent of Maximum Dry Density in accordance with ASTM D698.

3. Cross-sections of the sewage lagoon are shown on drawing QESin 2007 P6-2008-002.

Legend:

No.	DATE	REVISION REVISION	APPR.

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Qikiqtaaluk Logistics Inc.

PROJECT - PROJET
CAPE CHRISTIAN, NUNAVUT

TRADE - METIER: SITING	DATE: 2008-12-15
SCALE - ECHELLE: NOT TO SCALE	

SUBJECT - SUJET
CAPE CHRISTIAN REMEDAITION PROJECT
CROSS-SECTIONS OF SEWAGE LAGOON

PRODUCTION	CONCURRENCE - ASSENTIMENT
DESIGNED ETUDIE	Greg Johnson
DRAWN DESSINE	Greg Johnson
CHECKED VERIFIE	Philippe Simon
COORDINATION	REVIEWED - REVU

DWG. NO. - DESSIN NO.
QESin 2007 P6-2008-04

Cape Christian Sewage Lagoon

Assumptions:

- Season = 122 Days (June 1st to September 30th);
- Camp Water usage = 8.5 m^3 per day;
- Capacity required to meet half season = 518.5 m^3;
- The lagoon will need to be emptied at least twice per season (plus one additional event for the snow melt in 2010);
- The lagoon will be pumped from the side farthest away from the entry point of the sewage water to allow time for the settlement of solids
- Impermeable type soils will be used to construct the berms;
- Friction angle of the soil = 35^O;
- Maximum depth of liquid will be limited to 1 metre;
- The lagoon will be situated a minimum of 100 metres from the camp, 100 metres from any water body and 100 metres from any major drainage channels;
- Once the area for installation of the lagoon has been finalised it will have to be surveyed and the design finalised prior to construction.

Design & Construction:

- Lagoon will measure 50 metres long by 20 metres wide (inside top of slope);
- The berms will be 1.5 metres high;
- Berms will have inside and outside slopes of 3L:1H to ensure stability;
- The berms will be constructed in lifts of 250 mm of loose material and each lift will be compacted to 95 percent of Maximum Dry Density in accordance with ASTM D698;
- A swail will be incorporated into the design to allow for any overflow from spring snow melt events, the swail will be armoured with rock to prevent erosion.

Closure:

- At the end of the project just prior to closure of the site the lagoon will be closed;
- The liquid will be pumped out of the lagoon and the berms will be pushed over the remaining solids;
- Liquid will be pumped out as it pools with the berms being pushed up;
- The final cover will be track packed using a Caterpillar D6 bull dozer.