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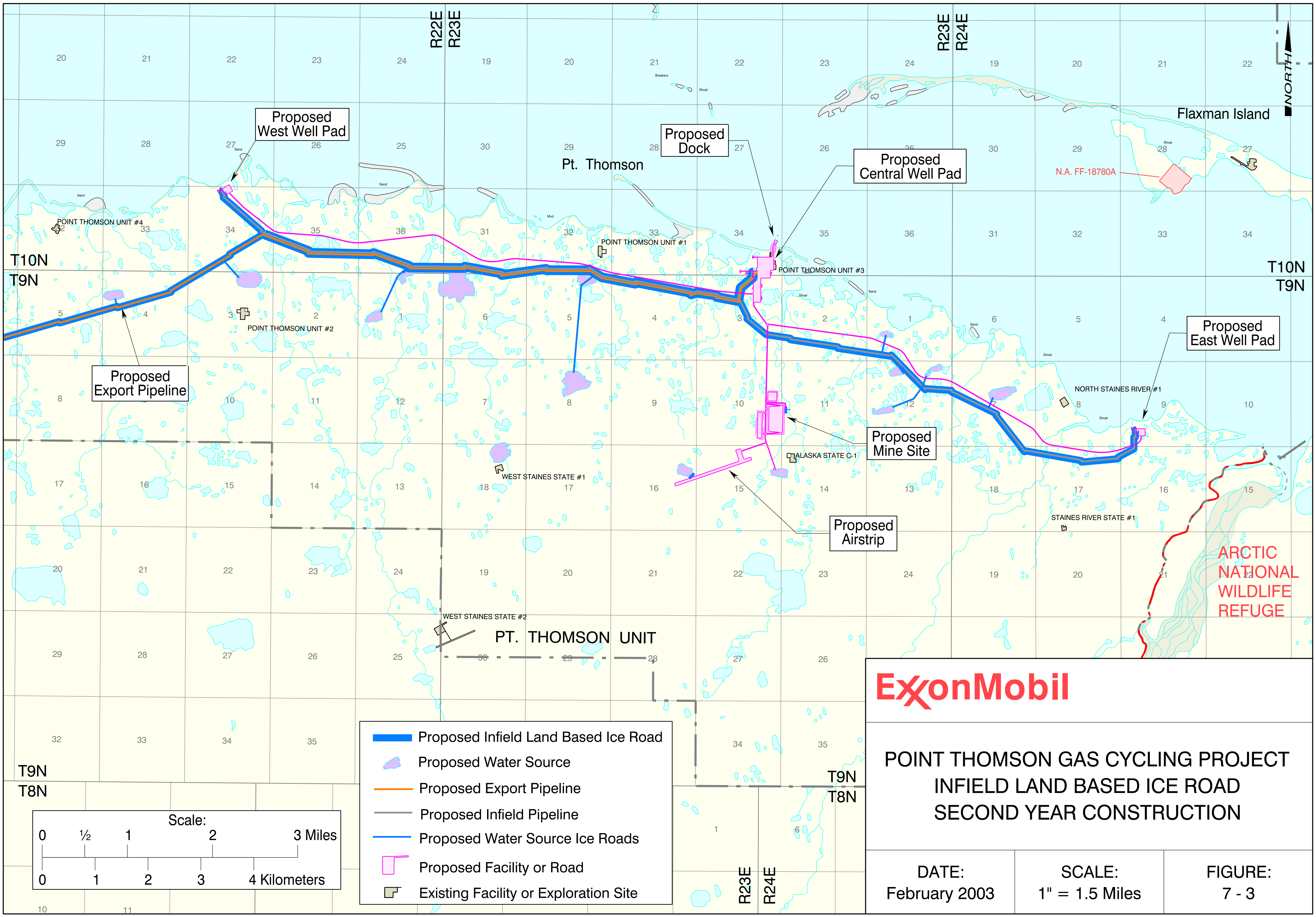
LIST OF ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ACMP	State of Alaska Coastal Management Program
ACS	Alaska Clean Seas
ADEC	Alaska Department of Environmental Conservation
AOGCC	Alaska Oil and Gas Conservation Commission
API	American Petroleum Institute
BAT	best available technology
bbl	barrel(s)
BMP	best management practices
BOP	Blowout preventer
BOPE	Blowout prevention equipment
BTPO	Building the Production Operations
Btu	British thermal units
CCR	central control room
CCTV	closed-circuit television system
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
Corps	U.S. Army Corps of Engineers
CPF	Central Processing Facility
CPU	Central Processing Unit
CWP	Central Well Pad
cy	cubic yard(s)
DEIS	Draft Environmental Impact Statement
DNR	Alaska Department of Natural Resources
°F	degrees Fahrenheit
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERD	extended reach drilling
ExxonMobil	ExxonMobil Development Company
FEED	front-end engineering design
ft	foot/feet
ft^3	cubic foot/feet

gal	gallon(s)
GCFD	billion cubic feet per day
G&I	grind and inject
HAZOP	hazard and operability
H_2S	hydrogen sulfide
hp	horsepower
HP	high pressure
HQ	headquarters
HMI	human/machine interface
ILS	Instrument Landing System
in.	inch(es)
kV	kilovolt
kW	kilowatt
LP	low pressure
MAOP	maximum allowable operating pressure
MCFD	thousand standard cubic feet per day
mi	mile(s)
MLLW	mean lower low water
MOC	management of change
MSDS	material safety data sheet
MSL	mean sea level
MWP	maximum working pressure
NDT	non-destructive testing
NEPA	National Environmental Policy Act
NORM	naturally occurring radioactive materials
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NSB	North Slope Borough
OD&S	Operations Development and Support Group
ODPCP	Oil Discharge Prevention and Contingency Plan
OIMS	Operations Integrity Management System
OSHA	Occupational Safety and Health Administration
%	percent
PCS	process control system
POBP	Production Operations Best Practices
ppg	pounds per gallon
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psia	pounds per square inch atmosphere
psig	pounds per square inch gauge
PMT	Project Management Team

PTU	Point Thomson Unit
PUF	polyurethane foam
PW	produced water
RCRA	Resource Conservation and Recovery Act
Rev. A	Revision A
Rev. B	Revision B
RF	radio frequency
rpm	rotations per minute
ROW	right-of-way
SCADA	supervisory control and data acquisition
SCSSV	surface-controlled subsurface safety valve
SHE	safety, health, and environmental
SOP	standard operating procedures
SO_2	sulfur dioxide
SSSV	subsurface safety valve
State	State of Alaska
TAPS	Trans Alaska Pipeline System
TCF	trillion cubic feet
TDS	top drive system
TVD	true vertical depth
TVDSS	true vertical depth subsurface
UIC	Underground Injection Control
UPS	uninterrupted power supply
VOCs	volatile organic compounds
VSM	vertical support member
WP	working pressure



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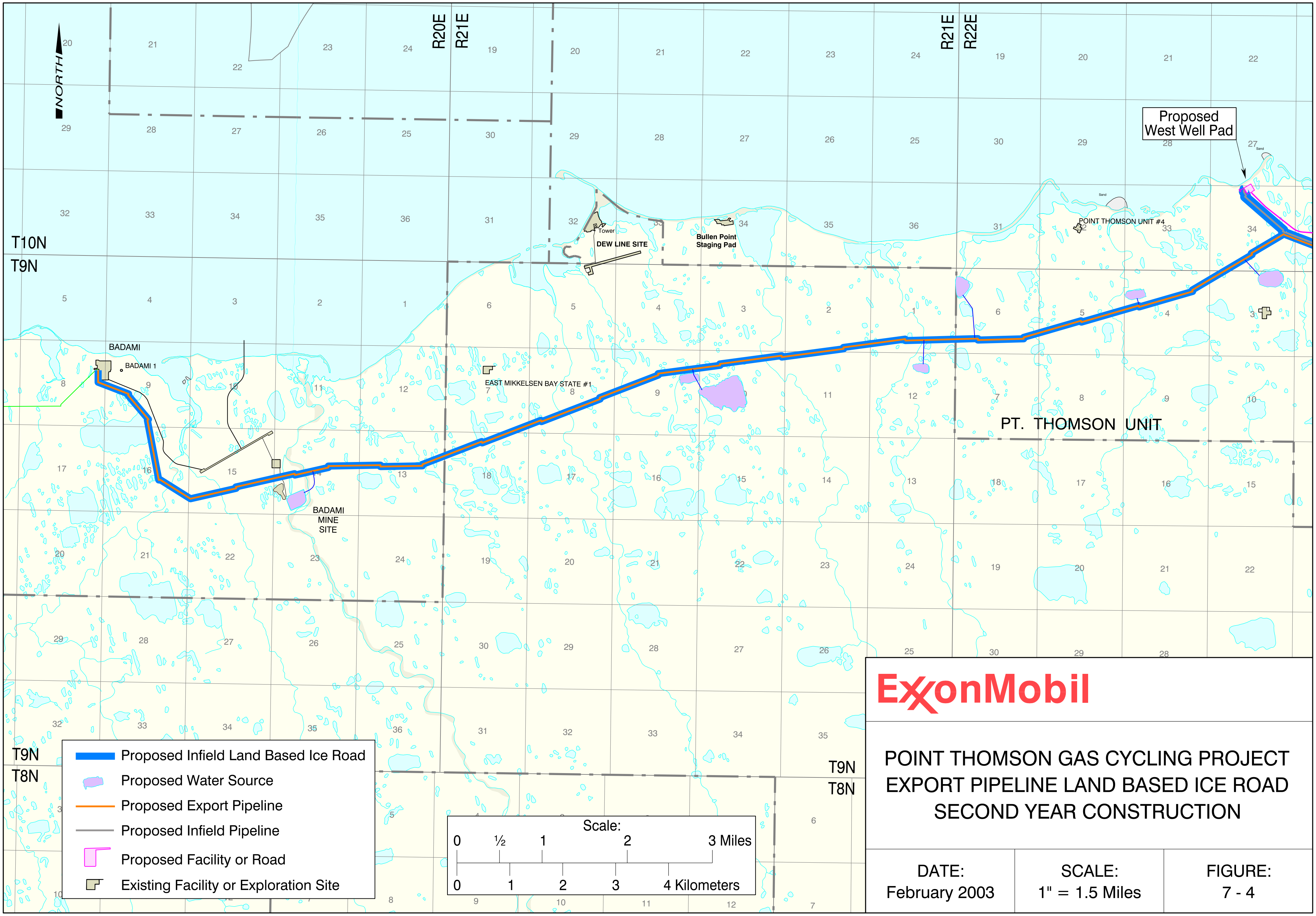
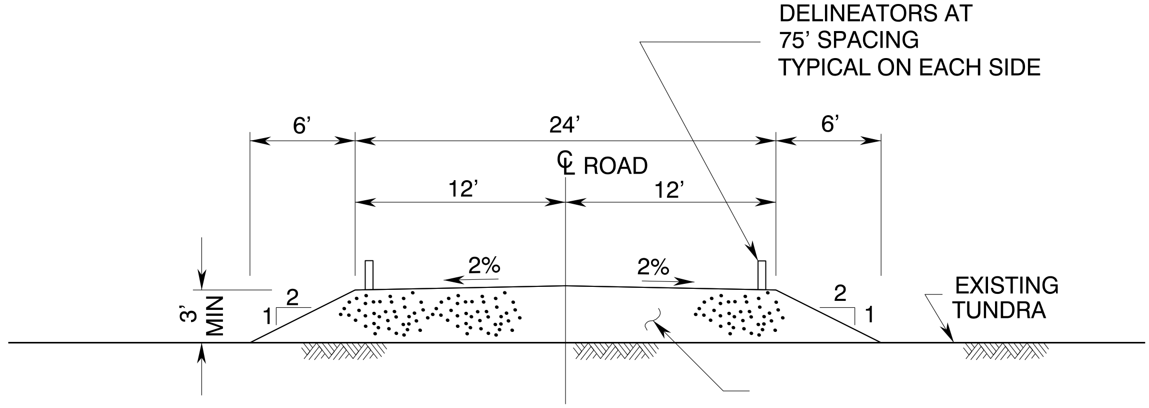


ExxonMobil

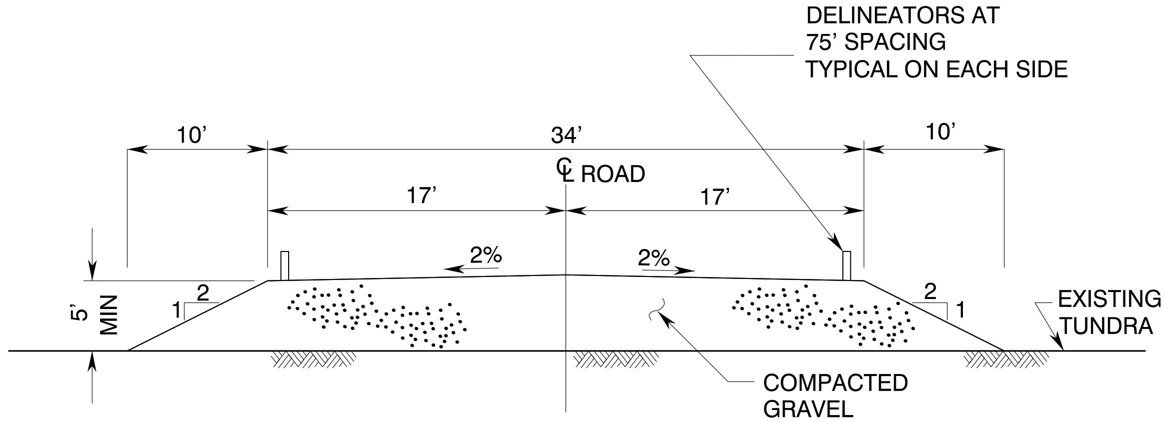
POINT THOMSON GAS CYCLING PROJECT
EXPORT PIPELINE LAND BASED ICE ROAD
SECOND YEAR CONSTRUCTION

DATE:	SCALE:	FIGURE:
February 2003	1" = 1.5 Miles	7 - 4

ex14745_7-4.dgn



TYPICAL 24' ROAD SECTION



TYPICAL 34' ROAD SECTION

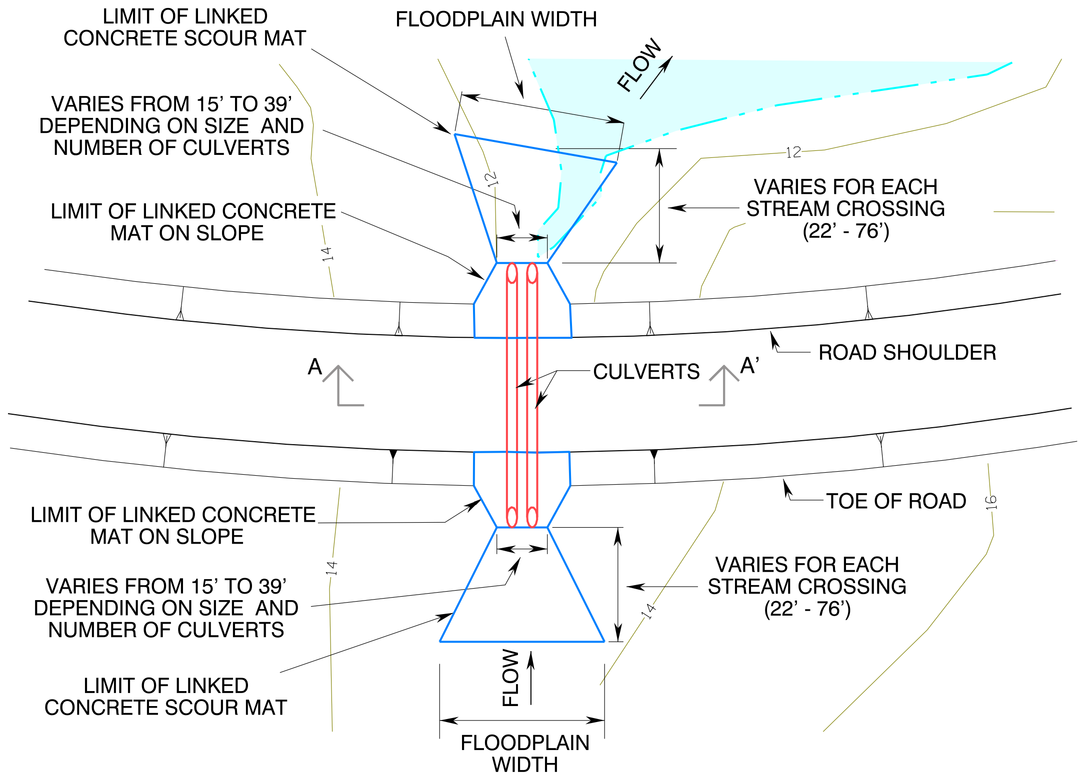
ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
TYPICAL 24-FT AND 34-FT
ROAD CROSS SECTIONS

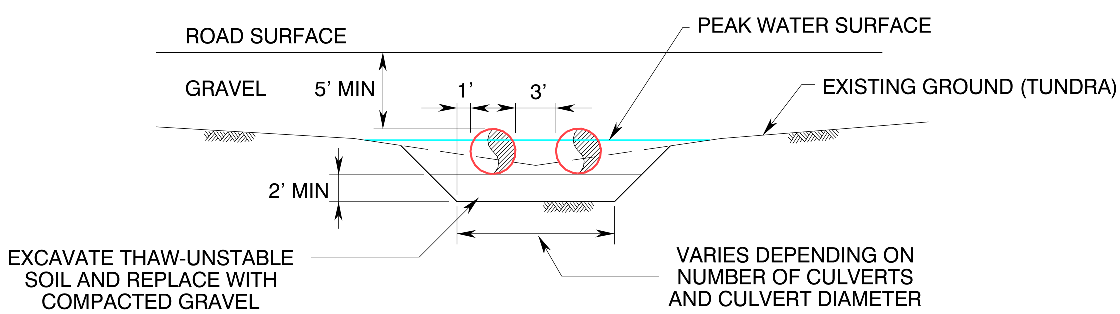
DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 5

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ex14745cross.dgn



PLAN VIEW



CROSS SECTION A - A'

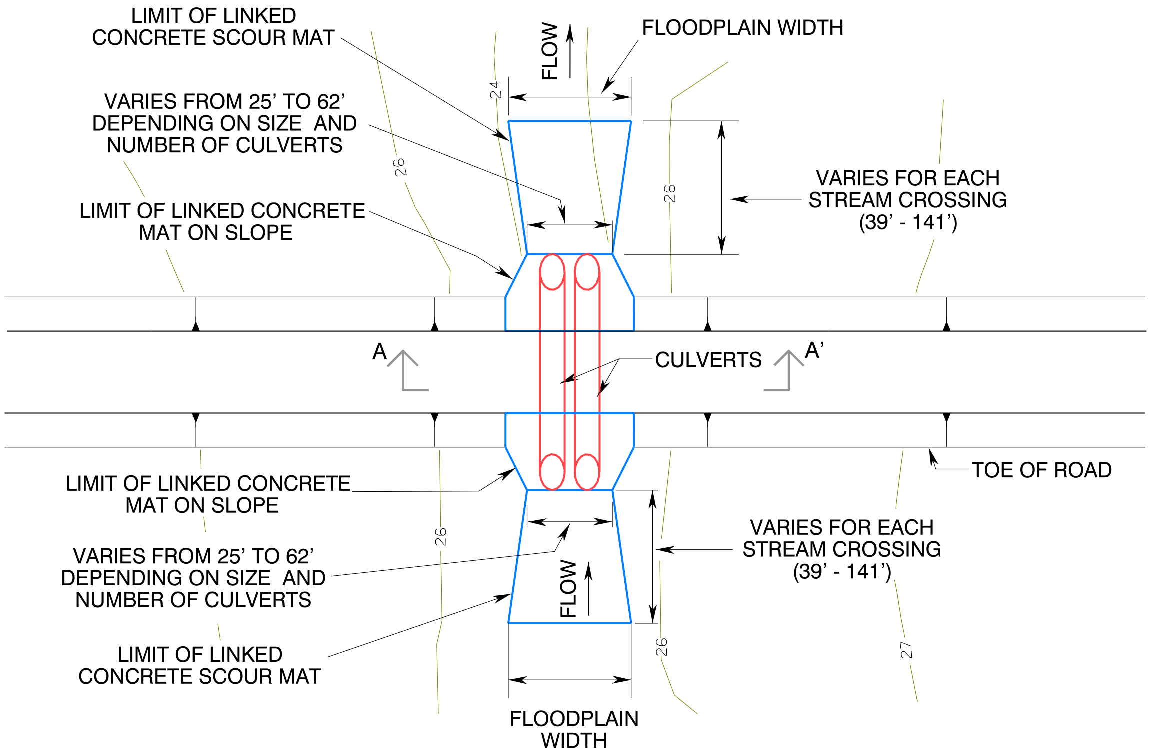
ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
PLAN AND CROSS SECTION
STREAM CROSSING RX-26-5
ROUND CULVERT EXAMPLE

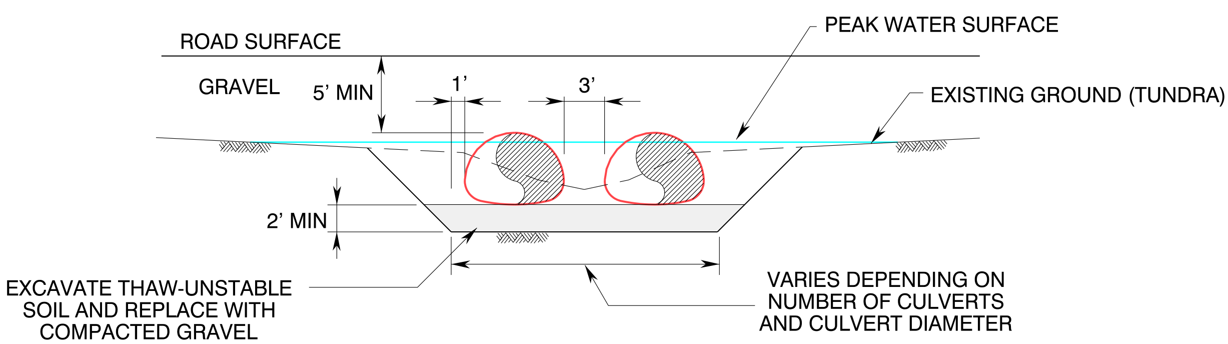
DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 6

FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ex14745cross.dgn



PLAN VIEW



CROSS SECTION A - A'

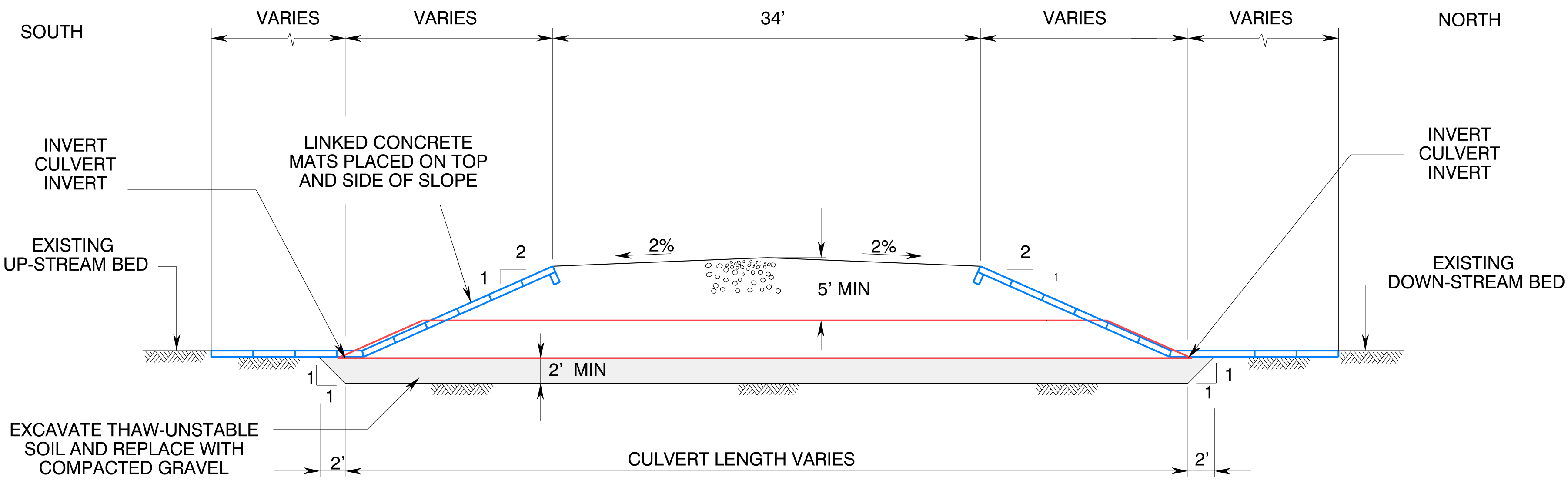
FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
PLAN AND CROSS SECTION
STREAM CROSSING RX-31
ARCH PIPE CULVERT EXAMPLE

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 7

ex14745cross.dgn



LONGITUDINAL CROSS SECTION

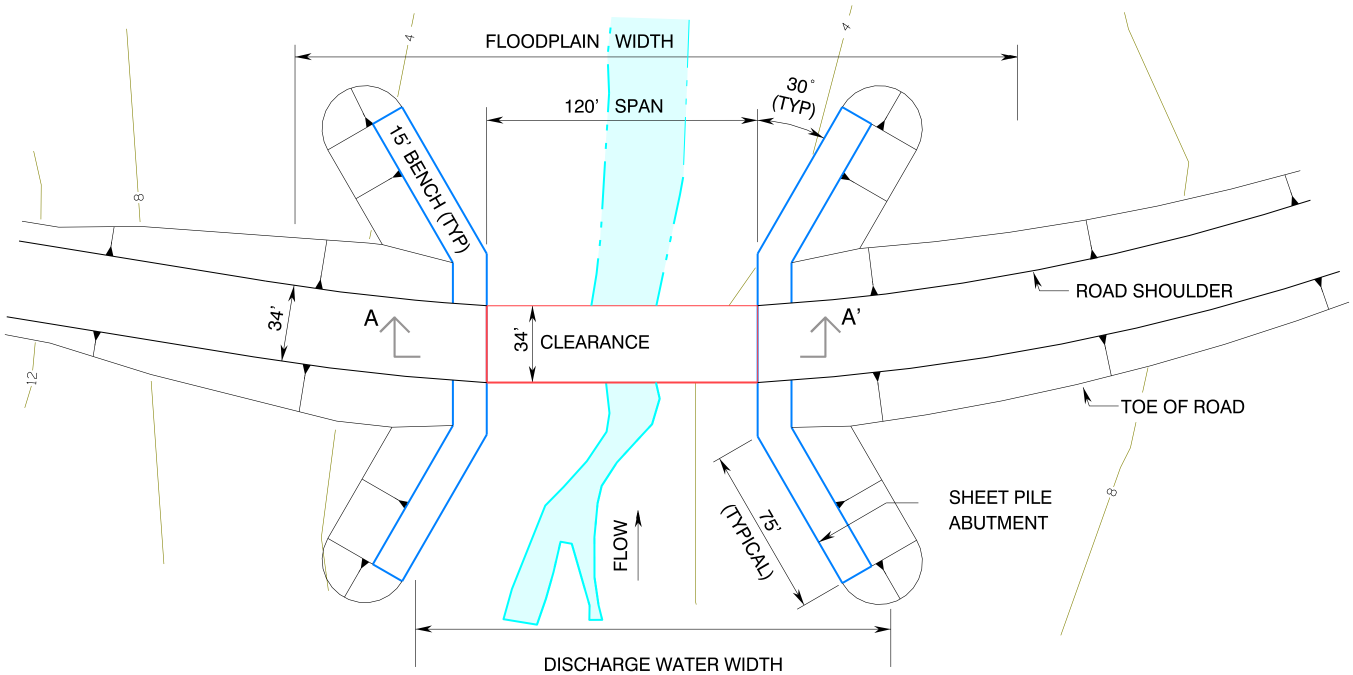
FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
CULVERT LONGITUDINAL
CROSS SECTION

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7-8

ex14745cross.dgn



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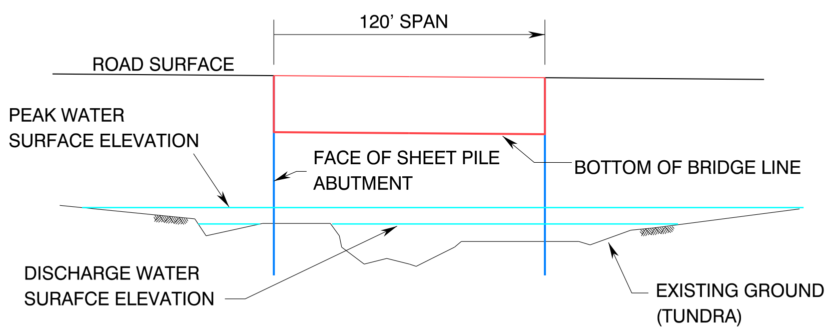


CROSS SECTION A - A'

THREE BRIDGES FOR THIS PROJECT
SPANS OF 50', 100' AND 120'

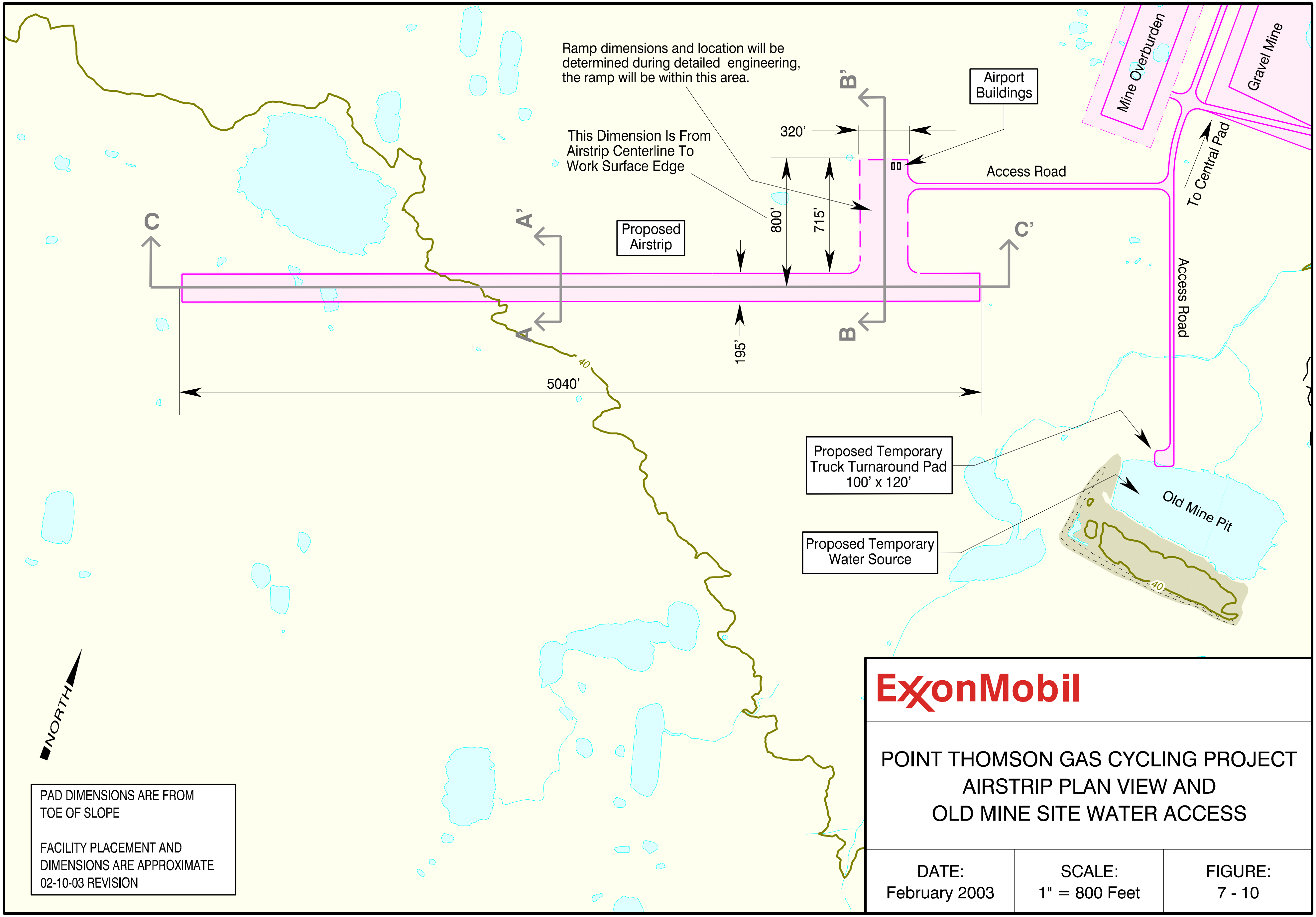
FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
PLAN AND CROSS SECTION
STREAM CROSSING RX-28
BRIDGE EXAMPLE

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7-9

ex14745cross.dgn



PAD DIMENSIONS ARE FROM TOE OF SLOPE

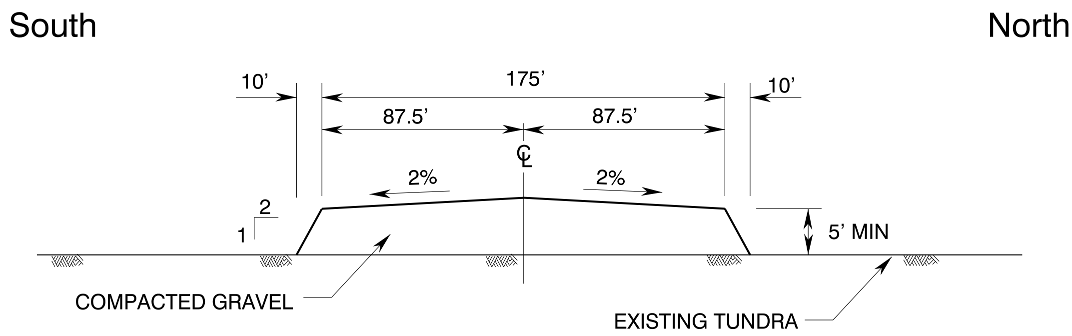
FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

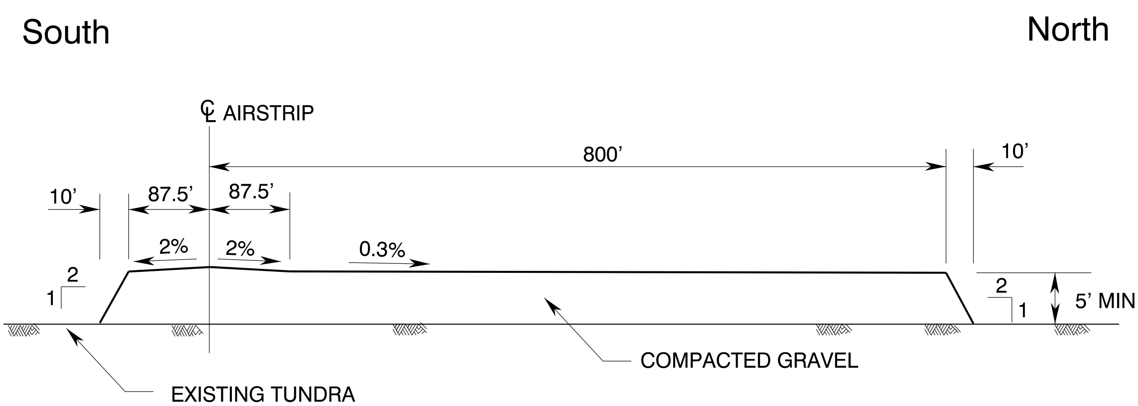
POINT THOMSON GAS CYCLING PROJECT
AIRSTRIP PLAN VIEW AND
OLD MINE SITE WATER ACCESS

DATE:	SCALE:	FIGURE:
February 2003	1" = 800 Feet	7 - 10

ex14745plan.dgn



CROSS SECTION A - A'



CROSS SECTION B - B'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

MSL = Mean Sea Level

ExxonMobil

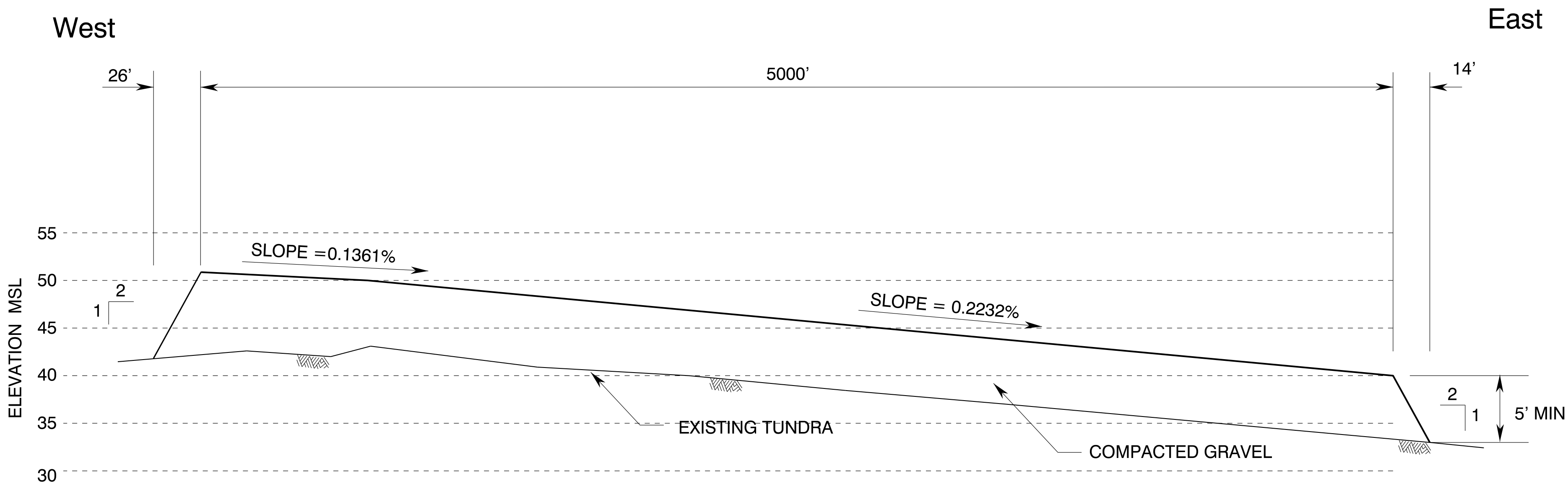
POINT THOMSON GAS CYCLING PROJECT

AIRSTRIP

CROSS SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 11

ex14745cross.dgn



CROSS SECTION C - C'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

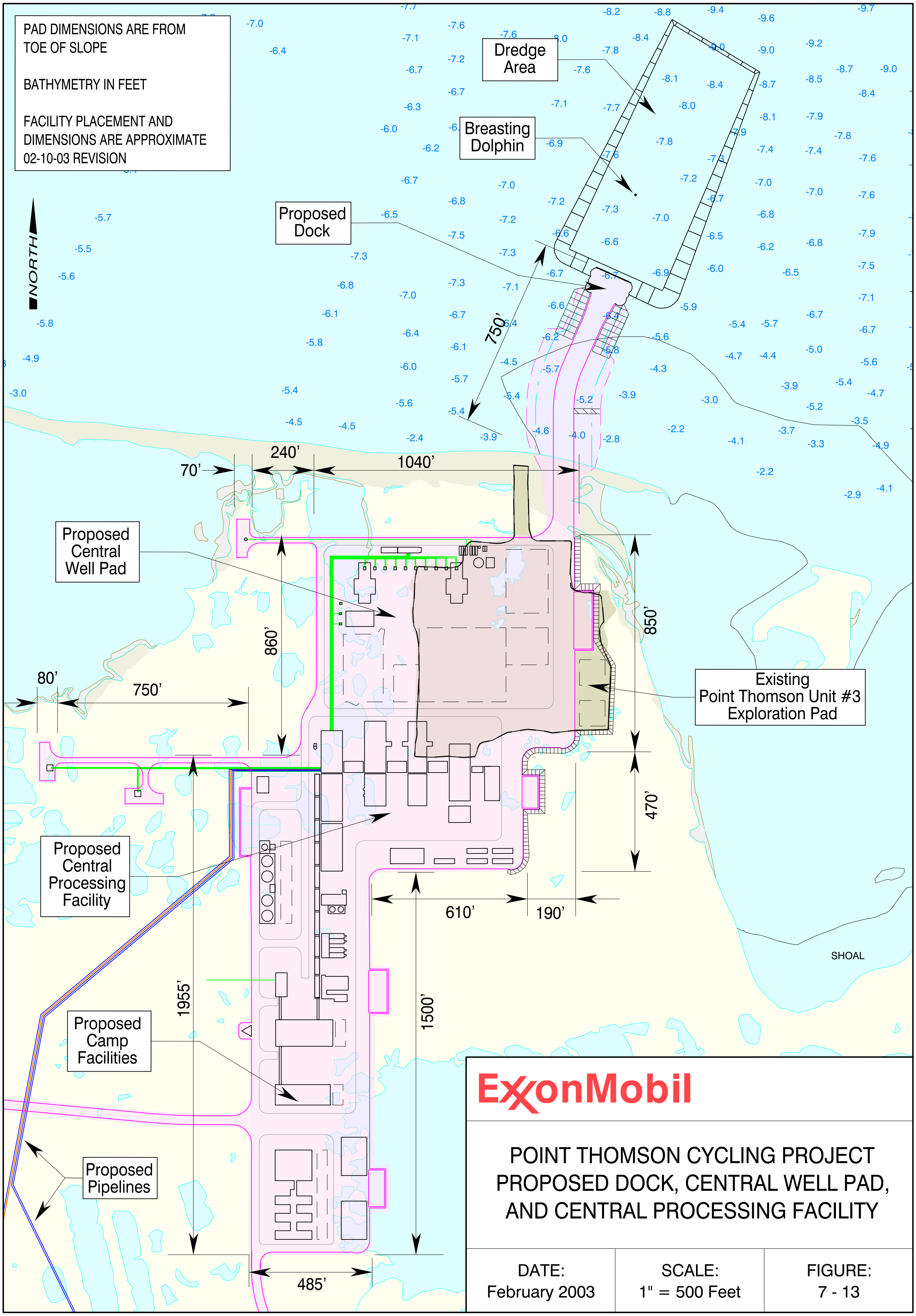
MSL = Mean Sea Level

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
AIRSTRIP
CROSS SECTION

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7-12

ex14745cross.dgn

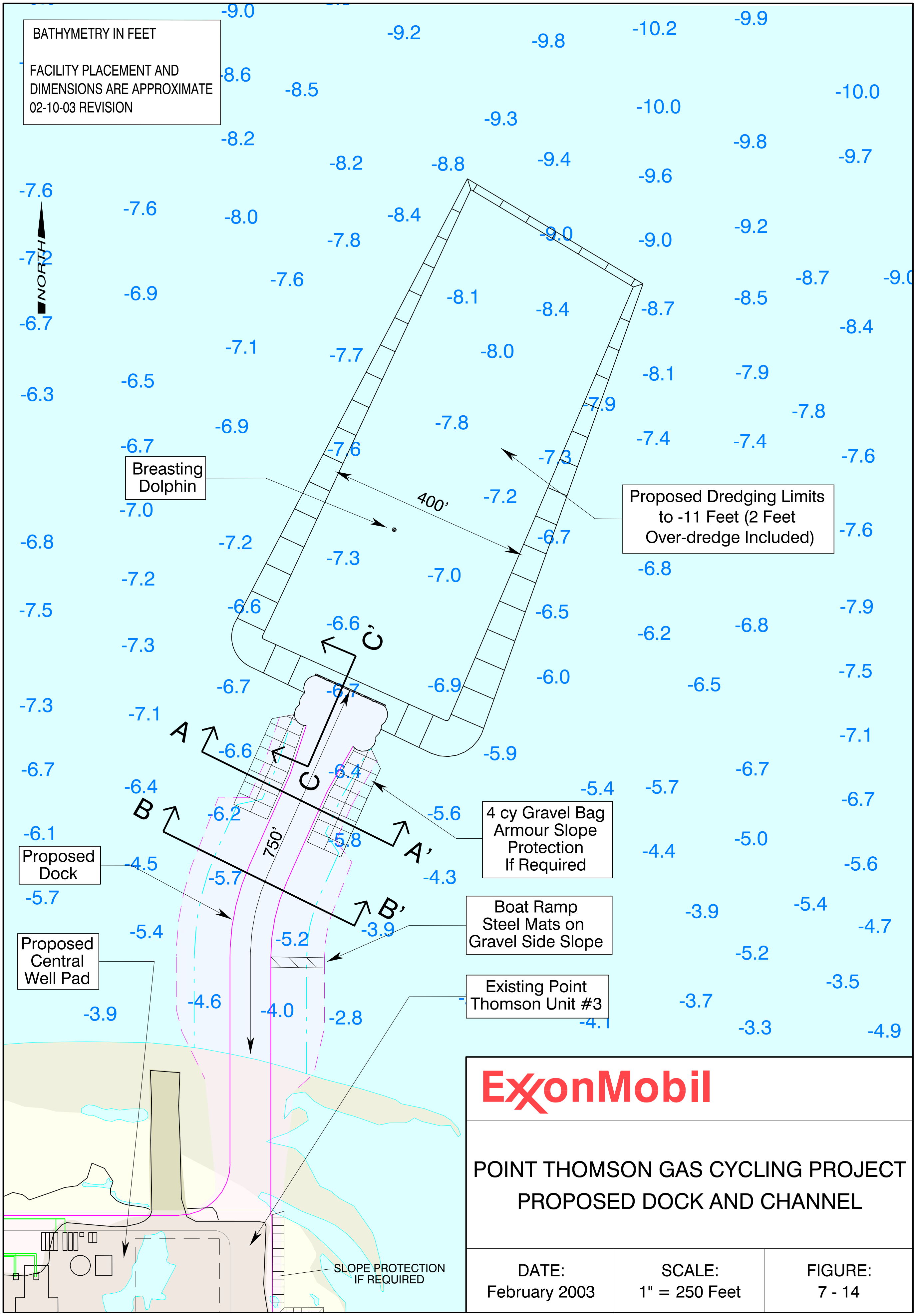


ExxonMobil

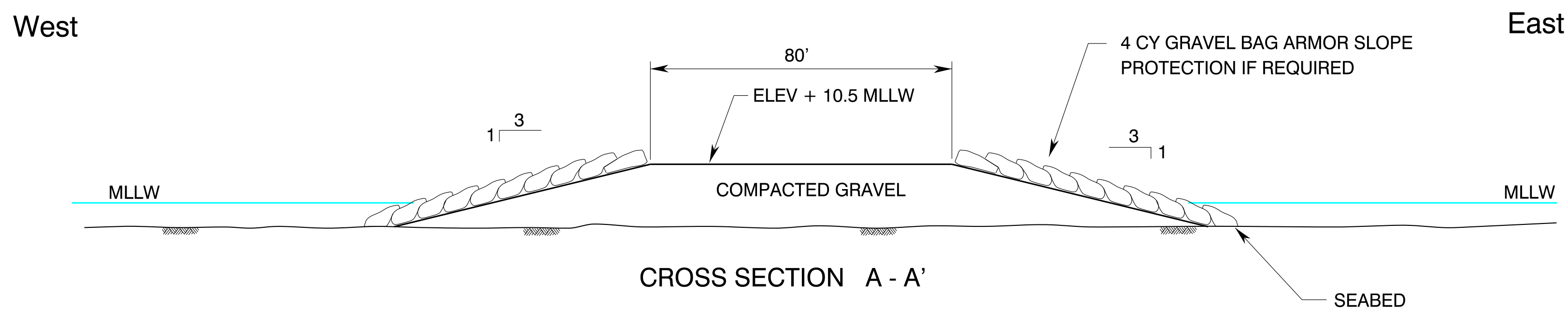
POINT THOMSON CYCLING PROJECT
PROPOSED DOCK, CENTRAL WELL PAD, AND CENTRAL PROCESSING FACILITY

DATE:	SCALE:	FIGURE:
February 2003	1" = 500 Feet	7 - 13

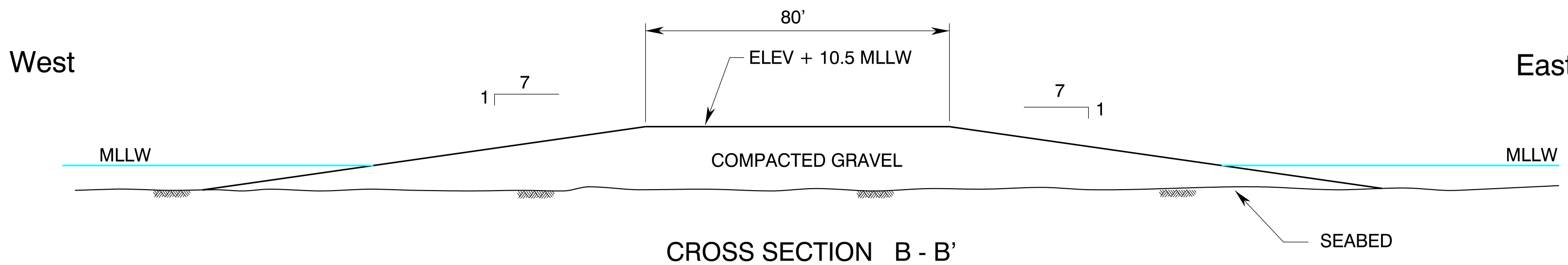
ex14745_7-13.dgn


BATHYMETRY IN FEET
FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION
NORTH
Breasting Dolphin
400'
Proposed Dredging Limits to -11 Feet (2 Feet Over-dredge Included)
C
C'
A
A'
B
B'
750'
4 cy Gravel Bag Armour Slope Protection If Required
Proposed Dock
Boat Ramp Steel Mats on Gravel Side Slope
Proposed Central Well Pad
Existing Point Thomson Unit #3
SLOPE PROTECTION IF REQUIRED
ExxonMobil
POINT THOMSON GAS CYCLING PROJECT
PROPOSED DOCK AND CHANNEL
DATE: February 2003
SCALE: 1" = 250 Feet
FIGURE: 7 - 14

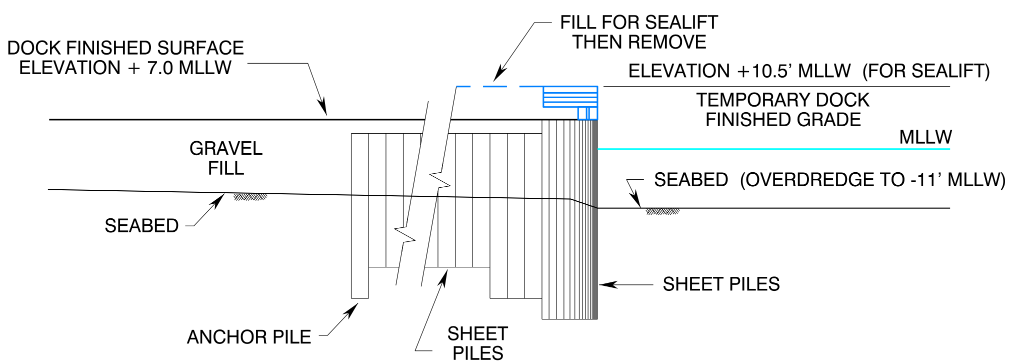
ex14645_7-14



CROSS SECTION A - A'



CROSS SECTION B - B'



CROSS SECTION C - C'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-12-03 REVISION

MLLW = Mean Lower Low Water

ExxonMobil

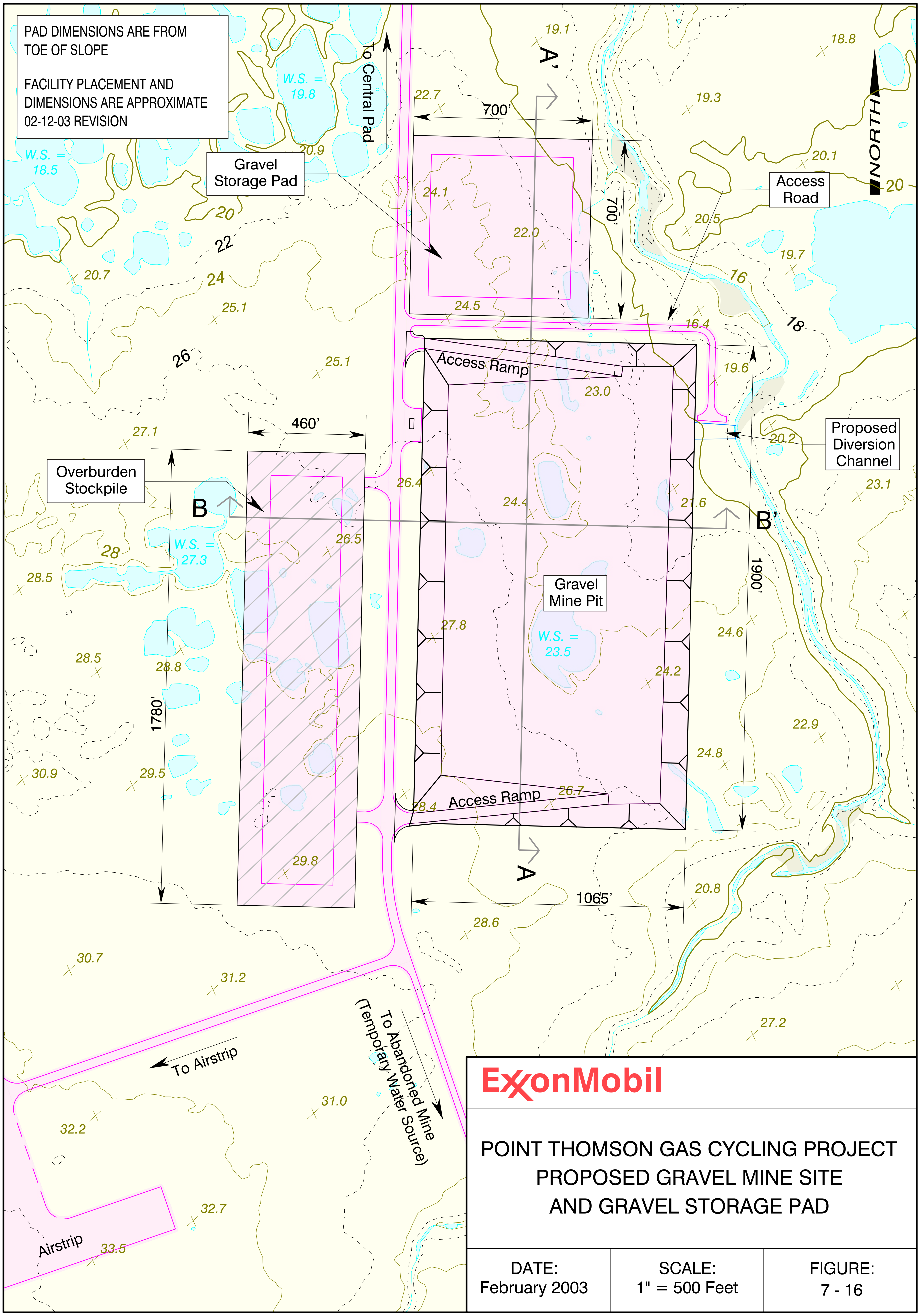
POINT THOMSON GAS CYCLING PROJECT

DOCK

CROSS SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7-15

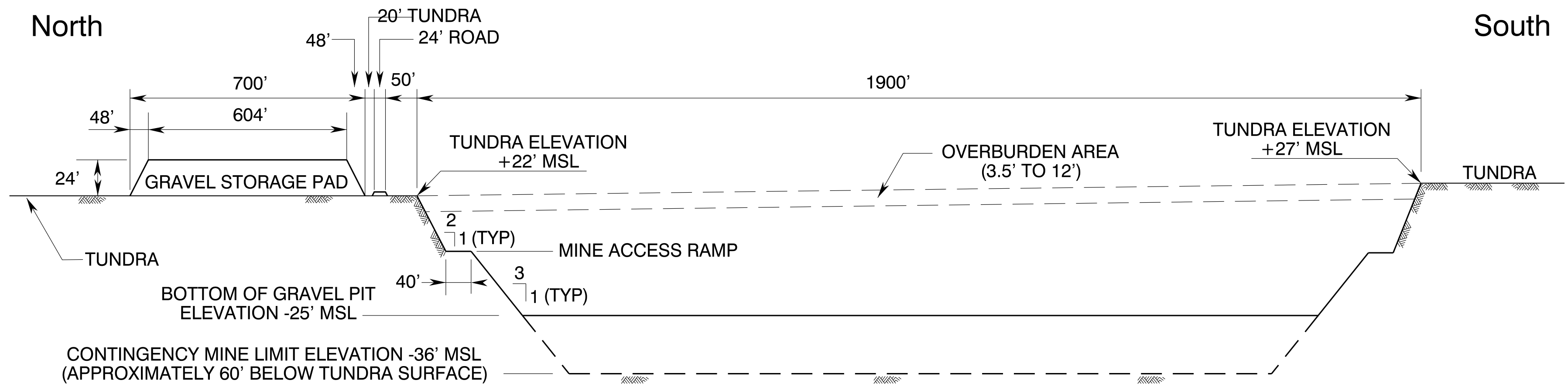
ex14745cross.dgn



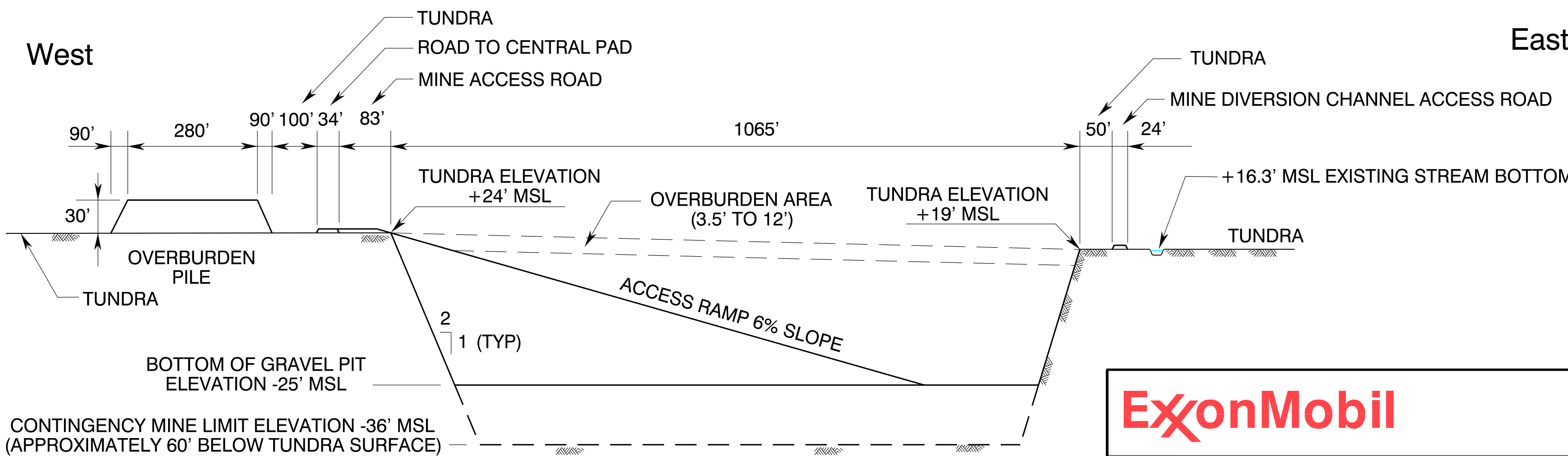
ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
PROPOSED GRAVEL MINE SITE
AND GRAVEL STORAGE PAD

DATE:	SCALE:	FIGURE:
February 2003	1" = 500 Feet	7 - 16



CROSS SECTION A - A'



CROSS SECTION B - B'

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT

PROPOSED GRAVEL MINE

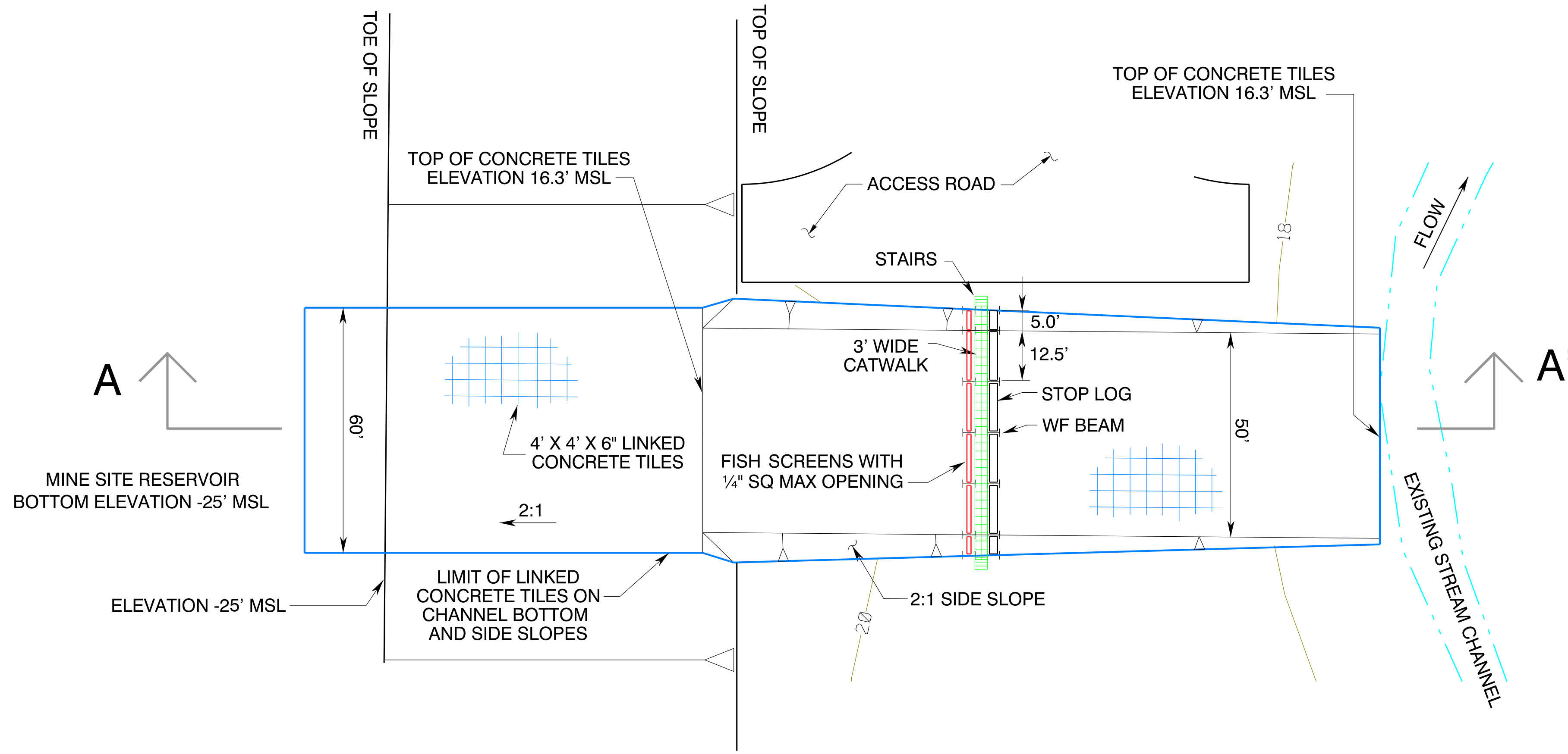
CROSS SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7-17

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

MSL = Mean Sea Level

ex14745cross.dgn



FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

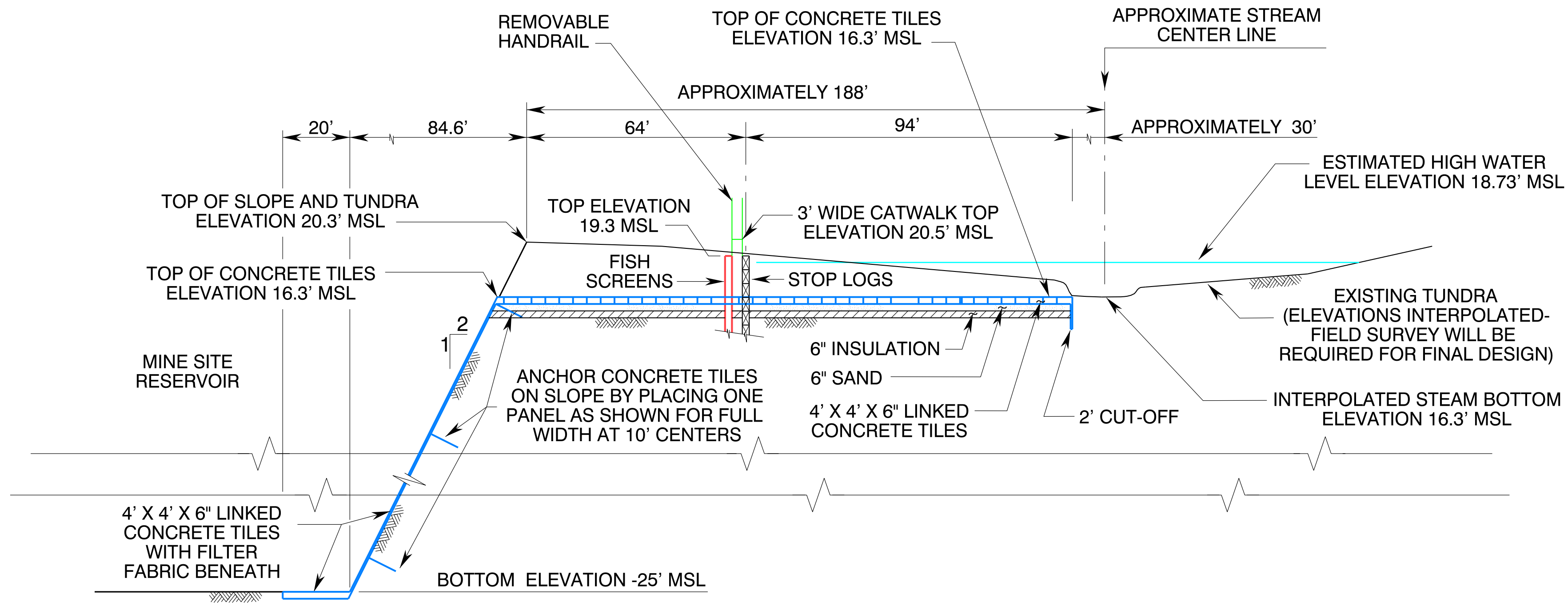
MSL = Mean Sea Level

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
DIVERSION CHANNEL
PLAN VIEW

DATE:	SCALE:	FIGURE:
February 2003	NOT TO SCALE	7 - 18

ex14745cross



CROSS SECTION A - A'

ExxonMobil

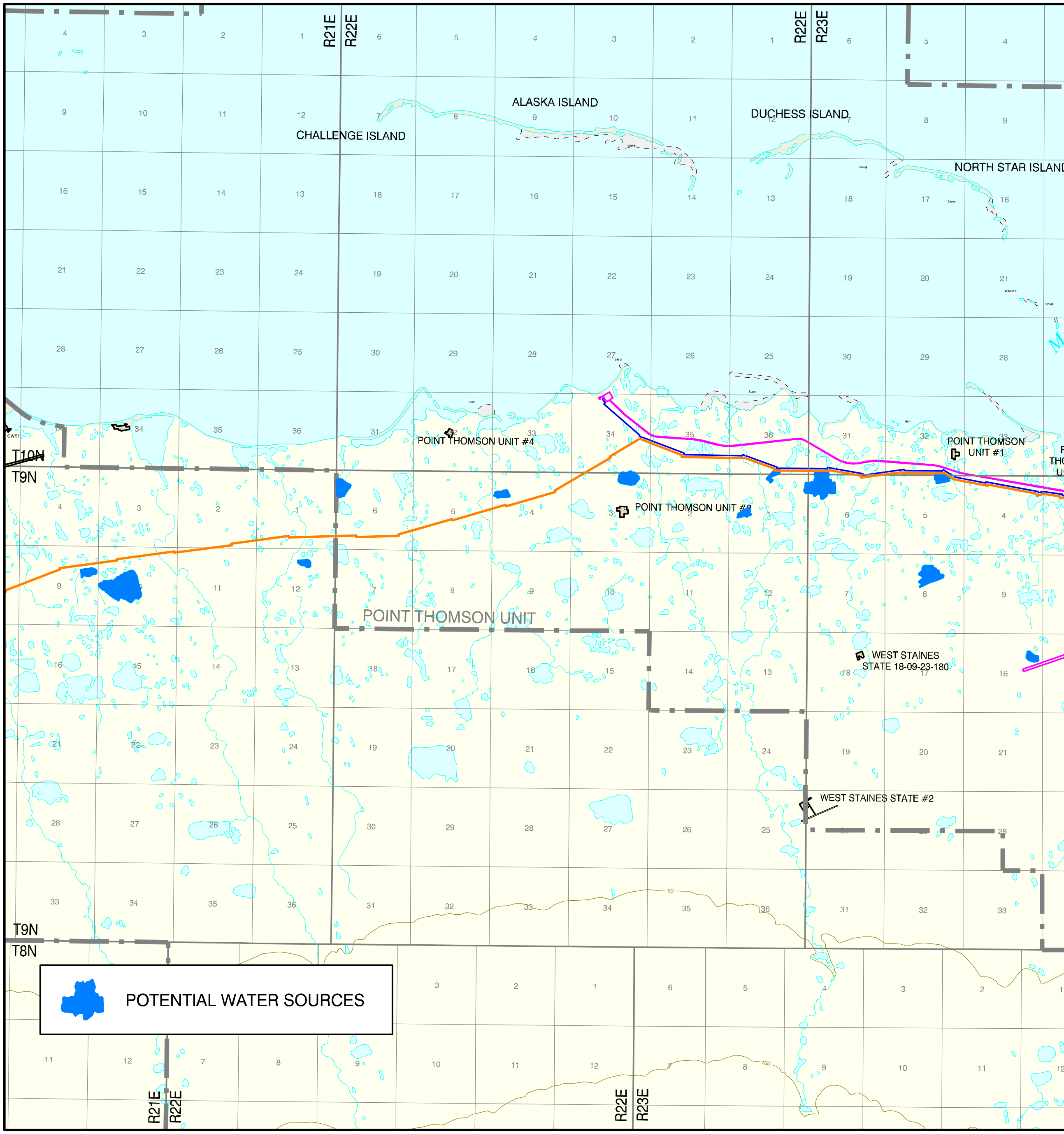
POINT THOMSON GAS CYCLING PROJECT
DIVERSION CHANNEL
CROSS-SECTION

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 19

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

MSL = Mean Sea Level

ex14745cross

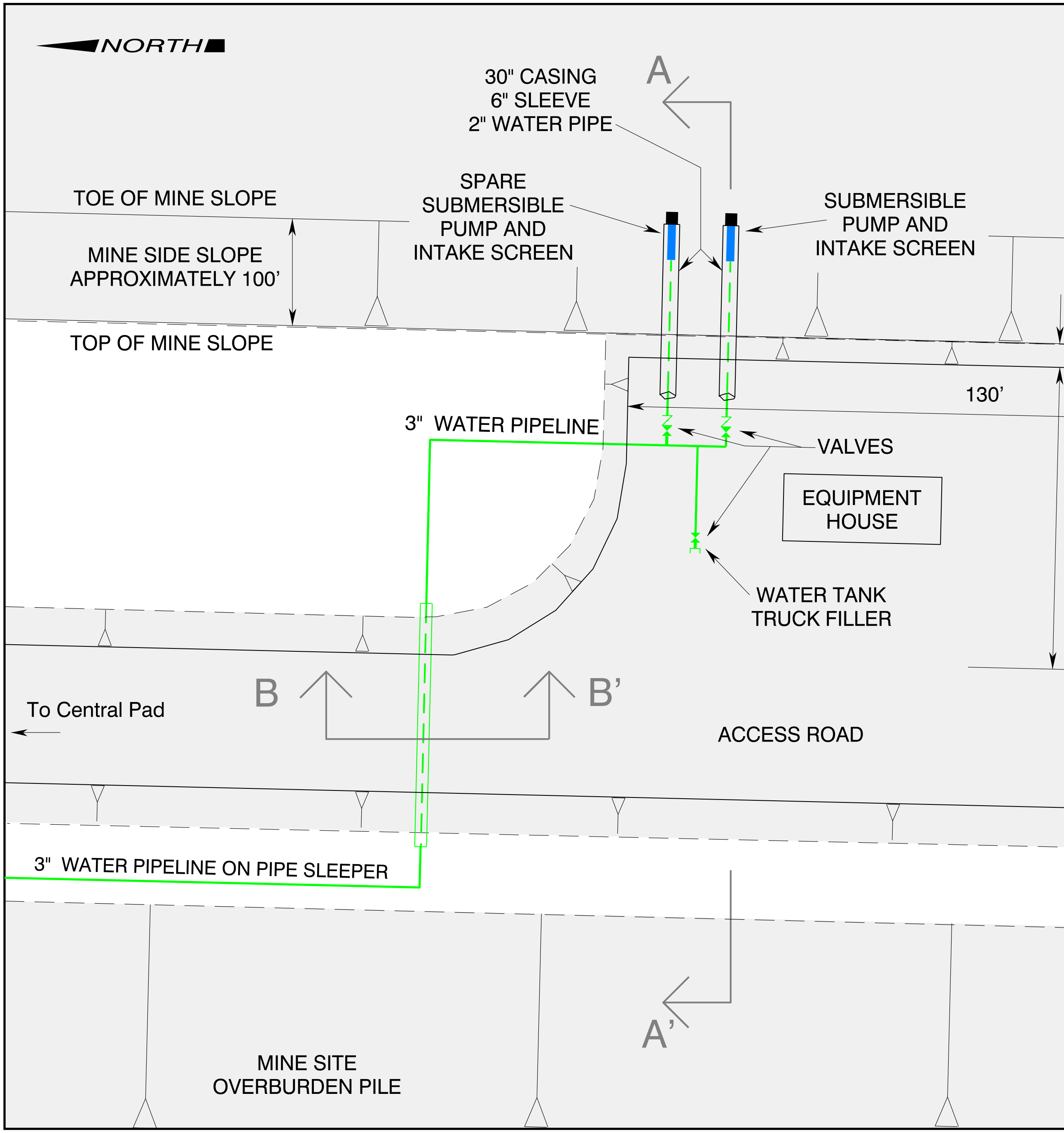


ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
POTENTIAL WATER SOURCE LAKES

DATE:	SCALE:	FIGURE:
February 2003	1" = 2 Miles	7 - 20

ex14745_7-20.dgn



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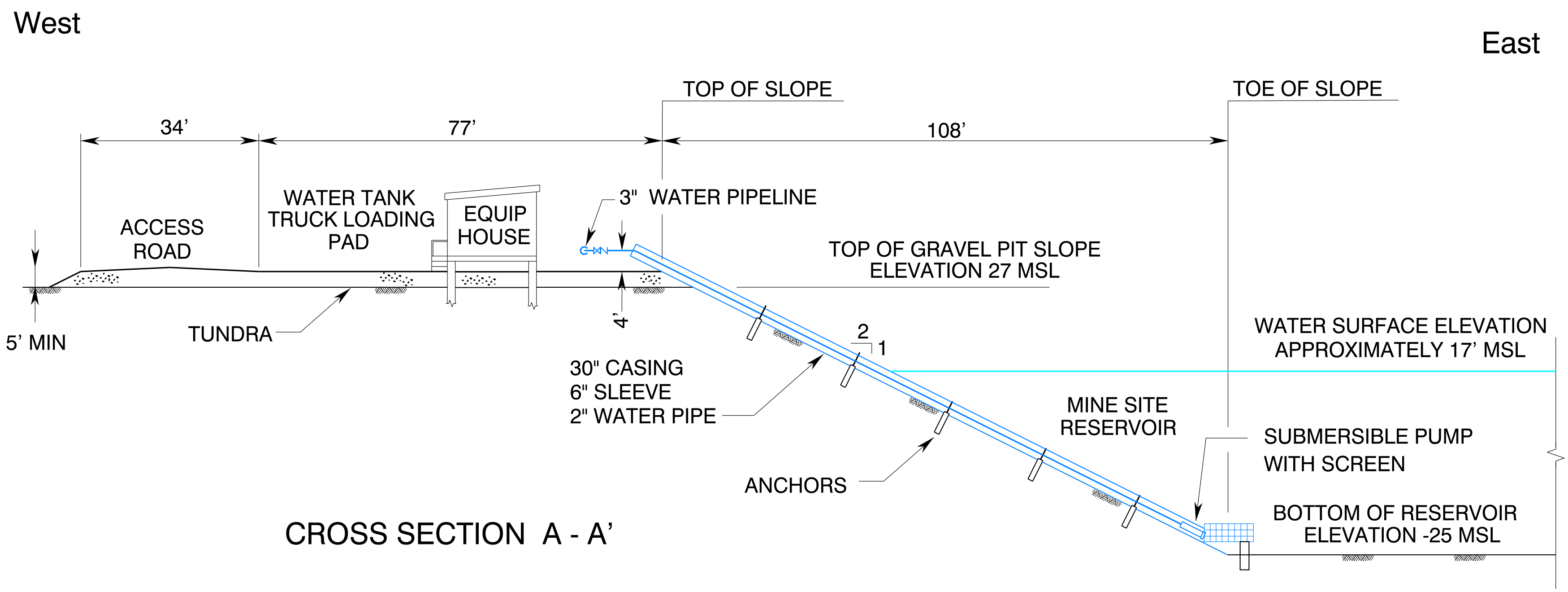
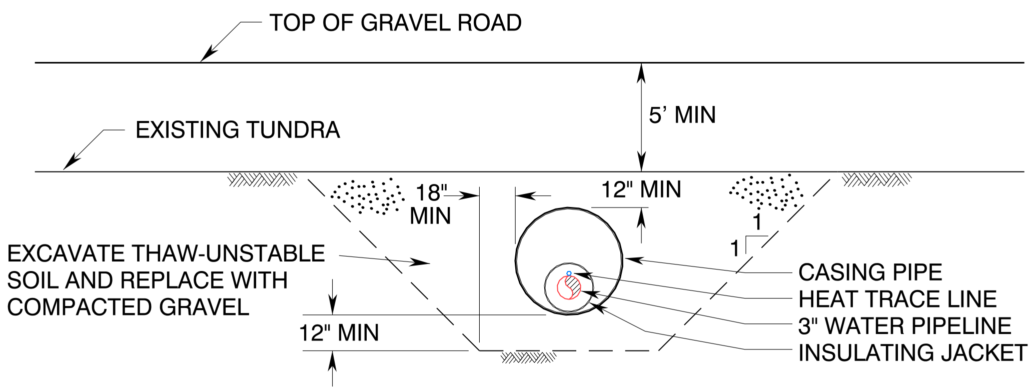
POINT THOMSON GAS CYCLING PROJECT
MINE SITE RESERVOIR
INTAKE STRUCTURE PLAN

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 21

ex14745cross



CROSS SECTION A - A'



CROSS SECTION B - B'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

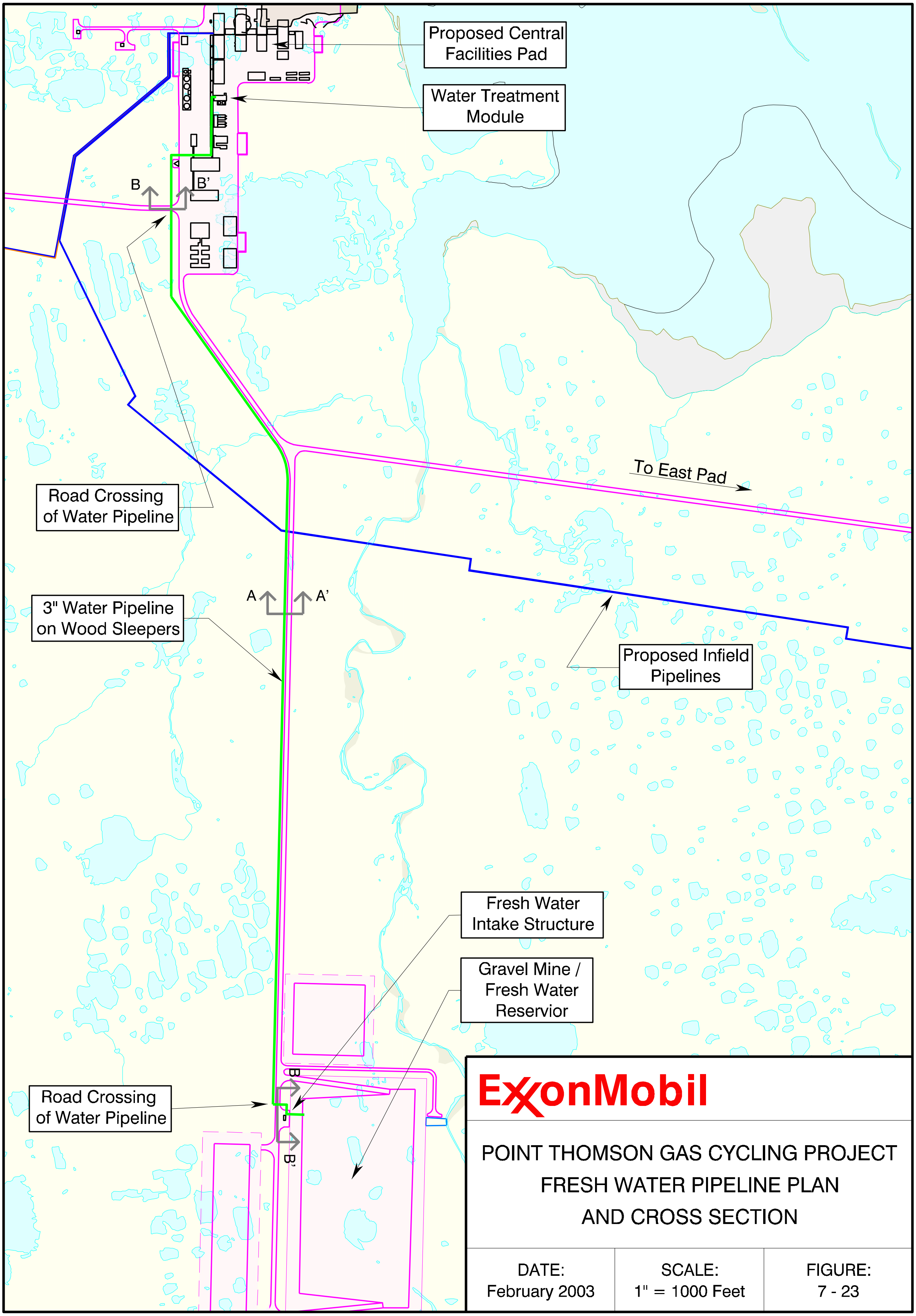
MSL = Mean Sea Level

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
MINE SITE RESERVOIR INTAKE STRUCTURE
CROSS - SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 22

ex14745cross



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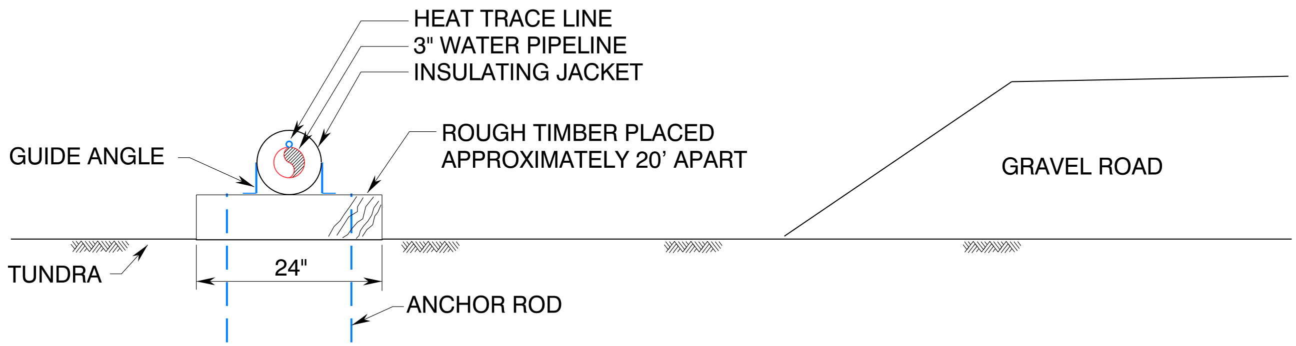
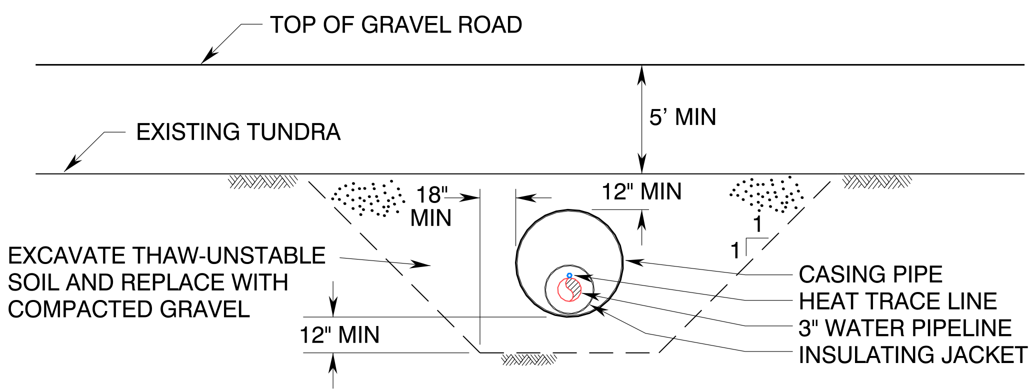
POINT THOMSON GAS CYCLING PROJECT
FRESH WATER PIPELINE PLAN
AND CROSS SECTION

DATE:	SCALE:	FIGURE:
February 2003	1" = 1000 Feet	7 - 23

ex14745_7-23.dgn



CROSS SECTION A - A'



CROSS SECTION B - B'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
FRESH WATER PIPELINE
CROSS - SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	7 - 24

ex14745cross

8.0 OPERATIONS AND MAINTENANCE

8.1 INTRODUCTION

Operations and maintenance of the Point Thomson facilities will be governed by the operational requirements for the project. These specifications will incorporate a central control room (CCR) for functional control of plant processes, monitoring security, safety surveillance of emergency shutdown systems, a fire and gas monitoring system, remote activation of pig launching operations, and data gathering as may be required by a surveillance system. In addition, Production Operations Best Practices (POBP) will be used for any issues/concerns not covered by the specifications.

The following sections provide descriptions of the operational requirements, including maintenance issues, for the civil works, pipelines, and process facilities. A section is also included on anticipated air emissions.

8.2 CIVIL WORKS MAINTENANCE

8.2.1 Roads, Pads, and Airstrip

To ensure the integrity of the airstrip, pads, and roads, routine inspection will be required. The operations at Point Thomson will maintain and use road maintenance equipment such as motor graders, front-end loaders, backhoes, and water tankers for dust control. Maintenance will be performed on an as-needed basis. Care will be taken not to damage the permafrost or the tundra.

8.2.2 Drainage Structures

Drainage systems will be inspected periodically as part of routine operations. Required equipment will be dispatched to remove debris, snow, etc. from culverts and storm-water collection basins.

8.2.3 Snow Removal and Storage

In accordance with all ExxonMobil SHE guidelines, the Point Thomson facilities will be well kept and maintained. During the winter months, snow removal activities will be conducted on an ongoing basis. Personnel and equipment such as front-end loaders and motor graders will be available to handle the snow removal requirements at the Point Thomson CPF, well pads, and airstrip.

To ensure a safe operating facility, a Standard Operating Procedures (SOP) Manual will be developed before operations start-up. The SOP Manual will include a section detailing snow removal and handling procedures and adhere to the snow removal Best Management Practice

(BMP) associated with the National Pollutant Discharge Elimination System (NPDES) permit for storm water. These procedures (BMP) will also address handling and disposing of contaminated snow, which will be visually inspected for contamination before removal. Contaminated snow will be collected and stored in a specially designated area for proper disposal (the location of the storage area will be determined at a later date). Snow may be allowed to melt, or a snowmelter will be used; any contaminated meltwater will be injected into the disposal well. Uncontaminated snow will be pushed onto surrounding tundra and/or dumped onto the lagoon sea ice, where it will be allowed to melt into the ocean during breakup.

While large accumulations of snow are possible during some winters, potential effects of snow storage are anticipated to be minimal. Snow dumps not only can be located on unused portions of pads but also could be located off-pad for uncontaminated snow.

8.3 PIPELINE MAINTENANCE

8.3.1 Infield Gathering and Injection Lines

Gathering lines extend from the East and West Well Pads to the CPF, and the gas injection lines run from the gas compression modules to the gas injection wells. The field operator will conduct surveillance and visual inspections of the gathering and injection lines as part of the routine operations.

8.3.2 Export Pipeline

The condensate export pipeline from the CPF to the Badami facility will include a leak detection system and will be monitored by supervisory control and data acquisition (SCADA) system 24 hours a day (described in Section 6). The pipeline will require some special methods of planning the inspections and maintenance program, which will take into consideration the limited seasonal access to the pipeline right-of-way, tundra protection, wildlife protection, logistics, and workforce. Surveillance of the pipeline, typically performed on a weekly basis, will be performed via aerial surveillance (fly over) or by ground visual observations. Internally, the pipeline will be periodically inspected using "smart" pigs. Pig launchers and receivers, isolation valves and associated instrumentation and controls will be housed in enclosures.

Access to the pipeline and associated facilities can be gained from roads along the pipeline right-of-way (where roads are available), by using Rolligons when tundra travel is allowed, or from ice roads built during the winter to access a specific location. Access can also be achieved by mobilizing a helicopter to move personnel and equipment directly to a specific location for minor repair and maintenance. Typically, minor repairs will require only hand tools and, possibly, welding equipment. Major repairs might require the use of earth-moving equipment, cranes and lifting equipment, and specialized tools and materials. Minor and major pipeline repairs will be scheduled, where possible, to ensure equipment, materials, and personnel required to perform these repairs will be available.

In order to provide quick response to minor emergencies and to perform repairs to the facilities dedicated to the pipeline flow and leak detection, spare parts and replacement materials will be maintained at the Point Thomson warehouse. Personnel at Point Thomson will supervise all pipeline repairs.

8.4 PROCESS FACILITIES

8.4.1 Gas Injection

The injection compressors will be in a fully enclosed modular building. There will be a long-term service agreement with a contractor to provide scheduled maintenance for the facility. Regular inspections by Operations personnel of the entire injection system will be performed to minimize downtime. Critical spare parts for the injection system will be warehoused at Point Thomson. An independent console will be located in the CCR along with a local equipment room to display functionality and status of the entire system. An anti-surge system will be installed on the compressors to ensure the load is balanced among the compressors.

The gas injection system will be connected with the entire emergency shutdown system of the CPF. The gas injection wells will be located within the CWP, which is adjacent to the CPF.

8.4.2 Produced Water

Produced water from the low-pressure (LP) compressor scrubber, third-stage separator, and the condensate dehydrator will be routed to the produced water separator. The produced water will be pumped to the CWP for disposal in a disposal well. Condensate will be skimmed off the produced water in the separator and pumped back to the condensate dehydrator by the produced-water skim-oil pumps.

8.4.3 Exterior Lighting

Interior and exterior process areas will have high-pressure sodium lighting. Control and electrical rooms will have fluorescent lighting supplied from 120-volt alternating-current uninterruptable power supply systems (UPS). Process area egress lighting to meet Uniform Building Code requirements will be powered from Underwriters Laboratories-listed UPS.

8.4.4 Instrumentation and Controls

Operations at the Point Thomson Unit will be controlled from the CCR. Operating consoles located in the control room will display process conditions and equipment status, including any alarms, trip conditions, and fire/gas detection. Alarms will be relayed to the operator on a real-time basis, thus allowing the operator complete surveillance capability throughout the plant while remaining in the control room.

The process control system (PCS) will be able to monitor and control the entire operation (both plant and field). The PCS will have standard local-area-network-based workstations for operator consoles; this will provide the operator and the maintenance technicians the ability to check or configure a device from any location at the facility. The PCS will continually monitor devices and deliver real-time data on their operation. The system provides the following capabilities:

- Surveillance and control of the process facility (CPF), the well pads, and the pipeline;
- The ability to pinpoint poor equipment performance;
- Optimization of maintenance activities;
- Early detection of failures of key pieces of equipment, reducing lost production and repair costs; and

- Identification of faulty instruments and subsequent prevention of incorrect and potentially costly actions based on bad data.

Safety instrumented system (SIS) and PCS alarms and trips will be annunciated on the human/machine interface (HMI) in the CCR by way of visual images on the associated graphics and by an audible signal. Alarms that are acknowledged at the HMI and CCR will automatically be acknowledged at all other HMIs in the CCR and in the local equipment room buildings. Priority 1 alarms, including gas leaks, will be annunciated on a dedicated alarm panel.

The facilities' public address and general alarm system will receive signals from the safety systems, manual call stations, and PCS, and will provide unique audible alarms (tones with voice overlay messages) to the audible stations. In addition to control and monitoring from the CCR, certain major pieces of equipment will have their own stand-alone local control and monitoring panels. These panels will provide local control during start-up and shutdown operations, and will assist Operations during equipment start-up and system trouble-shooting. Local panel functions will also be duplicated and accessible from the HMI in the CCR.

8.4.5 Flare

The bulk of material in the Point Thomson gathering system, plant, and gas injection system will be natural gas. The flare system will be used to safely burn these gases, which may occasionally need to be released when pipelines and facilities are depressurized for maintenance or when there is a temporary facilities upset. Depressurization and flaring might also be necessary if there is an emergency in the facility. Vented gas will first flow to flare knock-out drums, where liquids will be separated before the gas is sent to the flare. There are two separate flare systems, one for high-pressure (HP) gases and one for low-pressure (LP) gases. Noise associated with high flare-rate excursions is expected to be similar to that generated at other North Slope operations.

Flaring will be limited to serious plant emergencies, or and when necessitated by maintenance. The maximum gas flow rate to the high-pressure flare system is about 1.75 billion cubic ft per day. This scenario represents an abnormal emergency situation where production gas is being vented at high rates from the gathering lines due to a plant shutdown. This high-rate venting to the flare is considered to be a very rare occurrence. The more typical flaring scenario represents flaring at times when a single injection compression train drops off-line or is shutdown. These events could occur several times a year, and are likely to decrease in frequency as problems with new equipment are resolved. The predicted low-pressure flare gas rate is approximately 34 million cubic ft per day based on a process upset in the second stage of the condensate separation train. The LP flash-gas compression system also vents to the LP flare system and can flow as much as 25 million cubic ft per day if the single flash-gas compression train is off-line or shutdown.

Typically only flare pilot and purge volumes will be burned in the HP and LP flares during normal (non-flaring) conditions. There will be little audible noise from this normal state. Air emissions from the pilot and purge will be included in the emission inventory for the CPF.

High- and low-pressure system flare stacks will be located just to the west of the CPF Pad. Each flare stack will be 100 ft above the ground surface. Gas and air will mix at the flare tips located at the top of the stacks. The flare stack height will also aid in dispersion of the combustion products and will reduce ground-level heat radiation.

The location of the flare stacks was selected to meet a number of criteria. First, the stacks need to be located as close to the plant site as practical to minimize the length and resulting pressure drop of the flare lines. Secondly, the flares must be located such that the heat radiation at any occupied area of the plant, roads, or pipeline right-of-way is maintained below a limit of 500 British thermal units (Btu) per hour per square ft. The flares will be also located downwind of the plant (based on the prevailing wind direction). Finally, the stacks will be situated so that the microwave path between Point Thomson and Badami is not obstructed during flaring.

8.5 AIR EMISSIONS

Point Thomson Gas Cycling Project activities have the potential to produce the following regulated air pollutants: nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter, and volatile organic compounds (VOCs). The type and amounts of air pollutants expected from this project will differ under drilling, construction, and operations phases and will be quantified as part of the air permitting process.

Sources of emissions anticipated during the drilling, construction, and operations phases include:

- Rig generators (diesel fired initially, switching to gas);
- Diesel generators located at the CPF to provide power during the first year of construction and drilling activities (will switch to power from gas turbines located at the CPF once fuel gas is available, and to provide backup power for essential loads during the operations phase);
- Drilling rig support equipment such as generators, boilers, and heaters;
- Gas-turbine-driven compressors, gas-turbine driven generators, and process heaters used for condensate separation/production and gas reinjection;
- Venting and flaring (intermittent source, with the exception of the pilot and purge volumes); and
- Vehicles, equipment (e.g., cranes etc.), marine vessels (in summer if required), helicopters, and airplanes used to transport equipment, materials, and personnel to and from the site.

The main sources of emissions during drilling and operations will likely be the gas turbines for power generation and gas compression. The emissions from these turbines will consist mainly of NO_x and CO, with lesser amounts of SO_2 and particulates. Diesel generators and support equipment will produce NO_x, with lesser amounts of SO_2, CO, and particulates. Flaring will burn most VOCs, but will produce some NO_x, with lesser amounts of SO_2, CO, and particulates. Vehicle, marine vessel, and airplane emissions are expected to consist mainly of CO, with small amounts of VOCs from aviation and other fuels.

9.0 LOGISTICS AND TRANSPORTATION

9.1 INTRODUCTION

The Point Thomson facility will be a remote operating facility that will be approximately 50 miles from any existing North Slope road infrastructure. The Badami development approximately 22 mi to the west was also developed as a remote facility with no permanent road access due to environmental impact concerns related to a permanent gravel road and the high costs of a road, in particular, the need to construct bridges over the major rivers such as the east channel of the Sagavanirktok. Consequently, permanent road access was likewise deleted from consideration for Point Thomson during the Conceptual Engineering phase. As a result of the Badami and Alpine developments, there is considerable experience in operating and supporting such a remote facility, although specific details relating to transportation and logistics vary among these facilities.

Another important consideration in the logistics and transportation strategy is the plan to construct large process-facility modules, which can only be transported safely and efficiently to Point Thomson by sealift. Sea barges are typically used to transport large modules[1] and other supplies and equipment to the Alaska North Slope. Air transport is not a realistic option due to the size and weight of these items. Rail and road are not practical due to the remoteness of the site, length of rail/roadway required, and the associated habitat impacts.

Mobilization and supply of the drilling rigs are also important considerations. Again, as with the modules, barge shipment of the rigs and major resupply by sea offer the most cost-effective transportation method and allow the rigs to be available for an early start. Provision of a dock is thus a vital component of the development plan for Point Thomson.

Year-round access is, however, still essential for the project both for routine operations and in the event of an emergency. Air transportation will be used year-round for personnel, materials, and emergency support when there is no ice road and no barge traffic. The proposed airstrip is therefore sized to handle relatively large aircraft (e.g., Hercules C-130) and is located inland to maximize weather operability.

It is anticipated that for the first two years a winter ice road will be required for the construction of the gravel pads and airstrip, pipeline construction, delivery of early infrastructure facilities, and the transport of personnel, fuel, equipment, and materials. Ice roads may also be required in subsequent years to support ongoing drilling and plant operations. During the first two summers, barges will be used extensively, as noted above, for transporting drill rigs, major modules, other equipment, and supplies to the project site.

[1] Large process modules have been selected as the most efficient and economic design to minimize onsite assembly, and to facilitate expeditious commissioning and startup.

Tables 9-1 through 9-4 summarize the current estimated round-trips for marine, aviation, ice road, and infield gravel road traffic. The logistics and transportation plan will be refined as engineering and execution planning progress. This planning process will weigh the relative merits and costs of ice road transportation for major consumables, marine transport, and storage onsite. This will provide additional information on project traffic and specific routings.

9.2 SEALIFT

Large process-facility modules can be transported safely and efficiently only by sealift. Sealift is also the most cost-effective mode of transport for the drilling rigs and will allow them to be available to start drilling as early as possible. The shallow approaches to the Point Thomson area preclude beach landings, which are in any case difficult and costly. Provision of a dock is therefore a vital component of the development plan for Point Thomson.

Because of weather, marine access will be available via the Beaufort Sea only from mid-July through September to a dock to be constructed as part of the project (Figures 9-1 and 9-2). The dock will be connected to the central facilities area by a compacted gravel access road. Sealifts to support construction and drilling are currently planned to take place in the mid-July to September weather windows of 2005 and 2006 (Table 9-1). Additional sealifts could be planned for subsequent years when required to support drilling and operations. The special characteristics of the region demand contractors with suitable registered vessels, experience in similar operations in Alaska, and quality control and environmental procedures of the highest standards.

It is anticipated that the first-year inbound loads will include the drilling rigs, bulk materials and some small modules. Outbound loads will include bulk waste and redundant equipment.

It is anticipated that second-year loads will include the facility modules. The return legs of these deliveries will provide the opportunity to redeploy construction equipment and to remove bulk waste.

9.3 LOCAL MARINE TRAFFIC

In the summers, local barge and small boat traffic will be used as required between the roadheads at Endicott, Prudhoe Bay, and Point Thomson to deliver articles that are too heavy or too large to be shipped by air. This will also provide a timely means for resupply of heavy and large bulk materials, and to remove waste and redundant equipment (Table 9-1).

9.4 AIR TRAFFIC

Air transportation will be used on a year-round basis for personnel, materials, and emergency support during the period when there is no ice road and no sea access. The proposed airstrip therefore will be sized to handle relatively large aircraft (e.g., Hercules C-130) and will be located inland to take advantage of better weather conditions.

Until the airstrip is constructed and commissioned, air traffic will be restricted to helicopters. During this early period, helicopters will also provide the only means for rapid medical evacuation and emergencies. After the airstrip is commissioned, fixed-wing aircraft will be the normal route for deployment and rotation of personnel, including emergency medical evacuation.

After construction, aircraft will be the only means of transport in and out of the Point Thomson Unit except during the summer weather window when sea access is available. Preliminary estimates anticipate that several helicopter trips per week in addition to daily flights by other aircraft will be required to support operations activities. During the construction phase of the project numerous flights per day, either by helicopter and/or fixed-wing aircraft, will be required to support activities. The numbers of flights will depend on the activities and the extent of infrastructure in place (Table 9-2). Helicopters may also be required for emergency evacuation during pipeline construction.

9.5 ROAD TRAFFIC

The Badami development approximately 22 mi to the west was also developed as a remote facility with no permanent road access due to environmental impact concerns related to a permanent gravel road and to the high costs of a road, in particular, the need to construct bridges over the major rivers such as the east channel of the Sagavanirktok. Consequently, permanent road access was likewise deleted from consideration for Point Thomson during the Conceptual Engineering phase. However, roads will be needed to provide the essential link between the various elements of the facility (i.e., the CPF, the East and West Well Pads, the airstrip, and the gravel mine).

Truck traffic provides the most effective and efficient method of delivering the equipment and material necessary to construct the required infrastructure and to prepare the wellhead and processing sites. The roadhead at Endicott provides an all-year connection to the existing road system for normal truck and bus traffic. Starting in late November 2004, the project will construct a sea-ice road from Endicott to Point Thomson for deploying construction equipment, personnel, camps, and material. These will be mobilized in increments from Endicott as the infrastructure is developed (Table 9-3). A sea-ice road will be rebuilt the following year to provide similar road access to complete the initial project development (preliminary drilling) and to provide a route out for redundant equipment (Table 9-3).

9.6 INFIELD VEHICLE TRAFFIC

Vehicle traffic will take place on the infield roads as construction of the roads is completed. During summer facilities construction and installation activities, numerous daily vehicle trips can be expected on the infield gravel roads between the pads (Table 9-4).

TABLE 9-1
MARINE VESSEL TRAFFIC SUMMARY

MARINE TRAFFIC	NUMBER OF ROUND TRIPS											
	2005			2006			2007			2008		
	July	Aug	Sep	July	Aug	Sep	July	Aug	Sep	July	Aug	Sep
Barge (Fuel)[1]		1			1			1			1	
Barge (North Slope Coastal)[2]	9	36	36	8	27	27	7	28	28	4	16	5
Barge (via Mackenzie River)[3]												
Large Barge (Sealift)					9							
Other Vessels[4]	11	2	2	3	10	2	1	4	2	1	4	2
Total	**20**	**39**	**38**	**11**	**47**	**29**	**8**	**33**	**30**	**5**	**21**	**7**

NOTES:

1. Does not include lighter barge trips.
2. Chemicals represent 4% of the overall trips.
3. There is a possibility that some trips may come from the Mackenzie River.
4. Mobilization of ACS fleet, bathymetric survey, sealift assist tugs and screed barges.
5. After 2008, assume 6 Coastal Barge round trips per year (in August) for the life of the facility.
6. After 2008, assume 6 Other Vessel round trips per year (in August) for the life of the facility.
7. After 2008, assume 1 Fuel Barge round trip per year (in August) for the life of the facility.
8. All barges will be single tow (i.e., no tandem tows).
9. Return trips from Point Thomson may have some tandem tows.

TABLE 9-2
AVIATION TRAFFIC SUMMARY

TRAFFIC	NUMBER OF ROUND TRIPS															
	2005				2006				2007				2008			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
POINT THOMSON																
Helicopter (Bell 412)	10	39	10			198	232									
Small Passenger Aircraft (Beech 1900)			166	207	192	12	3	253	177	155	142	153	153	120	97	74
Medium Cargo Aircraft (DC-6)				6				12	12	12	12	12	12	12	12	12
Large Cargo Aircraft (C-130)				1				1	1	1	1	1	1	1		
TOTAL FOR POINT THOMSON	**10**	**39**	**176**	**214**	**192**	**210**	**235**	**266**	**190**	**168**	**155**	**166**	**166**	**133**	**109**	**86**
BADAMI																
Small Passenger Aircraft (Beech 1900)	100	69	20	5	66	31	5									
Large Cargo Aircraft (C-130)				1												
TOTAL FOR BADAMI	**100**	**69**	**20**	**6**	**66**	**31**	**5**									

NOTES:

1. After 2008, assume 3 Small Passenger Aircraft (B-1900) flights per week for the life of the facility.
2. After 2008, assume 16 Medium Cargo Aircraft (DC-6) flights per year for the life of the facility.
3. After 2008, assume 4 Large Cargo Aircraft (C-130) flights per year for the life of the facility.
4. It is likely that Helicopter trips may be required periodically through the life of the project but cannot be predicted at this time.
5. Small Passenger Aircraft for personnel billeted at Badami is required to support ice road, gravel, and pipeline construction.

TABLE 9-3
ICE ROAD TRAFFIC SUMMARY

ICE ROADS TRAFFIC	NUMBER OF ROUND TRIPS							
	2005				2006			
	Jan	Feb	March	April	Jan	Feb	March	April
General Cargo (Trailers)	63	350	429	188	25	63	63	31
Storage Tanks			13					
Truckable Modules			75	45		50	50	15
Fuel (Tankers)	119	106	254	84	94	118	281	89
Chemical (Tankers)								
Pipeline Construction					113	216	313	125
Drilling					25	156	163	38
Equipment Mobilization	114	146	13					
TOTAL	**295**	**602**	**783**	**317**	**256**	**603**	**869**	**298**

NOTES:

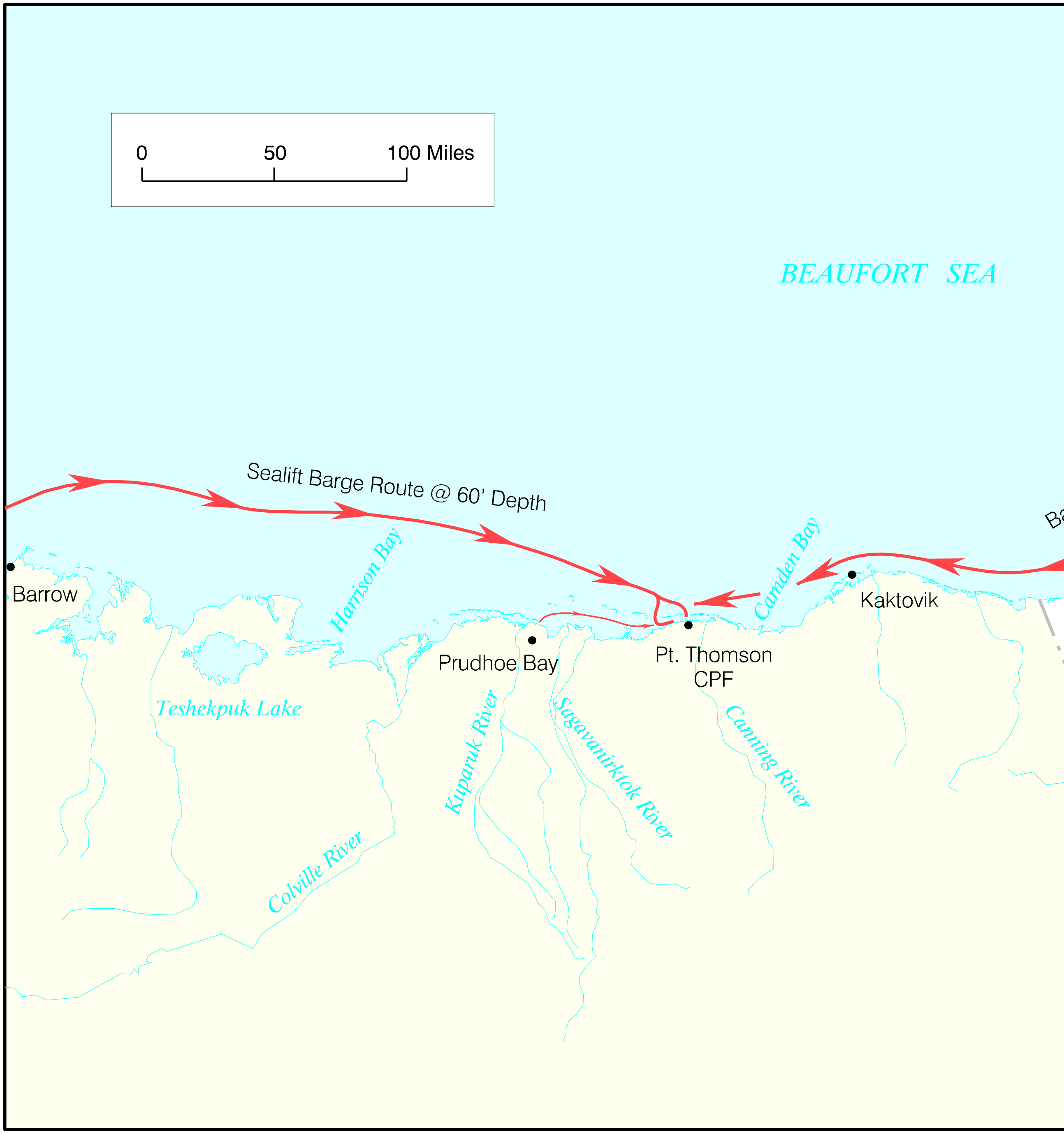
1. No ice roads are currently planned for after 2007 (although ice roads may be used for drill rig demobilization as an option in 2008).
2. Truckable module trips include support vehicles.
3. Fuel transported in January 2005 fills Badami tank.

TABLE 9-4
INFIELD GRAVEL ROAD TRAFFIC SUMMARY

GRAVEL ROADS	NUMBER OF ROUND TRIPS													
	2005		2006				2007				2008			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
East Road - Drill Site Facility Construction		1500	2250	2250	2250	1500								
East Road - Drilling/ Operations	563	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1200	225
West Road - Drill Site Facility Construction		1500	2250	2250	2250	1500								
West Road - Drilling/ Operations	563	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1688	1200	225
Airstrip Road - After Construction	300	900	900	900	900	900	900	900	900	900	900	900	450	450
Total	**1425**	**7275**	**8775**	**8775**	**8775**	**7275**	**4275**	**4275**	**4275**	**4275**	**4275**	**4275**	**2850**	**900**

NOTES:

1. From 2009 until 2037, assume 30 roundtrips per month to each well pad.
2. From 2009 until 2037, assume 30 trips per month to the airport\mine site.
3. Roundtrips do not include traffic related to gravel construction of the infield road system and pads.

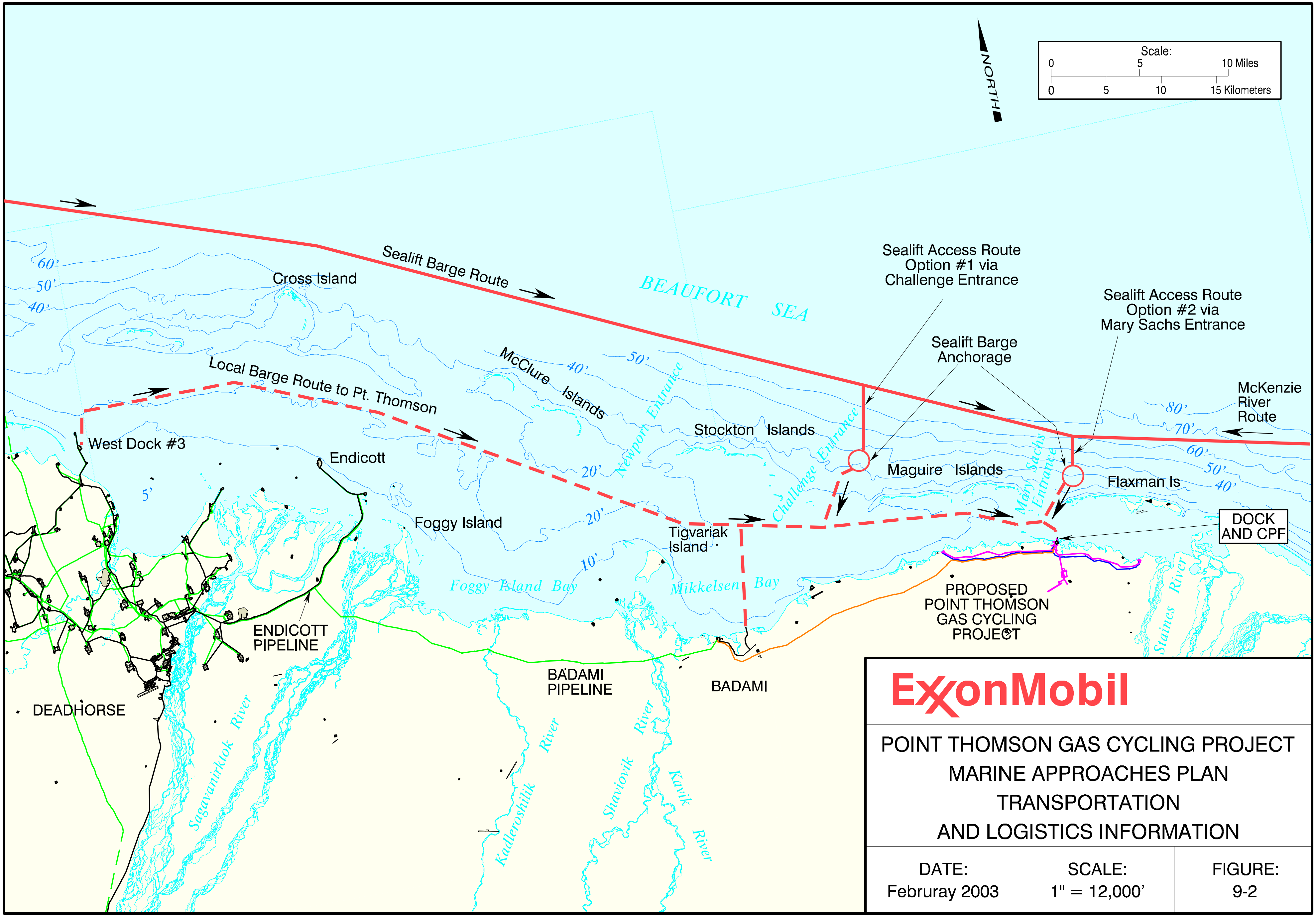


ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
MARINE APPROACHES PLAN
TRANSPORTATION AND
LOGISTICS INFORMATION

DATE:	SCALE:	FIGURE:
February 2003	1" = 60 Miles	9-1

ex14745_9-1.dgn



ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
MARINE APPROACHES PLAN
TRANSPORTATION
AND LOGISTICS INFORMATION

DATE:	SCALE:	FIGURE:
Februray 2003	1" = 12,000'	9-2

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1.0 INTRODUCTION

ExxonMobil Development Company (ExxonMobil) has prepared this Project Description to support the Environmental Impact Statement (EIS) process, as well as state, federal and North Slope Borough (NSB) permitting processes, associated with the Point Thomson Gas Cycling Project. The document is intended as a core (controlled) reference that describes the major design, construction, and operational features of the project. The Project Description will be issued as a series of revisions as project engineering and definition progress at key intersections of the engineering, EIS, and permitting processes. The Project Description is designed to ensure that all reviewers (state, federal, local and the public) have the same information and level of detail to assess the proposed project.

Revision B (Rev. B) of the Project Description as a draft has been produced to provide the agency EIS team and their third-party contractor with the current project design features and development concept as envisaged at the time of preparation of the Preliminary Draft EIS. Rev. B reflects the design of the project near the completion of preliminary engineering. It is also intended to provide project information to support pre-application process discussions that ExxonMobil has entered into with federal and state agencies and the NSB. Further, it will be the core support document for state and federal permit applications scheduled to be submitted to the regulatory agencies in the spring of 2003. Rev. B draws upon Rev. A of the Project Description which was issued on September 23, 2002, at the start of the EIS process, and updates information to the extent ongoing engineering studies have further defined the development concept. Rev. B describes ExxonMobil's base case project design as currently envisaged. Also, Rev. B, like Rev. A, does not detail the extensive environmental and safety mitigation measures already incorporated into the project design (please refer to *The Point Thomson Gas Cycling Project Environmental Report*[1] for details on project mitigation measures).

The basic development concept and design features were developed during Conceptual Engineering, which was completed in 2001, and were further described in the Environmental Report (2001) and its addendum (2002),[2] and in Rev. A (2002). The concepts and features have not changed substantially since. Currently, it is envisaged that the basic project features such as the location of the facility and well pads, and of the export pipeline route, will remain essentially the same.

Where appropriate, this Project Description contains comments on the level of project-scope definition to provide an understanding of where continuing engineering work will provide further

[1] URS Corporation (2001). *Point Thomson Gas Cycling Project Environment Report.* Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 30, 2001.

[2] URS Corporation (2002). *Point Thomson Gas Cycling Project Environmental Report Addendum.* Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 31, 2002.

definition over the next 12 months or so. Those comments draw attention to project features that may change as a result of completion of Preliminary Engineering. The principal changes between Rev. A and Rev. B include expansion of the central pads (increase of about 10 acres) due to results from safety studies which resulted in placement of the camp and other manned facilities south of the process facilities. In addition, the East and West Pads have been slightly increased in size (about one acre each) and reoriented. The alignments of the export pipeline and gathering lines have been optimized to avoid ponds and lakes, and to reduce stream crossing lengths. Minor adjustments have been made to the infield gravel road alignments and more detail is provided about stream crossings (three bridges and culverts). More definition is provided about dredging methods, disposal and volumes.

This draft of Rev. B of the Project Description will be made final after consideration of comments and to reflect resolution of any project issues in time to support various permit applications. The final Rev. B could be included as an appendix to the Draft Environmental Impact Statement (DEIS) at the Environmental Protection Agency's (EPA's) direction. Rev. B will also support major permit applications to be submitted to the State of Alaska and NSB and for the Alaska Coastal Management Program (ACMP) consistency review process that should be initiated shortly thereafter.

This draft of the Project Description includes two appendices, which have been added since the issuance of Rev. A. Appendix A provides an overview of rehabilitation activities (subject to owner approval) for the old gravel exploration sites in the Point Thomson Unit. The inclusion of this summary relates to the fact that the Point Thomson Gas Cycling Project, if progressed, affords a logistical opportunity to conduct rehabilitation work and, in some cases, reuse of the gravel. Some of the pads were constructed before implementation of Section 404 jurisdiction on the North Slope by the U.S. Army Corps of Engineers (Corps), and thus the rehabilitation obligations for these pads rest primarily with the lessor, the State of Alaska, Department of Natural Resources (DNR). Rehabilitation plans for two of the pads subject to Corps permits were submitted to the Corps in January 2003. Another site with a Corps permit is the Point Thomson No. 3 pad, which is planned to be incorporated into the Central Facilities/Central Well Pad.

Appendix B provides a draft mining and rehabilitation plan for the proposed Point Thomson gravel mine site. This plan will be required as part of ExxonMobil's submittal to the DNR for a Material Sales Contract.

1.1 PROJECT OWNERS

ExxonMobil proposes to develop the Thomson Sand reservoir in the Point Thomson Unit located east of Prudhoe Bay, Alaska. The Point Thomson Unit is composed of multiple state leases with different ownerships. ExxonMobil is the Unit Operator and has a working interest in the Unit of approximately 36 percent (%). Other major working interest owners include: BP Exploration Alaska, Inc. (~31%), ChevronTexaco (~25%) and ConocoPhillips (~5%). Other minor interests comprise the remaining 3%.

1.2 PURPOSE AND NEED

1.2.1 Purpose of the Project

The purpose of the proposed project is to produce gas condensate from the Point Thomson Unit and deliver that condensate to the Trans Alaska Pipeline System at Prudhoe Bay for shipment to market. This Project Description provides a summary of the current development concept, which has been selected based on engineering, economic, and environmental evaluations conducted during Conceptual Engineering.

1.2.2 Need for the Project

Development of this resource will help the United States meet domestic energy demand. Initial average annual production of condensate is expected to be approximately 75,000 barrels (bbl) per day. It is estimated this project could sustain economic production for 30 years or longer.

Through taxation and creation of jobs, the Point Thomson Gas Cycling Project will also provide economic benefits to the state and local communities including the NSB. This will include both temporary jobs during drilling and construction, and long-term jobs supporting permanent operations. Over the life of the project, significant benefits will accrue to the state and NSB through the payment of royalties, severance, income, and *ad valorem* taxes.

1.3 PROJECT SAFETY, HEALTH, AND ENVIRONMENTAL (SHE) OBJECTIVES AND STRATEGIES

ExxonMobil's primary SHE objective is to deliver exemplary safety, health, and environmental performance by providing a workplace free from accident and illness. Goals of this objective are no lost-time incidents, and overall safety, health, and environmental performance that equals or exceeds the best of international operators.

Strategies to ensure flawless execution of this objective include:

- Employing contractors experienced in the Alaskan North Slope environment, and keeping scope and execution approach within their proven capabilities;
- Learning from experience of prior projects, particularly those on the North Slope;
- Leveraging project management resources via an Engineering Procurement Construction Management contractor;
- Using proven ExxonMobil project management systems and practices;
- Engaging co-venturers via ongoing consultation and formal reviews;
- Including experienced personnel from co-venturers in the project team;
- Focusing on interface management and emphasizing ExxonMobil's high business ethical standards; and
- Implementing sound, verifiable business controls.

There are a number of design and operational features of the project that are planned to protect the environment and lower capital costs of the development including:

- Shore-based extended reach drilling (ERD) to reduce the number of well pads;
- Use of the existing Badami and Endicott sales oil pipelines to transport condensate to the Trans Alaska Pipeline System (TAPS);
- No permanent roads to Badami or Prudhoe Bay infrastructure;
- Use of existing exploration pads and gravel where technically and economically feasible;
- Zero discharge policy for drilling wastes;
- Class I (Industrial) injection well for underground disposal of most waste streams including drilling waste, produced water, and camp discharges;
- Use of existing and new gravel mines at Point Thomson for fresh water sources; and
- Timing and/or routing of marine support operations to minimize potential disturbance to subsistence hunters and whaling crews.

1.4 PROJECT SUMMARY

The Point Thomson Unit is located on the North Slope of Alaska immediately west of the Staines River, approximately 22 miles (mi) east of the Badami Development (Figure 1-1). Thomson Sand is a high-pressure gas reservoir that was discovered in 1977. The reservoir is estimated to contain more than 8 trillion cubic feet of gas and over 400 million stock tank bbl of recoverable condensate.

The Point Thomson Unit owners are proposing to develop this reservoir with a "gas cycling" project. A gathering pipeline system will collect production from well pads located on the eastern and western margins of the reservoir and deliver the three-phase stream to the Central Processing Facility (CPF). Gas, water, and hydrocarbon liquids (condensate) will be separated from the three-phase stream at the CPF. Residue gas[3] will be reinjected into the reservoir at the Central Well Pad (CWP) located near the CPF. A small amount of gas will be used to supply fuel for the facility. Produced water will be reinjected into one or more disposal wells at the CWP.

Condensate is the hydrocarbon liquid that condenses from the produced gas as pressure and temperature fall below original reservoir conditions during production and surface handling (gathering and processing facilities). The separated condensate will be dehydrated and stabilized at the CPF to meet pipeline specifications.

The recovered hydrocarbon condensate will be shipped to market through a new 22-mile export pipeline that will extend from Point Thomson to the Badami Development. From there, it will tie into the existing Badami and Endicott sales pipelines, with ultimate delivery to TAPS Pump Station No. 1.

Also located at the CPF will be infrastructure designed to support remote operations including temporary and permanent camps; office, warehouse and shop space; normal and emergency power-generating equipment; fuel, water, and chemical storage; and treatment systems for potable and effluent water. An airstrip will be built south of the CPF, and a dock will be constructed adjacent to the CWP. Because no permanent roads between Point Thomson and Prudhoe Bay or other North Slope infrastructure are proposed, the dock and airport facilities are critical to supporting long-term operations.

[3] The term "residue gas" refers to the gas leaving the process facilities and injected into the reservoir. This gas is stripped of condensate and produced water prior to injection, but has not been dehydrated.

10.0 CONSTRUCTION PLAN

10.1 FIRST-YEAR CONSTRUCTION SCOPE

The objective of the first construction year is to have all required drilling support infrastructure in place by October 2005, the proposed start of development drilling. The scope of work for 2005 includes gravel mine-site development; construction of all pads, infield roads, the dock, and the airstrip; and installation and commissioning of equipment required to support drilling operations as detailed in Section 4.0.

Most civil construction is planned to take place during the winter using both sea and inland ice roads to minimize impact to the tundra. Construction will be done using proven conventional arctic onshore equipment and techniques. The majority of civil construction is expected to be complete by April 2005, with the exception of final gravel compaction, shaping, and grading activities during June to July 2005. By late summer 2005, the dock is expected to be fully operational, and the airstrip is expected to be ready for use by the autumn of 2005.

10.1.1 Ice Roads

Depending on weather conditions, construction of a grounded-sea-ice road connecting Endicott to Point Thomson could begin as early as November 2004 and is expected to be completed by late December 2004 to early January 2005. The ice road will be designed, constructed, and maintained to support the first-year construction effort, including transport of heavy equipment, materials, construction camps, and personnel to the site.

An inland ice road will be built from the dock location to the mine site to facilitate mine development activities. Construction of the inland ice road will start once construction equipment can be mobilized to the site in early 2005. Fresh water from nearby permitted lakes will be the primary source for inland ice-road construction. Ice chips may also be used to reduce the amount of free water that is withdrawn from the lakes. Ice road maintenance will continue throughout the winter season.

10.1.2 Mine Site Development

The proposed Point Thomson gravel mine will serve as a major source of gravel for construction of the project facilities and for use as a maintenance stockpile. Other sources will include gravel obtained from nearby abandoned and/or rehabilitated sites. A *Draft Gravel Mining and Rehabilitation Plan* (Appendix B) has been prepared to satisfy the regulatory requirements of State of Alaska and federal resource agencies. The information will be updated with additional details of the rehabilitation approach, proposed performance standards, and needed monitoring as project design, execution planning, and agency consultation progress.

The proposed Point Thomson gravel mine site is located approximately 2 mi south of the Point Thomson Unit #3 exploratory well pad (see Figure 5-2). Preliminary results from a geotechnical investigation conducted in March 2000 indicate the presence of gravel to a depth of 30 ft to 60 ft. The gravel is overlain by an overburden layer of peat and silt that ranges from 3.5 ft and 12 ft thick. A vegetation analysis conducted for the *Point Thomson Gas Cycling Project Environmental Report*[1] indicates that tundra vegetation types potentially impacted by gravel mine development (including overburden storage area and gravel stockpile) will mainly consist of Moist or Dry Tundra and Wet Tundra, and to a lesser degree Moist/Wet Tundra.

10.1.3 Gravel Haul and Placement

Gravel haul and placement activities include gravel mine development to support construction of the roads, pads, airstrip, dock, and gravel stockpile for future road maintenance. Construction activity for field development will begin as soon as possible in the winter of 2004-2005. A sea-ice road will be constructed to mobilize equipment and materials to the Point Thomson area.

During the winter months, the gravel mine site will be developed, and gravel from the mine will be used to construct the field gravel structures (pads, dock, airstrip, infield road system). These gravel structures will have an initial nominal thickness above the tundra of 7-ft side slopes of the roads, pads, and airstrip will be constructed initially to approximately 1.7:1 horizontal to vertical (1.7H:1V). Following thawing, settling, and final grading and grooming during the ensuing spring, summer, and fall, the nominal finished thickness of roads, pads, and the airstrip will be 5 ft, and finished side slopes will be nominally 2H:1V.

Snow and ice will be removed from the tundra surface and stored near the construction sites. Gravel will then be laid, graded, and compacted. Typical construction equipment to be used will include bulldozers, front-end loaders, rollers, trucks, and other heavy equipment. After the spring of 2005, some thawing and subsequent settlement of the gravel structures are expected to occur. These gravel structures will be regraded and recompacted as necessary while they are thawing in the summer of 2005.

Most of the heavy construction equipment will be demobilized from the site via ice road before the ice road is no longer serviceable in late April or early May 2005. Most of the remaining heavy equipment will be demobilized via barge during July and August 2005.

10.1.4 Dock

During the first winter season of construction, the dock will be constructed by flooding as necessary to ground the sea ice, then removing ice in the construction area and disposing of the ice blocks at a suitable location. Gravel will be dumped onto the exposed seabed to form the bulk of the dock structure during the winter. Final dock construction, including installation of the dock hardware (i.e., sheet piles, dock head, etc.), gravel compaction, and shaping for all areas, will continue until the dock is operational in July 2005.

[1] URS Corporation (2001). *Point Thomson Gas Cycling Project Environment Report.* Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 30, 2001.

10.1.5 Channel Dredging and Spoils Disposal

The channel will be dredged from the sea ice during the winter prior to the sealift of process modules. Sea ice over the channel location will be removed in blocks and stockpiled on grounded sea-ice near the shoreline. Excavation will be performed using either a backhoe or a cutter/suction dredge. Spoil excavated by backhoe will be placed in trucks and hauled to permitted disposal areas. Spoil excavated by a dredge will be discharged into bermed areas atop the ice and allowed to freeze, after which it will be excavated and trucked as solid material to permitted disposal areas. Current areas proposed for spoil disposal include the Point Thomson spit, the grounded sea-ice offshore of the Point Thomson spit, the grounded sea-ice adjacent to the dock road, and the lagoon coast adjacent to the east side of the CWP.

Additional dredging operations may be required once the channel is established. However, it is believed that screeding (i.e., flattening of the sea floor without actual disposal of material) before module arrival and occasionally afterwards is more likely to be needed than additional dredging.

10.1.6 Infrastructure Installation

The following infrastructure will be installed during the first year when gravel has been placed and suitably compacted:

- Permanent camp and control room,
- Temporary camp,
- Diesel storage tanks,
- Warehouse,
- Utility module,
- Power plant (diesel generators and main turbine generators), and
- Telecommunication tower.

Spoils associated with module facility piling will be deposited in the overburden pile located near the mine site. Spoils generated from piling installation within one of the abandoned reserve pits on the Point Thomson Unit #3 pad will be segregated and treated and disposed of as a Class II waste.

10.1.7 Pioneer Construction Camp

The pioneer construction camp will be established early in the first winter construction season and located initially on the far east side of the Point Thomson Unit #3 gravel pad. This location allows for gravel-fill and grading activities to progress on the CWP and CPF. Initially, the pioneer construction camp will be provided as a stand-alone unit with its own water and waste treatment utilities. Once the final compaction of the CWP and CPF pads is completed, the pioneer construction camp will be moved to the extreme south end of the CPF. The pioneer construction camp will start using the permanent camp water and waste treatment systems once they are operational and tie-ins can be completed.

10.2 SECOND-YEAR CONSTRUCTION SCOPE

The objective of the second construction year is to install and commission all pipelines, the CPF modules, flare area, well pad facilities, and remaining telecommunications and controls equipment to support first production in the fourth quarter of 2006 or early 2007. Most pipeline construction will be conducted during the winter using both sea and inland ice roads to minimize impact to the tundra. All pipelines will be installed above ground using VSMs.

The construction workforce is expected to peak during the first quarter of 2006 with simultaneous ice road construction and maintenance, drilling operations, pipeline construction, and civil construction works for the CPF modules. Should actual workforce requirements exceed the combined capacity of the construction and permanent camp facilities, camps at existing oil field facilities and in the Deadhorse area may be used for overflow.

Work in the second year will include sealift and installation of the process modules and facilities at the East and West Well Pads, and commissioning and start-up of the Point Thomson Gas Cycling Project.

10.2.1 Ice Roads

Construction of the sea-ice road for the second year of construction will be similar to that of the first year. Work will begin in November 2005, weather permitting, with completion in early January 2006. Construction of the inland ice roads for both the infield gathering lines and export condensate pipeline is expected to begin mid-January 2006 based on the anticipated opening date for tundra travel, and should be complete by mid-February 2006.

10.2.2 Pipelines

Pipeline construction is planned to begin mid-January 2006. The scope of work includes the installation of gathering lines from both the East and West Well Pads, high-pressure gas injection lines from the CPF to the CWP Pad, and the condensate export pipeline from the CPF Pad to the Badami tie-in. This work will be performed mostly during the winter using proven conventional arctic onshore equipment and techniques.

The pipelines will be pre-insulated offsite and trucked to the site on ice roads. All other pipeline materials (VSMs, pipe racks, pipe spools, pig launch and receiver skids, etc.) will be prefabricated and trucked to Point Thomson on ice roads beginning January 2006.

VSM and Pipeline Installation

The pipe laying process will commence in January with surveyors staking the VSM installation positions. VSM holes will be drilled and the tailings cleared. Then VSMs will be strung along the pipeline alignment together with the beams. The VSM assemblies will be set in the holes, which are typically filled with sand/water slurry. Spoils associated with VSM installation will be deposited in the overburden pile located near the mine site.

Pipeline road crossings will be installed through casing/culvert that is buried in the roadbed gravel at or above tundra grade. Figure 6-1 illustrates a typical road crossing.

Upon completion of VSM installation on a segment of the pipeline, joints of pipe will be transported to the site, strung along the pipeline alignment, and welded together to form a continuous string. Each weld produced in the field will be examined by non-destructive testing (NDT). The pipeline strings will then be lifted onto the VSMs, with tie-in welds performed and tested by NDT. Applying insulation to the tie-in welds will conclude the pipe laying activities.

Storage and laydown areas may be required in support of pipeline construction. These areas would be ice pads, snow pads, space on existing gravel pads, or space on new gravel pads to be constructed in the Point Thomson Unit.

Valves and Valve Pads

Additional areas may be required for possible valve installation along the pipeline, if valves are found to be required during the detailed design phase. Locations and sizes will be determined as engineering design matures. Any gravel pads needed to support valves will be approximately 5 ft thick and sides will be sloped nominally at 2:1.

Badami Tie-In

The connection to the Badami pipeline will include valve facilities similar to those typically used in North Slope production and may include a heater.

Pig Launching Facilities

Pig launching and receiving facilities will be provided for the export pipeline. There will be a pig launcher at the Point Thomson CPF and a pig receiver at the Badami CPU or on an adjacent pad. Section 6.0 further describes pipeline monitoring and the use of pigs.

Hydrotesting

The export pipeline will be hydrostatically pressure-tested in accordance with accepted industry codes and regulations. The procedures for hydrostatic testing and caliper pigging of the pipeline have not been established to date. If not completed during the winter construction period, these activities may be performed during the summer and fall before the start of production. Three scenarios are being considered:

- Drawing fresh water from local water sources, and filtering and discharging the water to tundra after hydrotest (as authorized under the applicable NPDES permit).
- Using sea water, and filtering and discharging the water back to the ocean after hydrotest (as authorized under the applicable NPDES permit).
- Using a glycol/water mixture, and disposing of the mixture after use in the Point Thomson disposal well or sending it to Prudhoe or other suitable facility for recycling.

10.2.3 Truckable Skids

The smaller facilities and infrastructure to be installed before the sealift of major facilities in 2006 will be prefabricated and assembled into truckable skids. These skids may either be trucked to Point Thomson via ice road in the winter or barged to the site in summer. Examples of equipment and facilities delivered in this fashion include:

- Pipe rack modules,
- Well metering/manifold skids,
- Pig launcher/receiver skids,
- Well lines,
- Methanol tanks and injection skids,
- G&I module,
- Control systems, and
- All yard piping and electrical.

Concurrent construction and drilling activities will take place during installation of the well pad modules. The plan is to have as much equipment installed as feasible prior to the arrival of the CPF modules to maintain an efficient schedule and use of onsite construction workforce.

10.2.4 Commissioning

Process modules will be sealifted and are expected to arrive at the Point Thomson dock by mid-August 2006, assuming timely open-water access to the Beaufort Sea. Three months have been allocated as the minimum time needed to install and commission the first production train to support first production startup as early as the fourth quarter, 2006. The facility will be in full production when the drilling program is completed.

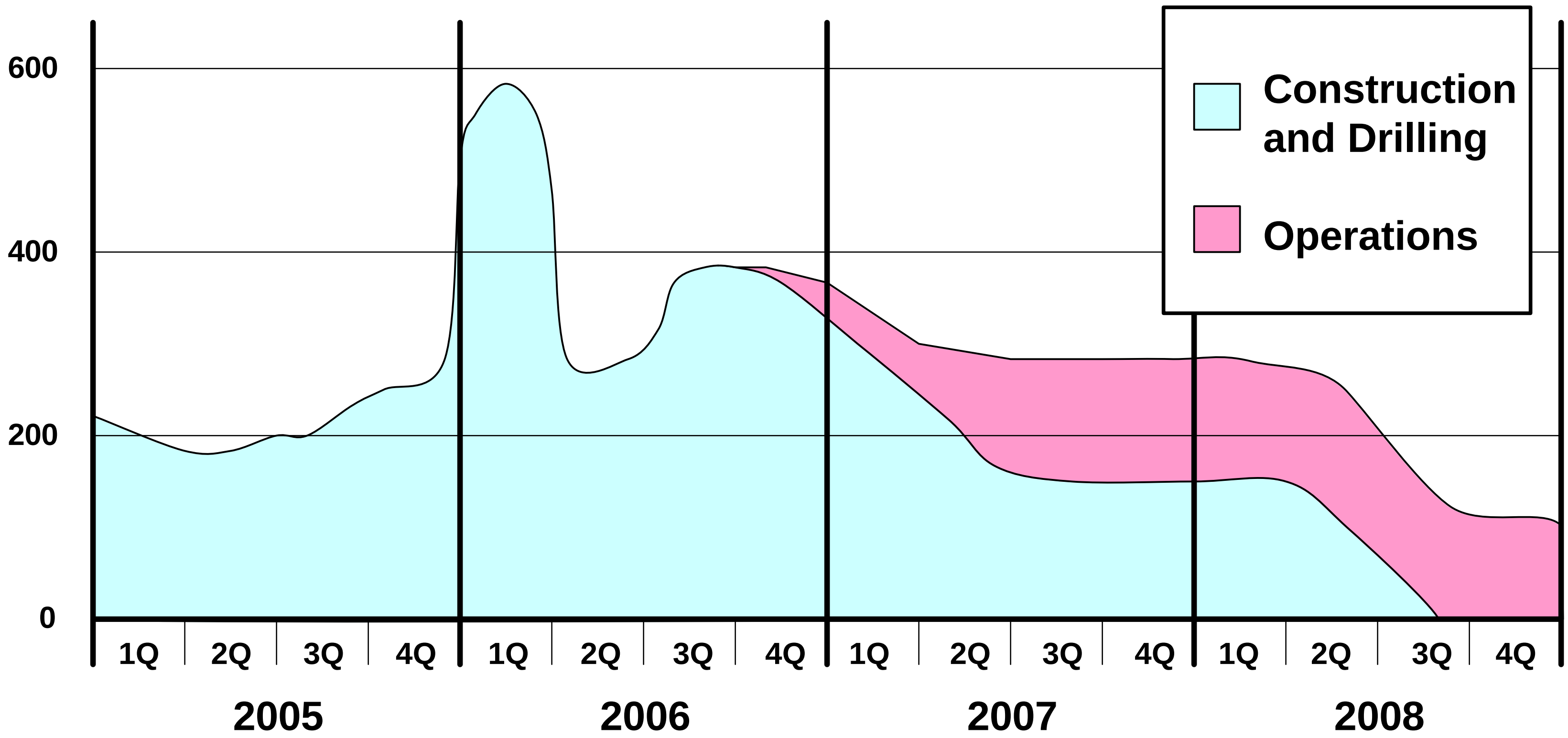
11.0 WORKFORCE

11.1 CONSTRUCTION AND DRILLING

The preliminary total workforce requirement during construction and drilling is expected to peak at more than 500 people (Figure 11-1). This peak is expected in the first quarter 2006 when simultaneous drilling operations, ice road construction, pipeline construction, and civil construction works for the CPF modules occur. Due to the diverse types of work being conducted at multiple locations, the workforce will be billeted at several sites. Bed space at Prudhoe Bay and other existing facilities will be used where appropriate. This plan will minimize travel time to camps as well as mitigate any safety concerns with any portion of the workforce being isolated due to weather.

11.2 OPERATIONS AND MAINTENANCE

The Point Thomson Gas Cycling Project will likely require a permanent workforce of approximately 40 people for general operations and 100 people or more during special work programs (e.g., planned and emergency maintenance operations and workovers). The permanent camp design includes accommodations for about 88 beds to allow for fluctuations in the workforce. These totals are included in the total labor figures above.



ExxonMobil

POINT THOMSON GAS CYCLING PROJECT TOTAL WORKFORCE PROJECTION BASED ON CONCEPTUAL ESTIMATES

DATE:	SCALE:	FIGURE:
February 2003	N/A	11-1

12.0 SPILL PREVENTION AND RESPONSE

The Oil Discharge Prevention and Contingency Plan (ODPCP) is currently being prepared to cover site operations and spill response considerations, and will include four major sections:

- *Response Action Plan:* Describes deployment and response strategies for a remote facility and pipeline system, including, but not limited to, information on safety, emergency action checklists, and flow diagrams and incident reporting requirements.
- *Prevention Plan:* Describes regular pollution prevention measures and programs to prevent spills (for example, discussions of tank and pipeline leak detection systems and discharge detection and alarm systems). This section also covers personnel training, site inspections schedules, and maintenance protocols.
- *Supplemental Information:* Describes the facility itself and the environment in the immediate vicinity of the facility. This section also includes information on response logistical support and equipment (mechanical and non-mechanical) and spill response team training.
- *Best Available Technology:* Presents analyses of various technologies used and/or available for use at the site for well source control, pipeline source control and leak detection, tank source control and leak detection, tank liquid level determination and overfill protection, and corrosion control and surveys.

To achieve the spill response capabilities described in the contingency plan, a range of specialized equipment dedicated to oil spill responses will be staged at Point Thomson. ExxonMobil and Alaska Clean Seas (ACS) will jointly manage pre-staged equipment at the central pads, West Well Pad, East Well Pad and an old exploration staging pad 12 miles west of CFP near Bullen Point. In addition, ACS response vessels will use the Point Thomson dock for quick mobilization for spill response.

ACS will serve as Point Thomson's Oil Spill Removal Organization and primary Response Action Contractor, as approved by the U.S. Coast Guard and the Alaska Department of Environmental Conservation. As they do for the other North Slope oil production operations, ACS technicians will help assemble, store, maintain, and operate Point Thomson's spill response equipment.

The central pads will store most of the facility's oil spill response equipment. The equipment is expected to include a number of containers holding a variety of boom types, oil skimmers, portable tanks, pumps, hoses, generators, and wildlife protection equipment. Snowmachines and other vehicles for off-road access are expected to be stored on the central pads as well. The central pads will include indoor and outdoor facilities to support the emergency response teams at Point Thomson for emergency responses to oil spills throughout the Point Thomson operating area.

Equipment will be pre-staged at the East and West Well Pads and Bullen Point Pad to assist with immediate spill responses there. Each production pad is expected to support a pair of metal container boxes with up to 2,000 ft of containment boom and 800 ft of absorbent boom, among other spill response gear.

To respond to spills into streams and into the marine environment, spill response vessels will be maintained at Point Thomson during open-water seasons. Shallow-draft boats capable of traversing the shallow waters common in the area will be staged at Point Thomson. Additional response vessels, for example an "Island Class" workboat, designed to pull long lengths of oil spill containment boom and operate skimmers are also planned. Small barges for storing and hauling oil recovered from marine oil spills also will be staged with the vessels. For the most part, the vessels and barges would be stored on trailers and then launched from the dock. Many other pieces of equipment, involved in the day-to-day operations and usually unassociated with oil spill responses, will be available to supplement the spill-dedicated equipment.

13.0 WASTE MANAGEMENT

The primary consideration in waste management strategy is compliance with all applicable federal, state, and local government requirements.

For the Point Thomson Gas Cycling Project, several environmental considerations must be factored into the design of the facilities. The waste management strategy must address:

- Disposal of domestic and production waste streams at a small, remote facility;
- Seasonal availability of disposal options;
- Alternatives for waste disposal should a primary system not be available;
- Disposal of wastes uniquely associated with oil and gas production and related processes;
- Changes in types and quantities of wastes during construction and operations; and
- Handling, holding, or storage of waste to facilitate proper disposal.

Waste minimization, product substitution, beneficial reuse, and recycling will be integral parts of the overall waste management strategy for the project.

The following sections describe the general waste management approach that will be followed during construction, drilling, and operation of the Point Thomson Gas Cycling Project. First, the major regulatory considerations are reviewed and then the approach to meet those regulatory requirements is presented. Section 13.2 provides a listing of the kinds of wastes anticipated for the project, with a brief description of the handling approach for the wastes.

13.1 MANAGEMENT APPROACH

13.1.1 General

The strategy for project waste management consists of waste minimization to the greatest extent possible coupled with onsite disposal wherever practical. The design considerations associated with implementing this strategy include site access, onsite storage capability, and regulatory compliance.

Site access mechanisms vary based on the time of year, and may be severely limited with regard to hauling waste offsite during certain portions of the year. During the open-water season, there will be access to and from the facility by seagoing vessels. During the construction phase of the project, it is envisioned there will be access via an ice road in winter.

Hauling of waste offsite is possible, but not necessarily the most effective option. After initial construction, ice roads will not be available for waste hauling during the winter; access to the site will be limited to air transportation during the spring and autumn (breakup and freezeup). During these times, waste that cannot be disposed of onsite will be stored for transportation to other disposal facilities during the summer sea-access windows.

Onsite disposal options discussed in this waste management plan will be used to the fullest extent practical. A permanent incinerator will be located onsite to dispose of non-hazardous burnables (wood, food, etc.). Additional temporary incinerators may be used to deal with the high volumes of burnables during construction and drilling activities. There will also be a permanent sewage treatment facility to treat camp wastewater. This will be used before the disposal well is operational and at times when the disposal well is not available. Initially, the pioneer construction camp will use dedicated water and waste treatment utilities; however, after the camp is moved to the south end of the CPF, it is anticipated that the camp will use the permanent camp water and waste treatment utilities.

Another important factor in design considerations associated with Point Thomson waste management is regulatory compliance. It is the project's philosophy to employ waste minimization techniques to the greatest extent possible in our operations and to prevent discharge of drilling wastes or produced fluids. Two permitting activities are being conducted to achieve this waste management strategy for this project.

The first activity includes permitting two Class I non-hazardous waste disposal well locations on the CWP. A location for a future third disposal well has been identified on the CWP but will not be permitted at this time. Only one Class I disposal well will be drilled and a second permitted in case it is needed in the future. The present plan is to permit and perform annular injection for the disposal of the drilling muds and cuttings at the East, West and Central Well Pads. The Class I disposal wells will be permitted so that all of the drilling waste as well as facility-generated wastewater onsite can be injected down the Class I disposal well. It is not planned at this time to take the drilling muds and cuttings down the Class I well on a routine basis for all wells drilled. The application for the UIC Class I Industrial well permit requests approval to dispose of the maximum anticipated volume of waste generated, including muds and cuttings from all wells drilled. G&I facilities are being incorporated into the execution plan to facilitate handling of drilling muds and cuttings. The G&I system is intended to be mobile with the drilling rig in order to facilitate annular injection of the drilling muds and cuttings. As a contingency, application will be made for two Class II disposal wells (same well slots as the Class I well locations) to ensure that if there are delays in processing the Class I well applications, a Class II well would be available for drilling and Class II wastes.

The second waste disposal permitting activity is that of obtaining the NPDES permit. The NPDES permit application will be submitted to the EPA for review and approval. The permit application will address all anticipated effluent streams. The permit will also include occasional discharges associated with testing the fire control system, as well as sanitary and domestic wastes associated with the camp during the occasional times when a Class I disposal well is not available for injection and prior to the well becoming operational (Figure 13-1). Storm-water runoff will be permitted under the NPDES program as surface drainage, and applicable Best Management Practices (BMPs) will be developed to mitigate storm-water contamination during construction and operations (Figure 13-2). Except for permitted NPDES discharges associated with the Point Thomson facility, no process streams will be designed to discharge into the environment. The majority of facility operations will be located in modules or containment areas where there is little risk of a release.

Disposal options for waste generated during construction, drilling, and operations are based on the strategy and design considerations outlined above and discussed below.

13.1.2 Construction

Winter construction operations will use ice roads and the existing Prudhoe Bay gravel road infrastructure to provide access between the construction sites and existing North Slope waste management facilities. Wastes generated during the initial construction stages of the project, when disposal options are limited at Point Thomson, will be back-hauled to waste facilities for disposal in the Prudhoe Bay area. Wastes generated during early pad and infrastructure construction activities in the summer will be consolidated and stored onsite, and transported by barge to Prudhoe Bay/Deadhorse. Additional options for waste disposal will become available as the drilling and operations phases of the project progress.

13.1.3 Drilling

Due to limitations on available space, onsite disposal options for the disposal of drilling wastes will be used to the fullest possible extent. Onsite disposal options include Class I disposal well, mobile G&I unit assigned to a drill rig, annular injection, and an incinerator. It is anticipated that the Class I disposal well will be the first well to be drilled. The Class I well be authorized to receive all non-hazardous Class I fluids and all Class II fluids.

The Point Thomson G&I facility will be designed to inject ground drill cuttings, waste mud and water from drilling activities. The G&I system will be mobile and assigned to drill rigs located on the CWP, East Well Pad, or the West Well Pad. After the cuttings are processed and slurrified by the G&I system, the slurry will be disposed by annular injection. At completion of the drilling program it will be determined whether the G&I system will be left at the Central Well Pad for injection of materials that would require the system.

Surface gravel from the upper holes is intended to be washed and used for road and pad maintenance, rather than being processed by a G&I unit. At the drill site, the larger rock (1/8-in. and bigger is allowed by permits for other recent projects) will be screened out, washed, and spread on the back slopes of existing pads and roads.

The G&I units will be designed to the capacity to grind the remaining cuttings to a 20-mesh size. Each mill train is capable of grinding approximately 6 cy of rock per hour, which is more than 100% of the volume of material expected. It is estimated that approximately 1.1 cy of rock per hour will be produced from each drilling rig operation at Point Thomson.

Grinding and injecting is generally performed in batches with a fixed volume ground up and converted to slurry for injection. The slurry injection pumps with capacities of approximately 168 gallons per minute and maximum discharge pressures of approximately 5,000 psi are typically used (actual injection pressures of 3,000 psi are normal).

A plant incinerator installed early in the construction process will be used to dispose of wood pallets, mud bags, and other burnable materials. It is likely that the peak use that defines rating and sizing requirements will occur during the construction and drilling phases. Air emissions from the incinerator will meet permit requirements for Prevention of Significant Deterioration (PSD).

13.1.4 Operations

The disposal well, a cuttings G&I unit, and an incinerator will be available as disposal options during operations. Evaluation continues to determine if a G&I unit will be needed to support operations activities. Vessels will be used during the open-water period to transport waste material that cannot be disposed of by these means and must therefore be transported from the facility for disposal. This material will be stored until transport options are available or will be carried to Prudhoe Bay/Deadhorse using alternate means of transportation, such as aircraft.

It is anticipated that by the time the operations phase has commenced, the Class I disposal well permit will be in-hand. If the permit has not yet been obtained, Class I fluids will either be reused in the drilling process, back-hauled to existing North Slope facilities, or temporarily stored onsite until the permit is obtained.

The Class I well will require stringent operational and record-keeping requirements as mandated by the EPA. A waste analysis plan, which will include information on waste tracking and waste identification, will be submitted for approval to the EPA before Class I disposal operations begin.

13.2 STORAGE AND DISPOSAL OPTIONS

The following discussion of waste disposal options for specific wastes addresses the three phases of the Point Thomson Gas Cycling Project (construction, drilling, operations) unless otherwise identified by waste type.

13.2.1 Non-Hazardous Solid Waste

Non-hazardous solid waste consisting of trash, food wastes, wood debris, metal debris and construction debris will be segregated onsite at main collection points into:

- Burnables (trash, food wastes, wood debris, etc.);
- Landfill (non-burnables); and
- Recyclable metal.

The waste will then be stored in designated dumpsters. Burnables will either be incinerated at Point Thomson in a permitted incinerator or be transported to processing facilities in Deadhorse. Landfill material and recyclable metal will be transported to permitted facilities (e.g., Deadhorse) for processing.

13.2.2 Oily Trash

Non-hazardous oily trash consisting of oily rags and sorbents, drained oil filters, rags and sorbents with non-hazardous chemicals, oily pit liners, empty oil and grease containers, and oily debris will be collected and stored onsite in designated lined and labeled dumpsters. The waste will be incinerated onsite in a permitted incinerator or transported to Deadhorse facilities for processing.

13.2.3 Oily Solids from Vessels

During the facilities' operations phase, oily solids from process tanks, vessels, and lines will require handling and disposal. The oily solids will be slurried and disposed of in the disposal well or transported to other North Slope facilities for injection in an approved disposal well. These types of solids are exempted from hazardous waste determination and may not be tested prior to disposal.

13.2.4 Drilling Mud

Drilling mud generated during drilling operations at Point Thomson will either be disposed of in the permitted Class I and/or Class II disposal well or through annular injection. If these options are not available (e.g., for the first well drilled), mud will be stored onsite until disposal is available or transported to existing Prudhoe Bay or Badami facilities for disposal.

13.2.5 Drill Cuttings

Presently it is envisioned that the gravel portion of the surface hole drill cuttings generated during drilling operations will be washed and stockpiled on the pad for future use. The finer fractions from the surface hole drill cuttings and the below-surface hole cuttings will be ground and injected as a slurry into the disposal well or into a well annulus. Cuttings may be temporarily stored until a disposal option becomes available.

13.2.6 Non-Hazardous Class I Fluids

Until onsite Class I fluid disposal is available, non-hazardous waste fluids generated during construction will be transported to existing North Slope facilities for disposal under third-party use agreements. The non-hazardous fluids include certain chemicals, tank rinse, sump fluids, and contaminated snowmelt. Approval from the disposal facilities will be obtained prior to transport. Temporary onsite storage consisting of portable tanks or tank trucks may be necessary until approvals are acquired.

After initiation of the drilling phase of the Point Thomson Gas Cycling Project, fluids will be evaluated for reuse in the drilling process. The Class I well will be used for disposal of non-hazardous Class I fluids after the Class I permit is obtained. All materials will be documented to be non-hazardous prior to disposal.

13.2.7 Class II Fluids

Class II fluids, defined as those fluids originating in the well bore (such as produced water, well returns from workovers, and fluids generated from process vessels) will be disposed of in the disposal well. These types of fluids are exempted from hazardous waste determination and will not be tested prior to injection. Certain fluids, such as mud and slurried cuttings, may be disposed of through annular injection.

All volumes of materials injected for disposal will be documented to meet agency reporting requirements.

13.2.8 Recyclable/Reusable Fluids

All fluids consisting of used oils, diesel, glycol, and other hydrocarbons, or chemicals, determined to be recyclable or reusable materials in accordance with state and federal regulations, will be managed as such and not as waste products.

Used oil will be segregated from other materials and stored in containers marked with the words "Used Oil." All used oil will be tested to verify acceptability for recycling and inserted into the export stream (e.g. condensate or crude oil) at Point Thomson or other North Slope facilities. Testing may consist of a halogens screen and flash point test. Used oil generated during the construction phase will be transported to existing facilities for insertion into the export stream after testing. Used oil generated from a known source with known inputs (such as from a turbine within the facility) will be evaluated for recycling based on Material Safety Data Sheet (MSDS) information.

During the construction and drilling phases of the project, used oil will be disposed of in an approved manner. All other materials determined to be potentially reusable will, at a minimum, be visually inspected. Suitable materials will be labeled with the container contents and stored until reused. Testing will be conducted on fluids found to be questionable. All materials determined to be unsuitable for reuse or recycling will be managed as a waste material and characterized for disposal. Used oil that cannot be reused or recycled will be managed as a waste and disposed of in an appropriate manner, either as a Class I liquid or as a hazardous waste.

13.2.9 Hazardous Waste

All wastes determined to be hazardous according to the Resource Conservation and Recovery Act (RCRA) will be managed in accordance with all federal and state guidelines. Hazardous waste will be placed in drums or other approved containers for storage. All containers will be marked with the contents, the date generated, and the words "Hazardous Waste." All containers will be stored in a containment area with an impermeable liner. All hazardous waste will be transported to management facilities located in the Lower 48 for recycling and/or disposal.

RCRA compliance files will be maintained onsite and will include information on waste identification, transportation manifests, and all correspondence with state and federal agencies regarding hazardous waste shipment.

13.2.10 Gray Water

Gray water generated from construction, drilling, and facility operations will be injected into the disposal well, once it is available. Prior to commissioning of the disposal well and during periods when the disposal well is unavailable for injection, gray water will be discharged through an outfall regulated by an NPDES permit after proper treatment by the sewage treatment facility (Figure 13-1).

13.2.11 Sewage Sludge

Sewage sludge generated from camp operations will either be injected down the Class I disposal well, when it is available, or back-hauled to existing North Slope facilities for treatment and disposal.

13.2.12 Incinerator Ash

Ash generated from waste incinerators will be characterized in accordance with RCRA guidelines. Ash determined to be hazardous will be managed as hazardous waste. Ash determined to be non-hazardous will be transported to Deadhorse facilities for processing, or slurried and injected into the onsite disposal well.

13.2.13 Contaminated Snow

Contaminated snow generated from spill cleanup operations during the operations phase of the project will be melted onsite and injected into the disposal well or disposed of by other regulatory approved methods. Only non-hazardous meltwater will be disposed of in the well. Snow with the potential for testing as hazardous will be segregated and melted in a designated bin to recover material for reuse.

Contaminated snow generated from spill cleanup operations during the construction and drilling phases of the project may be temporarily stored at the point of generation and/or at a central storage location, or transported as generated to disposal facilities. Storage areas will consist of impermeable containment. During drilling, the snow may be melted onsite and reused as a fluid in the drilling process or injected into the disposal well as either a Class I or Class II fluid. Until the Class I permit is obtained, snow contaminated with fluids not suitable for melting and reuse in the drilling process will be transported to existing North Slope facilities for disposal.

Storage logs will be maintained onsite for all material added to containment areas. The information documented will include volume, material spilled, date of generation, and certification that the material is non-hazardous.

Snow contaminated with gravel, soil, trash, wood, and other debris will be staged onsite and melted by natural or mechanical means. All resulting debris will be recovered and disposed of properly.

13.2.14 Contaminated Gravel

Contaminated gravel and soil generated from spill cleanup operations will be remediated onsite or at other North Slope facilities. Gravel will be recovered for pad maintenance or other uses. If needed, storage areas will consist of impermeable containment and will be constructed in accordance with Alaska Department of Environmental Conservation guidelines for storage of contaminated material. Remediation may consist of incineration, washing, and injection or other approved technology.

Storage logs will be maintained onsite for all material added to containment areas. The information documented will include volume, material spilled, date of generation, and verification that the material is non-hazardous.

13.2.15 Naturally Occurring Radioactive Material

Naturally occurring radioactive materials (NORM) may be present in some production facilities and will be properly identified and handled. Well tubulars and piping will be scanned for NORM when they are pulled from a well or removed from the process. Piping and tubulars that show indications of NORM will be stored onsite. When enough NORM-active pipes have been accumulated, they will be transported to a Prudhoe Bay area facility specially designed for NORM removal using high-pressure water. The resultant water-based slurry will be injected in a Class II disposal well.

13.2.16 Special Cases

The items listed below may be used during the construction and drilling phases of the development and, if so, will be managed in accordance with the following procedures indicated for facility operation.

- ***Empty Drums:*** Due to waste minimization efforts and limited storage space, drum stock will be kept to a minimum. Empty drums will be stored onsite and back-hauled to existing North Slope facilities for flushing, crushing, and processing. Empty drum storage will be in secondary containment if there is any threat that residual fluids will be released from the drums or if the physical condition of the drums will result in the contamination of snow or gravel (i.e., the drums are "dirty").
- ***Aerosol Cans:*** Aerosol cans that are completely empty (nothing is heard or felt when shaken) will be placed in a separate non-burnable container or dumpster. Non-empty cans will be punctured and the contents collected using a drum-mounted can crusher. Punctured cans will be placed in the non-burnable container, and the contents will be characterized for disposal. Aerosol cans will not be emptied into facility sumps.
- ***Lead Acid Batteries:*** Lead acid batteries will be segregated from waste streams and stored inside until transported to Deadhorse for exchange for new batteries with the supplier. Lead acid batteries that are not standard size (e.g., from heavy equipment) may not be accepted by suppliers for exchange and may have to be transported to recycling facilities in the Lower 48.
- ***Medical Waste:*** Medical waste will be stored in containers marked "Medical Waste" and will be shipped offsite to a regulated medical waste incinerator for disposal.
- ***Fluorescent Light Tubes:*** Fluorescent light tubes will be collected, crushed into drums or maintained in original packaging, and sent to recycling facilities in the Lower 48. Crushing will be accomplished by using a manually fed drum-mounted unit, which crushes the tubes and deposits the debris in the drum.
- ***Used Oil Filters:*** Used oil filters will be punctured and hot-drained onsite as generated. The collected oil will be screened for halogens and flash point prior to insertion into the crude stream, and the drained filters will be placed in a separate oily trash container or dumpster.
- ***Radioactive Waste:*** All radioactive waste will be characterized for disposal as generated. Common sources of radioactive waste are exit signs and smoke detectors. These materials will be stored in containers with the contents clearly identified.
- ***X-Ray Fluid:*** X-ray fluid will be processed through a silver recovery unit. The silver recovery cartridge will be shipped to an approved offsite reclaimer. The remaining fluid is non-hazardous after recovery of silver and then can be disposed of properly (e.g., in the Class I well).
- ***Hydrotest Fluid:*** Depending on the composition and previous use of the fluid, the following options may exist:
    - Point Thomson disposal well or other approved facility
    - Discharge under NPDES permit
    - Reuse

14.0 TERMINATION

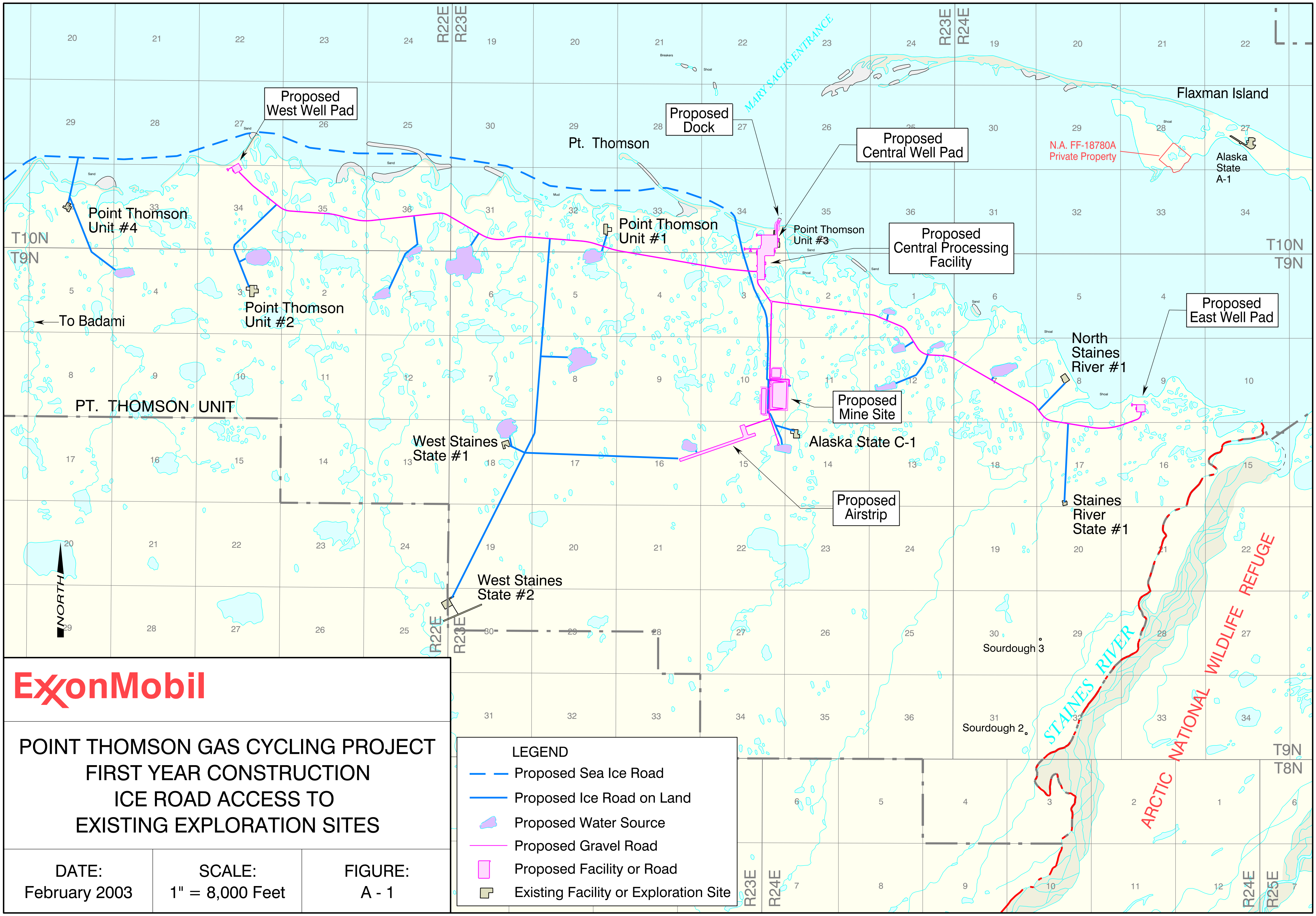
The expected life of the Point Thomson Gas Cycling Project is about 30 years. Abandonment timing will be determined based on the need for the facilities. Detailed abandonment procedures will be developed at the time of project termination. Specific plans will depend on the facilities in place and the specific requirements applicable to those facilities at the time of abandonment.

Abandonment activities will be consistent with lease terms, requirements in the Unit Agreement, permit conditions, and other applicable regulatory requirements. Abandonment plans will be subject to review by multiple agencies, with input from other local, state, and federal agencies, and likely will involve some degree of overlapping authority.

APPENDIX A
EXISTING EXPLORATION SITES

IN PREPARATION

Rehabilitation plans for existing exploration sites will be submitted by the operator of the individual well sites during the near term.



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POINT THOMSON GAS CYCLING PROJECT
FIRST YEAR CONSTRUCTION
ICE ROAD ACCESS TO
EXISTING EXPLORATION SITES

DATE:	SCALE:	FIGURE:
February 2003	1" = 8,000 Feet	A - 1

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APPENDIX B
POINT THOMSON GAS CYCLING PROJECT
MINE SITE MINING AND REHABILITATION PLAN

(T9N, R23E, Sec 10 E ½ SE ¼ & Sect. 11 West 1/2 of SW 1/4; U. M.)

This plan describes the proposed mining and rehabilitation of the proposed Point Thomson Mine Site. This mine site is required to support construction of the Point Thomson Gas Cycling Project located on the North Slope of Alaska. This material site will serve as the primary source of construction gravel for the project, which includes three well pads, a facilities pad, an infield road system, a dock, an airstrip, and stockpiles for maintenance gravel and overburden. The mine site will be located to the south of the Central Processing Facility (CPF), and approximately 2 miles south of the coastline (refer to Figure 5-2). Construction of the Point Thomson facilities will require the extraction of approximately 2,600,000 cubic yards (neat-line measure) of gravel from this mine site.

B.1 EXISTING CONDITIONS

This proposed mine site is located within T9N, R23E, E1/2 SE 1/4 Sec. 10, W 1/2 of SW 1/4 Sec 11, U. M. The site will be located within a 46.5-acre area to the west of an unnamed creek (refer to Figure 7-16). A geotechnical soils investigation was conducted at the mine site location in the vicinity of the proposed mine site in March 2000. The preliminary results of that investigation indicated the presence of gravel to a depth of 30 to 47 ft and overlain by an overburden layer of peat and silt that ranges between 3.5 and 12 ft thick.

The plant community surrounding the site is typical wet sedge tundra, dominated by sedges. Grass, forb and shrub species are minor components of this community. This vegetation is in its natural state and contains no exotic species. Four vegetation types were classified by LGL Alaska Research Associates, Inc.[1] from 19 July 1997 photography based on the Walker (1983)[2] vegetation classification scheme:

- Wet sedge/moist sedge, dwarf shrub tundra complex (IIId)
- Moist sedge, dwarf shrub/wet graminoid tundra complex (IVa)
- Moist sedge, dwarf shrub tundra (Va)
- Moist graminoid, dwarf shrub tundra/barren complex (Ve)

[1] Noel, L.E. and D.W. Funk. 1999. *Vegetation and Land Cover in the Point Thomson Unit Area, Alaska 1998.* Report prepared for Point Thomson Working Interest Owners. Eds. LGL Alaska Research Associates, Inc., Anchorage, AK.

[2] Walker, D.A. 1983. A hierarchical tundra vegetation classification especially designed from mapping in northern Alaska. Pages 1332-1337 in *Proceedings of the Fourth International Conference on Permafrost*. July 17-22, 1983, Fairbanks, AK.

The unnamed creek to the east of the mine site has a narrow channel typical of many of tundra creeks. Ground surface elevations in the area of the mine site slope from southwest (~28 ft mean sea level, MSL) to northeast (~21 ft MSL).

B.2 MINING PLAN

The Point Thomson Gas Cycling Project gravel structures will require approximately 2,600,000 cubic yards of gravel from the mine site. The development pit will be mined on a one-time basis during a winter construction season (refer to Figures 7-16 and 7-17).

B.2.1 Overburden

The overburden will be removed in a north to south direction for 1,900 ft beginning near the access road and extending west for approximately 1,065 ft. Approximately 586,000 cubic yards of overburden will be loosened with explosives, segregated from the gravel, and placed in a stockpile located west of the mine. The stockpile will have an area of approximately 18.80 acres based on dimensions of 1,780 ft in length and 460 ft in width. A temporary silt fence will be constructed at the toe of the stockpile in order to prevent silt-laden runoff from the stockpile. The temporary silt fence will retain meltwater and fines which may wash from the stockpile prior to revegetation.

It is anticipated that the majority of the overburden will remain stockpiled at the site for revegetation of existing or future gravel facilities. Overburden from the Point Thomson Gas Cycling Project mine site will be used during rehabilitation of pre-existing exploration pads within the Point Thomson Unit. Approximately 65,000 cubic yards of overburden may be used during the rehabilitation of new gravel construction currently envisioned within the Point Thomson Unit.

B.2.2 Gravel

The length of the mine site, measured in a north-south direction, is approximately 1,900 ft. Actual gravel mining will be conducted from north to south with the northern portion of the mine being the deepest if required. Blasting will be conducted in 20-ft lifts to loosen the material and to provide 2-inch-minus material for construction. Mining will extend to approximately a point 160 ft west of the creek (refer to Figure 7-19). Gravel extraction within the development pit may be conducted to a maximum depth of 60 ft, depending on the total need and the quality of the material mined. An excavation to yield approximately 2,600,000 cubic yards of gravel would have an average depth of 41 ft, based on an overburden thickness of 8 ft. Excavation to a depth of 60 ft, if required, would yield approximately 3,000,000 cubic yards of gravel. The ANFO bags will be burned on site, in compliance with the regulations of the Bureau of Alcohol, Firearms, and Tobacco. Ash from the bag burning will be tested for the presence of hydrocarbons and hauled to Prudhoe Bay for proper disposal.

Experience at other North Slope facilities indicates that gravel requirements for maintenance during facility life are approximately 15% of the original gravel volume used. A stockpile containing approximately 2,274,000 cubic yards of gravel will be constructed north of the gravel mine. This gravel will be used for road and pad maintenance and to account for any thaw settlement that may occur.

B.2.3 Fresh-Water Reservoir

It is anticipated that gravel mining at the mine site will produce an excavation approximately 40 ft deep, with some areas up to 60 ft deep. The excavation will be converted into a fresh-water reservoir by constructing a diversion structure to channel peak fresh water flows into the excavation from the unnamed stream to the east. The maximum volume of the reservoir would be approximately 527,300,000 gallons, based on the excavation of 2,600,000 cubic yards of gravel. The depth of the reservoir will allow use of the water during both the summer and winter. Typical water uses during drilling, construction, operations, and maintenance include make-up water for drilling mud, tundra ice road construction, ice pads, water for camps and facilities, and dust control.

The diversion structure will consist of a concrete-lined channel with a fish exclusion device and an adjustable weir. The reservoir will be maintained and operated as a water source free of fish. The weir crest will be adjusted during spring break-up to divert high flows during the period of peak stream flow without diverting the base (low water level) flow from the stream. At other times the weir will be maintained at its highest level to prevent fish entry, stream diversion, and any potential for salt-water intrusion during storm surges. It should be noted that storm surge is not expected to penetrate this far south from the coast. The downstream end of the channel will discharge into the reservoir over an area of articulated concrete mats to prevent erosion from the excavation side slope. The weir will be designed to prevent thermal degradation of the permafrost. Figures 7-18 and 7-19 show details of the diversion structure.

B.3 REHABILITATION

This rehabilitation plan addresses revegetation needs to restore plant cover to the exposed gravel and overburden stockpiles. The overburden stockpile will be rehabilitated shortly after mining is completed, and if applicable, exploration site rehabilitation is completed. The gravel stockpile and other gravel structures will be rehabilitated after facility abandonment. Exposed gravel within the excavation will be naturally submerged once the excavation fills with water.

B.3.1 Goals and Objectives

The goal will be to return the stockpiles to natural plant species. The first objective will be leave the mine site in a clean manner. The second objective will be to establish a stand of *Puccinellia borealis* grass to provide cover to areas of barren soil. The third objective will be to allow natural tundra plant species to invade and overtake the seeded grass.

B.3.2 Rehabilitation Approach

Prior to revegetation, the site will be inspected to determine the size of area needing treatment. Soils will be sampled at that time and submitted to a laboratory for testing nutrient availabilities, salinity, and standard soil characterization. An indigenous grass species (*Puccinellia borealis*) will be seeded to the stockpile. This grass is known to establish cover quickly before yielding territory to indigenous plants adapted to the site[3]. It is anticipated that the gravel stockpile will be

[3] McKendrick, Jay D. 2001. Boreal alkaligrass (*Puccinellia borealis*). *Agroborealis* 33(1):16-20.

depleted over the course of the facility life. The remaining gravel will be rehabilitated consistent with the other gravel structures at the end of the facility life.

B.3.3 Drainage and Erosion Control

Drainage from the stockpiles is not an issue. Snow is routinely blown from the top of each pile during winter storms; rainfall events in this climate are not intense. Low perimeter berms around the bases of the stockpiles will divert meltwater and fines which may wash from the stockpile prior to revegetation. The seeded grass will provide protection against soil erosion.

B.3.4 Plant Cultivation

The application of *Puccinellia borealis* will be designed to deliver approximately 10 to 15 pure live seeds per square foot. Seed may be applied with mechanical or hand spreaders. If soil fertility proves inadequate, an appropriate fertilizer application will be given at the time seed is applied.

B.3.5 Soils

Soils will be sampled prior to fertilizing and again at the end of the 5-year monitoring period. During monitoring inspections signs of erosion will be addressed.

B.3.6 Surface Stability

The stability of the stockpile surfaces is not expected to present a problem, based on the stability of a similar stockpile over a 20-year period at the closed Point Thomson Area Material Site.

B.3.7 Performance Standard

The revegetation success will require establishing an initial grass cover to control soil erosion and trap wind-borne native plant seeds. Eventually, the seeded grass stand should die out and be replaced with a complex of indigenous plant species which will colonize and develop a natural tundra community. Revegetation will be considered complete when the percentage of plant canopy cover reaches 10%. It is anticipated that this standard can be achieved 5 years after the initial application of seed.

B.3.8 Monitoring

Each stockpile will be monitored for revegetation success and to check for signs of erosion for a 5-year period after seeding and fertilizing. Monitoring is projected to occur in the second, third, and fifth years after seeding. Vegetation features to be measured include plant species present on site, canopy cover, and plant population densities. Repeat photography will be used to document vegetation aspect changes through time. Plant canopy cover will be measured with the walking point method, and plant densities with a 0.25-square-meter plot frame.

B.3.9 Reporting

Technical reports will be prepared after each field inspection. Plant and soil data obtained will be included in the second, third, and fifth year reports.

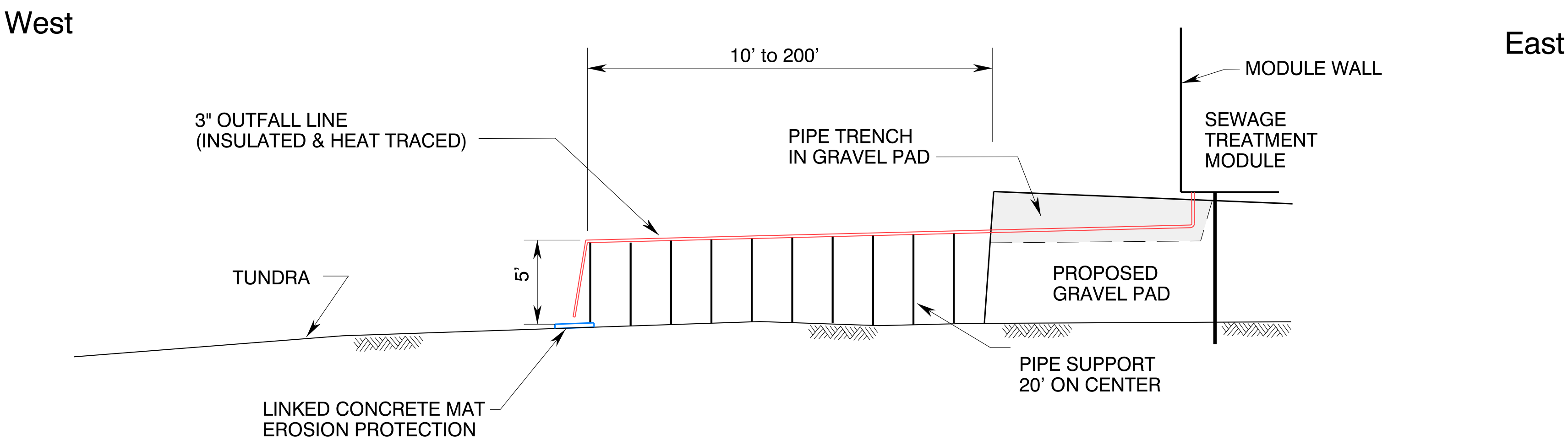
B.3.10 Remedial Action

Appropriate remedial actions will be taken to ensure the revegetation goal (percentage of plant canopy cover) is reached. These actions may include top-dressing, overseeding, and or fertilizing.

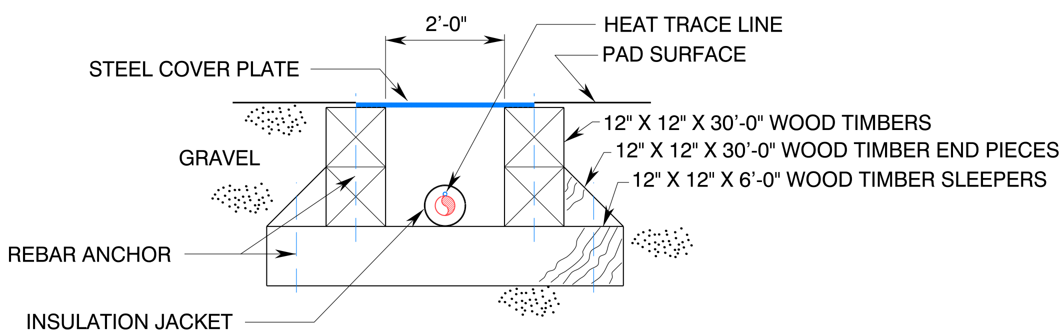
B.3.11 Observed Performance at Similar Site

A similar site located within the Point Thomson Unit was last mined in 1980 and then revegetated. Dr. Jay McKendrick (Lazy Mountain Research, Palmer, Alaska) provided the following observations about the revegetation of the former Point Thomson Area Material Site (old gravel mine site):

> "I inspected the site in 1999 and found the overburden stockpile to be supporting a wide complex of indigenous tundra plant species. Many of these were heavily grazed by geese and caribou, which was evidenced by the aftermath stubble and number of animal droppings and caribou hoof prints on the ground. High ground next to water bodies, such as the flooded mine and stockpile at this location, are often sought by molting geese. The vegetation and vantage point on the elevated ground are desirable for feeding and loafing birds, and the adjacent water provides escape habitat should predators approach. The high ground affords insect relief to caribou during the summer months when insect harassment is at its peak.
>
> "The overburden stockpile lies next to the water-filled pit, and is surrounded on three sides with a gravel berm placed there as part of the original rehabilitation plan. The vegetation on the stockpile consists of a variety of graminoids (grass and sedge species), forbs, and a few willow. It differs from the surrounding vegetation in having a greater plant species diversity and supporting plants adapted to sites drier than that surrounding the site."



SEWAGE OUTFALL PROFILE



SEWAGE OUTFALL TRENCH
DETAIL ON GRAVEL PAD

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
SEWAGE OUTFALL
PROFILE

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	13-1

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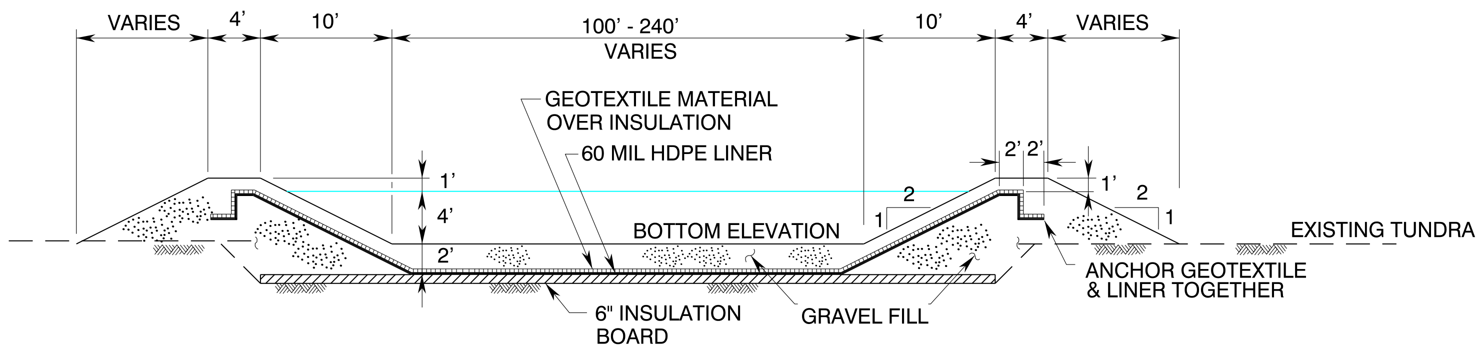
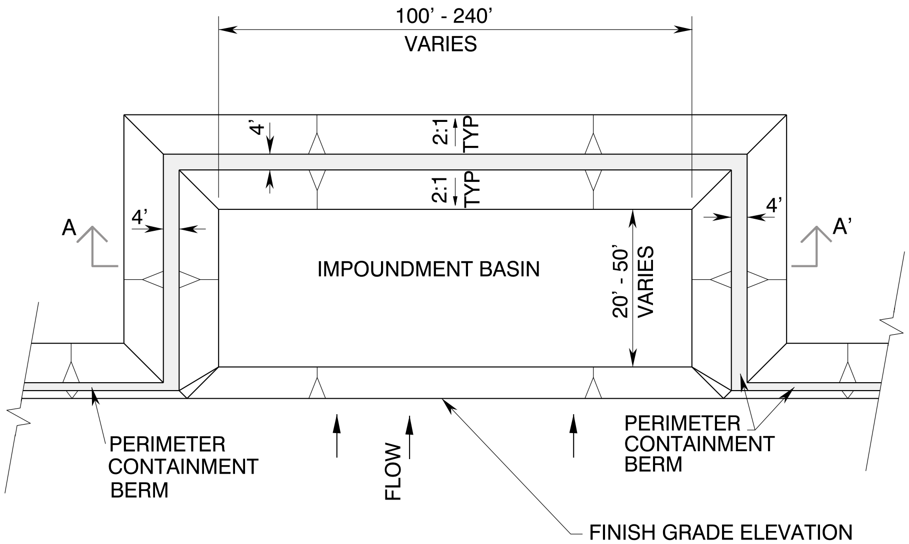


CROSS SECTION A - A'



TYPICAL IMPOUNDMENT BASIN

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
DRAINAGE IMPOUNDMENT BASIN
PLAN AND CROSS-SECTION

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	13 - 2

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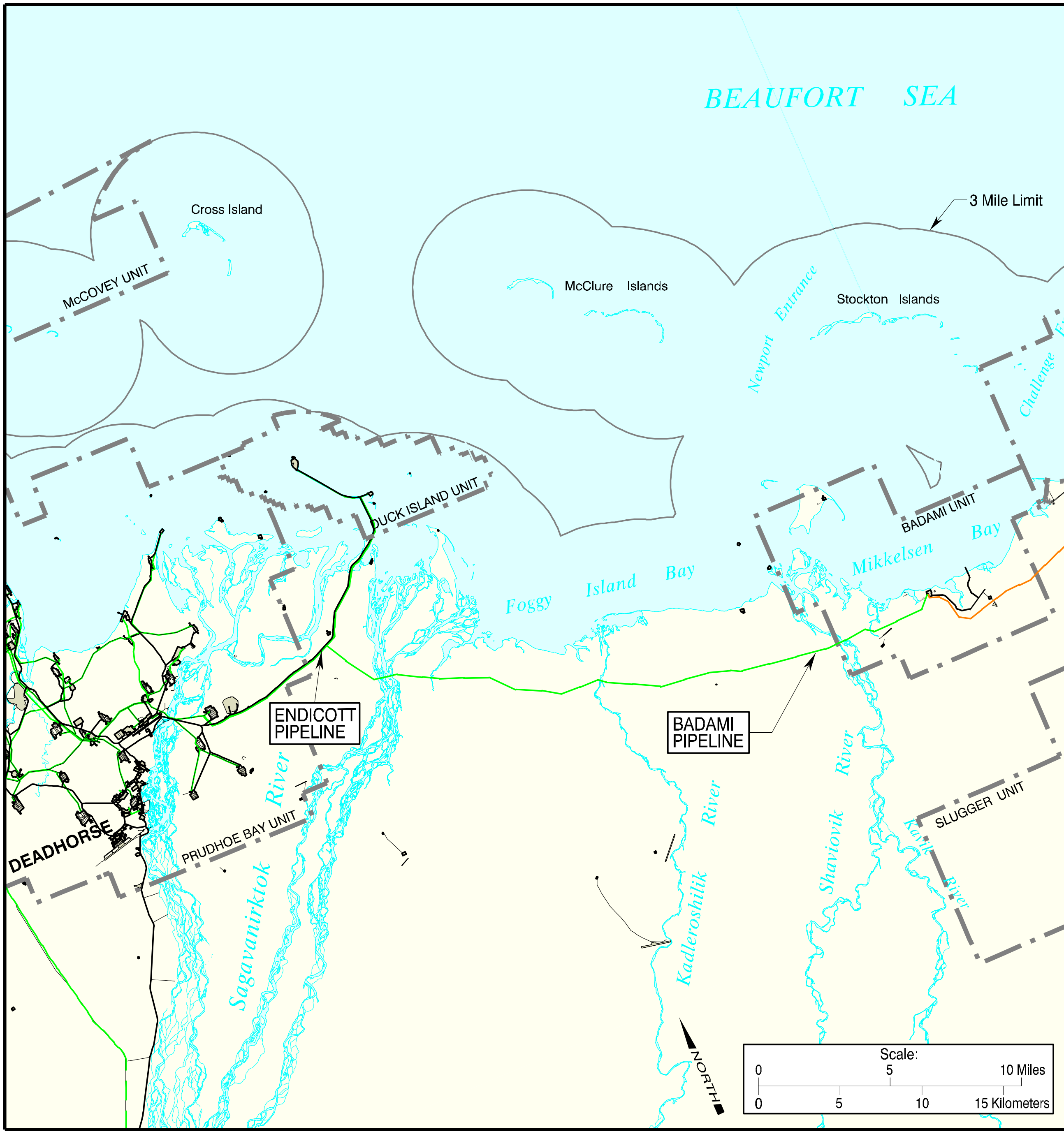

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
VICINTY MAP

DATE:	SCALE:	FIGURE:
February 2003	1" = 10,000’	1-1

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2.0 SHE, SECURITY, AND REGULATORY PLAN

2.1 SAFETY, HEALTH, AND ENVIRONMENTAL OBJECTIVES AND INTEGRITY MANAGEMENT

The overall SHE objective of the Point Thomson Gas Cycling Project is to deliver exemplary safety, health, and environmental performance. The vision held for the project and operations is a workplace free of accident and illness, with a commitment to deliver outstanding environmental performance. The Point Thomson Unit will conduct business in a manner that is compatible with the environmental and economic needs of the local communities.

The Point Thomson gas cycling facilities will be designed, constructed, and operated under and in accordance with all applicable laws and regulations. It will also be operated in compliance with the requirements of ExxonMobil's Operations Integrity Management System (OIMS), which is similar in structure and requirements to the Occupational Safety and Health Administration's Process Safety Management regulations. Key elements of OIMS are:

- *Management Leadership, Commitment, and Accountability:* Specific roles and accountabilities;
- *Risk Assessment and Management:* Ongoing risk management;
- *Facilities Design and Construction:* Standards and practices;
- *Information / Documentation:* Drawings and other required documentation;
- *Personnel and Training:* Skill maintenance, and safety and health management;
- *Operations and Maintenance:* Procedures, programs including regulatory compliance;
- *Management of Change:* Permanent and temporary changes;
- *Third-Party Services:* Contractor management;
- *Incident Investigation and Analysis:* Root cause identification and global sharing;
- *Community Awareness and Emergency Preparedness:* Response planning/drills; and
- *Operations Integrity Assessment and Improvement:* Ongoing audit and findings resolution.

2.2 SAFETY, HEALTH, AND ENVIRONMENTAL PROGRAM

2.2.1 SHE Plan

SHE requirements for the project will be specified in overall and site-specific SHE plans covering the design, construction and operations phases. SHE requirements differ for each project phase and these requirements are described herein.

2.2.2 SHE Site-Specific Plan

Overall project and site-specific SHE plans will be developed and used throughout the life of the project to ensure that development and operational activities are carried out with maximum safety, health, and environmental protection. ExxonMobil's standard management systems and practices will be used, along with existing practices developed by Alaskan North Slope operators and industry, to develop plans specific to Point Thomson. The *North Slope Operations Alaska Safety Handbook* and *North Slope Environmental Field Handbook* will be used for reference to address SHE issues associated with working in the Arctic.

Standard systems have been established and will be adapted for Point Thomson to provide a systematic approach to the management, monitoring and influencing of SHE concerns. These systems, including constructability and process safety reviews, will apply to all phases of the project from design to decommissioning. These systems will be communicated to contractors to ensure their understanding of ExxonMobil's expectations and philosophy.

Design Phase

SHE requirements will be incorporated into the design phase of the project by implementing certain design requirements, reviews, audits, and plans:

- *Hazard and Operability (HAZOP) for Process Hazard Analysis:* This technique will identify inadequacies with respect to safety and operability in design of process flow sequences to be addressed in the project design phase.
- *Facility Site Reviews:* The conceptual layout and the detailed design layout will be subject to a facility site review. This review will ensure that the location, layout, and orientation of process plant, utility modules, control rooms, camps, wells, and drill rigs are such that hazards from gas release(s), fire(s), and explosion(s) are all minimized. These reviews are conducted with the plot plan, three-dimensional computer-assisted-drafting model and consequence analysis.
- *Independent Project Review:* Audits assess the readiness of the project to proceed to the next phase (Design ⇨ Construction ⇨ Operation).
- *Constructability Review*: These reviews are done to incorporate construction knowledge into the design. Construction-related hazards found during these reviews could be addressed in the design phase, allowing for engineered solutions to safety versus procedural safety.

Construction Phase

SHE provisions will be very important during the construction phase of the facility and pipeline. Established safe construction practices, together with a strong quality control/quality assurance program, will be used to ensure the health and safety of project personnel and the public, and protection of the environment during the construction and commissioning of the facility and pipeline. All personnel will observe and comply with all applicable federal, state, and local laws and regulations related to public health and safety, and the environment.

Construction techniques, plans, and personnel training will be implemented during construction to maximize health and safety protection and minimize environmental impacts. These include:

- Oil Discharge Prevention and Contingency Plan (ODPCP);
- Ice roads to prevent tundra damage;
- Most civil gravel work to be conducted during the winter to minimize impact on tundra;
- Polar bear interaction plan;
- Project personnel training on environmental awareness;
- Permit compliance training;
- Quality control/assurance (e.g., welding inspection, hydrotesting, etc.);
- Evacuation plans (medical and emergency);
- Safety and environmental risk analysis;
- Safety procedures, training, and meetings;
- Job Safety Analysis; and
- Waste management plan

Operations Phase

All necessary systems (e.g., procedures and documentation) required to conduct the affairs of the Point Thomson Unit operating organization in a safe and efficient manner will be developed and implemented through the ExxonMobil Production Company's Operations Development and Support Group (OD&S).

ExxonMobil's Production Reference Manual (PRM) for New Operations establishes operations system requirements to be in place at start-up. Implementation of the PRM requirements will ensure that all necessary systems are in place and that the new operating organization benefits from best practices derived from global operating experience. The requirements for management processes, operating procedures, and documentation for new organizations are established by worldwide ExxonMobil standardized best practices and operating experiences. They incorporate ExxonMobil management systems modified for specific local requirements. Line management is accountable for ensuring that all necessary procedures and documents are implemented before start-up.

2.2.3 Environmental Goals

Environmental goals are defined as a set of criteria or objectives to be incorporated in project design and during planning for construction and operations. The principal environmental goals are to:

- Develop an environmentally sound project,
- Assure compliance with regulatory requirements and internal company expectations, and
- Address concerns of local residents.

The goals selected for the Point Thomson Unit development are based on applicability to the Unit area and reservoir characteristics, technical feasibility, economic feasibility, and effectiveness in reducing environmental impacts. These environmental goals are one component of the set of project mitigation measures including baseline studies, agency consultation, and public outreach.

The Point Thomson Project Management Team (PMT) understands that there are many environmental considerations and issues that must be addressed effectively throughout the project. Specific project environmental mitigation measures are delineated in the *Point Thomson*

Gas Cycling Project Environmental Report (July 2001)[1] and its Amendment (July 2002)[2]. The following list identifies potential issues:

- Caribou herd migration, insect relief, calving;
- Polar bears, grizzly bears, and other carnivores;
- Birds (including threatened and endangered species);
- Marine mammals (including threatened and endangered species);
- Fish and fish habitat;
- Air quality;
- Water quality and quantity;
- Spill prevention and response planning;
- Placement of gravel fill;
- Waste management;
- Archaeological sites; and
- Subsistence use and other local community issues.

These and other environmental issues have been addressed during conceptual engineering or will be addressed during subsequent engineering phases. Accordingly, they will be reviewed and updated on a regular basis. This will allow environmental mitigation measures to reflect more detailed design information and to be based on a more complete understanding of agency and public concerns.

2.3 SECURITY

Point Thomson is remotely located in a sparsely populated area and is not connected to other North Slope communities by permanent road. Customary security plans for similar operations in the area include coordination with local and state police agencies when some unusual security concern or event is experienced.

As with other North Slope industrial facilities, public access will be regulated to ensure facility security and safety. There is minimal documented use of the onshore area for significant subsistence use; however, local residents may occasionally pass through the Point Thomson Unit. ExxonMobil understands the need for public access and pass-through, and will provide access as necessary without compromising site control and safety issues. Hunting will be prohibited in the immediate vicinity of pipeline and other production facilities to prevent accidental damage, and reasonable precautions will be taken (locking critical valves, equipment buildings, etc.) to discourage or prevent vandalism or sabotage.

During the construction/drilling phase of the project, the local workforce at Point Thomson will be larger and traffic will be substantially higher than later during operations. Temporary ice roads will link Point Thomson to Prudhoe Bay infrastructure during construction and perhaps occasionally during operations, depending on logistics needs. Therefore, it will be necessary to

[1] URS Corporation (2001). *Point Thomson Gas Cycling Project Environment Report.* Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 30, 2001.

[2] URS Corporation (2002). *Point Thomson Gas Cycling Project Environmental Report Addendum.* Prepared for ExxonMobil Production Company on behalf of the Point Thomson Unit owners by URS Corporation (Anchorage, Alaska). July 31, 2002.

provide additional security resources when ice road access is available. Security plans for both construction/drilling and operating phases will be developed as part of the project execution plan.

2.4 REGULATORY REQUIREMENTS

Federal, state and local (NSB) approvals will be required for construction and operation of this project. The National Environmental Policy Act (NEPA) process is required for review of all federal permits, and for this project it has been determined that an EIS has to be prepared to comply with NEPA. The State of Alaska is landowner and oil and gas lessor of the Point Thomson Unit and along the proposed export pipeline corridor, and therefore has a major role in project land use and resource development approvals. These include approval of a Unit Plan of Development for surface facilities construction and issuance of a Right-of-Way Lease for the export pipeline. An ACMP consistency review is required for nearly all state and federal permits to ensure conformance with policies and standards of the ACMP and the NSB's Coastal Management Program. The Point Thomson Unit is located within the NSB, and the project requires approval from the NSB under the provisions of its Title 19 Land Management Regulations.

3.0 RESERVOIR

The Point Thomson Field is a major hydrocarbon accumulation that was discovered in 1975. The primary reservoir, the Thomson Sand, was discovered in 1977 and is a large, over-pressured gas-condensate reservoir located approximately 12,750 feet (ft) below sea level. A total of 19 exploration wells have been drilled in and around the field (see Figure 3-1), and numerous seismic surveys have been acquired to further delineate this extensive (approximately 23 mi by 8 mi) resource. The center of the field is about 50 mi east of Prudhoe Bay, and the nearest surface facility is the Badami Development, located about 22 mi west of the Point Thomson CPF (see Figure 1-1).

In 1977, the Point Thomson Unit was formed, and the State designated ExxonMobil (formerly Exxon Company U.S.A.) as the Unit Operator. Throughout the 1980s and 1990s, ExxonMobil and other Point Thomson Unit owners continued to delineate the Thomson Sand and shallower Brookian accumulations within the Unit while conducting development feasibility studies. In April 2000, interests among the major Point Thomson Unit owners were realigned for all horizons. Currently, the Point Thomson Unit covers approximately 117,000 acres.

In 1977 the Thomson Sand reservoir was discovered by the Point Thomson Unit #1 well. A total of 14 wells drilled in or around the Point Thomson Unit have penetrated the Thomson Sand interval. The last well that penetrated it was the Alaska State G-2, which was drilled in 1983. In the 1990s, the Sourdough and Red Dog exploration programs targeted the shallower Brookian (Lower Tertiary) oil sandstones and did not drill down to the Thomson Sand. Tests from these exploration wells indicate that the Brookian sandstones have low productivity and limited extent.

3.1 GENERAL RESERVOIR DESCRIPTION

The Lower Cretaceous Thomson Sand is interpreted as a shallow-marine fan delta complex. The fan delta sediments were sourced from a northwest-southeast trending paleohigh that underlies the general location of the present-day barrier islands. The primary depositional processes are inferred to be sediment gravity flows. The Thomson Sand thickness varies widely across the field, ranging from 0 ft up to a maximum penetrated thickness of 350 ft. A generalized cross-section of the Thomson Sand is shown in Figure 3-2.

The lithologies encountered in the Thomson Sand reservoir range from conglomerates to sandstones to sandy mudstones. No true shales have been observed within the interval. Grain composition is dominated by dolomite, argillite, quartzite, and sedimentary rock fragments. Primary controls on reservoir quality include depositional fabric (grain size and sorting), compaction, and calcite cementation.

The hydrocarbon trapping mechanism for the Thomson Sand is interpreted as a combination of structural closure, stratigraphic pinchout, and geologic facies changes, with structural closure being the dominant mechanism. The intersection of the dipping Thomson Sand and the fluid contacts define the downdip limit of the accumulation over most of the area. A generalized outline of the accumulation is shown in Figure 3-3.

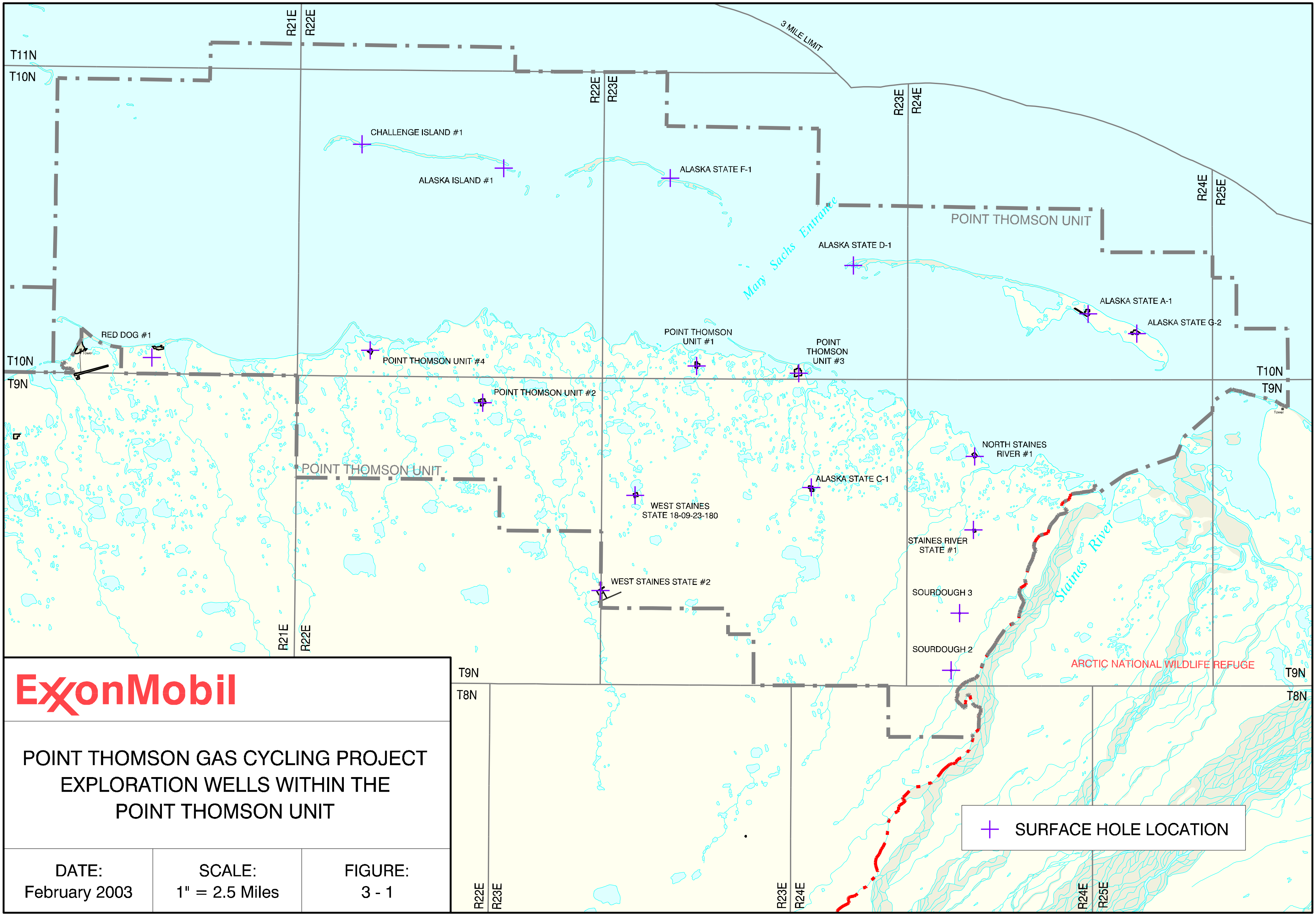
The Thomson Sand reservoir is estimated to contain over 8 trillion cubic feet (TCF) of natural gas in place over an area of approximately 60,000 acres. The carbon dioxide (CO_2) concentration in the natural gas is approximately 4.5%. The natural gas is considered to be sweet (hydrogen sulfide [H_2S] is absent or present in trace amounts). The hydrocarbon liquids yield is expected to be about 55 to 60 bbl of condensate per million standard cubic feet of produced natural gas.

3.2 RESERVES AND PRODUCTION

The proposed base development plan at Point Thomson is a gas cycling project in the Thomson Sand to enable sales of the hydrocarbon liquids (condensate) contained in the natural gas in the reservoir. Wet gas will be produced initially at a nominal rate of 1.5 billion cubic feet per day (GCFD), from which the condensate will be separated. The recovered condensate will be shipped to market through a new 22-mi export product pipeline that will extend from Point Thomson to the Badami Development, where it will tie into existing infrastructure (Badami and Endicott sales pipelines) with ultimate delivery to TAPS Pump Station No. 1. The remaining produced natural gas (less fuel and shrinkage) will be returned to the Thomson Sand reservoir.

It is anticipated that the field will be developed using approximately 22 wells, including 13 production wells from two onshore pads, and eight injection wells from an onshore pad located in the near the center of the field (Figure 3-3). This strategy will require an extended reach drilling program with horizontal offsets up to 21,000 ft. Production wells are planned to have large 7-inch (in.) tubing to enable high withdrawal rates. Once the condensate is removed, the residue gas will be compressed and injected into the Thomson Sand through wells drilled from an onshore pad (Central Well Pad) located towards the center of the field. In order to maintain high condensate production and minimize breakthrough of injected dry gas, the bottom-hole locations for the producing wells are located at a distance from the more-centrally located residue-gas injection wells.

Condensate production rates are expected to peak early in the life of the project, once all the production and injections wells are completed and placed on-line. Ultimately, the Point Thomson Gas Cycling Project is expected to recover over 400 million bbl during its 30-year lifespan.



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POINT THOMSON GAS CYCLING PROJECT
EXPLORATION WELLS WITHIN THE
POINT THOMSON UNIT

DATE:	SCALE:	FIGURE:
February 2003	1" = 2.5 Miles	3 - 1

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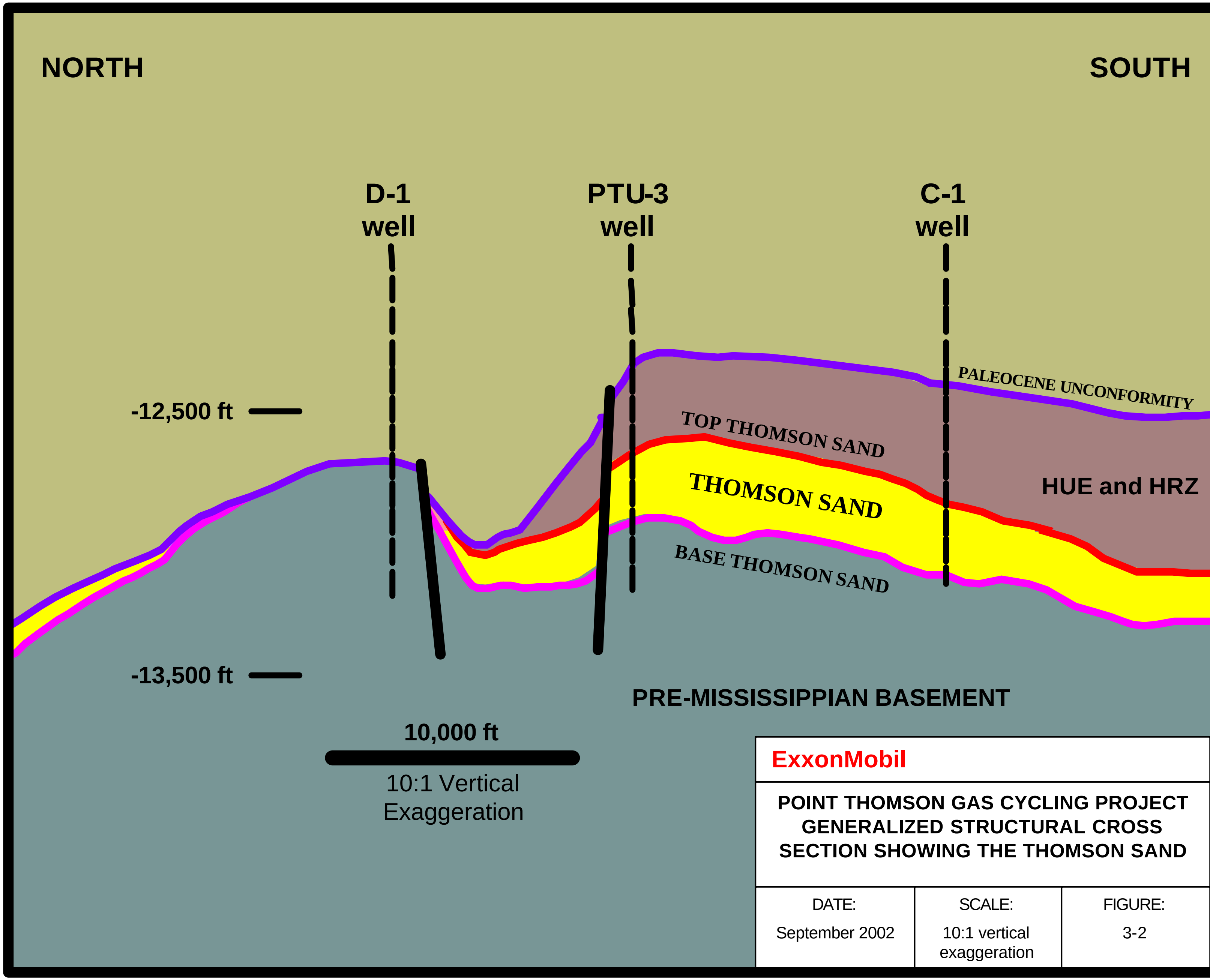
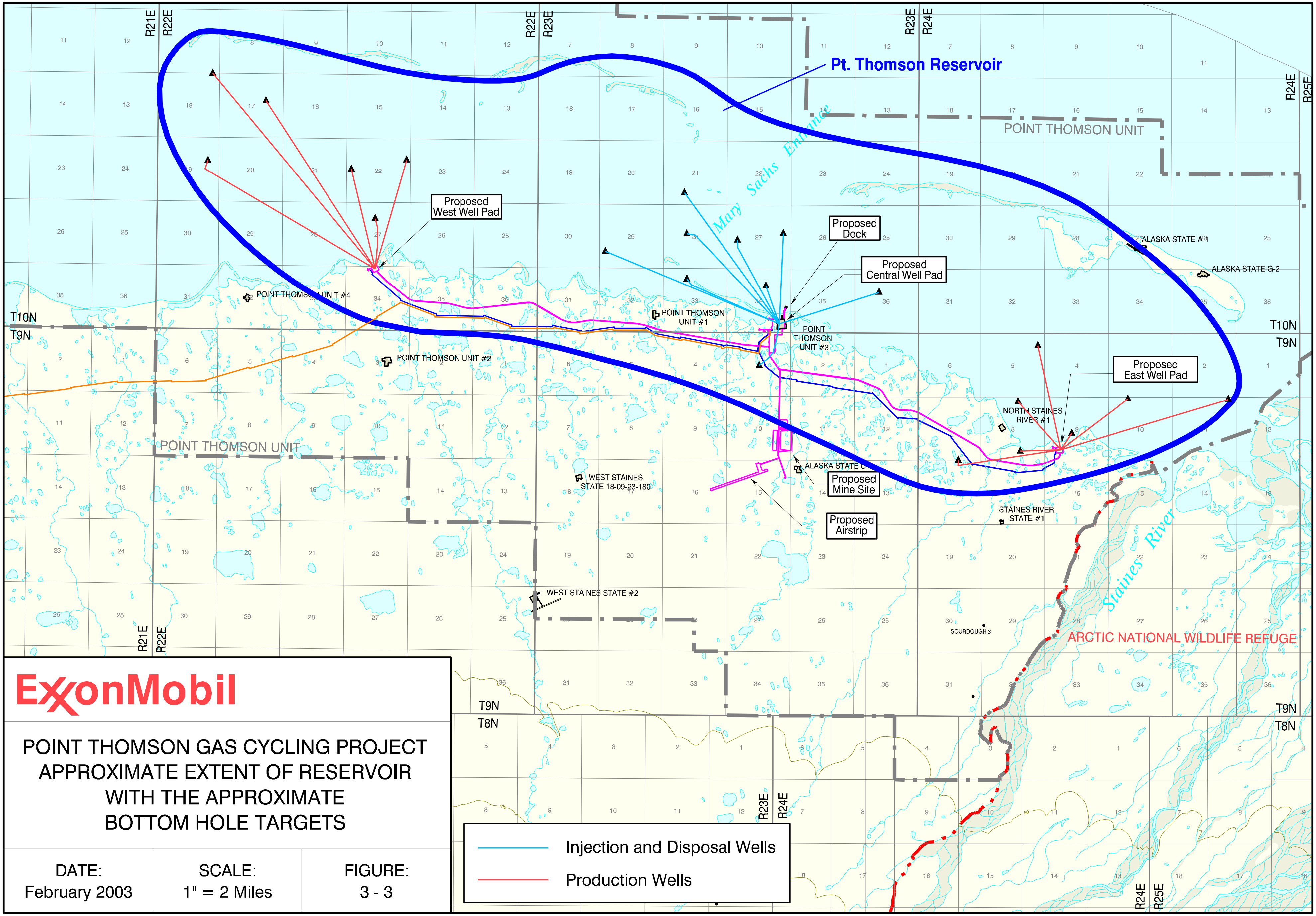

NORTH
SOUTH
D-1 well
PTU-3 well
C-1 well
PALEOCENE UNCONFORMITY
-12,500 ft
TOP THOMSON SAND
THOMSON SAND
HUE and HRZ
BASE THOMSON SAND
-13,500 ft
PRE-MISSISSIPPIAN BASEMENT
10,000 ft
10:1 Vertical Exaggeration
ExxonMobil
POINT THOMSON GAS CYCLING PROJECT
GENERALIZED STRUCTURAL CROSS
SECTION SHOWING THE THOMSON SAND
DATE:
September 2002
SCALE:
10:1 vertical exaggeration
FIGURE:
3-2



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POINT THOMSON GAS CYCLING PROJECT
APPROXIMATE EXTENT OF RESERVOIR
WITH THE APPROXIMATE
BOTTOM HOLE TARGETS

DATE:	SCALE:	FIGURE:
February 2003	1" = 2 Miles	3 - 3

ex14745_3-3.dgn

4.0 DRILLING

4.1 OVERVIEW

The Point Thomson Gas Cycling Project will be developed by drilling and completing approximately 13 production wells and 8 gas injection wells in the Thomson Sand, and one Class I disposal well to be drilled in the shallower Sagavanirktok from three onshore pad locations (Table 4-1). All wells will require directional drilling to reach the desired bottom hole. All bottom-hole targets lie beneath the lagoon except for the Class I disposal well and one East Well Pad production well (Figure 3-3).

The Point Thomson production and gas injection wells are considered long-life, very prolific, high-pressure wells (>0.8 pounds per square inch [psi] per ft vertical depth as defined by industry). The high pressure differentiates the Point Thomson wells from other North Slope wells. The working pressure requirements for blowout prevention equipment and producing wellheads and trees are 10,000 psi, while the requirements for the injection well trees are greater than 10,000 psi due to high-pressure compression of gas for reinjection. The working pressure of most equipment on the Slope is 5,000 psi or less.

Special emphasis will be placed on well design, procedures, communication, and training to ensure the wells can be safely drilled, completed, produced, and maintained. A minimum of two safety barriers will be in place at all times while work is progressing. For example, during drilling, the drilling fluid will act as one barrier and the blowout prevention equipment will act as another. In the case of producing the well, the surface controlled subsurface safety valve and the tree would act as barriers. If a barrier is compromised, work will be stopped and the barrier restored before proceeding with the work. The purpose of this philosophy is to prevent a single point failure from escalating.

TABLE 4-1
WELL COUNTS

PAD	APPROXIMATE NUMBER OF WELLS
West Well Pad	6 Production Wells + 2 Future Wells
Central Well Pad	8 Gas Injection Wells + 2 Future Gas Injection Wells 1 Disposal Well + 2 Future Disposal Wells
East Well Pad	7 Production Wells + 2 Future Wells
Total	22 to 30 Wells

The high pressure in the reservoir will require heavier (thicker-walled) casing and tubing than normally used on the North Slope. Connection testing and qualifications will be required for some of the heavy-wall casing and tubing for additional well security. Special emphasis will be placed on the selection of metallurgy to ensure the structural integrity for a long life at high pressure.

The production and injection wells will be large bore with 7-in.-nominal outside diameter tubing. Either one or two rigs will be used and likely mobilized to Point Thomson by barge a year before the CPF modules are delivered to Point Thomson.

It is anticipated that the Class I non-hazardous disposal well will be the first well drilled. This well will be used initially to dispose of the slurrified cuttings generated from the drilling of the development wells. In addition, this same well will be used to dispose of produced water, wastewater effluent from the camps, and exempt and other non-hazardous waste.

4.2 TARGET LOCATIONS

Figure 3-3 shows the preliminary target locations for the anticipated 8 injection wells, 13 production wells, and one Class I disposal well. It is anticipated that the actual target locations will change as additional reservoir data is obtained.

4.3 WELLS

Siting for the well surface locations and allocation of space on the well pads for drilling operations are governed by several criteria:

- Approximately 22 wells (21 production and injection wells and one disposal well) on three separate drilling pads,
- Flexibility in rig selection,
- Ability for future well interventions,
- Need for storage and handling of large quantities of consumables during freeze-up and breakup,
- Allowance for simultaneous drilling and production operations,
- Minimizing wellbore intersection possibilities,
- Mitigating collateral damage in the unlikely event of an uncontrolled hydrocarbon release, and
- Minimizing well departure.

The well spacing at each pad will be 40 ft. The well cellars for all wells will be lined with a 15-ft-square sealed container set in the gravel pad; 6 in. of cement will seal the base. At the conclusion of drilling, the cellar will be filled with gravel for personnel safety considerations.

4.4 WELL DESIGN

4.4.1 Well Profiles

The well profiles will be vertical through some of the permafrost and then deviated. This will provide additional separation from other wells as the hole is drilled deeper. It is envisioned that surface casing will extend through the section of the hole that defines the well deviation angle. This maximum hole angle will be maintained all the way to the reservoir target. This profile will minimize the hole angle required to reach the reservoir target. It is anticipated that the maximum hole angle will be 67º. This hole angle will allow wireline and/or coil tubing work to facilitate completions and workovers.

4.4.2 Casing Seats

Development well design, including casing seat locations, is based on Point Thomson exploration and appraisal data, and on North Slope drilling practices. A typical Point Thomson development well is anticipated to have the following casing seats (Table 4-2):

- *Conductor:* The conductor hole will be drilled, and the conductor will be cemented in place for all wells at approximately 80 ft true vertical depth (TVD). This will be done during pad construction. Conductors will be insulated and designed to minimize thawing of adjacent permafrost.
- *Surface Casing:* This casing will be set in the Sagavanirktok Formation (about 4,500 ft TVD).
- *Intermediate Casing*: This contingent casing will be used as required to ensure the protective/production casing can be set in the pressure transition zone or to isolate weak formations in the shallow intervals.
- *Protective/Production Casing:* This casing will be set when the mud weight required to drill the intermediate hole has reached a pre-determined level that indicates the formation mechanical strength is appropriate to support drilling through the productive interval.
- *Production Liner:* The well will reach total depth at the base of the Thomson Sand reservoir at approximately 13,300 ft TVD.

TABLE 4-2
TYPICAL PRODUCTION AND INJECTION WELL CASING PROGRAM

CASING / HOLE SIZE		SETTING DEPTH (TVD)	FORMATION
Low-Angle Well	High-Angle Well		
34 x 20-in. Conductor (Preset)	34 x 20-in. Conductor (Preset)	±80 ft	N/A
13-5/8-in. Surface Casing/ 16-in. Hole	13-5/8-in. Surface Casing/ 16-in. Hole	±4,500 ft	Sagavanirktok (Tertiary)
N/A	11-3/4-in. Intermediate Casing/14-3/4-in. Hole	As Required	Sagavanirktok (Tertiary)
9-7/8-in. Protective/ Production Casing/ 12-1/4-in. Hole	9-7/8-in. Protective/ Production Casing/ 12-1/4-in. Hole	±10,800 ft	Canning (Lower Tertiary)
7-in. Production Liner/ 8-1/2-in. Hole	7-in. Production Liner/ 8-1/2-in. Hole	±13,300 ft	Thomson Sand (Lower Cretaceous)

Setting depths may be adjusted with new interpretation of mud weight and fracture predictions. Emphasis has been placed on reducing conductor and surface casing size to minimize cuttings waste discharge. Detailed well designs will be included in the Permit to Drill applications submitted for approval by the Alaska Oil and Gas Conservation Commission (AOGCC).

4.4.3 Drilling Fluids

The anticipated drilling fluids program provided in Table 4-3 will be further refined based on wellbore stability analysis. The stability analysis will also help determine if an underreamed 14-3/4-in. contingency hole and 11-3/4-in. liner will be required in the higher-angle well to help build formation integrity for drilling the next hole interval. Refinements to the hole sizes will be made once the well has been optimized and final casing selection is made.

TABLE 4-3
TYPICAL DRILLING FLUIDS PROGRAM

HOLE SIZE/SECTION		DRILLING FLUID TYPE	DRILLING FLUID WEIGHT RANGE (ppg)
Low-Angle Well	High-Angle Well		
34 x 20-in. Conductor (Preset)	34 x 20-in. Conductor (Preset)	N/A	N/A
16-in. hole	16-in. hole	Fresh Water Gel	8.8 to 10.0
N/A	14-3/4-in. underreamed hole	Non-Aqueous Fluid	8.8 to 13.0
12-1/4-in. hole	12-1/4-in. underreamed hole	Non-Aqueous Fluid	8.8 to 14.0
8-1/2-in. hole	8-1/2-in. hole	Non-Aqueous Fluid	14.0 to 16.0

4.4.4 Class I Disposal Well

One EPA-regulated Underground Injection Control (UIC) Class I disposal well is planned for Point Thomson. The well will have approximately 3,800 ft of separation from any other well at approximately 5,700 ft TVD (the top of the injection zone). The well will be used primarily for disposal of cuttings and wastewater effluent initially and subsequently for disposal of wastewater, produced water, and exempt and other non-hazardous wastes.

The current Class I well design includes 20-in. conductor at about 80 ft, 10-3/4-in. surface casing set at approximately 4,000 ft TVD, and 7-5/8-in. casing set at approximately 6,700 ft TVD. The casing will be perforated through the injection zone and sealed with a permanent packer. It is anticipated that 4-1/2-in. tubing will be used for injection. Table 4-4 provides expected waste volumes of mud and cuttings for each well type.

TABLE 4-4
EXPECTED WASTE VOLUMES FOR POINT THOMSON WELLS

WELL TYPE	CUTTINGS WASTE GENERATED (bbl)	TOTAL SLURRY INJECTED (bbl)
<17,000 ft (measured depth)	~7,500	~ 34,000
>17,000 ft (measured depth)	~14,000	~57,000
Disposal Well	~3,000	~12,000

The total slurry injected includes waste mud and water used to dilute slurry for injection. A 25% safety factor will be added to the total slurry injected volume to allow for rig washing, cement rinsate and other allowable non-hazardous waste fluids. Annular injection of drilled cuttings on each pad is being planned as a means to reduce the amount of solid-laden material injected into the Class I disposal well.

4.4.5 Well Control

Two types of development wells are planned for Point Thomson: production and gas injection. All wells will have surface-controlled subsurface safety valves (SCSSV) in the completion string, and all wells will have Christmas trees consisting of:

- Master valve (actuated),
- Surface safety valve (actuated),
- Wing valves (actuated), and
- Swab valve (actuated).

The Thomson Sand reservoir is abnormally pressured to about 10,250 psi, and the maximum anticipated surface pressure with a gas column to surface is about 8,300 psi. The top of the onset of abnormal pressure varies from about 11,600 ft TVDSS (true vertical depth subsurface) in the east to as shallow as 9,700 ft in the west. No shallow hazards have been encountered in any of the previous 19 exploration wells drilled in the Point Thomson area. All development wells will use a diverter for drilling surface-hole sections until it can be demonstrated that shallow hazards do not exist on each pad. A stack with four rams and one annular preventer will be used to drill below surface casing. The rams and annular preventer in the blowout preventer (BOP) stack will be rated to 10,000 psi working pressure.

All well control training, operational practices, procedures, rig equipment, and testing will be in accordance with AOGCC regulations and ExxonMobil standards.

In the unlikely event that a well control incident escalates to a blowout, surface intervention (i.e., dynamic kill, bullheading, well capping, etc.) will be the primary means of controlling the blowout. The well will be voluntarily ignited in the event of a major blowout to minimize environmental damage, and surface intervention will then be used to control the well. Well capping, which is part of surface intervention, has proven to be extremely effective in bringing wells under control and facilitating well kills, and is much more expedient than a relief well.

Killing the well after capping can be completed without a rig (i.e., bullheading kill weight mud) through the existing wellbore. (It should be noted that all wells in Kuwait were successfully capped following the Gulf War.) Information detailing best available technology (BAT) for controlling a blowout will be presented in the ODPCP to be submitted to the Alaska Department of Environmental Conservation (ADEC) and other agencies. Efforts to drill a relief well will be pursued in parallel with the surface intervention techniques.

4.5 WELL TESTING

Well testing is planned for some of the wells located on the East, West, and Central Well Pads before process facilities are operational. A typical well test would be conducted through a portable separator, flaring the gas until facilities are operational, at a maximum rate of approximately 60 million standard cubic feet per day, for a maximum duration of 4 days. It is envisioned that condensate will be reinjected during well testing.

4.6 DRILLING EQUIPMENT AND MATERIALS

At present, the use of one or two drilling rigs is planned for drilling and completion of the wells. Preliminary rig specifications are:

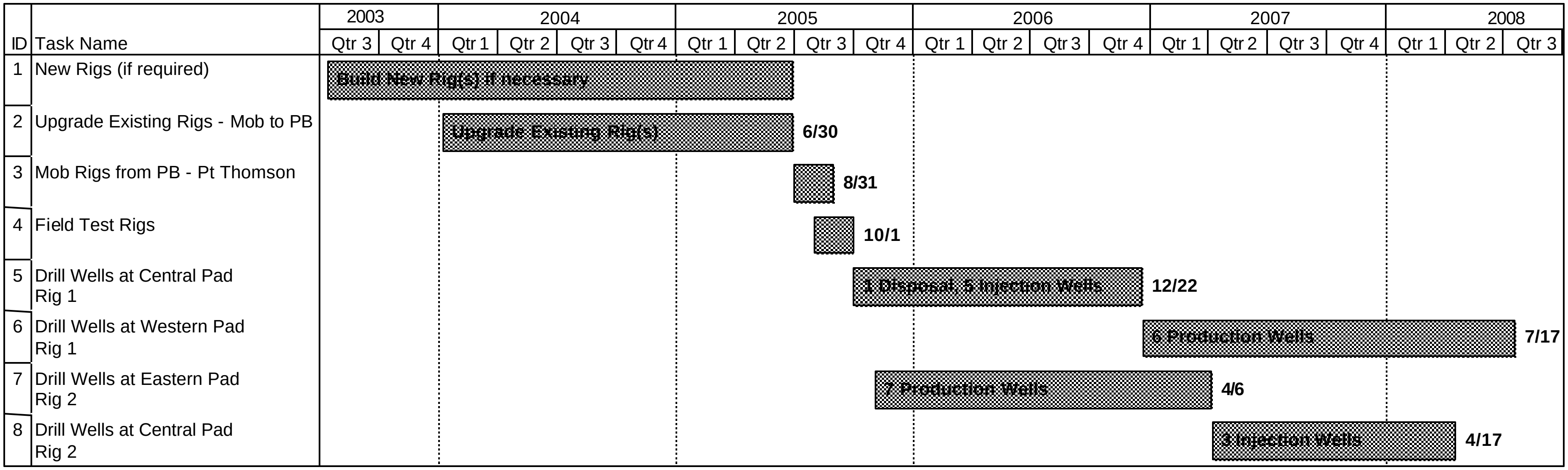
- *Design:* Arctic conditions;
- *Top Drive System (TDS):* 100 rotations per minute @ 62,000 foot-pounds of torque;
- *Drawworks:* 2,000 or 3,000 horsepower (hp);
- *Mast:* 1,200,000 pounds;
- *Mud System:* 2,500 bbl (1,500-bbl active and 1,000-bbl reserve);
- *Blowout Prevention Equipment (BOPE):* 10,000 psi, 4 rams plus the annular;
- *Shale Shakers:* 3 to 4 linear motion;
- *Mud System:* Three 1,600-hp mud pumps;
- *Drillpipe:* 5-1/2-in., 5-in., 4-1/2-in., etc. (S-135 as a minimum); and
- *Extra Diesel Storage:* 20,000 gallons per rig.

These requirements will be better defined once well optimizations are made. The specific rigs to be used will not be known until after December 2003.

Initially the rig power would be from diesel-powered generators. As soon as possible, the rig will convert to natural gas from the Thomson reservoir and would continue to use the natural gas as a means of providing power.

4.7 DRILLING SCHEDULE

The drilling rig and associated equipment will be mobilized by barge from the Prudhoe Bay area during July to August 2005. Drilling is scheduled to start in October 2005 and will continue through July 2008. Figure 4-1 provides the proposed drilling sequence for production, disposal, and gas injection wells.



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POINT THOMSON GAS CYCLING PROJECT PROPOSED DRILLING SEQUENCE

DATE:	SCALE:	FIGURE:
September 2002	N/A	4-1

5.0 PROCESS FACILITIES

5.1 PROCESS OVERVIEW

The Thomson Sand reservoir is being developed as a gas cycling project. Under this development plan, three-phase full-well-stream production gathered from remote well pads (East and West Well Pads) will be sent to a Central Processing Facility (CPF) where the condensate will be separated and stabilized to meet export (sales) pipeline specifications. The residue gas will then be reinjected at the Central Well Pad (CWP) located adjacent to the CPF. A small amount of gas will be used to fuel the facility. These facilities are described in detail in the following sections. Figure 5-1 is a simplified flow diagram showing the basic conceptual CPF process, while Figure 5-2 is a map showing the overall layout of the well pads, CPF, and related pipelines and infrastructure (roads, dock, airstrip, etc.).

The development basis consists of a “three-train case” in which production rates are dictated by the capacities of the three injection compressor trains. The term “train” is used to define a collection of facility components which together perform a basic process function. This term is typically used when referring to the number of similar groupings of components that are parts of an overall plant or facility. Therefore, “three trains” of injection compression indicates that there are three sets of equipment of similar design and capacity (Figure 5-3). Each train is discrete and does not share components with the other trains. For the three-train cycling case, there are three trains of injection compression and a single train of flash gas compression.

5.2 PRODUCTION WELL PADS

Both the East and West Well Pads will be production well pads. The West Well Pad will be located approximately 7 mi west of the CPF Pad; the East Well Pad will be approximately 6 mi southeast of the CPF. Figures 5-4 and 5-5 show plan views for the East Well Pad and West Well Pad, respectively. The exact shape, dimensions, and layout of the pads will change as engineering design matures. Significant features and approximate dimensions of the East and West Well Pads include the following:

- East Well Pad, which can accommodate up to nine production wells (base case = 7), will cover about 6 acres.
- West Well Pad, which can accommodate up to eight production wells (base case = 6), will cover approximately 6 acres.
- Both pads will be surface-graded to allow for effective spill collection.

The East Well Pad will have seven production wells initially, with space provided for up to two additional wells, if needed. During the drilling phase, much of the pad area will be taken up with facilities and services to support drilling, including a temporary early-fuel-gas conditioning skid. When production begins, the facilities located on this pad will include a production manifold, well metering and control facilities, an electrical building, methanol tank and injection system, and a gathering-line pig launcher. Production wells will be aligned in a row and spaced 40 ft apart. Production from each well will be measured using three-phase meters, and thus a permanent test separator is not envisioned at this time.

The West Well Pad will have six production wells initially, with space provided for up to two additional wells, if needed. The facilities provided on the West Well Pad will be similar to those on the East Well Pad. Differences arise due to the number of wells planned.

5.3 PRODUCTION GATHERING LINES

Production fluids from both the East and West Well Pads will be piped from the well manifolds to the gathering lines and then to the CPF. Construction material for the gathering lines is 22 Chrome duplex stainless steel. The gathering lines will be configured with a pig launcher on the well pad end and a pig receiver at the CPF end. The lines will be placed on vertical support members (VSMs) sized to maintain a minimum 5 ft height above the tundra. The gathering lines will be routed on the inland side of the access roads so that the road will act as a containment barrier in the event of a line leak. Pressure monitoring is planned as the primary means of leak detection for gathering lines, which will also be visually monitored from the infield roads during the course of routine operations. This is a typical means of monitoring in-field gas gathering lines on the North Slope of Alaska.

The well flow rate and inlet pressure to the gathering lines will be controlled so that the normal minimum delivery pressure at the plant will be approximately 3,040 psi atmosphere (psia). Normal flowing temperatures in the gathering lines will be over 170° Fahrenheit (°F), with normal temperature drops of 10°F or less. Because the estimated hydrate point of the produced gas at flowing pressure is ~80°F, the gathering lines will be insulated to delay cooling of the piping to ambient conditions when the flow is stopped or restricted. This will delay hydrate formation in the gathering line and the associated problems.

5.4 CENTRAL PROCESSING FACILITY

The CPF Pad is the largest of the gravel pads and the location for the Central Production Facility including the main process and utility modules, and related support and infrastructure facilities. Figure 5-6 provides the plan view, while Figure 5-7 shows the cross-section of the preliminary CPF Pad. While the exact shape, dimensions, and layout of the pad will change as engineering design matures, the total area of the pad is not expected to change significantly. Some of the significant features of this pad are follows:

- The pad will have an approximate area of 35 acres, and
- The pad will be surface-graded to allow runoff to be efficiently collected and routed away from the CPF and camp infrastructure.

The CPF Pad layout will be as required to accommodate the CPF modules and equipment, the permanent camp (including the central control room), the construction/drilling camp, the camp utility modules, the warehouse or Operations Support Center, the power generation modules, the communications tower and building, the diesel and methanol storage tanks, a cold storage area, and all associated pipe racks, cable racks, and storage equipment. In addition, there will be a short road to accommodate maintenance access to the CPF high- and low-pressure flares. The final layout of the equipment will accommodate the best arrangement for construction, operation, safety, and fire protection.

5.5 INJECTION LINES AND CENTRAL WELL PAD

The CWP will be located adjacent to and directly north of the CPF Pad. During the early construction phase of the project, the CWP will be used primarily to support drilling operations. It will contain a Class I disposal well, a mobile grind-and-inject (G&I) facility with the rig, drilling equipment and supplies, a mud plant, an electrical building, an early-fuel-gas treating facility, and storage areas for drilling activities. Approximately eight gas injection wells will be drilled initially from the CWP. Space is available for two additional gas injection wells on the CWP in the event that one or more wells not currently planned are needed for the project. High-pressure gas piping will transport the gas from the CPF Pad to the injection wells located at the CWP. Space is also provided on the CWP for two additional disposal wells. The current UIC application provides for two Class I disposal wells; the third disposal well is not being permitted at this time.

Figures 5-8 and 5-9 provide the plan view and cross section, respectively, of the conceptual CWP. While the exact shape, dimensions, and layout of the pad will change as engineering design matures, the overall area is not expected to change significantly. Important features of the CWP include the following:

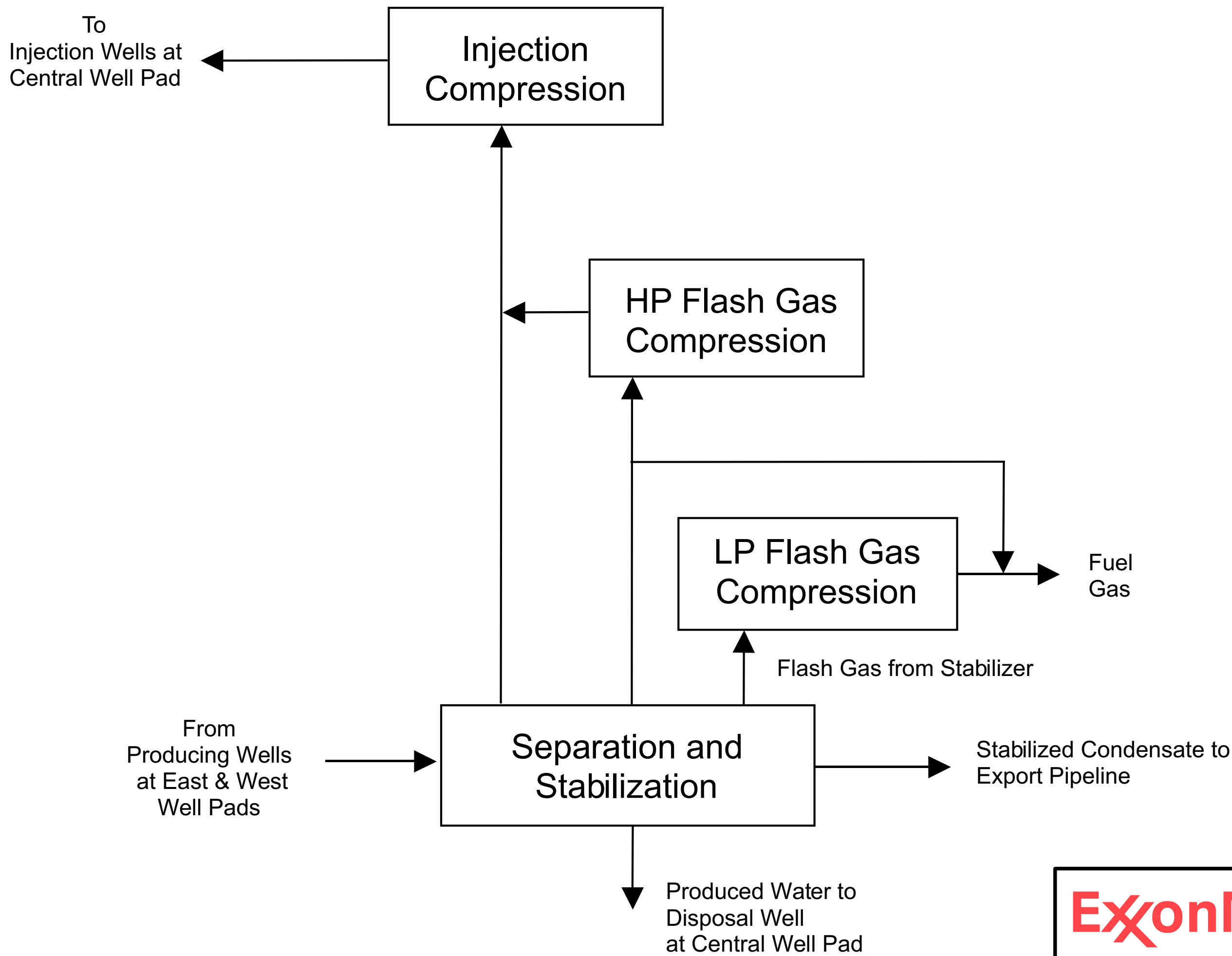
- The pad will have an approximate area of 15 acres.
- The pad will incorporate the existing Point Thomson Unit #3 exploratory gravel pad.
- The pad will be surface-graded to allow runoff to be efficiently collected and routed away from the wells, well-pad facilities, and adjacent CPF.
- Carbon steel will be used for the injection lines.

Wells on the CWP will be aligned in a row and spaced up to 40 ft apart. Flow meters will be installed on each gas injection well to measure the volume of gas injected. Separate piping will transport treated camp gray water and produced water from facilities on the CPF to the UIC Class I waste disposal well.

The well pad area and design will be adequate to accommodate the initial drilling operations and drilling storage requirements to support work at the satellite pads as well. The pad will also be suitable for ongoing well maintenance and service rig access, and future drilling activities, as well as for the equipment and facilities needed for gas injection.

Permanent facilities to be located on the CWP include a separator and fuel-gas-treating skid for providing early fuel gas and fuel gas for a plant black-start.

Gas discharged from the gas injection compressors will be piped directly to the CWP and injected down the designated injection wells. Because of the proximity of the CWP to the CPF, all injection lines will be run on VSMs or a pipe rack from the compressor area to the injection manifold.



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POINT THOMSON GAS CYCLING PROJECT

SIMPLIFIED FLOW DIAGRAM

DATE:	SCALE:	FIGURE:
February 2003	NOT TO SCALE	5 - 1

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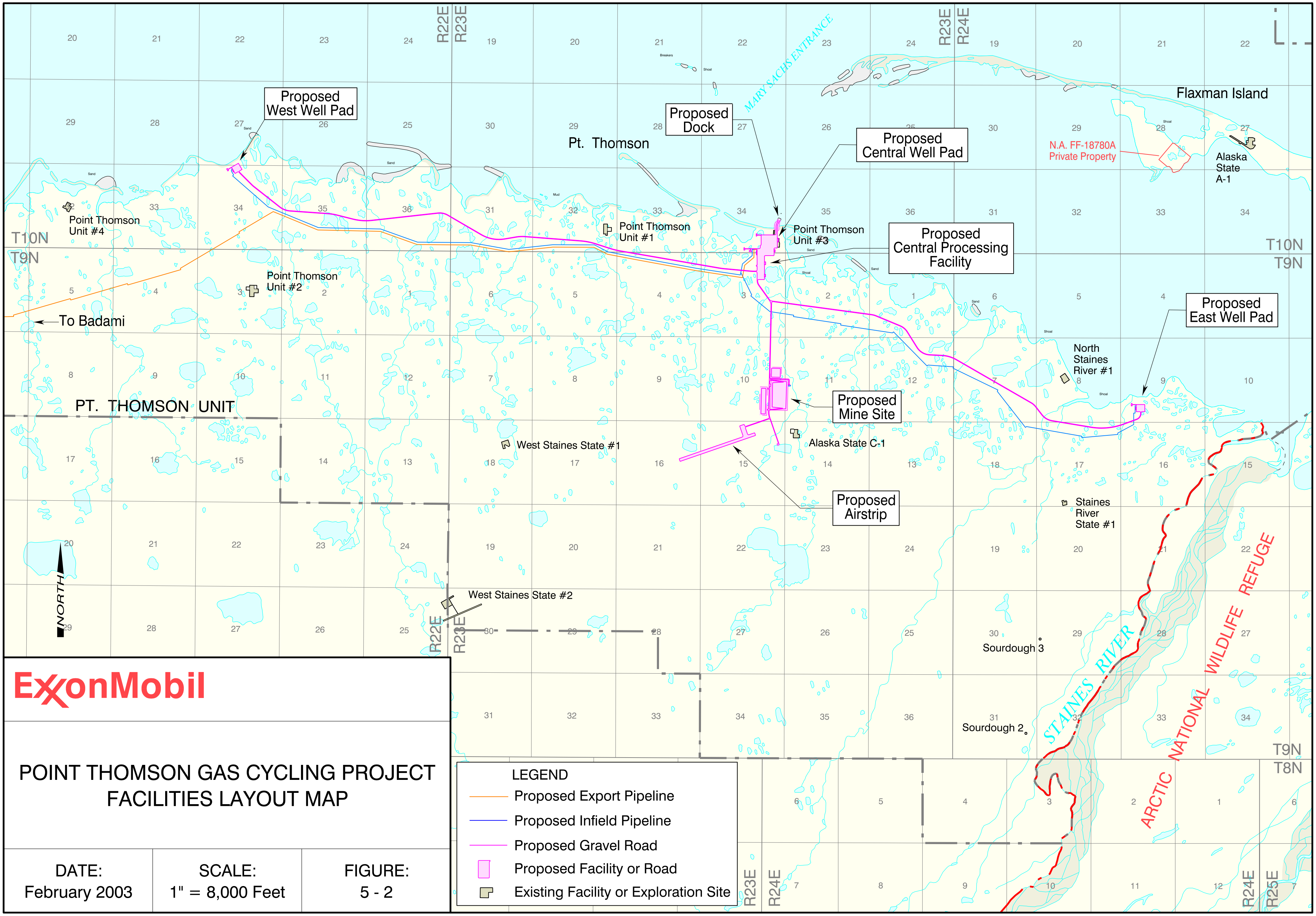

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POINT THOMSON GAS CYCLING PROJECT
FACILITIES LAYOUT MAP

DATE:	SCALE:	FIGURE:
February 2003	1" = 8,000 Feet	5 - 2

LEGEND

- Proposed Export Pipeline
- Proposed Infield Pipeline
- Proposed Gravel Road
- Proposed Facility or Road
- Existing Facility or Exploration Site

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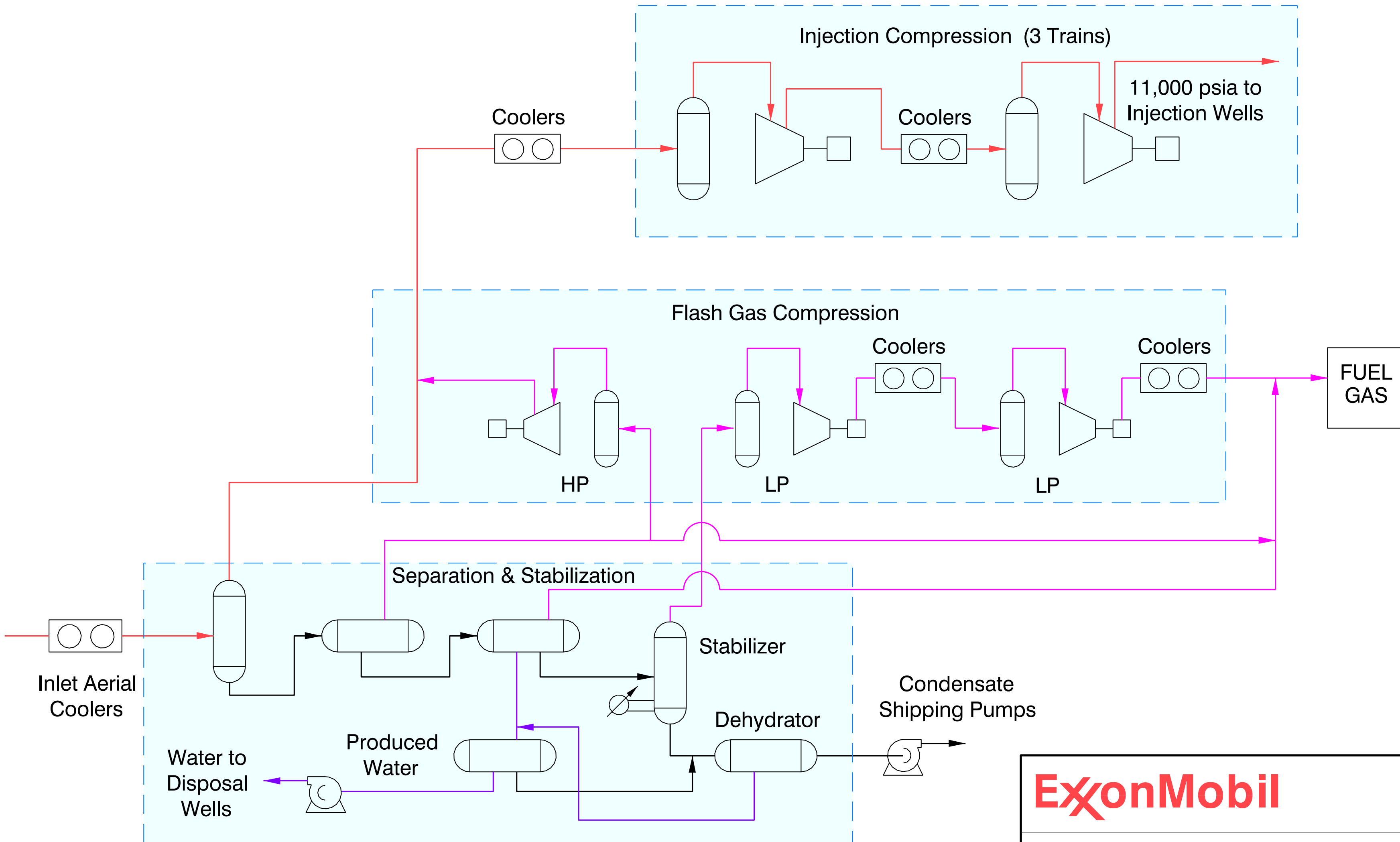

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POINT THOMSON GAS CYCLING PROJECT
THREE TRAIN INJECTION CASE

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	5 - 3

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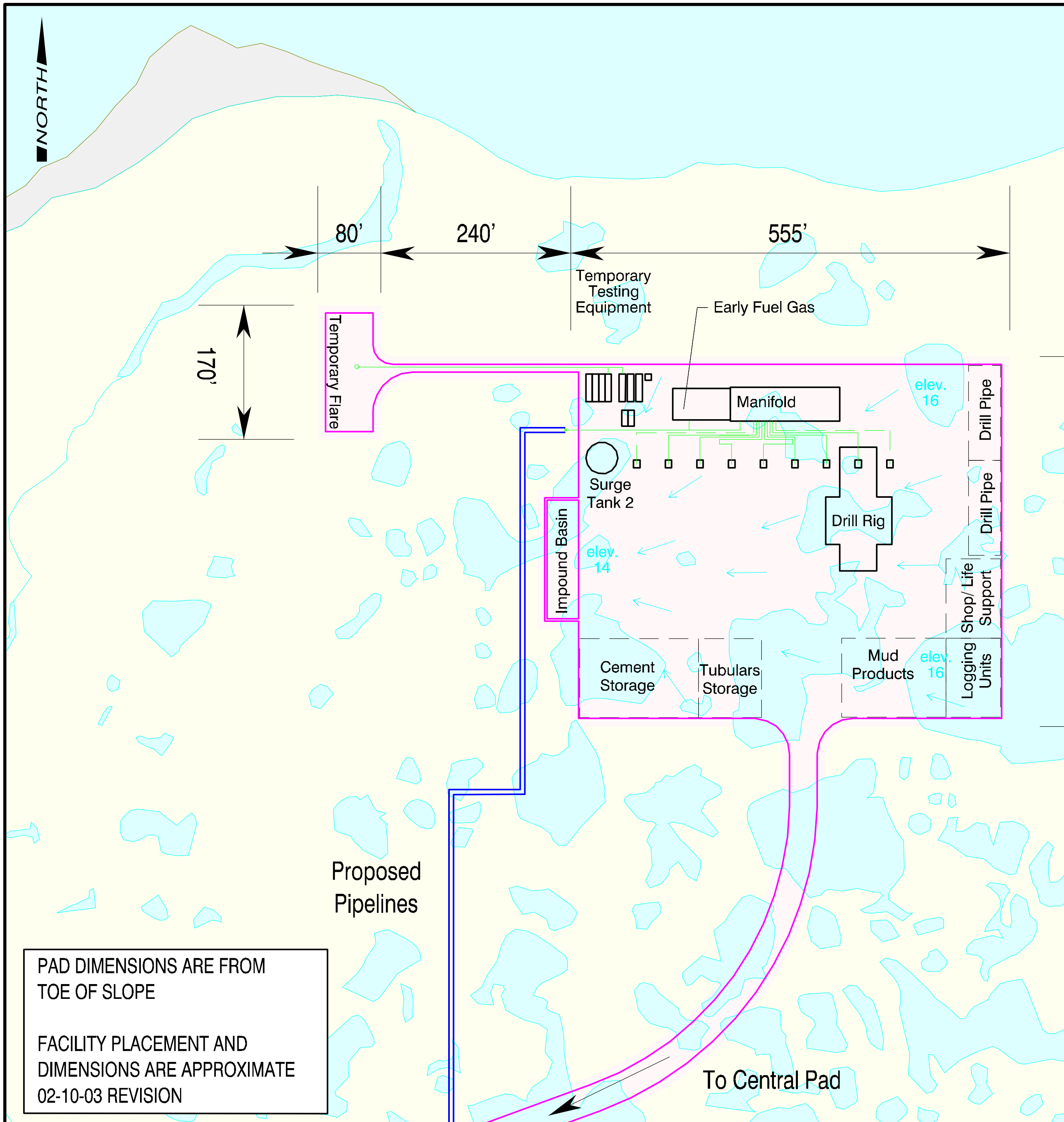

PAD DIMENSIONS ARE FROM TOE OF SLOPE

FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE

02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
EAST WELL PAD

DATE:	SCALE:	FIGURE:
February 2003	1" = 200 Feet	5 - 4

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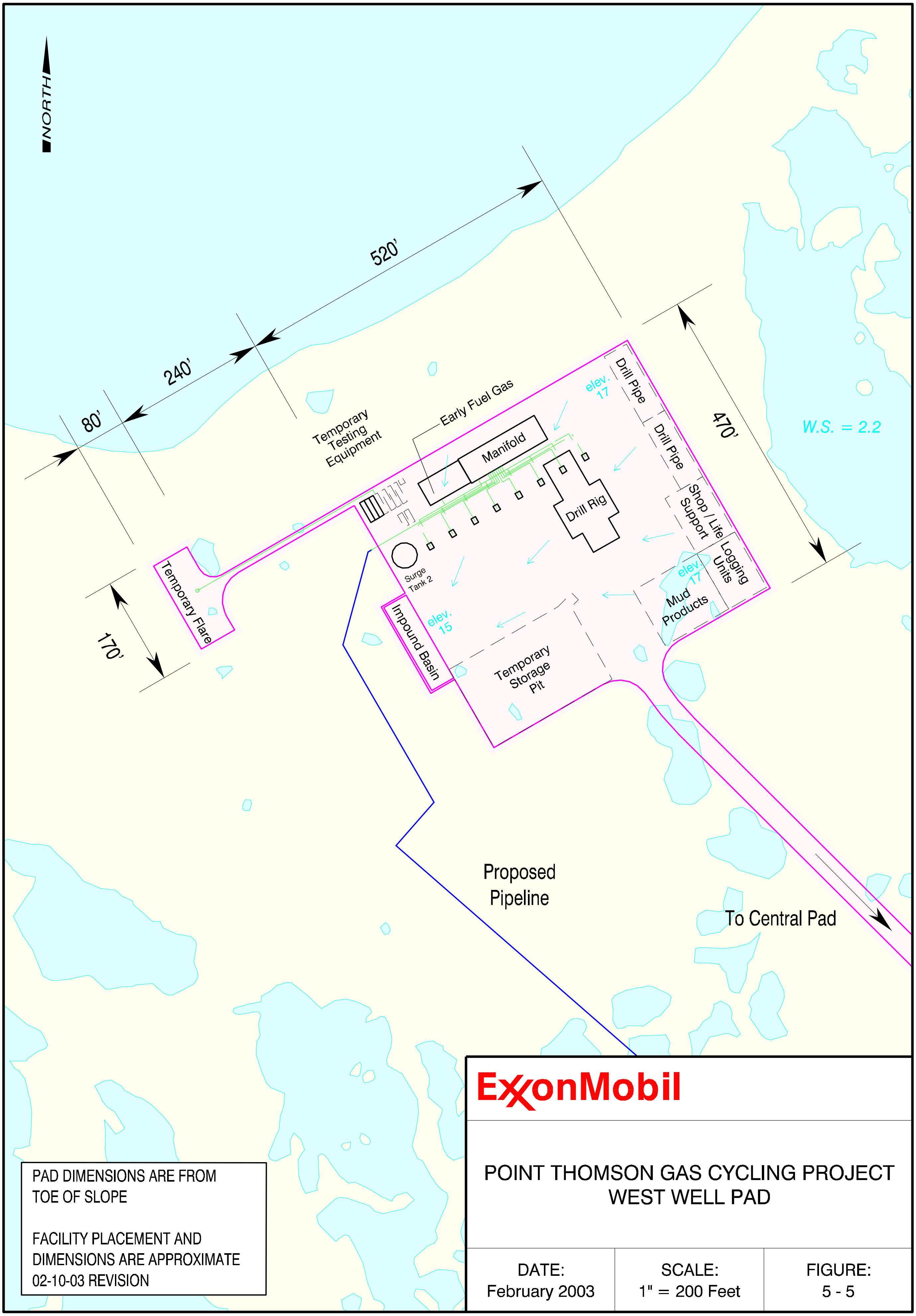

PAD DIMENSIONS ARE FROM TOE OF SLOPE

FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
WEST WELL PAD

DATE:	SCALE:	FIGURE:
February 2003	1" = 200 Feet	5 - 5

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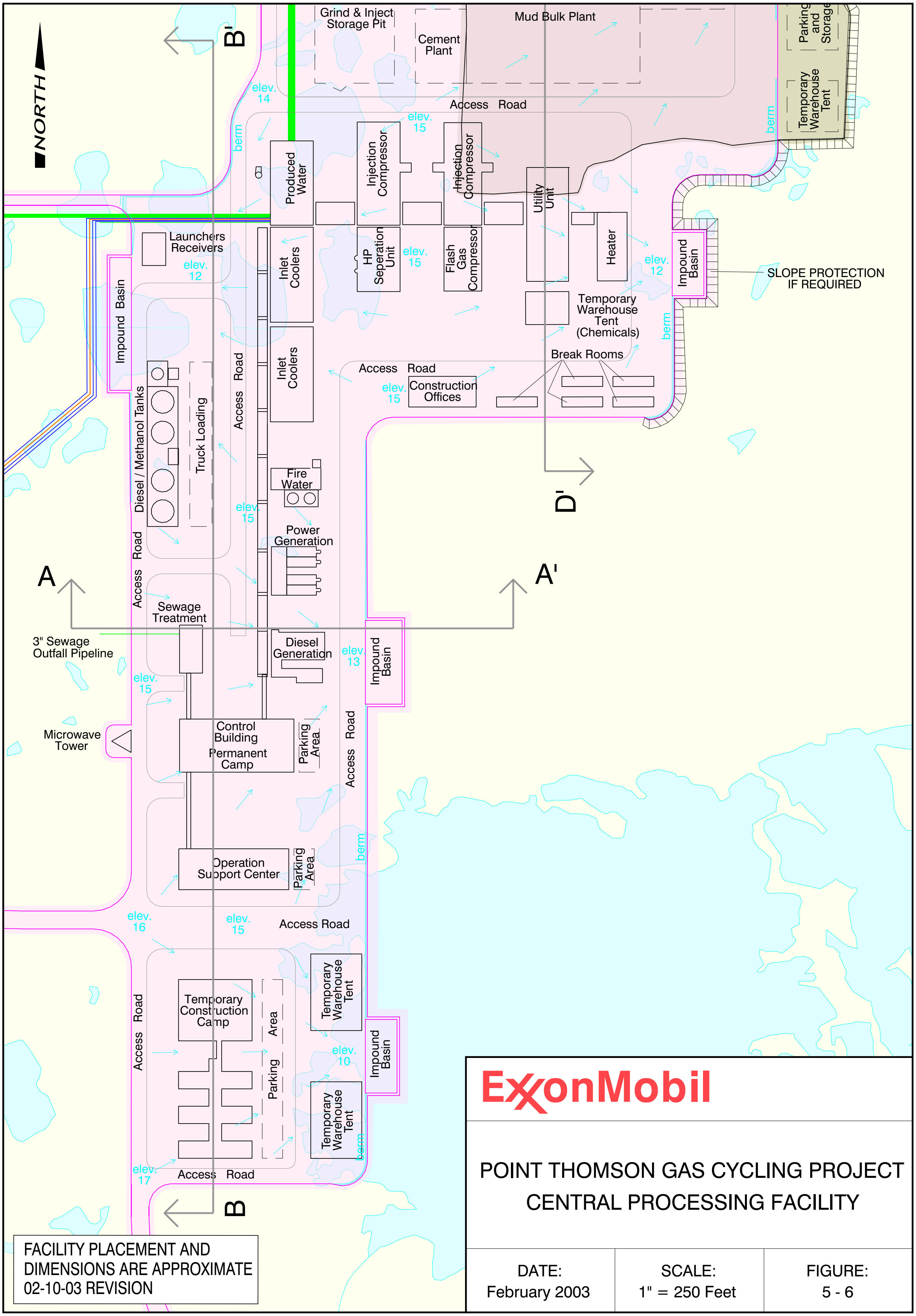

FACILITY PLACEMENT AND DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
CENTRAL PROCESSING FACILITY

DATE:	SCALE:	FIGURE:
February 2003	1" = 250 Feet	5 - 6

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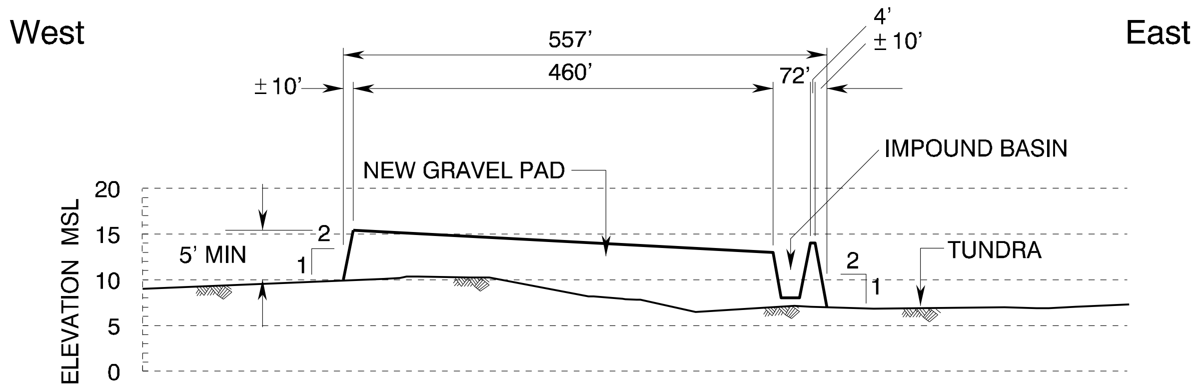
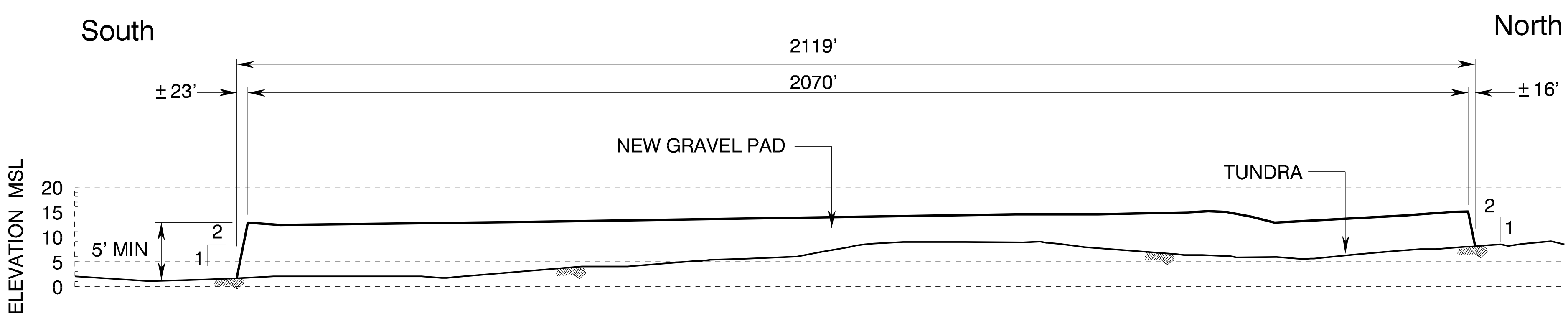


CROSS SECTION A - A'



CROSS SECTION B - B'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

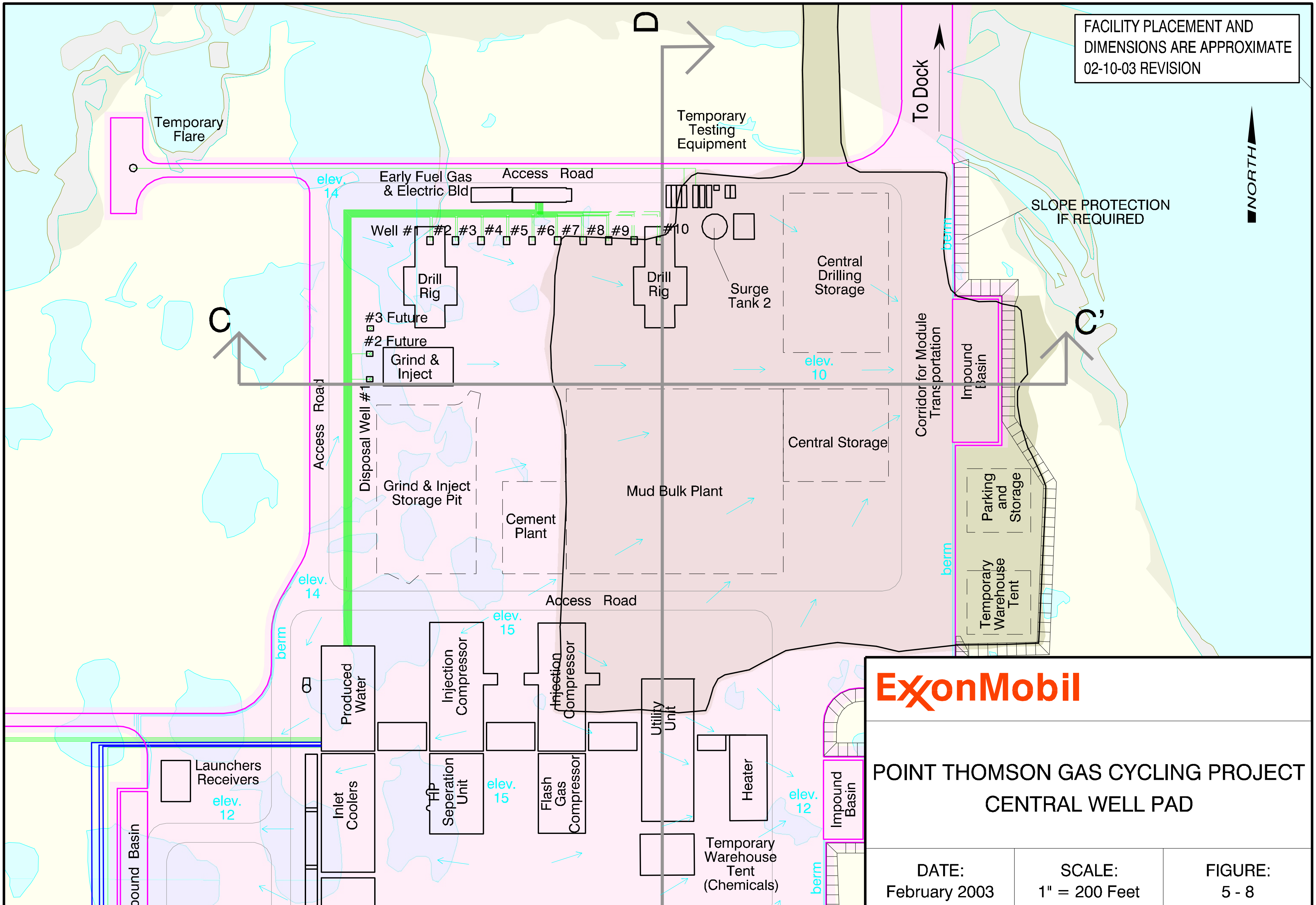
MSL = Mean Sea Level

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
CENTRAL PROCESSING FACILITY PAD
CROSS - SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	5 - 7

ex14745cross



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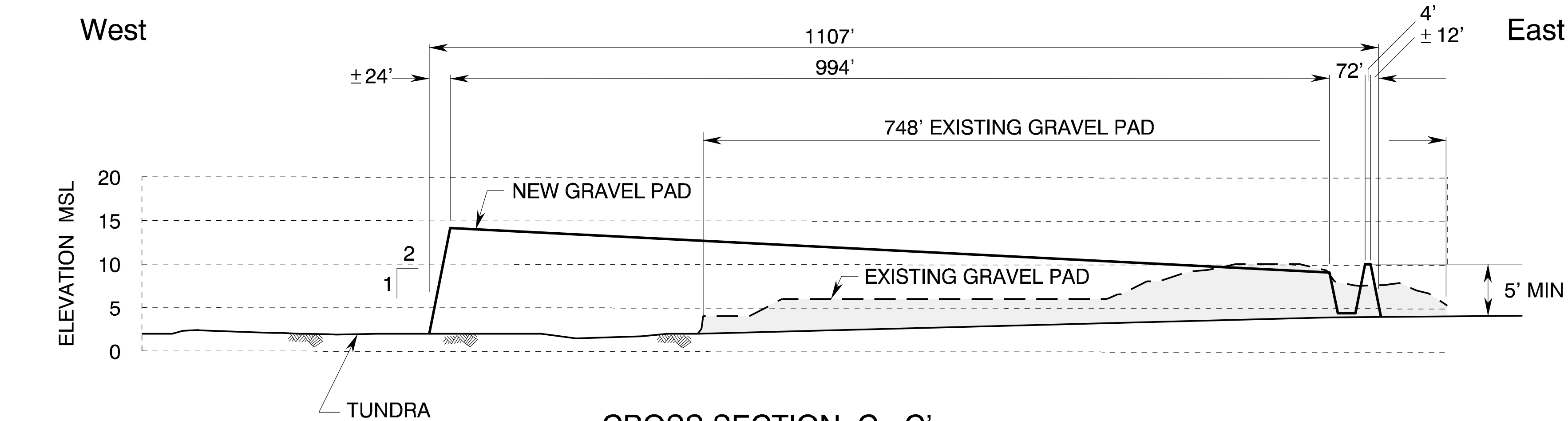
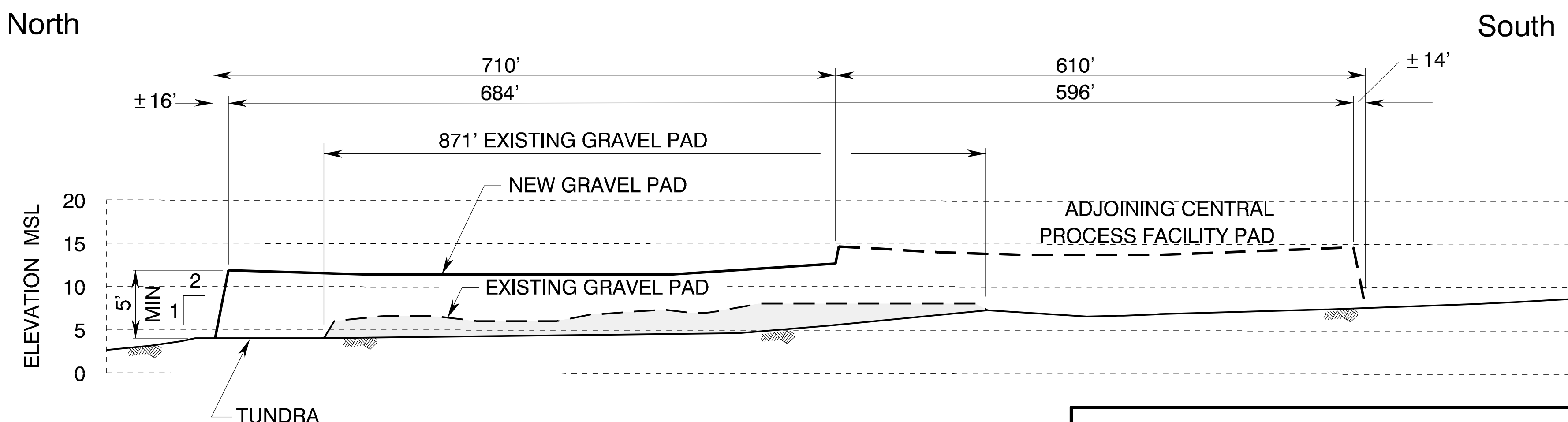


CROSS SECTION C - C'



CROSS SECTION D - D'

FACILITY PLACEMENT AND
DIMENSIONS ARE APPROXIMATE
02-10-03 REVISION

MSL = Mean Sea Level

ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
CENTRAL WELL PAD
CROSS - SECTIONS

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	5 - 9

ex14745cross

6.0 EXPORT PIPELINE SYSTEM

The Point Thomson Export Pipeline will be designed and, built according to proven North Slope design criteria, and operated as a common carrier system. The export system will consist of a 12-inch carbon steel pipeline approximately 22 mi long to transport condensate from the CPF to a connection point with the existing Badami pipeline. The pipeline will have a maximum allowable operating pressure (MAOP) of approximately 2,060 psi gauge (psig). Pig launchers and receivers will be included on this pipeline. From the tie-in point, the existing 12-in. Badami pipeline extends another 25 mi to tie in with the Endicott pipeline, which extends another 10 mi before connecting to TAPS Pump Station No. 1 at Prudhoe Bay.

The proposed Point Thomson Export Pipeline will be supported on VSMs complete with “Z” type offsets to allow for thermal effects. The VSMs will be designed and installed to provide minimum separation of 5 ft between the bottom of pipe, including any wind-induced vibration suppressors if required, and the tundra surface. Design and installation of the VSMs will be completed using standard ExxonMobil and North Slope pipeline specifications and procedures. The VSM design will be performed during the pipeline detailed design. Table 6-1 provides the engineering data as developed to date for the export pipeline.

6.1 ROUTE SELECTION AND ROUTE

The pipeline route was optimized to:

- Minimize pipeline encroachment into high-value vegetation areas,
- Minimize pipeline encroachment over small ponds and standing water,
- Minimize pipeline stream crossing by selecting those portions of the stream that are relatively narrow,
- Minimize pipeline bends, and
- Share the same VSMs as the gathering pipeline between the CPF and the West Well Pad.

The route, as shown in Figure 6-2, starts at the CPF Pad in Section 3, T9N, R23E, and Section 34, T10N, R23E and ends at the point of connection with the existing Badami sales oil pipeline in Section 8, T9N, R20E.

TABLE 6-1
ENGINEERING DATA SUMMARY FOR THE POINT THOMSON EXPORT PIPELINE

CATEGORY	DATA
Transported Substance	Liquid hydrocarbon (condensate)
Substance Specific Gravity (at standard conditions)	0.7 to 0.9 (water = 1.0)
Maximum Allowable Operating Pressure (MAOP)	2,060 psig
Pipeline Outside Diameter	12.750 inches
Pipeline Wall Thickness	**Mainline:** 0.281 inch **Station piping & valve and trap sites:** 0.375 inch
Pipe Material Grade	API 5L X65
Design Hoop Stress Factor	**Mainline:** 0.72 **Station piping & valve and trap sites:** 0.60
External Coating	**Mainline:** Polyurethane foam (PUF) insulation with galvanized metal outer jacket **Buried Road Crossings:** Fusion bonded epoxy and PUF insulation with galvanized metal outer jacket
Cathodic Protection	None
Minimum Hydrostatic Test Pressure & Duration	4 hr at minimum pressure of 125% MAOP and 4 hr at minimum pressure of 110% MAOP in accordance with U.S. Department of Transportation regulations (49 CFR, Part 195).
In-line Inspection Capability	Yes
Valves (To be determined**)**	**Mainline:** Actuated isolation valves at the inlet and outlet of the pipeline **Check:** None
Other Facilities	
Badami Meter	Meter at Badami CPU on or adjacent to existing pad
Badami Line Heater	Heater at Badami CPU on or adjacent to existing pad
Pigging Facilities	Pig launcher facility at Point Thomson CPF and pig receiver at Badami CPU on or adjacent to existing pad.
Pumps	Pumps at the Point Thomson CPF
Point Thomson Meter	Meter at the Point Thomson CPF
Pipeline Design Maximum Throughput	100,000 bbl/day
Pipeline Design Temperatures	**Maximum:** 200°F **Minimum:** -50°F
Pipeline Construction Mode(s)	**Mainline:** VSMs, minimum 5-ft clearance between bottom of pipe and tundra surface **Road Crossings:** In casings through road bed gravel (see Figure 6-1) **Creek and Water Crossings:** VSMs
Design Code/Regulation	49 CFR, Part 195
Minimum Operational Life	30 years

The entire length of the pipeline right-of-way (ROW) will cross lands owned by the State of Alaska. Figure 6-2 shows the approximate centerline alignment of the proposed route. The width and depth of stream or water body crossings will be determined and provided after field survey; however, all stream and water body crossings from Point Thomson CPF to the Badami tie-in will be constructed above-grade using VSMs. No below-grade river or stream crossings are planned, nor are they necessary because the streams traversed by the pipeline are small.

6.2 PIPELINE MATERIAL

As shown on Table 6-1, API 5L X65 pipe material will be used for the pipeline.

6.3 PIPELINE CAPACITY

As shown on Table 6-1, the pipeline is designed for a maximum throughput of 100,000 bbl/day.

6.4 PIPELINE INTEGRITY MONITORING SYSTEM

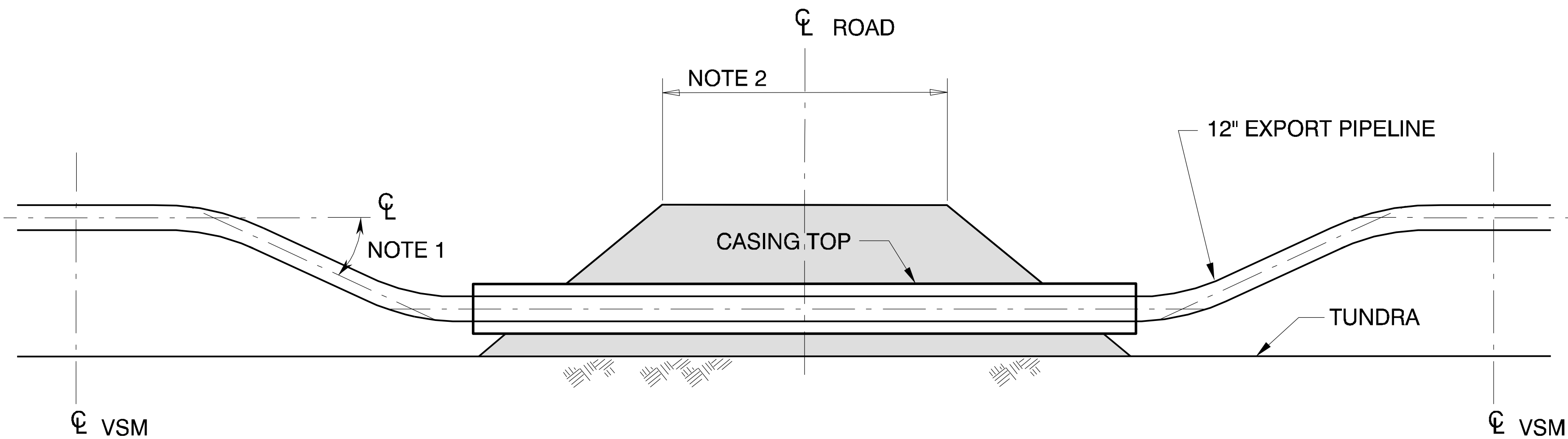
The proposed pipeline design will include a computational leak detection system in accordance with federal and state requirements. The system will perform real-time monitoring for pipeline leakage and will likely rely on operating data such as liquid hydrocarbon flow and pressure meter data. Meters will be provided on each end of the export pipeline (i.e., one at the CPF and one at the tie-in to the Badami pipeline). This information will be used to compute mass-balance calculations that will be able detect a leak volume less than 1% of the daily throughput. The operating data will be continually updated, gathered from field instruments, and compiled in the host computer via the supervisory control and data acquisition system. Specific hardware and software options for the leak detection system will be evaluated and selected later in project design.

Mainline valves will be installed at the pipeline inlet and outlet in accordance with the requirements of 49 Code of Federal Regulations (CFR), Part 195. Shutdown procedures will be developed to meet regulatory and industry standards. Pig launchers and receivers will be installed, and pipeline operations will include periodic in-line inspections using intelligent pigging tools to collect baseline and subsequent data sets for monitoring the condition of the pipeline over its operating life.

As discussed in Section 12, the Point Thomson Oil Discharge Prevention and Contingency Plan (ODPCP) will be developed and implemented in accordance with Alaska Department of Environmental Conservation (ADEC) regulations (18 AAC 75), which include plans for prevention of and response to any spills of oil, fuel or other substances. The ODPCP will provide specific spill containment and prevention measures, equipment needs, and response strategies. This ODPCP will address oil spill prevention and response to protect public health and safety during pipeline operation. Measures to protect public health and safety during pipeline operation include an ongoing inspection and maintenance program.

6.5 CORROSION MANAGEMENT

An internal protective coating is not necessary for the pipeline because condensate transported in the line will have low water and sulfur contents and thus would not cause corrosion of the inside wall of the pipelines. The addition of corrosion inhibitors to the fluid streams may be considered if required by the ultimate fluid properties and operating conditions. Corrosion coating of the export line to address external corrosion is being considered; however, it should be noted that cathodic protection for external corrosion control is not applicable for aboveground pipelines.



TYPICAL CROSS SECTION OF ROADWAY CROSSING

NOTES:

1. Angle will be determined during detailed design, based on topography, road bed thickness and the location and height of nearest VSM.
2. Road top width will be determined during detailed design.

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POINT THOMSON GAS CYCLING PROJECT
EXPORT PIPELINE
TYPICAL ROAD CROSSING

DATE:	SCALE:	FIGURE:
February 2003	Not to Scale	6 - 1

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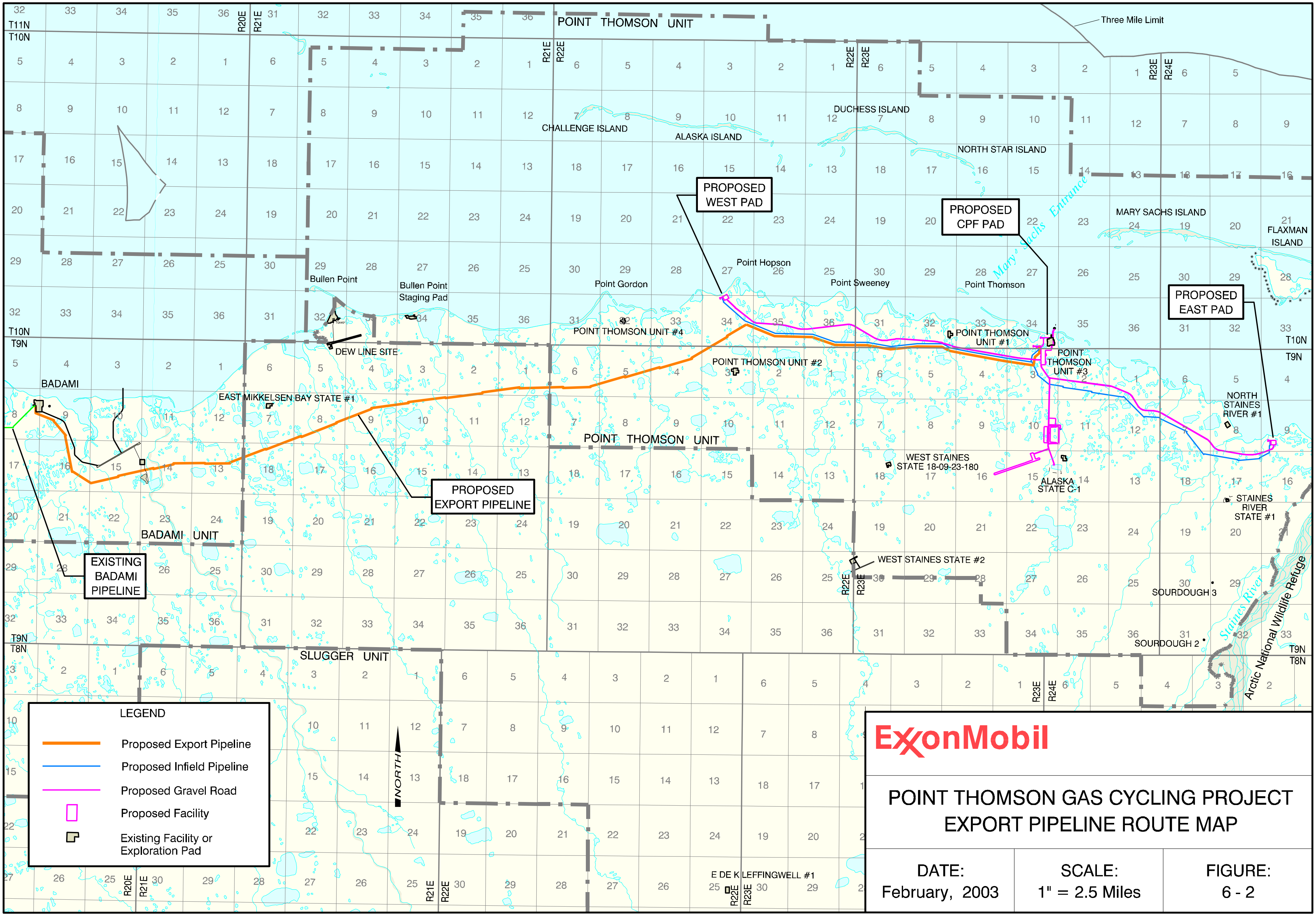


ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
EXPORT PIPELINE ROUTE MAP

DATE:	SCALE:	FIGURE:
February, 2003	1" = 2.5 Miles	6 - 2

ex14745_6-2.dgn

7.0 INFRASTRUCTURE AND CIVIL WORKS

This section includes descriptions of the transportation and support facilities required by the proposed project. Section 7.1 discusses the temporary road systems (sea-ice and land-based ice roads), as well as a temporary construction camp. Section 7.2 covers permanent facilities such as gravel roads, pads, an airstrip, and dock as well as the gravel sources and gravel stockpile required for construction. Infrastructure facilities such as a permanent camp, warehouse, diesel storage areas, telecommunications, fresh-water sources, and electrical power facilities are presented in Section 7.3.

7.1 CONSTRUCTION-RELATED INFRASTRUCTURE

7.1.1 Sea-Ice Road

Sea-ice roads will be established during the two winter-construction seasons to connect the Point Thomson Unit to the existing permanent road system at Endicott, which is approximately 50 miles to the west. The ice roads will follow the shoreline; the general route for the ice road is shown on Figure 7-1. During the second season, the ice road may tie into the infield gravel road at West Well Pad in order to reduce the length of the ice road. This will depend on activities that may be occurring at the West Well Pad during this period.

The sea-ice roads will support the 2005 and 2006 winter-construction seasons and drilling resupply (as described in Section 10). During the drilling and construction phase of the project, the sea-ice road will be used to transport heavy equipment, materials, and supplies. Depending on special activities and related logistics, a sea-ice road may be constructed on occasion once the facilities are in operation.

The roads will consist primarily of sea-water ice, with an option to cap the road with fresh-water ice. Spur roads probably will be constructed to connect the sea-ice road to onshore fresh-water sources and, if applicable, exploration gravel pads slated for gravel reuse and rehabilitation. Specific routes for the spur ice roads will be defined as project engineering and planning progress. Maintenance may consume 50,000 to 100,000 gallons of fresh water per day.

7.1.2 Land-Based Ice Roads

Ice roads situated on land (typically tundra) will be required during the first two construction seasons. During the first winter, one road approximately 3 mi long will extend south from the general location of the CWP, past the proposed gravel mine site, to the fresh-water source at the former gravel mine (Figure 7-2). Standard North Slope ice road construction from snow and fresh water produces a dock-to-mine-site ice road nominally 40 ft wide and 6 in. thick.

During the second winter, land-based ice roads will be required along the pipeline right-of-way to provide the travel and construction working surface for the export pipeline and gathering lines. Figures 7-3 and 7-4 show the proposed route of pipeline-construction ice roads from the East Well Pad to the CPF (about 6 mi), the CPF to West Well Pad (about 7 mi), and the West Well Pad to Badami (about 16 mi).

The width of an ice road for pipeline construction is generally about 100 ft , although it may be widened in select areas for materials storage or to provide access to other project-related activities. Standard North Slope ice road construction from snow and fresh water produces pipeline right-of-way ice roads which are nominally 100 ft wide and 6 in thick. Maintenance may consume an additional 50,000 to 100,000 gallons of fresh water per day.

Spur ice roads may be constructed to the sea-ice road at appropriate locations to improve access and travel times and, if applicable, connect to exploration gravel pads slated for gravel reuse and rehabilitation. The routes for the spur ice roads will be described as project execution plans are further developed. Standard North Slope ice road construction from snow and fresh water produces spur roads which are approximately 40 ft wide and 6 in thick. Maintenance may consume an additional 50,000 to 100,000 gallons of fresh water per day.

7.1.3 Temporary Camp

The initial "pioneer" stage of the construction camp will be a self-contained unit with its own utility services such as water and wastewater treatment. The camp may be leased from the existing North Slope inventory or purchased and then sold at a later date. The camp will be trucked to the site in stages, as required, on sea-ice roads. The pioneer stage will be used to support the first infrastructure construction and other early activities. The construction workforce is expected to peak during the first quarter of 2006, with simultaneous drilling operations, pipeline construction, and other construction works at the various locations.

The temporary camp will be augmented in stages to support the ultimate projected peak workforce capacity. The utility services required for the increasing construction camp size will be incorporated into the utility modules for the Central Processing Facility. The typical fresh-water requirement for camp operations amounts to 100 gallons per person per day. Should actual workforce requirements exceed the combined capacity of the construction and permanent camp facilities, the Badami construction camp may serve as overflow contingency along with other available facilities in the Deadhorse area.

7.2 CIVIL WORKS

7.2.1 Permanent Gravel Roads

Permanent all-weather gravel roads are required within the Point Thomson Unit to connect the project well pads, airstrip, gravel mine, and fresh-water supply source(s) to the centrally located CPF Pad (Figure 7-3). In addition, a gravel roadway will extend from the dock to the CPF Pad. Gravel roads for vehicle traffic will be nominally about 30 ft to 35 ft wide. However, the road from the dock to the CPF Pad will be about 50 ft wide to facilitate movement of the large, heavy facility modules brought in by a sealift.

The minimum permitted footprint for roads, pads, and the airstrip must have the dimensions of the finished surface plus an approximately 10-ft-wide shoulder per side to account for the side slopes (assuming a 5-ft average pad thickness). An additional buffer area around the entire footprint perimeter (i.e., beyond the traveled surface plus side slopes) will also be included in the permitted area for construction. This buffer area is necessary because, despite maintenance, material will invariably spread beyond the toe over time due to the steepness of the side slopes. Table 7-1 summarizes the design details for the various gravel roads, and Figure 7-5 depicts typical gravel road cross-sections. This information could change as engineering and project execution plans develop.

The gravel roads will cross creeks and small tundra streams, and culverts or bridges will be used at these crossings. The design selected will depend on the width of the stream and discharge flow parameters at the site of each road crossing. For the three streams, bridges will be installed. Figures 7-6 through 7-9 depict round pipe, arch pipe, and bridge configurations that will be used for typical crossings. The specific design will be selected for each water body crossing as engineering design progresses.

TABLE 7-1
SUMMARY OF GRAVEL ROADS

ROAD	DESCRIPTION	APPROXIMATE DIMENSIONS
CPF to AIRSTRIP[1]	Length	1.72 mi
	Width	34 ft
	Gravel Quantity	77,000 cubic yards (cy)
	Year Constructed	First winter
ABANDONED MINE SITE ROAD[1]	Length	0.31 mi
	Width	24 ft
	Gravel Quantity	18,000 cy
	Year Constructed	First winter
CPF to EAST WELL PAD	Length	5.2 mi
	Width	34 ft
	Gravel Quantity	328,000 cy
	Year Constructed	First winter
CPF to WEST WELL PAD	Length	5.64 mi
	Width	34 ft
	Gravel Quantity	405,000 cy
	Year Constructed	First winter
CWP to DOCK	Length	0.1 mi
	Width	50 ft
	Gravel Quantity	Included under Gravel Pad section Table 7-2
	Year Constructed	First winter

[1]Gravel volume includes spur roads to mine site, gravel storage pad, and abandoned mine site.

7.2.2 Airstrip

An airstrip operational on a year-round basis is essential for both the safety of plant operators and emergency response. The airstrip will provide the only year-round access to Point Thomson because the project is remote and isolated from existing facilities and the public and private road systems associated with Prudhoe Bay. Additionally, an airstrip provides a means of transporting people, supplies, equipment, and materials during those periods when access is not possible by either ice road or barge. The proposed location of the airstrip is approximately 2 mi from the coast, and south of the CPF Pad. Factors considered in the location were:

- Proximity to CPF and camp facilities,
- Location sufficiently south of the coast to minimize fog restrictions,
- Alignment with prevailing winds,
- Topography,
- Proximity to a gravel source,
- Avoidance of any creeks or lakes, and
- Proximity to existing access roads.

The location of the airstrip is shown on the facilities layout (see Figure 5-2) and details of its design are provided on Figures 7-10 through 7-12. It is anticipated that the airstrip will become operational by mid- to late-summer following its construction.

During operations, the types of aircraft using the strip most frequently for bringing in crew changes and supplies will be the size of a Beech 1900D. However, for maintenance and servicing of large equipment, the runway will be designed and built to provide landing and take-off capabilities for a fully loaded Hercules C-130. The proposed airstrip will also include the following features:

- An all-weather road to the CPF Pad,
- Runway lighting,
- Airport control building(s),
- Electrical service via cable buried in the road from the CPF power-generating facilities,
- Ramp for personnel and cargo transfer,
- Control and communication links to the CPF using fiber-optic cable, and
- Navigation and communication controls and an instrument approach system that provides 24-hour operation.

As with gravel roads, the minimum permitted footprint for the airstrip must have the dimensions of the finished surface plus an approximately 10-ft-wide shoulder per side to account for the side slopes. An additional buffer area around the entire footprint perimeter (i.e., beyond the traveled surface plus side slopes) will also be included in the permitted area for construction. This buffer area is necessary because, despite maintenance, material will invariably spread beyond the toe over time due to the steepness of the side slopes.

The airstrip will maintain an Instrument Landing System (ILS) to allow for aircraft operations to continue during certain adverse weather conditions. The ILS equipment will be located on small pads near the airstrip. The exact dimensions and locations of the ILS pads will be determined as engineering design progresses.

7.2.3 Dock

Facilities and logistics studies completed to date indicated that the dock is a necessary component of the project, and must be capable of landing barges transporting the CPF modules weighing up to 6,000 tons. This weight specification and the associated barge configuration require approximately a 9-ft water depth.

The design criteria and features of the proposed Point Thomson dock are similar to the 1,100-foot Badami Dock that has proven to be a successful design. The Badami dock head comprises sheet piling on three sides with gravel bag slope protection linking the sheet piling with the roadway. The dock access road is constructed of gravel placed at the natural angle of repose. In 2003, the Badami Dock was subject to two significant summer/fall storm events, which resulted in the need for only minor regrading of the roadway section. Both the Badami Dock and the proposed Point Thomson Dock are located within the barrier islands, which afford some protection from waves. On-going engineering evaluations preliminarily indicate similar oceanographic conditions at both locations but with slightly greater design wave height due to greater fetch at Point Thomson, which may necessitate a slightly higher roadway section.

The dock will be a gravel-fill structure 750 ft long by 100 ft wide (Figure 7-13). The dockhead will be 150 ft by 100 ft, complete with sheet piling, cell walls, fenders, bollards, and face beams (Figures 7-14 and 7-15). Gravel bag slope protection, if necessary, will be placed at the dock intersection with the roadway and the remainder of the structure will be gravel fill with 1:7 side slopes (horizontal to vertical). It is anticipated that approximately 63,000 cy of gravel will be required to construct the dock. During the summer of 2005 the water depth at the dock will be adequate for coastal barges operating between Prudhoe Bay West Dock and Point Thomson which will transport the drilling rig and various construction materials and supplies. During 2006, a sealift to ship the CPF modules to the project area will require larger barges with 9-ft draft. A dredged channel is planned to be excavated during the prior winter from the dockhead to the 9-ft isobath during the previous winter. The channel area, as depicted in Figure 7-14, is estimated to be approximately 1,000 ft by 400 ft. A small launch ramp for Alaska Clean Seas (ACS) spill response boats and equipment will be established on the dock road.

7.2.4 Pads

The Point Thomson Gas Cycling Project will require gravel pads to support production and gas injection wells, process facilities, a permanent camp, and gravel storage (Figure 5-2). The location of the pads in the Point Thomson Unit is based on a combination of environmental considerations and the need to reach bottom-hole targets in the Thomson Sand reservoir. Production wells will be situated on two pads: the East Well Pad and the West Well Pad. The CWP will support gas injection and waste disposal wells, and another pad will serve as a location for the CPF and all related infrastructure, support equipment, and required services. Surface drainage and impoundment basins on these pads will be designed to control storm-water runoff. A fifth pad will be located next to the gravel mine where gravel will be stockpiled for future maintenance needs. Table 7-2 provides a summary of the dimensions, gravel requirements, and features of each gravel pad; however, the final design is likely to change as engineering design matures.

TABLE 7-2
SUMMARY OF GRAVEL PADS

PAD	DESCRIPTION	APPROXIMATE SIZES
EAST WELL PAD	Size (L x W)	535 ft x 445 ft
	No. of Wells	7 production and space for 2 future
	Gravel Volume	70,000 cy
	Year of Construction	First winter
WEST WELL PAD	Size (L x W)	500 ft x 450 ft
	No. of Wells	6 production and space for 2 future
	Gravel Volume	67,000 cy
	Year of Construction	First winter
CENTRAL WELL PAD (includes portions of the 50-ft Dock Road)	Size (L x W)	1000 ft x 727 ft
	No. of Wells	8 injection and space for 2 future; 1 disposal, and space for 2 future
	Gravel Volume	147,000 cy
	Year of Construction	First winter
CPF PAD (includes portions of the 50-ft Dock Road)	Size (L x W)	1600 ft x 659 ft
	No. of Wells	N/A
	Gravel Volume	330,000 cy
	Year of Construction	First winter
GRAVEL STORAGE PAD / MAINTENANCE STOCKPILE	Size (L x W)	700 ft x 700 ft
	Gravel Volume	287,000 cy
	Year of Construction	First winter
CPF DOCK AND ACCESS ROAD	Size (L x W)	See Figure 7-14
	Gravel Volume	79,000 cy
	Year of Construction	First winter
CPF LP/HP FLARE AREAS	Size (L x W)	990 ft. x 24 ft.
	Gravel Volume	14,000 cy
	Year of Construction	First winter
CWP TEMPORARY FLARE AREA	Size (L x W)	310 ft. x24 ft.
	Gravel Volume	7,000 cy
	Year of Construction	First winter
CPF/CWP IMPOUNDMENT BASINS	Size (L x W)	Figures 5-6 and 5-8
	Gravel Volume	11,000
	Year of Construction	First winter

7.2.5 Gravel Sources

The majority of permanent infrastructure will be constructed using gravel mined within the Point Thomson Unit. The gravel uses for the permanent infrastructure will include:

- A gravel mine with stockpiles;
- Gravel pads for drilling, wellheads, and process facilities;
- Gravel infield roads;
- Gravel-filled dock with sheet-pile facing; and
- Gravel year-round airstrip.

The primary gravel source for the Point Thomson Gas Cycling Project will be a new gravel mine located approximately 2 mi south of the CPF. The centrally located site has been selected to minimize both the impact on seasonal lakes and the haul distance from the mine to the major gravel fill locations. Geotechnical surveys at this mine site have identified gravel of sufficient quantity and quality for construction use.

It is anticipated that approximately 2,600,000 cy of gravel and 586,000 cy of overburden will be removed from the 46.5-acre mine site. The site will be located just north and east of the airstrip. Figures 7-16 and 7-17 show the plan view and cross-section of the proposed gravel mine site, respectively. A mining and rehabilitation plan is presented in Appendix B.

The mine site will be used as a fresh-water reservoir once mining activities are completed. An inlet structure will be constructed to divert water from peak discharges which occur in an adjacent stream during spring breakup (Figures 7-18 and 7-19). The inlet structure consists of a concrete-lined channel with a fish exclusion device and an adjustable weir. The height of the weir can be increased or decreased to match the actual stream channel elevation during breakup. The weir can be left in its highest configuration to prevent diversion during low-level summer stream flows.

7.2.6 Maintenance Gravel Stockpile

A gravel stockpile will be required for maintenance of gravel roads and pads (Figure 7-16). This stockpile will be created during the gravel mining operation using gravel mined prior to the flooding of the mine site. The stockpile is anticipated to be approximately 274,000 cy, which should be enough to maintain the project road and pad system. Based on past North Slope projects experience, it is estimated that 15% of the total gravel requirement for the project is required for maintenance throughout the project operations.

A secondary use of the large gravel surface provided by the stockpile is to serve as a storage area, particularly during the drilling phase of the project. The gravel storage pad will be immediately adjacent to and north of the proposed mine site, with the west side of the pad adjoining the CPF/airstrip infield road. The gravel storage pad will cover approximately 11 acres.

7.2.7 Channel Dredging and Spoils Disposal

The dock will require an additional 2 ft of water depth (9 ft of water) to accept ocean-going barges carrying process modules with weights up to 6,000 tons. A channel with a bottom elevation of -9 ft mean lower low water (MLLW) will be dredged from the dock to the -9 ft MLLW isobath approximately 1,000 ft offshore of the dock (Figure 7-14). Approximately 70,000 to 90,000 cy of dredge spoil will be generated based on a channel 400 ft wide and 1,000 ft long with a bottom depth of -11 ft MLLW. The additional 2 feet of over-dredging (-9 ft to -11 ft) are required to compensate for potential channel refilling during the winter, spring, and summer between dredging and module arrival.

The channel will be dredged from the sea-ice during the winter prior to the sealift of process modules. Sea ice over the channel location will be removed in blocks and stockpiled on grounded sea-ice near the shoreline. Excavation will be performed using either a backhoe or a cutter/suction dredge. Spoil excavated by backhoe will be placed in trucks and hauled to permitted disposal areas. Spoil excavated by a dredge will be discharged into bermed areas atop the ice and allowed to freeze, after which it will be excavated and trucked as solid material to permitted disposal areas. Current areas proposed for spoil disposal include the Point Thomson spit, the grounded sea-ice offshore of the Point Thomson spit, the grounded sea ice adjacent to the dock road, and the lagoon coast adjacent to the east side of the CWP.

Additional dredging may be required during the summer the process modules are delivered. Depending on the degree of channel infilling between dredging and module arrival, maintenance dredging or screeding may be required to provide a sufficiently smooth and deep channel for grounding barges prior to unloading. Summer maintenance dredging could be performed using either a backhoe on a barge or a cutter/suction dredge. Spoil excavated by backhoe would be loaded onto a barge and towed to a permitted disposal location. Spoil excavated by dredge would be pumped to a permitted disposal location. Screeding would consist of smoothing the channel bottom without removing material from the water, and thus, no excavation or disposal would be required.

Ocean-going barges delivering process modules will approach the Point Thomson Unit through Mary Sachs Entrance or use Challenge Entrance. Summer screeding may be required prior to barge arrival to ensure that either route is deep enough to allow passage of ocean-going barges with a 9-ft draft. If sufficiently stiff and consolidated seafloor sediments are encountered, a backhoe may be necessary to loosen the material. While the available bathymetry is dated or incomplete at this time, the volume of screed material is anticipated to be approximately 10,000 to 13,000 cy. Additional engineering and logistics evaluations are going to identify the optimal approach for the sealift.

7.3 INFRASTRUCTURE AND SUPPORT FACILITIES

7.3.1 Permanent Camp

The permanent camp, located south of the process facilities, will be designed and built to accommodate 88 people at various times throughout the construction and operation phases. The camp will include a kitchen, laundry, recreational facilities, and sleeping quarters. Water supply and sewage treatment for the camp will be provided through a separate utility module.

A utility module supporting camp operations is planned to contain the potable-water treatment system, the sewage treatment system, the firewater pumps, and an incinerator used for some disposal of facility wastes. This utility module will also contain a potable-water storage tank for camp use. The typical fresh-water requirement for camp operations amounts to 100 gallons per person per day. Gray water from the plant sewage treatment system will be disposed of in the disposal well once that well is operational.

A raw-water storage tank will accompany the camp utility module and serve as the source for the camp potable water and firewater. This tank and associated instrumentation will be heat-traced and insulated to avoid damage during freezing weather. Water tanks will be refilled with local surface water collected either by truck or via a water-supply pipe from two area gravel-mine sites (i.e., an existing mine site and the new mine site, both located about 2 mi south of the CPF).

7.3.2 Warehouse

The warehouse will provide a dry and warm storage area, a rig maintenance area, a vehicle maintenance area, and individual maintenance areas for electrical, instrumentation, and mechanical support. Presently, the warehouse is planned as an insulated rigid-frame metal building. The warehouse floor will be a cast-in-place concrete slab at grade.

Other temporary structures may be erected onsite for maintenance and storage functions. Currently, two temporary 15,000-square-foot construction warehouses will be erected on the central pad. Additionally, one temporary 10,000-square-foot drilling warehouse will be installed on the central pad.

7.3.3 Water Sources

Sea water for 2005 and 2006 sea-ice roads will be withdrawn from locations along the road alignment. Sea water can be obtained by drilling through floating sea ice and then pumping the sea water across the surface of the ice. This technique is used for grounding sea ice and increasing sea-ice thickness in order to provide load-bearing capacity for vehicle travel.

Ice chips for the 2005 and 2006 ice roads are likely to be milled from the surface of the sea ice and the surface of frozen fresh-water lakes. Ice chips provide a solid aggregate to be used in place of liquid water. Ice chips are placed where required and coated with liquid water which provides a binder as it freezes in place. Figure 7-20 shows potential water-source lakes for ice road construction and other activities.

Fresh-water requirements during the first half of 2005 will be supplied from existing year-round water sources located between Endicott and the Point Thomson Unit, including the closed Point Thomson Area Material Site (i.e., Old Mine Site). Sources in the vicinity of the Pt. Thomson CPF include permitted Unnamed Lake and Pt. Thomson Old Mine Site as well as possible future permitted sources. Sources in the vicinity of Badami CPU include permitted Shaviovik Pit, Turkey Lake, and Badami Reservoir as well as possible future permitted sources. Sources in the vicinity of the Endicott causeway landfall include Duck Island Mine Site and Sag Mine Site C (Vern Lake) as well as possible future permitted sources.

Fresh water for construction is typically transported by truck, while fresh water for permanent use is typically transported by an above-grade force-main. Table 7-4 provides previously permitted volumes for water sources used for earlier activities in the Point Thomson area and developments to the west. The Point Thomson Area Material Site, located roughly 2.5 mi south of the CPF, was used as a gravel mine during exploration activities within the Point Thomson Unit. Fresh-water requirements after the 2005 breakup will also be supplied from existing year-round water sources located between Endicott and the Point Thomson Unit. The significantly greater water demand will require that a large portion of the water be drawn from the new fresh-water reservoir created by filling the new gravel mine. The new reservoir will be created by flooding the mine site. An intake structure and associated water line will supply the facility with fresh water from the reservoir (Figure 7-21 through 7-24).

Tables 7-3A through 7-3D summarize conceptual estimates of annual anticipated fresh-water demand during the Point Thomson Gas Cycling project construction and operation. Additional work is presently being completed to refine information on recharge of water sources.

7.3.4 Tankage

Table 7-5 illustrates the tanks and storage areas required for the project. Because the information provided in this table may change as engineering design develops, results of ongoing studies will be used to better define the actual tank sizes, contents, and locations. If required, tanks and associated instrumentation will be heat-traced and insulated to avoid damage during freezing weather.

Diesel fuel is required at the beginning of the project to support initial drilling and construction activities. Later, when the permanent gas-fired power plant is in operation, the diesel tanks will be used to store fuel for vehicles and to support the diesel-powered essential power generators consumption. Four 12,500-bbl tanks will be installed to meet these purposes. This capacity provides sufficient fuel, with resupply by either tanker trucks or barge, to support the various phases of the project through the first two years of construction and operations. The diesel tanks will be designed to applicable American Petroleum Institute (API) standards. The tanks will be double-walled and double-bottomed, with a leak detection system and instrumentation/controls system adequate to safeguard the tank storage, loading, and dispensing operations.

Methanol is required for hydrate and freeze protection for the wells, production and injection lines as well as the process facilities during startup and shutdowns (Table 7-5). Provision will also be made for the storage of several other chemicals to support ongoing operations.

7.3.5 Telecommunications

A private microwave connection (CPF-Badami-Deadhorse) will be the CPF’s local/wide area network and PBX telephone network tie-in point to the public switched telephone network, Company wide-area network (WAN), Alaska Clean Seas (ACS, the oil spill response contractor) radio network, distributed control system (DCS) local-area network (LAN) extension to Badami, and CPF Company radio system extension to Badami. Intra-module cabling (horizontal cabling) will be installed to support voice and business LAN data systems within designated modules located on the CPF pad. Redundant fiber optic and multi-pair copper cable runs (backbone) will be used to provide voice, data, DCS signals, and basic process control system signals between modules/locations at the CPF and to/from the East, Central, and West Well Pads.

TABLE 7-3A
POINT THOMSON 2005 FRESH-WATER USE

ACTIVITY	ITEM	ESTIMATED WATER QTY (GALLONS)	POTENTIAL SOURCE(S)
Ice Roads	2005 sea-ice road cap	16,421,100 (7,390,000 gallons fresh water and 44,720 cubic yards [cy] ice chip)	Source(s) in the vicinity of the Point Thomson CPF and West Well Pad; Source(s) in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott causeway landfall.
	Point Thomson dock-to-mine site ice road construction. Spur ice roads to water sources	6,270,000 (2,822,000 gal fresh water and 17,080 cy ice chip)	Existing Point Thomson gravel mine site and shallow lakes between the Point Thomson dock and mine site. Source(s) in the vicinity of the CPF and production well pads; and Source(s) in the vicinity of the Badami CPU.
	Shoreline to Shaviovik Pit ice road	1,425,000 (641,000 gal fresh water and 3,880 cy ice chip)	Source(s) in the vicinity of the Badami and Shaviovik pits.
	Ice road to existing exploratory well sites	11,400,000 (5,130,000 gal fresh water and 31,050 cy ice chip)	Source(s) in the vicinity of the Point Thomson CPF and West Well Pad; Source(s) in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott causeway landfall.
	2005 staging areas	2,700,000 (1,215,000 gal fresh water and 7,350 cy ice chip)	Source(s) in the vicinity of the Point Thomson CPF and West Well Pad; and Source(s) in the vicinity of the Badami CPU.
	2005 maintenance	5,050,000	Source(s) in the vicinity of the CPF and production well pads; Source(s) in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott causeway landfall.
Drilling & Construction	2005 drilling 2 wells @ 3,167,000 gallons per well	6,334,800	Source(s) in the vicinity of the CPF and production well pads.
	2005 temporary construction camp weekly manloading varies from min. 10 people to max. 225 people	2,320,500	Source(s) in the vicinity of the CPF.
2005 Totals	Water use	51,921,400	Source(s) in the vicinity of the CPF and production well pads; Sources in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott causeway landfall.
	20% contingency volume	10,348,000	Same as above.
	Total	62,305,400	

NOTES FOR TABLE 7-3A , 7-3B, 7-3C, 7-3D

1. Sources in the vicinity of the Pt. Thomson CPF include permitted Unnamed Lake and Pt. Thomson Old Mine Site as well as possible future permitted sources. Sources in the vicinity of Badami CPU include permitted Shaviovik Pit, Turkey Lake, and Badami Reservoir as well as possible future permitted sources. Sources in the vicinity of the Endicott causeway landfall include Duck Island Mine Site and Sag Mine Site C (Vern Lake) as well as possible future permitted sources.
2. Sea-ice road cap is nominally 40 ft wide, 6 in. thick and made from pure fresh water (790,000 gallons per mile [gal/mi] by 42 mi long).
3. Dock-to-mine-site ice road is nominally 40 ft wide and 6 in. thick, standard North Slope ice road construction from snow and fresh water (569,100 gal/mi by 2.6 mi long).
4. Spur roads to water sources will be nominally 40 ft wide and 6 in. thick, standard North Slope ice road construction from snow and fresh water (569,100 gal/mi by 20 mi total length).
5. 90-day maintenance period, 42,000 gal applied per day.
6. Pipeline right-of-way ice roads are nominally 100 ft wide and 6 in. thick, standard North Slope ice road construction from snow and fresh water (1,430,000 gal/mi by 28.2 mi total length).
7. 90-day maintenance period, 84,000 gal applied per day.
8. Water quantity for drilling includes sufficient water for the water-based drilling fluid, casing cement and operation of the G&I system for cuttings and drilling fluid disposal. Estimate is based on 3,167,400 gallons per well.
9. 2 wells in 2005.
10. 11 wells in 2006.
11. 7 wells in 2007 and 1 well in 2008.
12. 100 gal per day per person, average camp occupancy: per the table.
13. Hydrostatic testing could be conducted in the summer and fall following construction in which case access to the pipeline will not exist except at the trap and valve sites (i.e., located on pads). Pure fresh water would be used for testing and would be discharged onto the tundra following appropriate filtration and diffusion. Alternatively, the testing program could proceed in March and April, immediately after the pipelines are constructed in which case the ice roads would still be in place and ambient temperature would still be sub-freezing. A 60:40 water/glycol mixture would be used for testing and would be recovered and hauled to an approved facility for disposal or reuse upon completion of testing.
14. 100 gal per day per person, for domestic water use in camp.
15. May construct ice road in winter 2007 and/or 2008 for drilling demobilization.

TABLE 7-3B
POINT THOMSON 2006 FRESH-WATER USE

ACTIVITY	ITEM	ESTIMATED WATER QTY (GALLONS)	POTENTIAL SOURCE(S)
Ice Roads	2006 sea-ice road cap	13,721,100 (6,175,000 gal fresh water and 37,370 cy ice chip)	Source(s) in the vicinity of the CPF and West Well Pad; Source(s) in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott cause-way landfall.
	Pipeline right-of-way ice road construction Spur ice roads to water sources	139,233,600 (62,655,000 gal fresh water and 379,180 cy ice chip)	Source(s) in the vicinity of the CPF and the East and West Well Pads; Source(s) in the vicinity of the Badami CPU; and Sources in the Old PTU and New PTU Pit.
	2006 maintenance	6,900,000	Source(s) in the vicinity of the CPF and pro-duction well pads; Source(s) in the vicinity of the Badami CPU; and Source(s) in the vicinity of the Endicott cause-way landfall.
Drilling & Construc-tion	2006 drilling	34,841,400	Source(s) in the vicinity of the CPF and pro-duction well pads.
Domestic	2006 construction camp and permanent camp, weekly manloading varies from min. 185 people to max. 409 people	10,298,400	Source(s) in the vicinity of the CPF.
Hydrostatic Testing	Gathering pipeline hydro-static testing, summer/fall program	550,000	Source(s) in the vicinity of the CPF and pro-duction well pads, accessible from the pads or access roads.
	Condensate export pipe-line hydrostatic testing, summer/fall program	720,000	Source(s) in the vicinity of the Badami CPU pad, accessible from the pads or access roads.
	Well pad and CPF piping and vessel testing	30,000	Source(s) in the vicinity of the CPF and pro-duction well pads, water will be blended with glycol to form a 60:40 mixture.
2006 Totals	Water use	206,294,500	Source(s) in the vicinity of the CPF and pro-duction well pads; Sources in the vicinity of the Badami CPU; Source(s) in the vicinity of the Endicott cause-way landfall; and Sources from the New PTU Pit.
	20% contingency volume	41,258,900	Same as above.
	Total	247,553,400	

TABLE 7-3C
POINT THOMSON 2007 FRESH-WATER USE

ACTIVITY	ITEM	ESTIMATED WATER QTY (GALLONS)	POTENTIAL SOURCE(S)
Ice Roads	None	N/A	
Drilling & Construction	2007 drilling	22,171,800	Source(s) from the New PTU Pit and Old PTU Pit.
Domestic	2007 construction camp and permanent camp, weekly manloading varies from min. 264 people to max. 394 people	11,146,100	Source(s) from the New PTU Pit and Old PTU Pit.
2007 Totals	Water use	33,317,900	Source(s) from the New PTU Pit and Old PTU Pit.
	20% contingency volume	6,663,580	Same as above.
	Total	39,981,480	

TABLE 7-3D
POINT THOMSON 2008 FRESH-WATER USE

ACTIVITY	ITEM	ESTIMATED WATER QTY (GALLONS)	POTENTIAL SOURCE(S)
Ice Roads	None	N/A	
Drilling & Construction	2008 drilling 1 well @ 3,167,400 gal-lons	3,167,400	Source(s) from the New PTU Pit and Old PTU Pit.
Domestic	2008 construction camp and permanent camp, weekly manloading varies from min. 150 people to max. 200 people	5,657,900	Source(s) from the New PTU Pit and Old PTU Pit.
2007 Totals	Water use	8,825,300	Source(s) from the New PTU Pit and Old PTU Pit.
	20% contingency volume	1,765,060	Same as above.
	Total	10,590,360	

TABLE 7-4
EXAMPLE PERMITTED VOLUMES FOR FRESH WATER SOURCES IN THE POINT THOMSON AREA AND TO THE WEST

WATER SOURCE	GENERAL LOCATION	CURRENT/ PAST BPXA PERMIT #	PERMITTED VOLUME TOTAL FOR ALL SOURCES (CURRENT OR PAST)	ESTIMATED VOLUME (GAL)	ADF&G RESTRIC-TIONS?	COMMENTS
Duck Island Mine Site	Endicott Road	LAS 13290	221 acre-ft per year (72,000,000 gal)	600,000,000	No	Past permitted volumes based on need rather than availability
Sag Mine Site C (Vern Lake)	Endicott Road	LAS 13629		792,000,000	Yes	
Badami Reservoir	Badami Devel-opment	LAS 19045	12.27 acre-ft (Oct 1 to Jun 1) (20,000,000 gal) 6.14 acre-ft (Jun 2 to Sep 30) (10,000,000 gal)	86,000,000	Yes	Drinking water source
Turkey Lake	South of Badami CPU			730,000	No	Relatively shal-low lake
Shaviovik Pit	Shaviovik River Delta, west of Badami CPU	LAS 14042 (due to expire May 2003)	1125.27 acre-ft per year (370,000,000 gal)	125,000,000	No	Typically used in ice roads to Badami
Point Thomson Old Mine Site	Point Thomson Unit develop-ment area			104,000,000	Unknown	--
Point Thomson New Mine Site	Point Thomson Unit develop-ment area	--	--	527,318,230	Unknown	--
Unnamed Lake	Point Thomson Unit develop-ment area (Sec. 22 & 23, south of airstrip)	--	--	923,000	No	Used for Yukon Gold and Sour-dough ice roads

TABLE 7-5
PROPOSED TANKS AND STORAGE AREAS

LOCATION	DESCRIPTION	APPROXIMATE SIZE	NOTES
CPF PAD	Potable and Fire-Fighting Water Tank	2 tanks at 2,000 bbl/each	Located adjacent to the utility module building
	Fine-Water Mist System Fire-Fighting-Water Tank	1,400 bbl	Located within a module
	Cold Storage Area (chemical, lube oil, etc., drums and containers)	50 ft by 150 ft This is approximate size and may be adjusted once quantities better defined	Located outdoors, lined with high-density polyethylene attached to a 1-ft-high retention curb
	Diesel Fuel Tank	4 tanks @ 12,500 bbl each (One tank may be converted to produced water and the other to condensate storage)	Located outdoors, with double-walls and double-bottoms
	Drag Reducing Agent Tank (future)	500 to 800 bbl	Located outdoors, insulated and heated (may be a tanker)
	Methanol Tank	1 tank @ 2,500 bbl (CPF) 1 tank @ 30 bbl (CWP)	Located outdoors
	Produced Water Tank	2,000 bbl	Located outdoors; may be double-walled
	Raw Water Tank	240 bbl	Outdoor or utility module
	Other Production Chemicals (corrosion inhibitor, emulsion breaker, etc.)	Various	In totes or small tanks at locations where required (CPF, CWP, East and West Well Pads)
	G&I System Storage Pit (cuttings storage)	20,000 bbl (115 ft by 265 ft)	Open area with perimeter berms and synthetic liner
EAST & WEST WELL PADS	Methanol Tank	2,000 bbl	Located outdoors, each pad
	Diesel Tank	2,000 bbl	Located outdoors, each pad
	G&I System Storage Pit (cuttings storage)	16,000 bbl	Located outdoors, each pad

A PBX telephone switch will provide local telephony/fax services for Company personnel at the CPF. A multi-channel, conventional digital repeater system will provide Company personnel within the CPF and personnel traveling along the pipeline with continuous radio communications. A multi-channel, conventional analog repeater system will be dedicated to supporting emergency response activities at the CPF and along the pipeline route, and will be used for spill response. Miscellaneous radio and navigation systems will be installed in each ACS vessel at the CPF to support emergency response activities.

A color closed-circuit television system (CCTV) will be installed to visually monitor select areas at the CPF and wellpad locations. An entertainment system will be provided for the CPF living quarters and other communal areas.

A new communication tower and associated equipment will be installed on the Point Thomson CPF Pad. The existing communication tower at Badami will act as a repeater system enabling the exchange of voice and data signals between Point Thomson and Prudhoe Bay (Deadhorse), existing systems on the North Slope (e.g., ACS), and the outside world. The CPF tower is presently planned to be approximately 300 ft tall, and will be the facility's tallest structure. Depending on structural design of the existing Deadhorse tower, a new communications tower (approximately 175 ft) may be required at the existing ExxonMobil pad at Deadhorse.

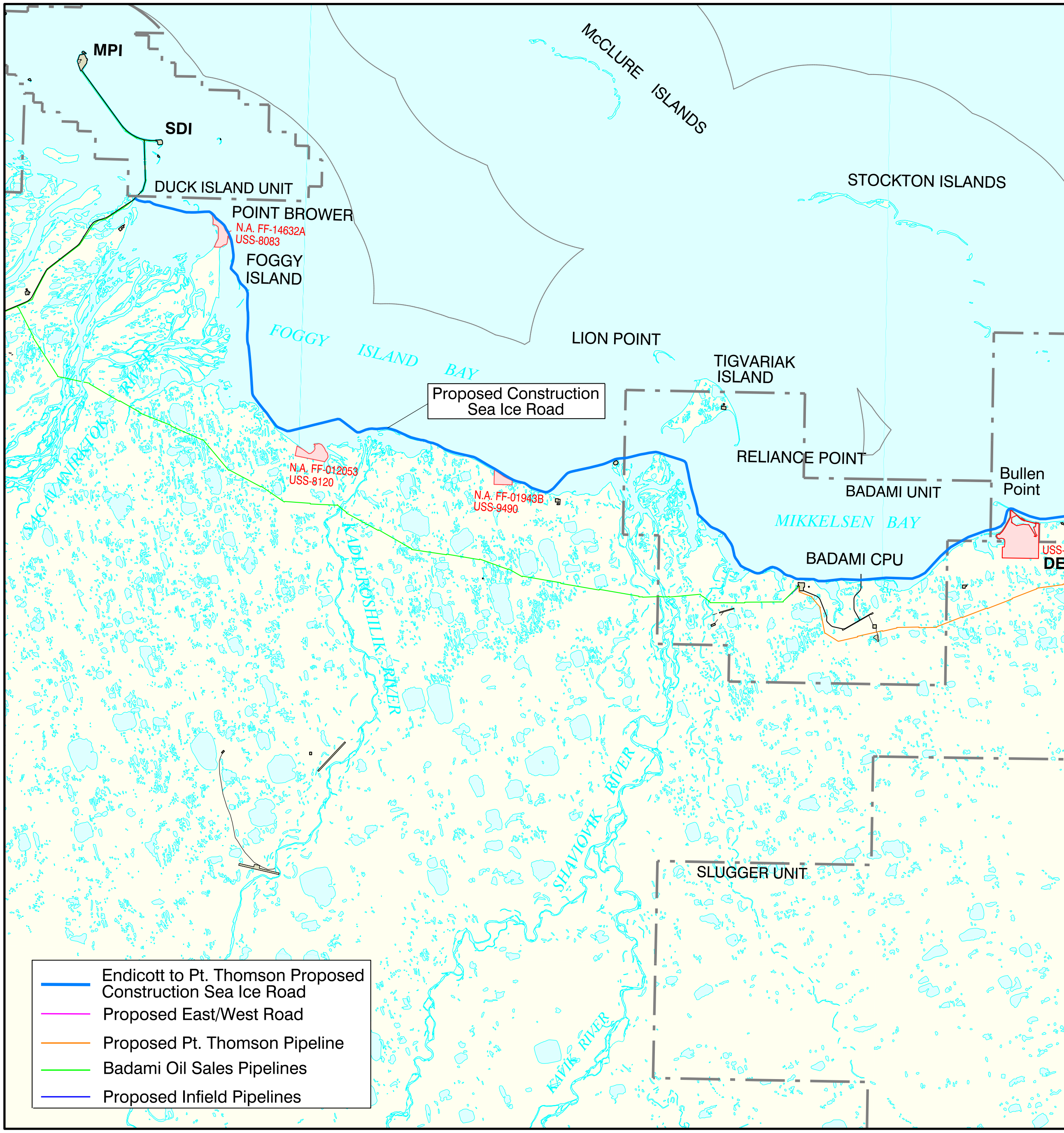
A separate communication building will, for reasons of radio frequency (RF) efficiency, house all RF equipment at the CPF. This building will be located in a manner that minimizes RF cable runs between the tower and the communications building, as well as the direct impact of ice falling from the tower onto the building. The building will be connected to the main Telecommunications Equipment Room via fiber optic cable in order to provide communications continuity.

7.3.6 Electrical Power Facilities

Fuel gas prior to startup of the facility is necessary to provide power to the drilling rigs and construction activities on each pad. The initial two wells on each pad will be drilled using diesel for rig fuel. In order to minimize onsite diesel storage requirements, subsequent wells on each pad will be drilled using natural gas produced from the Thomson Sand through the first well. The condensate associated with this gas will be separated at the surface and reinjected into the Thompson Sand through the second well. Alternative methods under consideration for disposing of the condensate include injection into the tubing by casing annulus, injection into the top of the Pre-Mississippian formation, and disposal down the Class I disposal well. Condensate produced during well testing activities will be reinjected in a similar manner.

Diesel-powered electrical generators will be used to meet early electrical demand for construction infrastructure and life support. Early power requirements at Point Thompson are estimated to be about 5,700 kilowatts (kW). Three 33% units each sized at 2,150 kW will be used to meet these requirements. The drilling rigs will generate their own power requirements, initially from diesel and later from gas produced from the initial well at each pad and treated by an early fuel gas system. Having the drilling rigs provide their own power reduces the size of the central power generation facility. Gas-fired turbines will become the primary power source for the electrical generators once fuel gas is available. The diesel generators will then become available to provide backup power for essential and emergency loads in the facility.

The power requirements currently identified for Point Thomson peak at about 18,000 kW with normal loads expected to be about 16,000 kW. Four 33% gas-fired electrical generators each sized at 7,000 kW will meet these requirements. These generators will be located at the CPF. Power feeds to the permanent facilities at the East Pad, West Pad, airstrip, and mine/water reservoir will be provided using power cables fed from the 13.8-kilovolt (kV) switchgear at the CPF module. The permanent power cables will be buried in the gravel roads. Transformers will be provided at each location to provide the required voltage.



ExxonMobil

POINT THOMSON GAS CYCLING PROJECT
SEA ICE ROAD

DATE:	SCALE:	FIGURE:
February 2003	1" = 4 Miles	7 - 1

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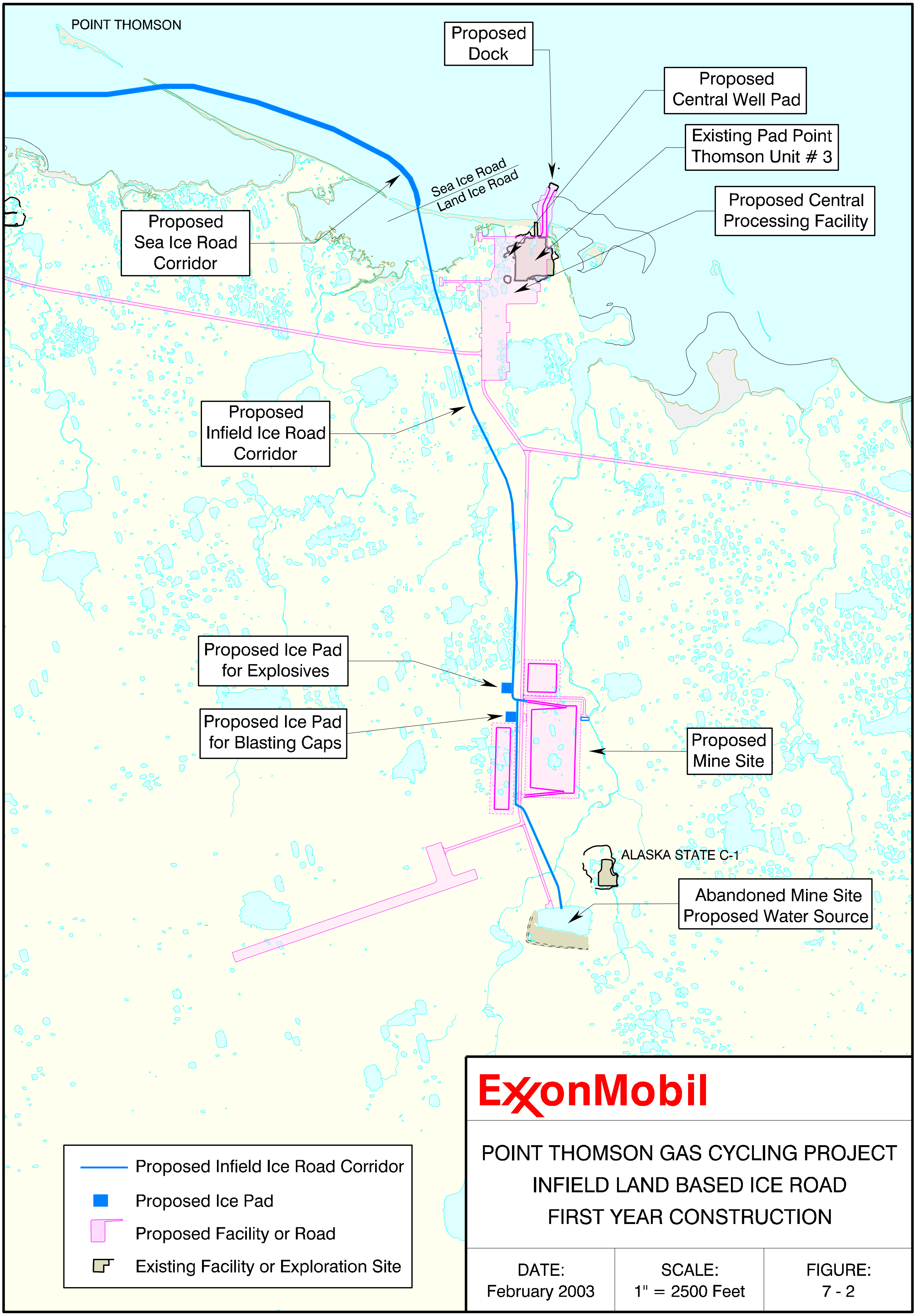

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