Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix A

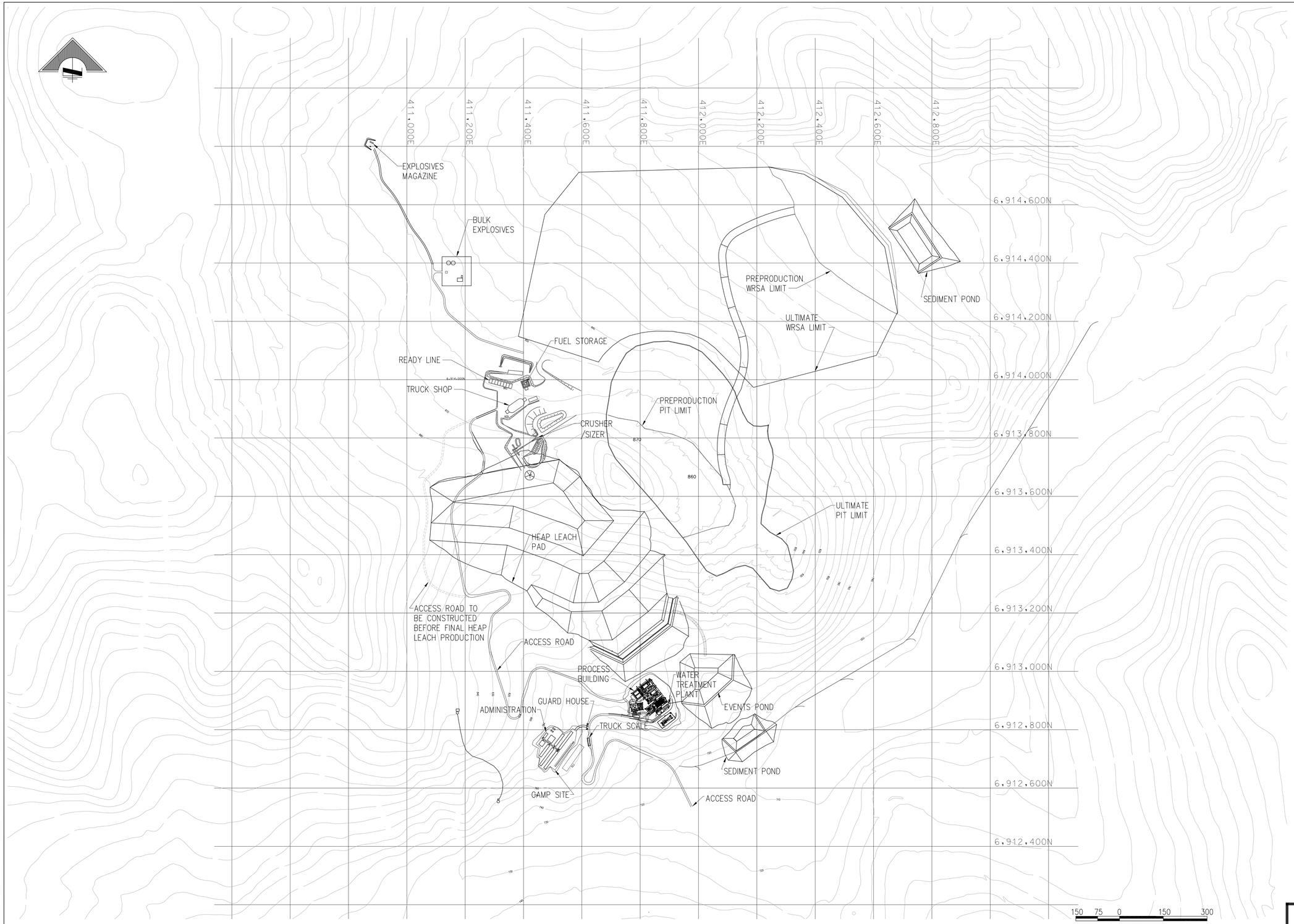
Project Drawings

Listing of Project Drawings

(Prepared by M3 Engineering & Technology)

Drawing No.	Drawing Title
000-CI-001	Civil Overall Mine Site Plan
000-CI-004	General Civil Standards Details
000-CI-005	General Civil Standards Details
000-CI-006	Civil Standards Details
000-FS-011	Water Distribution Process Flow Sheet Water Demand
000-FS-015	Ancillary Facilities, Fuel Storage Distribution and Dispensing Flow Sheet
000-FS-016	Ancillary Facilities, Fuel, Waste Oil and Truck Wash Flow Sheet
000-M-002	General Water Storage Tank Details
000-SS-001	General Structural Steel Tank Standard
100-CI-010	Site Grading Plan
100-CI-101	Access Road Site Plan Sheet Index
100-CI-102	Access Road Sta. 0+000 to 1+600
100-CI-103	Access Road Sta. 1+600 to 3+200
100-CI-104	Access Road Sta. 3+200 to 4+800
100-CI-105	Access Road Sta. 4+800 to 6+400
100-CI-106	Access Road Sta. 6+400 to 8+000
100-CI-107	Access Road Sta. 8+000 to 9+600
100-CI-108	Access Road Sta. 9+600 to 11+200
100-CI-109	Access Road Sta. 11+200 to 12+372
400-GA-001	SX-EW Area General Arrangement Site Plan
400-GA-003	SX-EW Area General Arrangement Sections
400-GA-004	SX-EW Area General Arrangement Sections
570-GA-001	Truck Shop General Arrangement Plan & Sections
600-AR-11	Truck Shop Architectural Plans
600-AR-012	Truck Shop Architectural Elevations

Note – Some drawings are preliminary and will be replaced as detailed engineering drawings become available.



PLAN

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REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE

REVISIONS						REVISIONS					
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WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
CIVIL
OVERALL MINE SITE
PLAN

JOB NO. M3-PN06192.01
DWG NO. **000-CI-001**
REV NO. P4
DATE 17 SEP 08

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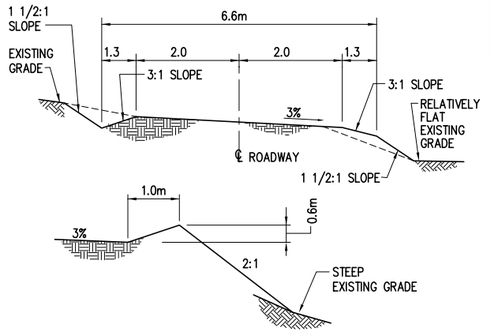

TYPICAL ONE WAY TRAFFIC GRADED IN-PLANT ROAD (20'-0") 1

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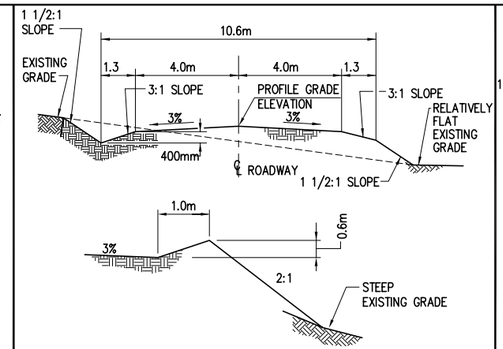

TYPICAL TWO WAY TRAFFIC GRADED IN-PLANT ROAD (32'-0") 2

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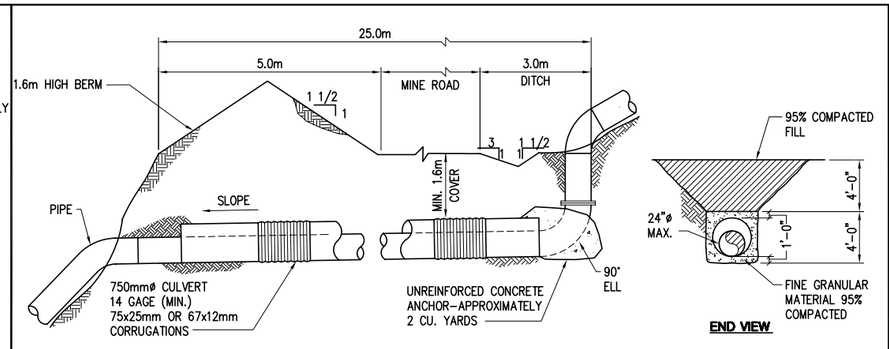
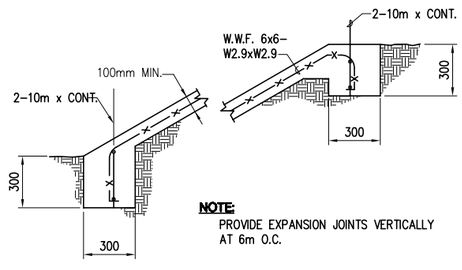


TYPICAL MINE ROAD CULVERT CROSSING 3

N.T.S.

CONSTRUCTION NOTES

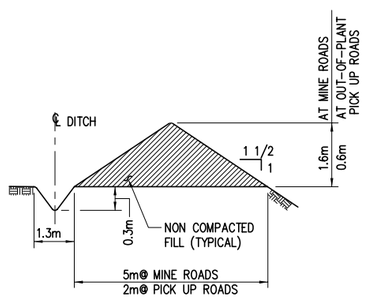
1. INSPECTION OF SITE: CONTRACTOR SHALL EXAMINE THE ACTUAL SITE FIRST HAND WITH OWNER'S REPRESENTATIVE TO DETERMINE THE NATURE AND TYPE OF MATERIALS TO CLEARED, EXCAVATED OR REMOVED PRIOR TO THE BIDDING OF WORK.
2. EXISTING UTILITIES: AVAILABLE DOCUMENTATION OF EXISTING OR RECENTLY CONSTRUCTED UTILITIES HAS BEEN INDICATED ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR AVOIDING ALL UTILITIES, WHETHER SHOWN ON DRAWINGS OR NOT.
3. EXECUTION OF WORK:
   - 3.1 CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS.
   - 3.2 BLASTING SHALL ONLY BE DONE WITH WRITTEN CONSENT OF THE OWNER, BY PERSONNEL WITH AT LEAST TWO YEARS IN THE TRADE.
   - 3.3 CONTRACTOR SHALL CONTROL AIR POLLUTION CAUSED BY DUST AND DIRT.
4. FILL MATERIAL SPECIFICATION FOR ROADS: AGGREGATE BASE COURSE: 100% PASSING 35mm SIEVE, 45% TO 90% PASSING #4 SIEVE AND NO MORE THAN 12% PASSING #200 SIEVE.
5. GRAVEL SURFACING COURSE
   - --100% PASSING, 12mm SIEVE
   - --40% VOIDS ±
   - --ADOT GUIDELINES
6. RIPRAP SEE DETAIL 9



NOTE:
PROVIDE EXPANSION JOINTS VERTICALLY AT 6m O.C.

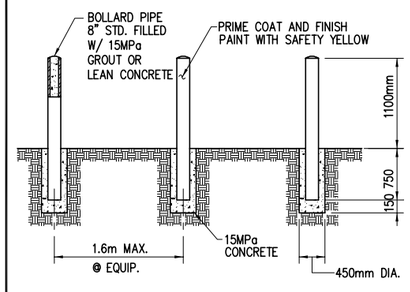
TYP. GUNITE EMBANKMENT SECTION 4

N.T.S



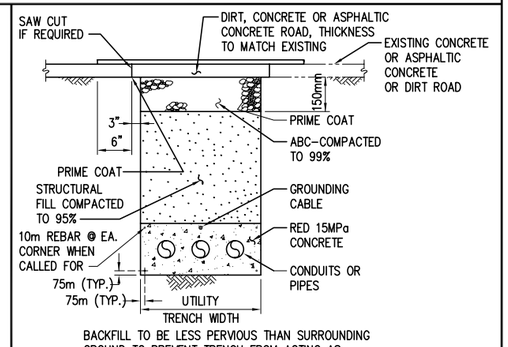
ROAD CURB AND DITCH AT OUT-OF-PLANT AND MINE ROADS 5

N.T.S.



BOLLARD BARRICADE 6

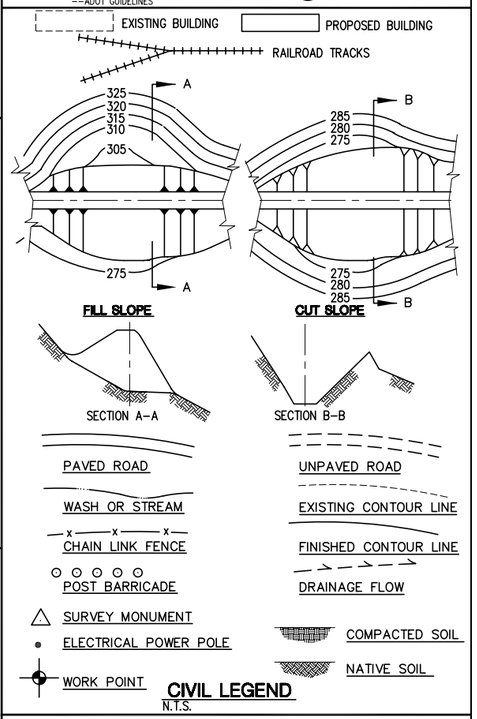
N.T.S.



BACKFILL TO BE LESS PERVIOUS THAN SURROUNDING GROUND TO PREVENT TRENCH FROM ACTING AS UNDERGROUND CONDUIT.

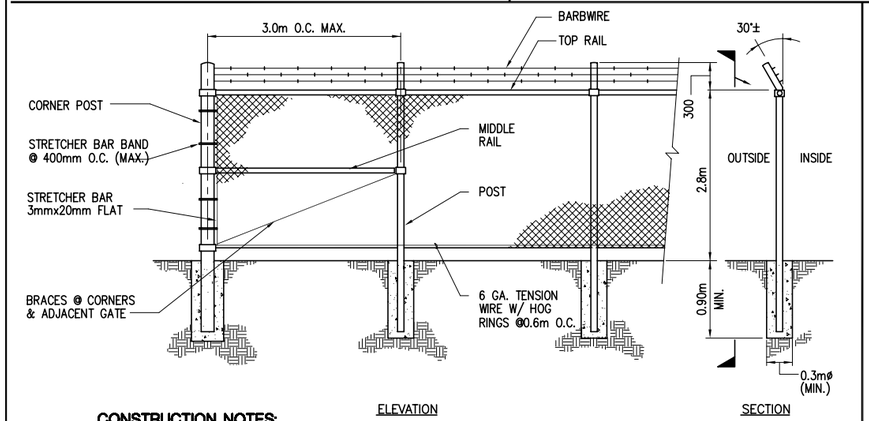
UTILITY TRENCH BENEATH ROAD 7

N.T.S.



CIVIL LEGEND

N.T.S.



CONSTRUCTION NOTES:

FABRIC – 9 GAGE, 50mm MESH (2 OZ. GALV)

BRACE & RAIL – 1 1/4"ø SCH. 40 PIPE (2OZ. GALV)

LINE POSTS – 2"ø SCH. 40 PIPE (2 OZ. GALV)

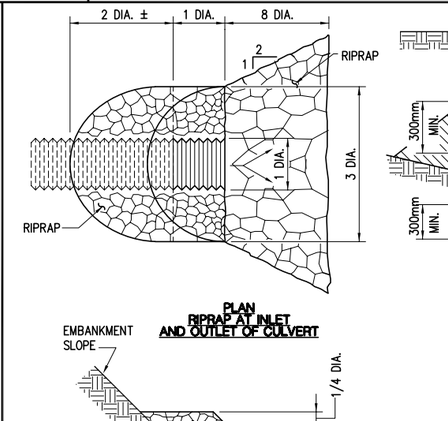
CORNER POSTS/GATE POSTS – 3"ø SCH. 40 PIPE (2 OZ. GALV)

BARBWIRE – 4 POINT BARBS; 75mm APART ON 9 GAGE WIRE; 3 TOTAL
BARBWIRE USED AT SUBSTATIONS AND RESERVOIRS ONLY. AT SLACK PULLEY CAGES FOR CONVEYORS, DO NOT USE BARBWIRE.

GATES TO BE PROVIDED W/ NECESSARY HARDWARE FOR OWNER PROVIDED PADLOCKS.

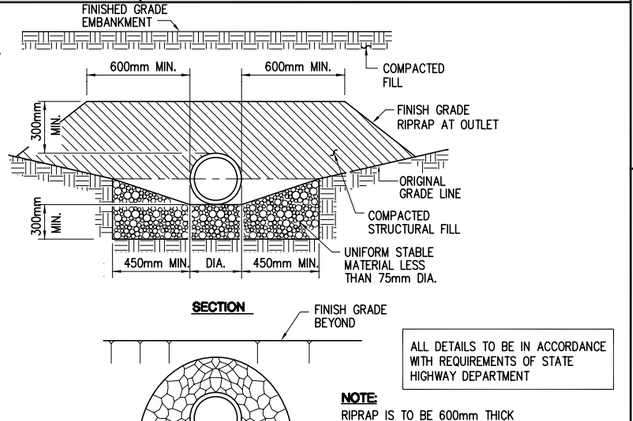
CHAIN LINK FENCE ELEVATION 8

N.T.S.



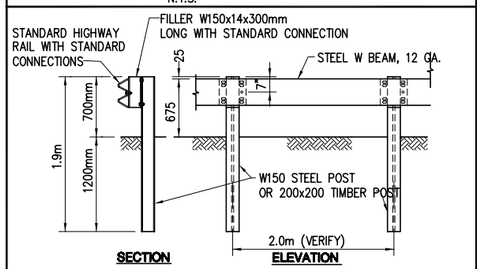
CULVERT 9

N.T.S.



ALL DETAILS TO BE IN ACCORDANCE WITH REQUIREMENTS OF STATE HIGHWAY DEPARTMENT

NOTE:
RIPRAP IS TO BE 600mm THICK AND MADE UP OF SCREENED ROCK WITH A MEAN DIAMETER OF 300mm. PLACEMENT IS TO BE DONE IN SUCH A MANNER AS TO ENSURE INTERLOCKING AND PREVENT VOIDS.



STANDARD PRE-ENGINEERED BUMPER DETAIL 10

N.T.S.

space reserved for seal

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REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
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DRAWN BY	AI	JUL 07
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PROJECT MGR	GK	
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WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
GENERAL
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JOB NO. M3-PN06192.01
DWG NO. 000-CI-004
REV NO. P1
DATE 19 JUL 07

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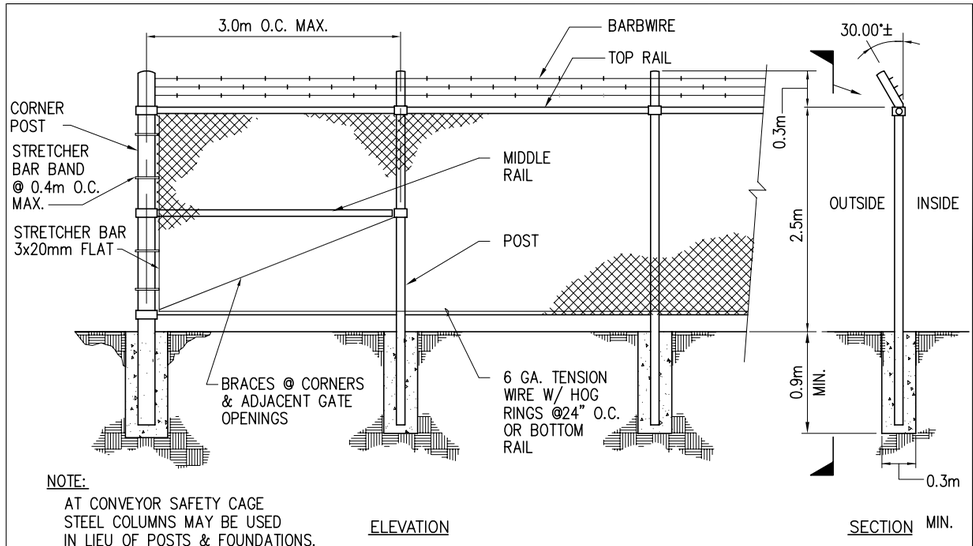

NOTE:
AT CONVEYOR SAFETY CAGE STEEL COLUMNS MAY BE USED IN LIEU OF POSTS & FOUNDATIONS.

ELEVATION

SECTION

CONSTRUCTION NOTES:

FABRIC – 9 GAGE, 50mm MESH (2 OZ. GALV)

BRACE & RAIL – 1 1/4"ø SCH. 40 PIPE (2OZ. GALV)

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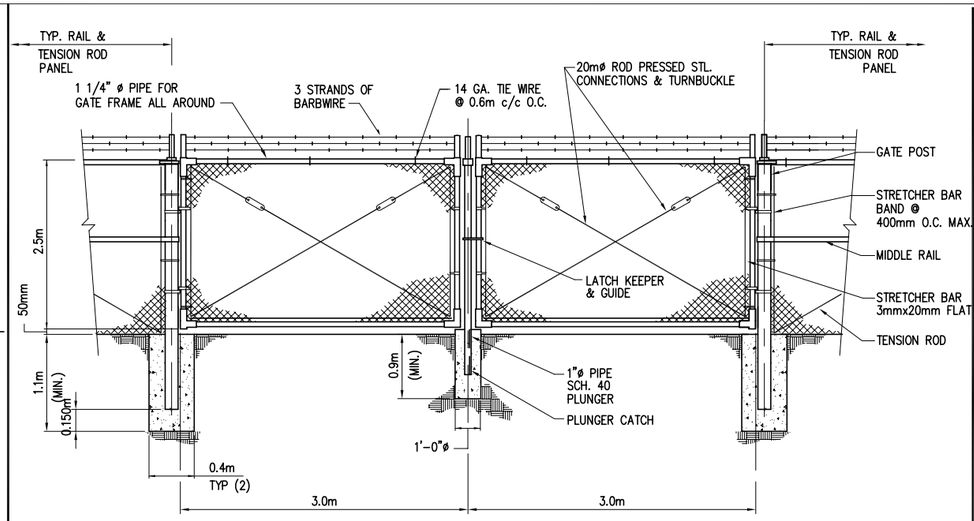
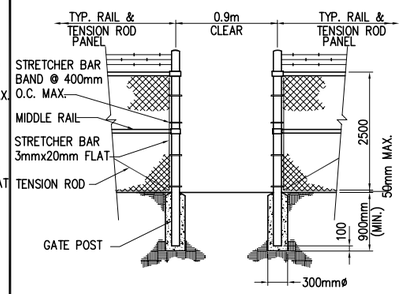
CHAIN LINK FENCE ELEVATION

N.T.S. 12 –



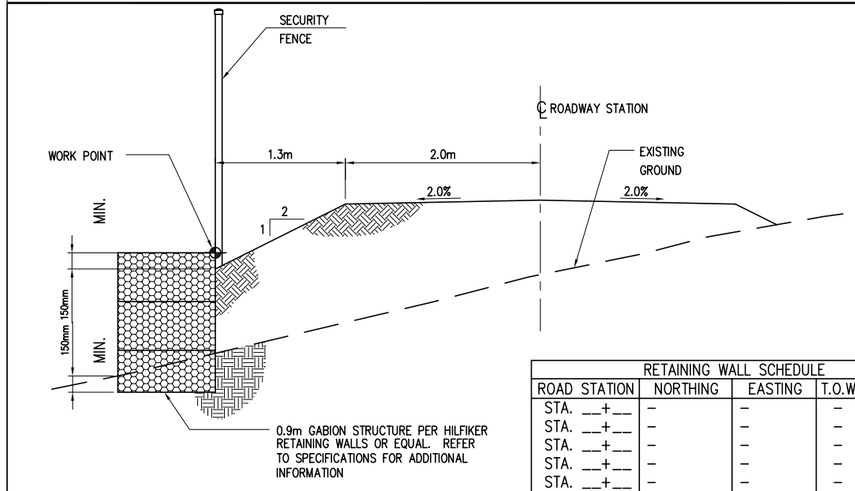
GATE DETAIL

N.T.S. 13 –



MAN GATE DETAIL

N.T.S. 14 –



RETAINING WALL SCHEDULE

ROAD STATION	NORTHING	EASTING	T.O.W. ELEV.	HEIGHT
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–
STA. __+__	–	–	–	–

RETAINING WALL DETAIL

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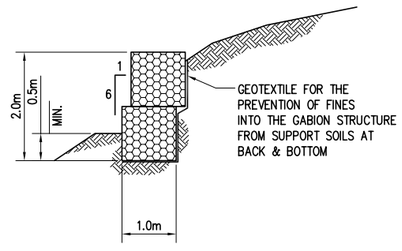
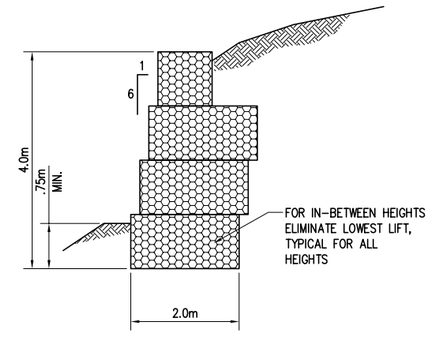
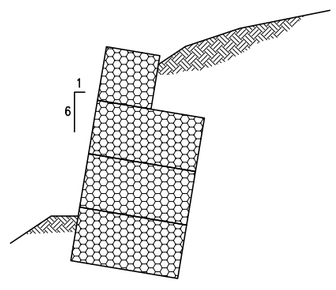


TYPE 1

MATERIALS:
1. SIDES & DIAPHRAGMS: 75x75 – 9 GA. WELDED WIRE
2. SPIRAL BINDERS & STIFFENERS: 9 GA. WIRE
3. ALL WWF & WIRE GALVANIZED 0.8 OZ./SQ. FT.
4. WIRE & GALVANIZING PER ASTM A-185 & ASTM A-123
5. STONE FILLING SHALL VARY IN SIZE IN GREATEST DIMENSION FROM 75 MINIMUM TO 300mm MAXIMUM.



TYPE 2



ALTERNATE BATTER

STONE CRIB RETAINING WALL

N.T.S. 16 –

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REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE

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WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
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DWG NO. 000-CI-005
REV NO. P1
DATE 19 JUL 07

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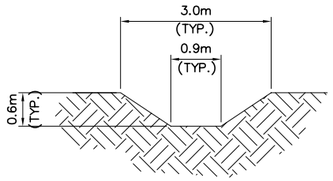

DRAINAGE DITCH SECTIONS 11 –

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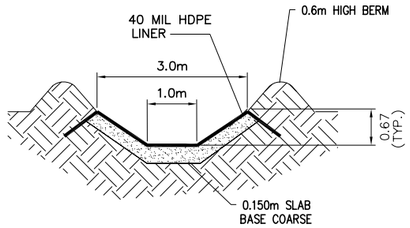
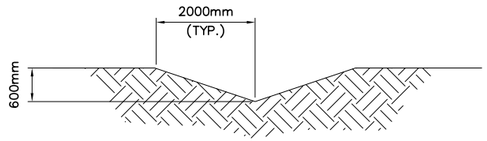


LINED DITCH 16 –

N.T.S.



SWALE SECTIONS 12 –

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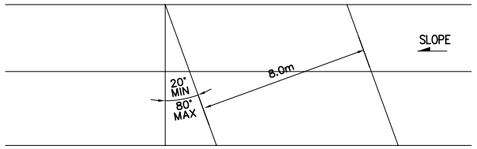
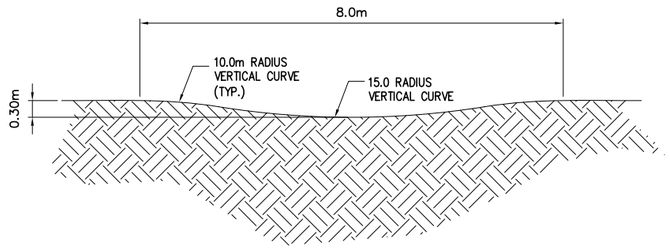


PLAN



ROAD DRAINAGE DIP SECTION 14 –

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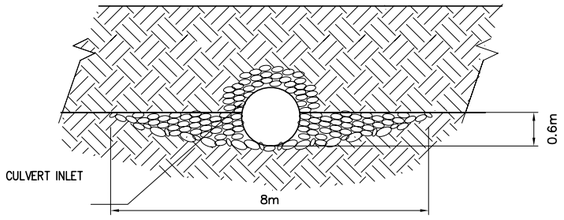

CATCH BASIN ELEVATION 15 –

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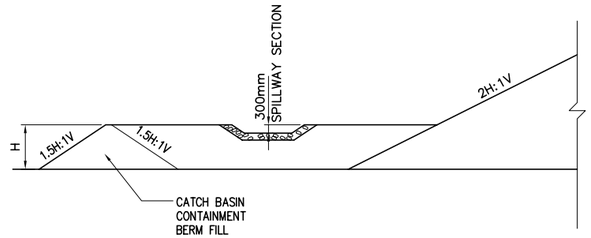

DETAIL 6 –

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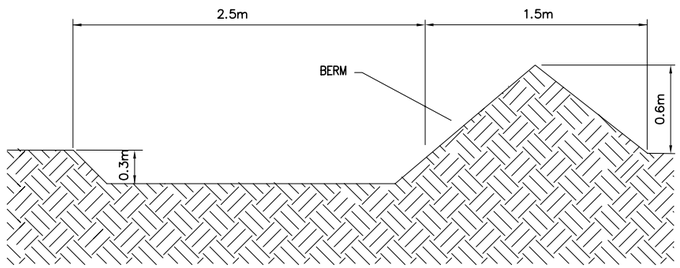

ROAD DITCH SECTION 17 –

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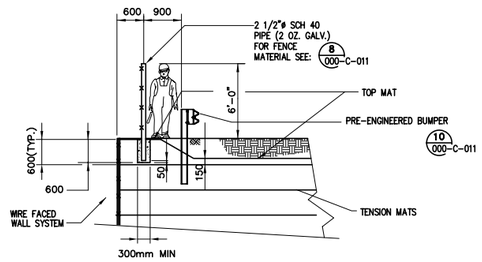

DETAIL 18 –

N.T.S.

PRELIMINARY
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REFERENCES		REFERENCES		REVISIONS						REVISIONS					
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

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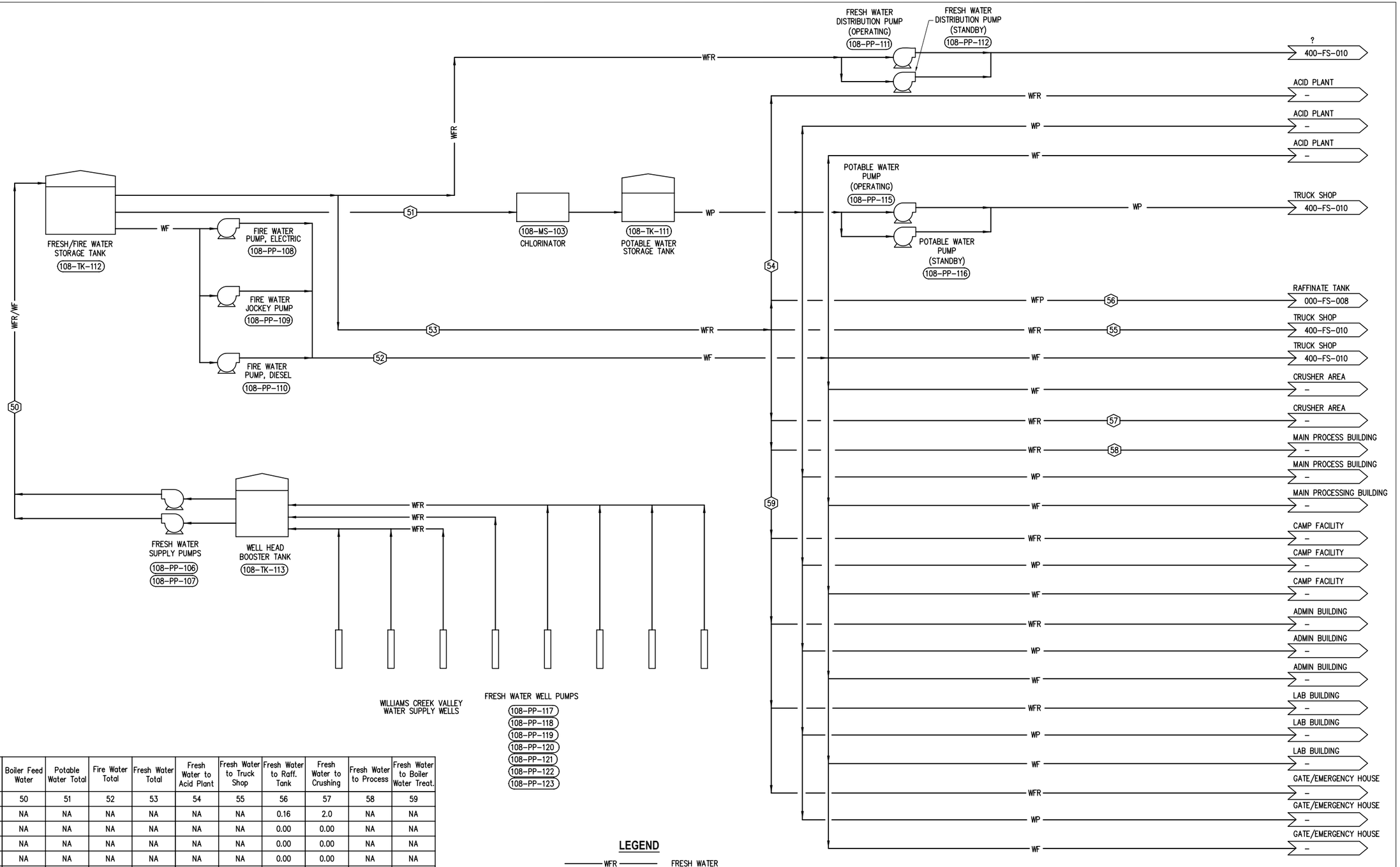
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
GENERAL
CIVIL
STANDARD DETAILS

JOB NO. M3-PN06192.01
DWG NO. **000-CI-006**
REV NO. P1
DATE 19 JUL 07

File: P:\2006\06192.01\To Be Issued\Civil\000-CI-006P1.dwg LAST UPDATE: JUL 19, 2007 @ 1:14 PM BY: jd87 LAST REV: P1 PLOT SCALE: 1:25.40



Description	Boiler Feed Water	Potable Water Total	Fire Water Total	Fresh Water Total	Fresh Water to Acid Plant	Fresh Water to Truck Shop	Fresh Water to Raff. Tank	Fresh Water to Crushing	Fresh Water to Process	Fresh Water to Boiler Water Treat.
Stream Number	50	51	52	53	54	55	56	57	58	59
Flowrate m^3/h	NA	NA	NA	NA	NA	NA	0.16	2.0	NA	NA
Cu Content g/L	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Cu Content kgs/day	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Acid Content g/L	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Acid Content kgs/day	NA	NA	NA	NA	NA	NA	0.00	0.00	NA	NA
Temperature	NA	NA	NA	NA	NA	NA	amb	amb	NA	NA
Specific Gravity	NA	NA	NA	NA	NA	NA	1.00	1.00	NA	NA
Notes										

LEGEND

WFR — FRESH WATER
WF — FIRE WATER
WP — POTABLE WATER

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES DWG. NO	REFERENCES TITLE	REFERENCES DWG. NO	REFERENCES TITLE

REVISIONS NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: NONE

		DATE
DESIGNED BY	TBD	TBD
DRAWN BY	TBD	TBD
CHECKED BY	TBD	TBD
PROJECT MGR	TO	TBD
CLIENT APPR.		

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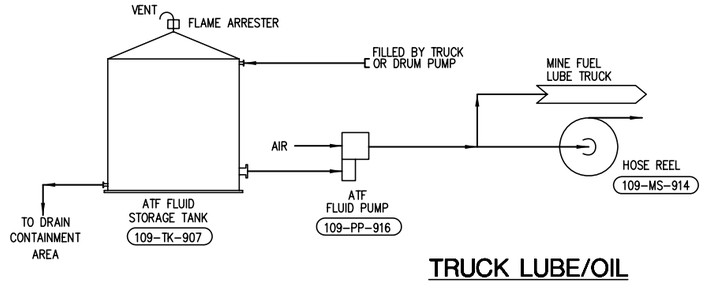
WESTERN COPPER CORPORATION

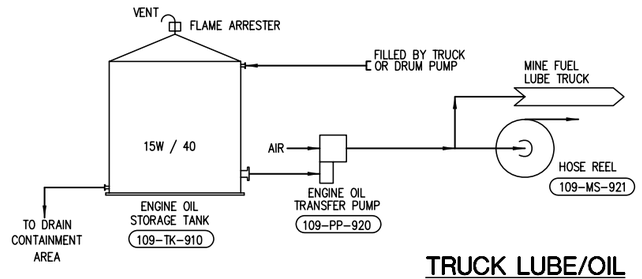
CARMACKS COPPER PROJECT WATER DISTRIBUTION PROCESS FLOW SHEET WATER DEMAND

JOB NO. M3-PN06192
DWG. NO. **000-FS-011**
REV NO. P2
DATE 15 OCT. 07

File: P:\2006\06192.01\To Be Issued\Flow Sheets\000FS011p2.dwg LAST UPDATE: OCT 15, 2007 @ 9:19 AM BY: mh397 LAST REV: PLOT SCALE: 1:25.40



TRUCK LUBE/OIL STORAGE AREA



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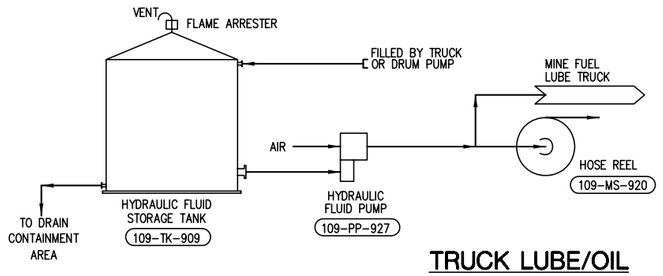

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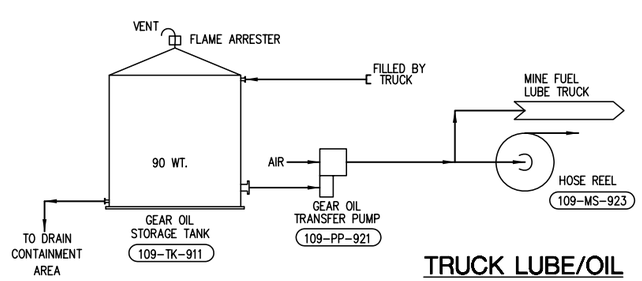

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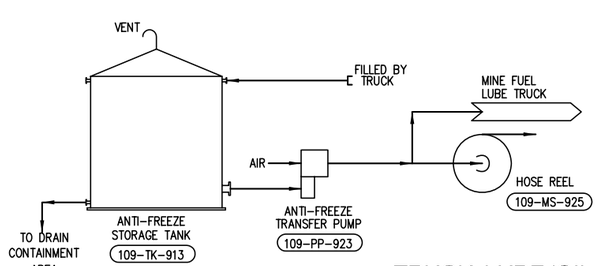

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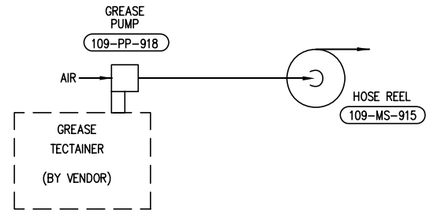

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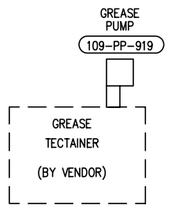
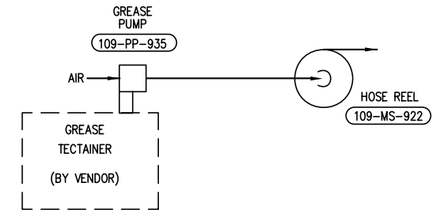
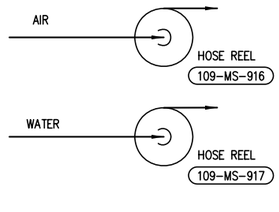


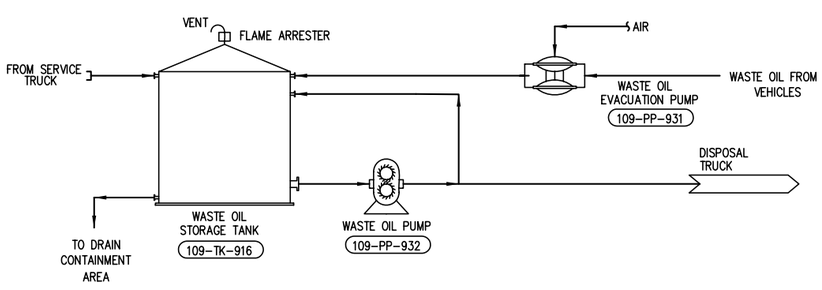
MOBILE SYSTEM FOR MINE USE

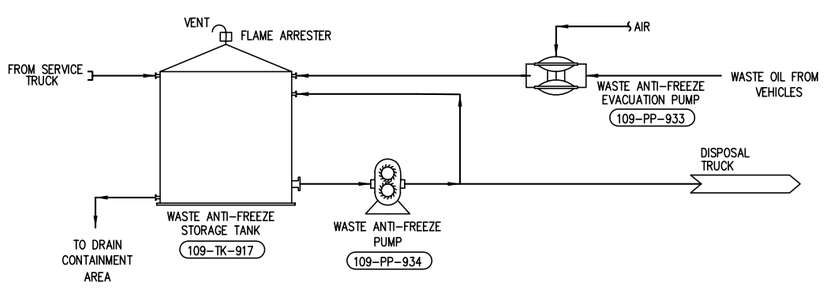


LIGHT VEHICLE SHOP



LUBE AREA





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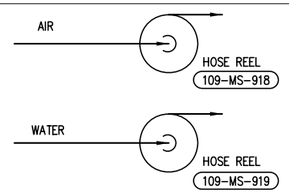

LIGHT VEHICLE SHOP

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES	
DWG. NO	TITLE	DWG. NO	TITLE

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: NONE		DATE
DESIGNED BY	BKK	TBD
DRAWN BY	MHH	06/12/07
CHECKED BY	TBD	TBD
PROJECT MGR	TO	TBD
CLIENT APPR.		

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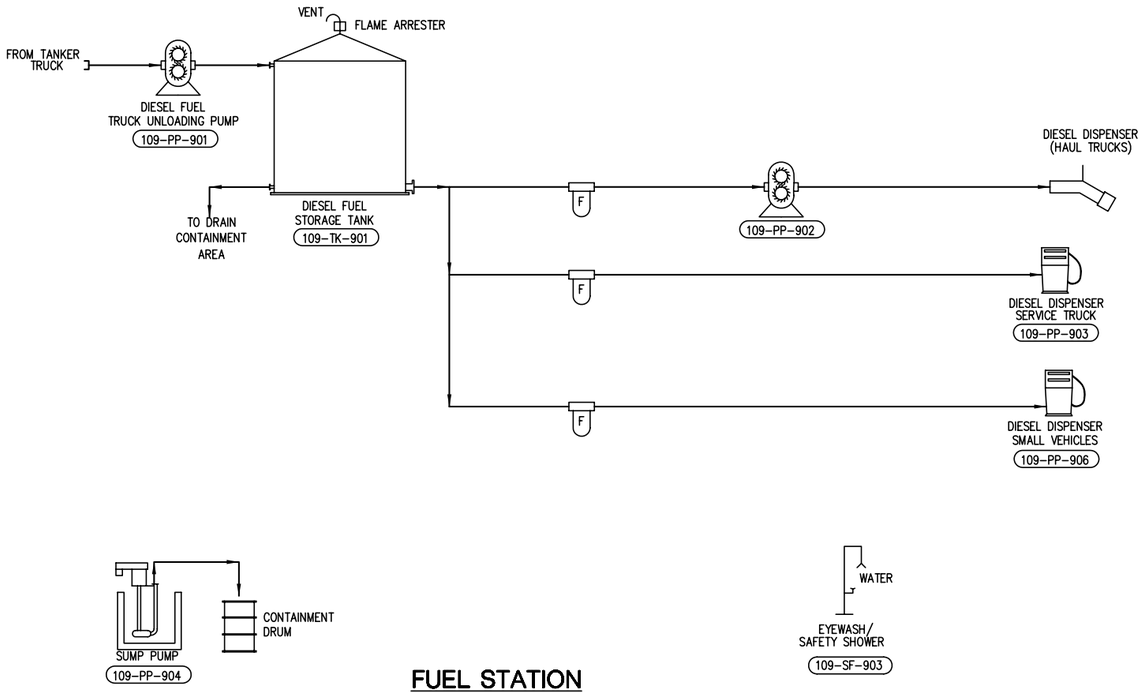
WESTERN COPPER CORPORATION

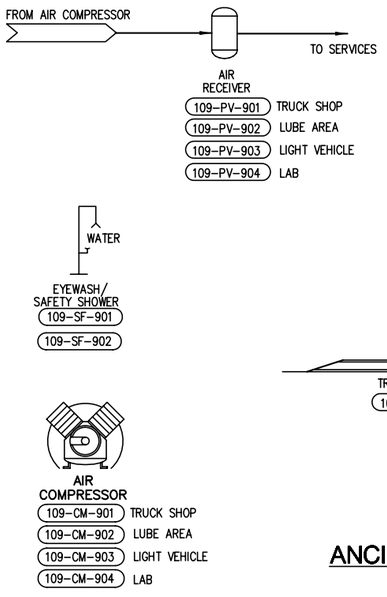
CARMACKS COPPER PROJECT
ANCILLARY FACILITIES
PROCESS FLOW SHEET
LUBE STORAGE & DISPENSING

JOB NO. M3-PN06192.01
DWG. NO. **000-FS-015**
REV NO. P2
DATE 8 NOV. 07

File: P:\2006\06192.01\Piping\FLOW SHEETS\000FS015.dwg LAST UPDATE: NOV 08, 2007 @ 2:07 PM BY: mh397 LAST REV: PLOT SCALE: 1:25.40



FUEL STATION



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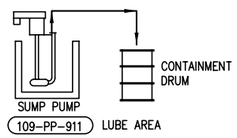

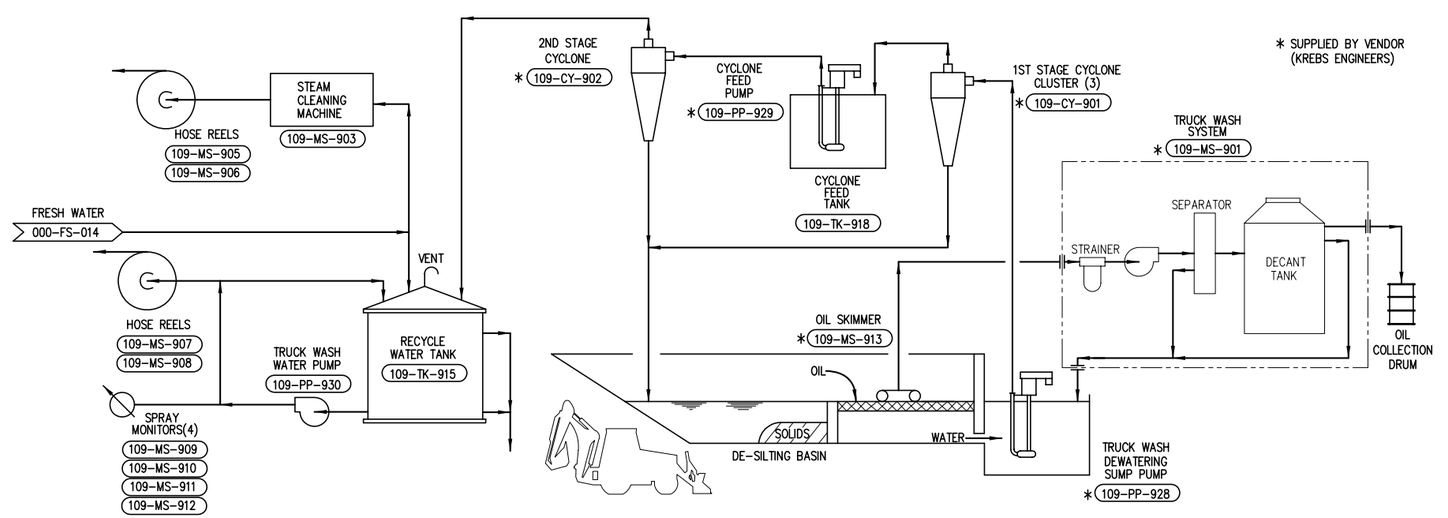

TRUCK WASH

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES	
DWG. NO	TITLE	DWG. NO	TITLE

REVISIONS						REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: NONE		DATE
DESIGNED BY	BKK	06/07
DRAWN BY	MHH	06/12/07
CHECKED BY	TBD	TBD
PROJECT MGR	TO	TBD
CLIENT APPR.		

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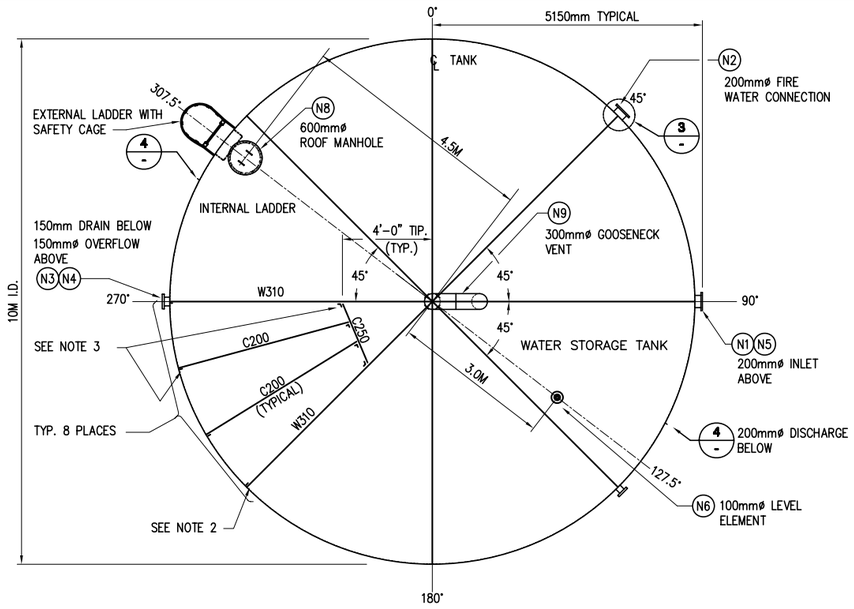
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
ANCILLARY FACILITIES
PROCESS FLOW SHEET
FUEL/WASTE OIL & TRUCK WASH

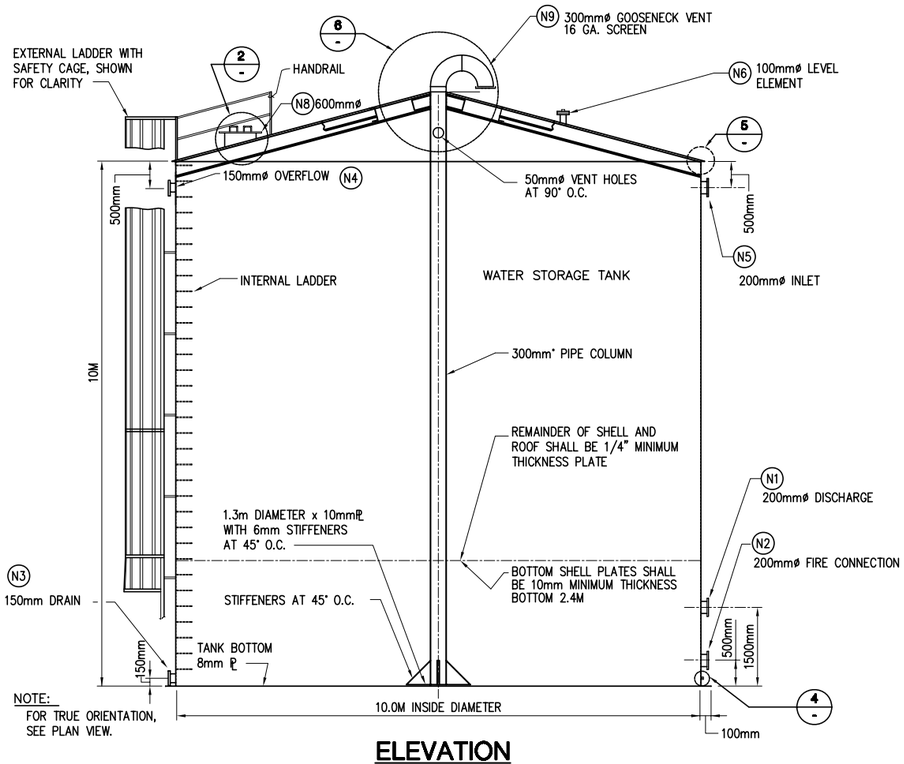
JOB NO. M3-PN06192.01
DWG. NO. **000-FS-016**
REV NO. P3
DATE 8 NOV. 07

File: P:\2006\06192.01\Piping\FLOW SHEETS\000FS016.dwg LAST UPDATE: NOV 08, 2007 @ 2:05 PM BY: mh397 LAST REV: PLOT SCALE: 1:25.40



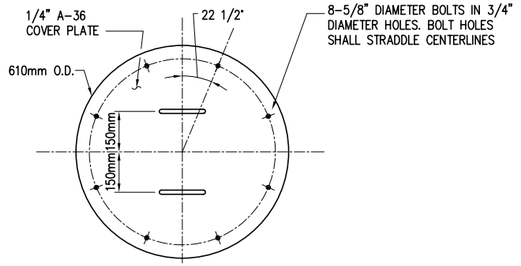
PLAN

TANK NO. 50-005

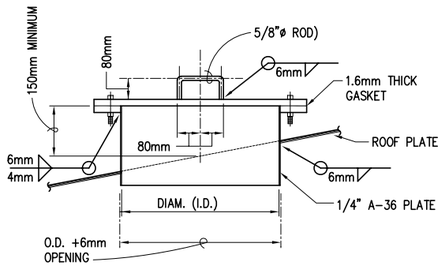


ELEVATION

NO SCALE



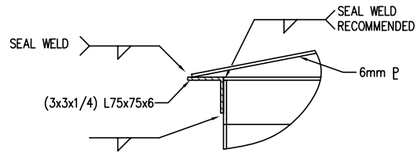
PLAN



SECTION

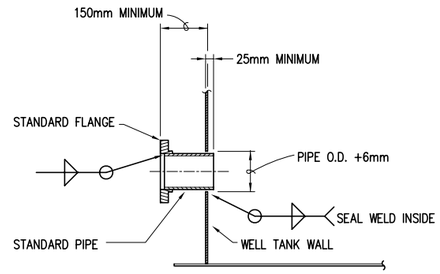
ROOF MANHOLE DETAIL

DETAIL 2 -
NO SCALE



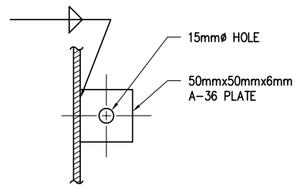
CONE TOP TANK CONNECTION

DETAIL 5 -
NO SCALE



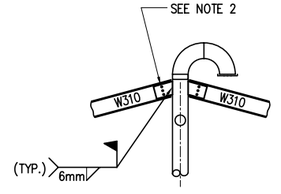
UNREINFORCED SHELL NOZZLE

DETAIL 3 -
NO SCALE



GROUNDING TABS (TYPICAL 2)

DETAIL 4 -
NO SCALE



DETAIL 6 -
NO SCALE

(NOTES:)

1. TANK SHELL, BOTTOM AND ROOF SHALL BE FABRICATED FROM ASTM A 285 GRADE C STEEL. MIMIMUM THICKNESS AS INDICATED ON DRAWING.
2. TOP FLANGES OF STRUCTURAL SHAPES TO BE TACK WELDED TO ROOF PLATE AT 0.9m ON CENTER WITH 9mm WELD, 50mm LONG.

PRELIMINARY
NOT FOR CONSTRUCTION

space reserved
for seal

REFERENCES		REFERENCES		REVISIONS						REVISIONS					
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

		DATE
SCALE: NONE		
DESIGNED BY	M3	JUL 07
DRAWN BY	AI	JUL 07
CHECKED BY		
PROJECT MGR	GK	
CLIENT APPR.		

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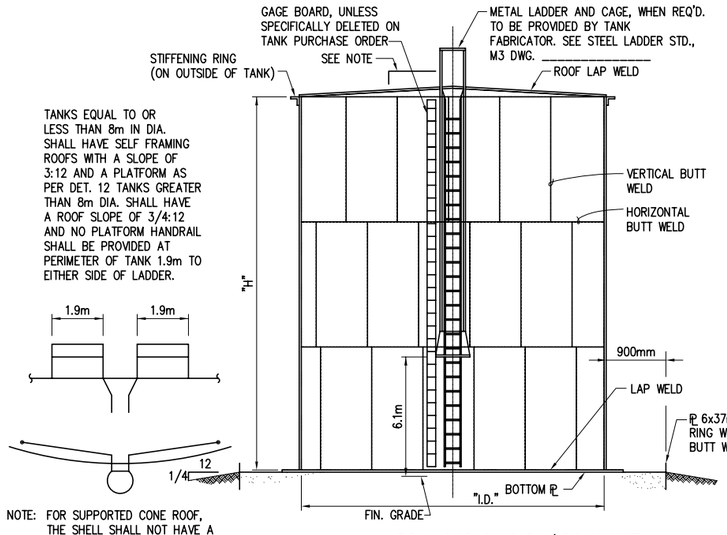
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
GENERAL
WATER STORAGE
TANK DETAILS

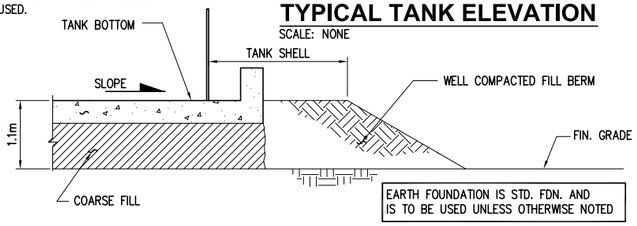
JOB NO. M3-PN06192.01	
DWG NO. 000-M-002	
REV NO. P1	DATE 19 JUL 07

File: P:\2006\06192.01\To Be Issued\Mechanical\000-M-002P1.dwg LAST UPDATE: JUL 19, 2007 @ 1:09 PM BY: jsd7 LAST REV: P1 PLOT SCALE: 1:25.40



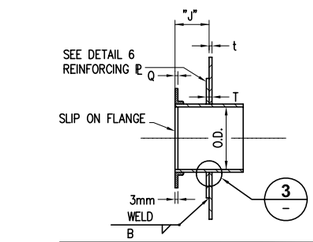
TYPICAL TANK ELEVATION

SCALE: NONE



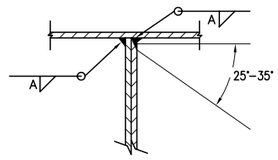
CONCRETE FOUNDATION PLAN

4 — SCALE: NONE



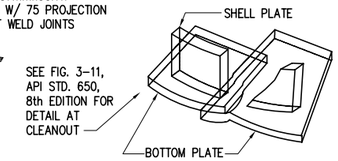
NOZZLE WELD DETAIL

2 — SCALE: NONE



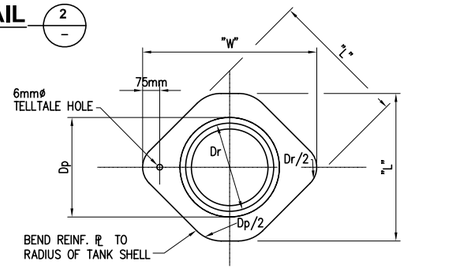
DETAIL

3 — SCALE: NONE



LAPPING OF BOTTOM PLATES DETAIL

5 — SCALE: NONE



DETAIL

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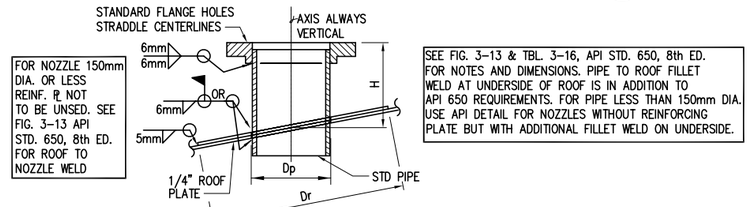
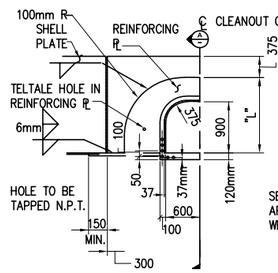
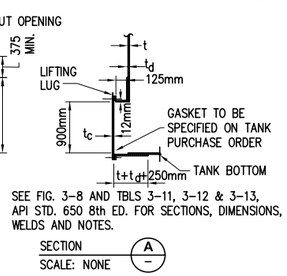


REINFORCED SHELL NOZZLE DETAIL

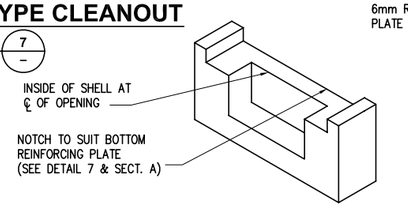
8 — SCALE: NONE





FLUSH-TYPE CLEANOUT DETAIL

7 — SCALE: 3"=1'



WALL & CLEANOUT OPENING DETAIL

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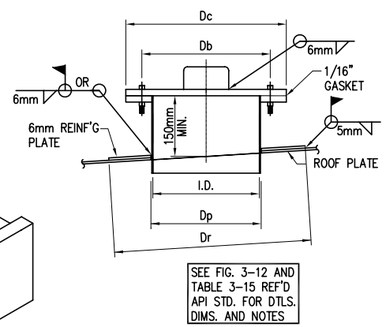
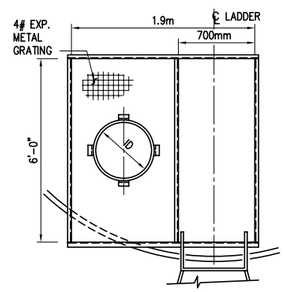


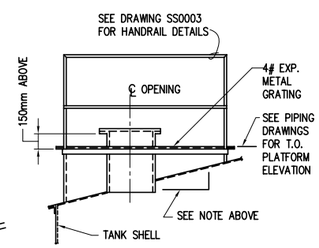
ROOF MANHOLE DETAIL

10 — SCALE: NONE



ROOF PLATFORM DETAIL

11 — SCALE: 1/4"=1'-0"



PLATFORM ELEVATION DETAIL

12 — SCALE: 1/4"=1'-0"

SPECIFICATIONS AND CONSTRUCTION NOTES

1.0 SCOPE

1.01 THIS SPECIFICATION COVERS MATERIAL, DESIGN, FABRICATION, ERECTION AND TESTING REQUIREMENTS FOR VERTICAL, CYLINDRICAL, ABOVE GROUND, OPEN AND CLOSED TOP, WELDED STEEL STORAGE TANKS, IN VARIOUS SIZES AND CAPACITIES FOR INTERNAL PRESSURES APPROXIMATING ATMOSPHERIC PRESSURES.

1.02 THE MANUFACTURER IS RESPONSIBLE FOR COMPLYING WITH ALL OF THE PROVISIONS OF THIS SPECIFICATION. THE PURCHASER MAY MAKE ANY INVESTIGATION NECESSARY TO SATISFY HIMSELF OF COMPLIANCE BY THE MANUFACTURER, AND HE MAY REJECT ANY MATERIAL AND/OR WORKMANSHIP THAT DOES NOT COMPLY WITH THIS SPECIFICATION.

1.03 ALL WORK SHALL BE DONE IN ACCORDANCE WITH THIS SPECIFICATION AND API STANDARD 650, BUT THE TANKS NEED NOT BE API STAMPED. MANUFACTURER AND/OR ERECTOR SHALL SUPPLY AND APPLY STANDARD NAMEPLATE.

1.04 SPECIFIC API DETAILS SHOWN ON THIS DRAWING SHALL BE USED TO THE EXCLUSION OF OTHER POSSIBLE API DETAILS.

2.0 MATERIAL

2.01 PLATES: A283 OR A285 THE MANUFACTURER SHALL STATE IN HIS PROPOSAL THE PLATE SPECIFICATION AND THICKNESS WHICH HE INTENDS TO USE.

2.02 WELDING ELECTRODES: E60 AND E70 IN ACCORDANCE WITH ATS A5.18 OR A5.20

2.03 STRUCTURAL SHAPES: ASTM A36

2.04 CASTING SHALL CONFORM TO THE LATEST EDITION OF ASTM A27, GRADE 60-30, FULLY ANNEALED.

2.05 PIPING EXCEPT AS OTHERWISE HEREIN NOTED SHALL CONFORM TO THE LATEST EDITION OF API STANDARD 5L, ASTM A53, GR. B SMLS, OR ASTM A106 GRADES A AND B.

2.06 BOLTING SHALL CONFORM TO THE LATEST EDITION OF ASTM A307 WITH HEAVY HEX NUTS AND BOLTS.

2.07 FLANGES SHALL CONFORM TO ANSI B16.5 AND SHALL BE HUB SLIP-ON WELDED.

3.0 DESIGN

3.01 FLOORS AND ROOFS SHALL HAVE SINGLE-WELDED LAP JOINTS. WALLS SHALL BE BUTT WELDED.

3.02 WALL AND FLOOR PLATES SHALL HAVE A MINIMUM THICKNESS OF 6mm FOR ALL TANKS WITH A DIAMETER GREATER THAN TEN FEET.

3.03 ROOFS FOR TANKS WITH DIAMETERS IN EXCESS OF TWENTY-FOUR FEET SHALL NOT BE SELF FRAMING.

3.04 TANKS SHELLS SHALL BE DSEIGNED TO HAVE ALL COURSES (MINIMUM 2m) WITH VERTICAL JOINTS IN ADJACENT COURSES OFFSET.

3.05 THE FABRICATING CONTRACTOR SHALL SUBMIT FOUR COPIES OF ALL STRUCTURAL CALCULATIONS, SHOP DRAWINGS AND ERECTION DRAWINGS TO BE APPROVED BEFORE START OF FABRICATION. ONE SEPIA REPRODUCIBLE OF SHOP AND ERECTION DRAWINGS SHALL BE MAILED TO THE CONSTRUCTION CONTRACTORS'S FIELD SUPERINTENDENT AND THE APPROVING ENGINEER AS SOON AS THESE DRAWINGS HAVE BEEN APPROVED FOR FABRICATION.

4.0 FABRICATION

4.01 WORKMANSHIP

A. ALL WORK OF FABRICATING API STANDARD TANKS SHALL BE DONE IN ACCORDANCE WITH THIS SPECIFICATION, WITH THE PERMISSIBLE ALTERNATIVE SPECIFIED ON THE ORDER. THE WORKMANSHIP AND FINISH SHALL BE FIRST CLASS IN EVERY RESPECT AND SUBJECT TO THE CLOSEST INSPECTION BY THE MANUFACTURER'S INSPECTOR, WHETHER OR NOT THE PURCHASER WAIVES ANY PART OF THE INSPECTION.

B. WHEN MATERIAL REQUIRES STRAIGHTENING, THE WORK SHALL BE DONE BY PRESSING OR OTHER NON-INJUROUS METHOD PRIOR TO ANY LAYOUT OF SHAPING. HEATING OR HAMMERING IS NOT PERMISSIBLE UNLESS THE MATERIAL IS HEATED TO A FORGING TEMPERATURE.

4.02 FINISH OF PLATE EDGES

THE EDGES OF PLATES MAY BE SHEARED, MACHINED, CHIPPED, OR MACHINE OXYGEN CUT. SHEARING SHALL BE LIMITED TO 10mm. WHEN EDGES OF PLATES ARE OXYGEN CUT, THE RESULTING SURFACE SHALL BE UNIFORM AND SMOOTH AND SHALL BE FREED OF SCALE AND SLAG ACCUMULATIONS BEFORE WELDING. AFTER WIRE BRUSHING CUT OR SHEARED EDGES, THE FINE FILM OF RUST WHICH ADHERES TO THE EDGES NEED NOT BE REMOVED BEFORE WELDING. CIRCUM-FERENTIAL EDGES OF ROOF AND BOTTOM PLATES MAY BE MANUALLY OXYGEN CUT.

4.03 SHAPING OF PLATES

SHELL PLATES SHALL BE SHAPED TO SUIT THE CURVATURE OF THE TANK AND THE ERECTION PROCEDURE.

4.04 MARKING

ALL SPECIAL PLATES WHICH ARE CUT TO SHAPE BEFORE SHIPMENT SHALL BE MARKED AS SHOWN ON THE MANUFACTURER'S DRAWINGS.

4.05 SHOP PAINTING SHALL BE APPLIED IN ACCORDANCE WITH SPECIFICATION 4801. ALL WATER TANKS SHALL ALSO BE IN COMPLIANCE WITH AWWA.

5.0 ERECTION

5.01 GENERAL

A. THE SUBGRADE AND FOUNDATION FOR RECEIVING THE TANK BOTTOM SHALL BE PROVIDED BY THE PURCHASER, UNLESS SPECIFIED OTHERWISE ON THE PURCHASE ORDER.

B. THE MANUFACTURER AND/OR THE ERECTOR SHALL FURNISH ALL LABOR, TOOLS, WELDING EQUIPMENT AND CABLES, FALSEWORK, SCAFFOLDING, AND OTHER EQUIPMENT NECESSARY FOR THE ERECTION OF TANKS COMPLETE AND READY FOR USE. POWER FOR WELDING SHALL BE SUPPLIED BY THE MANUFACTURER AND/OR ERECTOR UNLESS OTHER ARRANGEMENTS ARE MADE AND SPECIFIED ON THE PURCHASE ORDER.

C. PAINT OR OTHER PROTECTION FOR ALL STRUCTURAL STEEL AND PLATE WORK INSIDE AND OUTSIDE OF THE TANK SHALL BE AS SPECIFIED ON THE ORDER AND SHALL BE APPLIED BY COMPETENT WORKMEN. PROTECTIVE COATING TOUCH-UP SHALL BE APPLIED IN ACCORDANCE WITH PAINT SPECIFICATION 4801, INCLUDING ANY AWWA REQUIREMENTS.

D. LUGS ATTATCHED BY WELDING TO THE INSIDE AND OUTSIDE OF THE TANK, FOR THE PURPOSE OF ERECTION ONLY, SHALL BE REMOVED, AND ANY NOTICEABLE PROJECTIONS OF WELD METAL SHALL BE CHIPPED AND/OR GROUND FROM THE PLATE.

5.02 DETAILS OF WELDING

A. WELDING PROCEDURES SHALL FOLLOW THE RECOMMENDED PROCEDURE AS SET FORTH IN API STANDARD 650, SECTION 5 IN ITS ENTIRETY.

B. ON ALL SURFACES TO BE PAINTED, WELD SPLATTER SHALL BE REMOVED. ALL EDGES SHALL BE GROUND TO 3mm RADIUS. ALL WELDS SHALL BE GROUND.

5.03 TANK BOTTOMS AND ROOF SHALL BE TESTED BY AIR PRESSURE OR VACUUM USING SOAPSUDS. TANK SHELL SHALL BE TESTED BY FILLING WITH WATER.

6.0 METHODS OF INSPECTING SHELL JOINTS

6.01 METHODS OF INSPECTING AND REPAIRING SHELL JOINTS SHALL FOLLOW THE OUTLINE AS SET FORTH IN API STANDARD 650, SECTION 6 IN ITS ENTIRETY.

7.0 WELDING PROCEDURE AND WELDER QUALIFICATIONS

7.01 METHODS OF WELDING PROCEDURE AND WELDER QUALIFICATIONS SHALL FOLLOW THE OUTLINE AS SET FORTH IN API STANDARD 650, SECTION 7 IN ITS ENTIRETY.

PRELIMINARY
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space reserved for seal

REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: NONE		DATE
DESIGNED BY	M3	JUL 07
DRAWN BY	AI	JUL 07
CHECKED BY		
PROJECT MGR	GK	
CLIENT APPR.		

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WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
GENERAL STRUCTURAL STEEL TANK STANDARD

JOB NO. M3-PN06192.01
DWG NO. 000-SS-001
REV NO. P1
DATE 19 JUL 07

File: P:\2006\06192.01\To Be Issued\Structural\000-SS-001P1.dwg LAST UPDATE: JUL 19, 2007 @ 1:14 PM BY: js87 LAST REV: P1 PLOT SCALE: 1:25.40

PLAN

	ELEV.	CUT	FILL	DIFF.
PLANT	768.0	98,180	3,200	94,980
TRUCK SHOP	836.0	22,390	6,980	15,410
CRUSHER	832.0	19,130	17,640	1,490
CAMP	734.0	60,780	43,770	17,010
ROADS	VARIES	62,410	208,450	−146,040
TOTAL		262,890	280,040	−17,150

NOTE:
VOLUMES CALCULATED ARE IN CU. M. USING
A 1.5H:1V CUT SLOPE AND 2H:1V FILL SLOPE.

PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE
000-CI-008	OVERALL SITE PLAN		

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: 1:2,000		DATE
DESIGNED BY	FXE	JAN 07
DRAWN BY	FXE	JAN 07
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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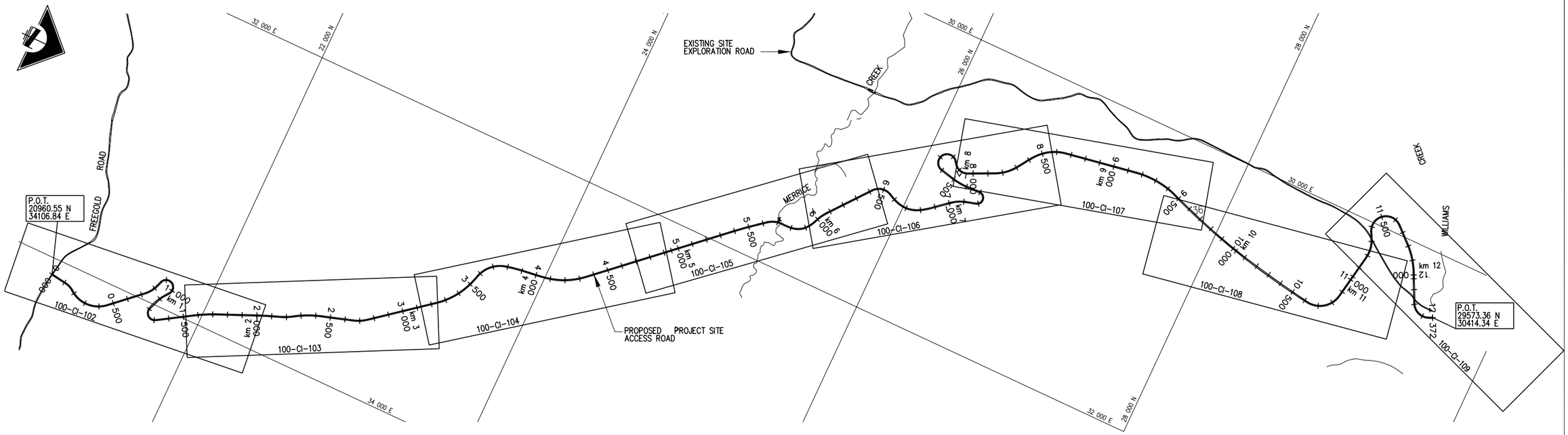
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
CIVIL
SITE GRADING PLAN

JOB NO. M3-PN06192.01
DWG NO. **100-CI-010**
REV NO. P7
DATE 17 SEP 08

File: P:\2006\06192.01\Civil\100CI010.dwg LAST UPDATE: AUG 07, 2008 @ 2:23 PM BY: fe399 LAST REV: PLOT SCALE: 1:25.40



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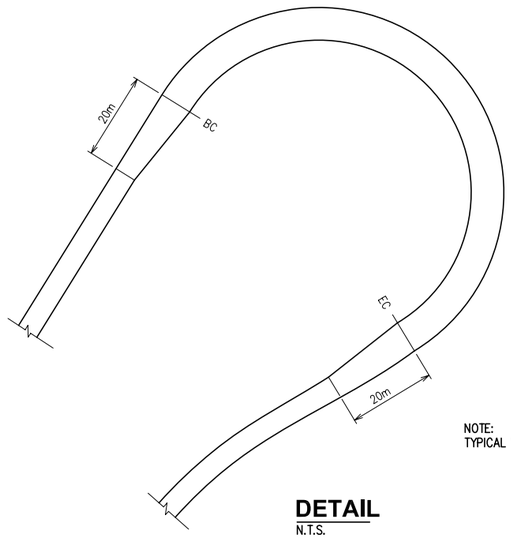

NOTE:
TYPICAL WIDENING AT SHORT DISTANCE CURVES

DETAIL
N.T.S.

	VOLUME OF EARTHWORK	
	EXCAVATION	BACKFILL
ACCESS ROAD	341,740 cu. mtrs.	312,490 cu. mtrs.
–	–	–

200 100 0 200 400 600 800 1000 metres
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PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES		REVISIONS						REVISIONS					
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

		DATE
SCALE:	AS NOTED	
DESIGNED BY	DEJ	OCT. '06
DRAWN BY	GS	OCT. '06
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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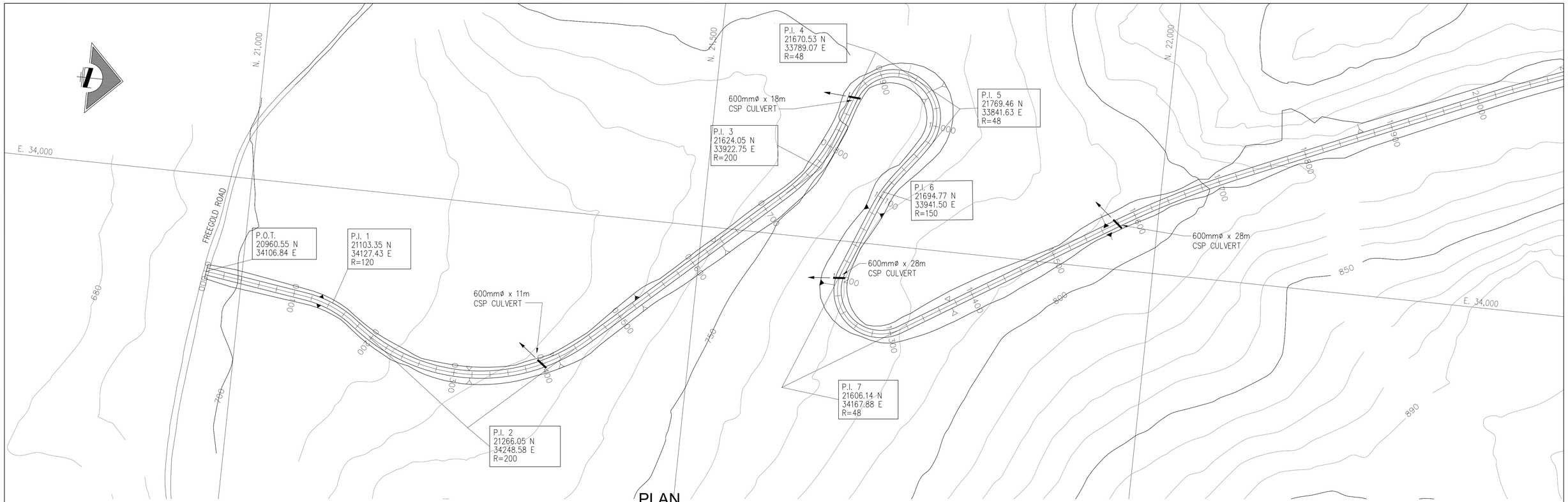
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
CIVIL
ACCESS ROAD
SITE PLAN SHEET INDEX

JOB NO. M3-PN06192.01
DWG NO. **100-CI-101**
REV NO. P2
DATE 7 SEP 07

File: P:\2006\06192.01\To Be Issued\Civil\100CI101 P2.dwg LAST UPDATE: SEP 07, 2007 @ 11:57 AM BY: djd82 LAST REV: PLOT SCALE: 1:25.4



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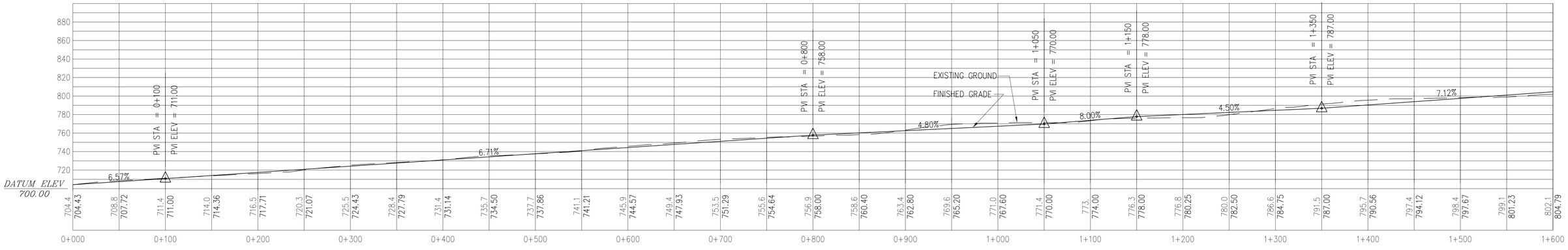

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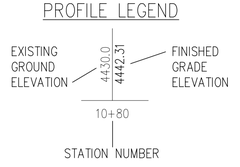

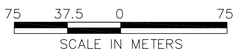

PRELIMINARY
NOT FOR CONSTRUCTION

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD														

SCALE: 1:2000		DATE
DESIGNED BY	DEJ	DEC. '06
DRAWN BY	DEJ	DEC. '06
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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WESTERN COPPER CORPORATION

CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 0+000 TO 1+600

JOB NO. M3-PN06192.01
DWG NO. **100-CI-102**
REV NO. P5
DATE 10 JUN 08

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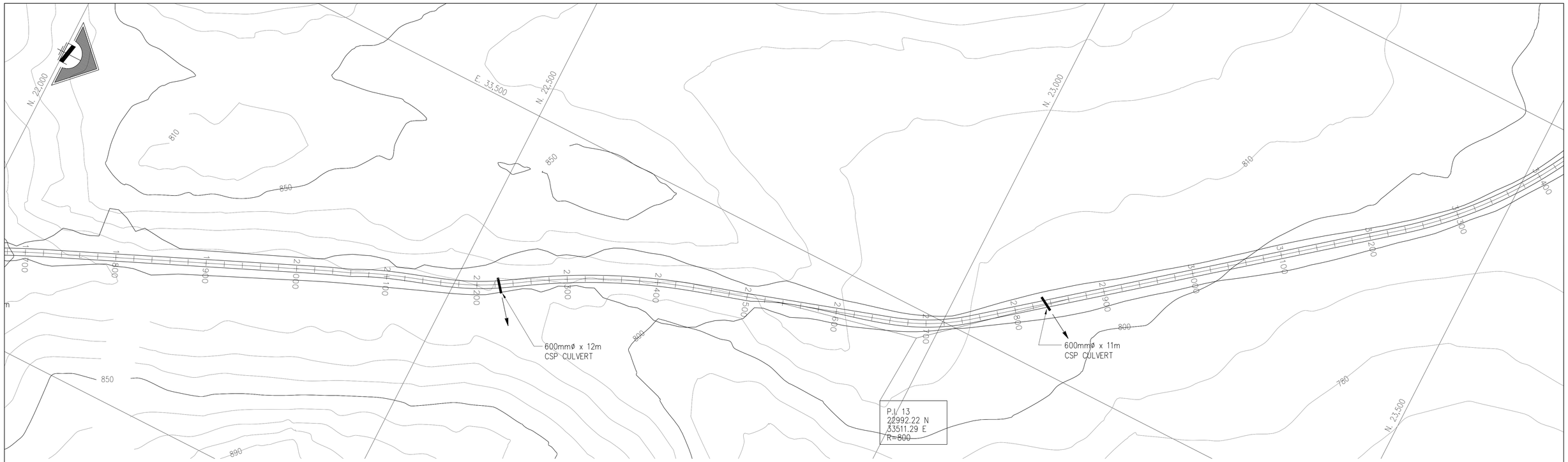

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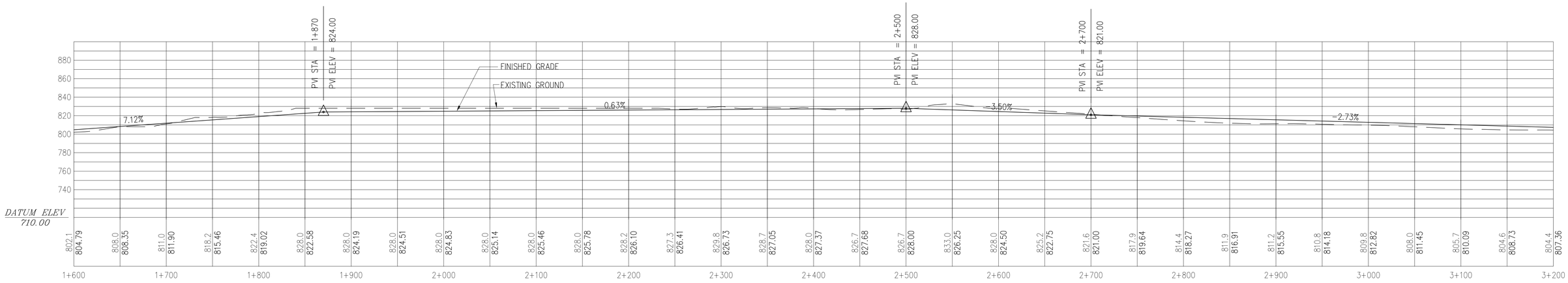

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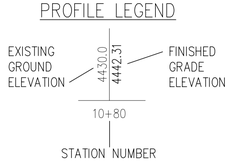

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD														

		DATE
SCALE:	1:2000	
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DRAWN BY	DEJ	DEC. '06
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PROJECT MGR		
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WESTERN COPPER CORPORATION

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CIVIL
ACCESS ROAD
STA. 1+650 to 3+200

JOB NO. M3-PN06192.01
DWG NO. **100-CI-103**
REV NO. P5
DATE 10 JUN 08

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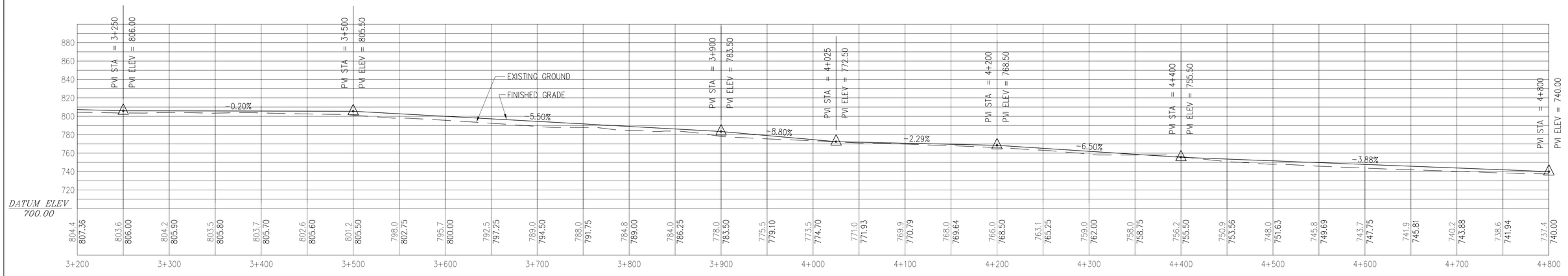

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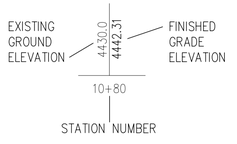

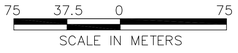

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CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 3+20 to 4+800

JOB NO. M3-PN06192.01
DWG NO. **100-CI-104**
REV NO. P5
DATE 10 JUN 08

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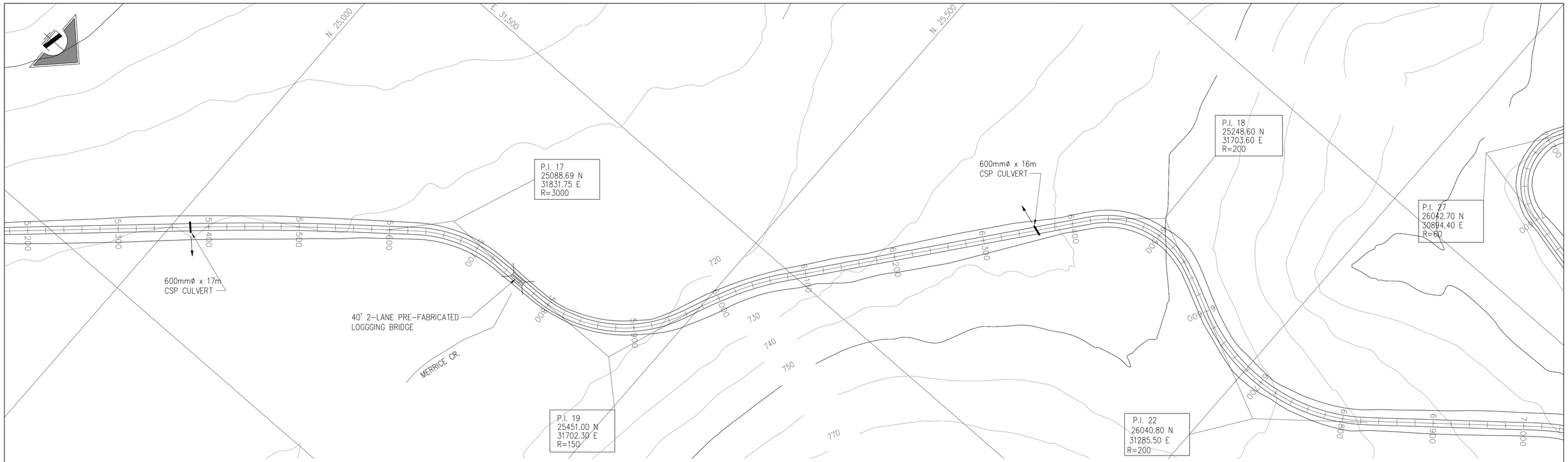

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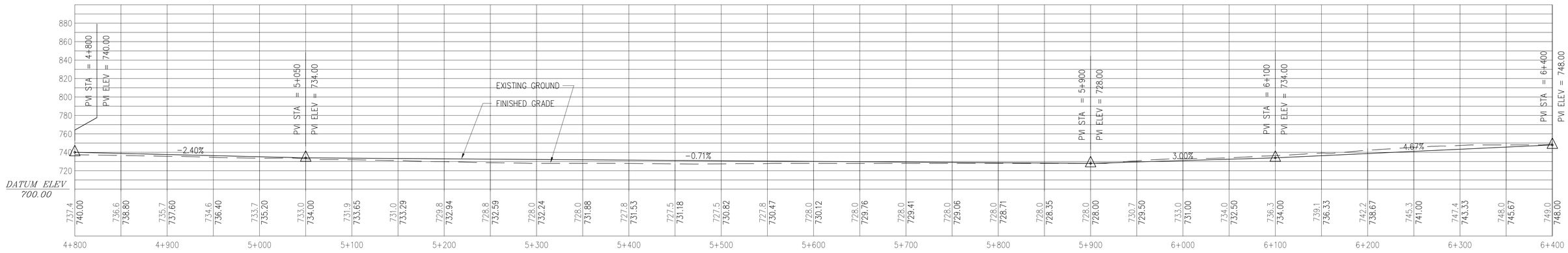

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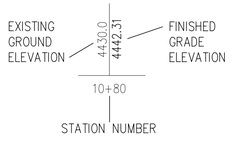

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD		

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

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STA. 4+800 to 6+400

JOB NO. M3-PN06192.01
DWG NO. **100-CI-105**
REV NO. P5
DATE 10 JUN 08

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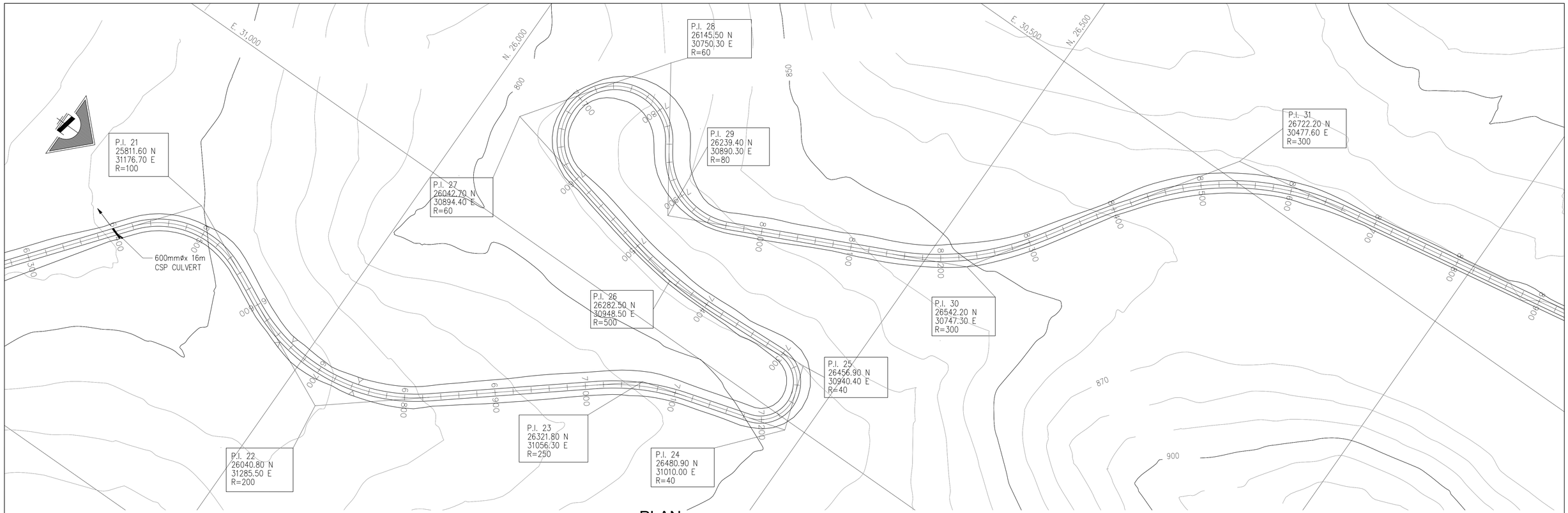

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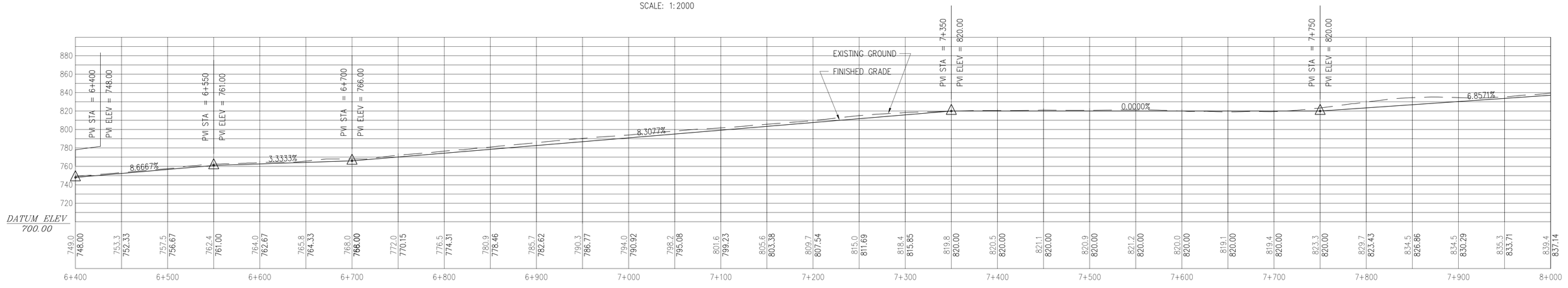

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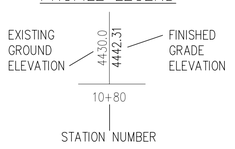

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NOT FOR CONSTRUCTION

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD														

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WESTERN COPPER CORPORATION

CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 6+400 TO 8+000

JOB NO. M3-PN06192.01
DWG NO. **100-CI-106**
REV NO. P5
DATE 10 JUN 08

File: P:\2006\06192.01\Civil\100CI106.dwg LAST UPDATE: JUN 02, 2008 @ 2:38 PM BY: fe399 LAST REV: PLOT SCALE: 1:25.4

PLAN

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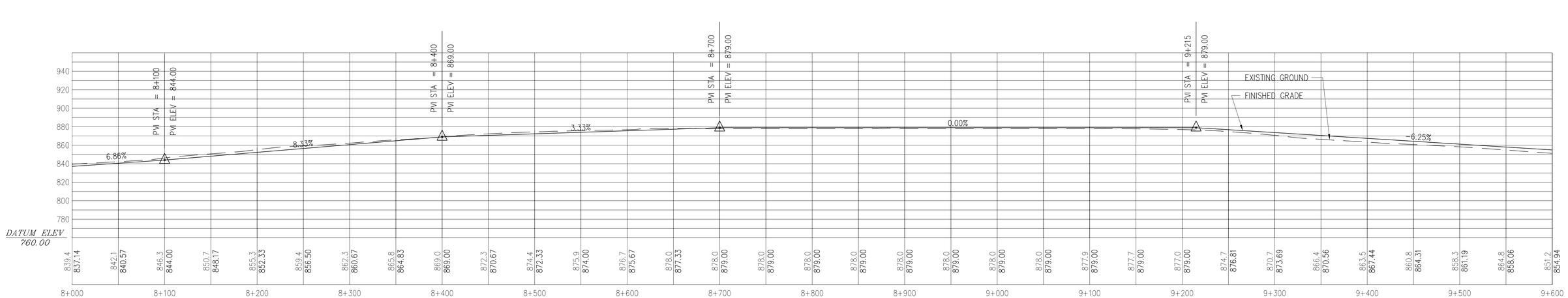

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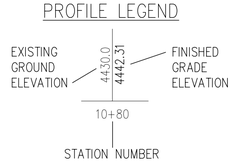

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WESTERN COPPER CORPORATION

CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 8+000 TO 9+600

JOB NO. M3-PN06192.01
DWG NO. **100-CI-107**
REV NO. P5
DATE 10 JUN 08

File: P:\2006\06192.01\Civil\100CI107.dwg LAST UPDATE: JUN 02, 2008 @ 2:54 PM BY: fe399 LAST REV: PLOT SCALE: 1:25.4

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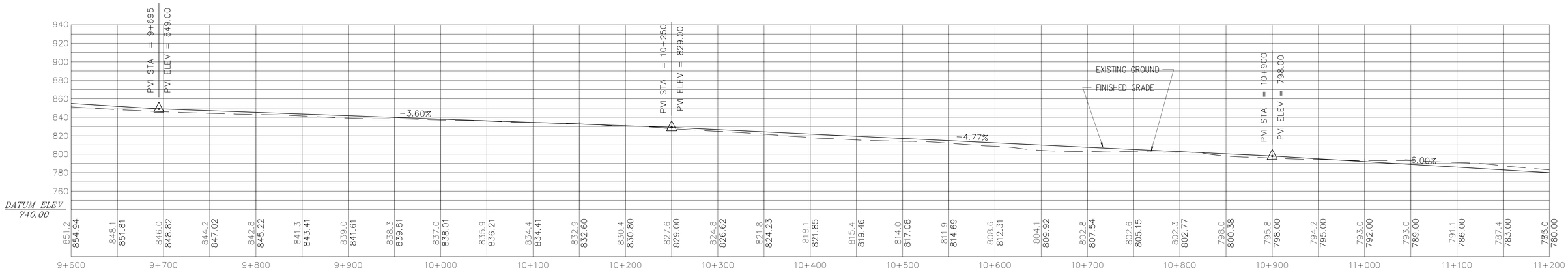

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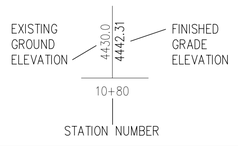

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NOT FOR CONSTRUCTION

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD		

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: 1:2000		DATE
DESIGNED BY	DEJ	DEC. '06
DRAWN BY	DEJ	DEC. '06
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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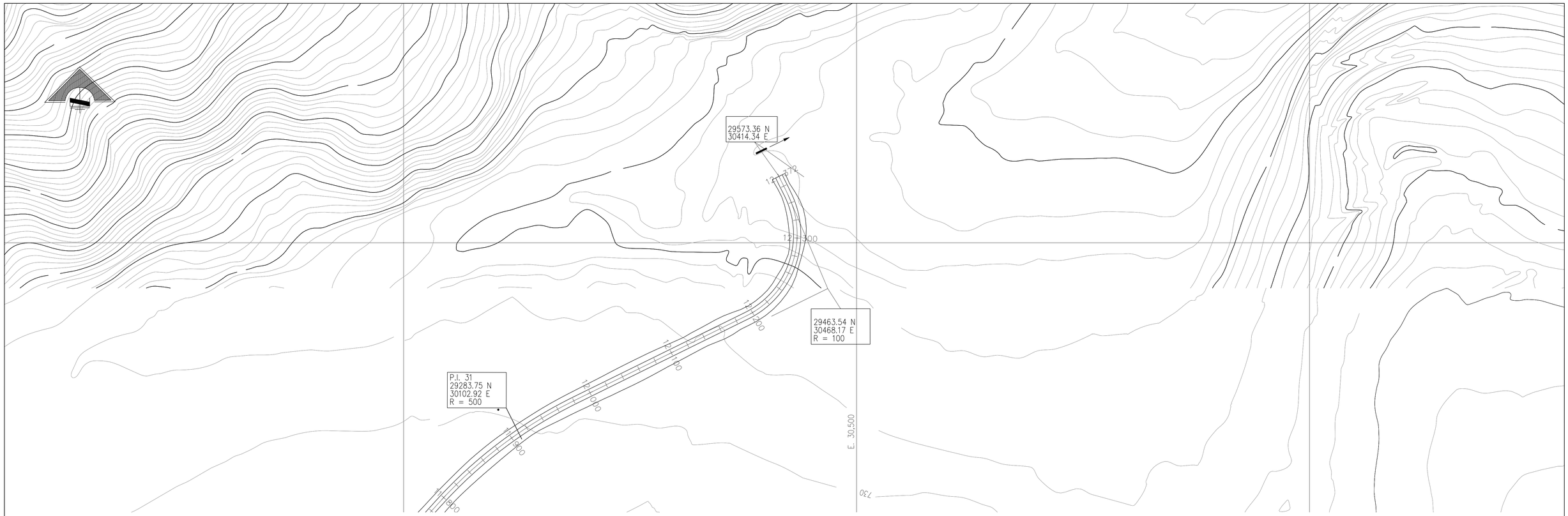
WESTERN COPPER CORPORATION

CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 9+600 TO 11+200

JOB NO. M3-PN06192.01
DWG NO. **100-CI-108**
REV NO. P5
DATE 10 JUN 08

File: P:\2006\06192.01\Civil\100CI108.dwg LAST UPDATE: FEB 20, 2008 @ 2:07 PM BY: fe399 LAST REV: PLOT SCALE: 1:25.4



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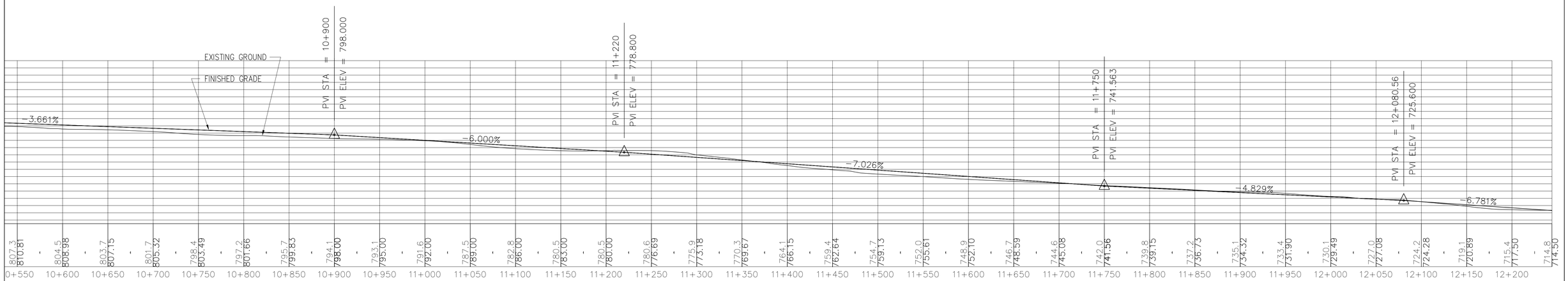

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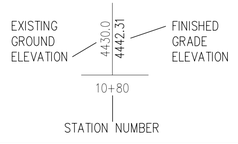

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PRELIMINARY
NOT FOR CONSTRUCTION

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000-CI-001	GENERAL CIVIL PROJ. SITE ACCESS ROAD														

SCALE: 1:2000		DATE
DESIGNED BY	DEJ	DEC. '06
DRAWN BY	DEJ	DEC. '06
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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WESTERN COPPER CORPORATION

CARMACK'S COPPER PROJECT
CIVIL
ACCESS ROAD
STA. 11+200 TO 12+372

JOB NO. M3-PN06192.01
DWG NO. **100-CI-109**
REV NO. P5
DATE 10 JUN 08

File: P:\2006\06192.01\Civil\100CI109.dwg LAST UPDATE: JUN 10, 2008 @ 3:00 PM BY: fe399 LAST REV: PLOT SCALE: 1:25.4

PLAN

SCALE 1: 400

PRELIMINARY
NOT FOR CONSTRUCTION

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REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

		DATE
SCALE: 1: 400		
DESIGNED BY	MD	JUN 07
DRAWN BY	MD	JUN 07
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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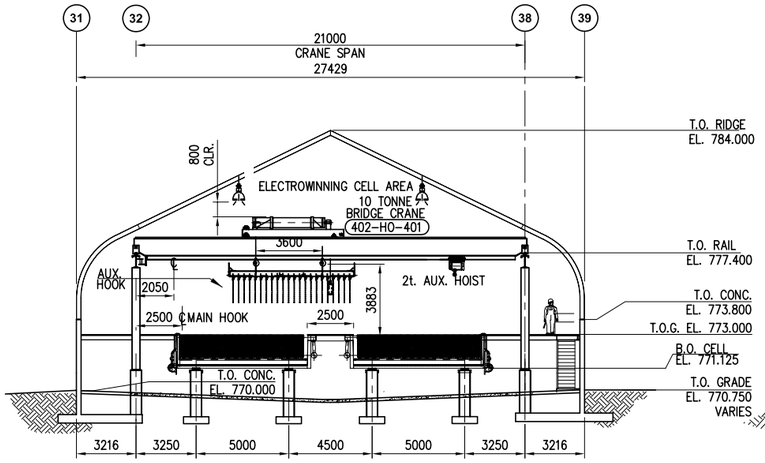
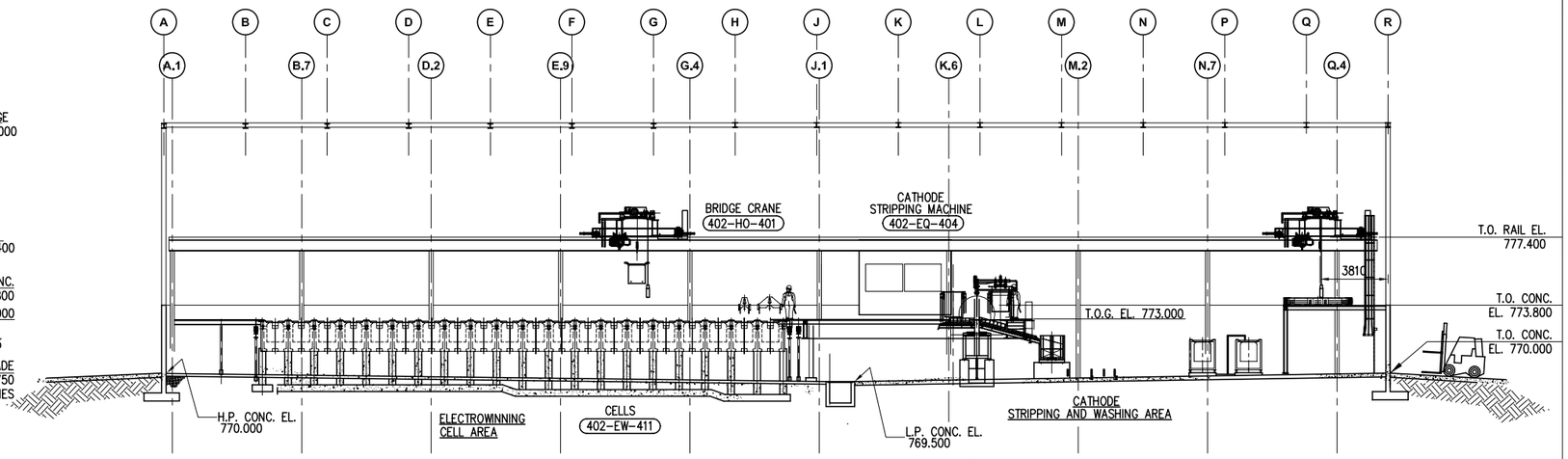
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
SX-EW AREA
GENERAL ARRANGEMENT
SITE PLAN

JOB NO. M3-PN06192.01
DWG NO. **400-GA-001**
REV NO. P3
DATE 05 MAY 08

File: P:\2006\06192.01\GA\400-GA-001.dwg LAST UPDATE: MAY 15, 2008 @ 9:56 AM BY: md262 LAST REV: P1 PLOT SCALE: 1:25.4





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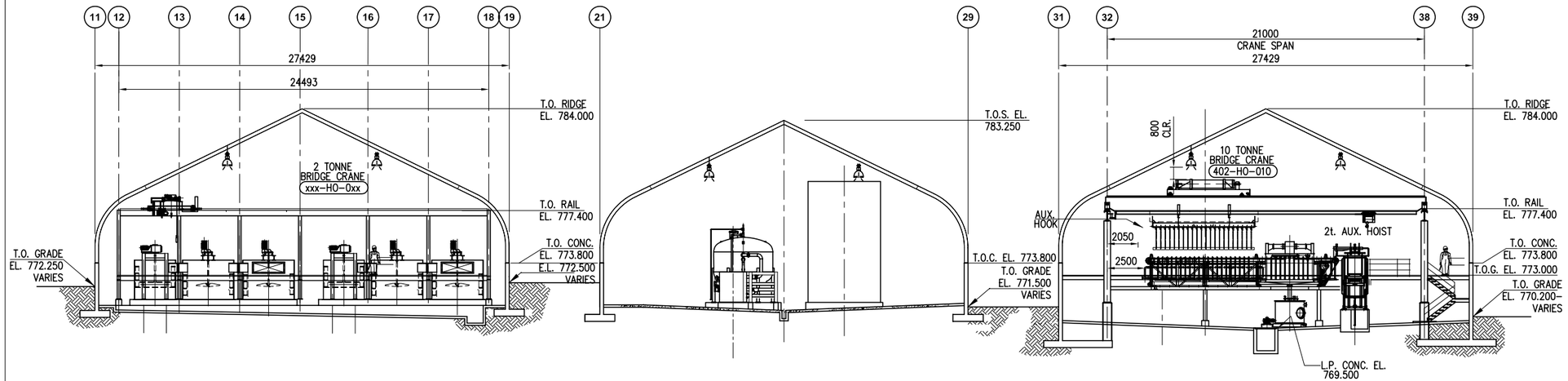

PLAN

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1:150

PRELIMINARY
NOT FOR CONSTRUCTION

space reserved for seal

REFERENCES		REFERENCES	
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REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: AS NOTED	DATE
DESIGNED BY JHB	JUN 07
DRAWN BY JHB	JUN 07
CHECKED BY	
PROJECT MGR	
CLIENT APPR.	

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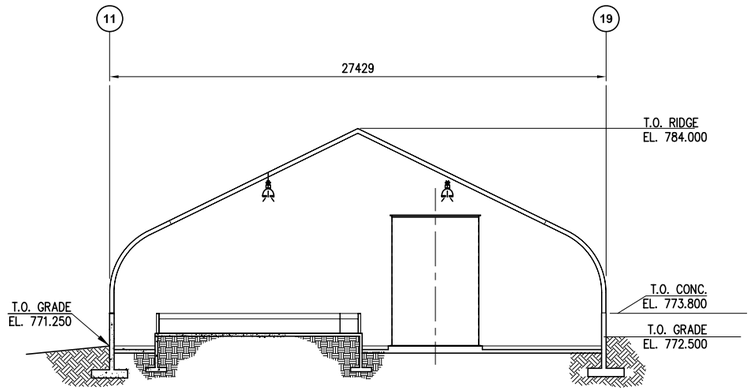
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
SX-EW AREA
GENERAL ARRANGEMENT
SECTIONS

JOB NO. M3-PN06192.01
DWG NO. **400-GA-003**
REV NO. P2
DATE 02 AUG 07

File: P:\2006\06192.01\GA\400GA003.dwg LAST UPDATE: AUG 03, 2007 @ 7:51 AM BY: jb87 LAST REV: P1 PLOT SCALE: 1:25.4



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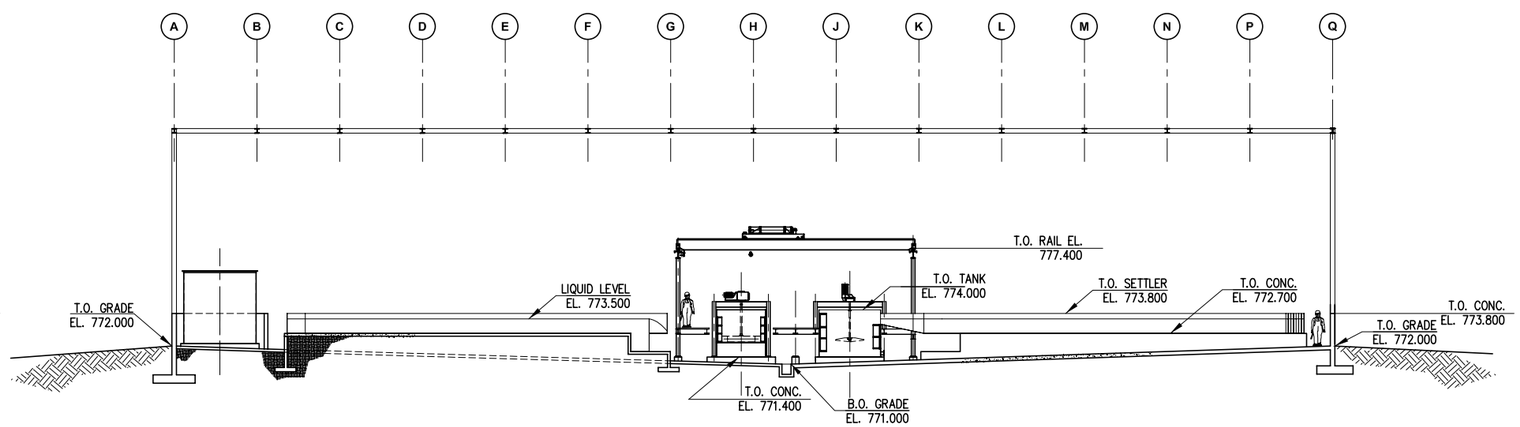

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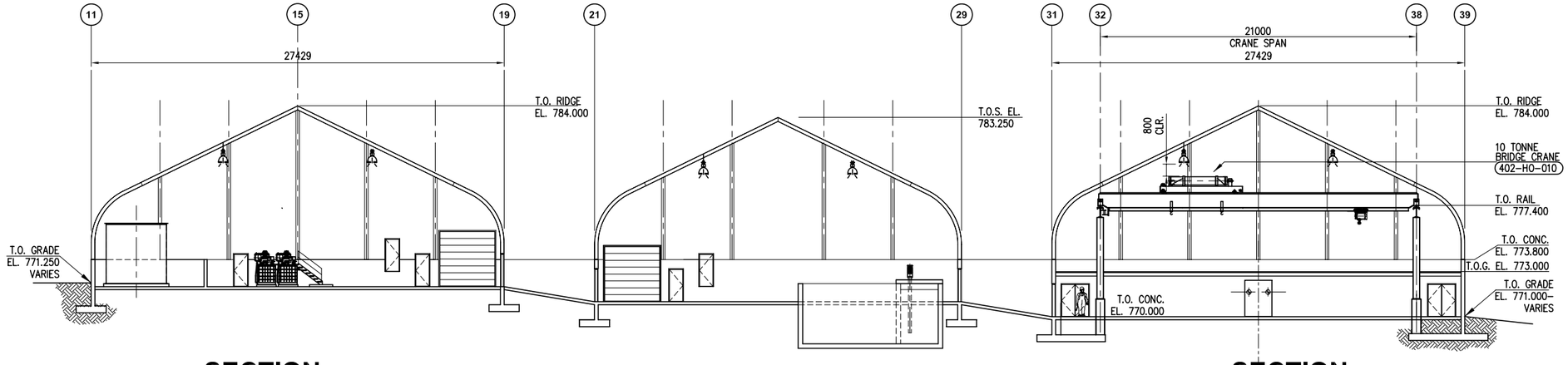

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SECTION B –
SCALE 1:150

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PRELIMINARY
NOT FOR CONSTRUCTION

space reserved for seal

REFERENCES		REFERENCES		REVISIONS						REVISIONS					
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		DATE
SCALE: AS NOTED		
DESIGNED BY	JHB	JUN 07
DRAWN BY	JHB	JUN 07
CHECKED BY		
PROJECT MGR	GK	
CLIENT APPR.		

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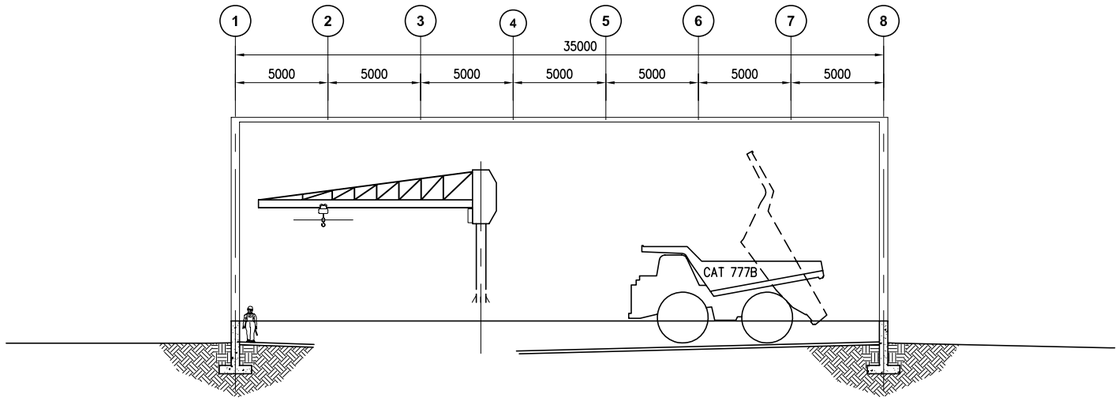
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
SX-EW AREA
GENERAL ARRANGEMENT
SECTIONS

JOB NO. M3-PN06192.01
DWG NO. **400-GA-004**
REV NO. P2
DATE 02 AUG 07

File: P:\2006\06192.01\GA\400GA004.dwg LAST UPDATE: AUG 03, 2007 @ 7:51 AM BY: js87 LAST REV: W PLOT SCALE: 1:25.4



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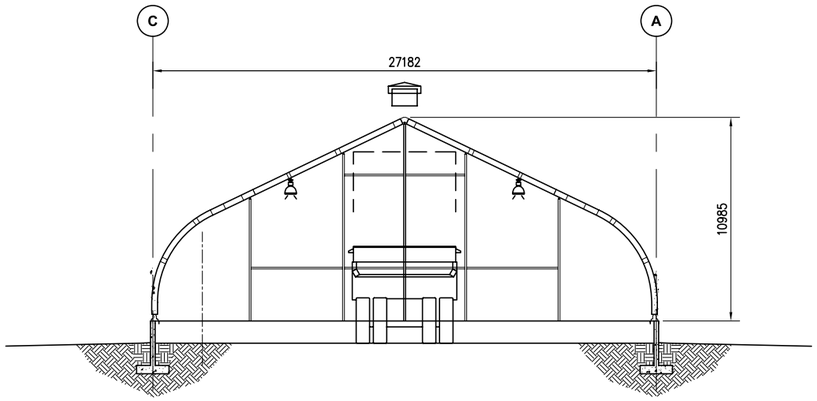

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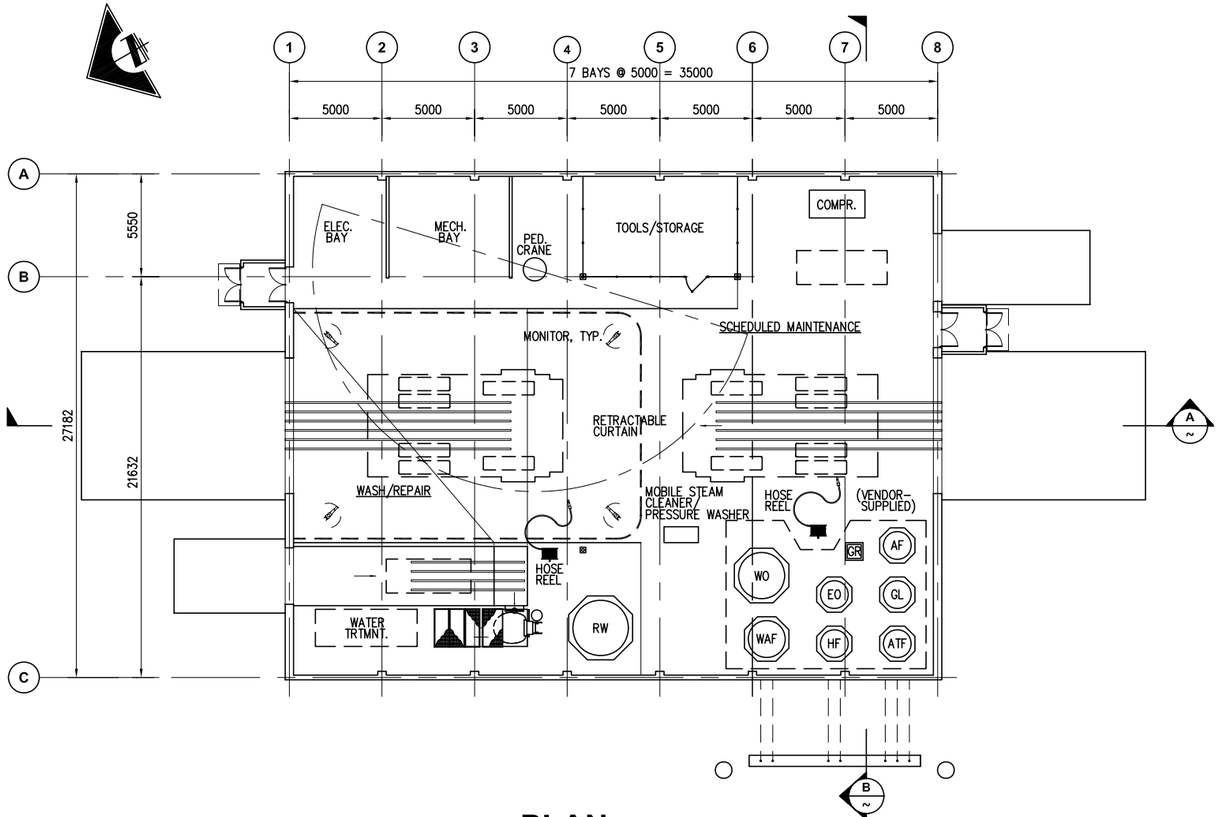

PLAN
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PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES		REVISIONS						REVISIONS					
DWG. NO.	TITLE	DWG. NO.	TITLE	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT	NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: 1:150		DATE
DESIGNED BY	MD	NOV 07
DRAWN BY	MD	NOV 07
CHECKED BY		
PROJECT MGR		
CLIENT APPR.		

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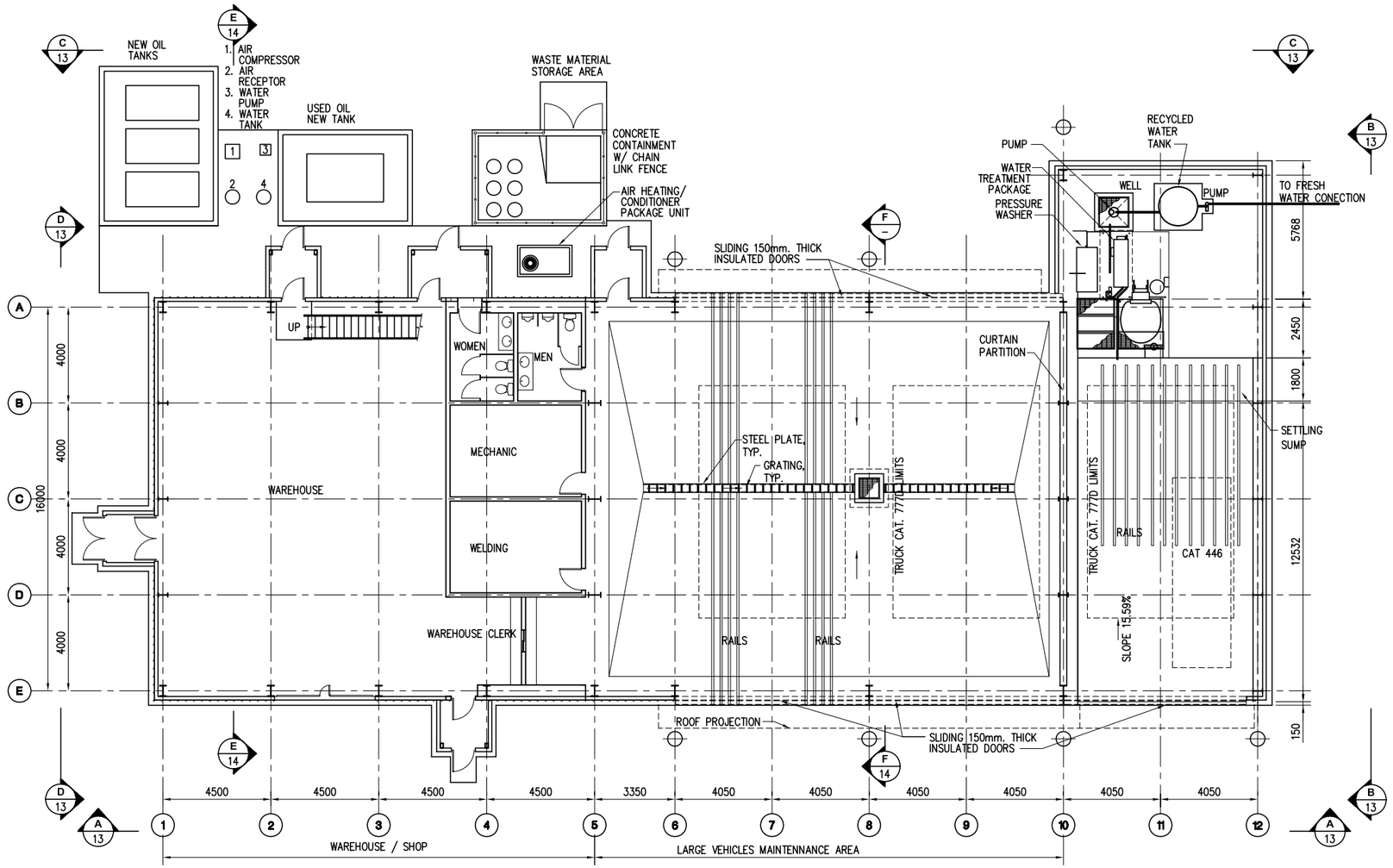
WESTERN COPPER CORPORATION

CARMACKS COPPER PROJECT
TRUCK SHOP
GENERAL ARRANGEMENT
PLAN & SECTIONS

JOB NO. M3-PN06192.01
DWG NO. 570-GA-001
REV NO. P2
DATE 6 DEC 07

File: P:\2006\06192.01\To Be Issued\GA'S\570-GA-001_P1.dwg LAST UPDATE: DEC 06, 2007 @ 8:46 AM BY: md262 LAST REV: PLOT SCALE: 1:25.40



PLAN
SCALE 1:100

MEZZANINE PLAN
SCALE 1:100

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PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES	
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REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	CLIENT

SCALE: 1:100		DATE
DESIGNED BY	JC	JAN 07
DRAWN BY	PG	JAN 07
CHECKED BY	TO	JAN 07
PROJECT MGR	TO	
CLIENT APPR.		

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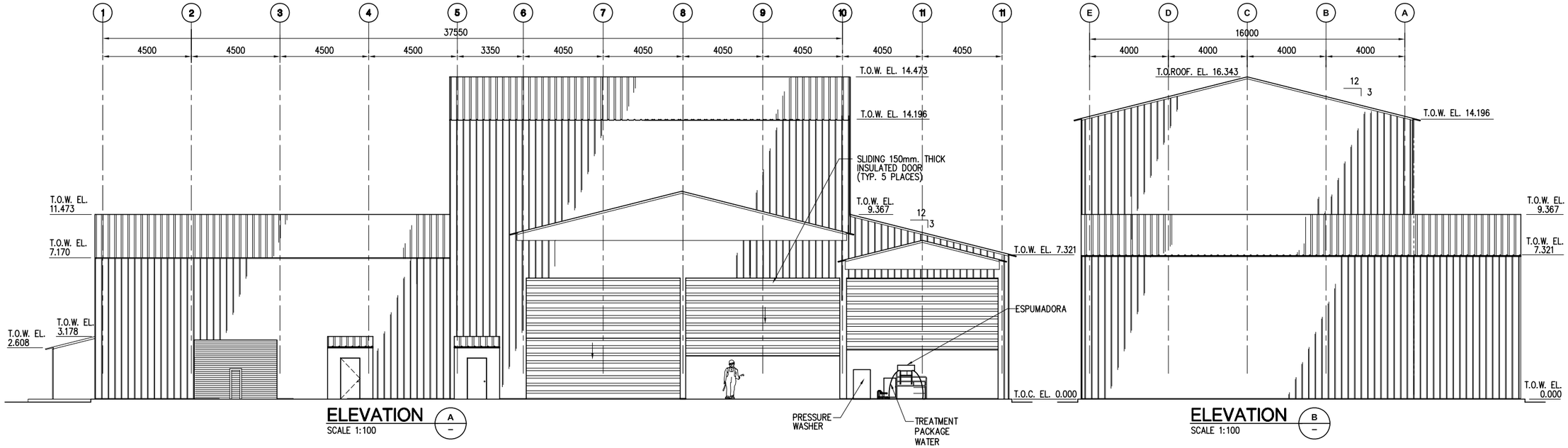
WESTERN COPPER CORPORATION

CARMACKS COPER PROJECT
TRUCK SHOP
ARCHITECTURAL
PLANS

JOB NO. M3-PN06192
DWG. NO. 600-AR-11
REV NO. P2
DATE JAN. 07

File: P:\2006\06192\To Be Issued\Arch\600AR11P1.dwg LAST UPDATE: JAN 24, 2007 @ 10:09 AM BY: ec394 LAST REV: P1 3/3/05 PLOT SCALE: 1:25.4



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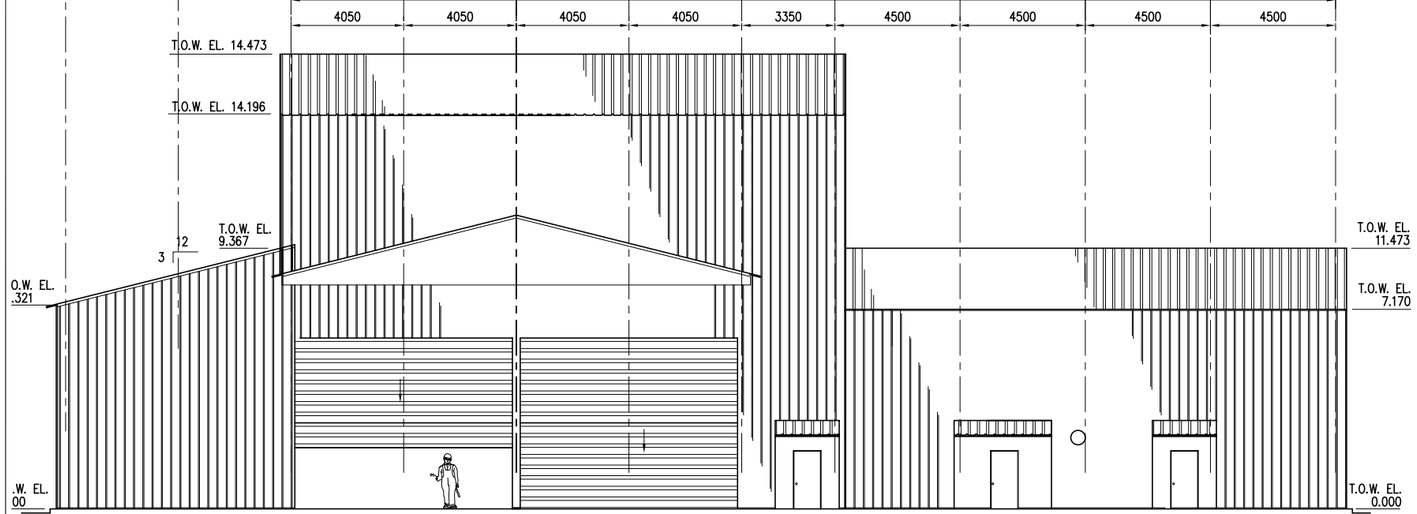
ELEVATION B
SCALE 1:100



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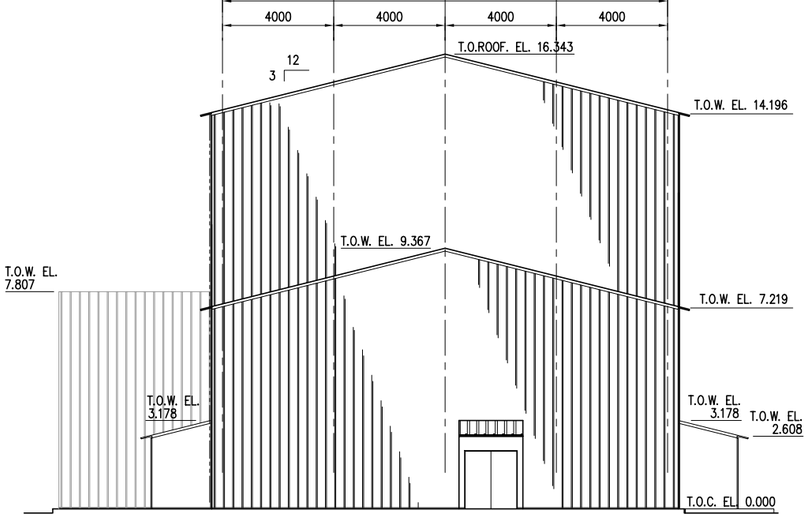

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PRELIMINARY
NOT FOR CONSTRUCTION

REFERENCES		REFERENCES		REVISIONS						REVISIONS					
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SCALE: 1:100		DATE
DESIGNED BY	JC	JAN 07
DRAWN BY	PG	JAN 07
CHECKED BY	TO	JAN 07
PROJECT MGR	TO	
CLIENT APPR.		

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WESTERN COPPER CORPORATION

CARMACKS COPER PROJECT
TRUCK SHOP
ARCHITECTURAL
ELEVATIONS

JOB NO. M3-PN06192
DWG. NO. 600-AR-012
REV NO. P2
DATE JAN 07

File: P:\2006\06192\Architectural\600-AR-12.dwg LAST UPDATE: JAN 25, 2007 @ 11:10 AM BY: ec394 LAST REV: P1 3/3/05 PLOT SCALE: 1:25.4

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix B

Western Copper Corporation Claims Affected by Construction

Western Copper Corporation Claims Affected by Construction

Grant Number	Claim Name	Claim Number	Facility Description
Y 91722	AC #	2	Plant roads
Y 51120	BOY	22	Plant roads
Y 51122	BOY	24	Process facilities, Events Pond, Sediment Pond, In-plant roads, borrow area
Y 51152	BOY	54	Waste Rock Storage area and in-plant roads
Y 51153	BOY	55	In - plant roads, Pit
Y 51154	BOY	56	Pit
Y 51155	BOY	57	Heap Leach facility
Y 51156	BOY	58	Heap Leach facility
Y 51181	BOY	83	Pit and Waste Rock Storage Area
Y 51183	BOY	85	Pit and Waste Rock Storage Area
Y 59383	DUN	2	Pit and Waste Rock Storage Area
Y 59384	DUN	3	Pit
YB97068	TT	1	New Access Road and borrow area
YB97251	TT	2	New Access Road and borrow area
YB96620	VW	11	New Access Road and borrow area
YB96622	VW	13	New Access Road and borrow area
YB96626	VW	17	New Access Road and borrow area
YB96627	VW	18	New Access Road and borrow area
YB96628	VW	19	New Access Road and borrow area
YB96629	VW	20	New Access Road and borrow area
YB96630	VW	21	New Access Road and borrow area
YB96632	VW	23	New Access Road and borrow area
YB96634	VW	25	New Access Road and borrow area
YB96636	VW	27	New Access Road and borrow area
YB96637	VW	28	New Access Road and borrow area
YB96638	VW	29	New Access Road and borrow area
YB96639	VW	30	New Access Road and borrow area
YB96640	VW	31	New Access Road and borrow area
YB96641	VW	32	New Access Road and borrow area
YB96642	VW	33	New Access Road and borrow area
YB96643	VW	34	New Access Road and borrow area
YB96644	VW	35	New Access Road and borrow area

Grant Number	Claim Name	Claim Number	Facility Description
YB96645	VW	36	New Access Road and borrow area
YB96646	VW	37	New Access Road and borrow area
YB96647	VW	38	New Access Road and borrow area
YB96986	VW	40	New Access Road and borrow area
YB96987	VW	41	New Access Road and borrow area
YB96988	VW	42	New Access Road and borrow area
YB96989	VW	43	New Access Road and borrow area
YB96990	VW	44	New Access Road and borrow area
YB96991	VW	45	New Access Road and borrow area
YB96992	VW	46	New Access Road and borrow area
YB96993	VW	47	New Access Road and borrow area
YB96994	VW	48	New Access Road and borrow area
YB96995	VW	49	New Access Road and borrow area
YB96996	VW	50	New Access Road and borrow area
YB96997	VW	60	New Access Road and borrow area
YB96998	VW	61	New Access Road and borrow area
YB26708	W	1	Waste Rock Storage area
YB26713	W	6	Waste Rock Storage area
YB26714	W	7	Heap Leach facility, Truck Shop , Crusher facilities
YB26715	W	8	Waste Rock Storage area, Explosives manufacturing facility and plant roads
YB26716	W	9	Heap Leach facility
YB26717	W	10	Waste disposal facility and plant roads
YB26718	W	11	Waste Rock Storage area
YB26719	W	12	Waste Rock Storage area
YB26720	W	13	Waste Rock Storage area
YB26721	W	14	Waste Rock Storage area
YB26722	W	15	Sediment control pond, borrow area and plant roads
YB26723	W	16	Sediment control pond, borrow area and plant roads
YB26724	W	17	Borrow area
YB26725	W	18	Borrow area
YB26728	W	21	Heap Leach facility and borrow area
YB26729	W	22	Heap Leach facility and borrow area
YB26738	W	31	New Access Road

Grant Number	Claim Name	Claim Number	Facility Description
YB26739	W	32	New Access Road
YB26740	W	33	New Access Road
YB26741	W	34	Camp facilities and new Access Road
YB26742	W	35	New Access Road and borrow area
YB26744	W	37	Sediment pond and plant roads
YB36249	W	50	New Access Road and borrow area
YB36250	W	51	New Access Road and borrow area
YB36251	W	52	New Access Road and borrow area
YB36252	W	53	New Access Road and borrow area
YB36929	W	91	New Access Road and borrow area
YB36930	W	92	New Access Road and borrow area
YB36931	W	93	New Access Road and borrow area
YB36933	W	95	New Access Road and borrow area
YB36450	WAR	36	Waste Rock Storage area, borrow area and plant roads
YB36451	WAR	37	Explosives storage facility and plant roads
YB36898	X	3	New Access Road and borrow area
YB36899	X	4	New Access Road and borrow area
YB36962	X	5	Plant roads, Fuel storage
YB36963	X	6	Heap Leach facility
YB36964	X	7	Heap Leach facility

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix C

Civil Design Criteria

i) Structural Steel, Concrete and Civil Design Criteria (M3)
ii) Existing Design Criteria (Golder)

M3 Engineering & Technology Corp.

JOB NO.: M3-PN06192.01

SPECIFICATION NUMBER: 06192.01-4700

Client: Western Copper Corporation

Project: CARMACKS COPPER PROJECT

Specification: **STRUCTURAL STEEL, CONCRETE AND CIVIL DESIGN CRITERIA**

THIS PAGE IS A RECORD OF REVISIONS OF THIS SPECIFICATION. EVERY TIME THIS SPECIFICATION IS CHANGED ONLY THE NEW OR REVISED PAGES ARE ISSUED, UNLESS OTHERWISE NOTED. THE REVISED PAGES ARE PART OF THIS SPECIFICATION AND SHALL BE COMPLIED WITH IN THEIR ENTIRETY. FOR CONVENIENCE, THE NATURE OF THE REVISION IS BRIEFLY DESCRIBED UNDER PURPOSE OF ISSUE.

REV	DATE	APPROVAL				PURPOSE OF ISSUE
		SPECIF. ENG/SPR	DISCIPL. ENG/MGR	PROJECT MANAGER	CLIENT	
P1	16 Jul 07	G. Keigher	G. Keigher	G. Keigher	WCC	Issued for Internal and Client Review

STRUCTURAL STEEL, CONCRETE AND CIVIL DESIGN CRITERIA

I N D E X

1 SCOPE

This document shall govern all structural steel, concrete and civil design.

2 APPLICABLE CODES (LATEST EDITIONS)

2.1 General

National Building Code of Canada

2.2 Structural Steel

CSA W59.03 Welded Steel Construction
CISC Handbook of Steel Construction
AISI Cold Formed Steel Design Manual
API Standard 650
SJI Steel Joist Institute

2.3 Concrete

CSA A23.1-04/A23.2-04 Concrete Materials and Methods of Concrete Construction
ACI 318 Building Code Requirements for Reinforced Concrete

2.4 Concrete Masonry

NBC

2.5 Wood

NBC

2.6 Railroads

AREA

2.7 Roads

Yukon Department of Transportation

3 DESIGN LOADS

3.1 Roof Loads

Live Load.....2.1 MPa (40 PSF)

Auxiliary Load (Misc., Pipe, Conduits, etc.)
Add to Live Load.....0.24 MPa (5 PSF)

3.2 Floor Live Load

As required for function of floor such as storage, equipment support, vehicles, etc., but not less than 4.8 MPa (100 pounds per square foot (PSF). For slabs on grade use not less than 24 MPa (500 psf), unless noted otherwise.

3.3 Typical Platform Live Loads

	SI	IMP	Comments
Handrails	.88 KN	200 lbs.	applied at top rail in any direction
Control Rooms	4.8 MPa	100 PSF	
Motor Control Centers	9.6 MPa	200 PSF	
Stairs and Landings	4.8 MPa	100 PSF	or a moving concentrated load of 1,000 lbs.
Access & Belt Conveyor Walkways	2.4 MPa	50 PSF	
Miscellaneous Working Platforms	4.8 MPa	100 PSF	
Laydown Platforms	9.6 MPa	200 PSF	
Mill or Kiln Platforms	14.4 MPa	300 PSF	

3.4 Equipment Loads

Design supporting structures for equipment loads plus operating loads. Vibrating loads shall be individually considered and, where feasible, shall be independently supported. Compare natural frequencies of supporting structures with frequencies of vibrating load to insure that they are not too close to resonance. The designed structure shall be high tuned (fn> 1.5 fe) or low tuned (fn <0.25 fe).

fn = Natural Frequency of Structure
fe = Equipment Forcing Frequency

3.5 Launder, Chute and Hopper Loads

Members supporting launders, chutes and hoppers will be designed for clogged condition with no increase in allowable stresses.

3.6 Conveyor Belt Loads and Other Similar Equipment

Connected horsepower belt tensions shall be increased by 200 percent for the design of structures and 400 percent for the design of connections to account for motor starting torque or locked rotor condition.

3.7 Site Data

See M3 Engineering & Technology's Specification No. 16192.01-1000, "Project Standards and Site Conditions," for data regarding wind speed, seismic zone, temperatures, elevation and rainfall. Wind pressure loading shall be calculated using the latest edition of the NBC.

3.8 The thermal loads (TH) are forces caused by changes in temperature. The primary source of thermal loads in an industrial plant is the expansion or contraction of vessels and piping. Anchor and guide forces shall be obtained from the piping department. The longitudinal thermal load on a pipeway shall be taken as 10 percent of the weight of all lines on the pipeway or 30 percent of the weight of those lines which will expand or contract simultaneously, whichever is greater.

3.9 Structures accessible to trucks shall be designed to withstand the gravity, lateral and impact effects of truck loading. Truck loading shall be HS20 or H20-44 wheel loading as defined by the American Association of State Highway and Transportation Officials (AASHTO).

3.10 All crane support structures shall be designed for the loads as specified in CISC, Handbook of Steel Construction. Where multiple cranes are used, loads shall be positioned to produce the maximum forces in the members considered. Maximum deflection for crane and monorail girders without impact shall not exceed 1/800 of the span length.

4 ALLOWABLE SOIL PRESSURE

4.1 Foundations

4.1.1 The foundations shall rest on undisturbed soil or compacted structural backfill.

4.1.2 The allowable soil pressure shall be as recommended in Golder's soils report. The allowable soil pressure may be increased by 33 percent for wind or earthquake load combination.

4.1.3 Weight of foundation stems may be neglected in computing footing loads.

4.2 Foundation Depth

Set minimum bottom of footing at 150 mm (6 inches) below frost depth in soils. In rock frost depth is not a consideration.

4.3 Typical Lateral Pressure

Active Pressure for Drained Retaining Wall Backfilled to Horizontal Plane ..... 560 kg/M3 (35 PCF)

Active Pressure for Drained Retaining Wall Backfilled to 35^{o} Slope ..... 720kg/M3 (45 PCF)

At Rest Pressure for Drained Retaining Wall Backfilled to Horizontal Plane ..... 720kg/M3 (45 PCF)

At Rest Pressure for Drained Retaining Wall Backfilled to 35^{o} Slope ..... 960 kg/M3 (60 PCF)

Passive Pressure ..... 4800 kg/M3 (300 PCF)

4.4 Coefficient of Sliding Friction 0.35

5 MATERIALS OF CONSTRUCTION

5.1 Structural Steel

5.1.1 Wide flange shapes and other structural steel shall conform to the requirements of G40.21 grade 350 W.

5.1.2 In general, shop connections shall be welded and field connections shall be bolted.

5.1.3 All framed, beam welded connections shall conform to CISC Handbook of Steel Construction.

5.1.4 All framed, beam bolted connections shall conform to CISC Handbook of Steel Construction.

5.1.5 All shop welded and field bolted combined connections shall conform to CISC Handbook of Steel Construction.

5.1.6 Eccentricity in bracing connections shall be avoided, if practical. Maximum eccentricity shall be 100 mm (4 inches).

5.1.7 Slip critical connection, high strength, M20 or ¾ inch diameter bolts conforming to ASTM A325 shall be used for all main structural members and all platforms.

5.1.8 Unfinished, M20 or ¾ inch diameter bolts conforming to ASTM A307 shall be used for connecting all purlins, girts, stairs, walkways and handrails, unless otherwise required.

5.1.9 Electrodes for welded connections shall conform with CSA W48.06 or AWS A5.1 or A5.5, E70 series.

5.1.10 Handrail shall be 1¼ inch diameter standard black pipe or of material and size indicated on drawings.

5.1.11 Bar grating shall be 1¼ inches x 3/16 inch steel bars at 13/16 inches off center, unless otherwise indicated on the design drawings.

5.1.12 Checkered plate shall be 6 mm (¼ inch) thick unless otherwise indicated on the design drawings.

5.1.13 Kickplate (toeboard) shall be a bent plate 5 mm (3/16 inch) thick x 100 mm (4 inches) high with a 25 mm (1 inch) leg.

5.1.14 Stair Widths

In general, stair widths shall be 750 or 900 mm (30 or 36 inches). Treads shall be grating with checkered plate nosings.

5.1.15 Walkways

Minimum width of main two way walkways shall be 750 mm (30 inches). Special operating runway widths shall be a minimum of 450 mm (18 inches).

5.1.16 Clearance

Clearance below steel for headroom shall be 3300 mm (7 feet, 0 inches) minimum. Clearance below any piping or conduits shall be a minimum of 3200 mm(6 feet, 8 inches).

5.1.17 Grout at column bases and bearing plates shall be “Embco 885” as manufactured by “Master Builders” or approved equal.

5.2 Structural Concrete

5.2.1 All concrete shall conform to CSA A23.1-04/A23.2-04 (ASTM C94) and have a minimum compressive strength of 20 MPa (3,000 psi) at twenty-eight (28) days for foundations and 25 MPa (4,000 psi columns, piers, walls and slabs. Lean concrete shall be 10 MPa (1,000 psi) and shall not be considered to be structural concrete by the General Contractor in reporting progress.

5.2.2 Reinforcing bars shall conform to CSA G30.18-M92 400 MPa.

5.2.3 Welded wire fabric shall conform to ASTM A185 and may be used for grade slabs and trench wall reinforcement.

5.2.4 Anchor Bolts

5.2.4.1 In general, all anchor bolts shall be designed for the following diameters only: ¾ inch, 1 inch, 1¼ inches, 1½ inches and 2 inches, unless otherwise required.

5.2.4.2 Leveling nuts shall be used on anchor bolts for leveling base plates.

5.2.4.3 Holes in all base plates of beams, columns, etc., to receive cast-in-place anchor bolts shall be oversized in accordance with the following, unless otherwise required.

Anchor Bolt Diameter	Hole Diameter
Up to 25mm (1 inch)	Diameter + 8 mm (5/16 inch)
> 25-50 mm(1 inch to 2 inches)	Diameter + 12 mm (1/2 inch)
> 50 mm (2 inches)	Diameter + 25 mm(1 inch)

5.2.4.4 Minimum grout thickness under base plates is to be 25 mm (1 inch). Use grout thickness of 50 mm (2 inches) under base plates over 600 mm (24 inches) in width.

5.2.4.5 Anchor bolts for equipment such as electric motors, reducers, compressors etc., shall be sleeved, unless only four (4) bolts are required and the anchor bolt size is 20 mm (¾ inch) diameter or smaller.

5.2.4.6 Four bolt patterns anchoring structural members shall be symmetrically spaced about both axes (square) and wide enough to facilitate non-guyed erection.

5.2.4.7 Use expansion anchors in lieu of anchor bolts to anchor minor posts or equipment.

5.2.5 Concrete Floor Slabs

5.2.5.1 Office Areas and Electrical Roofs

Office areas on grade shall be designed as light commercial slabs 100 mm (4 inches) thick with 6 x 6 - W1.4 x W1.4 (6 x 6 - 10/10) welded wire fabric. Elevated slabs on steel deck shall have 50 mm (2 inches) minimum concrete topping and be designed so shoring is not required during construction.

5.2.5.2 Equipment Areas

5.2.5.2.1 Areas not serviced by cranes - slab 150 mm (6 inches) thick with 6 x 6 - W1.4 x W1.4 (6 x 6 - 10/10) welded fire fabric.

5.2.5.2.2 Areas serviced by 10 and 15 ton cranes - slab 200 mm (8 inches) thick with 15 M at 300 mm on center each way, top and bottom.

5.2.5.2.3 Areas serviced by 20 and 30 ton cranes - slab 250mm (10 inches) thick with 15 M at 300 mm on center each way, top and bottom.

5.2.5.3 Vehicle Areas

In general, a 150 mm (6 inch) slab with 6 x 6 - W2.9 x W2.9 (6 x 6 - 6/6) welded wire fabric is sufficient, for non-dumps or non-haul vehicular type traffic. For dumps or haul vehicles use the following:

5.2.5.3.1 Highway traffic ..... 250 mm (10 inches)

5.2.5.3.2 100 ton mine trucks ..... 350 mm (14 inches)

5.2.5.3.3 150 ton haul paks ..... 450 mm (18 inches)

5.2.5.3.4 220 ton haul paks ..... 560 mm (22 inches)

5.2.5.4 Wash down areas normally have a slope of 5 percent to 10 percent for drainage. Laydown areas are normally flat.

5.2.5.5 Sumps for major washdown areas are typically 1.8 m x 1.8 m x 2.4 m (6 feet x 6 feet x 8 feet) deep, inside dimensions.

5.3 Structural Masonry

5.3.1 Concrete block shall be hollow load bearing, normal weight, conforming to CSA A16S or ASTM C90, Grade N-I, with a minimum twenty-eight (28) day compressive strength of 13 MPa (2,000 psi.)

5.3.2 Mortar shall be Type S with a 12 MPa (1,800 psi), twenty-eight (28) day compressive strength.

5.3.3 Grout shall conform to ASTM C476 and shall attain a twenty-eight (28) day compressive strength of 12 MPa (2,000 psi).

5.3.4 Special inspection, when required, shall be noted on drawings.

5.4 Wood Framing

5.4.1 Framing lumber shall have allowable stresses at least equal to that of Douglas Fir-Larch No. 2 with moisture content less than 19 percent.

5.4.2 Plywood roof sheathing shall be panel identification index 32/16 Group I, Standard (C-D) Int-DFPA and manufactured with exterior glue.

6 CIVIL CONSIDERATIONS

6.1 Drainage shall be provided for all graded areas. Yard finish grading shall be minimum of 300 mm (1 foot) below adjacent floor slabs.

6.2 Provide a minimum slope of 1 percent for drainage on newly graded and paved areas, and 2 percent for non-paved areas.

6.3 Maximum grade of roads shall be 10 percent, preferably slopes shall not exceed 8 percent.

6.4 Minimum width of one-way roads shall be 9.5 M (20 feet), including two (2) 1.3 m (4 foot) shoulders. Minimum width of two-way roads shall be 15 M (32 feet), including two (2) 4 foot shoulders).

6.5 Slopes shall be indicated to the nearest second for conveyors and to the nearest 1/10 percent for roads.

6.6 Access roads shall be designed for a turning radius of 18.2 M (60 feet).

6.7 Maximum percent change in grade for roads shall be 1 percent. Maximum percent change in grade for ramps onto roadways shall be 10 percent.

6.8 Secondary maintenance roads shall be designed for a maximum grade of 12 percent and a minimum horizontal curve radius of 15 m (50 foot).

6.9 Cut slopes shall be assumed at 1 to 1.

6.10 Fill slopes shall be assumed at one (1) rise to one and one-half (1½) run for non-structural benches and one (1) rise to two (2) run for structural benches.

6.11 All bearings shall be indicated on drawings from north.

6.12 All existing plant area drainage patterns shall remain unaltered if possible. If absolutely necessary, changes made in existing drainage system on Owner's property shall be kept minimal.

6.13 All culverts for drainage of storm water shall be designed for storm frequency of 100 years. Minimum size of culvert shall be 750 mm (30 inches) in diameter to allow for personnel cleanout.

6.14 Culverts shall have a minimum backfill cover of 450 mm (1 foot, 6 inches) or diameter divided by 2, whichever is greater.

6.15 Chain link fence shall be galvanized and a minimum of 1.8 m (6 feet) high except at electrical substations and transformer areas fence shall be 2.4 m (8 feet) high.

6.16 Minimum vertical roadway clearance under overpasses or obstructions shall be 4.4 M (14 feet, 6 inches).

6.17 Sanitary System

Sewage facilities	160 l (40 gallons)/person/day
Design flows	Equivalent fixture units
Sanitary sewers, minimum diameter	150 mm (6 inches)
Minimum velocity	0.6 Mps (2 fps)
Maximum velocity	2.4 Mps (8 fps)
Spacing between manholes, maximum	100 m (300 feet)

7 GUIDELINES FOR CLEAN PLANT DESIGN

7.1 Purpose

The purpose of this section is to provide information on design for a clean plant, i.e., a plant which minimizes emission of contaminants into the workplace and environment. General and specific guidelines to achieve this objective are categorized in the following sections.

7.2 Containment

7.2.1 Equipment which may frequently spill materials into the workplace due to upsets or high maintenance requirements, must be contained and isolated from the general work area.

7.2.2 Spillage in the form of gas or airborne/gasborne dust is a serious matter. Releases which are readily airborne/gasborne will quickly invade the workplace environment and therefore must be contained and not allowed to spread. Slurry materials must be readily cleaned to prevent them from drying and becoming an airborne problem. Spills of oil, acid flocculant, etc. can pose an immediate threat to the safety of personnel and must be addressed quickly.

7.2.3 Spillage containment is required for the following areas:

7.2.3.1 Material Storage and Conveying

7.2.3.2 Hydrometallurgical Plant

7.2.3.3 Acid Plant

7.2.3.4 Power Plant

7.2.3.5 Chemical Storage Areas

7.2.3.6 Fuel and Lubricant Storage Areas

7.2.3.7 Transformer Locations

7.3 Segregation

7.3.1 Segregation is defined as a “barrier” required to work in conjunction with the building ventilation and other controls to provide an environment that minimizes the effect of heat, noise, releases of gas and airborne/gasborne dust and particulates and releases from saturated liquids.

7.3.2 Segregation requirements include separation walls, as required, to help control the airflow through zones with a high potential contaminant release (to be identified as design develops).

7.4 Structural Design

7.4.1 The emphasis for structural design is:

7.4.1.1 To minimize horizontal flat surfaces where dust or moisture will accumulate.

7.4.1.2 To provide adequate access and head room.

7.4.1.3 To facilitate greater usage of mobile equipment for cleanup and repairs.

7.4.1.4 Provide generous (5 to 10 percent) slope to slabs on grade to promote drainage and general cleanup.

7.4.2 The following summarizes the recommended structural design features and details:

7.4.2.1 Truss members shall have all angles sloped down to prevent moisture and dust buildup.

7.4.2.2 In highly corrosive areas, WT's are preferred to double angles.

7.4.2.3 Consider long spans for column spacing. This results in fewer vertical members, more usable space and better equipment layouts.

7.4.2.4 Use wide spacing for primary supporting beams in combination with heavier flooring and decking as required, to accommodate mobile equipment loads.

7.4.2.5 Use single member or K-bracing to maximize mobile equipment access. Avoid X-bracing in equipment areas.

7.4.2.6 As part of the acoustical design (noise control), selected areas of walls and ceilings should be treated to absorb noise. This is especially critical in low head room situations.

7.5 Operation, Maintenance and Housekeeping Access

7.5.1 One of the main characteristics of a clean plant design is that all parts of the process equipment and building are accessible for operation as well as for maintenance and housekeeping.

7.5.2 Operation and Maintenance Philosophy

Through an organized and adequately designed program, based on aggressive preventative, predictive and corrective maintenance, provide the equipment availability appropriate to consistently meet or exceed plant production requirements in a cost effect manner. Several factors are required to successfully implement this philosophy with some of the main key factors being:

7.5.2.1 A safe work environment for all personnel.

7.5.2.2 A well laid out, well illuminated and accessible plant conducive to a productive work environment.

7.5.2.3 Engineered systems to minimize personnel exposure to contaminants.

7.5.2.4 Maintenance assistance systems and services strategically placed to maximize manpower utilization.

7.5.3 General Design Concepts

The following list identifies some of the items to be considered during the design of the physical facilities in order to effectively establish the “Operation and Maintenance Philosophy” outlined. This list is not intended to cover every item, but has been prepared as a guide in understanding project requirements.

7.5.3.1 Adequate access, overhead space and open work space are to be provided for all installed equipment which may be routinely changed, i.e., head and tail pulleys on conveyor belts and bucket elevators, motors, pumps, burners, gear boxes, casting spoons, etc.

7.5.3.2 Direct access, via overhead cranes to all operating floors in order to assure prompt movement of spare parts and servicing of equipment.

7.5.3.3 Overhead service hoists at all places where installed equipment may be routinely changed.

7.5.3.4 Adequate floor area and vertical clearance for mobile hoisting equipment to service installed equipment which may require frequent overhaul or replacement.

7.5.3.5 Electrical and instrumentation rooms should be constructed with noncombustible walls and reinforced concrete floors. Insides shall be painted white including underside of deck.

7.5.3.6 All main overhead traveling cranes should be designed with service platforms at one end of the crane runway to expedite repair work. Also continuous access is to be provided along the crane hot rail.

7.5.3.7 To facilitate cleanup, all hoppers and bins should be located so that all around access is not restricted.

7.5.3.8 In order to provide for cleanup by mobile equipment and personnel access, adequate vertical and horizontal space must be provided for all equipment installed.

7.5.3.9 Material conveyor belts must be accessible from both sides and will be protected from the weather by either a) fully enclosed gallery with monorail or b) covered conveyors.

7.5.3.10 All main building walls at ground level are to consist of a reinforced concrete wall below the structural steel frame and siding demarcation line. Typically a 2.4 m (8 foot) high wainscot is desirable.

7.5.3.11 All interior column pedestals are to be at the same elevation, typically the same as top of grade beam.

7.5.3.12 All corners of concrete pedestals, walls, end of walls, etc. are to be reinforced with steel angle iron inserts cast in place where subject to damage from vehicle movement.

7.5.3.13 Bollards are to be placed at all mobile equipment doorways and corners of buildings around exposed hose houses and other facilities vulnerable to vehicular traffic.

7.5.3.14 Layout should include common floor levels throughout and minimize ladders and intermediate platforms.

7.5.3.15 Electrical and instrumentation rooms are to be provide an additional 50 percent space for future expansion.

7.5.3.16 Stairwells to be continuous, rather than spread throughout the building. Rise and run shall be continuous through the flights, where possible.

7.5.3.17 Adequate vertical space at conveyor belt transfer points is to be provided in order to install suitable belt scrapers and corresponding dribble chutes for materials with up to 12 percent moisture content.

7.5.3.18 All ground level concrete floors are to be constructed with an adequate slope for drainage of a minimum of 2 percent. In addition, curbs are to be constructed around the perimeter to provide containment during area washdown.

7.5.3.19 Ground level floors will drain to strategically placed below grade sumps. Vertical sump pumps will be installed to evacuate drainage.

7.5.3.20 The clearance desired under piping, ducts and cable trays should be specified as 3.1 m, 2.1 m minimum (10 feet, 7 feet, 0 inches minimum). There should be adequate access for maintenance by manlift. Clearances shall be 2.4 m (8 feet, 0 inches) minimum for areas where forklift and manlift have access and 2.1 M (7 feet, 0 inches) minimum for areas where no mobile equipment is accessible.

7.6 Design of Enclosed Occupied Areas

Personnel and service facility rooms must be ventilated by separate HVAC systems to provide a thermally controlled environment. The following features are recommended for the HVAC design of enclosed areas to help ensure a contaminant free environment for people and sensitive equipment:

7.6.1 All access to control rooms, instrument rooms, lunch rooms, offices and where practical, electrical rooms shall be through double door air locks.

7.6.2 All enclosed areas except locker rooms/toilets shall be pressurized within a minimum of two (2) air changes per hour of clean, filtered outside air. A positive pressure shall be maintained at all times. The pressure shall not exceed +0.2 inch water gauge with respect to the open plant area.

TECHNICAL MEMORANDUM

Golder Associates Ltd.
500 – 4260 Still Creek Drive
Burnaby, British Columbia, Canada V5C 6C6
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TO:	Tim Oliver	**DATE:**	January 10, 2007
		JOB NO:	06-1413-077
FROM:	Fiona Esford and John Hull	**DOC NO:**	011
cc:	Jonathan Clegg, David Kidd		
EMAIL:	fesford@golder.com, jhull@golder.com		
RE:	**EXISTING DESIGN CRITERIA CARMACKS COPPER PROJECT, YUKON**		

As discussed during the December 7, 2006 conference call, Golder has revised and updated the list of Design Criteria for the Carmacks Copper Project, based on additional information provided by M3 Engineering and WCC.

We have added design criteria for the following:

Site Drainage

- Design flood events for temporary, minor and major drainage structures at the site;
- Drainage ditch lining requirements and freeboard requirements;
- Freeboard requirements for spillways; and,
- Oil/water separators for locations that are likely to be impacted by hydrocarbons.

Sediment Ponds

- Sediment settling properties for the sediment ponds;
- Dead storage for the sediment ponds; and,
- Design criteria for minor sediment ponds required to treat sediment laden runoff from disturbed areas of the site.

The list presented in the attached table and was based on a reviewed the following documents:

Access Consulting Group, 2006, Project Proposal - Revision No. 1, Carmacks Copper Project, Yukon Territory, Volume 1 - Main Report

EBA Engineering Consultants Ltd., 2005, Heap Leach Pad Liner Design Report

Knight Piesold Ltd., 1997, Report on Updated Detailed Design of the Heap Leach Pad and Events Pond (REF. No. 1785/1)

Knight Piesold Ltd., 1996, Report on Detailed Design (REF. No. 1784/2)

Knight Piesold Ltd., 1995, Report on Preliminary Design (REF. No. 1783/1)

Western Silver Corporation, 2005, Carmacks Copper Project, Performance Standards and Design Criteria Parameters

We also recommend the following items be created for the site:

Design Rainfall

- Intensity Duration Frequency (IDF) curves should be developed for the site. These can be developed from the 10 years of rainfall data collected at the Williams Creek climate station.

Water Balance

- Daily water balance assessment should be conducted for the next phase of the design to gain a better understanding of the operation and water demands of the site.

General

- Factor of safety for pipe capacity.

In addition, Golder assumes that the most recent site layout drawing provided by M3 Engineering drawing number 100CI046a (dated December 20, 2006), and provided in Attachment 1 to this memorandum, is to be used for the Feasibility Study work.

FE/JAH/fe/cm/lw
O:\Active_2006\1413\06-1413-077 Carmacks Copper\Correspondence\Word\doc 011 TM-0110_06 Design Criteria.doc

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PROJECT DESIGN CRITERIA

Client: Western Copper Corporation
Project Title : Carmacks Copper Project
Golder Project No.: 06-1413-077

SIGNATURE

PREPARED BY : _____

REVIEWED BY : _____

APPROVED BY : _____

Revision				Pages Revised	Remarks
#	By	App.	Date		
A	Golder		12/06/06	all	Initial compilation for discussion
B	Golder		01/05/07	all	Revised per comments 12//07/06

INSTRUCTION TO PRINT CONTROL (Indicate X where applicable)

	Entire Design criteria revised. Reissue all pages.
	Reissue revised pages only.

STAMP THE DESIGN CRITERIA AS FOLLOWS:

	Issued for review and comments.
	Released for study.

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

GENERAL PROJECT SUMMARY				

DESIGN AND VERIFICATION CODES

Design Input
A=Assumed
B=Calculated
C= Western Copper Corporation (Client) Information/Request
G=Golder Associates
I=Industry Standard Practice
M=M3 Engineering
O=Information Provided by Others
P=Published Information/Criteria Database/Recommendation
T=Testwork Data
V=Vendor Data

Discipline
Ci=Civil
St=Structural
Ar=Architectural
Me=Mechanical
Pi=Piping
Pr=Process
El=Electrical
In=Instrumentation
He=HVAC
Geo=Geologic
HGeo=Hydrogeologic
Hyd=Hydrology

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

References	**Sept 06' - Project Proposal: Revision No. 1 - Vol I Main Report** **April 05' – Appendix C: Carmacks Copper Project Performance Standards and Design Criteria Parameters.** **May 05' – Appendix D: EBA Engineering Consultants Carmacks Copper Mine Heap Leach Design Report.** **April 97' - Appendix D1: Report on Updated Design of Heap Leach Pad and Events Pond.** **August 96' – Report on Detailed Design (Ref NO. 1784/2)** **May 95' – Report on Preliminary Design (Ref NO. 1783/1)**				
Regional Design Factors					
Design Storm Events	Approximately 10 years of rainfall data (1994 to 2005) exists for the Williams Creek climate station which is considered representative of site conditions. (Intensity Duration Frequency (IDF) curves need to be developed for the Williams Creek climate station).			12/6/06	A
Climate					
Average Annual Total Precipitation	338.4 mm (CCL-7, Feb 06') 372 mm (Access 06')			1/5/07	B
Average Rainfall	196.7 mm (CCL-7 Feb 06')			1/5/07	B
Average Annual Snowfall	141.7 mm (CCL-7 Feb 06')			1/5/07	B

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Monthly Precipitation Distribution	<table><tr><th></th><th>Total Precipitation[1] (mm)</th><th>Rainfall[1] (mm)</th><th>Snowfall[1] (mm)</th></tr><tr><td>Jan</td><td>21.7</td><td>0</td><td>21.7</td></tr><tr><td>Feb</td><td>16.2</td><td>0</td><td>16.2</td></tr><tr><td>Mar</td><td>13.5</td><td>0</td><td>13.5</td></tr><tr><td>Apr</td><td>16.3</td><td>4.1</td><td>12.2</td></tr><tr><td>May</td><td>24.0</td><td>24.0</td><td>0</td></tr><tr><td>Jun</td><td>39.6</td><td>39.6</td><td>0</td></tr><tr><td>Jul</td><td>57.2</td><td>57.2</td><td>0</td></tr><tr><td>Aug</td><td>41.3</td><td>41.3</td><td>0</td></tr><tr><td>Sep</td><td>30.5</td><td>30.5</td><td>0</td></tr><tr><td>Oct</td><td>28.1</td><td>0</td><td>28.1</td></tr><tr><td>Nov</td><td>26.7</td><td>0</td><td>26.7</td></tr><tr><td>Dec</td><td>23.3</td><td>0</td><td>23.3</td></tr><tr><td>Total</td><td>338.4</td><td>196.7</td><td>141.7</td></tr></table> [1] Williams Creek station CCL-6 (Jan 06') and Access (Sep 06')			1/5/07	B
Total Annual Precipitation - 100 year return period wet year	496 mm (rainfall: 288 mm, snowfall: 208 mm) (CCL-6 Jan 06')			1/5/07	B
Average Annual Evaporation	Based on estimates made with the software WREVAP for Williams Creek climate station the average annual lake evaporation is 440 mm. For evaluation of maximum storage volumes the average annual lake evaporation is conservatively reduced to 400 mm. (CCL-6 Jan 06')			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Monthly Temperature Data					1/5/07	B

	Avg. Daily Max[1,2] (°C)	**Avg. Daily Min[1,2] (°C)**	**Avg. Daily Mean[1,2] (°C)**
Jan	-14.2; -22.2	-19.7; -32.8	-17.1; -27.5
Feb	-7.6; -14	-13.4; -28.1	-10.7; -21.1
Mar	-3.8; -2	-11.3; -20.3	-7.6; -11.2
Apr	6.7; 8	-1.9; -7	2.3; 0.5
May	12.8; 15.4	4; 0.6	8.4; 8.0
Jun	17.9; 20.9	9.3; 5.9	13.6; 13.4
Jul	19.6; 22.6	11.2; 8.3	15.2; 15.5
Aug	16.7; 20	8.5; 5.5	12.4; 12.7
Sep	10.7; 12.9	3.4; 0	6.9; 6.5
Oct	-1; 1.8	-5.7; -7.2	-3.4; -2.7
Nov	-9.7; -11.7	-14.2; -20.5	-12.1; -16.1
Dec	-12.3; -19.2	-18.3; -29.6	-15.3; -24.4

[1] Williams Creek station (1994 – 2005) elev. 850m
[2] Pelly Ranch station elev. 454 m
CCL-6 (Jan 06')

Minimum recorded temperature at site was -42°C and maximum was 30°C.

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Location	The Carmacks Copper Project is located in the Yukon Territory, approximately 38 km northwest of the town of Carmacks. The heap leach pad area for the project is located Southwest of the Open Pit. (May 05') **Refer to Site Plan – provided by M3 Engineering on Dec. 21, 2006 (drawing no. 100-CI-046a) and attached**. The site is at a latitude of 62.35˚ N and a longitude of 136.70˚ W. (May 05')			1/5/07	B
Pipe Capacity FOS				12/6/06	A
Seismicity PGA MCE	MCE = 0.132 g (May 95') FOS > 1.0 for MCE (for heap and events pond) Heap confining embankment and events pond dam will be designed to withstand accelerations resulting from the greatest of 50% of MCE from a deterministic analysis or the acceleration from an earthquake with a 1000-yr return period from a probabilistic analysis. Max. Ground Acc. for 475 yr return period = 8.5% of gravity (May 95') Max. Ground Acc. for 1000 yr return period = 10.3 % of gravity (April 05') Heap confining embankment and events pond will be designed to withstand horizontal peak acceleration of 10.3% of gravity and an allowable displacement of 0.15 m with FOS $\geq$ 1.15. For static (events pond and heap) FOS $\geq$ 1.5 Other embankments and waste rock storage will be designed for a peak horizontal acceleration of 8.5% of gravity with FOS $\geq$ 1.15. Waste rock will have an allowable displacement of 3.0 m and sediment pond 1.0 m. For static (all) FOS $\geq$ 1.3 (end of construction) (August 96')			1/5/07	B

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Valley Fill Leach Facility Design Factors					
Stability FOS	Minimum FOS ≥ 1.15 (April 05') design earthquake Min FOS > 1.0 MCE Min FOS ≥ 1.5 (Sep 06') all static failure mechanisms			1/5/07	B
Facility Storage Capacity	13.3 million tonnes (Sep 06') plus 20% = 16.3 M tonnes (Oliver 12/07/06)			1/5/07	B
Placed Ore Dry Density	1.6 tonnes/m^3 initially placed 1.9 tonnes/m^3 over time (Oliver 12/07/06)			1/5/07	B
Crushed Ore	P_{80} = 19 mm minus (Sep 06') considering 25 mm minus (Oliver 12/07/06)			1/5/07	B
Process Solution	Raffinate (May 05')			12/6/06	A
Average Solution Application Rate	0.0053 m^3/hr-m^2 or 0.088 litres/min-m^2 (Oliver 12/28/06)			1/5/07	B
Process Flow Rate	232 m^3/hr nominal 270 m^3/hr maximum (Oliver 12/28/06)			1/5/07	B
As-Delivered Ore Moisture	4% (Table 3.2 Aug 96')			12/6/06	A
Ore Moisture Under Leach	25% (saturated moisture content) (Aug 96')			12/6/06	A
Ore Moisture After Draindown	16% (residual moisture content) (Aug 96')			12/6/06	A
Overall Ore Slope	2.5 H: 1V (April 05')			12/6/06	A
Ore Permeability	1×10^{-8} m/s (May 05' Table 3 Appendix D)			12/6/06	A
Ore Shear Strength	Pre-leach: Ø = 27˚ (smooth); Ø = 32˚ (textured) Post-leach: Ø = 25˚ (smooth); Ø = 31˚ (textured) (May 95')			12/6/06	A
Leaching Cycle	240 days – two 120 day cycles minimum (April 05')			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Solution Storage	In heap solution storage will not occur under normal operating conditions.			12/6/06	A
Solution Removal	Perimeter drains and low level outlet pipe through embankment.			1/5/07	B
Spillway	Safely pass the 1:200 year, 24 hr event Embankment crest will be determined adding 0.5 m of freeboard to maximum routed water elevation. (April 05')			1/5/07	B
Liner System	The entire leach pad and the uphill face of the confining embankment will be lined with a **double 60 mil HDPE composite liner with an integral LDRS**. Three separate designs are envisioned for the following zones: **Upper works** comprise the upper portion of the heap leach pad, at elevations greater than 830m: • High-permeability, durable overliner cushion layer with solution collection piping; • 60 mil textured HDPE upper liner; • Leak detection and recovery system (LDRS) comprising a high transmissivity tri-planar geocomposite; • 60 mil textured HDPE lower liner; and • Subgrade (with foundation drains). **Lower works** comprise the lower portion of the heap leach pad adjacent to the confining embankment: • High-permeability, durable overliner cushion layer with solution collection piping; • 60 mil textured HDPE upper liner; • LDRS comprising a high transmissivity tri-planar geocomposite; • 60 mil textured HDPE lower liner; • Compacted lower soil liner with a permeability not greater than 10^{-8} m/s; and • Subgrade (with foundation drains).			12/6/06	A

	Trench design profile comprises: • High-permeability, durable overliner cushion layer with solution collection piping; • 60 mil textured HDPE upper liner; • 12 oz nonwoven polypropylene geotextile; • Drainage layer comprising durable crushed ore or sand and gravel with permeability of at least 5 x 10^{-4} m/s and solution recovery piping; • LDRS comprising a high transmissivity tri-planar geocomposite; • 12 oz nonwoven polypropylene geotextile; • 60 mil textured HDPE lower liner; and • Subgrade. (April 05')				
Leach Pad Area	31.5 ha (Sept 06')			12/6/06	A
Embankment	The pad will be surrounded by a 2-m high perimeter berm on the north and west sides and a perimeter bench on the east side. A confining embankment will form the lower limit of the leach pad to support the heap. With a crest elevation of 780 m, it will be about 22 m high and 350 m long. (Sept 06')			12/6/06	A
Ore Loading Rate	9,872 tonnes/day up to 200 days/yr Ore will be placed in 8 m lifts by conveyors (Sept 06')			1/5/07	B
Operating Life	8 year mine life 2 year residual leaching 2-5 year heap detoxification and decommissioning (April 05') Overall life of mine: 12-15 years (Sept 06')			12/6/06	A
Materials	Overliner (max. particle size 19 mm): $k > 5\times10^{-4}$ m/s Textured HDPE liner (60 mil): $k < 1\times10^{-10}$ m/s LDRS: $k > 1\times10^{-4}$ m/s Soil liner: $k < 1\times10^{-8}$ m/s (Sept 06')			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Events Pond Design Factors					
Storage Capacity	Events pond will have capacity of approximately 160,000 m^3 to store the following combinations: • The operating solution volume, plus • The critical duration 100 year return period event occurring at the most critical point in time, plus • An allowance for heap draindown as follows: 1^{st} year of operation 100%, of total heap draindown volume or subsequent years of operation, 48 hours of draindown at the full rate of solution application. For a solution application rate of 270 m^3/hr this volume is 13,000 m^3 (Oliver 12/28/06).			1/5/07	B
Spillway and Freeboard	Safely pass the 1:200 year, 24 hr event Embankment crest will be determined adding 0.5 m of freeboard to maximum routed water elevation. (April 05')			12/6/06	A
Liner System	Double HDPE liner with leakage detection recovery system (LDRS)			12/6/06	A
Leakage into LDRS	200 L/day averaged over a 12-month period, 600 L/day average over a 3-month period (April 05')			1/5/07	B
Containment	30 m high embankment; 380 m long; Crest elevation of about 754 m. (April 05')			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Heap Leach Sediment Pond Design Factors (Major Sediment Pond)					
Storage Capacity	The design parameters which have been used for the design of the sediment control pond include: • 1 in 10 year 24 hour storm event with 100% runoff coefficient (36 mm) – runoff volume 14,000 m^3. (April 97')			12/6/06	A
Catchment	A catchment area of 39 ha. (April 97')			12/6/06	A
Particle Size	The settling ponds will be sized to remove inflowing suspended sediments down to fine silt sizes for a 10-yr return period 24-hr duration storm. (April 05')			12/6/06	A
Spillway and Freeboard	Safely pass the 1:200 year, 24 hr event (April 97') Freeboard of 1 m (Golder 1/5/07)			1/5/07	B
Liner System	Not Lined			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

WRSA Sediment Pond Design Factors (Major Sediment Pond)					
Storage Capacity	The design parameters which have been used for the design of the sediment control pond include: • 1 in 10 year 24 hour storm event with 100% runoff coefficient (36 mm) - 10,000 m^3, dead storage - 10,000 m^3, runoff from WRSA - 45,000 m^3. Total storage - 65,000 m^3. (August 96') (Sep 06')			12/6/06	A
Catchment	A catchment area of 39 ha. (April 97')			12/6/06	A
Particle Size	The settling ponds will be sized to remove inflowing suspended sediments down to fine silt sizes for a 10-yr return period 24-hr duration storm. (April 05')			12/6/06	A
Spillway and Freeboard	Safely pass the 1:200 year, 24 hr event (April 97') Freeboard of 1 m (Golder 1/5/07) 1.25 m^3/s peak flow. Pass peak flow from 100 yr return period storm, 0.5 m freeboard above max routed water level. (April 05')			1/5/07	B
Liner System	Not Lined			12/6/06	A

Client: Western Copper Corporation	Design Input	Discipline	Date	Rev. No.
Project Title : Carmacks Copper Project				
Golder Project No.: 06-1413-077				

Minor Sediment Pond Design Factors					
Storage Capacity	Minor Sediment Ponds will be designed to have a surface area designed to settle the 10 micron particle size for the average flow from the • 1 in 10 year 24 hour storm event with 100% runoff plus snowmelt The minor sediment ponds will have a riser outlet that slowly drains the treated pond water. Other design criteria for the Minor Sediment Ponds include: • Settling depth – minimum depth of 1.0 m; • Storage depth – minimum depth of 0.5 m; and • A dead storage of at least 50 percent of the storage volume.(Golder 01/5/07)			1/5/07	B
Catchment	Not specified			12/6/06	A
Spillway and Freeboard	Safely pass the 1:200 year, 24 hr event (April 97') Freeboard of 0.5 m (Golder 01/5/07)			1/5/07	B
Liner System	Not Lined			12/6/06	A

Client: Western Copper Corporation Project Title : Carmacks Copper Project Golder Project No.: 06-1413-077	Design Input	Discipline	Date	Rev. No.

Minor Sediment Pond Design Factors					
Major Diversion Drains	Major diversion drains will have sufficient capacity to accommodate the 1:200 year, 24 hour return period peak flow (including a snowmelt contribution) with a minimum freeboard of 300 mm.			1/5/07	B
Minor Diversion Drains and Culverts	Minor diversion drains will have sufficient capacity to accommodate the 1:25 year, 24 hour return period peak flow (including a snowmelt contribution) with a minimum freeboard of 300 mm; Corrugated Steel Pipe (CSP) culverts are preferred for road crossings and will form part of the minor drain system and therefore will be designed to accommodate the 1:25 year, 24 hour return period flow. Additional design criteria for culverts include: • A velocity at the outlet that is less than 4 m/s; and It should be noted that the design return period may be increased for any critical road crossings.			1/5/07	B
Temporary Diversion Drains	Temporary diversion drains will have sufficient capacity to accommodate the 1:5 year, 24 hour return period peak flow (including a snowmelt contribution) with a minimum freeboard of 300 mm.			1/5/07	B
Lining requirements for Diversion Drains	When diversion drains are excavated in native soil, the allowable velocity for an unlined drain is 0.8 m/s. When the diversion drains are excavated in native rock the unlined drain velocity is increased to 2 m/s in weathered rock and to 3.5 m/s in sound rock. Where drain lining is required, it will comprise durable rock riprap underlain by a non-woven geotextile.			1/5/07	B
Oil Water Separators	Oil water Separators will be designed for any areas that are significantly impacted by hydrocarbons, such as fuel storage and vehicle washdown areas etc.			1/5/07	B

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix D

Construction Surface Water Management Plan

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

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Appendix E

Waste Management Plan

Western Copper Corporation

WASTE MANAGEMENT PLAN

Construction Version – June 2008

CARMACKS COPPER PROJECT

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Table of Contents

1.0 Introduction

Throughout the course of the Carmacks Copper Project various forms of waste will be produced and require management to ensure proper disposal under the applicable legislation. As such, the following preliminary Waste Management Plan has been prepared to outline the facilities and measures that will be used to manage the waste streams. As the project proceeds and permits are obtained that regulate the management and disposal of waste, this plan will be revised accordingly with approvals appended.

2.0 Waste Management Facilities

2.1 Facility Construction Schedule

The proposed schedule for constructing the waste management facilities follows:

Commercial Dump – Year 2 of Construction Phase
Incinerator – Year 2 of Construction Phase
Land Treatment Facility – Year 1 of Operations

2.2 Commercial Dump

A commercial dump is planned for the Carmacks Copper project to support construction, operation, and closure activities over a period of approximately 15 years. An application for a permit for a commercial dump will be submitted to Yukon Environment as per the *Solid Waste Regulations*. The proposed location for this waste management area is north of the heap leach facility, and west of project facilities (see Figure 1). Prior to developing this proposed area, a geotechnical evaluation will be conducted to ensure the site provides suitable soils and no near surface groundwater. Surface water runoff will be diverted around the facility.

The quantity of waste projected to be collected at the commercial dump for each phase of the project has been estimated as:

- Construction (year 0) ~ 106 m^3/year
- Pre-production (year 1) ~ 106 m^3/year
- Operations (years 2 – 8) ~ 50 m^3/year
- Closure (first 3 years) ~ 100 m^3/year
- Closure (subsequent years) – minimal use, facility closed out

2.3 Incinerator

An Air Emissions Permit will be sought for a solid waste incinerator from Yukon Environment as per the *Air Emissions Regulations.* This facility will be located in the commercial dump area.

Refuse originating as camp and office waste, plus warehouse scrap will contain some organic wastes. Garbage and debris destined for disposal will be collected routinely and prior to incineration stored in wildlife proof containers / fenced short term storage areas in a manner which does not attract wildlife to the mine site. Solid waste will be frequently and completely incinerated (once installed) in a manner which minimizes odours and eliminates the attraction of bears and other wildlife to the mine site. Combustible waste containing a fossil fuel by-product shall be drained prior to incineration and that material will be recycled where possible.

2.4 Land Treatment Facility

A land treatment facility will also be located in the vicinity of the commercial dump for the potential collection, storage and treatment of soil and/or liquid contaminated with petroleum hydrocarbons. A Land Treatment Facility Permit will be required from Yukon Environment in accordance with the *Contaminated Sites Regulation*.

2.5 Sewage Disposal

Sewage disposal facilities will include both permanent and portable facilities. Two conventional septic tank/leach field systems will accept all sanitary wastewater. One system will be located adjacent to the camp and serve the camp, administrative offices, and process plant. The second system will be located at the truck shop area to serve the truck shop and the mine.

These disposal facilities will comply with the Public Health and Safety Act, *Sewage Disposal Systems Regulations*. In particular, septic tanks, sewage holding tanks or contained privies will be located at least 15 m from the high water level of Williams Creek; while the soil absorption system (or pit privy) shall be located not less than 30 m from the high water level of Williams Creek. Soil absorption systems will not be located where soil conditions are unsuitable for absorption of effluent.

2.6 Sediment Control & Events Ponds

During construction the accumulated sediment within the sediment control & events ponds will be collected as required and buried below ground away from drainage flow paths and watercourses.

3.0 Waste Streams & Segregation

The type of waste that will be managed at the site includes:

- Solid Waste (non-hazardous)
    - Putrescible (i.e. camp refuse)
    - Non-putrescible (i.e. burnable or non-burnable)
- Special wastes (i.e. waste oil, batteries – only to be segregated and stored temporarily) Western Copper will submit an application for a Special Waste Permit for the proper handling, storage and disposal of special wastes)

3.1 Solid Waste (non-hazardous)

Kitchen / organic waste will be stored in clear plastic bags inside a 10'x10' bear proof steel clad bin at the camp site with a 1" thick steel door with heavy clasp for security. The bin will be emptied daily and taken to the incinerator for immediate burning.

Waste that is non-burnable, non-hazardous, and non-recyclable will either be temporarily stored in steel bins at the commercial dump area (e.g. construction wastes) or in the steel clad bin at the camp site (e.g. washed out containers for non-hazardous contents). This waste, along with incinerator ash will be buried within the dump. Material will periodically be covered with a layer of soil to prevent the loss of waste through wind action.

Used tires requiring disposal and have a rim size of 24.5 inches or greater will be buried within the commercial dump. Used tires requiring disposal with a rim size of 24.5 inches or less will be dealt with in accordance with the Yukon Used Tire Management Program and transported off site to an approved facility.

3.2 Special Waste

Any special wastes, as defined by the *Special Waste Regulations* (batteries, used oil, antifreeze, solvents), will be collected and stored in specially marked containers and then shipped to an appropriate treatment or disposal facility. Wildlife-proof rig bins will be used to provide segregated storage for solid waste that cannot be burned and special wastes in compliance with *Special Waste Regulations*.

Western Copper will obtain a Special Waste Permit for this project and will comply with the Yukon *Special Waste Regulations* and track wastes through the use of Transportation of Dangerous Goods Waste Manifests. A Special Waste Permit will also be applied for to authorize the use of a waste oil burner at the site (truck shop area) as per the *Special Waste Regulations.* Waste oil will be burned and used as a source of heat.

A concrete floor will be provided throughout the truck maintenance area and will be sloped towards a dry sump, which will collect any wash solutions and petroleum products that result from the maintenance activities. Oil-absorbent products will also be used on the shop floors.

Any accumulated sump water will be separated and oils pumped to the waste oil tank or empty drums. All oily wastes from oil changes, including the sump separation products and absorbent, will be hauled off the site for disposal or recycling in an environmentally acceptable manner or disposed of in the waste oil burner. An oil and water separator will be used in the truck shop to capture oil, which will then be taken offsite by the oil supplier for disposal or disposed of in the waste oil burner.

The lubrication bay of the maintenance shop will have a vacuum evacuation system for waste oil. Hose reels will feed from the lubrication storage area and will dispense antifreeze, grease and various grades of oil to the lubrication bay.

3.3 Waste Management Matrix

Both controlled / hazardous and non-controlled / non-hazardous materials will be dispensed of accordingly. Signage will be in place to assist in proper segregation of wastes. The general projected types of waste expected to be disposed of at the commercial dump for the project are presented in Table 1 while Figure 1 follows and shows the general location for the commercial dump.

Table 1 Waste Management Matrix

Type of Waste Generated	On Site Storage Method	On Site Storage Location	Disposal Method
Non-Controlled Materials			
Incinerator Ash	Open top drums with sealable lids.	N/A	Incinerator ash will be removed from the incinerator with machinery and hauled directly into the dump.
Scrap Steel	N/A	Waste management area	Segregated and recycled or buried.
Wood - Burnable	N/A	Waste management area	Incinerated.
Kitchen /Camp Waste	Clear plastic bags inside 10'x10' steel clad with a 1" thick steel door with heavy clasp for security.	Within camp	Bin shall be emptied daily and taken to the incinerator for immediate burning.
Construction Waste - drywall, glass, insulation, electrical wire, etc. (non hazardous)	Steel bins.	Waste management area	Bins shall have their contents emptied into the dump and buried.
All tires with a rim size of 24.5 inches or greater.	These tires will be taken directly to the ash disposal area.	N/A	These tires will be buried.
All tires with a rim size of 24.5 inches or less.	These tires will be placed in a segregated area within the waste management area.	Shall be stored in a segregated area determined by managers. Location will be clearly labeled.	These tires will be transported off site to a regulated and permitted dump with tire segregation on an as required basis.
Plastic containers - non hazardous contents	Containers will be inside placed 10'x10' steel clad with a 1" thick steel door with heavy clasp for security. Containers shall be washed out completely and not contain any residual.	Within camp	Bin shall be emptied as required and taken to the incinerator for immediate burning.
Metal containers - non hazardous contents	Containers will be inside placed 10'x10' steel clad with a 1" thick steel door with heavy clasp for security. Containers shall be washed out completely and not contain any residual.	Within camp	Bin shall be emptied as required and taken to the dump to have the contents buried.
Glass containers - non hazardous contents	Containers will be inside placed 10'x10' steel clad with a 1" thick steel door with heavy clasp for security. Containers shall be washed out completely and not contain any residual.	Within camp	Bin shall be emptied as required and taken to the dump to have the contents buried.
Controlled Materials			
Batteries	Lined wooden box	Segregated area at waste management area. Clearly labeled.	Batteries will be placed in an upright position within a 4'x4' box. When the 4'x4' box is full, another will be built and the full box shall be shipped off site to the local Waste Management facility in Whitehorse. Appropriate measures will be taken to ensure batteries remain upright during transport (i.e. waste construction wood will be used as filler to take up extra space).
Used Oil	Used oil will be placed in a 300 gallon container located in a bermed area.	Enclosed tanker.	When the container is full, the oil will either be transported to a waste oil burner onsite or management will contact a local supplier to transport oil to a recycling facility offsite.
Fuel Filters	Open top drums with sealable lids.	Waste management area - segregated special waste storage area.	Residual oil and fuel will be drained from filters into waste oil/fuel storage containers.
Antifreeze	Closed top drums with both bungs.	Segregated lined area at waste management area. Clearly labeled. Bungs sealed tight.	When enough drums are gathered up they shall be palletized in similar groups of 4 and banded together for shipment to the local Waste Management facility in Whitehorse.
Solvents	Closed top drums with both bungs.	Segregated lined area at waste management area. Clearly labeled. Bungs sealed tight.	When enough drums are gathered up they shall be palletized in similar groups of 4 and banded together for shipment to the local Waste Management facility in Whitehorse.

Waste Management Plan

Carmacks Copper Project
Yukon Territory

Western Copper Corporation

Potential Groundwater Supply Well

Note: Drawing is for illustrative purposes only, NOT FOR CONSTRUCTION

Original drawing from M3 Engineering & Technology Corp.,
"Carmacks Copper Project Civil Overall Mine Site Plan", Drawing 100-CI-011 P4, 17Sept08
Image obtained from Google Earth, dated August 18,2007

Proposed Commercial Dump Location

Figure Number:
1

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Revised by: HD	Checked by: NS/DC

Date: September 2008

File:D:\Project\AllProjects\WCH-01\ConstructionSitePlan\2008\Appendix\WasteMngtPlan\Fig1_DumpLocn.dwg

4.0 Atmospheric Emissions

Western Copper will implement the following measures with respect to the control of atmospheric emissions:

Fugitive Dust	• Minimize activities that generate large quantities of fugitive dust; • Use dust suppression measures to control any generated fugitive dust to the maximum extent possible such as watering main haul roads (ensuring water quality standards identified for release into receiving waters are met); • Progressively reseed disturbed areas that may contribute to fugitive dust.
Combustion	• Ensure proper maintenance of vehicles, pumps, compressors, generators, and other internal combustion engines to minimize emissions of polluting gases; • Use low sulphur fuels including diesel fuel with a sulphur content <15 ppm and propane with negligible sulphur content and where appropriate, waste heat recovery and energy efficient techniques will be employed to decrease diesel use.

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

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Appendix F

ARD Protocol for Evaluation of Construction Materials

Western Copper Corporation

ARD PROTOCOL FOR EVALUATION OF CONSTRUCTION MATERIALS

Construction Version – June 2008

CARMACKS COPPER PROJECT

ACCESS CONSULTING GROUP

Introduction

The Carmacks Copper Project is a proposed copper mine located some 38 km northwest of the Village of Carmacks on Williams Creek, about 8 km west of the Yukon River. The property is currently accessible via the Klondike Highway to Carmacks, then 33 km along the Freegold Road to the property exploration and a further 13 km to the site. As the exploration road is unsuitable for mine development a private access road will be constructed from km 31 on Freegold Road.

The following ARD protocol has been developed for environmental testing of construction material sources along a proposed access road running laterally from the Freegold Road to the Western Copper mine property, as well as sources from the mine site.

Construction materials used as borrow material along the proposed access road are found to the east and west of the proposed route. Targeted areas may consist of bedrock overlain with 1 to 5 metres of till veneer of diamicton, stony to gravelly material with a sandy to silty matrix. The protocols outlined below have been implemented for similar projects and therefore will be applied to determine acid rock drainage and metal leaching (ARD/ML) potential for Carmacks Copper construction materials.

Protocol

At locations where materials are likely to be extracted the following actions will be undertaken.

1. Visual Inspection

The sites intended for extraction of construction materials will be inspected by a qualified geoscientist or engineer. This inspection will initially assess the area for ARD/ML conditions. The visual inspection will assess the area geologically for the following parameters:

- rock type(s)
- sulphide presence (visual)
- carbonate presence (fizz test)
- presence or absence of other metal leachate indicators (i.e. iron staining, etc.)

The focus of the inspection will be to assess the potential at each borrow source for ADR/ML generation if disturbed. This inspection will include a visual characterization of the borrow source's mineralogy. Careful attention will be paid to the presence and amount of sulphides present. The proportion of sulphides to host rock, as well as the shape, size and degree of sulphides weathering will be recorded. The presence of quartz or carbonate veins in the rock will also be noted as well as the occurrence of iron-staining or secondary precipitates which may indicate in situ weathering.

2. Sampling

Samples of potential construction material will be collected from each site following the visual inspection. Quantities of each sample will be no less than 2kg each and will be collected from geologically distinct zones within each borrow area. Areas with large

volume may require multiple samples. Each sample will be bagged and clearly marked with a unique identifier.

3. Analysis

Samples will be shipped to a credited laboratory for analysis. The following testing is recommended based on the British Columbia ARD Guidelines:

Static Testing:

a. Trace Element Content
   - total concentration
   - soluble concentration (for weathered and oxidized materials)

b. Acid Base Accounting
   - total-, Sulphate-, and sulphide-sulphur
   - bulk neutralization point
   - carbonate content
   - pH

c. Mineralogy and other geological properties
   - Petrographic and submicroscopic examination (if required)

The above analyses will be performed at the lab. Soluble concentration of metals in weathered and oxidized materials will be tested by aqua-regia-ICP. Analytical methods will follow current industry standards and/or those described in the British Columbia ARD Guidelines (Guidelines) by Price (1997).

Kinetic Testing would only be conducted in the above static testing results indicated potential concern and an alternative borrow source could not be located, and would include:

a. Reaction Rates and Drainage Chemistry

- Humidity cell

4. Assessment Analysis

Results from the field inspection and subsequent sample testing will be analyzed by a qualified geoscientist or engineer. Assessment of the data will be performed according to the criteria described in the Guidelines, and will include neutralization potential, acid generation potential and metal leachate potential from borrow source locations. A need for additional testing or assessment may be indicated during the initial assessment.

Samples will be screened according to the Guidelines as follows:

Net Potential Ratios (NPR, or NP/AP), where

NPR<1	Likely acid generating
NPR>1 and NPR<2	Potentially acid generating
NPR>2 and NPR<4	Not likely acid generating
NPR>4	Non-acid generating

Sulphide sulphur content, where

S_S>0.3%	Potentially acid generating
S_S<0.3%	Non-acid generating

Paste Ph, where

pH<5.5	Potentially acid generating
pH>5.5	Non-acid generating

Neutralization Potential, where

NP<10kg $CaCO_3$/tonne Potentially acid generating

NP>10kg $CaCO_3$/tonne Non-acid generating

Samples tested with NP values under 10kg $CaCO_3$ should undergo additional testing consisting of the shake flask extraction test (as per the Guidelines) to determine the presence of leachable acidity or metals.

Materials that are potentially acid generating and/or have the potential to produce metal leachate levels in exceedance of the Guidelines would not be used as construction materials for this project. Further testing could be conducted to determine suitability or possible implementation of mitigation measures to ensure safe use of the material. Alternatively, another borrow source would be located and the materials tested for suitability.

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix G

Preliminary Design Waste Rock Storage Area

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REPORT ON

PRELIMINARY DESIGN
WASTE ROCK STORAGE AREA
CARMACKS COPPER PROJECT
WESTERN COPPER CORPORATION
YUKON

Submitted to:
Western Copper Corporation

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April 15, 2008

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TABLE OF CONTENTS

SECTION **PAGE**

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Western Copper Corporation (WCC) and is working in coordination with M3 Engineering and Technology Corporation (M3) to update the geotechnical components of the design for the proposed Carmacks Copper Project. The following report presents the geotechnical design for the proposed Waste Rock Storage Area (WRSA) and includes comments on the WRSA Sediment Pond, and associated surface water ditches.

The scope of work for this report was limited to geotechnical services only. Environmental services that may be required as part of this project are not considered part of this evaluation. Where the design of geotechnical components are based on criteria derived from environmental aspects, such criteria have been provided to Golder and are assumed to be correct.

This report was prepared in a manner consistent with the level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing in the Yukon Territory,. No other warranty, expressed or implied is made. For additional information, reference should be made to the *Important Information and Limitation of this Report* included at the end of this report.

1.1 Project Description

The Carmacks Copper Project is a proposed open pit copper mine located approximately 200 km north of Whitehorse and 40 km northwest of the village of Carmacks, in the Yukon Territory, as shown on Figure 1.

The mine site facilities are expected to include the open pit, heap leach facility, solvent extraction and electro-winning (SX/EW) processing facility, acid plant, waste rock storage area, crushing plant, truck shop, events pond, surface water control structures, haul roads, soil stockpiles, construction camp, and miscellaneous support and maintenance facilities as shown on Figure 2.

The project site is accessed by way of the existing Freegold Road, which is a gravel road, and an exploration site access road. As part of mine development, a new access road is planned to provide access from the Freegold Road to the site.

Portions of the mine are planned for year round operation and other portions will be shutdown for short intervals during winter months. The mining is planned to occur for some 330 days per year and in the middle of the winter may be temporarily stopped. Waste rock mining and loading of the WRSA will occur year round; and mining, loading

or stacking of ore on the heap leach facility will be temporarily halted during the coldest weeks of the year, while leaching will continue year round.

The mine life is expected to be 6 years, during which time the operations will produce approximately 60 million tonnes of waste rock, and 13.3 million tonnes of copper ore. Additional information regarding the Project Description can be obtained in the 2006 Project Proposal (Access 2006).

1.2 Site Conditions

The area proposed for the WRSA has a generally subdued topography with an elevation of approximately 730 m at the east or lower end of the WRSA. The ground surface rises gradually to 860 m near or at the west end of the WRSA. The area is naturally covered by the local forest vegetation and the forest cover is very heavy. Several small creeks cross the proposed site and there are no open meadows. The north limit of the WRSA is defined by North Williams Creek which drains the general area and flows to the east towards Williams Creek. The south limit of the storage area would be defined by a 50 m wide buffer zone planned between the WRSA and north limit of the mine open pit area.

1.3 Geologic Conditions

The project site lies within the Yukon Cataclastic Terrane geological area. The copper deposit is in a feldspathic mafic gneiss that is underlain by Upper Triassic deposits of hornblende – biotite granodiorite. The bedrock is overlain by overburden deposits of gravelly sand, silty sand, silt and silty clay. These deposits vary from 1 to 2 m thick on topographical high points on the south east edge of the WRSA to over 90 m thick on the north side of the WRSA site in the North Williams Creek valley. The site is underlain by continuous permafrost which is known to extend to a depth of at least 50 m under the WRSA. The underlying bedrock at depth is not frozen. Preliminary results from site investigations suggest the active layer is 1 to 2 m thick depending on site cover (trees or open cleared areas) and/or slope direction (north or south facing slope).

The groundwater table appears to be located at depth below the continuous permafrost that underlies the site. The groundwater regime appears to be connected to the local creeks and to be flowing towards Williams Creek east of the WRSA.

1.4 Design and Operation

The WRSA has been designed based on the guidelines set out in the B.C. Ministry of Energy, Mines and Petroleum Resources document for the ‘Investigation and Design of Mine Dumps, Interim Guidelines, May 1991’. The design is based on a projected

capacity of 60 million tonnes of waste rock assuming a unit density of 2 tonnes per cubic meter. Testing to date suggests that the rock that would be placed in the WRSA is not acid generating or metal leaching. Additional testing is planned and will be continued during operations to confirm this trend. The waste rock is a durable granodiorite or biotite gneiss and would be placed by end-dumping starting near the center of the site and progressing to the east limit of the WRSA before progressing to the west side of the storage area in lifts up to 20 meters thick. The design anticipates the WRSA would have sufficient operating space on the working lifts so the slope stability and settlement should not be a concern.

The WRSA was sited at the present location based on a general sitting study completed by Knight Piesold in 1995. Several sites to the north and northwest were investigated and the selected location ranked the most reasonable for stability, minimizing haul distance and minimizing the overall mine footprint.

The WRSA has been sited to the north of the open pit in an area that has a thick overburden layer and is understood to be beyond the area that would be considered for mining with the open pit operation. The north limit of the WRSA was determined by the local drainage and would stay south of North Williams Creek, the first major creek north of the mine area.

1.5 Previous Work

This design was based on field work previously carried out by: Knight and Piesold in 1992, 1995, and 1996, EBA Engineering (EBA) in 1997, Clearwater Consultants Ltd. (CCL), Access Consulting Group (Access) in 2006, Western Copper Corporation (WCC) in 2006 and Golder Associates in 2007. Borehole and thermistor installations from the 2007 Investigation are shown on Figure 3A. All borehole and test pit locations completed in the area of the Waste Rock Storage Area are shown on Figure 3B. The results of this work was documented in reports prepared by Knight Piesold (1993, 1995, 1996, 1996a, and 1997), Hallam Knight Piesold (1995), EBA (2006, 2006a), and Access (2006). Golder has relied on the work in 2007 and on the previous work and assumes there are no major omissions in the previous work. Where available information is limited, or where additional detailed field investigation work may affect the design, attempts have been made to identify the interpretations and assumptions made in this report.

2.0 YUKON REGULATORY REQUIREMENTS

The Waste Rock Storage Area or waste rock dump is to be developed and designed based on the criteria set out in 2005 agreement between 'Western Silver Corporation' (now Western Copper Corporation) and the Government of the Yukon. In particular the agreement sets out for the WRSA, the performance objectives and regulations/guidelines as specified by the Yukon Government (Yukon Government 2005a) and has additionally considered the following design and operational objectives:

- Permanent stability of the WRSA under both operation and closure conditions;
- Physical stability as defined by the guidelines in the B.C. Ministry of Energy, Mines and Petroleum Resources document 'Investigation and Design of Mine Dumps, Interim Guidelines, May 1991'; and
- The waste rock will be managed in a manner to prevent significant impacts downstream based on the 'Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia' and 'Guidelines and Recommended Methods for Predictions of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia'.

The WRSA will also be operated in a manner to maintain efficient collection and management of surface water around and on the site of the WRSA. The surface water run off from the WRSA would be directed to a surface water sedimentation pond east and down slope of the WRSA.

3.0 DESIGN OVERVIEW AND PROPOSED OPERATIONS

The design is to be carried out in accordance with the current industry design standards and performance objectives and in accordance to regulations/guidelines specified by the Yukon Government. The WRSA is to be located north of the open pit at the mine site to minimize haul distance. The design will accommodate potential changes in the mine plan, and will be designed to manage surface water from the storage area to a water management and sedimentation pond east of the facility. The WRSA has been designed and will be operated to minimize the effort needed at the end of the mine operation for closure.

The WRSA will cover some 70 hectares and would contain up to 60 million tonnes of waste rock. The waste rock would be placed in the storage area while the mine is operating for approximately 330 days a year. The WRSA would be developed in a series benches which for the current design are proposed at 20 meters. The benches would be developed with internal or interim slopes and final or ultimate bench slopes that would be developed at 1.4 or 1.5 horizontal to 1 vertical (1.4 or 1.5 H: 1 V). The actual slope angle for the benches or lifts of the WRSA will be at or consistent with the angle of repose of the rock material that is placed in the facility. The design anticipates that for the ultimate or external WRSA slopes, 10 to 20 meter wide benches would be developed to create an overall slope of between 2 and 2.25 H: 1 V (bench slopes at 1.4 H to 1 V with set back between benches of 20 m) with total WRSA height of 90 m. The current closure plan does not include resloping of these benches.

The design and operation of the WRSA will leave a facility at the end of the mine life or at closure that is physically stable in the long term (static and seismic stability issues to be considered) and that has been reclaimed to manage any metal leaching considerations and to address issues with surface runoff and erosion. The operational ditches around the facility would be infilled or removed and the water retaining sedimentation pond to the east of the WRSA would be re-contoured so as not to retain water. The flat areas of each bench set back and the flat top area of the WRSA and the surrounding area disturbed by the operation would be vegetated to minimize long term erosion. Natural vegetation of the slopes of the WRSA would be encouraged.

4.0 DESIGN CONSIDERATIONS

4.1 Design Requirements and Criteria

The WRSA will contain up to 60 million tonnes of waste rock. The WRSA has been sited with a 50 m wide buffer zone from the north of the open pit in an area that has a thick overburden layer and is understood to be beyond the area to be mined by the open pit operation. The bedrock increases in elevation from the west to the east along the north edge of the pit and at the northwest corner of the pit, the bedrock is at a depth of 20 m while on the northeast corner of the pit, bedrock is within 5 m of surface. The 50 m set back will be re-evaluated once the pit slope design is completed and the evaluation confirms the pit slopes are stable under the loading of the WRSA. The north limit of the storage area was determined by the local drainage and the WRSA would be operated to stay south of the first major creek north of the mine area.

It is planned that the storage area would be developed in a series of 20 meter high lifts. The 20 m lifts would be developed with interim slopes that would be developed at 1.4 or 1.5 horizontal to 1 vertical (1.4 or 1.5 H: 1 V). The actual slope angle for the face of the intermediate slopes of the WRSA will be defined by the angle of repose of the material as it is dumped. The rock will be placed starting from near the center of the site and progressing to the east limit of the storage area or in a down slope direction.

The WRSA has been laid out to have Factors of Slope Safety for the interim and final bench slopes of 1.0 or 1.1 during operation (and considering local seismic events). At the end of mine life and after reclamation the Factor of Safety for the local or bench slope would be above 1.3. At present it is not anticipated that re-contouring of the external bench slopes will be required. The overall or total slope should have a Factor of Safety of 1.3 to 1.5 (static) during operation and at closure a Factor of Safety of greater than 1.5 (static). The Factor of Safety long term for the maximum design earthquake or seismic events should be in the range of 1.1 to 1.2.

4.2 Operation Sequence

The eastern half of the WRSA footprint would be cleared at least 1 year before pre-production stripping starts in the pit to allow the permafrost under the WRSA footprint to thaw. The remainder of the area would be stripped as or before production mining starts. The thawing of the permafrost is important, as the stability of the intermediate slopes of the WRSA is impacted by the thawing ground and this impacts the slope stability of the initial lift of the WRSA. The ground would be monitored to confirm the permafrost retreats under the WRSA. If local pockets of the permafrost remain in the ground, the interim operations slopes would be flattened locally to less than

the angle of repose or a 'small catch berm' would be developed on the east side of the WRSA to 'catch' potential small slope slumps or creep failures that may occur in the initial phase of the operation. As the WRSA expands and the upper lifts of the facility are developed, the permafrost will disappear or the permafrost zone will stabilize under the WRSA. This condition would increase the bench slope stability. The stability of the intermediate slopes would then be defined by the strength of the waste rock and the drained unfrozen soils which underlie the site. This sequencing may allow for a steepening of the slopes as mining progresses. Geotechnical monitoring will occur during operation (Section 9) to predict if in closure the permafrost will move up into the WRSA.

A perimeter surface water ditch system would be developed before and as the WRSA is developed. The series of ditches would surround the WRSA and direct surface water to the main ditch on the north side of the WRSA which would then flow into the WRSA sediment pond to the east of the storage area.

It is proposed to develop the initial lift waste rock starting at elevation 760 m (760 m bench) and filling to the east limit of the storage area. Then, a second lift would be developed starting at the elevation 780 m and this bench would be developed over the eastern half of the WRSA.

As the second lift nears completion, the southeastern portion of the WRSA would be developed to an elevation of 800 m as shown on Figure 4. The 800 m bench would then be extended all the way to the western limit of the WRSA at elevation 800 m. The west portion would then be developed to elevation 860 m in three 20 m thick lifts starting from the southwest edge of the storage area as shown on Figure 5. The access ramp on the south side of the WRSA would be developed to maintain access to the top level of the WRSA. The ramp would 'climb' on the south slope of the WRSA to the top elevation of the WRSA at 860 m. Finally, the waste rock would be placed on the east side of the WRSA area to complete the development of the east half of the footprint as shown on Figure 6. The storage area would be finished out at an elevation of 860 m area as shown on Figure 7. It is anticipated based on the sequencing of the WRSA that there would be adequate space to adjust to minor slope movements and shift dumping to stable portions of the facility. It is proposed that as the operations guidelines or manuals for the WRSA are prepared, criteria would be developed to identify trigger levels when dumping should be slowed or moved to new areas on the dump face.

4.3 Subsurface Conditions

Geotechnical site investigations have previously been carried out by others across the planned area of the WRSA (Knight Piesold, 1992, 1995, and 1996) and by

Golder Associates in 2007. The investigations included a total of 13 boreholes, four large trenches, and 17 test pits as shown on Figure 3B. The borehole logs and test pit records and the results of the laboratory testing from the Golder 2007 field investigation effort are attached in Appendix I.

Based on the site investigation results, the subsurface soil stratigraphy across the area generally consists of the following soil layers:

- Organic peat and/or ash layer;
- Glacio-fluvial/Glacio-lacustrine silts and clays;
- Well-graded compact to dense silty sand and gravelly sand (glacial deposits);
- Weathered bedrock; and
- Unweathered bedrock.

The thickness of soil above the weathered and unweathered bedrock varies substantially over the area from approximately 1 to 2 meters under the southeast corner of the WRSA to over 90 m on the north side of the site and to 70 m to the east of the WRSA. In general, the overburden thickness decreases towards the south or towards the open pit area. The depth to bedrock on the east and north side is such that the WRSA stability will be governed by the overburden soils at the site.

The results of all of the site investigations to date indicated that most of the area planned for the WRSA is underlain by shallow isolated pockets of peat and organic silt. These deposits are typically less than 1.0 m thick and are underlain by compact sand or silty sand and sand deposits. These deposits range from 8 to 10 m thick and are underlain by sandy silt or silt which may vary in thickness from 2 to 9 m thick. In several boreholes, thin silt layers were encountered in the sand layer within 5 m of the ground surface. The silt layers were discontinuous and appeared to be localized. The upper sand deposits also have varying amounts of silt and/or clay, but generally the upper sandy materials appear well graded. At depth under the east portion of the WRSA site, the sands are underlain at depths ranging from 13 to 25 m by a low plasticity silt or silt with trace sand and clay. On the north side of the WRSA, the silt and clayey silt layers are at depths of 7 and 14 m. The silt layer under the west and southwest side of the WRSA were encountered at depths of 10 to 16 m and are typically interlayered with sandy zones which are generally 0.5 to 1 m thick. The interlayered clay, silt and sand deposits then extend to depths of some 70 m at the east limit of the facility, while on the north side the depth to rock appears to vary from 60 m to 90 m.

The investigations also indicated that the site is underlain by permafrost. Typically the permafrost was encountered at depths of about 1 to 2 meters. Further, the boreholes drilled over the WSRA footprint indicated that the groundwater table was located at

depths of up to 10 meters and typically at or just above the bedrock that underlies the site at depth. The deep ground water system appears to follow the site topography and flow to the east or down slope. A limited number of permeability tests have been completed in the bedrock that underlies the WRSA and the tests indicate the bedrock has permeability in the order of $1x10^{-4}$ to $1x10^{-5}$ cm/sec.

The results of the site investigation and the review of the site conditions indicate that the sandy deposits which would thaw under the initial loading of waste rock will control the slope stability of the WRSA. The silt zones at depth which are frozen will also influence the slope stability of the WRSA but it is anticipated that the silts are deep enough and should remain frozen. Thus, the results of the investigations indicate that the general foundation conditions under the WRSA which consider the impact of permafrost, bearing capacity and long term settlement are acceptable for the proposed development. The key to the operation of the WRSA will be the impact that the operation will have on the permafrost and the impact the waste rock loading from 20 to 80 m of waste rock will have on the silt strata under the WRSA. These factors are considered in design and would be monitored in the operation of the facility.

4.4 Seismic Criteria

The seismic risk in the Carmacks Copper Project area has previously been characterized by a seismic hazard assessment carried out for the project site (Knight Piesold, 1995), providing probabilistic and deterministic values for the maximum ground acceleration. The evaluation characterized the site as a low risk site due the low level seismic activity recorded in this area of the Yukon.

The evaluation for this phase of the project was based on the more recent 2005 National Building Code Seismic Hazard Calculations. The site remains a low risk site with the peak ground acceleration for the site at 0.055g for the 475-yr return period and 0.076g for the 1000-yr return period.

The seismic loadings or conditions on site were set by the design criteria for the heap leach facility. The design earthquake for the heap leach pad and the associated events pond was selected from the greater or larger event of 50% of the MCE or the 1 in 1,000-yr earthquake. The peak ground acceleration for 50% of the MCE was determined to be 0.055g with a return period of 475 years. The Maximum Design Earthquake (MDE) which was determined to be the 1 in 1,000 year event has a local firm ground acceleration of 0.076g.

5.0 DESIGN

5.1 Slope - Benches and Overall Slope

The Waste Rock Storage Area was evaluated and the design is based on the BC Guidelines for Mine Waste Dumps, May 1991. In order to set out the design for the WRSA, it was determined based on the above guidelines that the facility would be a large facility (at low end of large dumps rating based on volumes) with a moderate overall slope height on a moderate foundation slope of approximately 10% to 14% to the northeast. The storage area is defined as an 'unconfined facility' with no confining gullies or side slopes to act to confine the facility on an intermediate foundation situation with the presence of permafrost being the major foundation stability item. The bench lifts are generally considered favourable and are less than 25 m in height with an ascending construction sequence and a large enough dumping area that the rate of advancement of the front face of the WRSA should be considered slow to moderate.

Settlement is not considered a critical design issue as long as settlement does not impact the slope stability. Settlement would be monitored during operation and as it is in the estimated range of approximately 2 % to 3 % of the overall facility height should not be a concern. The settlement will however impact the planning and sequencing for the closure activities of the facility at the end of the mine life. The settlement would be monitored to make sure that surface water ditches during operations direct run off to the WRSA perimeter ditches on each level or lift, so water flows off the WRSA and does not seep or flow through the waste rock, causing potential stability issues during operations.

The stability evaluation for the WRSA considered the results of the Golder 2007 site investigation and the results from the previous field programs in defining the parameters for the stability evaluation. The strength parameters for the silty sand and silt stratum were assigned based on the results of the recent laboratory work and are summarized on Table 1. The analysis considered that while the silty sand is currently frozen, the construction sequence would allow the silty sand time to thaw and based on the rate of development or the rate of advance of the front / active face of the WRSA, there would be time to allow drainage of the silty sand material so that the drained thaw stable strength parameters were used in design of the slopes of the WRSA facility.

TABLE 1: Material Properties for Waste Rock and Foundation Soils

Material Type	Bulk Unit Weight (kN/m^3)	Cohesion (kN/m^2)	Phi (Degrees)
Bedrock	20	0	40
Silty Sand (Thawing)	22.8	33	10
Silty Sand (Frozen)	19.6	0	34
Silty Sand (Thawed)	19.6	0	28
Waste Rock (Surcharge < 200 kPa)	19.6	0	36
Waste Rock (Surcharge > 200 kPa)	19.6	0	38
Clay or Silt (Thawing)	18.0	33	0
Clay or Silt (Frozen)	18.0	30	10

The waste rock was assigned a conservative friction angle for confining pressures of less than 200 kPa corresponding to slope heights less than 10 m. The friction angle was set at 36 degrees with a unit weight of 19.6 kN/m^3. The values were increased with increasing confining pressure above 200 kPa. The field investigations indicated that in the north and east directions, bedrock was at a great enough depth that it would not impact the stability of the WRSA facility (i.e. deep failures of overall WRSA slope would not pass through bedrock).

5.2 Slope Stability Results

The stability of the WRSA was modeled using the computer program SLOPE/W by Geo Studio produced by Geo-SLOPE International Ltd. The geotechnical criteria used for the design included a bench slope angle of 1.4 H: 1V with a bench set back of from 15 to 20 meters and bench height of 20 meters.

The minimum Factors of Safety for deep seated failure used in the design were:
F.S. $\geq$ 1.3 to 1.5 for static during the operations period;
F.S. $\geq$ 1.5 for static at closure; and
F.S. $\geq$ 1.0 for seismic during the operation period and in closure.

The WRSA was split into the following zones or material types for the foundation and waste rock:

Material 1: Bedrock
Material 2: Silty Sand (Thawing)
Material 3: Silty Sand (Frozen)
Material 4: Silty Sand (Thawed)
Material 5: Waste Rock (Surcharge < 200 kPa)
Material 6: Waste Rock (Surcharge > 200 kPa)
Material 7: Clay Layer

For the purpose of this analysis, two conditions were considered:

- **Case 1:** Thawing of the upper silty sand layer which results in a weakening of the foundation soils resulting from permafrost degradation and the development of excess pore water pressures in the thawing silty / clay layer and in the thin silt layers within the silty sand strata; and

- **Case 2:** The silty sand layer is thawed and the permafrost (frozen foundation soil conditions) stabilizes within the silty sand layer and the base or bottom of the new or re-established active layer is located above the regional phreatic surface. The soil within the active zone consists of silty sand with only thin thawed silt layers and the clay layer at depth remains frozen.

The thawing of the silty sand and deep clay layer was modeled with a thaw weakened silty sand layer (Material 3 - thawing silty sand) and a thawing clay (Material 7 – clay layer).

The results of this evaluation for these foundation conditions resulted in a global failure of the overall slope with factors of safety less than 1.0 for both the static and seismic cases (FoS = 0.9 static and FoS = 0.8 seismic). This case was not considered further as thawing to the depth of the clay layer would not be expected.

The second condition evaluated assumed that the shallow soils below the WRSA were thawed and stable and the soils at depth remained frozen. The frozen conditions were applied to the silty sand layer (Material 3) and the clay layer (Material 7), with the upper silty sand (Material 2) thawed and stable in the active zone. The phreatic surface was assumed to be below the active layer.

Three failure modes were analyzed for this condition for both static and seismic conditions - single bench failure, double bench failure and global failure. Global failure modes were analyzed for both a single 20 m lift and the complete WRSA configuration. The results of the analysis are presented in Table 2 and 3. The results indicate that if the silty sand and clay remain frozen and the upper silty sand thaws and is thaw stable, the WRSA has Factors of Safety that are above the minimums suggested by the BC Guidelines for Design of Waste Dumps. Thus, the design and successful operation of the WRSA will depend on the permafrost conditions at the site. The monitoring planned for the WRSA will be important to confirm a safe operation of the WRSA. Further, the results suggest that the WRSA slopes may be steepened in later stages of the operation as the behavior of the permafrost is understood.

TABLE 2: Factors of Safety for Static Condition

Failure Mode	FOS
Global Failure – Single Lift	1.7
Single Bench Failure	1.2
Double Bench Failure	1.7
Global Failure – Overall Slope	1.5

TABLE 3: Factors of Safety for Seismic Condition

Failure Mode	FOS
Global Failure – Single Lift	1.3
Single Bench Failure	1.1
Double Bench Failure	1.5
Global Failure	1.2

Appendix II presents selected plots from the slope stability analysis.

The evaluation indicated that if the operational sequence is such that the silty sand remains frozen, the intermediate bench slope will be stable and the Factors of Safety will be in the same range as for the thawed conditions.

It is suggested that the WRSA be developed with an overall slope of 2.0 H or 2.25 H to 1 V. This would allow for adjustments to the slope configuration depending on the monitoring to be placed under the WRSA and on the local dump benches. The proposed WRSA layout allows for 20 m wide bench set back at present to achieve the above overall WRSA slope. The evaluation for this configuration indicates that the overall Factor of Safety is at the upper end of the range suggested by the BC guidelines for Mine Waste Dumps. This conservative approach is recommended until the behaviour of the permafrost is understood under the WRSA.

The key to the design of the WRSA is the fill sequencing that will fill initially into the east area of the WRSA with two 20 m high benches and then filling will shift to the west end of the WRSA footprint. The silty sand layer in the east area is 16 to 20 m thick and is underlain by a silty clay or clayey silt. In the event that the clayey silt thaws, it will not be thaw stable and would develop excess pore water pressures which will reduce the above factors of safety and local instability may occur. While it is not anticipated the permafrost would thaw to these depths, it is important to monitor the behaviour of the material as it is loaded by the waste rock. If the clayey silt does not thaw, it is still anticipated that the material would have some minor loss of strength and there would be minor creep of the foundation soils. Thus, the monitoring will determine if the clayey silt thaws. The development sequence is such that there will be a year or two after the initial filling, before the final lifts are placed in the east portion of the WRSA. This will allow time to respond if the slope configuration needs to be modified. The filling sequence on the north slope is also sequenced to allow modification if needed.

6.0 CONSTRUCTION SEQUENCE

Based on the WRSA design, proposed dumping sequence and the frozen silty sand beneath the WRSA, it is anticipated that during the pre-production pit stripping phase the following construction activities would be carried out across the WRSA footprint and sediment pond areas:

- general site development and site preparation removing all trees and stripping the area down to the mineral soil over the area to average depths of 30 to 50 cm;
- stockpiling the material in a selected area north or west of the WRSA;
- site grading with construction of the surface water perimeter ditch and the internal ditches and french drains;
- excavation and construction of surface water sediment pond east of the WRSA;
- installation of instrumentation;
- construction of required section of main mine haul road in WRSA footprint; and
- start of the stripping and grading the west portion of the WRSA before the start of production of the mine operation.

The clearing of the east portion of the WRSA as noted above is proposed for at least 1 year before pre-production stripping for the open pit starts and this will allow time to install several ditches or french type drains to drain the upper silty sand that underlies the overall footprint of the WRSA.

The site drains or ditches would direct water or run off to the main perimeter ditch system on the north side of the WRSA. The north perimeter ditch will ultimately direct surface water flows to the WRSA sediment pond east of the site. It is anticipated that to ensure the silty sand under the WRSA drains some of the french drains will be installed at depths of 3 to 5 m as shown on Figure 8. The french drains would be placed below grade with a coarse drain rock core and a sandy surround to allow the drains to function as the waste rock is placed.

During the production phase (year 1 and on), it is anticipated that the following construction activities would be carried out:

- Placement of the waste rock in the first bench to completion and the start of the 780 m bench on the east site; and
- Completion of the installation of the monitoring instrumentation on the benches as the WRSA is developed.

7.0 SURFACE WATER MANAGEMENT

A Preliminary Surface Water Management Plan (Golder, November 2007) and a Construction Surface Water Management Plan (Golder, March 2008a) were developed for the project and site. The plan included design recommendations for the WRSA and the area around the perimeter of the WRSA. The plan minimizes the project related impacts to surface water and minimizes the quantity of contact water across the site. The plan details surface water management structures that collect or divert surface water to storage and treatment facilities.

The surface water management plan sets out the objectives for the surface water management strategy for the WRSA. The features (ditches etc.) in the plan direct non-contact surface water from the area around the perimeter of the facility away from the disturbed areas towards North Williams Creek on the north side of the WRSA. Contact surface water from the WRSA or the immediate disturbed areas would be collected and conveyed through a series of perimeter ditches into the WRSA sedimentation pond for treatment (removal of suspended solids), prior to discharge to the environment. There will also be the option of reusing the water as part of mine operations (e.g. dust control or make-up water for operation of the heap leach facility), or, if necessary, treatment of the water in the on-site treatment plant, prior to discharge to the environment.

The plan sets out that unlined diversion ditches will be used where expected flow velocities are less than 1 m/s, and riprap and geotextile lined ditches will be constructed anywhere expected flow velocities are in excess of 1 m/s. In addition, any life of mine or long term surface water diversion drains will be lined with riprap.

The surface water management plan has provided the criteria for the design of the sediment pond which is to capture runoff for the 1 in 10 year, 24-hour, rainfall event, plus snowmelt. In addition, the sediment pond has been designed with a dead storage capacity equal to 50 per cent of the runoff storage. The proposed storage capacity of the sediment pond is 45,000 m^3 based on the current management strategy for the north portion of the project area.

For normal operations, it is proposed that the sediment pond will have a riser decant structure that will be used to slowly draw down the stored water allowing sufficient time for the settling of suspended sediment. For extreme events, a riprap lined spillway will convey the 1 in 200 year return flood event, plus snowmelt, with a minimum freeboard of 1 m, to prevent overtopping of the embankment. The decant structure and spillway will discharge downstream into a plunge pool, then to North Williams Creek and finally to Williams Creek.

8.0 OPERATIONAL CONSIDERATIONS

The pre-production construction and the initial stages of the operation of the WRSA has been set out with the anticipation that pre-production site work will result in thawing of the permafrost in the upper silty sand strata and any silt layers in the upper soils beneath the WRSA. The sequence and pace of the placement of the waste rock is set to allow an opportunity to monitor the waste rock slopes and the performance of the site. The monitoring planned will enable the operations group to collect information on the re-stabilizing permafrost and to provide changes, if needed, in the operation as required. The sequencing of waste rock on the west and north portion also allows time for modifications to the procedures to complete the WRSA in a successful manner.

During operation, a series of samples of the waste rock will be collected to complete an operational set of kinetic tests to confirm the initial test data which suggests that acid rock drainage and metal leaching will not be a concern with the rock placed in the WRSA during operation and in closure. The testing would be set up to allow the operation to monitor where waste rock is placed in the storage area so if required, measures can be implemented to address any potential concerns. Based on testing to date this should not be an issue and no changes to the operation are anticipated and therefore would be no impact on the currently proposed closure plan for the WRSA.

9.0 MONITORING AND LONG TERM PERFORMANCE

The construction or fill sequence of the WRSA is set to develop an initial 20 m thick bench starting at the 760 m contour in the middle of the overall WRSA footprint with the dumping progressing east and down slope. The waste rock material would be placed over a larger bench area and the slope would be monitored. The second bench would be developed starting further west at the 780 m contour and would progress east and stop 20 m short of the end point of the initial bench. The initial bench would have been instrumented with survey settlement and movement hubs. At present the dump sequence has not been finalized and trigger levels to move dumping from one area of the WRSA face to another area has not been set. The trigger levels which would set alarms would be based on the guidelines in the Operations and Monitoring Manual developed by BC Mine Waste Rock Pile Research Committee, May 1991. The guidelines indicate that if movements greater than 50 cm per day are recorded in an area, the mine would be required to move operations to alternative dump areas within the WRSA. It is anticipated that once the fill sequence is finalized by WCC operations personnel, a detailed set of guidelines would be prepared for the facility based on the BC guidelines. It is anticipated that the detailed plan would include the installation and monitoring of survey hubs and wire line extensometers to provide an indication of the bench movement and along with monitoring of data from the piezometers and thermistors under the WRSA and around the WRSA. The overall performance of the facility would be reviewed daily by mine staff.

Geotechnical monitoring of the WRSA throughout operations will evaluate the performance of the facility and would determine if the operating conditions are as assumed in the design. Further, due to the continuing development or continuous dumping at the WRSA, observations on the performance of the initial stages may provide useful information for optimizing subsequent stages of development.

It is anticipated that instrumentation installed within, and beneath the WRSA will consist of the following and as shown on Figures 9 and 10.

- *Thermistors*: Placed beneath the WRSA in boreholes up to 20 m deep under the east and north portions of the site. These instruments will provide a profile of ground temperature with depth for use in assessing changes to frozen ground and permafrost conditions beneath the WRSA, and the resulting impact to geotechnical stability and groundwater seepage conditions and thus the stability of the bench slopes.

- *Vibrating Wire Piezometers*: These are to be placed within the foundation drains and in the boreholes with the thermistors beneath the east and north portions of the WRSA. These instruments will provide information regarding pore pressure levels

within the foundation soils beneath the structures, for use in monitoring geotechnical stability.

- *Survey Monuments*: Installed on the final surface of each intermediate bench. These relatively simple reflectors will provide a means by which to detect settlements, deformations or slope movements.

- *Wireline Extensometers*: Wireline extensometers will be used to monitor movements of the active dump crests during dumping.

A detailed monitoring plan would be developed by the mine to establish monitoring frequencies and reporting responsibilities. The plan would set out trigger levels and action items if movement or the measurements approach 50% of the trigger level and then 80% of the trigger level. The plan would identify staff that would be responsible to respond to the warnings provided by the monitoring system. The proposed layout of the instrumentation under and on the east and north side of the WRSA is shown on Figure 9 and Figure 10. The final plans for the WRSA slope monitoring would be developed in conjunction with the preparation of the dumping and monitoring plans to be developed by the mine.

The monitoring of the surface water quality and quantity would be set out in the final surface water management plan. It is anticipated that as a minimum, the surface water quality would be monitored on a regular basis during spring runoff and after major storms or when there is active discharge of water to the surrounding environment.

10.0 CLOSURE PLAN

Revegetation of the general site and the WRSA would follow the general guidelines for reclamation in the Yukon. The plan would be to provide fall seeding to flat areas on the WRSA and to encourage lodgepole pine on south and east facing slopes and white spruce on the north slopes of the WRSA. The flat surfaces of the WRSA would be covered with 0.3 to 0.5 m of the organic material that was stripped from the area before mining. This material will have been stockpiled around the area and would be moved onto the site at closure to encourage re-vegetation. The initial seeding would include native seed mixtures to minimize erosion and provide time for the natural trees to re-vegetate the area. While revegetation would be encouraged on the WRSA slopes, it is not proposed at this time to reseed these areas. If areas of erosion are noted, the slopes may be seeded. The objective of the cover would be to minimize erosion and to return the area to a vegetative cover similar to the current tree cover in the area.

Since the testing to date indicates that neither acid generation nor metal leaching will occur in the WRSA, the cover will not be designed as an evapo-transpiration type cover. Instead the objective of the cover would be to minimize erosion and to return the area to a vegetative cover similar to the current tree cover on the area. Establishment of the cover would commence during the later stages of mine operation in areas of the WRSA where the final design elevations have been achieved. This will allow additional time to monitor the success of the initial cover application and if necessary refine the soil and seed application techniques before completing the application of the cover.

Surface water (snow melt and rain water) will be managed off the west side of the WRSA down the main access ramp, and on the east and north sides of the WRSA in lined rock engineered channels. The drainage ditches and the sediment pond to the east of the WRSA would be removed from service or de-built once the above revegetation is established and is successful and suspended solids are not an issue in surface run off flows.

There are several tasks and research projects that will be carried out during the operation in order to improve the potential success of the revegetation. The work would be to classifying the soils which create the optimum growing conditions and which fertilizers provide the best initial boost to growth and how long should the fertilizer be placed as the long term goal is to have the vegetation self sustaining without the need for on-going care or maintenance. This work may require small test plots managed by the mine that would be reported in the annual mine environmental summary reports.

11.0 CLOSURE

We trust the above information is sufficient for your needs at this time. Should you require additional information or further clarification, please do no hesitate to contact us.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED BY

John Hull, P.Eng
Principal

ORIGINAL SIGNED BY

Fiona Esford, P.Eng
Project Manager

Reviewed by:

ORIGINAL SIGNED BY

Andy Haynes, P.Eng. (BC)
Associate

JAH/AJH/FCE/mrb/lw/mrb
Attachments
O:\final\2006\1413\06-1413-077\doc. 066\doc. 066 rev. 1 rpt-0415_08 wcc carmacks copper proj-design waste rock storage area.doc

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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the

whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, and safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. **The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report.** The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic,

excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

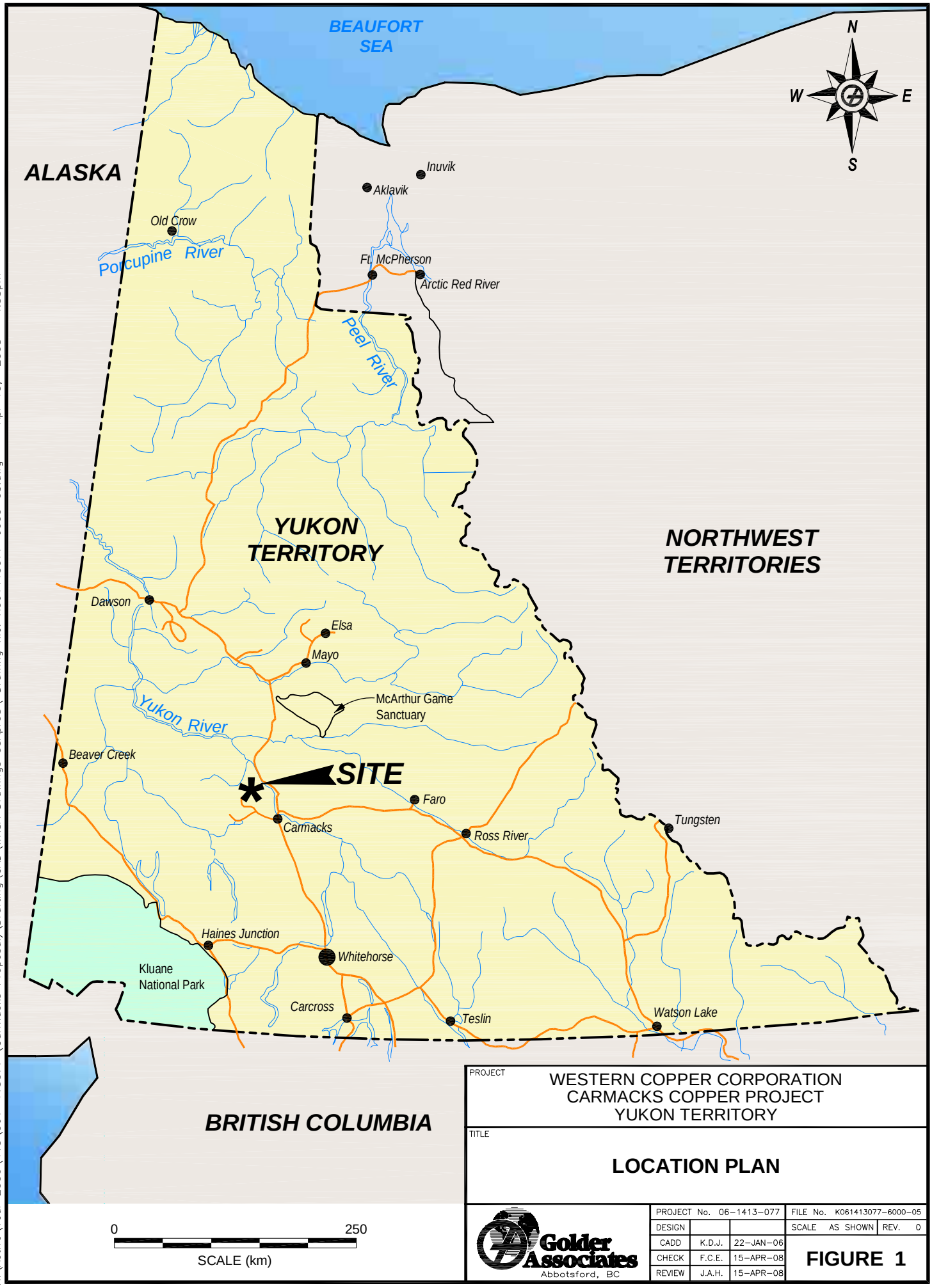
Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage

unless specifically involved in the detailed design and construction monitoring of the system.



PROJECT

WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE

LOCATION PLAN

Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			FILE No. K061413077-6000-05	
DESIGN			SCALE AS SHOWN	REV. 0
CADD	K.D.J.	22-JAN-06	FIGURE 1	
CHECK	F.C.E.	15-APR-08		
REVIEW	J.A.H.	15-APR-08		

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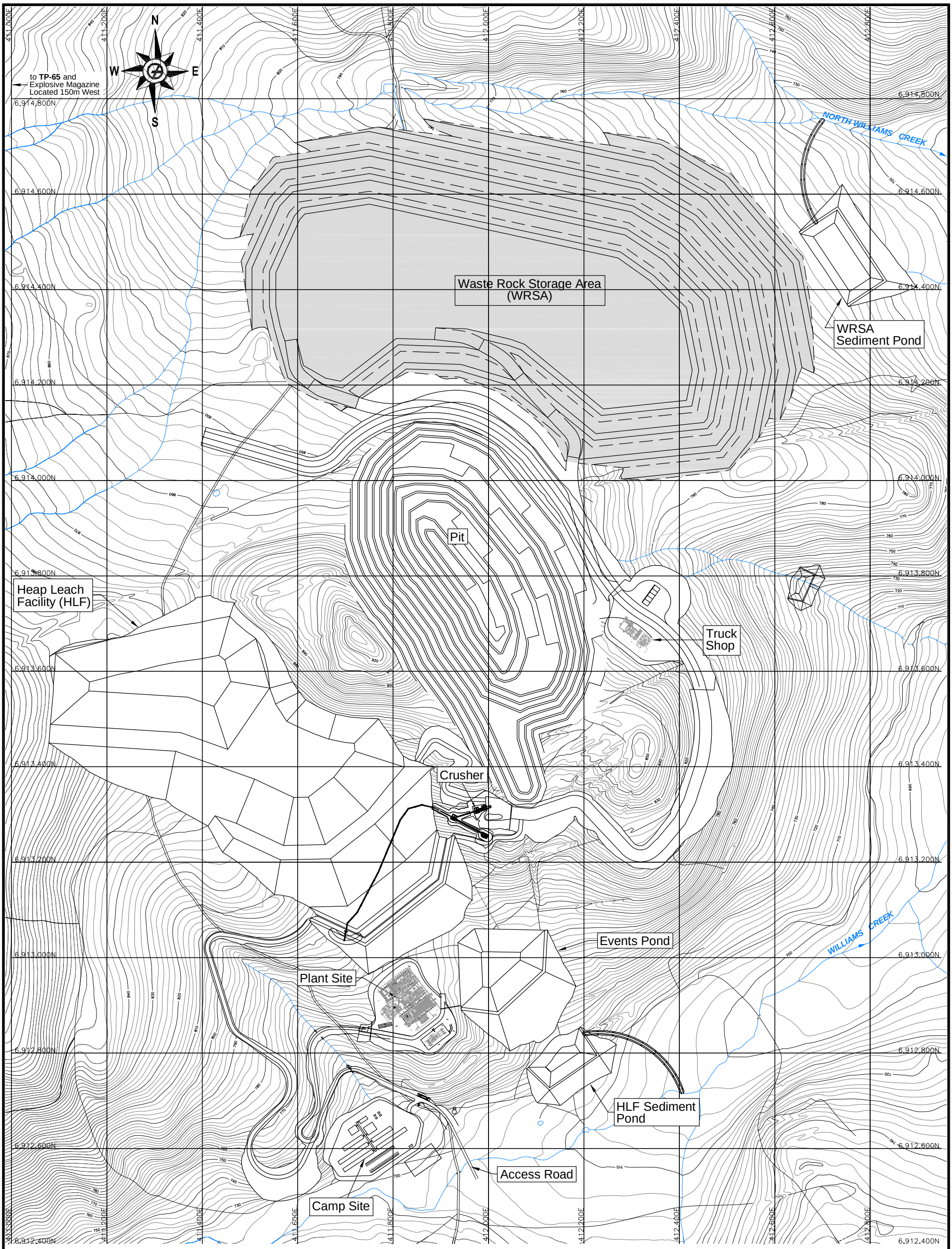

NOTES

1.) Elevations Shown are in metres above Mean Sea Level.
2.) Grid Coordinates Shown in UTM NAD 83, Zone 8.

REFERENCES

1.) M3 Engineering Ltd., CAD Files: 100-CI-010P5.dwg, Dated March 13th, 2008.
2.) Eagle Mapping Ltd., CAD Files: SH1-UTM.dwg to SH9-UTM.dwg, Dated November 1st, 2007.
3.) Western Copper Corporation, CAD File: End_Of_Yr_06.dwg, Dated March 30th, 2007.

0 400
SCALE (m)

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
SITE PLAN

Golder Associates
Greater Vancouver Office, BC

PROJECT No. 06-1413-0077			FILE No.P071413077-06A.DWG	
DESIGN	J.A.H.	10-MAR-08	SCALE AS SHOWN	REV. 0
CADD	S.S.S.	10-MAR-08		
CHECK	F.C.E.	15-APR-08		
REVIEW	J.A.H.	15-APR-08		

FIGURE 2

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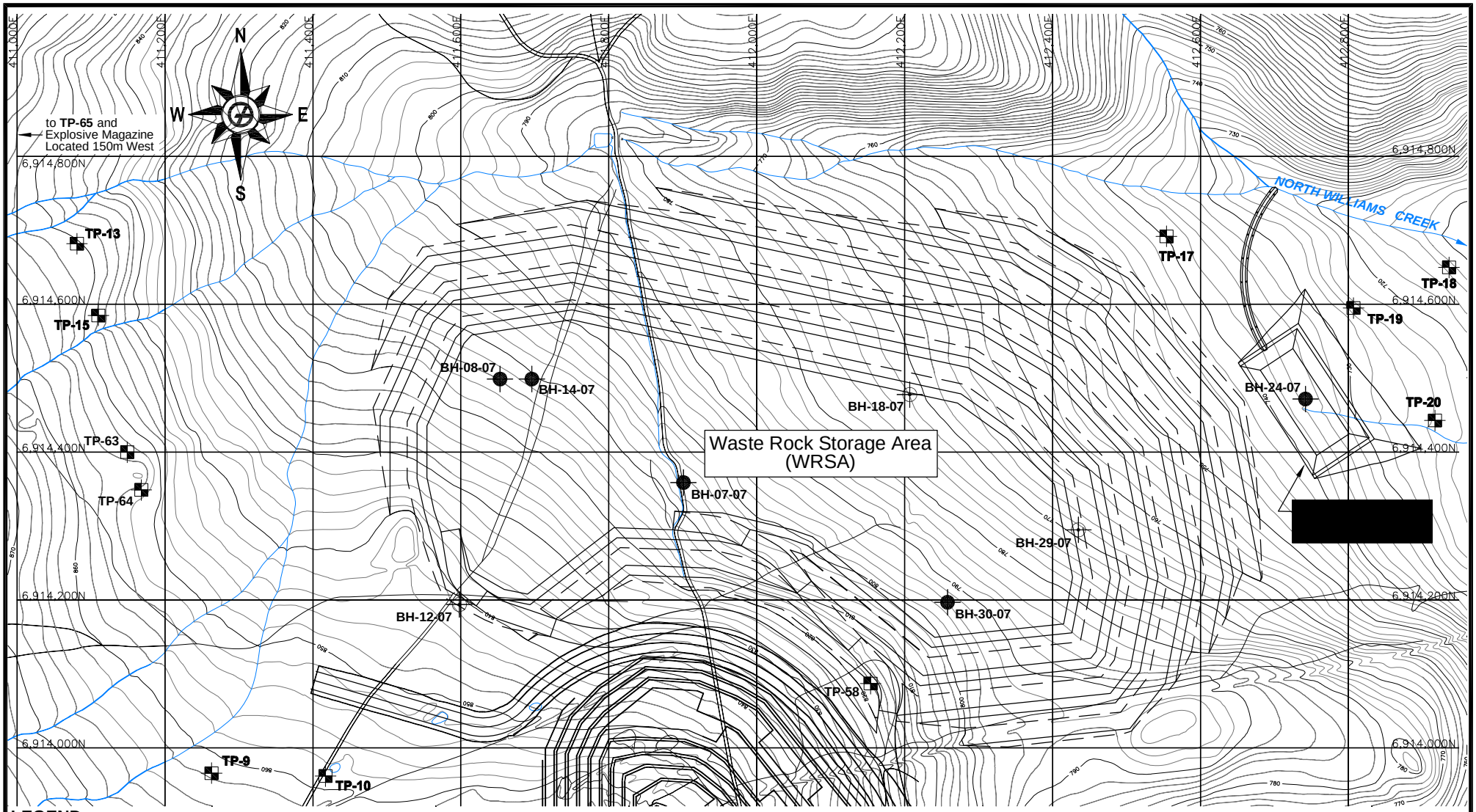

LEGEND

BH-32-07	Approximate Borehole Location
BH-29-07	Approximate Location of Borehole with Thermistor Installation
TP-64	Approximate Test Pit Location

NOTES

1.) Elevations Shown are in metres above Mean Sea Level.
2.) Grid Coordinates Shown in UTM NAD 83, Zone 8.

REFERENCES

1.) M3 Engineering Ltd., CAD Files: 100-CI-010P5.dwg, Dated March 13th, 2008.
2.) Eagle Mapping Ltd., CAD Files: SH1-UTM.dwg to SH9-UTM.dwg, Dated November 1st, 2007.
3.) Western Copper Corporation, CAD File: End_Of_Yr_06.dwg, Dated March 30th, 2007.

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SCALE (m)

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
2007 INVESTIGATION LOCATIONS

Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 1000	TASK	
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CHECK	F.C.E.	15-APR-08	FIGURE 3A		
REVIEW	J.A.H.	15-APR-08			

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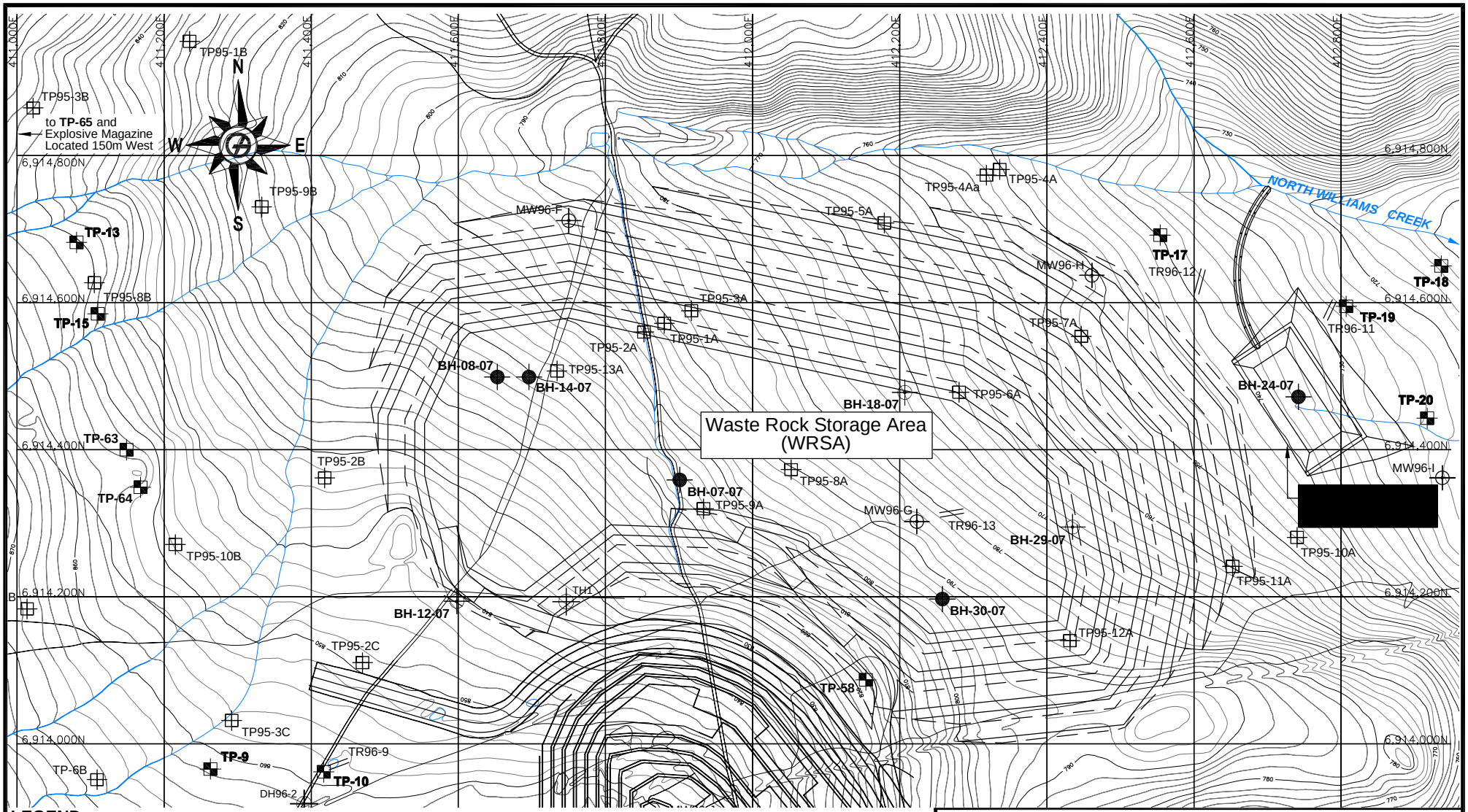

LEGEND

- BH-32-07 — Approximate Borehole Location
- BH-29-07 — Approximate Location of Borehole with Thermistor Installation
- TP-64 — Approximate Test Pit Location
- Approximate Test Pit Location by others
- Approximate Investigation Trench Location by others
- Approximate Test Hole/Drill Hole/Rock Core Location by others
- Approximate Test Hole Location by others

NOTES

1.) Elevations Shown are in metres above Mean Sea Level.
2.) Grid Coordinates Shown in UTM NAD 83, Zone 8.

REFERENCES

1.) M3 Engineering Ltd., CAD Files: 100-CI-010P5.dwg, Dated March 13th, 2008.
2.) Eagle Mapping Ltd., CAD Files: SH1-UTM.dwg to SH9-UTM.dwg, Dated November 1st, 2007.
3.) Western Copper Corporation, CAD File: End_Of_Yr_06.dwg, Dated March 30th, 2007.

0 400
SCALE (m)

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
BOREHOLE AND TEST PIT LOCATIONS

Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 1000	TASK	
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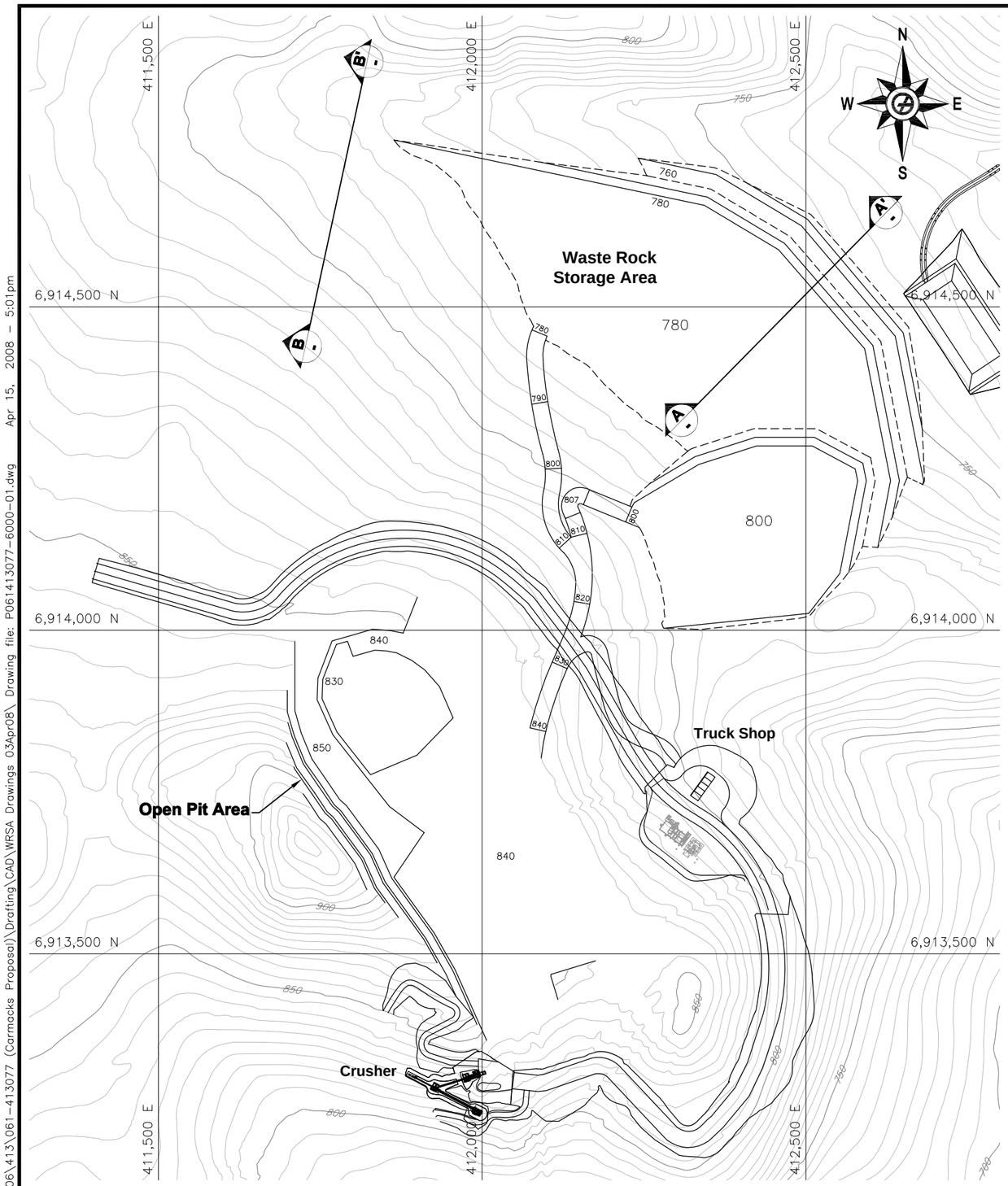
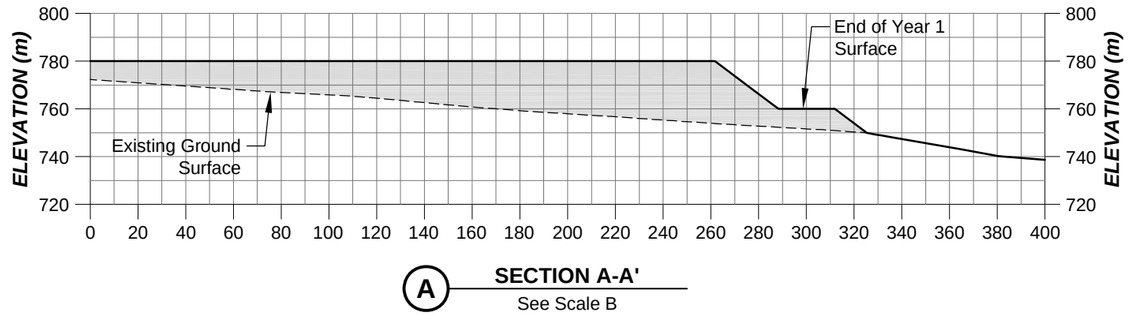
CADD	S.S.S.	01-APR-08	SCALE AS SHOWN	REV.	0
CHECK	F.C.E.	15-APR-08	FIGURE 3B		
REVIEW	J.A.H.	15-APR-08			



1 **PLAN - END OF YEAR 1**
See Scale A



A **SECTION A-A'**
See Scale B

B **SECTION B-B'**
See Scale B

DRAFT
For Discussion Purposes Only

0 250
SCALE A (m)

0 100
SCALE B (m)

REFERENCE

1.) INDEPENDENT MINING CONSULTANTS, INC., CAD File: End_Of_Yr_01.dwg, Dated: March 2007.

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
PIT AND WRSA
END OF YEAR 1

Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 6000	TASK 5000	
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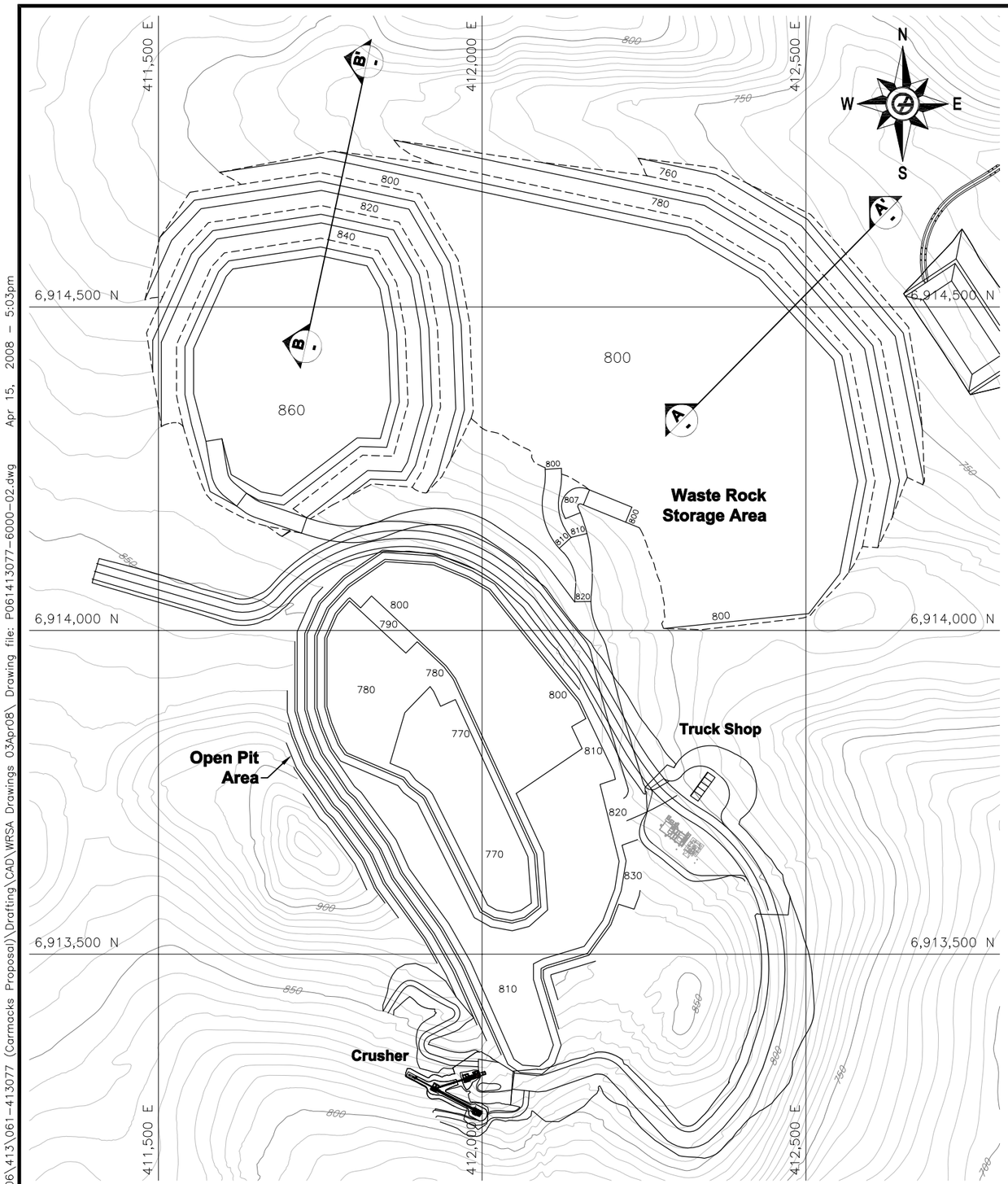
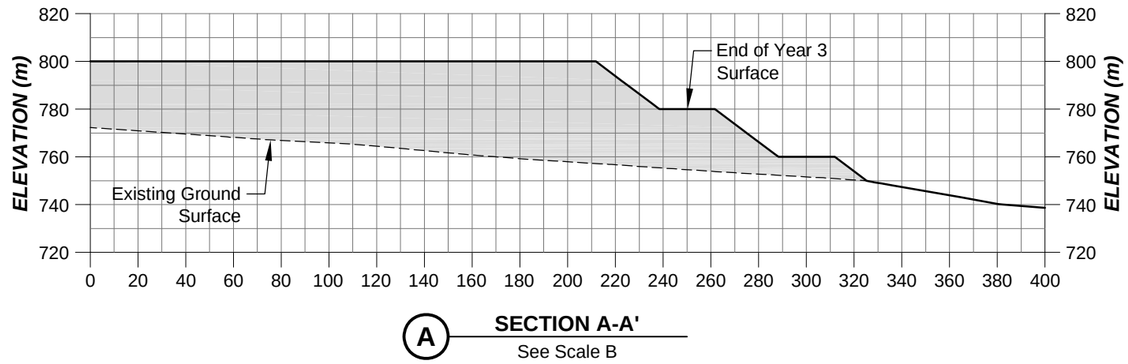
REVIEW	J.A.H.	15-APR-08			



2 **PLAN - END OF YEAR 3**
See Scale A



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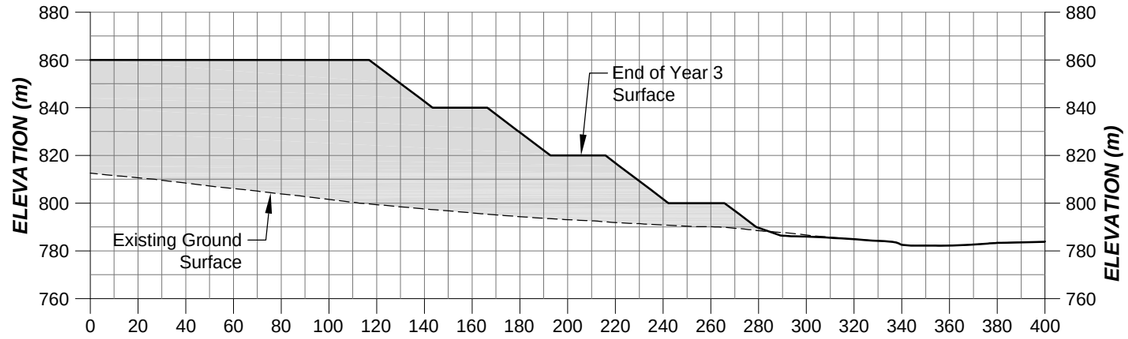

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DRAFT
For Discussion Purposes Only

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SCALE A (m)

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SCALE B (m)

REFERENCE

1.) INDEPENDENT MINING CONSULTANTS, INC., CAD File: End_Of_Yr_03.dwg, Dated: March 2007.

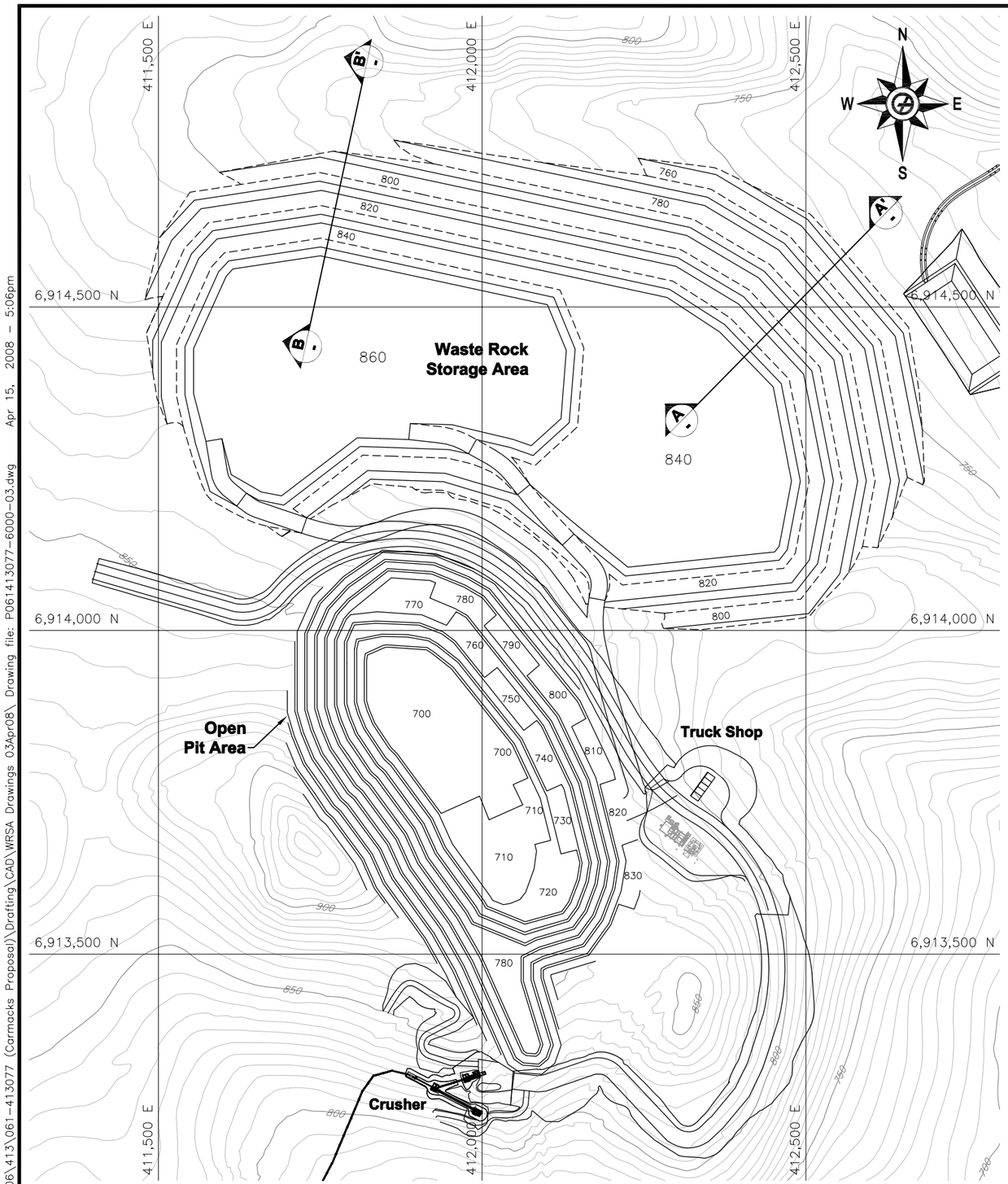
PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
PIT AND WRSA
END OF YEAR 3

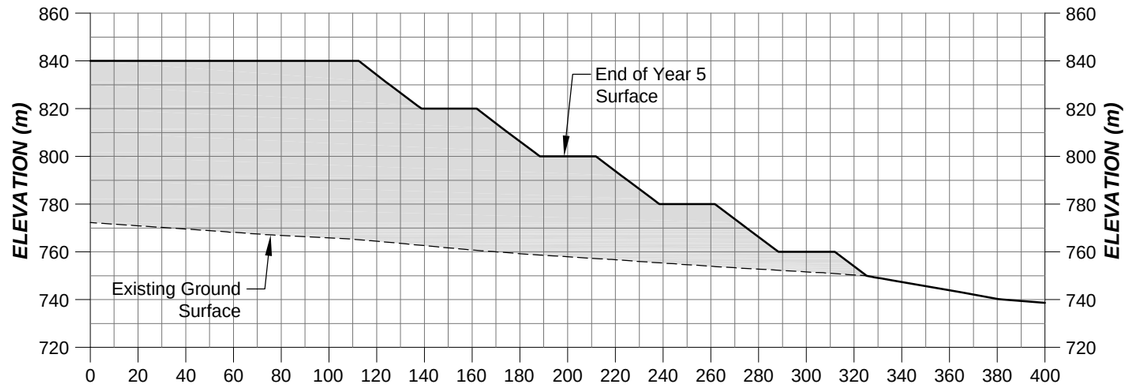
Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 6000	TASK 5000	
DESIGN	J.A.H.	29-JAN-08	FILE No. P061413077-6000-02		
CADD	J.S.D.	29-JAN-08	SCALE AS SHOWN	REV. 0	
CHECK	F.C.E.	15-APR-08	**FIGURE 5**		
REVIEW	J.A.H.	15-APR-08			

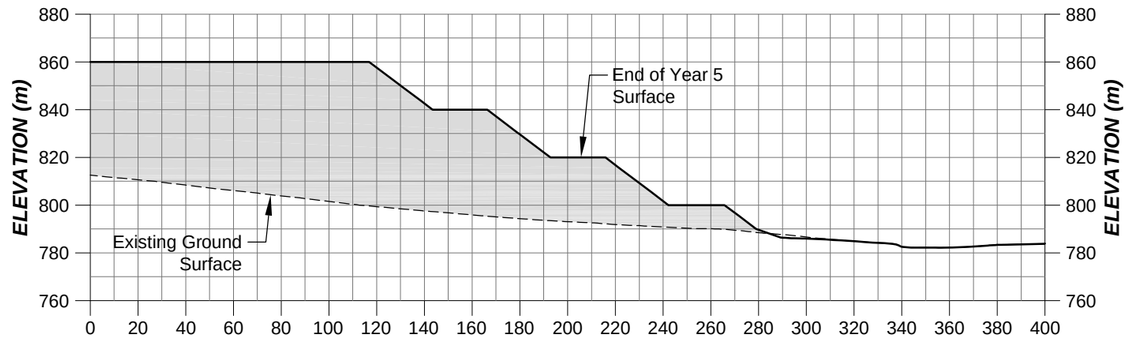
N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-02.dwg Apr 15, 2008 - 5:03pm



3 **PLAN - END OF YEAR 5**
See Scale A



A **SECTION A-A'**
See Scale B



B **SECTION B-B'**
See Scale B

DRAFT
For Discussion Purposes Only

0 250
SCALE A (m)

0 100
SCALE B (m)

REFERENCE

1.) INDEPENDENT MINING CONSULTANTS, INC., CAD File: End_Of_Yr_05.dwg, Dated: March 2007.

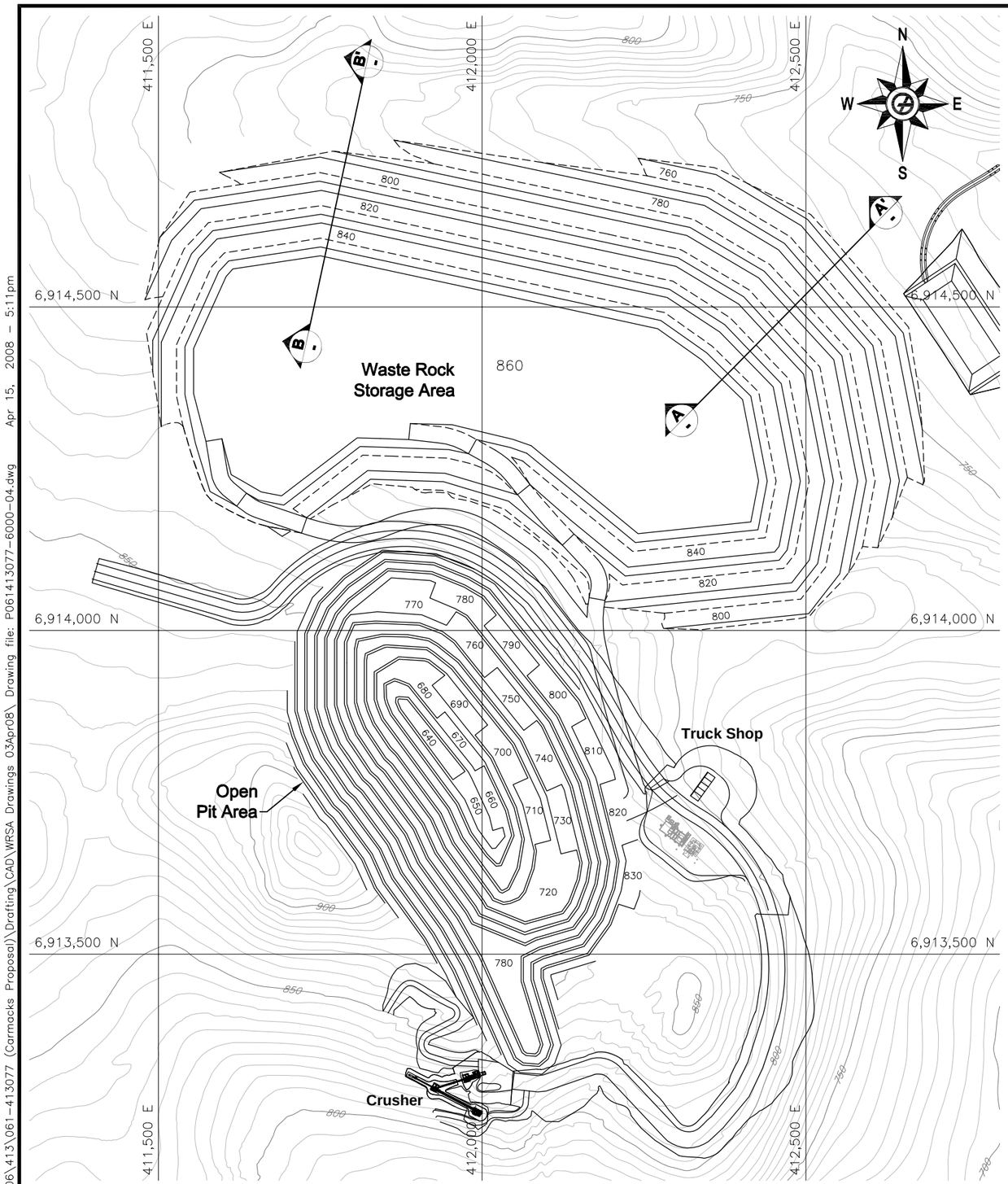
PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
PIT AND WRSA
END OF YEAR 5

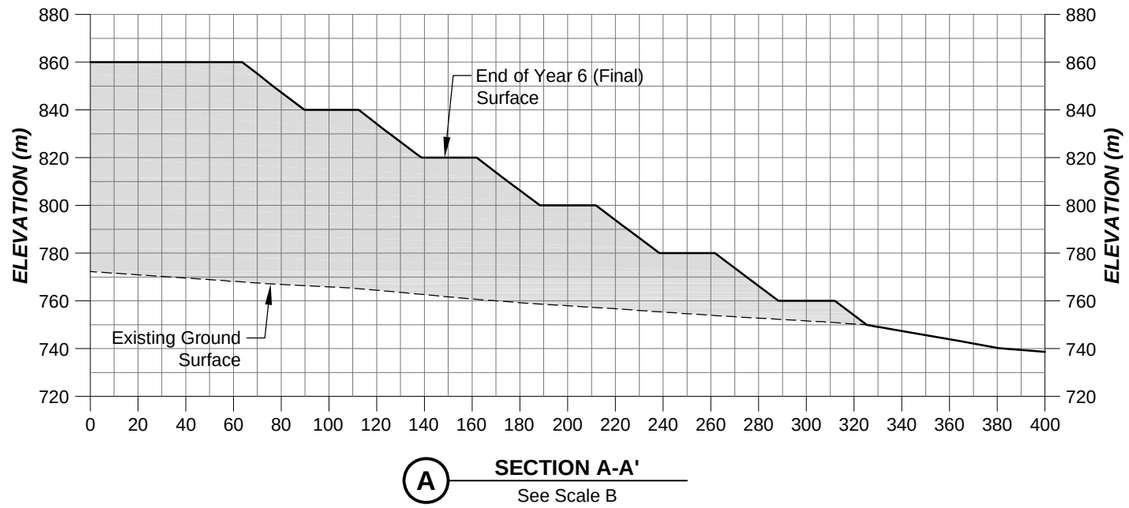
Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 6000	TASK 5000	
DESIGN	J.A.H.	29-JAN-08	FILE No. P061413077-6000-03		
CADD	J.S.D.	29-JAN-08	SCALE AS SHOWN	REV. 0	
CHECK	F.C.E.	15-APR-08	**FIGURE 6**		
REVIEW	J.A.H.	15-APR-08			

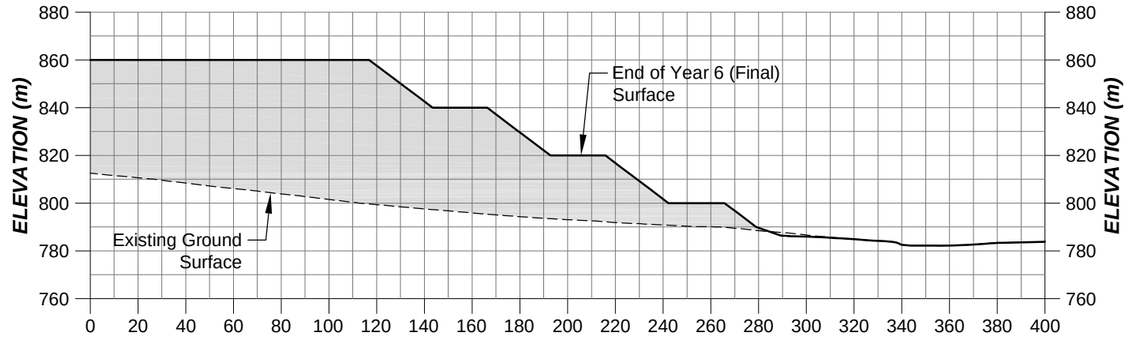
N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-03.dwg Apr 15, 2008 - 5:06pm



4 **PLAN - END OF YEAR 6**
See Scale A



A **SECTION A-A'**
See Scale B



B **SECTION B-B'**
See Scale B

DRAFT
For Discussion Purposes Only

0 250
SCALE A (m)

0 100
SCALE B (m)

REFERENCE

1.) INDEPENDENT MINING CONSULTANTS, INC., CAD File: End_Of_Yr_06.dwg, Dated: March 2007.

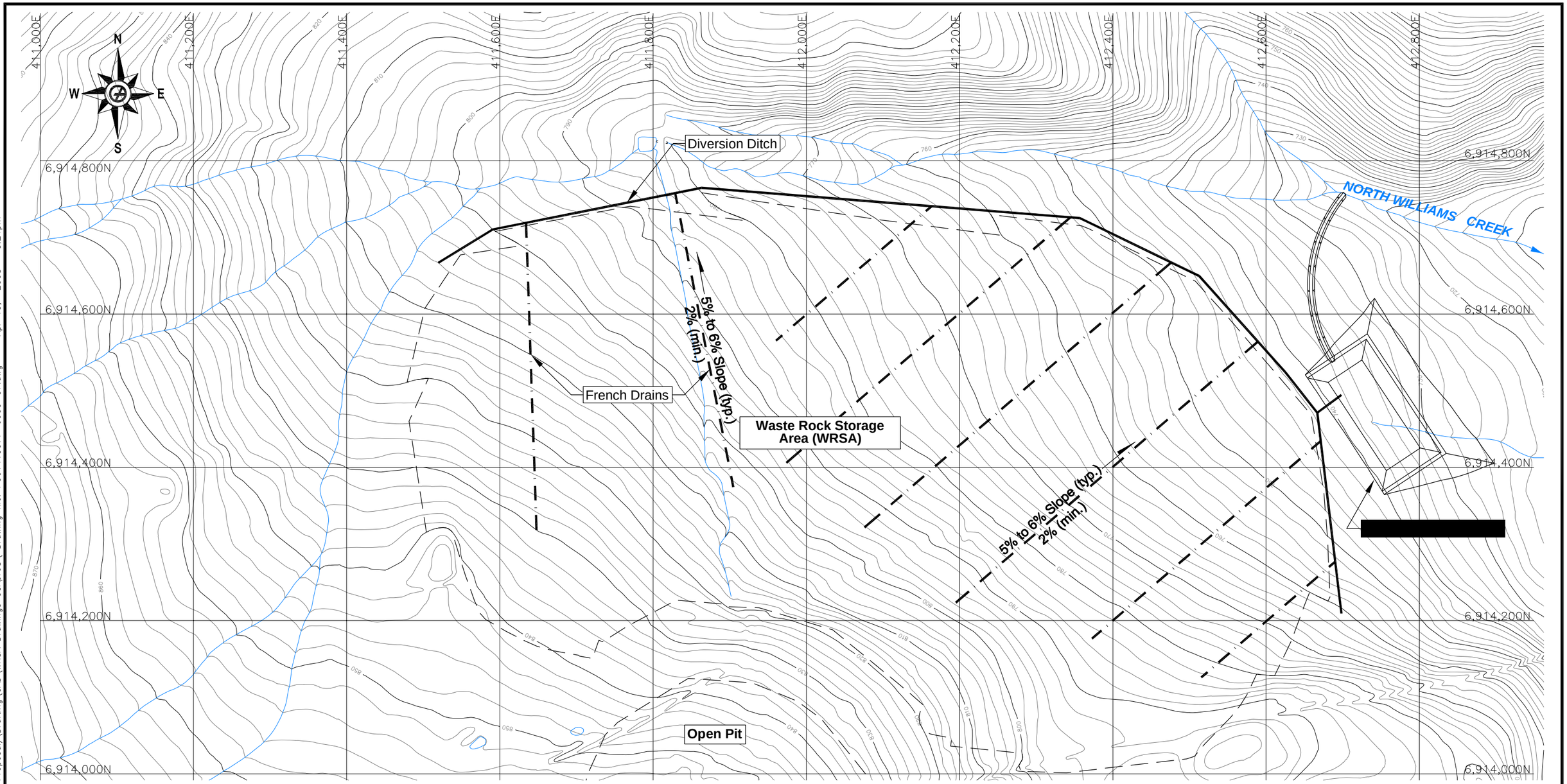
PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

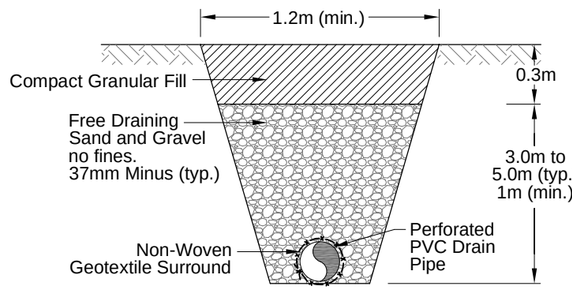
TITLE
PIT AND WRSA
END OF YEAR 6 (FINAL)

Golder Associates
Abbotsford, BC

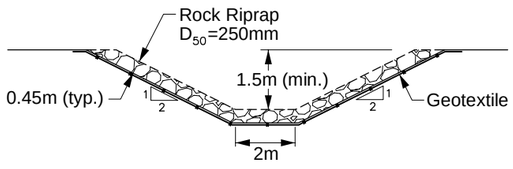
PROJECT No. 06-1413-077			PHASE 6000	TASK 5000	
DESIGN	J.A.H.	29-JAN-08	FILE No. P061413077-6000-04		
CADD	J.S.D.	29-JAN-08	SCALE AS SHOWN	REV. 0	
CHECK	F.C.E.	15-APR-08	**FIGURE 7**		
REVIEW	J.A.H.	15-APR-08			

N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-04.dwg Apr 15, 2008 - 5:11pm





FRENCH DRAIN DETAIL
Scale 1:30



DIVERSION DITCH DETAIL
Scale 1:200

0 400
SCALE (m)

LEGEND

Approximate French Drain Location

Approximate Diversion Ditch Location

NOTES

1.) Elevations Shown are in metres above Mean Sea Level.
2.) Grid Coordinates Shown in UTM NAD 83, Zone 8.

REFERENCES

1.) M3 Engineering Ltd., CAD Files: 100-CI-010P5.dwg, Dated March 13th, 2008.
2.) Eagle Mapping Ltd., CAD Files: SH1-UTM.dwg to SH9-UTM.dwg, Dated November 1st, 2007.
3.) Western Copper Corporation, CAD File: End_Of_Yr_06.dwg, Dated March 30th, 2007.

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

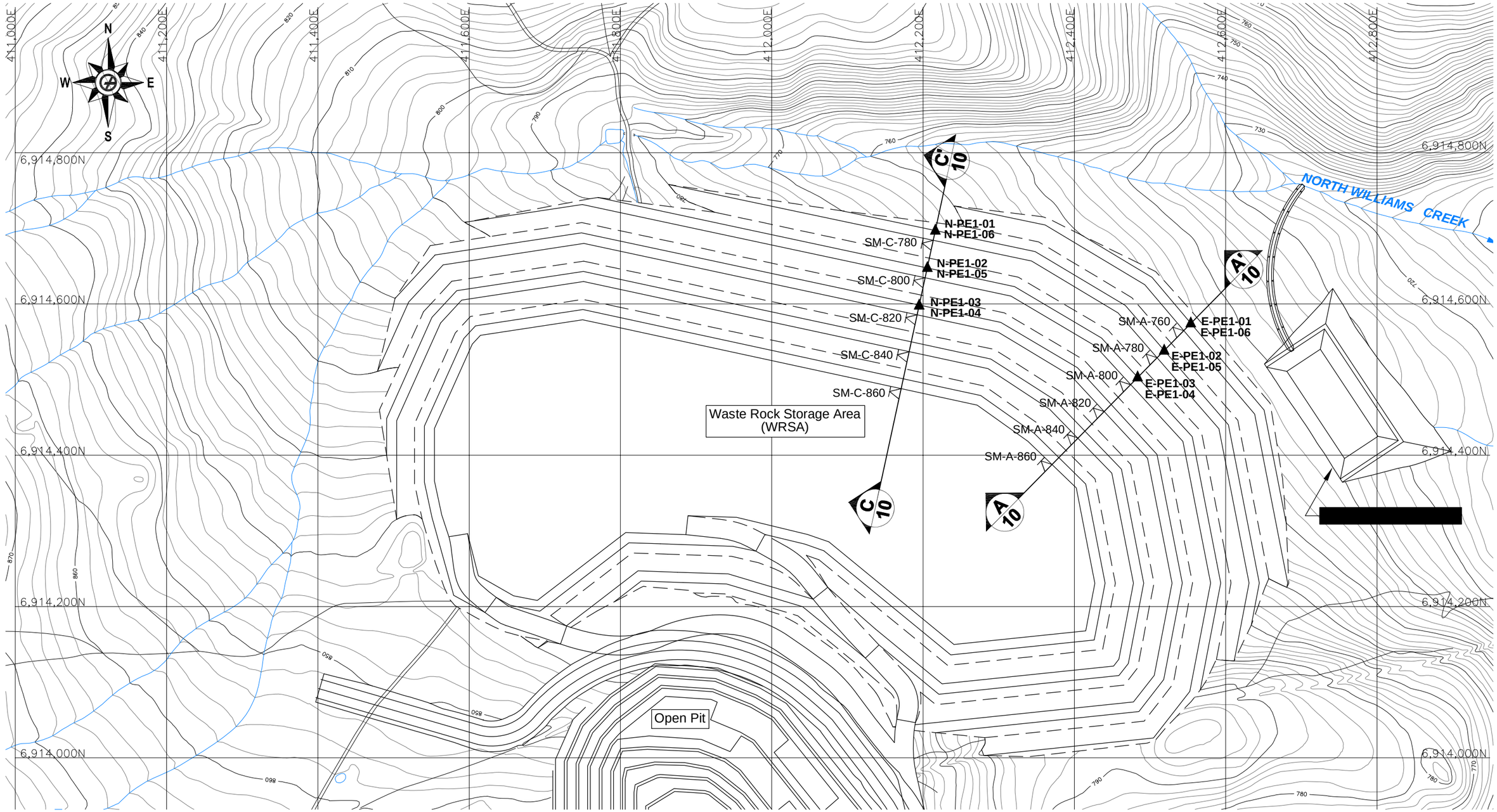
TITLE
WASTE ROCK STORAGE AREA FRENCH DRAIN ARRANGEMENT

Golder Associates
Abbotsford, BC

PROJECT No.	06-1413-077		PHASE	6000	TASK 5000
DESIGN	J.A.H.	04-MAR-08	FILE No.	P061413077-6000-07	
CADD	S.S.S.	06-MAR-08	SCALE	AS SHOWN	REV. 0
CHECK	F.C.E	15-APR-08			
REVIEW	J.A.H.	15-APR-08			

FIGURE 8

N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-07.dwg Apr 15, 2008 - 5:24pm



LEGEND

▲ Proposed Foundation Piezometer

⏄ Proposed Surface Movement Monument Location

NOTES

1.) Elevations Shown are in metres above Mean Sea Level.
2.) Grid Coordinates Shown in UTM NAD 83, Zone 8.

REFERENCES

1.) M3 Engineering Ltd., CAD Files: 100-CI-010P5.dwg, Dated March 13th, 2008.
2.) Eagle Mapping Ltd., CAD Files: SH1-UTM.dwg to SH9-UTM.dwg, Dated November 1st, 2007.
3.) Western Copper Corporation, CAD File: End_Of_Yr_06.dwg, Dated March 30th, 2007.

0 400
SCALE (m)

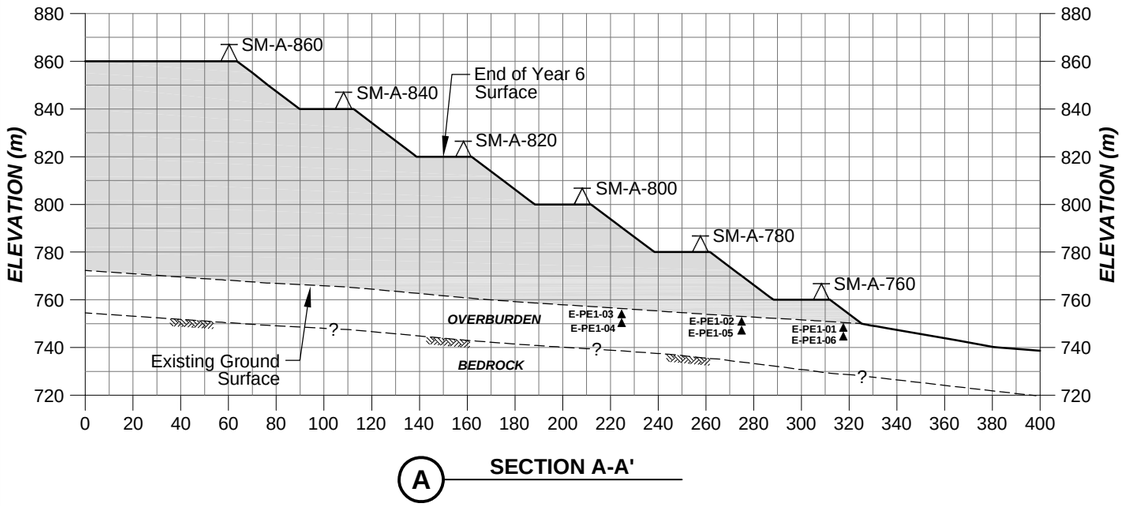
PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
WASTE ROCK STORAGE AREA INSTRUMENTATION PLAN

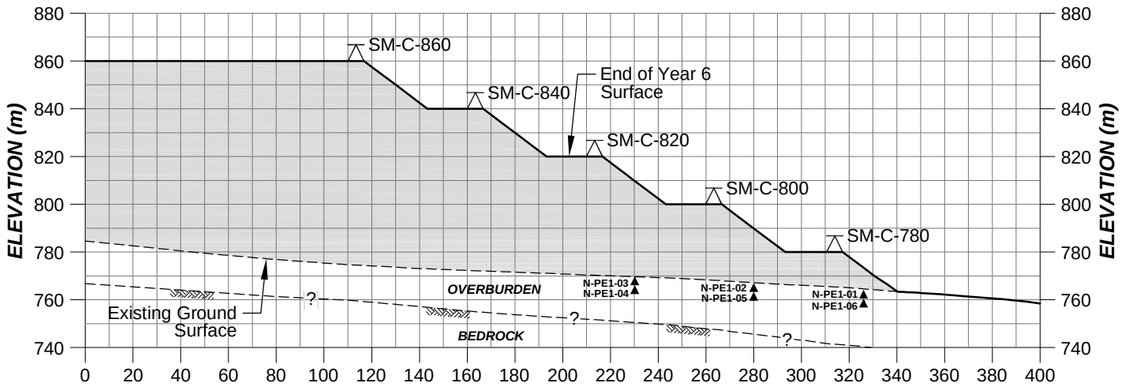
Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077			PHASE 6000	TASK 5000	
DESIGN	J.A.H.	04-MAR-08	FILE No. P061413077-6000-06		
CADD	S.S.S.	04-MAR-08	SCALE AS SHOWN	REV. 0	
CHECK	F.C.E.	15-APR-08	**FIGURE 9**		
REVIEW	J.A.H.	15-APR-08			

N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-06.dwg Apr 15, 2008 - 5:26pm



A **SECTION A-A'**



C **SECTION C-C'**

LEGEND

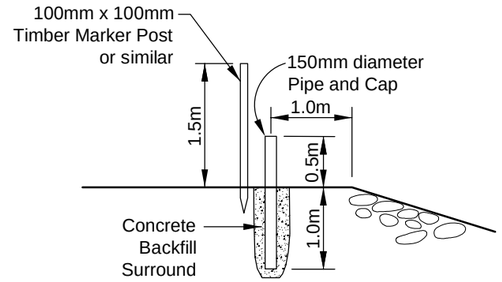
- Area (see below)
- *E-PE1-01* — Number I.D.
- Type of Instrumentation (PE- Piezometer electric; vibration wire type piezometer)
- N-PE1-01 ▲ — Proposed Foundation Piezometer
- SM-A-840 — Proposed Surface Movement Monument Location

NOTES

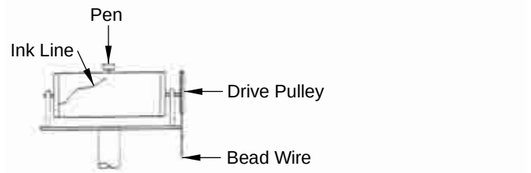
1. Section locations shown in plan on Figure 9.
2. Trenches to be excavated in original ground only.
3. Bedding and backfill for piezometer leads trenches to comprise fine grained soil designed by the Engineer with all particles exceeding 25mm removed.
4. Surface movement monument installed as lifts are completed.

REFERENCE

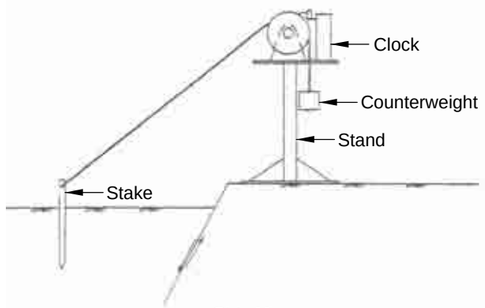
1.) INDEPENDENT MINING CONSULTANTS, INC., CAD File: End_Of_Yr_06.dwg, Dated: March 2007.



DETAIL A - TYPICAL SURFACE MOVEMENT MONUMENT
N.T.S.

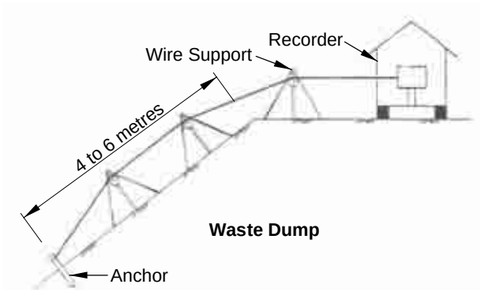


Front View



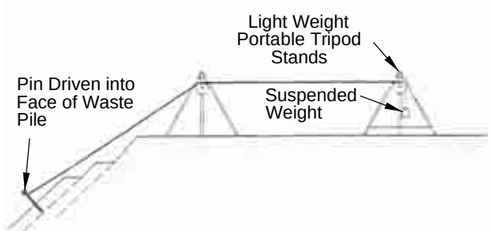
Side View

SINGLE STAND WIRE EXTENSOMETER
N.T.S.

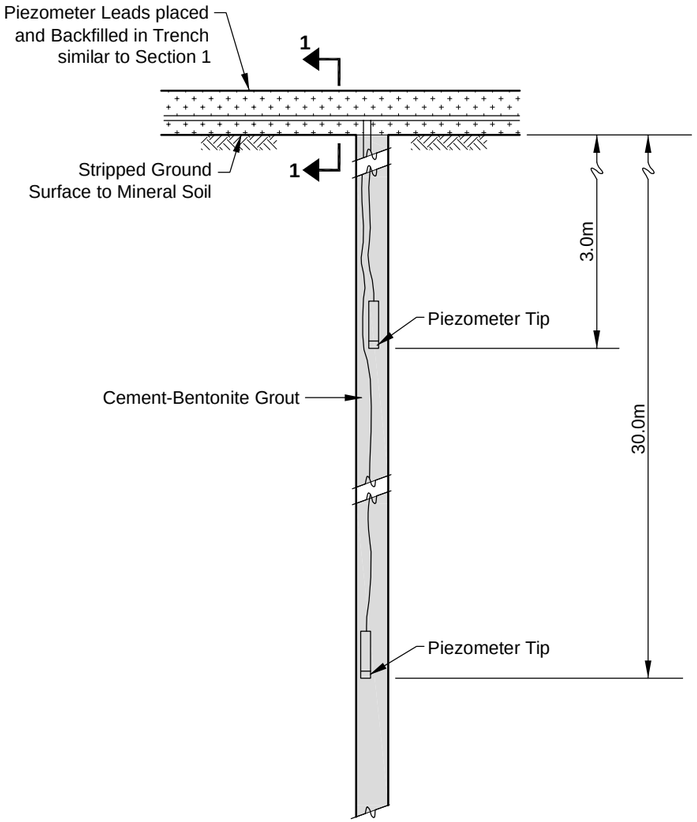


Waste Dump

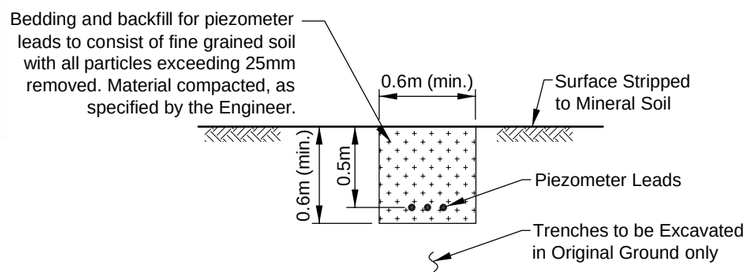
MULTIPLE STAND WIRE EXTENSOMETER USED TO MONITOR MOVEMENT OF THE INCLINED SURFACE OF A DUMP
N.T.S.



TWO STAND WIRE EXTENSOMETER
N.T.S.



DETAIL B - TYPICAL INSTALLATION OF PIEZOMETERS IN BOREHOLES
N.T.S.



SECTION 1 - TYPICAL SECTION THROUGH PIEZOMETER LEAD TRENCH
N.T.S.

0 100
SCALE (m)

PROJECT
WESTERN COPPER CORPORATION
CARMACKS COPPER PROJECT
YUKON TERRITORY

TITLE
WASTE ROCK STORAGE AREA INSTRUMENTATION SECTIONS AND DETAILS

Golder Associates
Abbotsford, BC

PROJECT No. 06-1413-077		PHASE 6000	TASK 5000	
DESIGN	J.A.H.	29-JAN-08	FILE No. P061413077-6000-05	
CADD	J.S.D.	29-JAN-08	SCALE AS SHOWN	REV. 0
CHECK	F.C.E.	15-APR-08	FIGURE 10	
REVIEW	J.A.H.	15-APR-08		

N:\Active\Year 2006\413\061-413077 (Carmacks Proposal)\Drafting\CAD\WRSA Drawings 03Apr08\ Drawing file: P061413077-6000-05.dwg Apr 15, 2008 - 5:13pm

APPENDIX II

SLOPE STABILITY ANALYSIS

Factors of Safety for Static Condition

Failure Mode	FOS	Figure No.
Global Failure – Single Lift	1.4	App. II - 1
Single Bench Failure	1.1	App. II - 2
Double Bench Failure	1.6	App. II - 3
Global Failure – Overall Slope	1.4	App. II - 4

Factors of Safety for Seismic Condition

Failure Mode	FOS	Figure No.
Global Failure – Single Lift	1.2	App. II - 5
Single Bench Failure	1.0	App. II - 6
Double Bench Failure	1.4	App. II - 7
Global Failure – Overall Slope	1.2	App. II - 8

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: FIRST 20 m LIFT

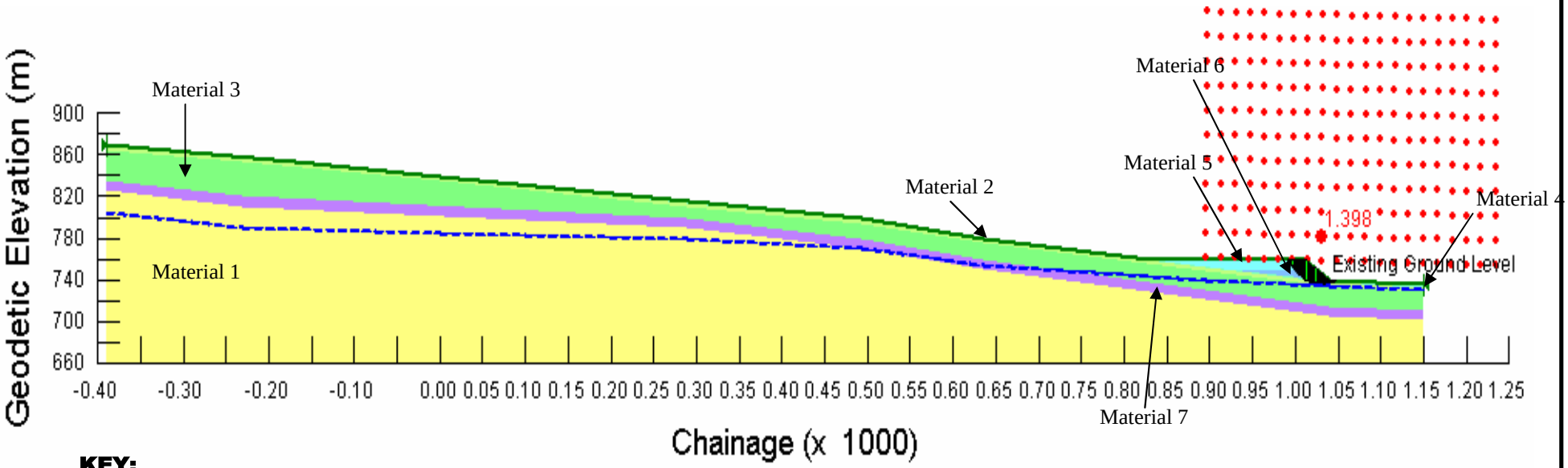
SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

STATIC CONDITIONS – GLOBAL FAILURE

FROZEN CONDITION

Factor of Safety: 1.4



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.	6000/5000	
DESIGN	JJC	13FEB07	SCALE NTS		REV.
CADD					
CHECK	JH	13FEB07			
REVIEW					

App. II - 1

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

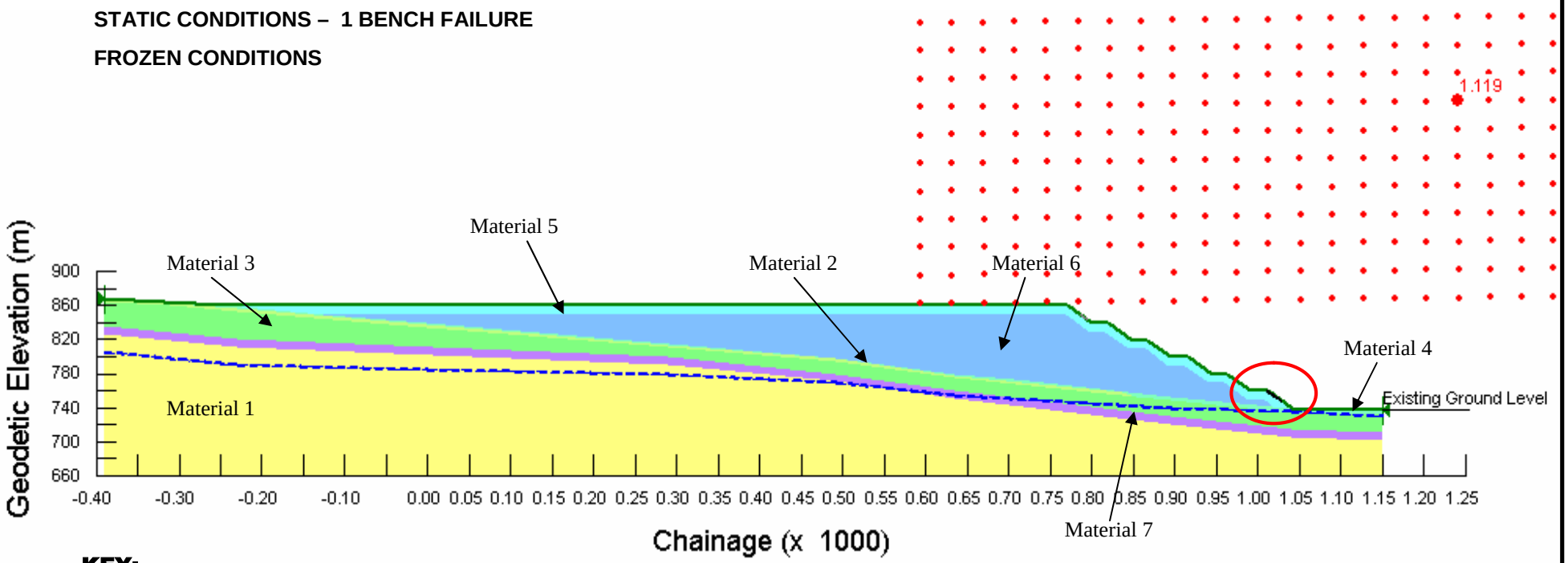
Factor of Safety: 1.1

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

STATIC CONDITIONS – 1 BENCH FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.		6000/5000
DESIGN	JJC	22FEB08	SCALE	NTS	REV.
CADD					
CHECK	JH	13FEB07			
REVIEW					

App. II - 2

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

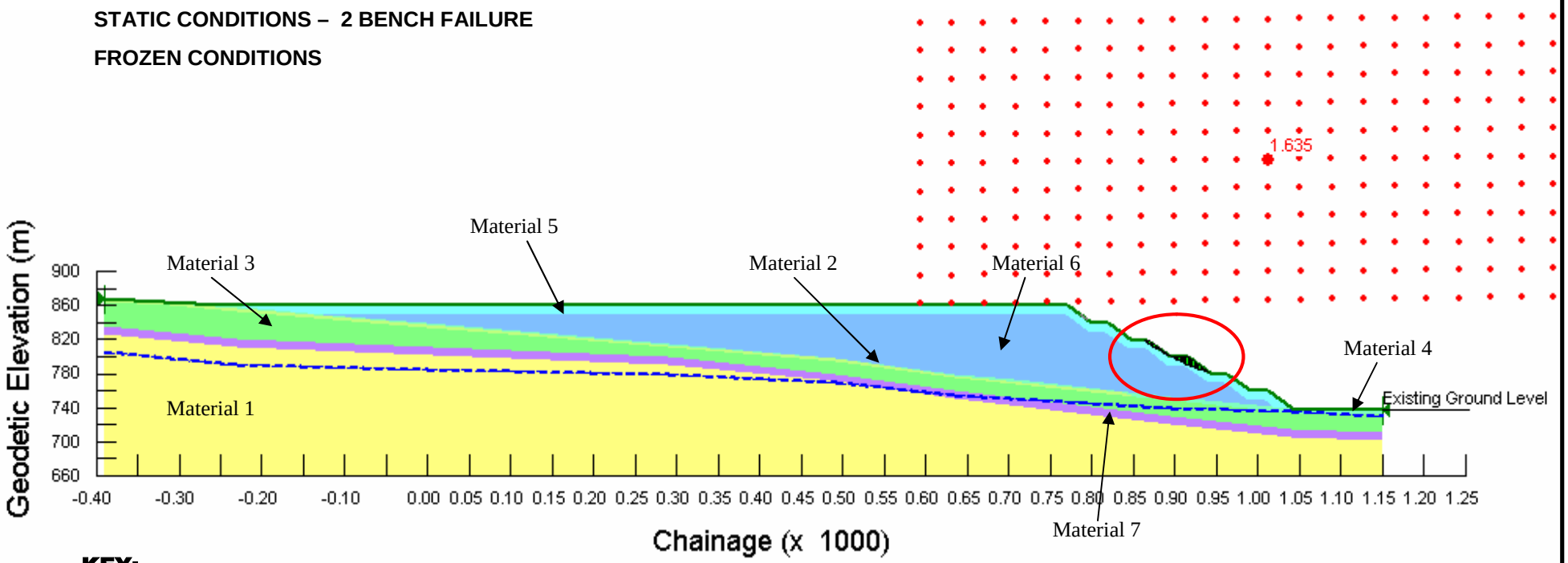
Factor of Safety: 1.6

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

STATIC CONDITIONS – 2 BENCH FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.		6000/5000
DESIGN	JJC	22FEB08	SCALE	NTS	REV.
CADD					
CHECK	JH	13FEB07			
REVIEW					

App. II - 3

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

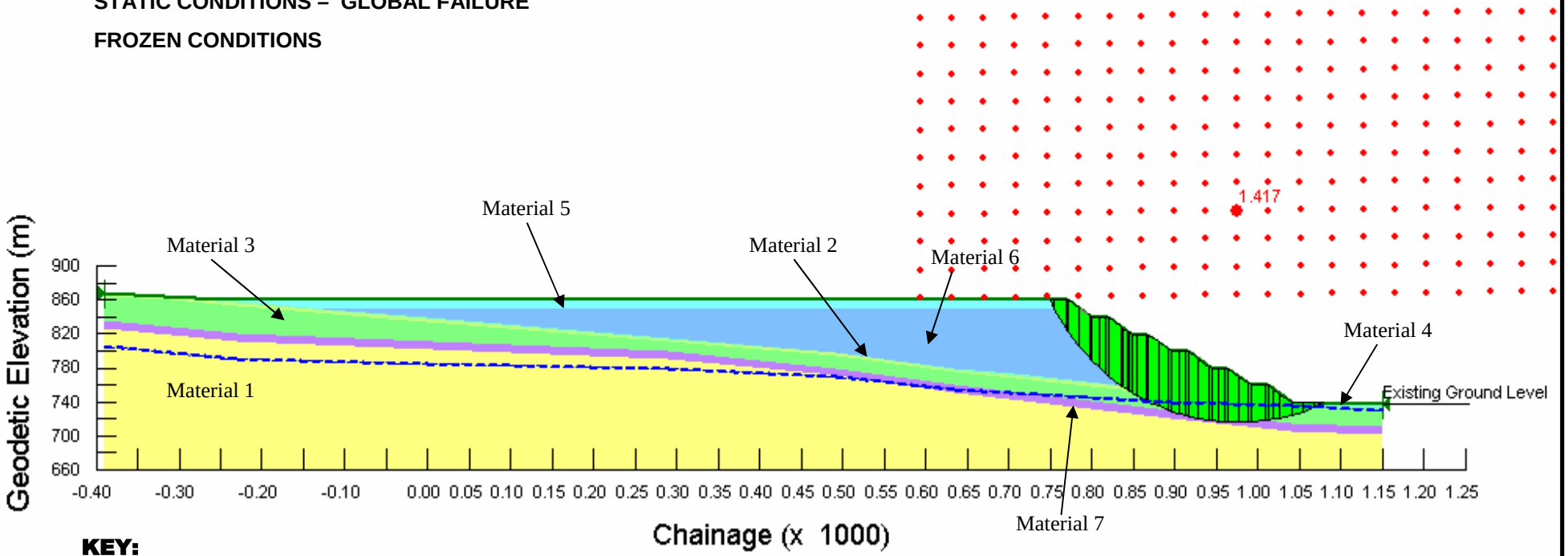
Factor of Safety: 1.4

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

STATIC CONDITIONS – GLOBAL FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.		6000/5000
DESIGN	JJC	13FEB07	SCALE	NTS	REV.
CADD					
CHECK	JH	13FEB07	**App. II - 4**		
REVIEW					

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: FIRST 20 m LIFT

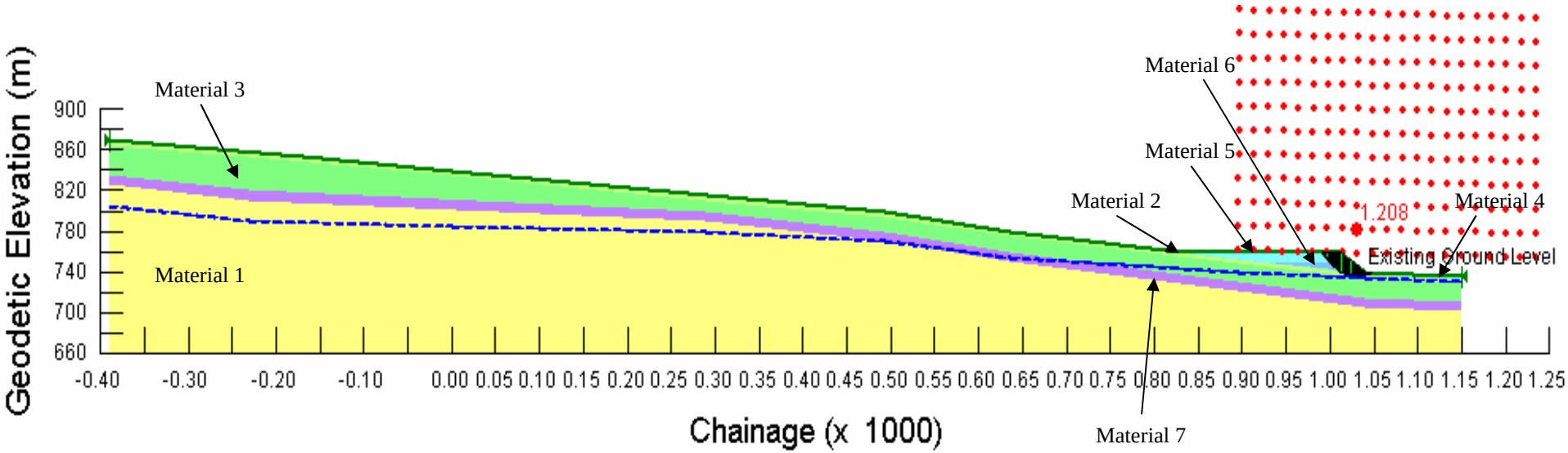
Factor of Safety: 1.2

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

SEISMIC CONDITIONS – GLOBAL FAILURE

FROZEN CONDITION



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.	6000/5000
DESIGN	JJC	13FEB07	SCALE NTS	REV.
CADD				
CHECK	JH	13FEB07	**App. II - 5**	
REVIEW				

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

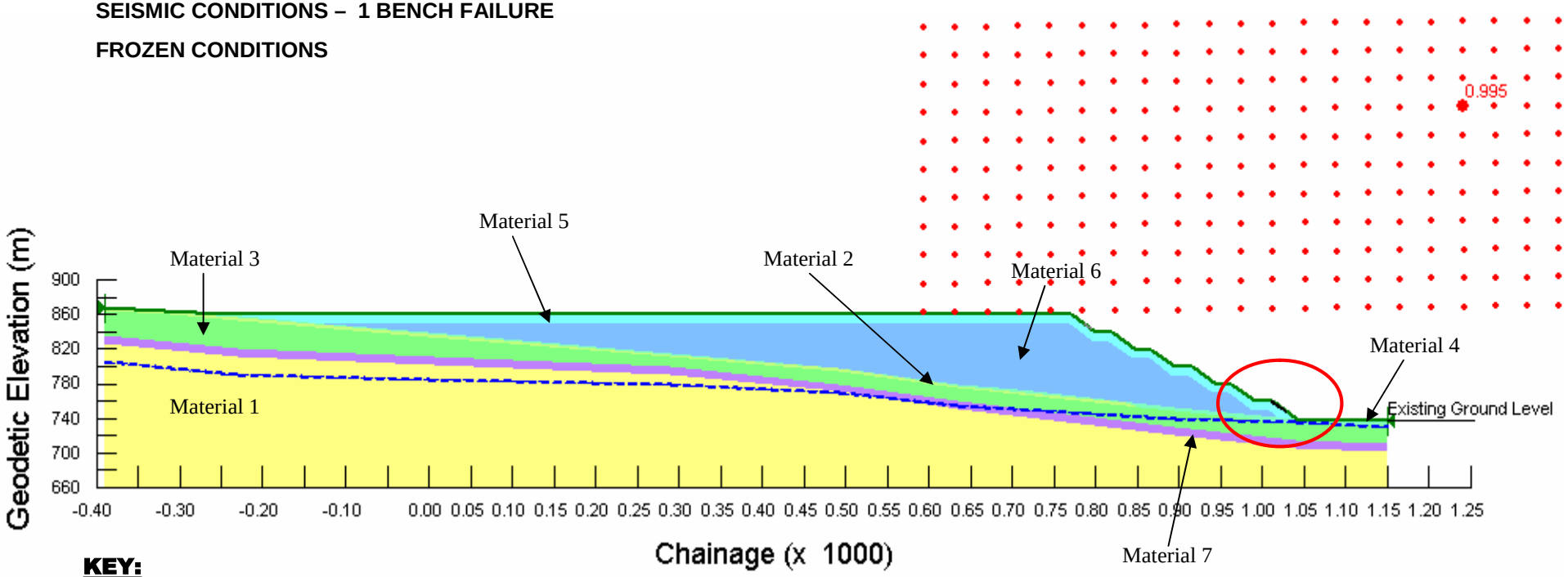
Factor of Safety: 1.0

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

SEISMIC CONDITIONS – 1 BENCH FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
Bulk Unit Weight: 22.8 kN/m3
Cohesion: 33 kN/m2
Phi: 10 deg

Material 3: Silty Sand (Frozen)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.	6000/5000	
DESIGN	JJC	13FEB07	SCALE NTS		REV.
CADD					
CHECK	JH	13FEB07	**App. II - 6**		
REVIEW					

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

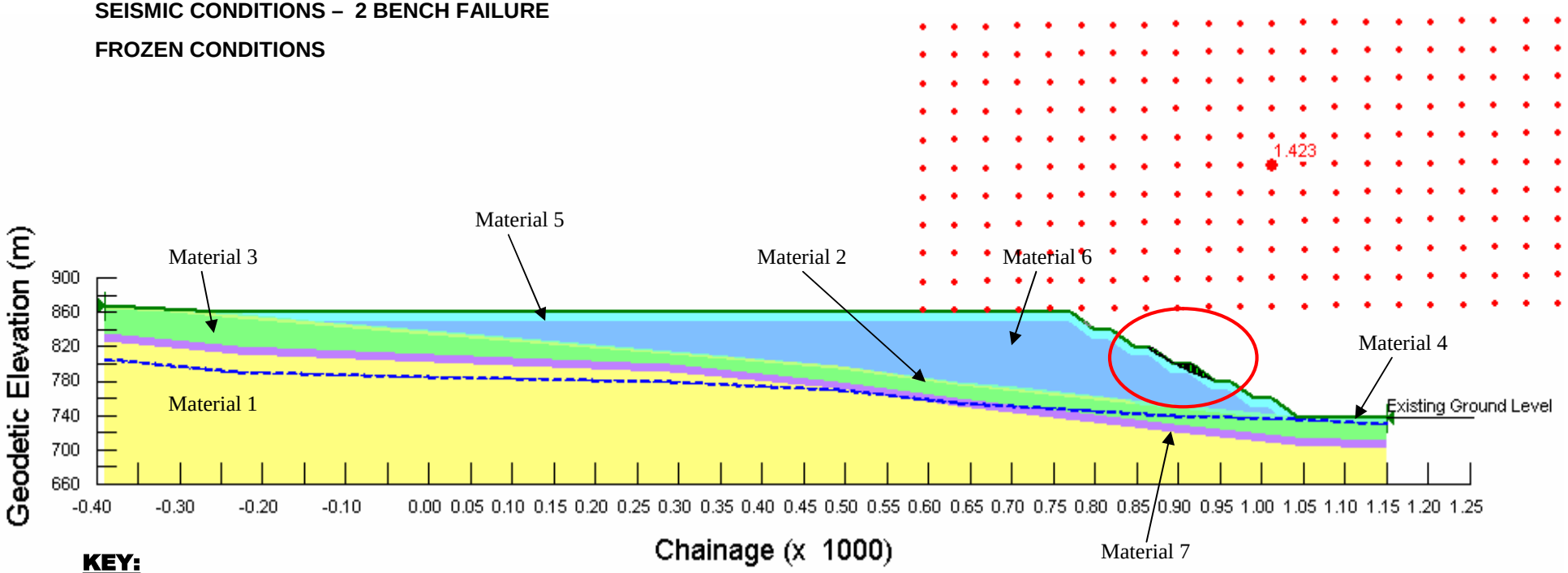
Factor of Safety: 1.4

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

SEISMIC CONDITIONS – 2 BENCH FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

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Cohesion: 33 kN/m2
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Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 34 deg

Material 4: Silty Sand (Thawed)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
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Material 5: Rock Fill (Surcharge < 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 36 deg

Material 6: Rock Fill (Surcharge > 200kPa)
Bulk Unit Weight: 19.6 kN/m3
Cohesion: 0 kN/m2
Phi: 38 deg

Material 7: Clay (Frozen)
Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.	6000/5000	
DESIGN	JJC	13FEB07	SCALE NTS		REV.
CADD					
CHECK	JH	13FEB07	**App. II - 7**		
REVIEW					

REVISION DATE: BY: FILE:

SLOPE STABILITY ANALYSIS: COMPLETE WRSA CONFIGURATION

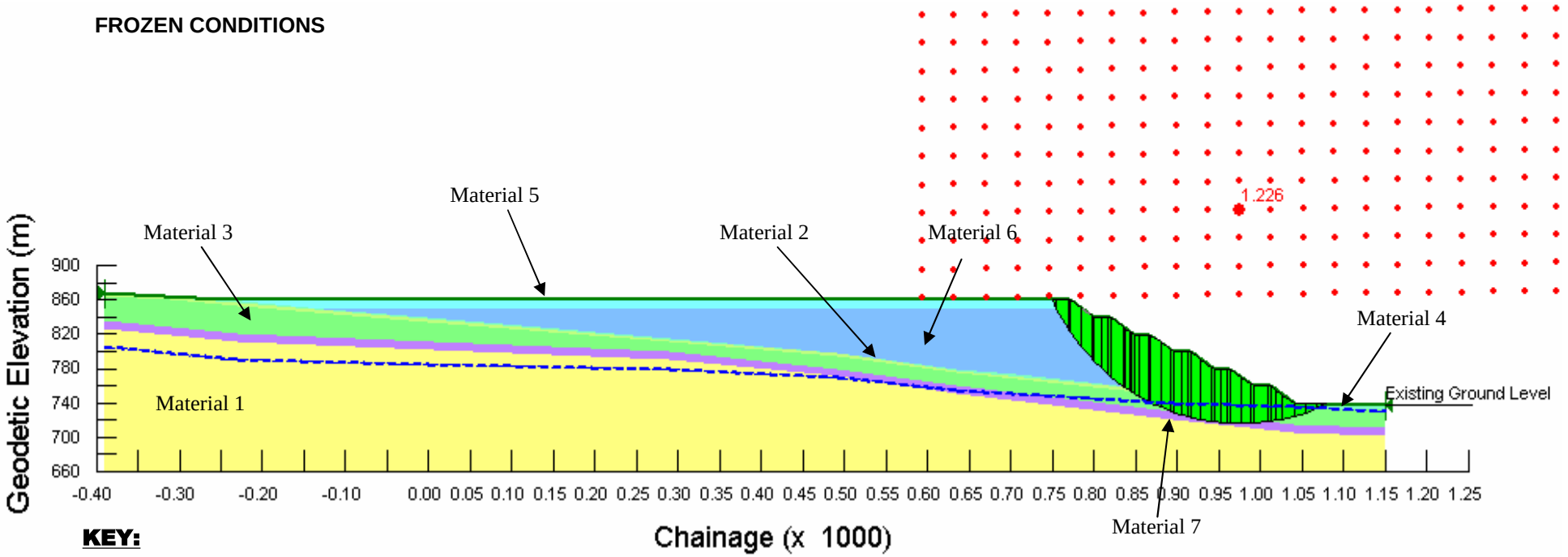
Factor of Safety: 1.2

SLOPE GRADIENT: 1.4H : 1V

BENCH WIDTH: 20 m

SEISMIC CONDITIONS – GLOBAL FAILURE

FROZEN CONDITIONS



KEY:

Material 1: Bed Rock (Thawed)
Bulk Unit Weight: 20 kN/m3
Phi: 40 deg

Material 2: Silty Sand (Thawing)
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Bulk Unit Weight: 18.0 kN/m3
Cohesion: 30 kN/m2
Phi: 10 deg

PROJECT
WASTE ROCK STORAGE AREA
CARMACKS COPPER, YUKON

TITLE
WRSA SLOPE STABILITY

Golder Associates

PROJECT No. 06-1413-077			PHASE / TASK No.	6000/5000	
DESIGN	JJC	13FEB07	SCALE NTS		REV.
CADD					
CHECK	JH	13FEB07	**App. II - 8**		
REVIEW					

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix H

Detailed Closure and Reclamation Plan

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix I

Environmental Monitoring Program

Western Copper Corporation

ENVIRONMENTAL MONITORING PROGRAM

Construction Version – October 2008

CARMACKS COPPER PROJECT

October 2008

Prepared by:

ACCESS CONSULTING GROUP

www.accessconsulting.ca

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This document describes the individual monitoring programs that will be carried out to ensure that project activities during all stages of mine development including construction, commissioning, and operations are managed in a manner that strives for overall human and environmental protection. Closure monitoring will be proposed within the Detailed Closure and Reclamation Plan.

These programs are designed to monitor:

- potential effects to the receiving environment through scheduled sampling of water and aquatic resources, terrestrial resources, climate, air quality as well as inspection tours of the project components and receiving environment;
- effluent discharge points (waste rock storage area and heap leach facility sediment ponds, as well as water treatment plant discharge, and heap and events pond leak detection and recovery systems and foundation drains) and consequently operational performance;
- site facilities and incorporated design measures to prevent accidents and malfunctions;
- mitigation success; and
- adaptive management responses to improve procedure/process.

Monitoring data will also be utilized for site management during construction, operations, and closure plan development as necessary. As such, this environmental monitoring program will be updated and revised regularly. If monitoring indicates that project facilities are not performing or issues with mine components arise, then maintenance measures or contingency plans can be implemented following an adaptive management approach (see Section 7.0 – Adaptive Management).

A surveillance network has been implemented for baseline data collection at the Carmacks Copper property. This network includes regular water quality and flow surveillance, aquatic monitoring for benthic invertebrate populations and sediment monitoring, as well as continuous meteorological data collection from the automatic

station at the site. Periodic fisheries investigations, and wildlife and vegetation surveys have also been conducted and further monitoring of these resources is planned. A summary of recent site monitoring in 2007 is provided in the *Environmental Monitoring Program Update & Data Summary – Revision No.3* prepared by Access Consulting Group (Access) in June 2008.

This Environmental Monitoring Program is a continuation and expansion of a program reactivated in 2005, with the goal of further enhancing the understanding of potential project effects on the receiving environment.

2.0 WATER RESOURCES

2.1 SURFACE RECEIVING WATER

A surface receiving water surveillance network is in place to monitor receiving water quality and hydrology for environmental effects purposes until an environmental effects monitoring study design is established in accordance with the *Metal Mining Effluent Regulations* (MMER), under authority of the Fisheries Act. The environmental effects monitoring program has been designed to achieve national uniformity in monitoring of effects in the aquatic environment, while taking into consideration site-specific factors. The objectives of the environmental effects monitoring program are to determine potential effects of project operations on the receiving water aquatic ecosystem in Williams Creek and assist in determining the effectiveness of various environmental protection measures at the mine site. The environmental effects monitoring study will be designed to recognize existing site monitoring and established sample stations, and will be subject to review and approval by a Technical Advisory Panel coordinated by Environment Canada.

Table 1 provides UTM coordinates for the numbered surface receiving water sample station locations that will continue to be monitored as part of the surveillance network and Figure 1 shows these locations.

Table 1 Surface Receiving Water and Background Sample Station Locations

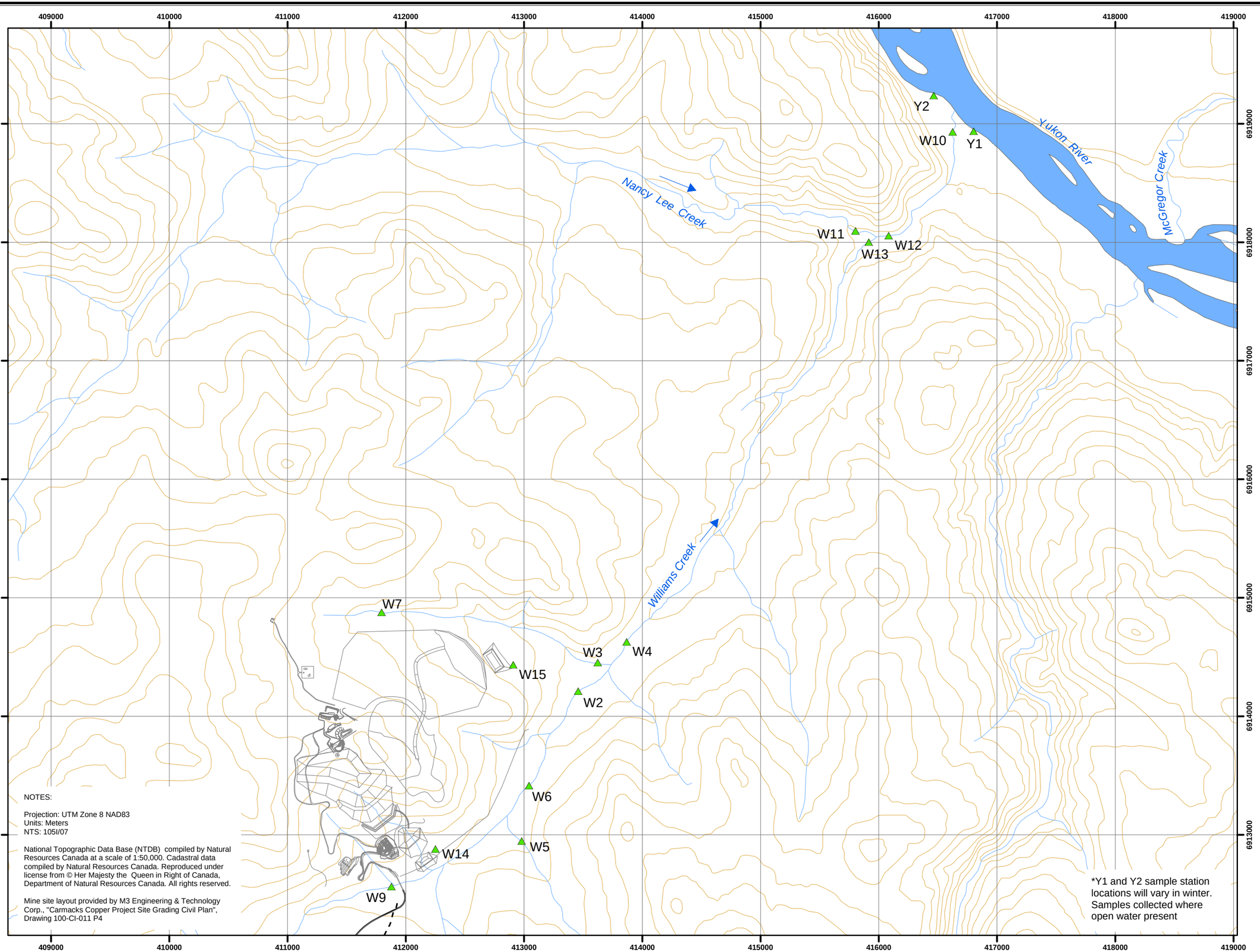
Station Number	Site Description	Easting	Northing
W2	Williams Creek Upstream of North Williams Creek Confluence	413499	6914145
W3	Lower North Williams Creek Upstream of Confluence with Williams Creek	413640	6914379
W4	Williams Creek Downstream of Confluence with North Williams Creek	413888	6914653
W5	South East Tributary to Williams Creek	412978	6912947
W6	Williams Creek Downstream of South East Tributary	413042	6913373
W7	Upper North Williams Creek Tributary Upstream of Road Crossing	411778	6914810
W9	Williams Creek Upstream of Access Road Crossing	411907	6912511
W10	Williams Creek Upstream of Yukon River	416606	6919033
W11	Nancy Lee Creek (Tributary of Williams Creek)	415803	6918096
W12	Williams Creek Downstream of Confluence with Nancy Lee Creek	416102	6918000
W13	Williams Creek Upstream of Confluence with Nancy Lee Creek	415912	6917984
Y1*	Yukon River Upstream of Williams Creek	416752	6918974
Y2*	Yukon River Downstream of Williams Creek	416249	6919308

Notes: Coordinates are UTM Zone 8 NAD83
* Yukon River open water sample station locations; during freezing conditions samples collected where open water available.

Environmental Monitoring Program

Carmacks Copper Project
Yukon Territory

Western Copper Corporation



NOTES:

Projection: UTM Zone 8 NAD83
Units: Meters
NTS: 105I/07

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced under license from © Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved.

Mine site layout provided by M3 Engineering & Technology Corp., "Carmacks Copper Project Site Grading Civil Plan", Drawing 100-CI-011 P4

*Y1 and Y2 sample station locations will vary in winter. Samples collected where open water present

Legend:

- Surface Water Sample Station
- Access Road
- Exploration Road
- Contour
- Water Course
- Water Body

Monitoring Station Locations

Figure Number:

1

Scale:

1:30,000

(when plotted 11"x17")

Drawn by: HD	Checked by: DC/NS

Date: June 2008

Our D:\Project\AllProjects\WCH-01\ConstructionSitePlan\2008\Appendix\EnvMonProg\Fig1_WQStns.mxd

Table 2 provides a summary of the proposed operational surface and groundwater monitoring program including sampling frequency and analytical schedule. Monitoring station W12 on Williams Creek below the confluence with Nancy Lee Creek represents the compliance point for meeting site specific water quality objectives and CCME guidelines. Sampling at monitoring station W10, located downstream of W12 is not proposed for water quality monitoring but will continue to be used as a flow monitoring station due to its suited location.

On-site or internal inspections will be undertaken and measurements collected to track conditions of the background and receiving waters without the need to wait for outside laboratory analysis to be completed. However, concurrent samples will also be collected and sent to a CAEAL accredited laboratory for additional analyses and will be used to confirm on-site measurements.

<u>On-site Monitoring:</u>

- Visual inspection
- In-situ measurements (pH, conductivity, temperature and turbidity)
- Flow / velocity measurements
- Total copper measurement

<u>External Laboratory Analysis:</u>

- Total ICP Metals
- Dissolved ICP Metals
- Hardness
- Ammonia Nitrogen
- pH
- Conductivity
- TSS

Table 2 Surface and Groundwater Monitoring Program Summary

Station #	Description	On-site				External Lab								Sediment Program	Benthos Program
		Inspect	In-situ*	Flow/ Level**	Total Copper	Total ICP Metals	Dissolved ICP Metals	Hardness	Ammonia Nitrogen	pH	Cond.	TSS	LC50		
	Background & Receiving Waters:														
W2	Williams Creek Upstream of North Williams Creek Confluence	M	M	M	M	M	M	M	M	M	M	M		2A	
W3	Lower North Williams Creek Upstream of Confluence with Williams Creek	M	M	M	M	M	M	M	M	M	M	M		2A	
W4	Williams Creek Downstream of Confluence with North Williams Creek	M	M	C	M	M	M	M	M	M	M	M		2A	2A
W5	South East Tributary to Williams Creek	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q		2A	
W6	Williams Creek Downstream of South East Tributary	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q		2A	
W7	Upper North Williams Creek Tributary Upstream of Road Crossing	M	M	M	M	M	M	M	M	M	M	M			
W9	Williams Creek Upstream of Access Road Crossing	M	M	M	M	M	M	M	M	M	M	M		2A	
W10	Williams Creek Upstream of Yukon River			C											
W11	Nancy Lee Creek (Tributary of Williams Creek)	M	M	M	M	M	M	M	M	M	M	M		2A	2A
W12	Williams Creek Downstream of Confluence with Nancy Lee Creek	M	M		M	M	M	M	M	M	M	M		2A	2A
W13	Williams Creek Upstream of Confluence with Nancy Lee Creek	M	M	M	M	M	M	M	M	M	M	M		2A	2A
Y1	Yukon River Upstream of Williams Creek	Q	Q		Q	Q	Q	Q	Q	Q	Q	Q			
Y2	Yukon River Downstream of Williams Creek	Q	Q		Q	Q	Q	Q	Q	Q	Q	Q			
	Effluent Discharge Locations:														
W14	Heap Leach Facility Sediment Pond	W/DWD	W/DWD	W/DWD	W/DWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD		
W15	Waste Rock Storage Area Sediment Pond	W/DWD	W/DWD	W/DWD	W/DWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD	M/WWD		
	Process/ Mine Waters:														
W16	Events Pond	D	D	D	D	M	M	M	M	M	M	M			
W17	Events Pond LDRS	D	D	D	D	M	M	M	M	M	M	M			
W18	Heap Leach Pad LDRS	D	D	D	D	M	M	M	M	M	M	M			
W19	Heap Leach Pad Underdrains	D	D	D	D	M	M	M	M	M	M	M			
W20	Water Treatment Plant (when operating)	D	D	D	D	W	W	W	W	W	W	W			
W21	Open Pit Inflow/Sump	WWD	WWD	WWD	WWD	M	M	M	M	M	M	M			
	Groundwater Wells:														
WW95-01	Current Camp Water Supply Well			C		Q	Q	Q	Q	Q	Q	Q			
	New Water Supply Wells			C		Q	Q	Q	Q	Q	Q	Q			
	New Groundwater Monitoring Wells	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q			

Codes: *In-situ = pH, conductivity, temperature, turbidity
** Flow collected for surface waters and water level collected for wells
D = Daily
W = Weekly
WWD = Weekly When Discharging
W/DWD = Weekly / Daily When Discharging
M/WWD = Monthly / Weekly When Discharging
M = Monthly
Q = Quarterly (May/July/October/February)
2A = Every 2 Years
C = Continuous (for water supply wells and surface water during open water conditions)

ICP Metals include: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc and Zirconium.

The water chemistry database developed for background and receiving water quality data continues to be updated and maintained to monitor water chemistry. If significant changes in metal loadings are detected as compared to background data, then monitoring frequency may be revised. This information will also be used for closure planning purposes and linked with other closure studies (groundwater monitoring and geochemical characterization).

The hydrology of the Williams Creek watershed will be monitored for stream flow for available dilution and downstream water quality impacts. Staff gauges are located at both W4 and W10 and both Dipper Log Water Level and Barometric data loggers are installed during the open water season at these sites. Only continuous flow monitoring is planned at station W10 as the location is better suited to installation of data loggers, as compared to the compliance station W12 located further upstream.

Water quality and hydrology results will be reported as required by the Yukon Water Board within monthly water quality reports following the sampling event and summarized in the Annual Report with an assessment of any change in the resultant data.

2.1.1 Sampling Protocol

Sampling will continue to be undertaken using Standard Operating Procedures for the collection of surface water samples and follow Environment Canada's *Guidance Document for the Sampling and Analysis of Metal Mining Effluents* (April 2001, Report: EPS 2/MM/5) when applicable. Flow measurements will be obtained by following the appropriate protocol as described in ASTM International *Standard D 4409-95: Standard Test Method for Velocity Measurements of Water in Open Channels with Rotating Element Current Meters* and Environment Canada's *Guidance Document for Flow Measurement of Metal Mining Effluents* (April 2001, Report: EPS 2/MM/4) when applicable.

2.2 EFFLUENT DISCHARGE

Individual effluent streams at the following locations will be monitored in accordance with the MMER environmental effects monitoring program:

- heap leach facility sediment pond (monitoring station W14); and
- waste rock storage area sediment pond (W15).

Regular on-site monitoring will be used for controlling effluent treatment processes. A summary of the proposed monitoring program is provided in Table 2 and includes sampling frequency and analytical schedule. The locations of the sediment pond monitoring stations are shown in Figure 1.

Any dust control measures using water shall ensure water quality standards identified for release into the receiving environment are met. Make-up water from the sediment control ponds will be sampled and analyzed for total suspended solids and total copper to ensure MMER criteria are met.

If necessary, waters from the waste rock storage area can be treated using conventional lime treatment technology. A contingency high density sludge water treatment plant will be constructed prior to leaching operations and will be operated as required. If necessary, wastewater from the waste rock storage area sediment pond can be pumped to the water treatment plant for treatment.

It is intended that many components of the mine will be equipped with automated monitoring devices for continuous surveillance. Automated monitoring systems equipped with alarm systems will be used to monitor remote equipment. Regular inspections of the entire system will be undertaken on a routine basis to physically inspect monitoring equipment, facilities, and structures.

Effluent quality results will be reported in the monthly water quality reports and summarized in the Annual Report.

2.2.1 Sampling Protocol

Sampling will follow Environment Canada's *Guidance Document for the Sampling and Analysis of Metal Mining Effluents* and the *Guidance Document for Flow Measurement of Metal Mining Effluents*.

2.3 MINE WATERS

Other mine waters that will be monitored on a daily basis during operations include:

- Events pond (W16);
- Events pond leak detection and recovery system (W17);
- Heap leach pad leak detection and recovery systems (LDRS) (W18);
- Heap leach pad under drains (W19);
- Water treatment plant (W20); and
- Open pit water (W21).

The LDRS will be subdivided into zones and monitored for both quality and quantity. A contingency plan will be implemented if flows within any zone of the heap leach pad LDRS exceed the target of 300 L/day.

A summary of the proposed monitoring program for these waters is provided in Table 2 and includes sampling frequency and analytical schedule. In addition, the environmental effects monitoring study program will also characterize effluents from the site including possible effluents from any mine installations. Acute toxicity testing will be conducted along with sublethal toxicity testing (fish, invertebrates, algae, and plant).

2.4 GROUNDWATER

A groundwater surveillance network is in place to monitor groundwater levels and quality prior to mine operations. A summary of groundwater monitoring up to 2007 is provided in the *Environmental Monitoring Program Update & Data Summary – Revision No.3* (Access, 2008).

Most of the existing monitoring wells will be decommissioned once project components are constructed. For the purposes of monitoring groundwater quality during operations of the Carmacks Copper mine, additional wells (or other complimentary approaches) will be established on site, particularly downgradient of project components. In 2007 a new well was installed down gradient of the heap leach facility sediment pond. To ensure that water from the heap, waste rock storage area, events and sedimentation ponds is not infiltrating groundwater, additional monitoring wells will be installed down gradient of these features for monitoring groundwater levels and quality.

Location, elevation, borehole logs, screening depth, lithologies encountered, installation methods, monitoring schedules and permeability analysis of these measures will be submitted to the regulator.

The camp water supply well and any new water supply wells will also be monitored for water usage (flow) and sampled for chemical and bacteriological analyses.

A summary of the proposed groundwater monitoring program is provided in Table 2. Groundwater quality results will be reported in the monthly water quality reports and summarized in the Annual Report.

2.4.1 Sampling Protocol

Sampling will continue to be undertaken using Standard Operating Procedures for the collection of groundwater samples and follow the ASTM *D 4448-01: Standard Guide for Sampling Ground-Water Monitoring Wells*.

3.0 AQUATIC RESOURCES

3.1 BENTHIC INVERTEBRATES

Periodic benthic invertebrate monitoring has taken place and a discussion of the most recent investigation is found in the *Environmental Monitoring Program Update & Data Summary – Revision No.3* (Access, 2008). An annual program is proposed (Table 2) in conjunction with an annual sediment monitoring program and a water quality sampling

event, until an environmental effects monitoring study design is established in accordance with the MMER. Samples will be identified to the lowest possible taxa and counted. Data will be analyzed using a variety of indices and compared with existing information and reported in an Annual Report.

3.1.1 Sampling Protocol

Benthic invertebrate sampling will follow ASTM E 1391 – 03 *Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Ecological Testing and for Selection of Samplers Used to Collect Benthic Invertebrates*. When applicable, protocols will follow those outlined in the *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring*.

3.2 CREEK SEDIMENTS

Periodic sediment sampling has taken place and a discussion of the data collected in previous years is found in the *Environmental Monitoring Program Update & Data Summary – Revision No.3* (Access, 2008). An annual program is proposed (Table 2) in conjunction with the annual benthic invertebrate monitoring program and a water quality sampling event until an environmental effects monitoring study design is established in accordance with the MMER. Sediment quality results will be reported in an Annual Report and include an evaluation against existing stream sediment data.

3.2.1 Sampling Protocol

Sampling will be undertaken using Standard Operating Procedures for the collection of sediment samples from surface water and follow ASTM E 1391 – 03 *Standard Guide for Collection, Storage, Characterization, and Manipulation of Sediments for Ecological Testing and for Selection of Samplers Used to Collect Benthic Invertebrates*. When applicable, protocols will follow those outlined in the *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring*.

3.3 FISHERIES

Periodic fisheries investigations have occurred and will take place during operations in accordance with the MMER environmental effects monitoring program and follow protocols outlined in the *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring*.

A summary of past investigations is provided within the *Environmental Monitoring Program Update & Data Summary – Revision No.2* (Access, 2007).

4.0 TERRESTRIAL RESOURCES

4.1 SOILS & VEGETATION

Soil and vegetation sampling is planned to track evidence of possible sulphur dioxide releases from the process plant and acid plant areas. If releases are found to be of a level that may be harmful to humans, vegetation or wildlife, additional mitigations will be employed to reduce these to harmless levels.

As part of the Reclamation Research Program for the project, soil quality will be tested to determine if sufficient nutrients and organic matter exist to support revegetation. A series of test plots on disturbed areas will be established to assist in the determination of optimum depth of materials, soil amendment and moisture requirements to sustain growth. Please refer to the Closure and Reclamation Plan for details.

4.2 WILDLIFE

A Wildlife Protection Plan has been prepared and will be implemented in conjunction with wildlife monitoring to assist in determining trends or changes in wildlife populations and will include:

- Sightings and encounters with large mammals, raptors and waterfowl will be recorded and logged (species, sex, numbers, location);
- Wildlife encounters and/or mortality reporting to a Yukon Government Conservation Officer;

- Routine monitoring of measures to ensure birds do not settle in ponds; and
- Working with the LSCFN Lands Branch to track moose utilization in the project area.

November post-rut moose surveys, including gender/age composition, will be conducted annually for the first three years of project construction/operations. Results will be provided to the Carmacks Renewable Resource Council, LSCFN, and YG Environment.

Western Copper will jointly work with LSCFN, SFN, their Renewable Councils and Yukon Government Environment (local wildlife managers) towards implementation of any further monitoring or mitigation measures to ensure that predicted effects to wildlife are adaptively and cooperatively managed.

5.0 METEOROLOGICAL

5.1 CLIMATOLOGICAL

Ongoing meteorological data is required to verify design assumptions. Design criteria may need reconsideration in light of enhanced understandings or unexpected changes in weather patterns. Site temperatures, solar radiation and wind speed will assist in scheduling ore loading and heap leach operations near freezing conditions, and snow pack and precipitation data will be used for regulating the water management systems and updating the heap water balance.

The Water Resources Branch of Yukon Government Environment established an automatic weather station at the Williams Creek site in September 1994, which records the following information every half hour:

- Net radiation (W/m^2);
- Incoming Solar Radiation (W/m^2);
- Outgoing Solar Radiation (W/m^2);
- REBS Soil Heat Flux (W/m^2);
- Air Temperature (^oC);
- Relative Humidity (%);

- Lower Wind Speed (m/s);
- Upper Wind Speed (m/s); and
- Precipitation (Tipping Bucket) (mm).

Wind direction is not recorded and it is expected that the station can be augmented to collect this data during operations to ensure an appropriate zone of safety is established in the event of an uncontrolled release of gas.

Periods of thermal inversion will be noted so that solid waste burning does not take place to prevent smoke from accumulating in the area.

A snow course station will be reinstated at the Williams Creek site and monitored monthly during the period of snow accumulation.

5.2 AIR QUALITY

Air quality monitoring will be implemented to continuously measure any sulphur dioxide and other air contaminants from the process plant and acid plant stack areas to ensure national emission standards are adhered to. Gas monitoring meters, to measure SO_2 and O_2 level, and equipped with both audio and visual alarms, will be used at all times in process facilities and the acid plant. If releases are found to be of a level that may be harmful to humans, vegetation or wildlife, additional mitigations will be employed to reduce these levels.

6.0 PHYSICAL INSPECTIONS AND MONITORING

If problems are identified during the daily inspections of engineered structures, works and installations (e.g. waste rock storage area, overburden stockpiles, heap leach embankment, diversion ditches, and sediment ponds) an inspection by a qualified geotechnical engineer would be undertaken for physical stability. Inspection checklists will be filled out on a daily basis to ensure structural integrity of mine components and that runoff is being appropriately managed (see Appendix A).

Water management structures will be monitored weekly and after each rain event for maintenance purposes. Accumulated sediment will be cleaned out and buried and away from drainage flow paths and natural watercourses. Additional erosion and sediment controls may need to be implemented as required.

There will be annual physical inspections by a qualified geotechnical engineer of all structures, works and installations including:

- waste rock storage area;
- heap leach facility and associated retention dikes;
- open pit;
- stockpiles;
- process plant & ancillary facilities;
- camp infrastructure;
- diversion structures;
- events and sediment ponds and spillways; and
- any other engineered structures, works or installations.

The geotechnical inspections are carried out during the summer months when the surface and sides of the various rock-fill structures are not obscured by snow. It is anticipated that the number and frequency of inspection tours will continue until closure and then diminish once the heap leach has been fully decommissioned.

Heap embankment safety reviews will be conducted periodically by a qualified registered professional engineer in accordance with the requirements of the CDA Dam Safety Guidelines. The frequency of the safety review will be based on the consequences of failure, external hazards, failure modes, the ongoing surveillance program, and demonstrated performance, but will be undertaken at least once annually.

Results of the annual physical inspection will be reported as per the Quartz Mining Licence and include a summary of the stability and status of inspected structures, works and installations and any recommendations for remedial actions.

Stability monitoring of the ore settling patterns throughout the duration of the mine operations shall be completed, inclusive of analysis of the heap leach pad angle of repose and associated ore and/or heap slumping.

7.0 ADAPTIVE MANAGEMENT

7.1 PERFORMANCE STANDARDS AND OBJECTIVES

Project performance standards and objectives have been developed to ensure that project components are designed, constructed, operated and decommissioned in a manner that ensures human and environmental protection. Table 3 presents a summary of the performance standards and objectives, along with proposed monitoring or follow up programs for the various mine components for the project. The performance standards are presented in three categories: water/chemical stability, physical stability and revegetation. Triggers for performance and action and response measures are listed within each category. Monitoring and potential follow-up programs are also outlined where required along with expected regulatory reporting requirements.

The results of all monitoring programs will be assessed on an ongoing basis to determine if any negative trends in water quality or other biological or physical parameters are occurring. If the results indicate that there are no negative environmental impacts, then the frequency schedule and length of operational and post closure monitoring and maintenance would continue as proposed or possibly be reduced subject to approval by the regulator. Adaptive management plans will be put in place to respond to any negative trends observed. Refer to Table 3 for specific actions and responses for implementation should performance triggers be exceeded.

7.2 ADAPTIVE MANAGEMENT PLAN

Adaptive management plans are a component of the Company's environmental management system and tools designed to provide a response to unforeseen or contingency events. Adaptive management plans will be used as a framework to guide the assessment of mitigation measures, the plan's effectiveness, and provide guidance

for orderly implementation of responses. This framework encompassing active Company management would include:

- Routine inspection and environmental monitoring and maintenance of project components;
- Routine assessment of monitoring and performance data; and
- Defining triggers and thresholds for appropriate levels of responses that could be implemented and planned contingency measures, including engineering designs where appropriate.

Table 3 Carmacks Copper Project Summary of Performance Standards, Objectives, Triggers and Actions

Mine Component	Water / Chemical Stability	Physical Stability	Revegetation	Monitoring
Open Pit	Triggers • Water Licence Effluent Standards for direct discharge & Metal Mining Effluent Regulations standards (MMER); • Receiving Water Quality Objectives – CCME Freshwater Aquatic Life Guidelines – Lower Williams Creek. Action/Response • Routine monitoring • Resampling to confirm results • Water recycle to reduce or eliminate release • Water treatment in sediment control ponds	Triggers • Inter-ramp angles of 55^{o} with overall angles of 41^{o} in the NW & SE sectors and 45^{o} & 55^{o} in the NE & SW sectors respectively; • Double benching to be used with bench height and catchment berm width 12 m and 8 m respectively; • Bench face angles will be blasted to 70^{o}; • Terrestrial Reclamation Standards for terrain stability and erosion control. Action/Response • Physical inspection and survey control • Engineering evaluation and geotechnical assessment • Pit slope revision	• Terrestrial reclamation standards for revegetation.	• Operational & Closure Monitoring Programs for effluent discharge and receiving waters (surface water and groundwater quality, sediment, benthos, flows) to meet MMER, Water Licence and CCME requirements. Weekly MMER monitoring (effluent) and water licence monitoring (effluents) and monthly (receiving waters). Annual sediment monitoring (receiving waters) and biannual benthos monitoring (receiving waters); • MMER Environmental Effects Monitoring (EEM) program to be developed with Environment Canada; • Routine physical inspections and monitoring (survey hubs). Annual geotechnical inspection; • Revegetation monitoring (annual); • Monthly Water Quality reporting to YWB; Quarterly Water Quality Reporting to Environment Canada & Annual reporting to YWB and YG EMR.
Waste Rock Storage Area (WRSA)	Triggers • Water Licence Effluent Standards for direct discharge & MMER standards; • Receiving Water Quality Objectives – CCME Freshwater Aquatic Life Guidelines – Lower Williams Creek. Action/Response • Routine monitoring • Resampling to confirm results • Water recycle to reduce or eliminate release • Water treatment in sediment control ponds	Triggers • WRSA slopes 2½ h: 1v; • Terrestrial Reclamation Standards for terrain stability and erosion control. Action/Response • Physical inspection, survey control, piezometer and thermistor monitoring • Engineering evaluation and geotechnical assessment for permafrost control • Review of WRSA monitoring as per the WRSA Design Report • Implement WRSA control measures or alternative design	• Terrestrial reclamation standards for revegetation.	• Operational & Closure Monitoring Programs for effluent discharge and receiving waters (surface water and groundwater quality, sediment, benthos, flows) to meet MMER, Water Licence and CCME requirements. Weekly MMER monitoring (effluent) and water licence monitoring (effluents) and monthly (receiving waters). Annual sediment monitoring (receiving waters) and biannual benthos monitoring (receiving waters); • MMER EEM program to be developed with Environment Canada; • Routine physical inspections and monitoring. Annual geotechnical inspection; • Revegetation monitoring (annual); • Monthly Water Quality reporting to YWB; Quarterly Water Quality Reporting to Environment Canada & Annual reporting to YWB and YG EMR.
Diversion Channels & Stream Crossings	Triggers • Water Licence Effluent Standards for direct discharge & MMER standards; • Receiving Water Quality Objectives – CCME Freshwater Aquatic Life Guidelines – Lower Williams Creek. Action/Response • Routine monitoring • Resampling to confirm results • Physical inspection to identify erosion • Implement erosion control and stability measures	Triggers • Convey peak flows from a 100-year return period storm event with 250 mm freeboard; • Culverts at stream crossing sized to convey peak flows from a 25-year return period event; extreme peak flows with return periods of up to 100-years may be considered for critical road sections; • Stilling basins will be excavated at the intake of all culverts to prevent sedimentation and blockage; • Terrestrial Reclamation Standards for terrain stability and erosion control; • Clear span bridge – Merrice Creek. Action/Response • Physical inspection and survey control and meteorological monitoring • Physical inspection to identify erosion • Hydrological evaluation and/or geotechnical assessment • Implement erosion control and stability measures	• Terrestrial reclamation standards for revegetation.	• Operational & Closure Monitoring Programs for effluent discharge and receiving waters (surface water and groundwater quality, sediment, benthos, flows) to meet MMER, Water Licence and CCME requirements. Weekly MMER monitoring (effluent) and water licence monitoring (effluents) and monthly (receiving waters). Annual sediment monitoring (receiving waters) and biannual benthos monitoring (receiving waters); • MMER EEM program to be developed with Environment Canada; • Routine physical inspections and monitoring. Annual geotechnical inspection; • Revegetation monitoring (annual); • Monthly Water Quality reporting to YWB; Quarterly Water Quality Reporting to Environment Canada & Annual reporting to YWB and YG EMR.

Mine Component	Water / Chemical Stability	Physical Stability	Revegetation	Monitoring
Heap Leach Pad	Triggers • Water Licence Effluent Standards for direct discharge & MMER standards; • Receiving Water Quality Objectives – CCME Freshwater Aquatic Life Guidelines – Lower Williams Creek; • Contaminated Site Regulations for Industrial Groundwater. Action/Response • Routine monitoring and solution management tracking • Resampling to confirm results • Water Balance review & control measure implementation • Water recycle to reduce or eliminate release • Spray or evaporation measures to maintain solution balance • Water treatment in sediment control ponds	Triggers • Heap will be designed to store ~13.3 million tonnes of ore at a dry density of 1.7 tonnes/m3; • Ore will be placed for 6 yrs at an average rate of 1.77 million tonnes per year for about 220 days per year; • The 38.2 ha leach pad will be constructed in 3 stages throughout the operational life of the mine; • Ore will be placed in 8-m lifts at an overall slope of 2½h: 1v; • Raffinate will be applied at a rate of 0.010 m3/h/m2 and total raffinate flow to the heap will be 471 m3/hr for a cycle of 130 days; • Leach pad design exceeds YG criteria with a double composite liner system with LDRS; • The pad will be surrounded by a 5 m high perimeter berm on the north and west sides and a perimeter bench on the east side; • A confining embankment will form the lower limit to the leach pad to support the heap (CDSG, high consequence); • With a crest elevation of 808 m, a crest width of 6 m, it will have a maximum height of 28 m and 440 m long; • Terrestrial Reclamation Standards for terrain stability and erosion control. Action/Response • Construction QA/QC program • Physical inspection, survey control, piezometer, process solutions, LDRS and thermistor monitoring • Engineering evaluation and geotechnical assessment • Review of Heap Leach Facility Operating Plan • Implement Heap Leach Facility Operating Plan	• Terrestrial reclamation standards for revegetation.	• Operational & Closure Monitoring Program for effluent discharge and receiving waters (surface water and groundwater quality, sediment, benthos, flows) to meet MMER, Water Licence and CCME requirements. Weekly MMER monitoring (effluent) and water licence monitoring (effluents) and monthly (receiving waters). Annual sediment monitoring (receiving waters) and biannual benthos monitoring (receiving waters); • MMER EEM program to be developed with Environment Canada; • Meteorological and water balance monitoring; • Routine physical inspections and monitoring. Annual geotechnical inspection; • Revegetation monitoring (annual); • Monthly Water Quality reporting to YWB; Quarterly Water Quality Reporting to Environment Canada & Annual reporting to YWB and YG EMR.
Events Pond	Triggers • Water Licence Effluent Standards for direct discharge & MMER standards; • Receiving Water Quality Objectives – CCME Freshwater Aquatic Life Guidelines – Lower Williams Creek; • Contaminated Site Regulations for Industrial Groundwater. Action/Response • Routine monitoring and solution management tracking • Resampling to confirm results • Water Balance review & control measure implementation • Water recycle to reduce or eliminate release • Spray or evaporation measures to maintain solution balance • Water treatment in sediment control ponds	Triggers • Capacity of approximately 160,000 m3 and will have a lined area of about 62,000 m2; • Storage to be created by an embankment across the valley at the lower end of the pond with a crest elevation of 762 m and crest width of 6m with a maximum height of 22 m, and 295 m long (CDSG, high consequence); • Allowable leakage rate into the events pond LDRS is 200 L/day averaged over a 12-month period, and 600 L/day averaged over a 3-month period. Action/Response • Construction QA/QC program • Physical inspection, survey control, piezometer, process solutions, LDRS and thermistor monitoring • Engineering evaluation and geotechnical assessment • Review of Heap Leach Facility Operating Plan • Implement Heap Leach Facility Operating Plan	• Terrestrial reclamation standards for revegetation.	• Operational & Closure Monitoring Programs for effluent discharge and receiving waters (surface water and groundwater quality, sediment, benthos, flows) to meet MMER, Water Licence and CCME requirements. Weekly MMER monitoring (effluent) and water licence monitoring (effluents) and monthly (receiving waters). Annual sediment monitoring (receiving waters) and biannual benthos monitoring (receiving waters); • MMER EEM program to be developed with Environment Canada; • Routine physical inspections and monitoring. Annual geotechnical inspection; • Revegetation monitoring (annual); • Monthly Water Quality reporting to YWB; Quarterly Water Quality Reporting to Environment Canada & Annual reporting to YWB and YG EMR.

Mine Component	Water / Chemical Stability	Physical Stability	Revegetation	Monitoring
Infrastructure and Buildings	Triggers • Infrastructure and buildings removed. Action/Response • See Stream Crossings	Triggers • Terrestrial Reclamation Standards for terrain stability and erosion control. Action/Response • See Stream Crossings	• Terrestrial reclamation standards for revegetation.	• Terrestrial reclamation standards for buildings and infrastructure; • Routine physical Inspection; • Revegetation monitoring (annual); • Annual reporting to YWB and YG EMR.
Haul Road and Trails	Triggers • See Stream Crossings. Action/Response • See Stream Crossings	Triggers • Haul roads will have an overall width of 26 m including an allowance for ditches and safety berms; • Maximum grade will be 10 % on all main roads and 12 % on bench access roads; • Bridge will be sized to convey peak flows from a 100-year return period event; • Terrestrial Reclamation Standards for terrain stability and erosion control. Action/Response • See Stream Crossings	• Terrestrial reclamation standards for revegetation.	• Terrestrial reclamation standards for buildings and infrastructure; • Routine physical Inspection and annual geotechnical inspection; • Revegetation monitoring (annual); • Annual reporting to YWB and YG EMR.
Main Access Road	Triggers • See Stream Crossings. Action/Response • See Stream Crossings	Triggers • Options for closure to be determined with community; • Physical inspection. Action/Response • See Stream Crossings	• Options for closure to be determined with community; • Physical inspection.	• Terrestrial reclamation standards for buildings and infrastructure; • Routine physical Inspection and annual geotechnical inspection; • Revegetation monitoring (annual); • Inspection of gates and signs; • Annual reporting to YWB and YG EMR.

7.3 ENVIRONMENTAL SURVEILLANCE & INSPECTIONS

Either the Environmental Monitor or Project Manager will be responsible for ensuring site personnel undertake regular inspections and environmental surveillance to look for environmental and safety hazards, potential accidents, and assess waste management activities. Specifically, personnel will ensure that all waste management facilities such as the commercial dump, solid waste incinerator, waste oil burner, dump pads, settling ponds, solution pumps, and septic tanks are operating efficiently and that environmental protection systems such as fuel storage berms, liner aprons, diversion ditches and the fire water tank are maintained and that water treatment facilities are fully functioning.

These scheduled inspections will help to ensure that the project components/facilities are meeting environmental performance objectives and complying with appropriate regulatory standards. Inspections and reporting will be conducted in accordance with any permits obtained for the project (i.e. Commercial Dump Permit, Special Waste Permit, Air Emissions Permit).

Information collected is used for feedback in safety briefings and implementation of corrective action. Site personnel will record observations on an inspection check list, which is reviewed by management personnel for action as necessary.

8.0 CONSTRUCTION MONITORING

In order to assess the efficacy of treatment/control measures during construction activities, an Environmental Monitor will conduct on-site analysis of water samples collected from site monitoring stations as well as conduct sampling for external analysis to provide QA/QC on in-situ screening methods. The Environmental Monitor will also conduct periodic flow measurements on Williams Creek and contributing tributaries to assist with loading calculations. All monitoring results will be documented daily on the attached form, *Carmacks Copper Mine Daily Environmental Monitoring Reporting Form for Construction Activities* (Appendix B). These sampling activities will follow the schedule below:

- Daily screening for turbidity, pH and total copper concentrations at stations W4, W9, W14, and W15 using an onsite HACH portable colorimeter, with weekly split duplicate samples sent for external QA/QC analysis;
- Weekly collection of full parameter analysis (general water chemistry, total and dissolved metals, total inorganic/organic carbon, dissolved organic carbon, etc.) at the same stations; and
- Weekly bioassay sampling at compliance points (W14 and W15).

Results of these analyses will guide the implementation of mitigation measures on the site, which may include:

- Recommending appropriate erosion and surface runoff control measures that site managers can implement to reduce the requirements for more costly and difficult sediment control measures; and
- Maintaining or adding sediment controls, based on changes to site runoff patterns and associated quality and quantity.

In addition to water quality monitoring, the Environmental Monitor will also monitor construction activities and provide the construction team with direction to avoid or mitigate other environmental impacts. The Environmental Monitor's daily reporting form (Appendix B) will be submitted to project and construction managers as the basis for effective communication of changing environmental conditions and the success of mitigation measures on the Carmacks Copper Property. In addition, the Environmental Monitor will prepare a cross-shift report at end of shift outlining the week's activities and issues of concern for briefing opposite shift.

Daily monitoring of mine components by construction staff will also take place to ensure structural integrity of mine components and that runoff is being appropriately managed.

Progress reporting will be completed on a biweekly basis to summarize construction activities, environmental management efforts, any environmental issues and their resolution, assessments or data, upcoming construction activities and relevant meetings and correspondence in the reporting period.

Western Copper Corporation

ENVIRONMENTAL MONITORING PROGRAM

Construction Version – October 2008

CARMACKS COPPER PROJECT

APPENDIX A

PHYSICAL MONITORING PROGRAM INSPECTION CHECKLISTS

Carmacks Copper Project

Physical Monitoring Program Inspection Checklist - Visual Elements

Month: _____

DAILY MONITORING	Date																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Check ☑ if correct or ☒ if not (record details in spaces below)																															
Main Waste Rock Dump																															
Check for dump movement?																															
Checked for seepage?																															
Good runoff management?																															
Photo(s) taken?																															
Stockpile Areas																															
Checked for seepage?																															
Good runoff management?																															
Photo(s) taken?																															
Heap Leach Pad Embankment																															
Check for dike movement?																															
Checked for seepage?																															
Spillway clear?																															
Checked after storm event?																															
Diversion Ditches																															
Checked visually																															
Checked for seepage?																															
Diversion clear?																															
No failure?																															
No loose material or exposed liner?																															
Checked after storm event?																															
Sediment Ponds																															
Checked visually																															
Spillway clear?																															
Checked for seepage?																															
No seepage?																															
Checked after storm event?																															
Inspector's Initials																															

Comments (recommendations / corrective actions required)

Detailed description of maintenance activities

Physical Monitoring Program Inspection Checklist - Structural Elements

Month: _____

DAILY MONITORING

	Date																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Check ☑ if correct or ☒ if not (record details in spaces below)																															
General																															
Materials being disposed of in assigned areas?																															
Main Waste Rock Dump (volume added last 24hrs?)																															
Crest checked?																															
Tension cracks?																															
Safe for use next 24 hrs?																															
Toe checked?																															
Dump limits adhered to?																															
No creep?																															
No possible failure?																															
Instrumentation monitored?																															
Heap Leach Pad Embankment (volume added last 24hrs?)																															
Crest checked?																															
Tension cracks?																															
Safe for use next 24 hrs?																															
Toe checked?																															
Limits adhered to?																															
No creep?																															
No possible failure?																															
Instrumentation monitored?																															
Overburden Dump (volume added last 24hrs?)																															
Crest checked?																															
Safe for use next 24 hrs?																															
Toe checked?																															
Dump limits adhered to?																															
No creep?																															
No possible failure?																															
Inspector's Initials																															

Comments (recommendations / corrective actions required)	Detailed description of maintenance activities

Western Copper Corporation

ENVIRONMENTAL MONITORING PROGRAM

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APPENDIX B

DAILY ENVIRONMENTAL MONITORING REPORTING FORM FOR CONSTRUCTION ACTIVITIES

CARMACKS COPPER MINE

Daily Environmental Monitoring Reporting Form For Construction Activities

Date	
Environmental Monitor	
Overall Weather Conditions	

Environmental Issues Covered at Daily Construction Meeting

Description and Status of Construction Activities

Summary of Erosion/Sediment Control Activities and Direction Provided

Summary of Daily On-site Sampling and Analysis

W4: Turbidity _____ NTU Cu _____ ppm pH _____ Staff Gauge Reading: _____

W9: Turbidity _____ NTU Cu _____ ppm pH _____

W14: Turbidity _____ NTU Cu _____ ppm pH _____

W15: Turbidity _____ NTU Cu _____ ppm pH _____

Notes:

Summary of Weekly Sampling for External Analysis (sites, dates, parameters, shipping schedule)

Description of other Environmental Issues / Corrective Actions Planned and/or Implemented

Pertinent Photographs Taken:

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix J

Health and Safety & Emergency Response Guide

Western Copper Corporation

HEALTH AND SAFETY &

EMERGENCY RESPONSE GUIDE

Construction Version – June 2008

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ACCESS CONSULTING GROUP

Table of Contents

Appendices

1.0 INTRODUCTION

This Health and Safety and Emergency Response Guide has been prepared for the construction phase of the Carmacks Copper Project and encompasses:

- Worker Health & Safety Program
- Emergency Response Protocol
- Fire Prevention/Response
- Explosives Management
- Spill Response Plan (including Hazardous Materials Management)

A Traffic Management Plan will also be implemented but is not included within this Guide.

This Guide will be maintained, and updated as necessary, in the following locations:

- Mine Manager Office;
- Administration Offices (i.e. Safety offices);
- Departmental Superintendents Offices;
- Environmental Coordinators Offices;
- First Aid Room;
- Fire Truck; and
- Ambulance.

In addition, copies will be issued to:

- Little Salmon Carmacks First Nation (LSCFN);
- Village of Carmacks;
- Carmacks RCMP;
- Whitehorse General Hospital;
- Environment Canada Spill Centre;
- YG Department of Environment, Water Resources Branch;
- YG Department of Environment, Environmental Affairs;
- YG Energy, Mines and Resources, Minerals Development Branch; and

- YG Energy, Mines and Resources, Client Services & Inspection Branch, Village of Carmacks Natural Resource Officer.

2.0 WORKER HEALTH & SAFETY

To ensure worker health and safety, all personnel and contractors will meet the standards outlined in the Occupational Health and Safety Legislation, Mine Safety Rules, and Regulations of the Worker's Compensation Board.

Prior to construction, YG Health and Social Services will be contacted to establish mine health and safety protocols and to delineate the responsibilities of all parties for emergency response to accidents and malfunctions. Western Copper will continue to liaise with the local and regional health services to provide updates on potential demands to the health care system (i.e. number of workers on site) and health and safety protocols in place at the mine.

Measures that will be implemented to ensure worker health and safety are listed below:

Safety Meetings	• Safety meetings will be held for all staff at the beginning of each work assignment period.
Trained Staff	• A designated health and safety office and safety manager will be onsite at all times as well personnel trained in general safety, as well as emergency response and first aid measures to address accidents/ malfunctions and manage and follow management and response plans as required.
Personal Protective Equipment	• All employees will be equipped with the proper personal protective equipment.
No Firearms Policy	• Project personnel will not be permitted to have firearms on the project site, unless authorized as a safety precaution.
Substance Abuse	• Mandatory substance abuse and chemical dependency awareness training will be provided to all employees and contractors. • Mandatory pre-employment drug testing and random testing during employment will be implemented for all employees. • In the event an employee is found consuming alcohol or drugs on

	site, or failing the drug test, a system of graduated response, in which the employee may be given the opportunity to address a substance abuse problem through a treatment program.
Monitoring	• Environmental components such as water and air quality will be monitored to ensure compliance with legislation and related permits. • Health and safety parameters (e.g. injury rates, accidents, near-misses) will be monitored. • Equipment monitoring and maintenance programs will be implemented to ensure facility and worker safety. • Rates of substance abuse instances will be monitored as well as success of the mine's substance abuse treatment resources (in terms of repeat offenses) and results will be provided to YG Health & Social Services, and the Little Salmon Carmacks First Nation.
Counseling	• Counseling services will be made available to employees and their families.

3.0 DEFINITIONS

3.1 "SERIOUS INCIDENT"

A "**Serious Incident**" is defined as any occurrence meeting one of more of the following criteria:

1. Any "serious injury" or "serious accident" as defined in OH&S 33(1) (see Section 2.2),
2. Any incident requiring first aid or rescue response to the scene,
3. Any fire requiring discharge of a fire extinguisher,
4. Any release of process solution outside of containment,
5. Any release of a hazardous product where there is potential for that product to enter a waterway,
6. Any hazardous product spill of reportable volume, as defined in Section 11.0.

3.2 "SERIOUS INJURY" AND "SERIOUS ACCIDENT" UNDER OH&S ACT

(Excerpt from Occupational Health & Safety Act)

33. (1) In this section, **"Serious Injury"** means

(a) an injury that results in death,

(b) fracture of a major bone, including the skull, the spine, the pelvis, or the thighbone,

(c) amputation other than of a finger or toe,

(d) loss of sight of an eye,

(e) internal bleeding,

(f) third degree burns,

(g) dysfunction that results from concussion, electrical contact, lack of oxygen, or poisoning, or

(h) an injury that results in paralysis (permanent loss of function);

"Serious Accident" means

(a) an uncontrolled explosion,

(b) failure of a safety device on a hoist, hoist mechanism, or hoist rope,

(c) collapse or upset of a crane

(d) collapse or failure of a load-bearing component of a building or structure regardless of whether the building or structure is complete or under construction,

(e) collapse or failure of a temporary support structure,

(f) collapse or cave-in, of a trench, excavation wall, or stockpile,

(g) accidental release of a controlled product,

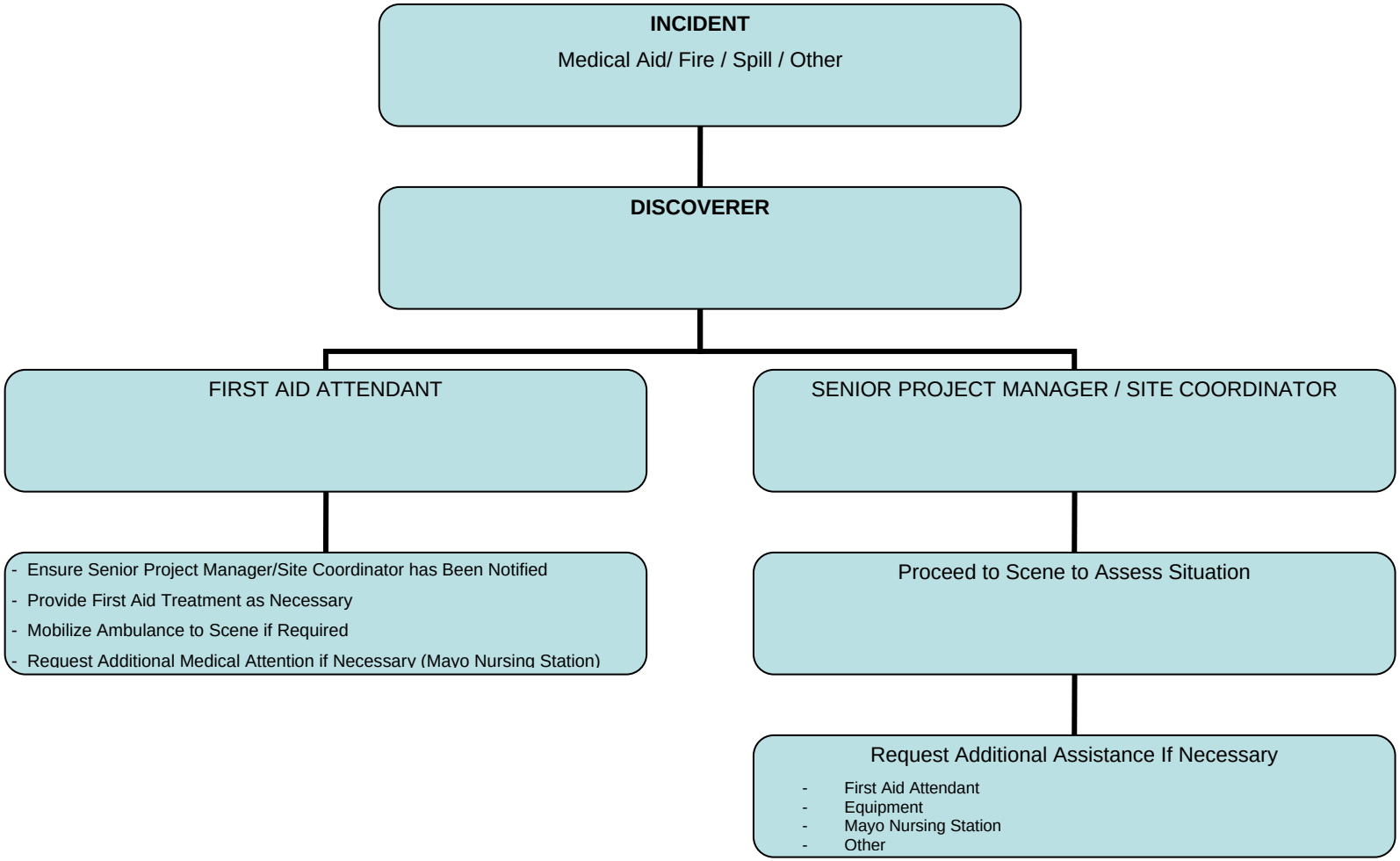
(h) brake failure on mobile equipment that causes a runaway,

any accident that likely would have caused serious injury but for safety precautions, rescue measures, or chance. (As amended by SY 1988, c.22, s. 5; SY 1989, c. 19, s.6)

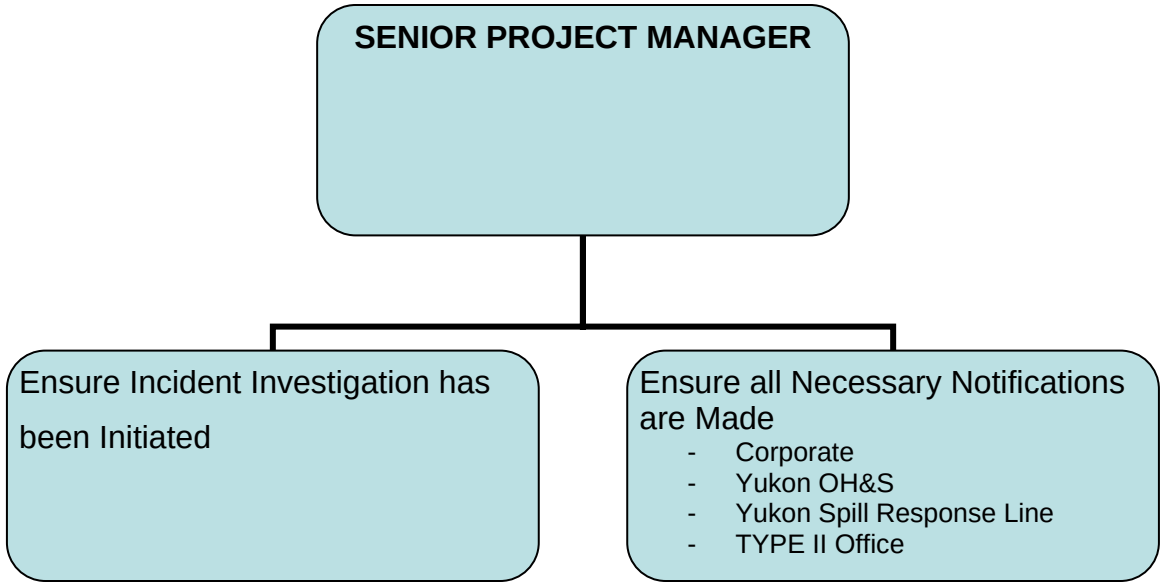
Included from *"Occupational Health and Safety with Mine Safety Regulations."* Yukon Workers' Compensation Health and Safety Board. Department of Justice, Government of the Yukon (1992).

4.0 INITIAL RESPONSE TO SERIOUS INCIDENT

In an emergency situation it is imperative that due diligence is exercised as well as discretion. The priorities are the protection of **LIFE, LIMB and PROPERTY** – in that order.



5.0 FOLLOW-UP TO SERIOUS INCIDENT



6.0 ORGANIZATION AND RESPONSIBILITIES

A structured organization will be created for contingency planning and spill response. Preparations will include clear definitions of responsibilities in the event of an emergency. The On-Scene Coordinator (OSC) and back-ups will be designated in a later update of this document.

During the construction phase of the Project, a designated OSC who is a member of the Emergency Response Team will be on site at all times. The OSC will have the prime responsibility of coordination and directing control efforts at the scene of an emergency/spill incident, as well as coordinating safety meetings for all staff at the beginning of each work assignment period. Radio, telephone and satellite phones will be on site to ensure key personnel have constant communication with one another and external resources.

The duties of the OSC, First Aid Attendant, and Project Manager are outlined below:

The OSC will contact the Construction Supervisor, the Environmental Supervisor, and the First Aid Supervisor to relay details of the spill incident. The OSC will notify the appropriate authorities and submit the required reports, including all relevant details of the spill.

The Construction Supervisor will indicate the deployment of available equipment to facilitate containment and clean-up functions. He or she will be responsible for procuring off-site contractors or additional equipment as required. Equipment monitoring and maintenance programs will be implemented to ensure facility and worker safety.

The Environmental Supervisor will assess the impact of the spill on the environment and direct the actions needed to reduce further impact. The Environmental Supervisor will determine and supervise the institution of appropriate disposal techniques and restoration measures in cooperation with government representatives.

The First Aid Supervisor will ensure that personnel involved with spill containment and clean up are outfitted with proper safety equipment. In addition, clean-up personnel will be advised of the possible hazards and proper clean-up procedures for the spill.

All on-site personnel will receive training in spill response procedures, materials hazards, and local biophysical constraints. Special training will be provided for a fire fighting team(s), to truck driving personnel, road maintenance personnel, freight handlers and load-out operators, and others most likely to be present at a possible spill. Employees will be required to undergo drug testing and the consumption of alcohol and 'recreational' drugs will not be allowed on site.

The detailed Emergency Response will be kept in a loose-leaf binder with tabbed sections so that information is easily accessible and can be updated as operations progress. This manual will contain the response organization, action procedures, environmental mapping, resource inventory, training, hazardous materials information and supporting documentation. In addition, training and exercises in the form of mock spills will be undertaken to ensure that individuals know their responsibilities, spill response, action plan, where and what type of equipment can be obtained.

At the Carmacks Copper Mine, any person witnessing a serious injury, fire, chemical spill or serious incident will be charged with the responsibility for immediately advising the OSC. This requirement and responsibility will be conveyed to all new employees through the orientation and environmental awareness training. All communications for mine-site emergencies will be coordinated through the OSC. Depending on the emergency (serious injury, fire, chemical spills, serious incidents) the following people will be notified:

- On-Scene Coordinator;
- Project / Mine Manager;
- Safety Officer / First Aid Attendant;
- Mine Superintendent;
- Plant Superintendent;
- Construction Supervisor;
- Environmental Supervisor.

The ERT will include members that have received St. John Advanced First Aid training, WHMIS and TDGA training, specialized hazardous materials response training, fire fighting training, and production or facility operators that have specialized knowledge. Members of the ERT, Safety Officer, Plant Superintendent, and Mine Superintendent, will stand by to assist the emergency

response agency(s) and offer the benefit of their special knowledge of the facility and its contents. A well-stocked first aid treatment room and ambulance will also be available on-site.

Any employee affected by exposure to a hazardous materials release or spill, that may require medical attention, will be transported to Whitehorse. This is the nearest medical facility that can provide appropriate treatment and/or evaluation of chemical related injuries. A copy of the appropriate WHMIS and MSDS, which includes emergency medical and/or first-aid treatment, will accompany the affected person(s) to the hospital. The first aid room and ambulance will be provided with a complete copy of the Health and Safety & Emergency Response Guide prior to production beginning at the mine.

POSITION	RESPONSIBILITIES
Area Supervisor or On-Scene Coordinator	• Coordinate initial response • E.R.T. and specialized resources mobilization & consultation • Attend and coordinate response for all incidents involving "serious injury" and "serious accident", as defined in Sec. 33, OHS Act • Initial scene loss control • Prime responsibility for investigation – determine contributing causes and take immediate action to prevent recurrence • Request additional external resources when necessary • Coordinate recovery and investigative activity • Make necessary notifications to Project Manager • Ensure government spill reporting has been completed by designated personnel • Organize and conduct post-incident debriefings • Prepare Incident Report and make recommendations
First Aid Attendant	• Ensure area supervisor has been notified of incident • Provide first aid treatment if necessary • Mobilize ambulance to scene, if required • Stand by to assist as required by scene coordinator
Project Manager	• Designate on-call senior personnel during weekends • Receive briefings on incident details • Provide direction as required • Make appropriate notifications to government and corporate

	• Review Incident Reports • Attend at all incidents involving "serious injury" and "serious accident", as defined in Sec. 33, OHS Act • Make notifications to regulatory agencies as required • Verify compliance with standards and government regulatory requirements • Forward necessary reports to regulatory agencies • Fire Chief – assume responsibility for fire investigation

7.0 EMERGENCY PHONE NUMBERS

Once these positions have been filled, the emergency response plan will be amended to include the person's name and home phone number:

- On-Scene Coordinator and alternates;
- Project / Mine Manager;
- Mine Superintendent;
- Plant Superintendent;
- Construction Supervisor;
- Environmental Supervisor;
- Safety Officer / First Aid Attendant.

Occasionally, a serious incident may require assistance from other outside organizations. With the exception of medical aid incidents, requests for outside assistance will be authorized only by the Senior Project Manager, or those with higher level of responsibility. Important contact phone numbers are provided in the following table.

Emergency Contact Numbers

Resource	Contact Number
Carmacks Nursing Station	867-863-4444
Hospital – Whitehorse	867-393-8700
Poison Control Center	1-867-633-8477
Fire Department – Carmacks	867-863-2222
Fire Department – Whitehorse	867-668-8699 or 867-668-2462
Forest Fire	1-888-798-FIRE
Yukon Spill Report Line	867-667-7244
Canadian Transport Emergency Centre (CANUTEC)	0 (613) 996-6666 (collect)
Police – Carmacks	867-863-5555
Police – Whitehorse	867-667-5555
YG EMR, Village of Carmacks Natural Resource Officer	867-863-5271
Little Salmon Carmacks First Nation	867-863-5576
Village of Carmacks	867-863-6271
Trans North Helicopters	867-668-2177
Access Consulting Group (Environmental Consultant)	867-668-6463
YG EMR, Mineral Resources Branch	867-633-7952
YG Department of Environment, Water Resources Branch	867-667-3227
YG Environmental Protection Branch	867-667-3436

8.0 FIRE PREVENTION/RESPONSE

Personnel will be trained for fire response and procedures will be implemented to avoid fire hazard areas and prevent inadvertent fires, including forest fire fuel reduction. Fire protection equipment and water distribution systems will be located at the project area. Redundant systems for key operations (heap leach pad, ancillary facilities) will implemented as part of fire contingency plans.

A central water supply tank will supply the fire water system. The fire water requirement is 280 m^3/hr for two hours. This demand is easily satisfied by designing the storage tank with a fire reserve capacity of 560 m^3 in the lower portion of the tank that will be unavailable for other uses.

9.0 EXPLOSIVES MANAGEMENT

An Explosives Management Plan will be developed by the explosives contractor for the safe manufacturing, handling, storage and use of explosives at the site and will include:

- Management, record keeping and security procedures;
- Secure storage buildings away from the general operations site constructed, fenced and signed in accordance with relevant guidelines and legislation;
- Daily washing of the explosives dispensing vehicle; and
- Conformity with NRCan guidelines and requirements.

The Bulk Explosives Facility will meet Bulk Guidelines published by the Explosives Regulatory Division and local and federal regulations. The explosives facilities area will be appropriately constructed, fenced and gated with signage installed.

Explosive storage magazines will be located in a bermed area and security measures will be in place to limit access to the explosives storage magazines to authorized personnel only. Fuel oil will be stored within the mine fuel storage facility located in a bermed, lined area.

Ammonium nitrate will be transported and delivered to the site in solid prill form and in licenced bulk container vehicles, which are accompanied by spill kits. The ammonium nitrate and fuel oil

mixing-dispensing vehicle will be washed thoroughly on a daily basis. Any un-detonated explosive blastholes will be washed out prior to pit excavation.

10.0 SPILL RESPONSE PLAN

10.1 INTRODUCTION

The purpose of the Spill Response Plan is to minimize spill potential through design features (such as secondary containment impoundments), to establish procedures for storage and handling of material and to enable a quick and efficient response in the event of a spill. This plan has been developed using industry and regulatory approved handling, storage, containment, response and notification procedures. The measures outlined in this section are applicable to the construction phase only and have been extracted from the full Plan which was prepared for construction, operations and closure.

The procedures outlined in this plan are designed to protect the health and safety of mine personnel and the public, to minimize adverse effects to wildlife, and to help ensure that downstream waters are not degraded. The Spill Response Plan is designed to cover the construction/operations area and the access road into the site and will apply to facility design, construction, operation and maintenance. However, the company will also respond, if requested, to any incidents between Whitehorse and the Freegold Road turnoff, but will assume no responsibility for the incident outside this defined response area.

A variety of heavy equipment, suitable for contingency use during a hazardous spill, will be on site at different phases of the operation. An Equipment Inventory will be kept updated for efficient relocation of heavy equipment required for spill response. The On-Scene Coordinator (OSC) and Spill Contingency and Emergency Response Team (ERT) will have a current list of available heavy equipment.

Typically, bulldozers, backhoes, excavators, and other equipment will be located at various locales throughout the mine site and the access road and will be available for spill contingencies on a site-specific basis.

Maps of the Contingency Plan Area covered by the final Spill Contingency Plan will be prepared. Potentially affected watercourses will be highlighted on the topographic maps and material storage locations identified. Important strategic items for a spill response (heavy machinery, sorbents, safety items, etc.) will be localized at fuel or chemical storage areas during construction and will be relocated as construction progresses. During operations, permanent storage locations will be situated for minimum response times.

The only solid materials requiring special containment are lime and cobalt powder; liquid materials include SX/EW reagents, kerosene, sulphuric acid, gasoline, diesel fuel, propane, varsol, and ethylene glycol. Storage facilities will be designed with adequate containment and response facilities to rapidly clean up any spills. Loading and transport protocols will reduce the possibility of spills occurring during shipment.

Transportation to the site from Alaska or British Columbia (B.C.) will follow all transportation regulations for the Yukon Territory, B.C. and Alaska. Any spills on site or during transport will follow the general procedures presented in the spill plan.

10.2 SECURITY

The Carmacks Copper Mine will have an active security/safety system. All in-coming traffic will will be required to sign in at the security gatehouse. Visitors will be directed to the administration offices and equipment and supplies will be directed to the warehousing or cold storage receiving areas. All trucks and vehicles delivering chemicals, fuels, etc. will be inspected for leakage and integrity when entering the Carmacks Copper property. The inspection will be performed by warehouse personnel with the assistance of maintenance personnel when requested. The inspection will include:

- Cargo inspection, quantity and quality against way bills and bills of lading;
- Checks for any visible leakage; and
- General condition of the vehicle and equipment.

Routine patrols of the property, including the waste rock storage area and explosives magazines will be carried out on a daily basis either by foot or by vehicle. All pump stations and process control points will be equipped with adequate lighting or area and yard lighting to

prevent vandalism and to allow detection of spills or leaks. Primary facilities will be secured or equipped with locks (i.e. valves or pump starters).

The Carmacks Copper Mine security system will be designed to prevent accidental or intentional entry to the plant that might result in vandalism, theft, sabotage or other improper or illegal use of facilities that could possibly result in an incident.

10.3 TRANSPORTERS

10.3.1 Transporter Qualifications

Transporters will be carefully selected, and are required to have Department of Transport certification, acceptable spill response programs, hazardous materials safety and handling procedures (including material safety data sheets [MSDS]), and driver training programs. Each approved transporter will be periodically reviewed to assure that they continue to carry valid Department of Transport certification.

10.3.2 Delivery Scheduling

The potential for spills will be minimized to the extent possible by scheduling deliveries to avoid any regular or temporary congestion that may occur along routes leading to Carmacks Copper project. Transporters will be required to advise the operations of any delays or schedule changes that occur. Deliveries will be timed during daylight hours to coincide with warehousing hours and to minimize offloading problems.

10.3.3 Regulatory Compliance

Transporters making deliveries to Carmacks Copper operations will be required to follow all federal and territorial Department of Transportation regulations for the transportation of dangerous goods, as defined in the Transportation of Dangerous Goods Act (TDGA). This will include all placarding, packaging, manifests, etc.

10.3.4 Response Outside Territory

The transporters or contact carriers will implement their response plan. The Carmacks Copper OSC will be notified as a courtesy and kept informed of the success of the cleanup.

10.3.5 Response Inside Territory

Carmacks Copper's Spill Contingency and Emergency Response Plan is designed to cover the operations area and the access road into the site. However, the company will also respond, if requested, to any incidents between Whitehorse and the Freegold Road turnoff. The transporter or other agency (i.e. RCMP) who is first made aware of the emergency will be required to notify the territory emergency response office. If the Carmacks Copper operations are informed of the incident, the OSC may then direct the ERT to the scene if requested, although Carmacks Copper will assume no responsibility for the incident beyond their defined Response Area.

10.3.6 Response Access Road and Operations Area

This Spill Response Plan is designed to respond to spills or emergencies which arise at the site or along the access road from the Freegold Road turnoff to the site. The transporter or mine personnel who is first made aware of the emergency will be required to notify the OSC. He/she will then immediately coordinate the clean-up operations and direct the ERT to the scene.

10.4 RELEASE / SPILL PREVENTION AND CONTAINMENT

Release prevention measures centre around proper design, inspection, and maintenance procedures. The leach pad and events pond at Carmacks Copper are designed as zero discharge facilities under all normal and extreme operating conditions; all process solutions are either contained within the events pond or process fluid management system for re-circulation.

A perimeter diversion system consisting of a lined ditch and raised access road has been included in the design to direct all clean runoff away from the heap leach pad and to direct all extraneous runoff from the heap into the heap events pond. The general arrangement includes

a 5.0 m wide lined barren solution ditch between the heap perimeter toe, with the heap synthetic and soil liner ramped up onto a 1m high outer dike. Outside of the dike is a 5.0 m wide running course and a runoff collection ditch.

Runoff from the plant site area will be directed to a plant site sedimentation pond, located downslope of the plant site, heap leach pad and events pond.

Runoff from the waste rock storage area will be intercepted by a perimeter ditch and directed to a stilling pond located at the eastern end of the stockpile. This pond also serves as a source of plant make-up water.

Any release from the plant site sedimentation pond and waste rock storage area stilling pond will be released down gradient once it is determined that effluent criteria are met.

10.4.1 Fuel Storage and Handling

Fuel storage areas will be lined with an impermeable geomembrane and bermed or set on concrete foundations with berms. Design of these areas will follow both the Gasoline Handling Act under the Yukon Government and the Canadian Council of Ministers of the Environment (CCME) guidelines. The bermed area will be sized to accommodate 110% of the largest tank volume. All tanks are located above ground and are visually inspected on a regular basis for leaks, damage or unusual conditions. The berms and liners will also be inspected on a regular basis. Any leaks or other damage will be reported to the Plant Superintendent, who will ensure that necessary repairs are completed in a timely manner.

Diesel Tanks – Service Complex

The mine will use diesel-powered trucks and various diesel-powered equipment. The diesel fuel supply will be contracted to a company which will be responsible for the on-site facilities. The exact details of the diesel storage facilities will be determined by the supplier but are generally expected to be as follows: tanks will be a steel, above ground vertical, with a 75 m^3 capacity. There will be room within the lined, bermed storage area for an additional tank in addition to 110% capacity and 300 mm of freeboard. Diesel will be transported into the site from

Whitehorse via a 42,000 L capacity B-train haul truck. The following controls will be incorporated.

- Tanks will be located in bermed areas with a concrete base and concrete curbs. The preferred strategy will be to operate each tank independently, and consequently the containment volume would be 110% of the volume of the largest tank. However, if the final design incorporates the more flexible operation of tanks in parallel, a worst-case scenario will be assumed and the containment volume will be designed to accommodate the total volume of all tanks.

- The containment foundations will be designed by geotechnical engineers.

- The bottom of the containment area will be sloped so that spilled material will drain toward a corner sump where the material can be reclaimed.

- A drain valve will be installed through the berm wall adjacent to the sump to allow for periodic drainage of precipitation. A locking system incorporated in the valve will ensure that the valve is not left open inadvertently.

Gasoline Storage Tank

A gasoline tank will be provided in the service complex fuel storage area along with the diesel tanks and the waste oil tank. The gasoline fuel tank will have 38 m^3 capacity. The spill control measures outlined for the diesel storage area will also apply to the gasoline tank.

Flammable Materials Storage

A lockable, fireproof cabinet will be installed in the laboratory to isolate the small quantities of flammable materials that are normally used in analytical laboratories. This is a standard safety practice at other operating mines, which in addition to deducing fire hazard is designed also to prevent spillage of these materials and to confine any cleanup operation within the laboratory building.

Small quantities of flammable materials for use in general operations will be stored in the warehouse. A fireproof cabinet will be installed in a designated area of the warehouse, to minimize spillage of these materials and to facilitate cleanup.

10.4.2 Lubricants, Oils, Solvents and Degreasers

Lubricants, oils, solvents and flammable materials will be stored in the warehouse or maintenance shop. Storage and dispensing of bulk delivered lubricants and solvents in the shops will be done through a well engineered, integrated system that has been developed and used at other major mine sites. This system, which is designed to minimize and control spillage, will consist of the following components:

- Bulk storage tanks for lubricants and solvents will be located outside the pit shop in a concrete bermed storage area. Smaller day tanks will be located inside the pit shop and will incorporate standard spill control measures.
- All liquids will be piped directly to the area in the shop where they will be used. As a result of the direct piping of liquids to the point of use, the manual transfer of liquids in small containers will be minimized. This will reduce the spillage and fire hazards associated with the use of open vessels of petroleum products.
- Sight glasses will be located on each tank to indicate the liquid level in the tank. Appropriate filling techniques and schedules can then be used, which will eliminate spillages from overfilling the tanks.
- The simplicity of this overall system will encourage a clean and safe working environment, which in turn will reduce the risk of spills within the mine site area.

All solvents and degreasers delivered in small containers will be stored inside the cold storage area. Incoming container trucks will report to the warehouse personnel, where new containers will be offloaded and empty containers loaded on returning trucks.

The following will be incorporated in the design to minimize the impact of minor spills and to allow an orderly cleanup.

- The storage of these materials inside a building will prevent accidental spillage or puncture of the containers from vehicle traffic or other mine activities.
- The cold storage and warehouse will have a concrete floor to confine any spilled liquids. In the area of the stored liquids, the floor will be slightly sloped toward a small sump designed to contain spills and allow them to be cleaned up.
- A separate area will be defined for the storage of solvents and degreaser materials, away from the general materials in the warehouse. Areas designated for storage of solvent and degreaser materials will be surrounded by a concrete curb. Concrete roll curbs will be installed to allow access by forklifts. The compatibility of materials for storage in a common area will be determined and, where necessary, additional intermediate berms will be installed to isolate and separate incompatible materials.
- Clear labels for each area will declare the type of material stored. WHMIS labels will be posted as appropriate, to ensure that materials are handled safely and that correct methods are used to clean up any spilled materials.

This overall berming strategy will ensure that any spillage is confined inside the building, and will eliminate the potential problems of minor spills seeping into adjacent ground with attendant cleanup difficulties.

10.5 OPERATING PROCEDURES

Operating procedures relate to on-site movement and use of chemicals, and monitoring of fluid containment areas. Employees involved in chemical handling will receive WHMIS and TDGA training and instruction on safe work practices. This will include:

- Driving vehicles (trucks and forklifts) carefully to avoid collisions or ruptures to storage containers and pipelines.
- Making sure there is adequate clearance when positioning a truck or equipment adjacent to storage or distribution points.
- Checking to ensure all pallets or containers are securely placed when transporting and storing, to prevent tipping and spilling.
- Proper dispensing of fuels and other motor vehicle fluids (including dipping tanks before filling).
- Locations of storage and use areas for chemicals and solutions.

- Employees assigned to areas in which chemicals are utilized, receive personal instruction and task training to promote and ensure safe chemical work practices.

10.6 PETROLEUM PRODUCT SPILLS

Spills and leaks are addressed herein.

A, **"spill"** is defined as:

> "Petroleum product or lubricant which is poured, spilled, or pumped onto the ground or into water, by faulty conveyance or transfer, overturned vehicles or equipment, or through human error or negligence."

Severity rating: Non-Reportable – Less than 100 litres*
Minor – More than 100 litres and Less than 400 litres
Major – More than 400 and Less than 1,000 litres
Emergency - More than 1,000 litres

*If a spill is less than 100 litres and has not entered a watercourse, the Owner and/or operator do not have to report the spill; however for the purposes of the water use licence, any quantity of spill is reportable.

A **"leak"** is defined as:

> "Passing of a petroleum product through a breach, tear or puncture in a container, or receptacle at a rate of less than 10 litres per minute."

Under federal and territorial regulations, we are required to *immediately* notify the 24-hour Yukon Spill Report line should a spill of reportable quantity occur. The Senior Project Manager, On-Scene Coordinator or Manager On-Call are responsible for reporting spills. Reportable spills do require an Incident Investigation Report to be completed. For the purposes of the water use licence, any quantity of spill is reportable.

This guide will assist in determining what volume of product requires reporting to regulatory agencies. If a spill is deemed to be of reportable quantity, the area supervisor will immediately

notify the On-Scene Coordinator or Senior Project Manager who will in turn ensure that spill reporting is completed by designated personnel.

HAZARD Class	TYPICAL PRODUCTS ON SITE	REPORTABLE QUANTITY
Explosives (1)	• ANFO	Any amount spilled outside of blast pattern
Flammable Gases (2.1)	• Propane • Acetylene	>100 Litres
Non-Flammable Gases (2.2)	• Halon	>100 Litres
Poisonous Gases (2.3)		Any Amount
Non-poisonous Gases (2.3)		>100 Litres
Corrosive Gases (2.4)		Any Amount
Non-corrosive Gases (2.2)		>100 Litres
Flammable Liquids (3.)	• Diesel • Gasoline • Glycol • Hydraulic &/or Engine Oil	>200 Litres
Flammable Solids (4.)		>25 kg
Spontaneous Combustibles (4.)		>25 kg
Dangerous When Wet (4.)		>25 kg
Oxidizers (5.1)	• Sodium Hydroxide / Caustic Soda • Lime Solution • Sodium Nitrate • Calcium Hypochlorite • Ammonium Nitrate	>50 kg or 50 Litres
Corrosive Materials (8.)	• Hydrochloric / Muriatic / Chlorhydric Acid • Sodium Hydroxide	>5 kg or 5 Litres
Miscellaneous Dangerous Goods (9.1)		>50 kg
Dangerous Waste (9.3)	Waste Oil	>5 kg or 5 Litres

10.7 REPORTING PROCEDURES

The following two levels of reporting are required by any individual who locates a spill or leak:

Report to a Supervisor: Refers to the direct supervisor in charge of the individual who located the spill or leak.

and,

Report to the Owner: The Owner shall immediately be given details of any leak or spill. It is the Owner's responsibility to ensure protection of human health and safety, provide directions to stop or contain spills, and report the spill (if necessary, see severity rating and notes above) to affected agencies prior to investigating the spill themselves.

Affected Agencies: Affected Agencies shall all be contacted through the 24-hour emergency spill response line at ***(867) 667-7244***. Affected parties may include organizations associated with fuel supply and transport companies. All of the major suppliers in the Yukon are members of TEAP, or the Transportation Emergency Assistance Plan. One of the responsibilities of this organization is the sharing of resources, consumables, equipment, and personnel in the event of a spill.

The following information shall be conveyed to the affected agencies through the 24-hour Emergency Spill Response Line. This information should be documented on the "Spill Reporting Form" that will be provided.

- Location of the Spill or Leak
  - Nearest community, town, highway, major water body, kilometre location on highway if known etc.
- Time of Spill
- Severity of Spill or Leak
  - Minor – more than 100 litres and less than 400 litres
  - Major – more than 400 litres and less than 1,000 litres
  - Emergency - more than 1,000 litres

- Type of Spill
  - Total loss/leakage
  - Overturned vehicle or tanker (plus name of transport company)
  - Ruptured tank
  - Lost drum
- Product Spilled
  - Diesel Fuel (Identify Grade)
  - Gasoline
  - Lubricant (Identify Grade)
  - Other (Identify)
- Nearest Watercourse
  - Identify by name and description the nearest watercourse, pond or lake, with an approximate distance to the spill.
  - Describe the soils conditions and direction of probable flow for the spilled product.
- Potential to enter surface water
- Fire Hazard
- Hazard to life and limb, injuries
- Environmental effect expected, if any
- Equipment and clean-up consumables on hand

Response by Affected Agencies depends upon the location of the possible spill and will vary. However, they will be coordinated by phoning the Emergency Response Spill Line ***(867) 667-7244***. For the purpose of this Plan, it is recommended that only one call be made to government or other agencies using the 24 hr spill line. Other affected parties could include organizations associated with fuel supply and transport companies or local First Nations.

Most major suppliers in the Yukon are members of the Transportation Emergency Assistance Plan (TEAP). One of the responsibilities of this organization is the sharing of resources, consumables, equipment and personnel in the event of a spill. The transporter is responsible for contacting TEAP in the event of a spill.

The Canadian Transport Emergency Centre (CANUTEC), a branch of Transport Canada, can also be contacted for 24 hr technical advise on Dangerous Goods, as needed. The CANUTEC – help line for dangerous goods is **0 (613) 996-6666 (collect)**.

10.8 EMERGENCY SPILL RESPONSE PROCEDURE

As outlined in the previous section, any person witnessing a spill will be charged with the responsibility for notifying the OSC. The ERT members and the appropriate people within the mine operation will be alerted and mobilized, as appropriate. These people will ensure the following activities are conducted in a timely manner in the event of a discharge:

Ensure personal and worker safety, if you cannot identify the spilled substance consider it dangerous.

<u>If Personnel Are Injured</u>

- Call for medical help, attend to injured person, and administer first aid if safe to do so.
- Warn / remove bystanders

<u>If Safe (do not enter confined spaces or expose self to fire hazard)</u>

- Stop all sources of ignition and stop or reduce the source flow of the spill
- Shut off all valves
- Shut off all electrical power
- Initiate containment: put down sorbent pads and berm spill area, if possible
- Recover product and contaminated soil / other materials
- Remain at the site and assist with response as needed when help arrives.

<u>If Unsafe</u>

- Initiate evacuation (upgrade or upwind), move to safe area
- Notify Owner
- Report the following: location, initial spill site, possible cause, description of present condition, affecting or about to enter water.
- Isolate area and deny entry until qualified response personnel arrive
- Deny access to all unauthorized personnel
- Update Owner on spill status

At Carmacks Copper, the following procedures are part of the release response policy:

- If it is determined that there is a release outside secondary containment, then the ERT will be called into action and will immediately commence containment and clean up of the spill or release.
- Personal protection equipment is required to be used when responding to a release or spill. The personal protection equipment will be determined by the product specific Material Safety Data Sheet (MSDS). All precautions that are stated in the MSDS will be followed. Special personal protection equipment will be available for the ERT.
- If the spill is all liquid and outside secondary containment, a pump will be used to place the liquid back into contained area.
- If a spill occurs within a stream or creek, previously approved (by emergency response agencies) booms, absorbents, etc. will be put to use immediately.
- Soil contaminated with regulated material will be removed and disposed of according to the product specific MSDS. Disposal will follow applicable local, territorial and federal regulations and guidelines.

10.8.1 Response for Gasoline Spills

If in <u>water</u> and if safe to do so:

1. Stop or reduce discharge, if safe to do so, by plugging, uprighting, adjusting valves, or other suitable method.
2. If possible, contain discharge by booming using commercial boom material, logs, or other material at hand.
3. If in rapidly flowing water, direct to quieter backwater using booms to deflect material.
4. Ensure that you have reported the spill.
5. Remove from water by skimming, using absorbents, and collect in suitable container (tanks, drums, plastic lined depression in ground or snow). A listing typical spill response tools/equipment will be provided.

NOTE: IN THE EVENT MATERIAL IS SPILLED DURING VERY WARM WEATHER AND THERE IS DANGER OF FIRE DUE TO FUMES, DO NOT ATTEMPT TO CONTAIN PRODUCT ON WATER. ALLOW PRODUCT TO DISPERSE AND EVAPORATE.

6. Dispose absorbents by recycling or incineration if conditions are suitable and after consultation with environmental authorities and/or forestry officials contacted through the Emergency Spill Response Line.

Response for Gasoline Spills (Cont'd)

If on land and it is safe to do so:

1. Stop, or reduce discharge if safe to do so by plugging, uprighting, adjusting valves or other suitable method.
2. Contain spill by diking with earth, snow and ice or other barrier, possible trenching or creating a lined sump down gradient from the spill source.
3. Ensure that you have reported the spill.
4. Remove fuel from containment area with pumps, vacuum equipment and place in appropriate containers. Ensure equipment intrinsically safe (does not have a source of ignition/spark).
5. Absorb residual liquid on natural or synthetic absorbents (e.g. 3M products).
6. Remove contaminated soils in the spill site to an appropriate disposal site if spill located near water supply or stream/river course or for aesthetic reasons.
7. Dispose of contaminated fuel by recycling or incineration. In situ, incineration may be possible if permission granted from environmental and forestry officials contacted through the Emergency Spill Response Line.

10.8.2 Response for Diesel Spills

If in water and if safe to do so:

1. Stop, or reduce discharge if safe to do so by plugging, uprighting, adjusting valves, or other suitable method.
2. If possible, contain discharge by booming using commercial boom material, logs or other material at hand.
3. If in rapidly flowing water, direct to quieter backwater using booms to deflect material.
4. Ensure that you have reported the spill.
5. Remove from water by skimming, using absorbents, and collect in suitable container (tanks, drums, plastic lined depression in ground or snow).
6. Dispose by recycling or incineration, if conditions are suitable and regulatory authorities grant permission.

Response for Diesel Spills (Cont'd)

If on land and it is safe to do so:

1. Stop or reduce discharge if safe to do so by plugging, uprighting, adjusting valves or other suitable method.
2. Contain spill by diking with earth, snow or ice or other barrier, possible trenching or creating a lined sump down gradient from the spill source.
3. Ensure that you have reported the spill.
4. Remove fuel from containment area with pumps, vacuum equipment and place in appropriate containers.
5. Absorb residual liquid on natural or synthetic absorbents (e.g. 3M products).
6. Remove contaminated soils in the spill to an appropriate disposal site if spill site is located near water supply or stream/river course or for aesthetic reasons.
7. Dispose of contaminated fuel by recycling or incineration. In site, incineration may be possible if permission granted from environmental and forestry officials.

Specific Information for Gasoline and Diesel

Gasoline

Characteristics

- Flammable
- Solubility in water 1 to 100 ppm
- Floats
- Flash point - 38 to -43 C

Human Health

- Moderately toxic by inhalation. Avoid prolonged exposure to fumes

Environment

- Harmful to aquatic life. Fish toxicity: 5 - 40 ppm rainbow trout

Protective Clothing

- No specific recommendations. Protective clothing is required.

Diesel

Characteristics

- Combustible/Flammable liquid
- Insoluble in water (30 ppm)
- Floats
- Flash point 52 to 96 C

Human Health

- Low toxicity by all routes

Environment

- Fish toxicity: 10 ppm rainbow trout; 2 ppm for grass shrimp

Protective Clothing

- Gloves and boots made from neoprene or butyl rubber

10.9 HAZARDOUS MATERIALS

The substances used or generated at the mine site or to be transported via the Freegold Road and highways are listed below. Each of these products is to be classified according to Federal 2005 *Transportation of Dangerous Goods Regulations* Classification codes:

copper cathode	Exempt
gasoline	Flammable Liquid 3.1
diesel	Flammable Liquid 3.2
ethylene glycol (antifreeze)	N/A – very toxic material
ammonium nitrate (for ANFO)	Oxidizer 5.1
varsol	N/A – Combustible Liquid
propane	Ignitable Gases 2.1
mill reagents:	
- petroleum derived organic	flammable liquid
- Hydrated lime	not regulated
- sulphuric acid	corrosive 8
- elemental sulphur	unclassified
- cobalt SO_4	unclassified
- guar gum	unclassified
- kerosene	unclassified

All dangerous/hazardous materials storage and containment areas will be protected, signed, and monitored. Action plans for each of these dangerous goods will be based on published Materials Safety Data Sheets (MSDS) issued by the manufacturer. The action plan for each substance lists potential dangers, the recommended initial spill response, the recommended fire response, recovery protocol, and disposal protocol. Employees who have any potential to come in direct contact with these materials (in particular, sulphuric acid and lime) will be educated in the properties of each chemical, proper handling techniques and personal protection measures.

If for any reason it becomes necessary to import sulphuric acid (due to acid plant problems) spills may potentially occur: from tankers along the access road to the mine or during transfer from the trucks to the on-site storage facility.

Sulphuric acid is a colourless liquid that must be handled carefully with proper protective equipment and adequate ventilation. Ventilation systems must be non-corrosive. When in contact with some metals, sulphuric acid liberates hydrogen gas, which is explosive. Therefore, flames and sparks should not be used in these areas. In the event of a spill, all sources of ignition should be eliminated and the product should be collected for recovery or disposal. Personal safety must come first before attempting clean up. For release to land, or storm water runoff, discharge should be contained by constructing dykes or applying inert absorbent; for release to water, damming and/or water diversion should be utilized to minimize the spread of contamination. Applicable government authorities should be notified if the environment may be adversely affected.

Elemental sulphur will be transported to site in liquid form in heated tankers. In the event of a spill the sulphur will quickly solidify to a relatively inert substance that can easily be recovered and returned to the supplier for reprocessing.

Cobalt sulphate is a toxic, odourless pink crystalline powder that may cause irritation to skin, eyes or respiratory tract if contact is made. Ingestion can cause nausea, gastrointestinal upset and abdominal pain. Proper protective handling measures should be taken and spills cleared up. Cobalt sulphate should not be allowed to enter the streams and should not be disposed of with normal garbage; special disposal is required.

Organic reagents will be used as industrial solvents in the process plant. Potential spills may occur during transportation to site, transfer to storage facilities and during use. If a spill occurs, the product should be collected for recovery or disposal, the area should be ventilated, and release to watercourses should be avoided.

Kerosene is an organic solvent that will be used to aid the organic reagents. As with the organic reagents, spills will be recovered and/or disposed of and the handling areas will be kept well ventilated. Initial spill response to a kerosene spill is to stop the flow if possible, eliminate open flame ignition processes, contain flow of oil by dyking, barricading or blocking flow by any means available (use earth moving equipment as available), and preventing the spill from reaching open water. If fire is involved, CO_2 should be used in dry chemical, foam, or water

spray (fog) to fight the fire. Fog streams are a means used to protect rescue team and trapped people and to cool surface tanks. Alternatively, fuel is diverted to an open area where it is left to burn off under controlled conditions. If the fire is extinguished before it is fully consumed, there is a chance of re-ignition. Contact with strong oxidizing agents (e.g. ammonium nitrate) may ignite the product, or cause it to explode. Unburned kerosene can be recovered by soaking up with sand, straw, peat moss, or by commercial sorbents (e.g. Graboil). Contaminated soil should be excavated and seepage entering the ground should be recovered by digging sumps or trenches and pumping from below the water table. Spills to surface waters should be collected and recovered by booms, sorbents such as Graboil, or collected by a liquid/solid vacuum cleaner. Recovery materials should be incinerated under controlled conditions with the approval of the Territory Emergency Response Officer or burned at an approved site.

Copper cathode is not regarded as being a hazardous material and will be secured down by strapping and covered for truck transportation.

10.10 SPILL RESPONSE PLAN IMPLEMENTATION AND AMENDMENT

Warning signs are part of the chemical spill prevention program and will be posted at all material storage and use areas. These signs are posted to remind people of the nature of the material, potential hazards and to promote safe work practices. Copies of the Spill Contingency and Emergency Response Plan will be maintained by the Safety Officer. Response tables will be posted in appropriate areas of the processing facilities in highly visible locations. Material Safety Data Sheets (MSDS) and WHMIS sheets will be kept accessible to personnel at appropriate locations, including the Mine Managers office, line Superintendent offices, Safety and Environmental Supervisors offices, first aid room and ambulance. Material safety data sheets for some of the substances likely to be found at the Carmacks Copper project mine site will be provided.

All workers will be trained in the following area to ensure that implementation of the Spill Contingency and Emergency Response Plan is possible:

- Handling and clean-up of hazardous materials and combinations of hazardous materials on site;

- Fire fighting and fire suppression;
- First Aid (St John Advanced First Aid); and
- Supply and maintenance of equipment needed to control and clean-up any incidents.

Copies of the plan will also be sent to the following people:

- Village of Carmacks;
- RCMP in Carmacks;
- Whitehorse General Hospital;
- Environment Canada Spill Centre;
- YG Water Resources, Inspection Section;
- YG Energy, Mines and Resources, Minerals Development Branch;
- LSCFN Office; and
- YG Energy, Mines and Resources, Client Services & Inspection Branch, Village of Carmacks Natural Resource Officer.

The Spill Contingency and Emergency Response Plan will be updated internally on a quarterly basis or as necessary. An updated Spill Contingency and Emergency Response Plan will be provided to the appropriate regulatory authorities on an annual basis.

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Appendix A

Material Safety Data Sheets

1. Gasoline
2. Diesel
3. Propane
4. Antifreeze

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Appendix A - 1

Gasoline MSDS

MATERIAL SAFETY DATA SHEET

Product Name: Regular Unleaded Gasoline (3392)

SECTION 1 – PRODUCT IDENTIFICATION AND USE

Product name	Regular Gasoline (unleaded) ***Note: All Irving gasolines are***	**PIN #, UN #**	1203
Chemical name	Natural gasoline	**TDG, DOT class**	Class 3
Common names and	Automotive gasoline	**Packing group**	II
Product use	Fuel	**Shipping name**	Gasoline; Motor spirit; or Petrol

WHMIS classification	Flammable liquid	Class B Division 2
	Very toxic material	Class D Division 2 Subdivision A

Hazard codes	**NFPA**	Health	1	**HMIS**	Health	1
		Flammability	3		Flammability	3
		Reactivity	0		Reactivity	0

NFPA & HMIS Ratings: 0=Insignificant/No Hazard. 1=Slight Hazard. 2=Moderate Hazard. 3=High/Serious Hazard. 4=Extreme/Severe

Supplier	Irving Oil Limited, Refining Division	**Phone**	(506) 202-2000
	Box 1260, Saint John	**Emergency**	1-800-424-9300
	New Brunswick Canada E2L 4H6	**Refinery**	(506) 202-3000

SECTION 2 – HAZARDOUS INGREDIENTS

			ACGIH-TLVs (2004) (ppm)		OSHA PELs (ppm) (2004) (general industry)			NIOSH RELs (2004) (ppm)			
Ingredients	**CAS#**	**Wt (%)**	TWA	STEL	TWA	STEL		TWA	STEL	**LD_{50}** (rat, oral)	**LC_{50}** (rat, 4 hours)
Gasoline	8006-61-9	100	300	500	Not available			Not available		13.6 g/kg	43 g/m^3
Contains a variety of aromatic and aliphatic hydrocarbons including:											
Benzene	71-43-2	NAv	0.5	2.5	1	5	None	0.1	1.0	0.9 g/kg	13,200 ppm
n-Hexane	110-54-3	NAv	50	None	500	None	None	50	None	0.025 g/kg	48,000 ppm
Toluene	108-88-3	NAv	50	None	200	300	500	100	150	0.636 g/kg	49 g/m^3

Gasoline is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Gasoline contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.

SECTION 3 – PHYSICAL DATA

Form	Liquid	**Specific gravity**	Typically 0.72 to 0.76 @ 15°C
Colour	Clear to yellow	**Vapour density**	Typically 2.5 to 3.7 (air = 1)
Odour	Characteristic odour	**Vapour**	Variable: 400 to 775 mm Hg @ 20°C
Odour	About 0.1 ppm	**Evaporation rate**	Rapid. ~4. (Butyl acetate = 1)
pH	NAp	**Boiling point**	29 to 217°C (85 to 424°F)
Coefficient of water/oil	NAv. Expected to be >1	**Freezing point**	NAv

SECTION 4 – FIRE AND EXPLOSION HAZARDS

Flammability ☒ Yes ☐ No **Conditions** Easily ignited by heat, sparks or flames.

Flash point	Typically about -43°C (-45°F) (cc)	**Auto ignition**	Typically 257°C (494°F)
Lower flammable	Typically 1.4%	**Upper flammable limit**	Typically 7.6%

Explosion data: Sensitivity **Mechanical impact** Not expected to be sensitive **Static discharge** Vapour: yes

Means of extinction	In general, do not extinguish fire unless flow can be stopped. Use carbon dioxide, dry chemical, or foam. Cool containers with flooding quantities of water until well after the fire is out.
Special precautions	Vapour is heavier than air. It will spread along the ground & collect in low or confined areas (sewers, basements). Also travels to source of ignition and flash back. Containers may explode when heated.
Hazardous combustion	Carbon monoxide. Nitrogen oxides. PAHs, phenols, and other aromatic hydrocarbons.

SECTION 5 – REACTIVITY INFORMATION

Stability	Stable
Conditions to avoid	Sources of ignition. Static discharges. High temperatures.
Incompatible substances	Oxidizers such as peroxides, nitric acid, and perchlorates.
Hazardous decomposition products	Carbon monoxide, nitrogen oxides, and numerous aromatic hydrocarbons.

SECTION 6 – HEALTH HAZARD INFORMATION

Route of Entry

- ☐ **Eye**
- ☒ **Skin absorption**
- ☒ **Inhalation**
- ☒ **Ingestion**

Hazardous

- ☒ **Eye**
- ☒ **Skin contact**

Acute exposure Headache, nausea, dizziness and other symptoms of central nervous system (CNS) depression. Aspiration into the lungs can cause severe pneumonitis (serious lung irritation), with coughing, gagging, shortness of breath, chest pain, and/or pulmonary edema (swelling).

Chronic exposure Peripheral & CNS damage, such as tremors, hallucinations, memory loss, & impaired mental capacity. Damage to kidneys and blood-producing system. Prolonged skin contact may cause

Carcinogenicity EPA, IARC, and NIOSH consider gasoline to be a suspected (potential) carcinogen. ACGIH refers to gasoline as a confirmed animal carcinogen with unknown relevance to humans. NTP and OSHA have not classified gasoline for carcinogenicity. Benzene is a recognized carcinogen

Teratogenicit Yes (toluene)

Reproductive toxicity NAv

Mutagenicity Not known to be mutagenic

Irritancy Skin eyes, and respiratory tract. Very serious irritant if trapped against skin.

Sensitization No

Toxicologically synergistic Other CNS depressants can be expected to produce additive or synergistic effects.

SECTION 7 – FIRST AID

Inhalation Move victim to fresh air. Give artificial respiration if breathing has stopped and if a qualified AR administrator is available. Apply CPR if both pulse and breathing have stopped. Obtain medical attention immediately.

Ingestion Never give anything by mouth if the person is unconscious, rapidly losing consciousness, or convulsing. If the person is conscious, have them drink 8 to 10 ounces of water or milk to dilute the material in the stomach. **Do not** induce vomiting. If vomiting occurs spontaneously, have the person lean forward to avoid aspiration. Obtain medical attention immediately.

Eye If irritation occurs, flush eye with lukewarm, gently flowing fresh water for at least 10 minutes.

Skin Quickly and gently blot away excess chemical. Remove contaminated clothing and shoes. Wash skin gently and thoroughly with water and non-abrasive soap. Obtain medical assistance.

SECTION 8 – PRECAUTIONARY MEASURES

Personal protective equipment	**Gloves**	Nitrile, Viton™, Responder®, Tychem®BR/LV, or Tychem®TK preferred.
	Eye	Chemical safety goggle or face shield, as a good general safety practice.
	Respiratory	NIOSH-approved. SCBA or air line respirator with escape cylinder for confined spaces. A qualified occupational health and safety professional should advise on respirator selection. If an air-purifying respirator is appropriate, use a “P series” filter & organic vapour cartridges.
	Clothing & footwear	Coveralls to prevent skin contact with product. If clothing or footwear becomes contaminated with product, completely decontaminate it before re-use, or discard it.

Engineering controls	Enclose processes. Use local exhaust ventilation to remove vapour at its site of generation. Handle laboratory samples in a fume hood. Use mechanical ventilation in confined spaces.
Handling procedures & equipment	Eliminate all sources of ignition. Ensure that ventilation systems are explosion-proof, non-sparking, and grounded. Use intrinsically-safe electrical systems. Ground and bond transfer containers. Keep containers closed. Have safety shower and eyewash in the work area. Never siphon gasoline by mouth.
Leak & spill Procedure	Keep unauthorized persons away. Eliminate all sources of ignition. Ventilate area. Stop leak if it can be done safely. Prevent entry into sewers, waterways, or confined spaces. Small spills: Contain with earth, sand, or non-flammable absorbent material. Shovel (non-sparking tools) into clean, dry, labelled containers and cover. Flush area with water. Large spills: Contact emergency services for advice.
Waste	Contact appropriate governmental agencies for approved disposal of material.
Storage	Cool, dry, well-ventilated area, out of direct sunlight. No ignition sources or incompatible materials. Containers should be grounded, vented and equipped with a flame arrester. Consider leak detection and alarm equipment for storage area.
Shipping	Load at normal temperature (up to 38^{o}C) and pressure. Bond and ground containers for transfer.

SECTION 9 – PREPARATION DATE OF MSDS

Prepared by	Irving Oil Limited, Refining Division	**Phone**	(506) 202-3000
Revision date	July 26, 2005	**To re-order MSDS,**	(506) 202-2000

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Appendix A - 2

Diesel MSDS

MATERIAL SAFETY DATA SHEET

Product Name:
Diesel Fuel (3092)

SECTION 1 – PRODUCT IDENTIFICATION AND USE

Product name	Diesel Fuel	**PIN #, UN #**	1202
Chemical name	None	**TDG, DOT class**	Class 3
Common names and	API No. 2 fuel oil. Home heating oil No. 2. Number 2 burner oil.	**Packing group**	III
Product use	Fuel	**Shipping Name**	Diesel Fuel
WHMIS classification	Combustible liquid Class B Div 3 (Very) toxic Class D Div 1 Subdivision A – sulphur (S)-containing, or Div 2 Subdivision B – no S		

Hazard codes

NFPA	Health	4 for S-containing. 1 if no S	**HMIS**	Health	4 for S-containing. 1 if no S
	Flammability	2		Flammability	2
	Reactivity	0		Reactivity	0

NFPA & HMIS Ratings: 0=Insignificant/No Hazard. 1=Slight Hazard. 2=Moderate Hazard. 3=High/Serious Hazard. 4=Extreme/Severe Hazard.

Supplier	Irving Oil Limited, Refining Division	**Phone**	(506) 202-2000
	Box 1260, Saint John	**Emergency (Chemtrec)**	1-800-424-9300
	New Brunswick Canada E2L 4H6	**Refinery**	(506) 202-3000

SECTION 2 – HAZARDOUS INGREDIENTS

Ingredients	**CAS#**	**Wt** (%)	**ACGIH-TLVs** (2004)	**OSHA PELs** (2004) (general industry)	**NIOSH RELs** (2004)	**LD_{50}** (rat, oral)	**LC_{50}** (rat, 4 hours)
Diesel fuel	68476-30-2	100	100 mg/m^3 TWA (vapour & aerosol)	NAv for this product name or CAS#		>5 g/kg	~5g/m^3
May contain:							
Benzene	71-43-2	Trace	0.5 ppm TWA 2.5 ppm STEL	10 ppm TWA 25 ppm CEILING 50 ppm PEAK	0.1 ppm TWA 1.0 ppm STEL	0.9 g/kg	13,200 ppm
Polycyclic aromatic hydrocarbons (PAHs)	Various	Up to 10	Various	Various	Various	Various	Various
which may include:							
Naphthalene	91-20-3	Trace	10 ppm TWA 15 ppm STEL	10 ppm TWA	10 ppm TWA 15 ppm STEL	0.49 g/kg	>170 mg/m^3
May also contain:							
Sulphur	7704-34-9	Varied	NAv	NAv	NAv	>0.008 g/kg	NAv
which may result in the evolution of:							
Hydrogen sulphide (H_2S)	7783-04-6	NAp	10 ppm TWA 15 ppm STEL	20 ppm CEILING 50 ppm PEAK	10 ppm CEILING	NAp	444 ppm

Product may also contain dye, at concentrations well below the lowest reporting limit, i.e., 0.1%.

Diesel fuel is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Diesel fuel contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.

SECTION 3 – PHYSICAL DATA

Form	Slightly viscous, oily, liquid	**Specific gravity**	0.830 to 0.879 @ 20˚C
Colour	Yellowish-brown	**Vapour density**	NAv
Odour	Rotten eggs if sulphur present; kerosene-like if sulphur-free	**Vapour pressure**	2.12 to 26.4 mm Hg @ 21˚C
	Note: H_2S deadens the sense of smell. Absence of rotten egg smell does <u>not</u> mean absence of H_2S.	**Evaporation rate**	NAv
		Boiling point	160 to 358˚C (321 to 676˚F)
Odour threshold	<0.15 ppm for H_2S. Not available for sulphur-free product.	**Freezing point**	NAv
Coefficient of water/oil distribution	3.3 to 7.06 (Log K_{ow})	**pH**	NAp

SECTION 4 – FIRE AND EXPLOSION HAZARDS

Flammability ☒ Yes ☐ No **Conditions** Easily ignited by heat, sparks or flames.

Flash point 38 to 54˚C (100 to 130˚F) (cc) **Auto ignition temperature** 257°C (494˚F)

Lower flammable limit 0.6 to 1.3% **Upper flammable limit** 6 to 7.5%

Explosion data: Sensitivity to: **Mechanical impact** Not expected to be sensitive **Static discharge** Vapour: yes

Means of extinction In general, do not extinguish fire unless flow can be stopped. Use carbon dioxide, dry chemical, or foam. Cool containers with flooding quantities of water until well after the fire is out.

Special precautions Vapour is heavier than air. It will spread along the ground & collect in low or confined areas (sewers, basements). Travels to source of ignition and flashes back. Containers may explode when heated.

Hazardous combustion products Carbon monoxide. Nitrogen oxides. PAHs and other aromatic hydrocarbons. H_2S and sulphur dioxide (SO_2) if product contains sulphur.

SECTION 5 – REACTIVITY INFORMATION

Stability	Stable
Conditions to avoid	Sources of ignition. Static discharges. High temperatures.
Incompatible substances	Oxidizers such as peroxides, nitric acid, and perchlorates.
Hazardous decomposition products	H_2S and SO_2 if product contains sulphur. Carbon monoxide, nitrogen oxides, and numerous aromatic hydrocarbons.

SECTION 6 – HEALTH HAZARD INFORMATION

Route of Entry ☒ **Inhalation** ☒ **Ingestion** ☐ **Eyes** **Hazardous Contact** ☒ **Eye**
☒ **Skin absorption** Diesel fuel itself, as well as benzene & naphthalene ☒ **Skin contact**

Acute exposure

Coughing, headache, and giddiness following inhalation. Aspiration into the lungs can cause severe pneumonitis (serious lung irritation), with coughing, gagging, shortness of breath, chest pain, and/or pulmonary edema (fluid in the lungs). Ingestion may produce nausea, vomiting, and cramping. Kidney effects and systemic edema have been reported after severe exposure.

H_2S is very toxic. At concentrations as low as 1 to 5 ppm, nausea and severe eye irritation may occur. Sense of smell may be impaired at about 20 ppm, with headache and respiratory tract lung irritation. At 250 to 500 ppm, potentially fatal pulmonary edema may occur. Dizziness, sudden (often fatal) collapse, unconsciousness, and death occur at higher concentrations. Note: Pulmonary edema may be delayed as long as 48 hours after exposure.

Chronic exposure Kidney, gastrointestinal, blood, and skin disorders. Headache, nausea, vomiting. Fatigue, and severe nervous and respiratory system symptoms may follow survival of H_2S poisoning.

Carcinogenicity

Benzene and certain PAHs are known to be carcinogenic. Exposure to fuel oils during refining is considered "probably carcinogenic to humans".

IARC and NTP classify untreated and mildly treated mineral oils as known human carcinogens. ACGIH, EPA, NIOSH, and OSHA have not classified them.

Mutagenicity	Not known to be mutagenic
Sensitization	No
Irritancy	Skin and respiratory tract
Teratogenicit	Not available
Reproductive toxicity	Not available

Toxicologically synergistic products Other CNS depressants can be expected to produce additive or synergistic effects.

SECTION 7 – FIRST AID

Inhalation	Move victim to fresh air Give artificial respiration if breathing has stopped and if a qualified AR administrator is available. Apply CPR if both pulse and breathing have stopped. Obtain medical attention immediately.
Ingestion	Never give anything by mouth if the person is unconscious, rapidly losing consciousness, or convulsing. If the person is conscious, have them drink 8 to 10 ounces of water or milk to dilute the material in the stomach. **Do not** induce vomiting. If vomiting occurs spontaneously, have the person lean forward to avoid aspiration. Obtain medical attention immediately.
Eye	If irritation occurs, flush eye with lukewarm, gently flowing fresh water for at least 10 minutes.
Skin	Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes under running water. Wash gently and thoroughly with water and non-abrasive soap. Obtain medical assistance.

SECTION 8 – PRECAUTIONARY MEASURES

Do not attempt rescue of an H_2S knockdown victim without the use of proper respiratory protective equipment.

Personal protective equipment

Gloves	Nitrile, Viton™, Polyvinylchloride, Tychem®BR/LV, or Tychem®TK preferred.
Eye	Chemical safety goggles or face shield, as a good general safety practice.
Respiratory	NIOSH-approved SCBA or air line respirator with escape cylinder for confined spaces or work with sulphur-containing product. A qualified occupational health and safety professional should advise on respirator selection. If an air-purifying respirator is appropriate, use a "P series" filter & organic vapour cartridges.
Clothing & footwear	Coveralls to prevent skin contact with product. If clothing or footwear becomes contaminated with product, completely decontaminate it before re-use, or discard it.

Engineering controls	Enclose processes. Use local exhaust ventilation to remove vapour at its site of generation. Handle laboratory samples in a fume hood. Use mechanical ventilation in confined spaces.
Handling procedures & equipment	Avoid heating open containers of product so as to minimize vapour production and accumulation. Use non-sparking equipment, explosion-proof ventilation, and intrinsically safe electrical equipment. Ground handling equipment. Have clean emergency eyewash and shower readily available in the work area.
Leak & spill Procedure	Keep unauthorized persons away. Eliminate all sources of ignition. Ventilate area. Stop leak if it can be done safely. Prevent entry into sewers, waterways, or confined spaces. Absorb or cover with dry earth, sand or other non-combustible material and use clean, non-sparking tools to transfer to container.
Waste disposal	Consult local authorities for advice.
Storage	May be stored at ambient temperatures. Containers should be vented and equipped with a flame arrester.
Shipping	Stable during transport. May be transported hot.

SECTION 9 – PREPARATION OF MSDS

Prepared by	Irving Oil Limited, Refining Division	**Phone**	(506) 202-3000
Revision date	July 12, 2006	**To re-order MSDS, phone**	(506) 202-2000

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Appendix A - 3

Propane MSDS

MATERIAL SAFETY DATA SHEET

SECTION 1 – PRODUCT INFORMATION

Product Name:	Propane
Trade Name:	LPG (Liquefied Petroleum Gas), LP-Gas
Chemical Formula:	C_3H_8
WHMIS Classification:	Class A – Compressed Gas Class B, Division 1 – Flammable Gas

Supplier: Superior Propane
A Division of Superior Plus LP
1111 - 49th Avenue N.E.
Calgary, AB T2E 8V2
Business: (403) 730-7500

24-Hour Emergency Contact: Canutec (613) 996-6666

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.

SECTION 2 – HAZARDOUS INGREDIENTS

COMPONENTS	CASE NO.	% VOLUME (v/v)	LD_{50} (RAT, ORAL)
Propane	74-98-6	90% -99%	Not Applicable
Propylene	115-07-1	0% - 5%	Not Applicable
Ethane	74-84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106-97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:
Based upon animal test data, the acute toxicity of this product is expected to be inhalation: 4 hour LC50 = 280,000 ppm (Rat)

Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada. Exact composition will vary from shipment to shipment.

SECTION 3 – CHEMICAL AND PHYSICAL DATA

Form:	Liquid and vapour while stored under pressure
Boiling Point:	-42°C @ 1 atm
Freezing Point:	-188°C
Evaporation Rate:	Rapid (Gas at normal ambient conditions)
Vapour Pressure:	1435 kPa (maximum) @ 37.8°C
Vapour Density:	1.52 (Air = 1)
Coefficient of Water/ Oil Distribution:	Not available
pH:	Not available
Solubility in Water :	Slight, 6.1% by volume @ 17.8°C
Specific Gravity:	0.51 (water = 1)
Appearance/Odour:	Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.
Odour Threshold:	4800 ppm

With proper handling, transportation and storage, adding a chemical odourant such as ethyl mercaptan has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

SECTION 4 – FIRE OR EXPLOSION HAZARD

Flash Point: -103.4°C

Method: Closed cup

Flammable Limits: Lower 2.4%, Upper 9.5%

Auto Ignition T emperature: 432°C

Hazardous Combustion Products: Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.

Fire and Explosive Hazards : Explosive air -vapour allowed to leak to atmosphere.

Sensitivity to Impact: No

Sensitivity to Static Discharge: Yes

Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent flame impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus.

SECTION 5 – REACTIVITY DATA

Stability: Stable

Conditions T o A void: Keep separate from oxidizing agents. Gas explodes spontaneously when mixed with chloride dioxide.

Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible material, drains and openings to building.

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 6 – TOXICOLOGICAL PROPERTIES OF MATERIAL

Routes of Entry: Skin Contact, Eye Contact, Inhalation

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vapourizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: Contact with Liquefied Petroleum Gas may cause frostbite or cold burns. Propane acts as a simple asphyxiant as oxygen content in air is displaced by the propane. At increasing concentration levels, propane may cause dizziness, headaches, loss of coordination, fatigue, unconsciousness and death.

Chronic Exposure: No reported effects from long term low level exposure.

Sensitization to Product: Not known to be a sensitizer.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant.

ACGIH TLV: 1000 ppm

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported.

Other Toxicological Effects: None

SECTION 7 – PREVENTATIVE MEASURES

Eyes:	Safety glasses or chemical goggles are recommended when transferring product.
Skin:	Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.
Inhalation:	Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.
Ventilation:	Use in well-ventilated areas. Use with explosion proof mechanical ventilation in confined spaces or poorly ventilated areas.

SECTION 8 – EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.
Skin:	In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.
Ingestion:	None considered necessary.
Inhalation:	Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.
Spill or Leak:	Eliminate leak if possible. Eliminate source of ignition. Ensure cylinder is upright. Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

SECTION 9 – TRANSPORTATION, HANDLING AND STORAGE

- Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).
- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.
- Do not store with oxidizing agents, oxygen, or chlorine cylinders.
- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG)
TDG Classification: Flammable Gas 2.1

TDG Shipping Name: Liquefied Petroleum Gas (Propane)

PIN Number: UN1075

SECTION 10 – PREPARATION INFORMATION

Prepared by: Superior Propane
Health Safety and Environment Team

Telephone: (403) 730-7500
Revision: November 1, 2006
Supersedes: May 9, 2005

Western Copper Corporation

HEALTH AND SAFETY & EMERGENCY RESPONSE GUIDE – CONSTRUCTION VERSION JUNE 2008

CARMACKS COPPER PROJECT

YUKON

Appendix A - 4

Antifreeze MSDS

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **ESSO ANTIFREEZE/COOLANT**
Product Description: Glycol
MSDS Number: 8512
Intended Use: Antifreeze/coolant

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Products Division**
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada

24 Hour Environmental / Health Emergency Telephone	519-339-2145
Transportation Emergency Phone Number	519-339-2145
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
Ethylene Glycol	107-21-1	90 - 100%	Dermal Lethality: LD50 9.53 g/kg (Rabbit); Inhalation Lethality: LC50 4300 ppm (Rat); Oral Lethality: LD50 4.70 g/kg (Rat)

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

HEALTH EFFECTS

Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child. Danger of serious irreversible effects by a single exposure. Ingestion of ethylene glycol may result in nausea, vomiting, abdominal cramps, blindness, liver damage, irritation, reproductive effects, nerve damage, convulsions, edema of the lung, cardiopulmonary effects (metabolic acidosis), pneumonia and kidney failure which could result in death. The single lethal dose for humans is about 100 ml. Inhalation of high levels of vapour or mists for prolonged periods of time may also result in toxic effects. Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

Target Organs: Kidney | Reproductive system |

NFPA Hazard ID: Health: 1 Flammability: 1 Reactivity: 0

HMIS Hazard ID: Health: 2* Flammability: 1 Reactivity: 0

Note: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention.

NOTE TO PHYSICIAN

This product contains ethylene and/or diethylene glycol which, if ingested, is metabolised to toxic metabolites by the enzyme alcohol dehydrogenase, for which ethanol and 4-methylpyrazole {US drug name Fomepizole, trade name Antizol} are antagonists. Administration of oral or intravenous ethanol or intravenous 4-methylpyrazole may arrest further metabolism of this material and thereby ameliorate the toxicity. Use of ethanol or 4-methylpyrazole does not affect toxic metabolites that are already present and is not a substitute for haemodialysis.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, alcohol-resistant foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water or standard foam

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon, Smoke, Fume,

Aldehydes

FLAMMABILITY PROPERTIES

Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 400°C (752°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Do not touch or walk through spilled material. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Consult an expert. Warn other shipping. Material will sink. Remove material, as much as possible, using mechanical equipment.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Remove debris in path of spill and remove contaminated debris from shoreline and water surface. Dispose of according to local regulations. Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapour. Avoid contact with skin. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is not a static accumulator.

STORAGE

Do not store in open or unlabelled containers.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
Ethylene Glycol	Aerosol.	Ceiling	100 mg/m3			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No protection is ordinarily required under normal conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If prolonged or repeated contact is likely, chemical-resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Form: clear
Colour: green

Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 16 °C): 1.115 - 1.145
Flash Point [Method]: 116°C (240°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 3.2 UEL: 15.3
Autoignition Temperature: 400°C (752°F)
Boiling Point / Range: 197°C (387°F)
Vapour Density (Air = 1): 2.1 at 101 kPa
Vapour Pressure: 0.008 kPa (0.06 mm Hg) at 20°C
Evaporation Rate (N-Butyl Acetate = 1): 0.01
pH: 9 - 11
Log Pow (n-Octanol/Water Partition Coefficient): < 2
Solubility in Water: Complete
Viscosity: [N/D at 40°C]
Oxidizing properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/D
Pour Point: -13°C (9°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers, Acids, Alkalies

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

Route of Exposure	Conclusion / Remarks
INHALATION	
Toxicity (Rat): LC50 > 5000 mg/m³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures. Based on test data for structurally similar materials.
INGESTION	
Toxicity (Rat): LD50< 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Irritation (Rabbit): Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.

Eye	
Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

Contains:

ETHYLENE GLYCOL (EG): Repeated high oral exposure has caused kidney damage, neurological effects, degeneration of the liver and changes in blood chemistry and circulating blood cells in laboratory animals. Repeated overexposure has the potential to cause similar toxic effects in humans. EG causes developmental and reproductive effects at high dose levels in laboratory animals. The relevance of these findings to humans is uncertain. However, as a precaution, avoid exposure during pregnancy.

Additional information is available by request.

CMR Status: None.

Chemical Name	CAS Number	List Citations
Ethylene Glycol	107-21-1	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Material -- Expected to remain in water or migrate through soil.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Even though this product is readily biodegradable, it must not be indiscriminately discarded into the environment. Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning (where applicable): Empty containers may retain residue and can be dangerous. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG) : Not Regulated for Land Transport

LAND (DOT)

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S. (Ethylene Glycol)
Hazard Class & Division: 9
ID Number: 3082
Packing Group: III
ERG Number: 171
Label(s): 9
Transport Document Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S., 9, UN3082, PG III, RQ (ETHYLENE GLYCOL)

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Class D, Division 2, Subdivision A: Very Toxic Material

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

CEPA: All components of this material are either on the Canadian Domestic Substances List (DSL), exempt, or have been notified under CEPA.

NATIONAL CHEMICAL INVENTORY LISTING: DSL, TSCA

The Following Ingredients are Cited on the Lists Below: None.

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 16: Water Spill was modified.
Section 01: Product Identification Product Name was modified.
Section 11: Chronic Tox - Component - WHMIS was added.
Section 11: Chronic Tox - Component - Header was added.
Section 11: Other Health Effects Header was added.
Section 11: Other Health Effects Header was deleted.
Section 16: Fire Fighting Media - Header was deleted.
Section 16: Fire Fighting Media - Header was deleted.
Section 11: Chronic Tox - Component was deleted.
Section 11: Chronic Tox - Component - Header was deleted.

Precautionary Label Text:
WHMIS Classification: Class D, Division 2, Subdivision A: Very Toxic Material

HEALTH HAZARDS
Danger of serious damage to health by prolonged exposure. May cause harm to the unborn child. Danger of serious irreversible effects by a single exposure.

Target Organs: Kidney | Reproductive system |

FIRST AID
INHALATION: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention.

Skin: Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

SPILL/LEAK
Land Spill: Stop leak if you can do so without risk. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Recover by pumping or with suitable absorbent. Do not touch or walk through spilled material.

Water Spill: Stop leak if you can do so without risk. Report spills as required to appropriate authorities. Material will sink. This product emulsifies, disperses or is miscible in water. Consult an expert.

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DGN: 5007470 (1002960)

Prepared By: Imperial Oil Limited, IH and Product Safety

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

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YUKON

Appendix K

Heritage Resources Protection Plan

Western Copper Corporation

HERITAGE RESOURCES PROTECTION PLAN

Construction Version – October 2008

CARMACKS COPPER PROJECT

ACCESS CONSULTING GROUP

Table of Contents

1.0 Introduction

The Carmacks Copper Project is a proposed copper mine located some 38 km northwest of the Village of Carmacks on Williams Creek, about 8 km west of the Yukon River. The property is currently accessible via the Klondike Highway to Carmacks, then 33 km along the Freegold Road to the property exploration and a further 13 km to the site. As the exploration road is unsuitable for mine development a private access road will be constructed from km 31 on Freegold Road.

The following Heritage Resources Protection Plan has been assembled to address the potential discovery of previously unknown heritage resources during the course of the project and provide a protocol for reporting and protecting these resources. For reference, the following definitions of heritage resources are provided:

- Heritage (or Historic) Resource – abandoned sites and objects greater than 45 years in antiquity. Cabins, caches, graves, brush camps, and other man-made structures, features or objects are the most readily recognized.
- Archaeological Resource – tend to date before European contact and found on or under the ground surface, generally consisting of the remains of ancient camps, hearths, stone tools and debris.
- Palaeontological Resource – fossil and other remains of extinct or prehistoric plants and animals including bones of mammoth, horse, bison and other ice age fauna as well as fossil remains and traces plants, vertebrate and invertebrate fauna.

2.0 Heritage Resources Protection Plan

As a component of cross-cultural awareness training, all employees at the Carmacks Copper mine will be informed of the value of heritage resources, Yukon laws and company policies prohibiting disturbance of these sites. Instruction on the identification of heritage resources will also be included in the employee training. It is anticipated that an environmental monitor and field crews will recognize features indicating the presence of these resources as well as the actual resources (majority of heritage sites occur within 100 m of waterbodies).

Heritage site surveys have been completed within the Williams Creek and Nancy Lee Creek valleys and along the proposed mine access road as well as at locations with high potential for heritage sites. Sites identified are located outside of the mine footprint (lower Williams Creek and Yukon River as well as Crossing Creek) and will not be disturbed.

No activities would occur in the vicinity of known heritage resources unless approved in writing by the appropriate authorities. Before commencing any project activities that may disturb known heritage resources, the area would be appropriately marked in the field. Development is prohibited within 30 m of a known or suspected heritage site.

2.1 Response to Discovery of Heritage Resources

The following response will be implemented to provide protection for any heritage resources discovered during:

- Land clearing;
- Road and trail construction/use; and
- Excavation and placement of soils/rock in areas proposed for development.

Notification & Preliminary Response	• In the event previously unknown heritage resources are discovered, operations will be suspended and the site will immediately be marked and protected from further disturbances and no objects will be removed. • Notification will be provided to Yukon Government Heritage Resources Branch at (867)667-5363 and the LSCFN at (867)863-5576 and they will be consulted for advice on mitigation. • No further activities may be carried out within 30 m of the site until Yukon Government indicates in writing that the activities may be resumed.
Archaeological Resources	• Any site containing archaeological objects discovered in the course of carrying out operations will, as soon as practicable, be reported to the Yukon Archaeology Program, Government of Yukon in Whitehorse at (867)667-3771 or (867)667-5386.
Palaeontological Resources	• Any site containing palaeontological resources discovered will, as soon as practicable, be reported to the Yukon Palaeontology Program, Government of Yukon in Whitehorse at (867)667-8089 or 1-800-661-0408.
Human Remains	• If human remains or burial sites are discovered, work will cease immediately and the RCMP notified. The Guidelines Respecting the Discovery of Human Remains and First Nation Burial Sites in the Yukon will be followed.

Western Copper Corporation

STAGE 1 CONSTRUCTION SITE PLAN

CARMACKS COPPER PROJECT

YUKON

Appendix L

Wildlife Protection Plan

Western Copper Corporation

WILDLIFE PROTECTION PLAN

Construction Version – October 2008

CARMACKS COPPER PROJECT

ACCESS CONSULTING GROUP

Wildlife surveys in the vicinity of the Carmacks Copper Project were first completed in 1992, with additional surveys being completed in 1994, 2003, 2005 and 2006 (Access Consulting Group, 2007). Surveys have identified a number of wildlife species in the area, including moose, woodland caribou, grizzly and black bear, wolf, coyote, lynx, snowshoe hare, marten, as well as a variety of bird species and small mammals. No evidence of caribou or moose calving grounds was observed, and to date no observations of denning bears or wolverine have been recorded. High quality nesting habitat for peregrine falcon and golden eagle is available along the cliff banks of the Yukon River, as well as other cliffs in the project area. However, these raptors have not been observed during field surveys. As described in the Project Proposal, wildlife monitoring will be ongoing throughout all phases of the mine, including post-closure.

The Carmacks Copper Project is located in the Central Yukon Plateau ecoregion, which contains wildlife habitat and supports important wildlife species. Populations of birds, mammals, and possibly amphibians exist at the project site. Grizzly and wolverine denning, and ungulate winter range are of prime concern, and protection of these areas will mainly be focused on avoiding disturbance (although the project does not infringe on any known sites). The objective of the procedures described below is to mitigate adverse impacts on wildlife by minimizing disturbance to the animals and their habitat, and minimizing disruption of their free movement.

Topic of Concern	**Protection Measures**
General	• All incidents and interactions with wildlife shall be reported to the District Conservation Officer in Faro at (867) 994-2862, as well as any other communication regarding wildlife. • Every effort shall be made to avoid disturbing wildlife.
Socio-economic	• To avoid disturbance of any trap line or traditional trails that may be affected by the project, appropriate crossing locations along the mine site access road will be discussed with trapping concession holder #147 and breaks in the snow banks will be left at these crossing points. • Discussions will take place with trapping concession holder #147 for relocating, repairing, and/or re-establishment of the trapping trails that are in proximity to the mine site to comparable or better condition. • Employees will be instructed to make every reasonable effort to avoid interference with trapline trails. Any trails used or crossed will be restored

Topic of Concern	Protection Measures
	by slashing any trees that fall across these trails in the course of construction and operation. Debris and snow piles pushed across the trails will be removed. • The outfitter for Concession #13 will be contacted prior to construction to identify areas where outfitting activities will be taking place in the upcoming outfitting season. Construction activities will avoid interfering with outfitting activities, where possible.
Access Management	• Public access to the site will be controlled by means of a gate at the junction of the Freegold Road and the mine access road until the mine access road is decommissioned. Upon commencement of operations this gate will be controlled. A main gatehouse will be located at the site to prevent unauthorized vehicle access to the project area. • Speed limits will be enforced for mine traffic and posted along the access and site roads (maximum 40 km/hr, reduced to 20 km/hr at blind corners and bridge crossings). Mine traffic between Carmacks and the mine site will be radio controlled for safety and speed control. • To the maximum extent possible employees will be encouraged to take advantage of project bussing and transportation from Carmacks to the mine site, thereby minimizing hunting opportunities and direct road mortalities; • Private employee off-road and on-road vehicles will be prohibited on the access road and at the mine site. • Existing trails and disturbed areas will be used where possible to minimize the addition of new linear corridors and there will be no unnecessary disturbance to the organic mat and soils. • Subject to safety considerations, new trails, roads, or cut-lines will be doglegged to prevent predator line of sight into new habitat. • Snow plows on the access road will create breaks in the snow berm every 0.5 km to allow for wildlife to escape from the access road.
Air Traffic	• Follow aircraft flight guidelines (e.g., flight corridors and minimum altitudes) except when poor weather conditions require that a different flight path be followed. • Maintain a minimum flying altitude of 600 m (2,000 feet) in areas where wildlife concentrations occur (e.g., caribou or moose calving), except where flights at lower altitudes have been approved and are within safety limits. • Avoid areas to be used for outfitting activities in the upcoming outfitting season where practical.

Topic of Concern	Protection Measures
Harassment	• As provided for in sections 92 and 93 of the *Wildlife Act*, the proponent shall not harass wildlife or encourage wildlife to become a public nuisance. • Employees will undergo wildlife education, which will encompass no wildlife feeding, wildlife avoidance, and bear awareness among other topics. • Project personnel will not be allowed to have pets on the project site.
Ecologically Sensitive Areas	• Every precaution will be taken to avoid disturbance of wildlife sensitive areas, including but not limited to denning or nesting sites. • Vegetative buffer zones will be maintained around stream riparian areas and facilities to minimize wildlife disturbance and protect wildlife corridors.
Wildlife Movement	• Measures will be implemented to reduce any impediment of wildlife movements, including ploughing back snow banks and ensuring sufficient breaks in the bank to provide adequate sightlines for drivers and wildlife escape. • All project activities will be maintained to the project area. Personnel movement will be restricted to the project area and access routes. Wildlife movements will not be restricted. • Windrows will not be created so that wildlife movements are not restricted, and fire hazards are minimized.
Wildlife Mortality	• Speed limits and signage at possible wildlife crossings will be posted to minimize vehicle/wildlife collisions. • Collisions between wildlife and project vehicles along the Freegold Road will result in changes to the Traffic Management Plan to minimize these effects. • Once the Heap Leach Pad, Events Pond, and Process Area are constructed, they will be enclosed with fencing to prevent entrance and injury or mortality of wildlife. • An electric fence will encompass the commercial dump area and incinerator.
Wildlife Monitoring	• Wildlife monitoring is outlined within the Western Copper Environmental Monitoring Program and includes maintaining a wildlife observation log onsite; reporting wildlife encounters; monitoring measures to ensure birds do not settle in ponds; and scheduled post-rut moose surveys. Environmental personnel on site will monitor project activities and modify operations to address wildlife concerns. • Wildlife monitoring responsibilities will include waterfowl and shorebirds within the events and sedimentation ponds during migration periods.

Topic of Concern	Protection Measures
Hunting and Fishing	• Project personnel will not be permitted to have firearms on the project site, unless authorized as a safety precaution. • Employees are prohibited from hunting and fishing while on the mine site or in the vicinity of the project area, including during travel to and from the site. Infringement of this policy will be reported and may result in disciplinary measures.
Migratory Birds	• Monitoring of measures to ensure waterfowl and shorebirds do not settle in ponds. Environmental personnel on site will monitor project activities and modify operations to address wildlife concerns. • Further measures to protect against impact on migratory birds will be discussed with the Canadian Wildlife Service. These discussions may include bird scaring devices and measures to ensure birds do not settle in the events or sedimentation ponds.
Bears	• The Company will have an employee bear awareness program. • The camp shall be equipped with bear deterrent devices and the devices shall be maintained in good working order throughout the duration of camp occupancy. • A Waste Management Plan is provided (section 6.0). Routine garbage patrols will be undertaken to remove materials, (e.g., metals, plastics, grease) which may be potentially harmful to wildlife. Garbage and debris destined for disposal will be collected routinely and prior to incineration stored in wildlife proof containers / fenced short term storage areas in a manner which does not attract wildlife to the mine site. Solid waste will be frequently and completely incinerated (once installed) in a manner which minimizes odours and eliminates the attraction of bears and other wildlife to the mine site. Nuisance bears shall be reported to Yukon Government authorities. • In the event that bears or other wildlife become a nuisance or problem at the camp, the Company will take appropriate measures such as the installation of a portable electrified fence around the perimeter of the camp.
Caribou	• Although the Tatchun caribou herd range is primarily east of the Yukon River and north of the Robert Campbell Highway, individuals may be observed on the project site. • If caribou are observed on the project site between 15 May and 30 June[1], construction activities will be minimized to reduce disturbance of caribou calving.

Topic of Concern	Protection Measures
Moose	• If moose are observed on the project site between 20 May and 10 June[2], construction activities will be minimized to reduce disturbance of moose calving.

[1] Boreal Caribou Committee (BCC). 2001. Strategic plan and industrial guidelines for boreal caribou ranges in northern Alberta. BCC, Edmonton, Alberta, Canada.
[2] Nette T. 2006. Large Mammal Biologist, Nova Scotia Department of Natural Resources. Personal communication.
Ward, R. 2006. Moose Biologist, Environment Yukon. Personal communication.