APPENDIX K-1: Contact Water Pond Design

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July 6, 2017

File No.:VA101-00460/03-A.01 Cont. No.:VA17-01137

Mr. Jerry Zieg Vice President, Exploration Tintina Resources Inc. (Vancouver) 10th Floor - 595 Howe Street Vancouver, British Columbia Canada, V7X 1A6

Knight Piésold

Dear Jerry,

Re: Updated Brine and Contact Water Pond Design

Knight Piésold Ltd. (KP) was requested by Tintina Resource Inc. (TRI) to update the design and drawings of the Brine and Contact Water Pond (BCWP) for the Black Butte Copper Project (the Project) Mine Operating Permit Application (MOPA). The initial pond designs included in the December 2015 MOPA document were originally completed by Tetra Tech.

DESIGN CONCEPTS

The primary purpose of the BCWP is to temporarily store all brine (the by-product of the water treatment process) produced during construction and contact water produced during construction and operations. The brine will be transferred to the Process Water Pond (PWP) after the construction of the PWP is complete. Contact water will be pumped to the water treatment plant and released via the underground infiltration gallery once construction of those two facilities is complete. Contact water run-off from the mill, portal pad, and temporary waste dump catchment areas will be directed to the BCWP for temporary storage during operations.

The BCWP will remain operational throughout the life of the mine to provide temporary storage of contact water and underground mine water on an as needed basis. The facility will be kept drained to the greatest degree possible when temporary storage is not required.

The BCWP is a lined facility, located immediately south of the portal pad. The brine and contact water will be kept in separate cells, separated by a berm. These cells will be referred to as the "brine pond" and "contact water pond". Drawing C1001 shows the mine site general arrangement and location of the BCWP. Drawings C9001 and C9002 show the grading plan and layout of the BCWP.

BRINE POND

The brine pond is located on the west side of the BCWP, and consists of a double lined facility that will store brine from the water treatment plant during pre-production. It will utilize a double liner system with an integrated seepage collection and recycle system.

The brine pond has a design capacity of $21,000 \text{ m}^3$, with an additional capacity of $4,000 \text{ m}^3$ to accommodate operational variances or direct precipitation from a 1 in 200 year storm event. A 1 m freeboard allowance is included above the maximum pond level.

LINER SYSTEM

The liner system is a double liner that comprises a layer of high flow 7.6 mm geo-net placed between two layers of 60 mil HDPE geomembrane. A 300 mm protective layer of sub-grade bedding material will be placed below the liner system.

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Details of the liner system are shown on Drawing C9003. Sub-grade bedding material specifications are included on Drawing C0003.

SEEPAGE COLLECTION AND RECYCLE SYSTEM

The seepage collection and recycle system will collect seepage through the upper HDPE geomembrane and direct it through the geonet, via gravity, to a sump and pump system at a low point along the east side of the brine pond cell. Water collected in the sump will be pumped through a riser pipe to the embankment crest and returned to the brine pond. An underlying subgrade bedding layer will be installed to protect the lining system.

The sump and pump system between the HDPE geomembrane layers will consist of a sump filled with drainage gravel that is deep enough to allow the effective operation of a submersible pump that can be raised and lowered through a protective pipe. The bottom of the pipe will be perforated (in the sump) for pump operation. An additional pipe is included for redundancy. The pump will have a high/low water level primer to control pumping (switch on when the water level reaches a high water mark and switch off when the water level reaches the low water mark).

Details of the seepage collection and recycle system are shown on Drawing C9004. Material specifications for drainage gravel are included on Drawing C0003.

BRINE RECLAIM AND PUMP SYSTEM

The reclaim system is designed to pump brine to the PWP, from full capacity to empty, over a two week period. The intake for the reclaim system includes a 30 HP vertical turbine submersible pump, located at the southeast corner of the brine pond. A stand-by pump will be provided as back-up. The pump intake line will be installed down the side of the pond.

A ND 100 mm DR17 HDPE pipeline will convey brine to the PWP. The pipeline alignment follows the mine site access road, and crosses the main haul road between the mill and PWP. The pipeline will be anchored with earthen berms as required. The pipeline will discharge off the crest of the PWP.

Plans and details of the pump system and pipeline alignment are shown on Drawings C9005 and C9006.

CONTACT WATER POND

The contact water pond is a single lined cell located on the east side of the BCWP. The purpose of the facility is to contain run-off and contact water from the mill, portal pad, and temporary waste rock storage pad areas, as well as water from underground mine dewatering. It will be used during pre-production and operations.

The contact water pond has a design capacity of 70,000 m³. It is sized to store run-off from the mill, portal pad, and temporary waste rock pad catchment areas during a 1 in 200 year storm event, which is approximately $35,000 \text{ m}^3$. The remaining $35,000 \text{ m}^3$ is provided to store water from underground mine dewatering in the event of a surge or if the water treatment plant is not operational. A 1 m freeboard allowance is included above the maximum pond elevation.

LINER SYSTEM

The liner system comprises of a single 60 mil HDPE geomembrane liner placed over a 300 mm thick protective layer of sub-grade bedding material. Details of the liner system are shown on Drawing C9003.

CONTACT WATER RECLAIM AND PUMP SYSTEM

The reclaim system is designed to pump water to the water treatment plant, from full capacity to empty, over a two week period. The intake for the reclaim system includes a 50 HP vertical turbine submersible pump, located at the southeast corner of the contact water pond. A stand-by pump will be provided as back-up. The pump intake line will be installed down the side of the pond.

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A ND 200 mm DR21 HDPE pipeline will convey contact water to the water treatment plant. The pipeline alignment follows the mine site access road. The pipeline will be anchored with earthen berms as required.

Plans and details of the pump system and pipeline alignment are shown on Drawings C9005 and C9006.

Yours truly, Knight Piésold Ltd.

Prepared:

nn, Reviewed: Greg Magoon, P.Eng. Ken Embree, P.Eng. **Project Engineer** Managing Principal KEN J. BROUWER 10020 PE **Reviewed:**

Approval that this document adheres to Knight Piésold Quality Systems:

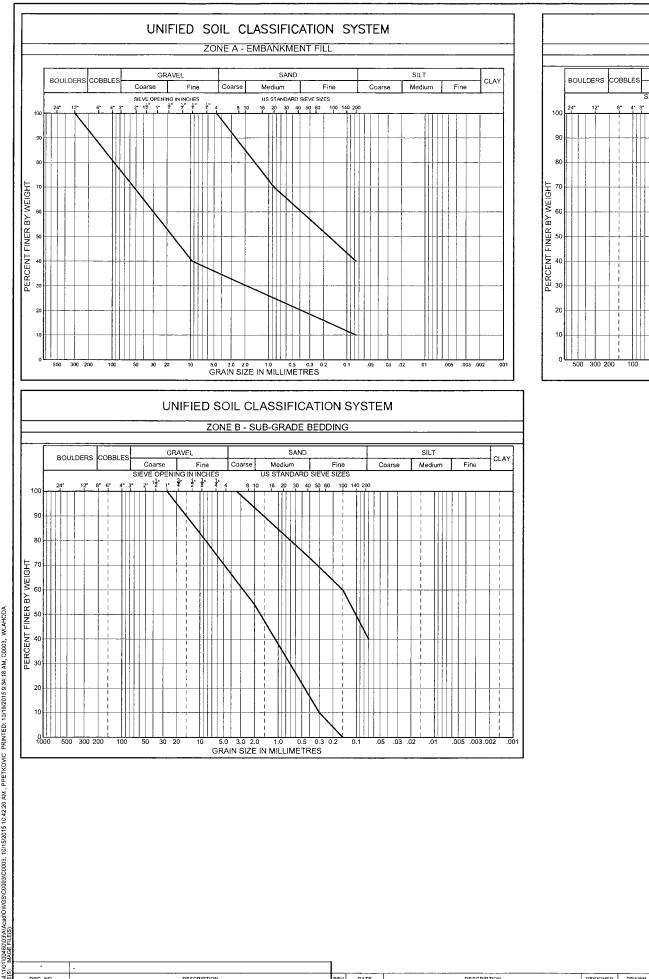
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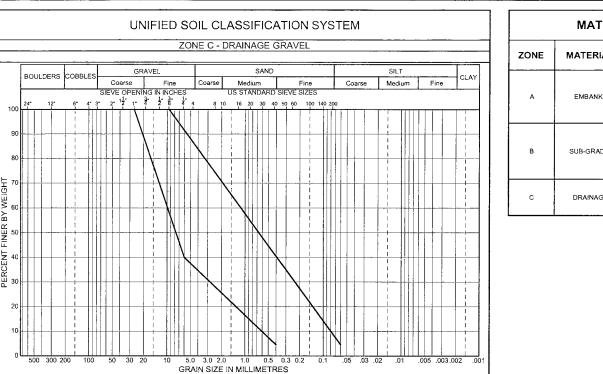
Ken Brouwer, P.E.

President

Drawing C0003 Rev 0	Construction Material Specifications
Drawing C1001 Rev 4	General Arrangement
Drawing C9001 Rev 1	Brine and Contact Water Pond – Grading Plan
Drawing C9002 Rev 1	Brine and Contact Water Pond – General Arrangement and Line System Layout Plan
Drawing C9003 Rev 1	Brine and Contact Water Pond – General Arrangement Sections and Details
Drawing C9004 Rev 0	Brine Pond Seepage Collection and Recycling System – Plan, Profile, Section and Detail
Drawing C9005 Rev 0	Brine and Contact Water Pond – Water Management System Piping and Instrumentation Diagram
Drawing C9006 Rev 1	Brine and Contact Water Reclaim – Pipeline System Layout Plan

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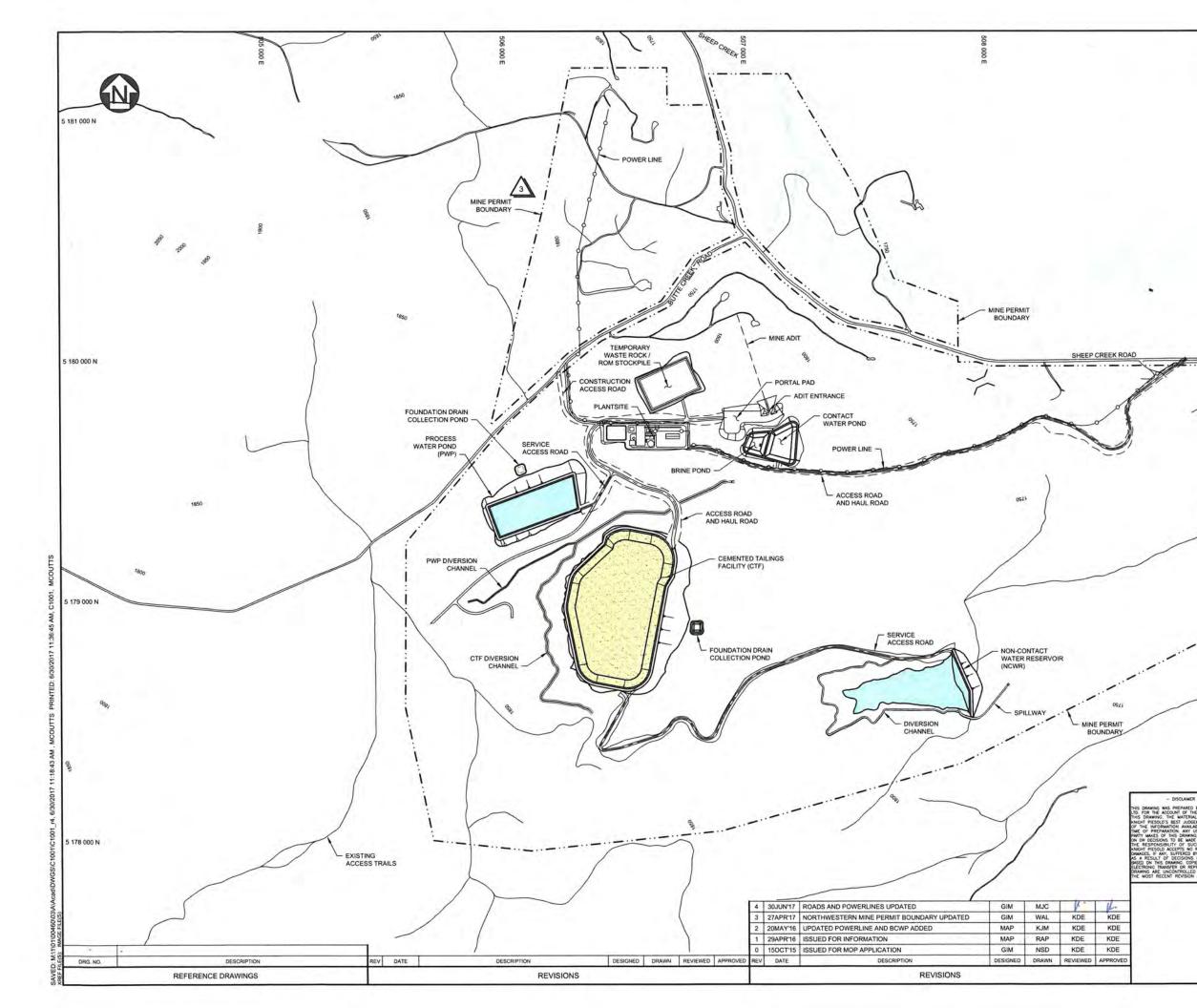
MATERIAL PLACEMENT AND COMPACTION REQUIREMENTS								
MATERIAL TYPE	PLACING AND COMPACTION REQUIREMENTS							
EMBANKMENT FILL	ZONE A MATERIAL SHALL CONSIST OF HARD, DUTABLE FRESH TO MODERATELY WEATHERED ROCK FILL WITH A MAXIMUM PARTICLE SIZE OF 300mm AND PLACED IN 500mm THICK LIFTS WITHIN THE MAIN EMBANKMENT ZONE. THE MATERIAL SHALL BE FREE OF CLAY, LOAM, TREE STUMPS OR OTHER DELETERIOUS OR ORGANIC MATTER. THE MATERIAL WILL BE PLACED AND SPREAD IN HORIZONTAL LIFTS BY A DOZER. COMPACTION OF ZONE A WILL BE TO 95% MODIFIED PROCTOR LABORATORY DENSITY WITH A SMOOTH DRUM VIBRATORY ROLLER.							
SUB-GRADE BEDDING	ZONE B MATERIAL SHALL CONSIST OF DURABLE, FRESH TO WEATHERED ROCK FILL WITH A MAXIMUM PARTICLE SIZE OF 1" AND PLACED IN 300mm THICK LIFTS ON THE BASIN SURFACE AND UPSTREAM SIDE OF ANY EMBANKMENT, THE MATERIAL SHALL BE FREE OF CLAY, LOAM, TREE STUMPS OR OTHER DELETERIOUS OR ORGANIC MATTER. THE MATERIAL WILL BE PLACED AND SPREAD IN HORIZONTAL LIFTS BY A DOZER. COMPACTION OF ZONE B WILL BE TO \$5% MODIFIED PROCTOR LABORATORY DENSITY WITH A SMOOTH DRUM VIBRATORY ROLLER.							
DRAINAGE GRAVEL	THIS MATERIAL WILL BE FREE DRAINING, DURABLE CRUSHED ROCK. THE MATERIAL SHALL BE FREE OF CLAY, TREE STUMPS OR OTHER DELETERIOUS OR ORGANIC MATTER. THE MATERIAL WILL BE PLACED IN 500mm THICK LIFTS AND SPREAD BY DOZER OR MANUALLY PLACED BY EXCAVATOR.							

NOTES:

- 1. THESE MATERIAL PLACEMENT AND COMPACTION REQUIREMENTS APPLY TO ALL COMPONENTS OF THE WORKS EXCEPT WHERE NOTED OTHERWISE. MATERIALS SUBJECT TO REVIEW PRIOR TO CONSTRUCTION.
- 2. THE MAXIMUM DIMENSION OF ANY PARTICLE SHALL NOT EXCEED 2/3 OF THE MAXIMUM LIFT THICKNESS,
- 3. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS.
- 4. ALL FILL MATERIALS SHALL BE FREE OF ORGANIC AND DELETERIOUS MATTER, AND SOFT FRIABLE PARTICLES.

FOR INFORMATION ONLY

- DISCLANER - WIG WAS PREPARED BY KINCHT RESOLD THE ACCOUNT OF THE CLEAT LISTED ON WINIG. THE MATERIAL ON IT REFLECTS SOLD'S BEST JUDGENET IN THE LIGHT INFORMATION AVAILABLE TO IT AT THE PREPARATION AVAILABLE TO IT AT THE	Knigh	t Piésold	
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SULT OF DECISIONS MADE OR ACTIONS I THIS DRAWING. COPIES RESULTING FROM IC TRANSFER OR REPRODUCTION OF THIS ARE UNCONTROLLED AND MAY NOT BE IT RECENT REVISION OF THIS DRAWING.	BLACK BUTTE	COPPER PROJE	СТ
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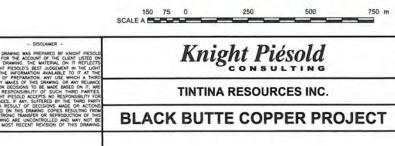


NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 12.

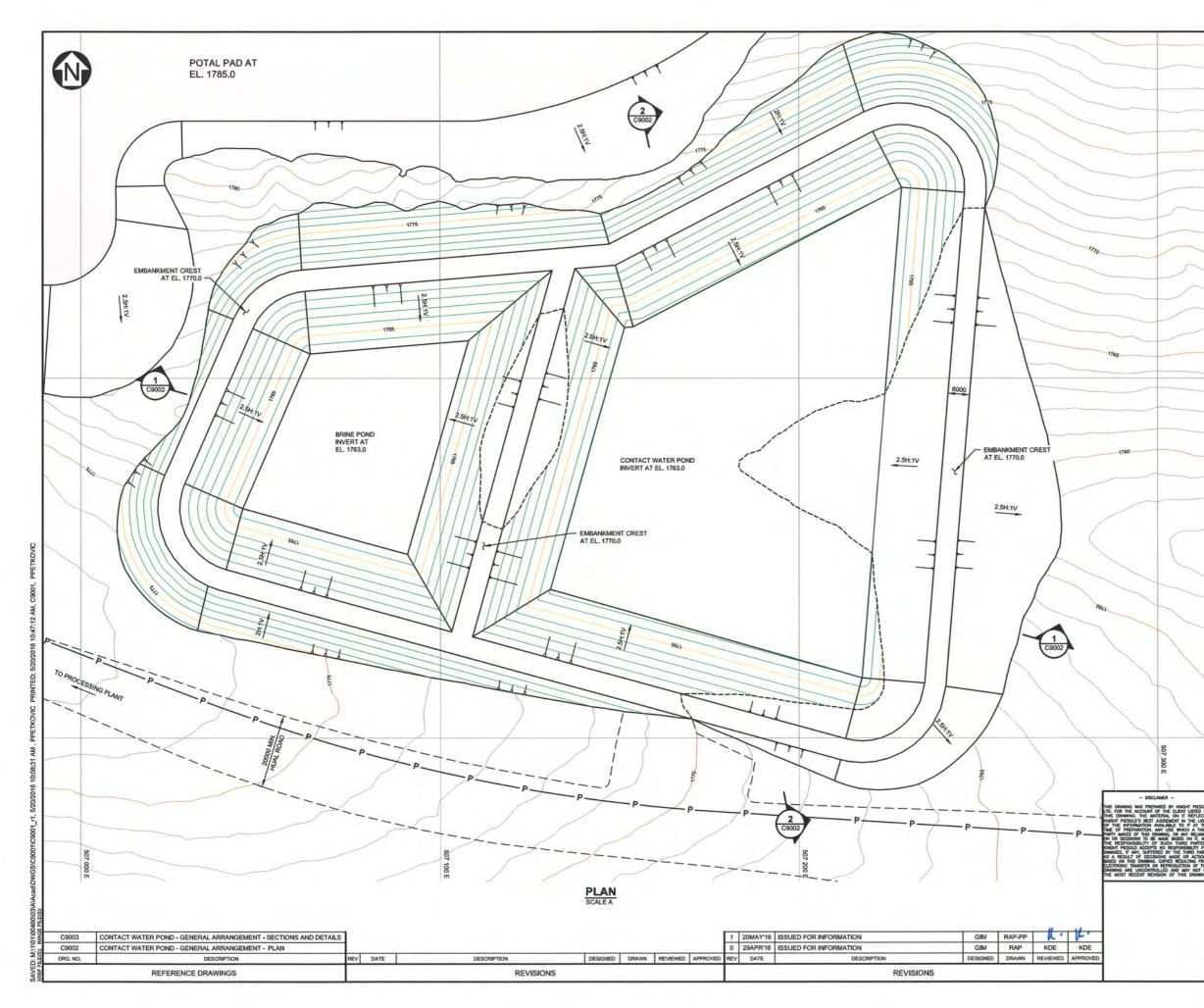
- 2. PLAN BASED ON INFORMATION PROVIDED BY TINTINA RESOURCES INC, DATED (FEB 03, 2011).
- 3. CONTOUR INTERVAL IS 5 METERS.
- 4. DIMENSIONS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.

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GENERAL ARRANGEMENT

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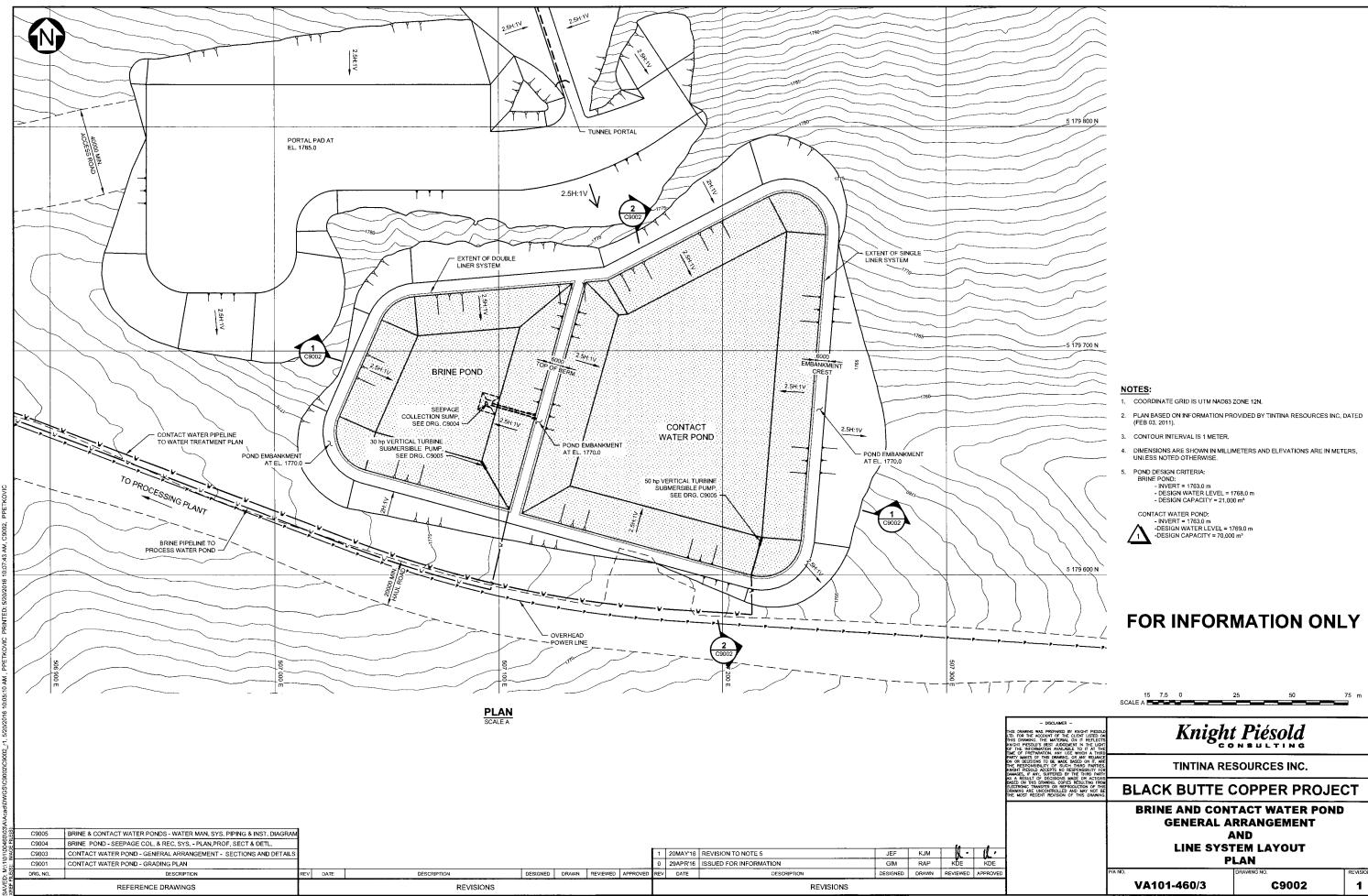


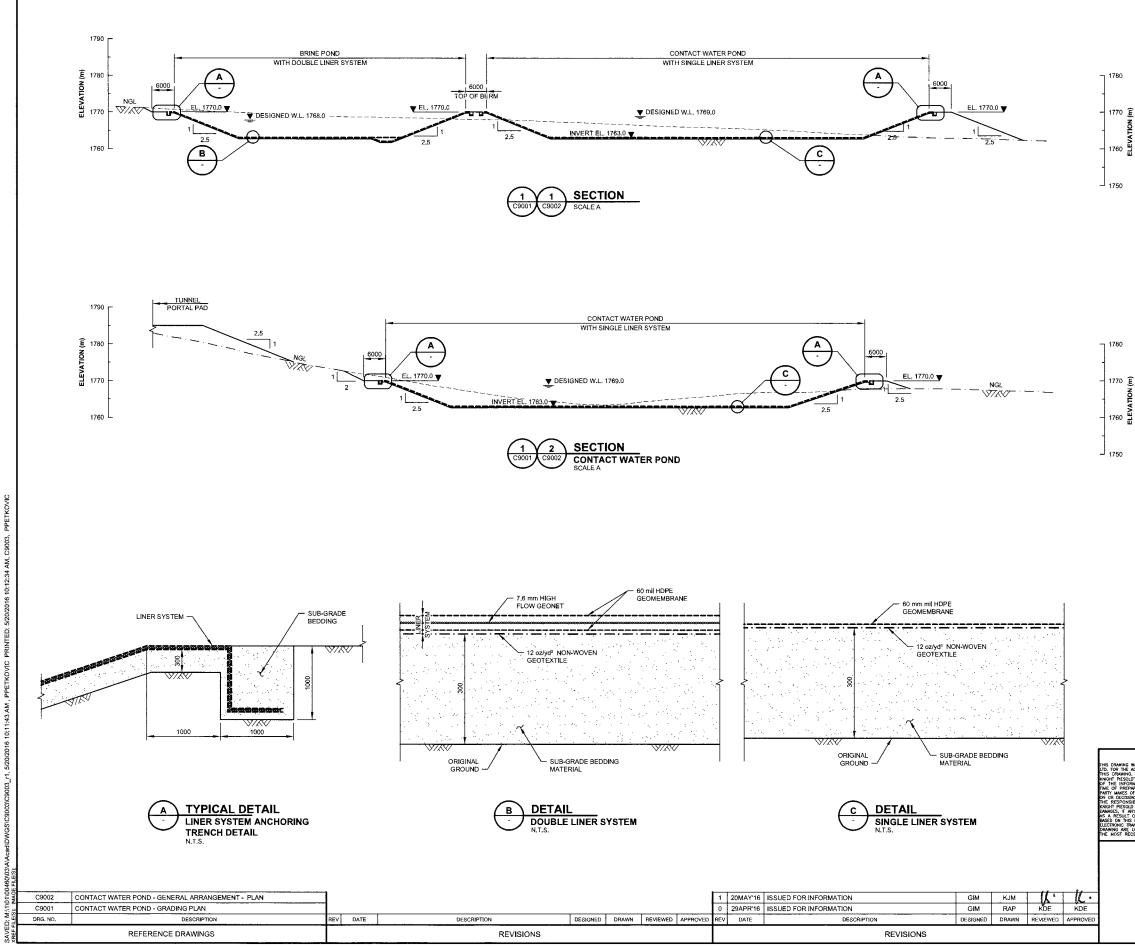
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EXCAVATION CONTOURS

---- CUT/FILL TRANSITION

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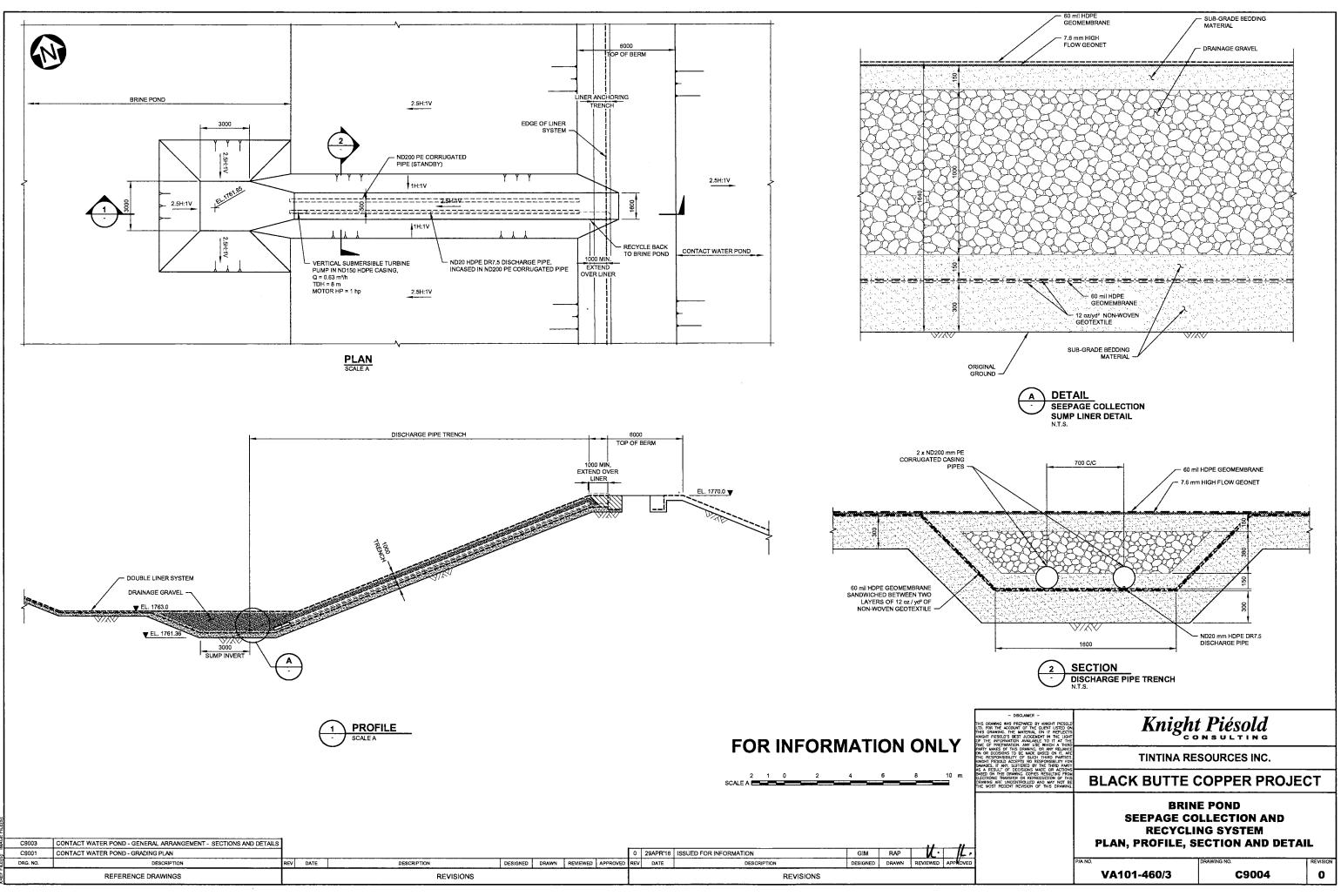
NOTES:

- 1. COORDINATE GRID IS UTM NAD83 ZONE 12N.
- ORIGINAL GROUND PROFILE BASED ON INFORMATION PROVIDED BY TINTINA RESOURCES INC, DATED (FEB 03, 2011).
- 3. DIMENSIONS ARE SHOWN IN MILLIMETERS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.
- 4. SEE DRAWING C0003 FOR CONSTRUCTION MATERIAL SPECIFICATIONS.

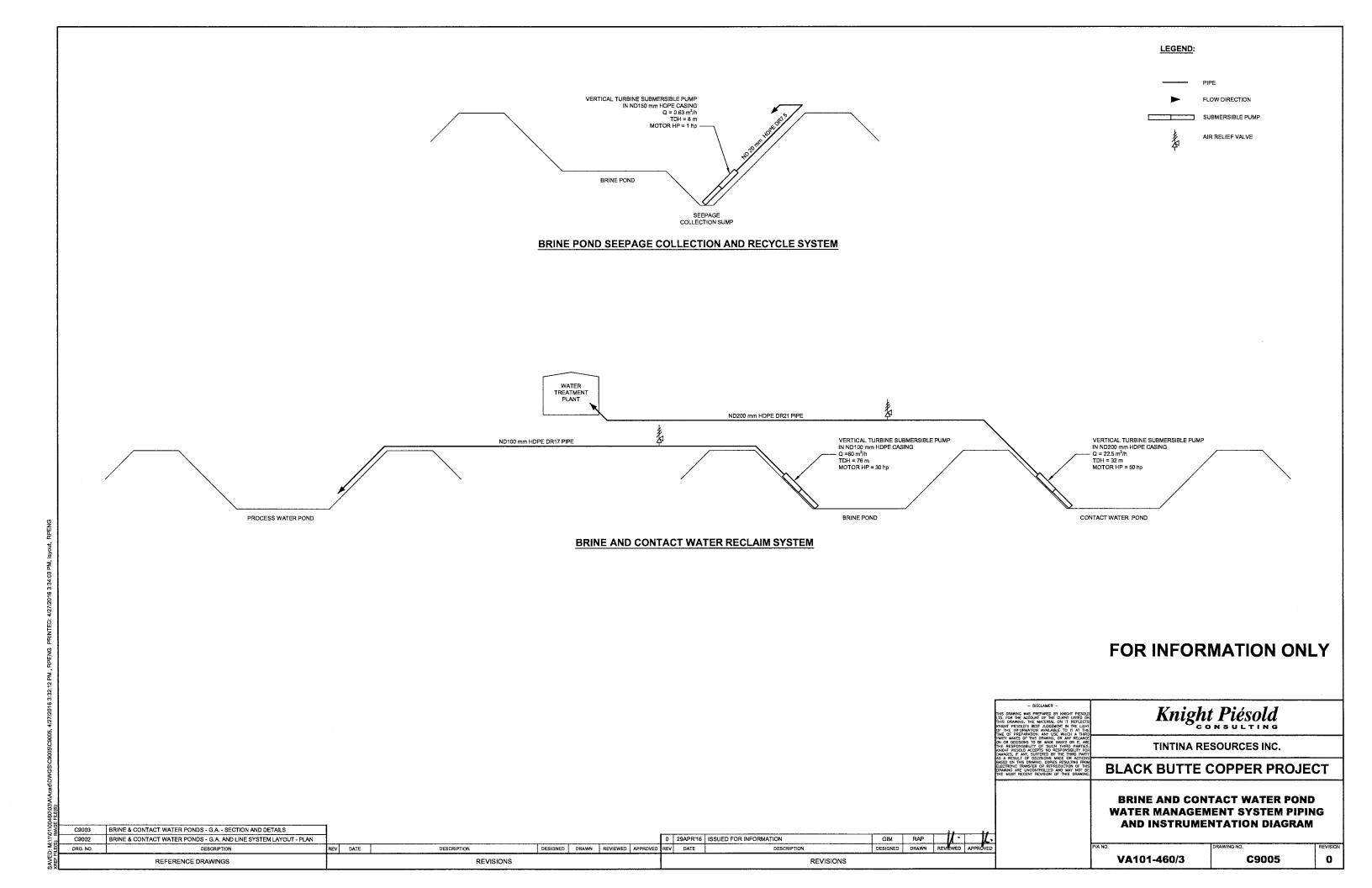
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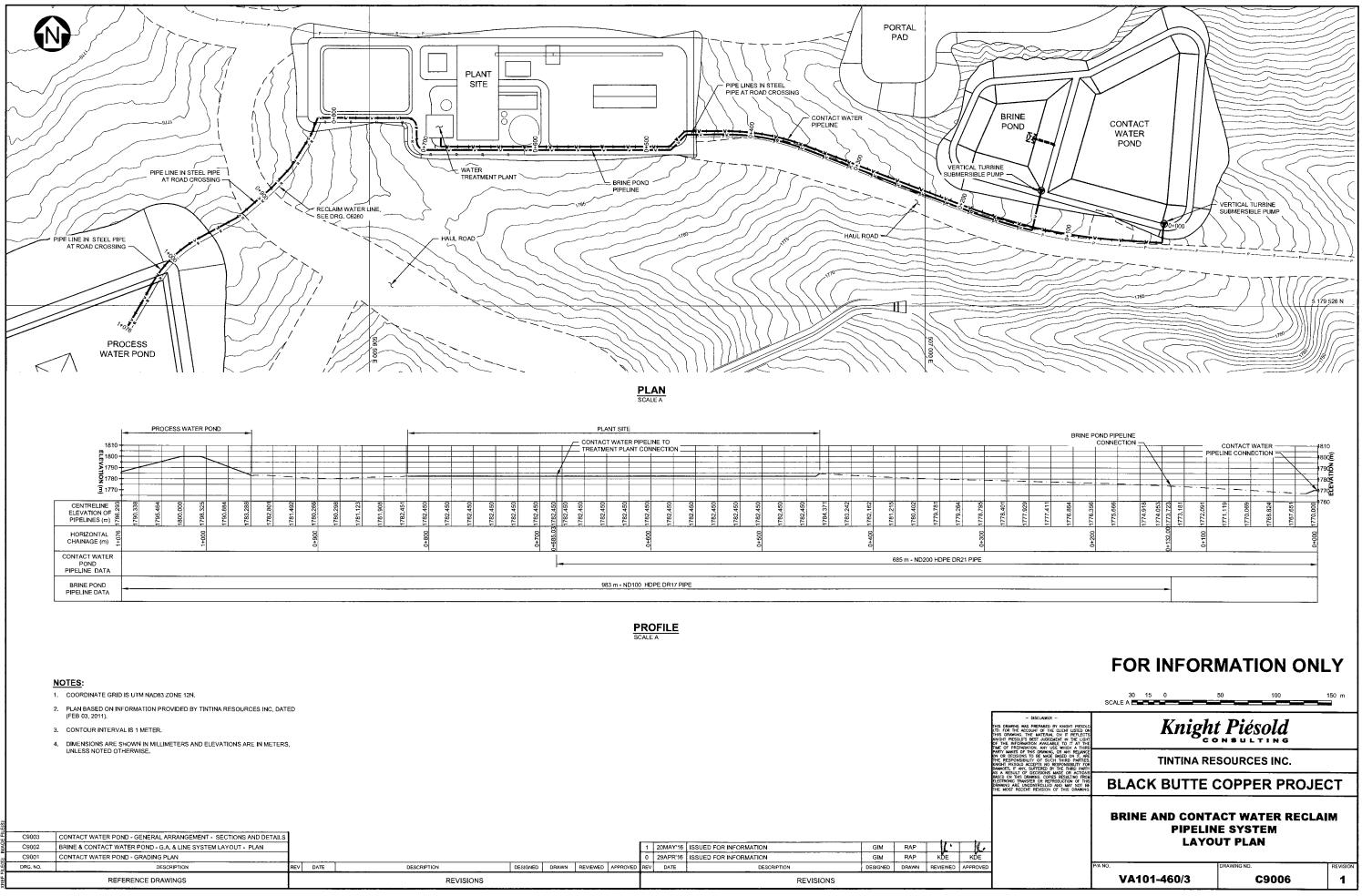
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