

Appendix 4

Categories 1, 2/3, and 4 Stockpiles and Ore Surge Pile Design and Category 1 Stockpile Groundwater Containment System Permit Application Support Drawings

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

Permit Application Support Drawings: Categories 1, 2/3, and 4 Stockpiles and Ore Surge Pile Design

August 2017 (version 3)

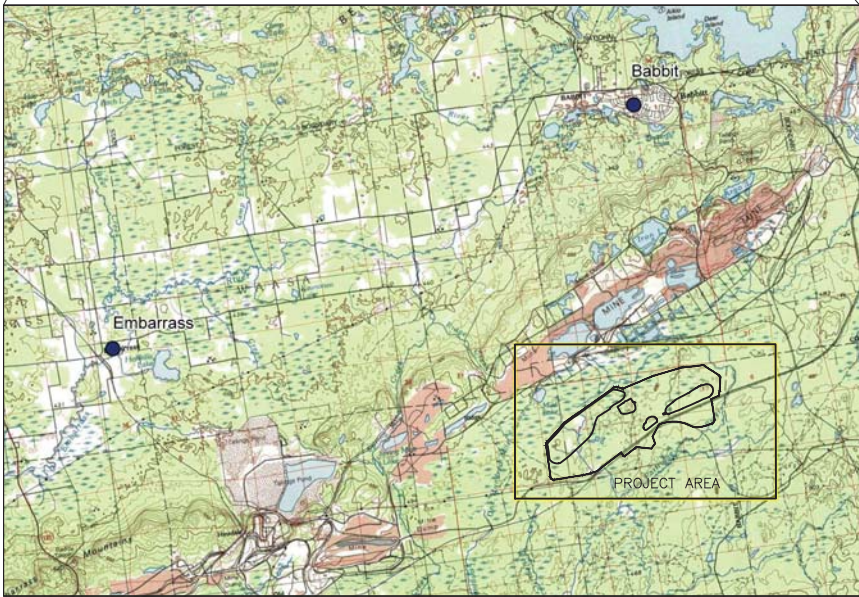
Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

| Drawing Sheet(s) | Change |
|---|---|
| Global change to all sheets, as needed | The terminology "mine drainage" as noted in these drawings will be changed to "mine water". |
| SKP-002, SKP-003, SKP-004, SKP-005, SKP-006, SKP-007, SKP-008, SKP-009, SKP-010, SKP-011, SKP-012, SKP-014, SKP-015, SKP-016, SKP-017, SKP-018, SKP-026, SKP-027, SKP-028, SKP-029, SKP-030 | The "Mine Site Boundary" will be replaced by the "Mining Area Boundary" as shown on figures included in the Permit to Mine Application. |

POLY MET MINING, INC. NORTHMET PROJECT
PERMIT APPLICATION SUPPORT DRAWINGS
CATEGORIES 1, 2/3, AND 4 STOCKPILES
AND ORE SURGE PILE DESIGN
HOYT LAKES, MINNESOTA







PROJECT LOCATION MAP



SITE LOCATION

| DRAWING LIST | | | |
|--------------|----------|---|--|
| SHEET NUMBER | REVISION | SHEET TITLE | |
| SKP-001 | G | TITLE SHEET AND LOCATION MAP | |
| SKP-002 | G | LEGEND, GENERAL NOTES AND SPECIFICATIONS | |
| SKP-003 | G | STOCKPILE LAYOUTS – MINE YEAR 1 LIMITS | |
| SKP-004 | G | STOCKPILE LAYOUTS – MINE YEAR 2 LIMITS | |
| SKP-005 | G | STOCKPILE LAYOUTS – AT PLANNED UTILIZATION LIMITS | |
| SKP-006 | G | STOCKPILE LAYOUTS – MINE YEAR 21 LIMITS CLOSURE CONFIGURATION | |
| SKP-007 | G | EXISTING SITE CONDITIONS | |
| SKP-008 | G | SITE LAYOUT AND LOCATION OF FIELD INVESTIGATIONS | |
| SKP-009 | G | DEPTH TO BEDROCK ISOPACH MAP | |
| SKP-010 | G | CATEGORY 1 STOCKPILE SUBGRADE EXCAVATION PLAN | |
| SKP-011 | G | CATEGORY 1 STOCKPILE MINE YEAR 1 CONTINGENCY CLOSURE CONFIGURATION | |
| SKP-012 | G | CATEGORY 1 STOCKPILE FINAL GRADES AND SUB-BASIN DELINEATION | |
| SKP-013 | G | CATEGORY 1 STOCKPILE DESIGN SECTIONS | |
| SKP-014 | G | CATEGORY 2/3 STOCKPILE SUBGRADE EXCAVATION PLAN | |
| SKP-015 | G | CATEGORY 2/3 STOCKPILE FOUNDATION GRADING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-016 | G | CATEGORY 2/3 STOCKPILE UNDERDRAIN PIPING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-017 | G | CATEGORY 2/3 STOCKPILE OVERLINER DRAINAGE PIPING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-018 | G | CATEGORY 2/3 STOCKPILE MAXIMUM CAPACITY CONFIGURATION | |
| SKP-019 | G | CATEGORY 2/3 STOCKPILE DESIGN SECTIONS | |
| SKP-020 | G | CATEGORY 4 STOCKPILE SUBGRADE EXCAVATION PLAN | |
| SKP-021 | G | CATEGORY 4 STOCKPILE FOUNDATION GRADING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-022 | G | CATEGORY 4 STOCKPILE UNDERDRAIN PIPING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-023 | G | CATEGORY 4 STOCKPILE OVERLINER DRAINAGE PIPING PLAN – MINE YEAR 1 AND MAXIMUM | |
| SKP-024 | G | CATEGORY 4 STOCKPILE MAXIMUM CAPACITY CONFIGURATION | |
| SKP-025 | G | CATEGORY 4 STOCKPILE DESIGN SECTIONS | |
| SKP-026 | G | ORE SURGE PILE SUBGRADE EXCAVATION PLAN | |
| SKP-027 | G | ORE SURGE PILE FOUNDATION GRADING PLAN | |
| SKP-028 | G | ORE SURGE PILE UNDERDRAIN PIPING PLAN | |
| SKP-029 | G | ORE SURGE PILE OVERLINER DRAINAGE PIPING PLAN | |
| SKP-030 | G | ORE SURGE PILE TYPICAL CONFIGURATION | |
| SKP-031 | G | ORE SURGE PILE DESIGN SECTIONS | |
| SKP-032 | G | CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER – MANAGEMENT DETAILS – SHEET 1 OF 2 | |
| SKP-033 | G | CATEGORY 1 STOCKPILE RECLAMATION AND OPERATIONS SURFACE WATER – MANAGEMENT DETAILS – SHEET 2 OF 2 | |
| SKP-034 | G | CATEGORY 1 STOCKPILE PHASED COVER DESIGN | |
| SKP-035 | G | CONSTRUCTION DETAILS | |

| VER NO | | DATE | DESCRIPTION | ISSUE STATUS | | | I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNATURE  PRINTED NAME BRENT R. BRONSON DATE 8/21/17. LICENSE # 46492 | DRAWN: MTM CHECKED:  GOLDER PROJECT NO.: 113-2209 SCALE: AS SHOWN |  POLYMET MINING POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | | | |
|--------|----------|------|---|------------------|--------------------------------|---------|--|--|---|--|--|-----|
| | | | | | | | | | | | | |
| A | 12/02/11 | | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | ISSUED | VERSION | DATE | | |  Golder Associates GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com | | | |
| B | 2/15/13 | | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | FOR PERMITTING | G | 8/21/17 | | | | | | |
| C | 5/29/13 | | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | | | | | | | |
| D | 1/14/14 | | ISSUED FOR AGENCY REVIEW | | | | | | | | | |
| E | 4/10/15 | | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | NOT APPROVED FOR CONSTRUCTION. | | | | | | | |
| F | 5/22/15 | | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | | | | | | | |
| G | 8/21/17 | | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | | | | | | | |
| | | | | | | | | | DWG. NO. SKP-001 | | | REV |

PLANT DRAWING NUMBER:

TITLE SHEET AND
LOCATION MAP



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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LEGEND

MAJOR FEATURE

EXISTING GROUND TOPOGRAPHY (SEE NOTE 2)

PROPOSED FINISHED GRADE TOPOGRAPHY

SLOPE DIRECTION

CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

SLOPE

HAUL ROADS

MINE SITE BOUNDARY

PIT BOUNDARY

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE LIMITS

MAXIMUM ORE, WASTE ROCK STOCKPILE LIMITS

GEOMEMBRANE BARRIER LAYER

PREPARED SUBGRADE

SOIL LINER 1

SOIL LINER 2

WASTE ROCK OR ORE

STRUCTURAL FILL

GRANULAR DRAINAGE MATERIAL 1

COMMON FILL 1

DRAIN ROCK

RIPRAP

RANDOM FILL

OVERBURDEN MATERIAL

VERTICAL PERCOLATION LAYER (USCS - ML)

LATERAL DRAINAGE LAYER (USCS - SP OR SM)

TERTIARY COLLECTION PIPING

4-INCH

PRIMARY AND SECONDARY COLLECTION PIPING

4-INCH

6-INCH

8-INCH

10-INCH

12-INCH

GATP-06-7

GOLDER ASSOC. TEST PIT (2006)

SB-05-01

BARR ENGINEERING BOREHOLES (2005)

RS-11

BARR ENGINEERING BOREHOLES (2008)

J003

AMERICAN ENGINEERING TESTING, INC. BOREHOLES (2010)

SHALLOW MARSH

CONIFEROUS SWAMP

HARDWOOD SWAMP

SHRUB SWAMP

CONIFEROUS BOG

OPEN BOG

SEDGE MEADOW

LIST OF ABBREVIATIONS

| | |
|--------|-------------------------------------|
| AMSL | ABOVE MEAN SEA LEVEL |
| CY | CUBIC YARD |
| DIA. | DIAMETER |
| EL. | ELEVATION |
| ET | EVAPOTRANSPIRATION |
| FT. | FEET |
| HDPE | HIGH DENSITY POLYETHYLENE |
| ID | INSIDE DIAMETER |
| IN. | INCH |
| LLDPE | LINEAR LOW DENSITY POLYETHYLENE |
| LCRS | LEAK COLLECTION AND RECOVERY SYSTEM |
| MAX. | MAXIMUM |
| MIN. | MINIMUM |
| N.T.S. | NOT TO SCALE |
| OD | OUTSIDE DIAMETER |
| SY | SQUARE YARD |
| TYP. | TYPICAL |
| ROMP | ROCK AND OVERBURDEN MANAGEMENT PLAN |
| USCS | UNIFIED SOIL CLASSIFICATION SYSTEM |
| CPEP | PERFORATED CORRUGATED POLYETHYLENE |

GENERAL NOTES:

- THIS DRAWING SET REPRESENTS THE DESIGN FOR PERMITTING FOR CATEGORY 1 STOCKPILE, CATEGORY 2/3 STOCKPILE, CATEGORY 4 STOCKPILE AND ORE, SURGE PILE FOR THE POLYMET NORTHMET PROJECT IN HOYT LAKES, MINNESOTA, PREPARED IN SUPPORT OF A PERMIT TO MINE. THE DRAWING SET ONLY INCLUDES INFRASTRUCTURE ASSOCIATED WITH THE MOVEMENT OF ROCK (STOCKPILES, PITS, HAUL ROADS, AND RAIL TRANSFER HOPPER) AND NOT OTHER SUPPORT FACILITIES.
- BASE TOPOGRAPHY PROVIDED BY BARR ENGINEERING IN AUGUST 2011.
- GOLDER ASSOCIATES INC. (GOLDER) IS RESPONSIBLE FOR STOCKPILE DESIGNS WITH BATTERY LIMITS DEFINED BY THE PERIMETER/LINER BERMS AND THE UNDERDRAIN SUMPS.
- AT THE BASIC ENGINEERING LEVEL, LIMITED GEOTECHNICAL DATA EXISTS, PARTICULARLY IN LOWLAND AREAS. ADDITIONAL DATA WILL BE OBTAINED FROM THESE AREAS AFTER THE PERMIT TO MINE IS APPROVED. SUBGRADE EXCAVATION PLANS WERE DEVELOPED USING AVAILABLE INFORMATION, AND WILL BE UPDATED FOR FINAL DESIGN BASED ON RESULTS OF PHASE II GEOTECHNICAL INVESTIGATION.
- EARTHWORK QUANTITIES BASED ON NEAT LINE (I.E., NET CUT/ FILL SHRINKAGE FACTOR = 1.0).
- PREPARED SUBGRADE, AS DEFINED ON THE DRAWINGS, INCLUDES CLEARING, GRUBBING, TOPSOIL REMOVAL, REMOVAL OF GEOTECHNICALLY-UNSUITABLE MATERIALS, MOISTURE CONDITIONING, AND SUBGRADE COMPACTION AS DEFINED IN THE SPECIFICATIONS.
- FOUNDATION PREPARATION ASSUMES THE FOLLOWING GENERAL CONSTRUCTION SEQUENCE: (I) EXCAVATE TO BEDROCK WITHIN LOWLAND AREAS ASSUMING A MAXIMUM DEPTH OF OVER-EXCAVATION OF 20 FEET, OR UNTIL REACHING GEOTECHNICALLY-SUITABLE FOUNDATION SOILS AS DETERMINED BY THE PHASE II GEOTECHNICAL INVESTIGATION. STOCKPILE ORGANIC SOILS AND MINERAL OVERBURDEN SEPARATELY FOR FUTURE APPROVED USE; (II) PLACE STRUCTURAL FILL AS REQUIRED TO MEET THE FOUNDATION GRADE REQUIREMENTS WITH GRANULAR SOILS, E.G., DULUTH COMPLEX CONSTRUCTION ROCK, BIWABIK IRON FORMATION CONSTRUCTION ROCK, AND UNSATURATED MINERAL OVERBURDEN; (III) ESTABLISH FOUNDATION DRAINAGE AS REQUIRED TO PREVENT EXCESS PORE PRESSURES DURING OPERATION; AND (IV) CONSTRUCT LINER SYSTEM DEPENDENT UPON THE REACTIVITY CATEGORY OF THE STOCKPILE MATERIAL.
- AREAS WITH UNSUITABLE SOILS (LOWLAND AREAS) ARE ASSUMED TO COINCIDE WITH THE PREVIOUSLY IDENTIFIED WETLAND AREAS. HORIZONTAL AND VERTICAL EXTENTS OF LOWLAND AREAS ARE EXPECTED TO BE REVISED BASED ON RESULTS OF PHASE II GEOTECHNICAL INVESTIGATION.
- POST-CONSOLIDATION STOCKPILE SETTLEMENTS WERE ESTIMATED BASED ON LIMITED INFORMATION ON THE CONSOLIDATION PROPERTIES OF SUBGRADE MATERIALS. HENCE, FOUNDATION EXCAVATION AND GRADING PLANS ARE ANTICIPATED TO UNDERGO MINOR MODIFICATIONS BASED ON THE RESULTS OF THE PHASE II GEOTECHNICAL INVESTIGATION TO ENSURE SUFFICIENT DRAINAGE.
- CATEGORY 1 WASTE ROCK STOCKPILE WILL BE RECLAIMED BY PLACEMENT OF A GEOMEMBRANE COVER AT CLOSURE. PRIOR TO CLOSURE, WASTE ROCK CATEGORY 2, 3 AND 4 WILL BE USED FOR PIT BACKFILL.
- LIMITS OF DISTURBANCE (I.E., CLEARING LIMITS) ASSUMED TO BE 40 FEET FROM THE FACILITY LIMITS.
- INTERIM STOCKPILE FILL SLOPES SHOWN WITH WASTE ROCK SLOPES AT ANGLE OF REPOSE. FINAL/CLOSURE STOCKPILE FILL SLOPES SHOWN WITH WASTE ROCK SLOPES REGRADED TO FINAL SLOPE ANGLES.

SPECIFICATIONS:

- FOR EARTHWORKS COMPONENTS OF THE STOCKPILE DESIGN, REFER TO SECTION 2300 OF THE PROJECT SPECIFICATIONS.
- FOR GEOSYNTHETIC AND PIPING COMPONENTS OF THE STOCKPILE DESIGN, REFER TO SECTION 2272 FOR GEOTEXTILE, 2273 FOR POLYETHYLENE GEOMEMBRANE LINERS, AND SECTION 2610 FOR PIPING.
- QUALITY ASSURANCE REQUIREMENTS FOR STOCKPILE CONSTRUCTION ARE DEFINED IN THE CONSTRUCTION QUALITY ASSURANCE PLAN.
- SPECIFICATION SECTION NUMBERING IS PRELIMINARY.

PLANT DRAWING NUMBER:

LEGEND, GENERAL NOTES
AND SPECIFICATIONS



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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UNDER THE LAWS OF THE STATE OF
MINNESOTA.

SIGNATURE

PRINTED NAME BRENT R. BRONSON

DATE 8/21/17 LICENSE # 46492

DRAWN:
MTM

CHECKED:

GOLDER PROJECT NO.:
113-2209

SCALE:
AS SHOWN

DWG. NO.
SKP-002

REV

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---|---------|
| A | 12/02/11 | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | FOR PERMITTING | G | 8/21/17 |
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| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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INCHES

2

1



LEGEND

EXISTING GROUND TOPOGRAPHY

PROPOSED STOCKPILE LAYOUTS

HAUL ROADS

MINE SITE BOUNDARY

MINE YEAR 1 PIT BOUNDARY (SEE NOTE 1)

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.

2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.

3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

4. CATEGORY 2/3 AND CATEGORY 4 STOCKPILES SHOWN BASED ON WASTE ROCK SCHEDULE ONLY, I.E. WITHOUT OVERBURDEN. SEE DRAWINGS 018 AND 024 SHOWING MAXIMUM CAPACITY LAYOUTS FOR THESE STOCKPILES.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.

2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.

3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

STOCKPILE LAYOUTS – MINE YEAR 1 LIMITS

POLY MET MINING, INC.
NORTHMET PROJECT
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SIGNATURE

PRINTED NAME BRENT R. BRONSON

DATE 8/21/17 LICENSE # 46492

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FOR PERMITTING

FOR CONSTRUCTION

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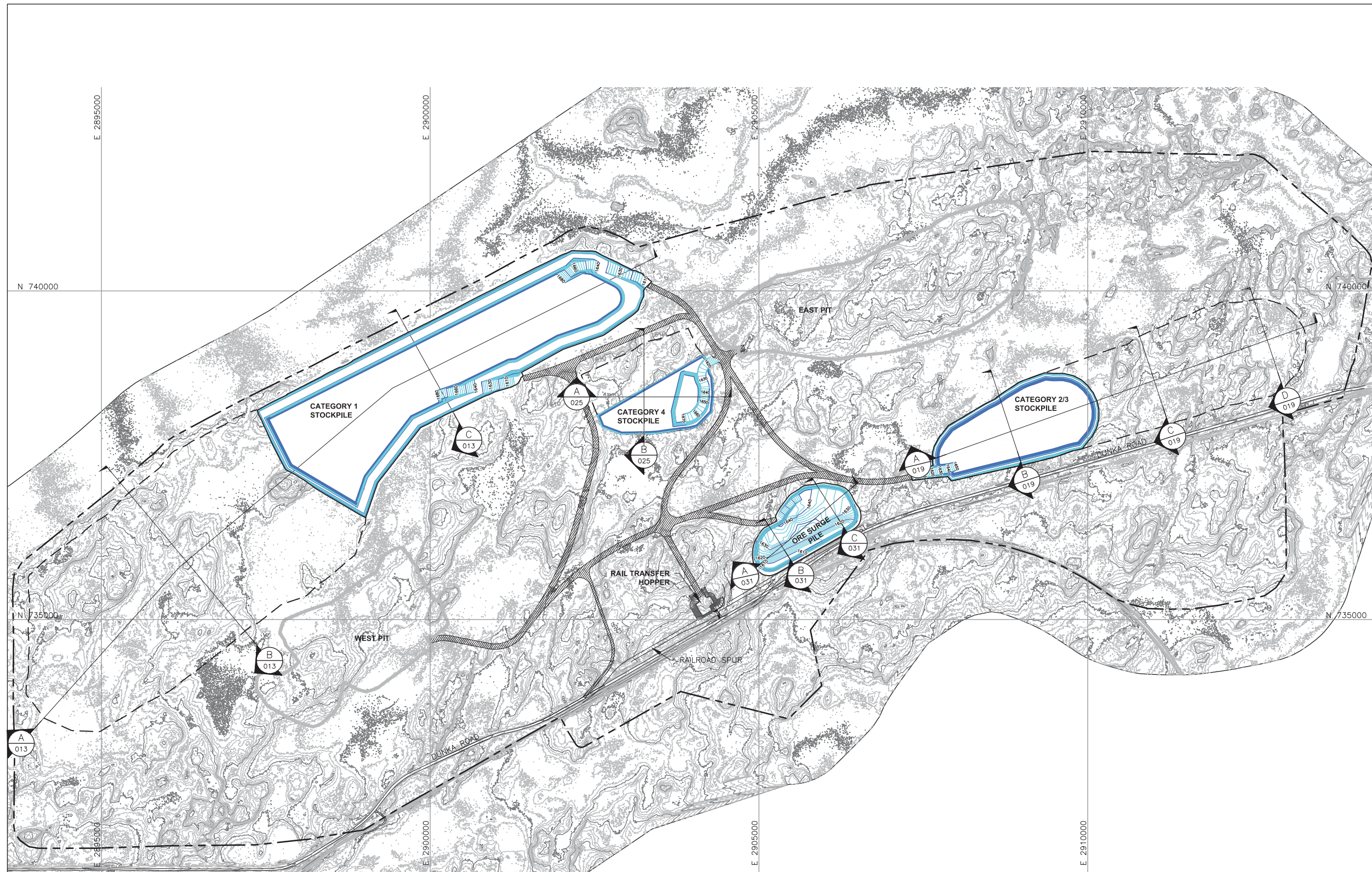
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GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN

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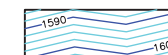
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LEGEND



EXISTING GROUND TOPOGRAPHY



PROPOSED GRADING TOPOGRAPHY



HAUL ROADS



- MINE SITE BOUNDARY



PIT BOUNDARIES AT MINE YEAR 2 (SEE NOTE 1)

MINE YEAR 1 AND 2 ORE, WASTE ROCK STOCKPILE
- OUTLINES (SEE NOTE 2)

CONTINUED (SEE NOTE 2)

MAXIMUM ORE, WASTE ROCK STOCKPILE
- OUTLINES (SEE NOTE 2)



— CROSS SECTION IDENTIFIER

— SHEET WHERE SECTION IS LOCATED

NOTES

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2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

STOCKPILE LAYOUTS – MINE YEAR 2 LIMITS



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SIGNATURE B. Bronson
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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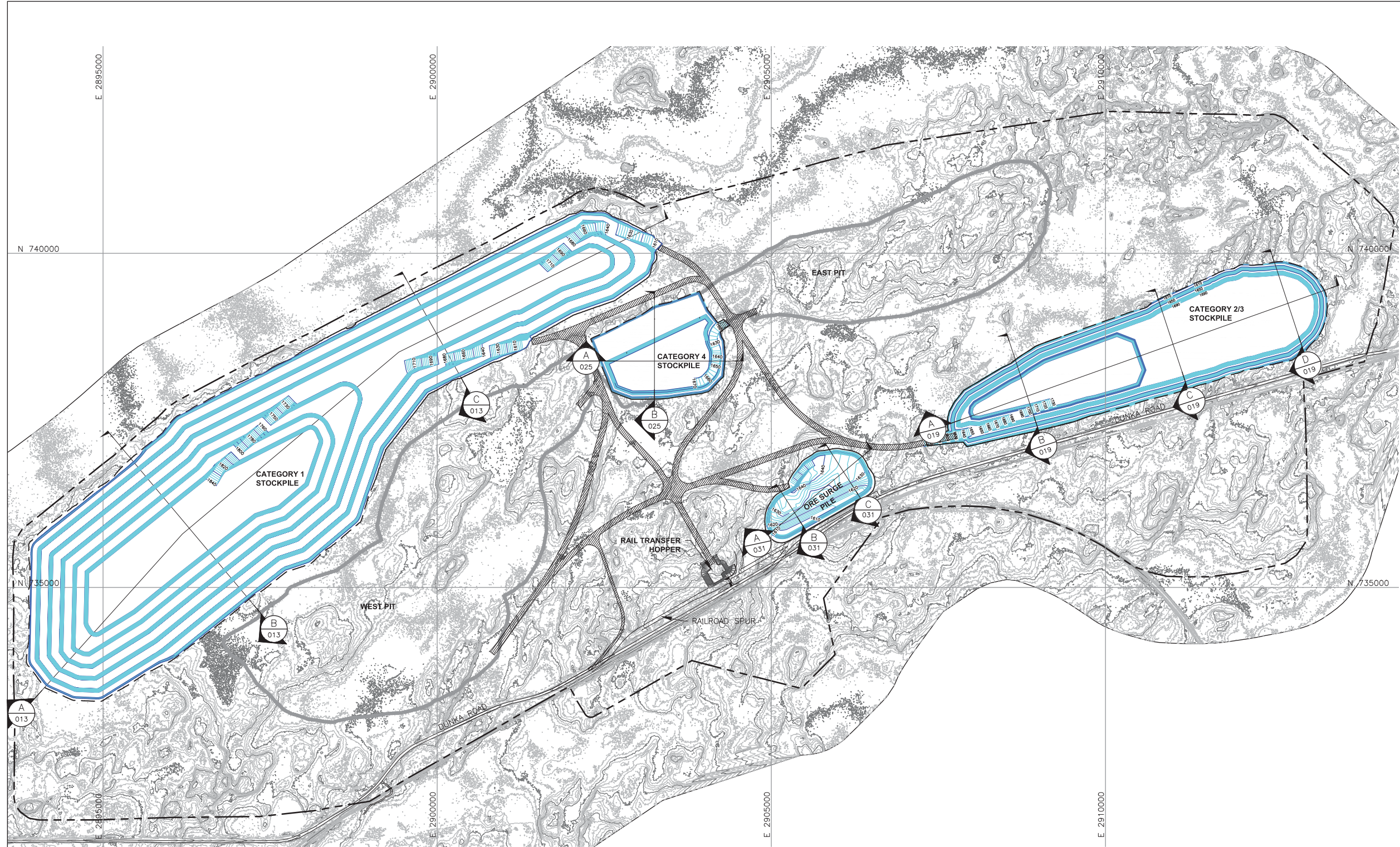
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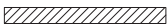
LEGEND



EXISTING GROUND TOPOGRAPHY



PROPOSED LAYOUTS



HAUL ROADS



MINE SITE BOUNDARY



PIT BOUNDARIES AT MINE YEAR 11 (SEE NOTE 1)



MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



CROSS SECTION IDENTIFIER



SHEET WHERE SECTION IS LOCATED

NOTES

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- CATEGORY 2/3 AND CATEGORY 4 STOCKPILES SHOWN BASED ON WASTE ROCK SCHEDULE ONLY, I.E. WITHOUT OVERBURDEN. SEE DRAWINGS 018 AND 024 SHOWING MAXIMUM CAPACITY LAYOUTS FOR THESE STOCKPILES.
- PLANNED UTILIZATION LIMITS FOR CATEGORY 1 STOCKPILE REACHED IN MINE YEAR 13, PLANNED UTILIZATION LIMITS FOR CATEGORY 2/3 AND CATEGORY 4 STOCKPILES REACHED IN MINE YEAR 11.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

STOCKPILE LAYOUTS –
AT PLANNED UTILIZATION LIMITS



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| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

DRAWN:
MTM

CHECKED:
GOLDER PROJECT NO.:
113-2209

SCALE:
AS SHOWN

DWG. NO.
SKP-005

REV

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\11 SKP FEB2013\1132209H028.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:26 AM

INCHES

2

1



LEGEND

- EXISTING GROUND TOPOGRAPHY
- PROPOSED LAYOUT CONTOURS
- HAUL ROADS
- MINE SITE BOUNDARY
- ULTIMATE PIT BOUNDARIES (SEE NOTE 1)
- MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- CROSS SECTION IDENTIFIER
- SHEET WHERE SECTION IS LOCATED

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

STOCKPILE LAYOUTS
MINE YEAR 21 LIMITS
CLOSURE CONFIGURATION



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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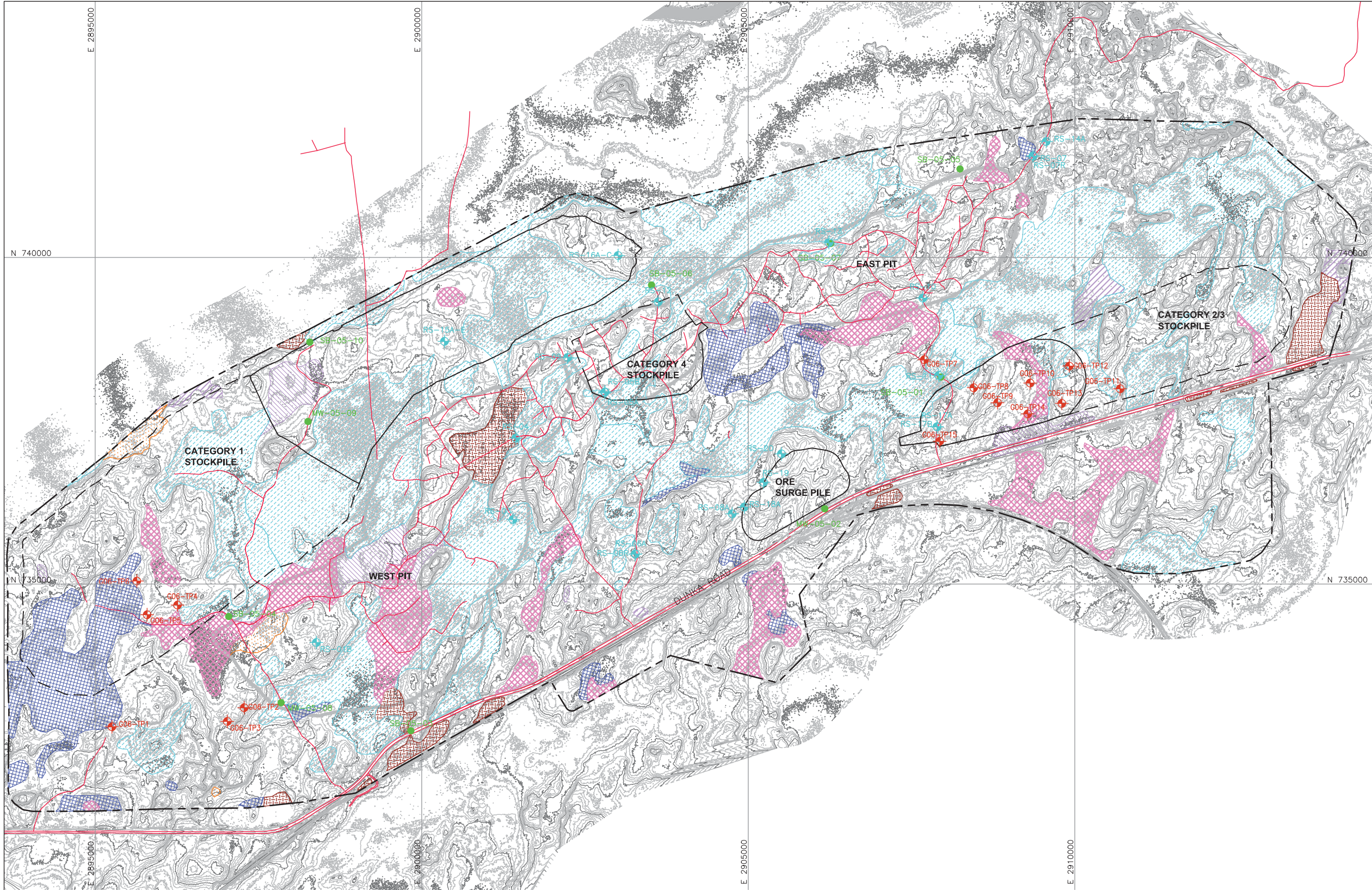
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CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\H SKP FEB2013\1132209H022.DWG PLOT SCALE: 1:1 PLOT DATE: 6/18/2017 10:28 AM

INCHES

2

1



LEGEND



EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)



MINE SITE BOUNDARY



GOLDER ASSOC. TEST PIT (2006)



BARR ENGINEERING BOREHOLES (2005)



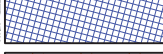
BARR ENGINEERING BOREHOLES (2008)



SHALLOW MARSH



SHRUB SWAMP



CONIFEROUS SWAMP



HARDWOOD SWAMP



SEDGE MEADOW



CONIFEROUS BOG



OPEN BOG



EXISTING TRAIL OR ROAD



MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 2)



MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 3)



MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 3)

NOTES

1. WETLAND DELINEATION CHARACTERIZATION PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. OPEN PIT LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
3. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH,
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

EXISTING SITE CONDITIONS



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NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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SKP-007


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| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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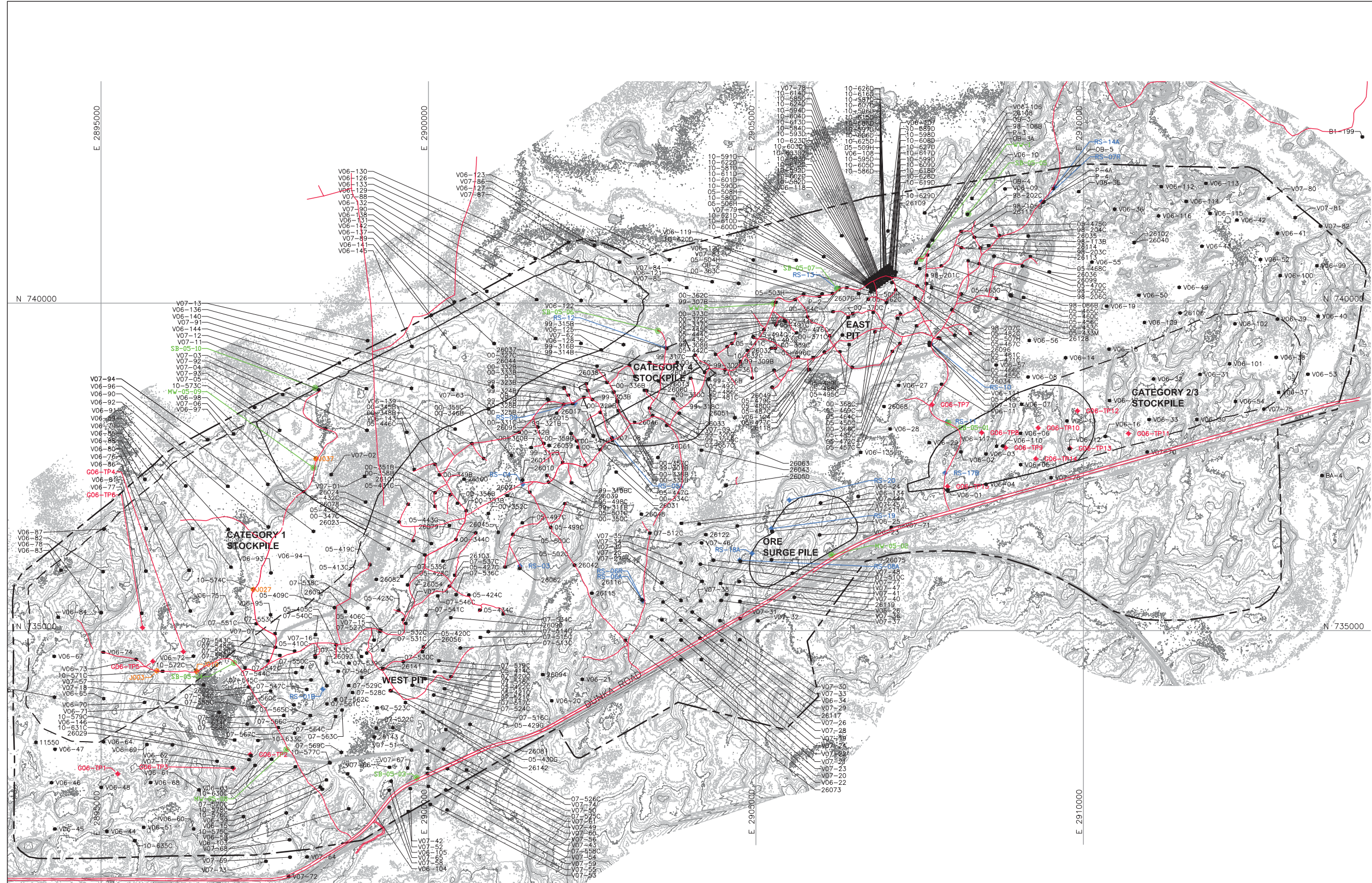
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DATE 8/21/17 LICENSE # 46492

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GOLDER PROJECT NO.:
113-2209

SCALE:
AS SHOWN



LEGEND

- EXISTING GROUND TOPOGRAPHY
- MINE SITE BOUNDARY
- MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)
- MINE YEAR 1 ORE, AND WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM ORE, AND WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- G06-TP11 GOLDER ASSOC. TEST PIT (2006)
- SB-05-01 BARR ENGINEERING BOREHOLES (2005)
- RS-07R BARR ENGINEERING BOREHOLES (2008)
- 05-444PM BORING OR GEOPHYSICAL SURVEY LOCATION
- J003 AMERICAN ENGINEERING TESTING, INC. BOREHOLES (2010)

NOTES

- OPEN PIT LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
- SEE GEOTECHNICAL DATA PACKAGE VOLUME 3 FOR DETAILS ON TEST PITS, BOREHOLES AND GEOPHYSICAL SURVEYS.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

| | |
|--|--|
| PLANT DRAWING NUMBER: | |
| SITE LAYOUT AND LOCATION OF FIELD INVESTIGATIONS | |
| | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA |
| | GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com |
| | DWG. NO. SKP-008 |
| | REV |

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| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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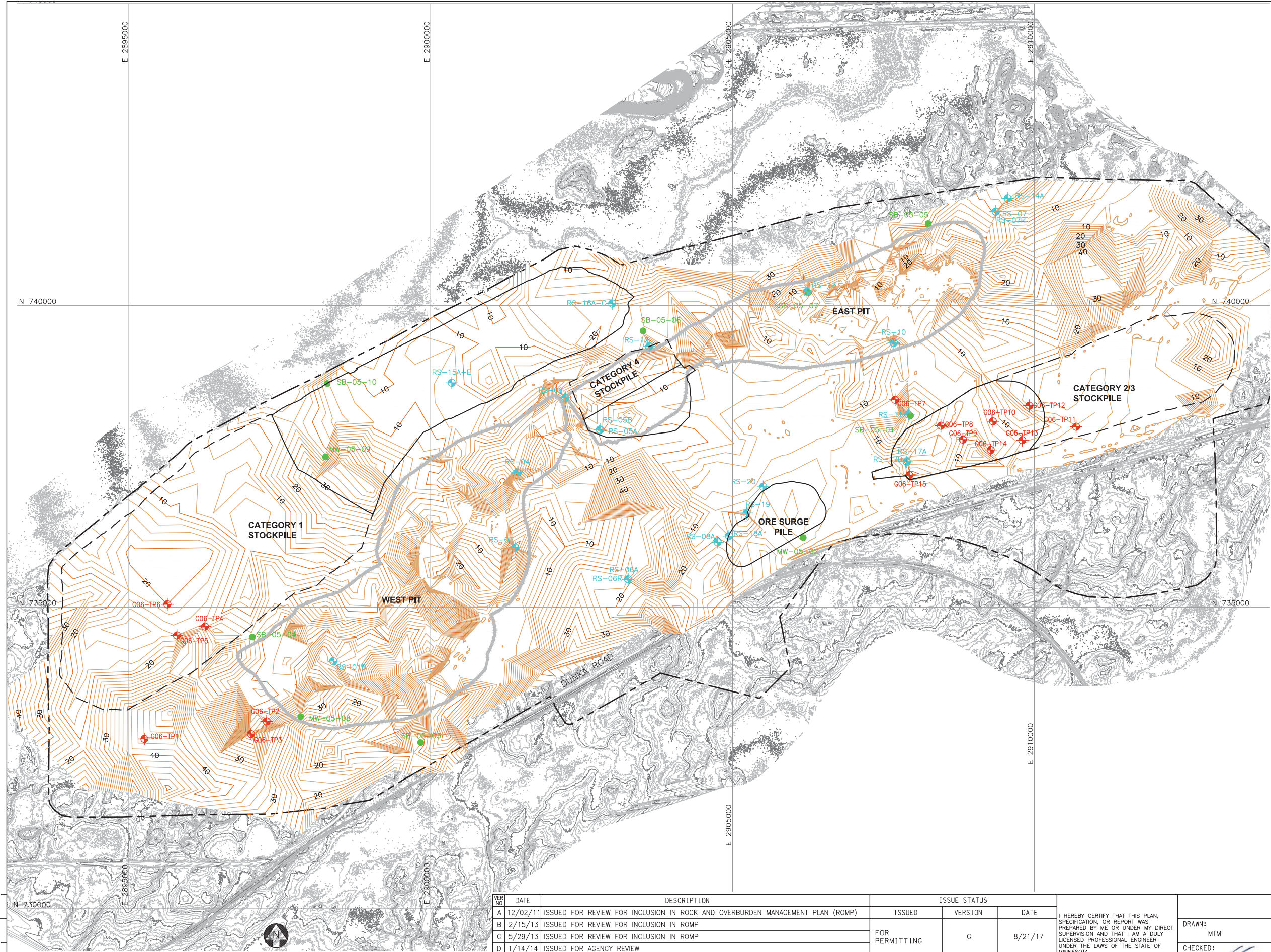
CHECKED:

GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN

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INCHES

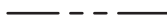


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SCALE IN FEET

LEGEND



EXISTING GROUND TOPOGRAPHY



MINE SITE BOUNDARY



ESTIMATED DEPTH TO BEDROCK CONTOURS



MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)



MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



GOLDER ASSOC. TEST PIT (2006)



BARR ENGINEERING BOREHOLES (2005)



BARR ENGINEERING BOREHOLES (2008)

NOTES

- OPEN PIT BOUNDARIES PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

DEPTH TO BEDROCK ISOPACH MAP



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| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN

DWG. NO. SKP-009

REV

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H025.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:35 AM

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| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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SIGNATURE *B. Bronson*

PRINTED NAME BRENT R. BRONSON


DATE 8/21/17 LICENSE # 46492

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CHECKED: *gg*

GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN



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NORTHMET PROJECT
HOYT LAKES, MINNESOTA


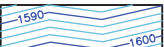










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LAKEWOOD, CO USA 80233
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Fax: (303) 985-2080
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DWG. NO. SKP-010

REV

LEGEND

-  EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
-  PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY
-  MINE YEAR 11 AND ULTIMATE EXCAVATION TOPOGRAPHY
-  MINE SITE BOUNDARY
-  MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)
-  MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  HAUL ROADS
-  CROSS SECTION IDENTIFIER
-  SHEET WHERE SECTION IS LOCATED

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- UNSUITABLE SOILS TO BE EXCAVATED WITHIN FIRST 100 FEET FROM THE ULTIMATE STOCKPILE BOUNDARIES. GEOTECHNICAL PROPERTIES OF THE FOUNDATION SOILS WILL BE CONFIRMED PRIOR TO FINAL DESIGN.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

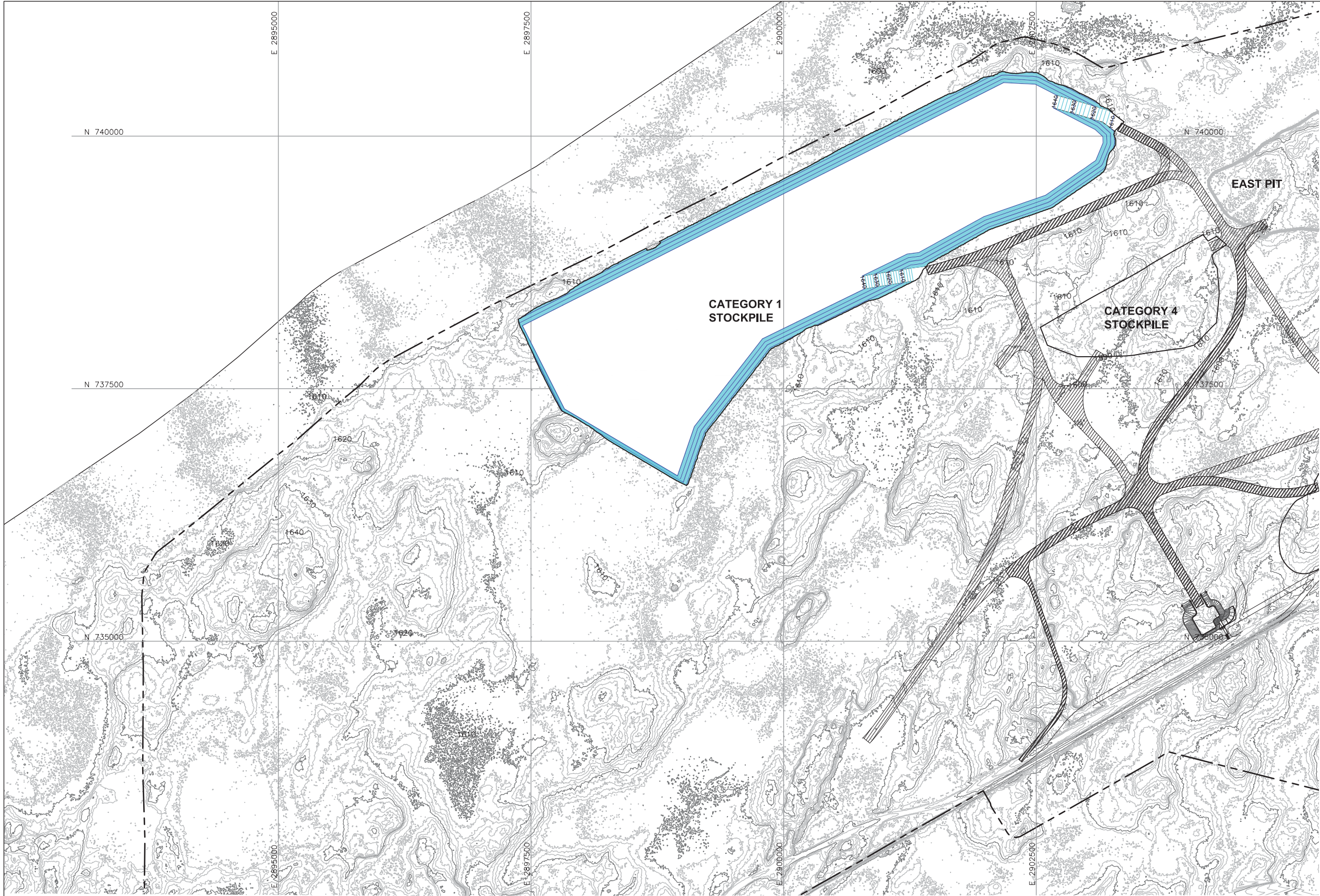
CATEGORY 1 STOCKPILE
SUBGRADE EXCAVATION PLAN

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H021.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:37 AM

INCHES

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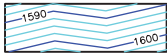
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LEGEND



EXISTING GROUND TOPOGRAPHY



PROPOSED GRADING TOPOGRAPHY



HAUL ROADS



MINE SITE BOUNDARY



PIT BOUNDARIES AT MINE YEAR 2 (SEE NOTE 1)



MINE YEAR 1 AND 2 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
4. IF CLOSURE OCCURS AFTER 1 YEAR OF MINING, STOCKPILE DRAINAGE WILL BE AS SHOWN ON DRAWING 012 FOR THIS PORTION OF THE STOCKPILE.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
MINE YEAR 1 CONTINGENCY
CLOSURE CONFIGURATION



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| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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GOLDER PROJECT NO.: 113-2209
SCALE: AS SHOWN

DWG. NO. SKP-011

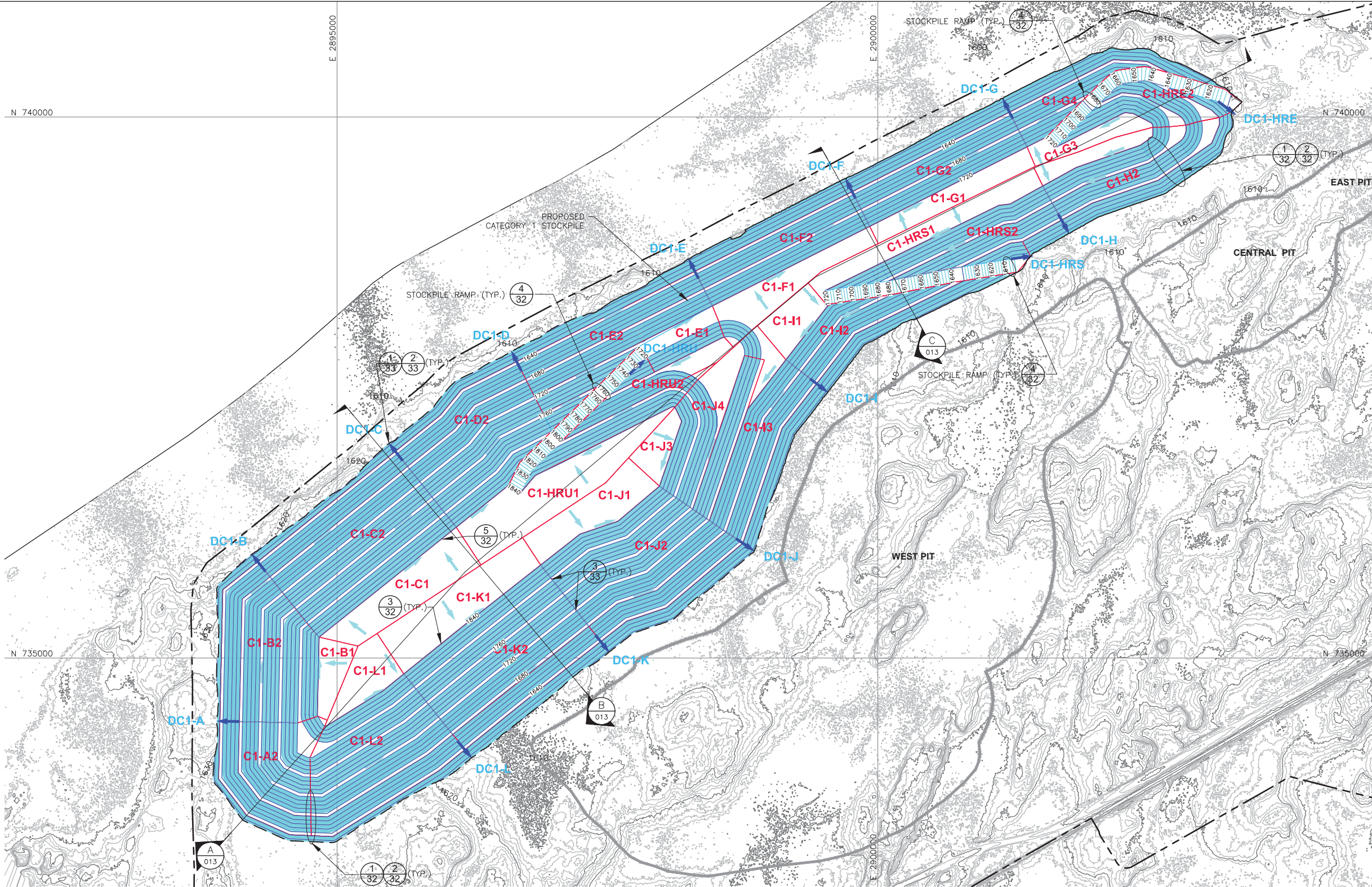
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INCHES

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| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | NOT APPROVED FOR CONSTRUCTION. | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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SIGNATURE *B. Bronson*

PRINTED NAME BRENT R. BRONSON


DATE 8/21/17 LICENSE # 46492

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GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN



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NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
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DWG. NO. SKP-012

REV

LEGEND

EXISTING GROUND TOPOGRAPHY

GRADING TOPOGRAPHY AT MAXIMUM STOCKPILE CAPACITY

HAUL ROADS

MINE SITE BOUNDARY

PIT BOUNDARIES AT MINE YEAR 2 (SEE NOTE 1)

MINE YEAR 1 AND 2 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)

DOWNCHUTE/DRAINAGE DIRECTION

WATERSHED DIVIDES

WATERSHED ID

DOWNCHUTE ID

GENERAL DRAINAGE DIRECTION

CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.

2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.

3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002 AND NOTES ON DRAWING 013.

4. FINAL GRADES SHOWN ARE WITH STOCKPILE AT MAXIMUM CAPACITY. SEE CROSS-SECTIONS AND NOTES ON DRAWING 013.

5. SEE DRAWINGS 003 THROUGH 005 FOR INTERIM STOCKPILE FILL CONTOURS.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.

2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.

3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

NOTES

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2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.

3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002 AND NOTES ON DRAWING 013.

4. FINAL GRADES SHOWN ARE WITH STOCKPILE AT MAXIMUM CAPACITY. SEE CROSS-SECTIONS AND NOTES ON DRAWING 013.

5. SEE DRAWINGS 003 THROUGH 005 FOR INTERIM STOCKPILE FILL CONTOURS.

REFERENCES

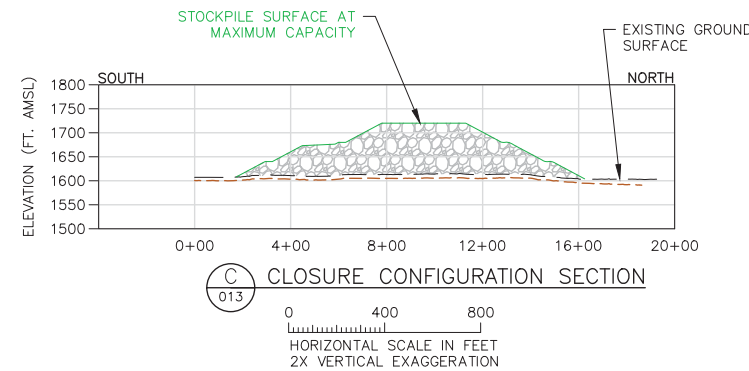
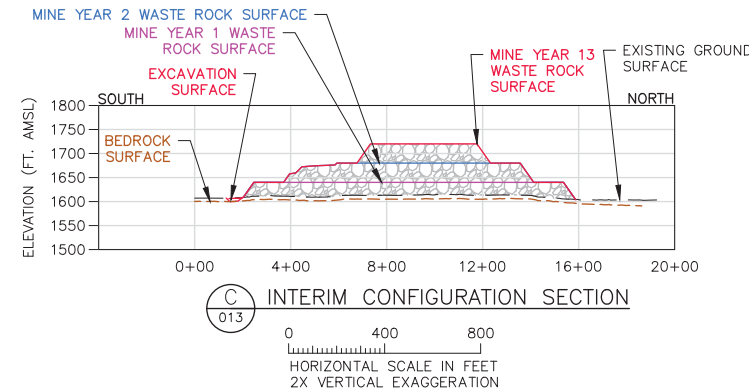
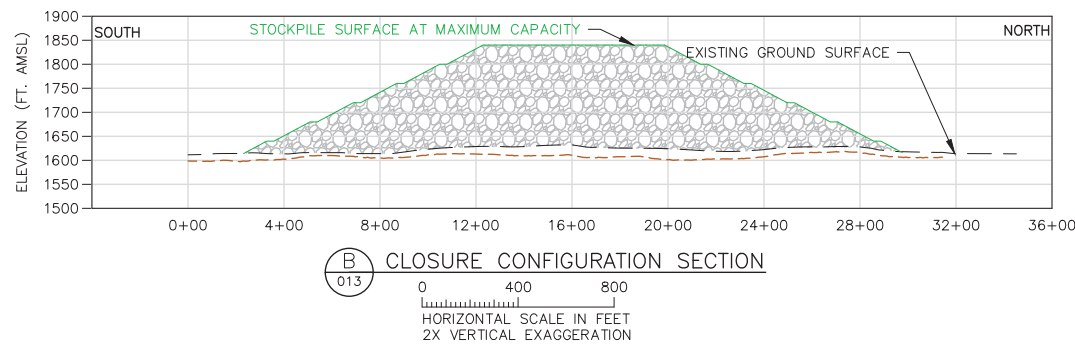
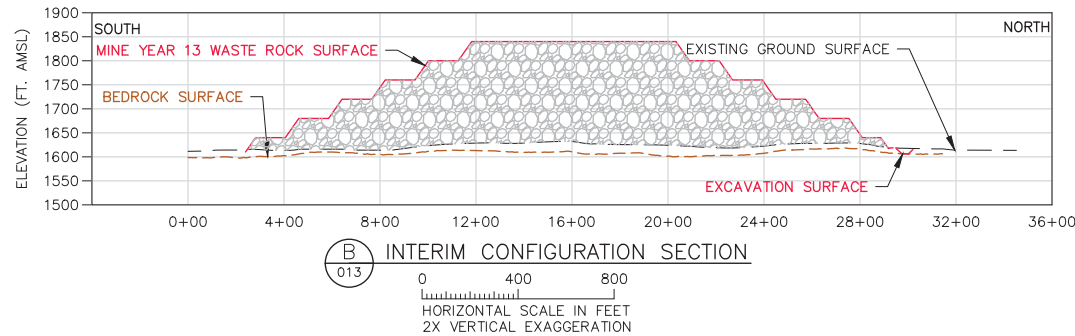
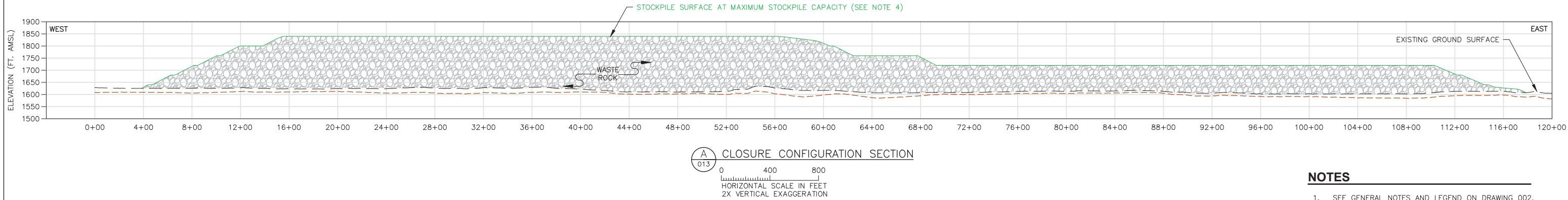
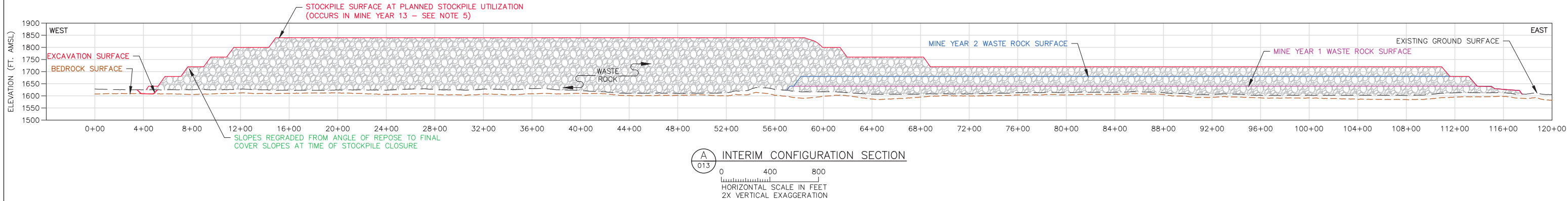
1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.

2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.

3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).




PLANT DRAWING NUMBER:


CATEGORY 1 STOCKPILE
FINAL GRADES AND SUB-BASIN DELINEATION



- NOTES**
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
 - UNSUITABLE SOILS TO BE EXCAVATED WITHIN FIRST 100 FEET FROM THE ULTIMATE STOCKPILE BOUNDARIES. GEOTECHNICAL PROPERTIES OF THE FOUNDATION SOILS WILL BE CONFIRMED PRIOR TO FINAL DESIGN.
 - SEE CROSS SECTION LOCATIONS ON DRAWINGS 3, 4, 5, 6, 10, AND 12.
 - MAXIMUM STOCKPILE CAPACITY - THE TOTAL CAPACITY OF THE WASTE ROCK STOCKPILE IF FILLED TO THE MAXIMUM ELEVATIONS NOTED.
 - PLANNED STOCKPILE UTILIZATION - THE PORTION OF THE TOTAL WASTE ROCK STOCKPILE CAPACITY PLANNED TO BE UTILIZED.

- LEGEND**
- MINE YEAR 1 LIMITS
 - MINE YEAR 2 LIMITS
 - MINE YEAR 13 LIMITS
 - MINE YEAR 21, ULTIMATE LIMITS
 - EXISTING GROUND SURFACE
 - BEDROCK SURFACE
 - EXCAVATION SURFACE

| | |
|--|----------|
| PLANT DRAWING NUMBER: | |
| DESIGN SECTIONS | |
|  POLYMET MINING | |
| POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | |
|  Golder Associates | |
| GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com | |
| DRAWN: MTM | REV A |
| CHECKED:  | |
| GOLDER PROJECT NO.: 113-2209 | |
| SCALE: AS SHOWN | |
| DWG. NO. SKP-013 | |

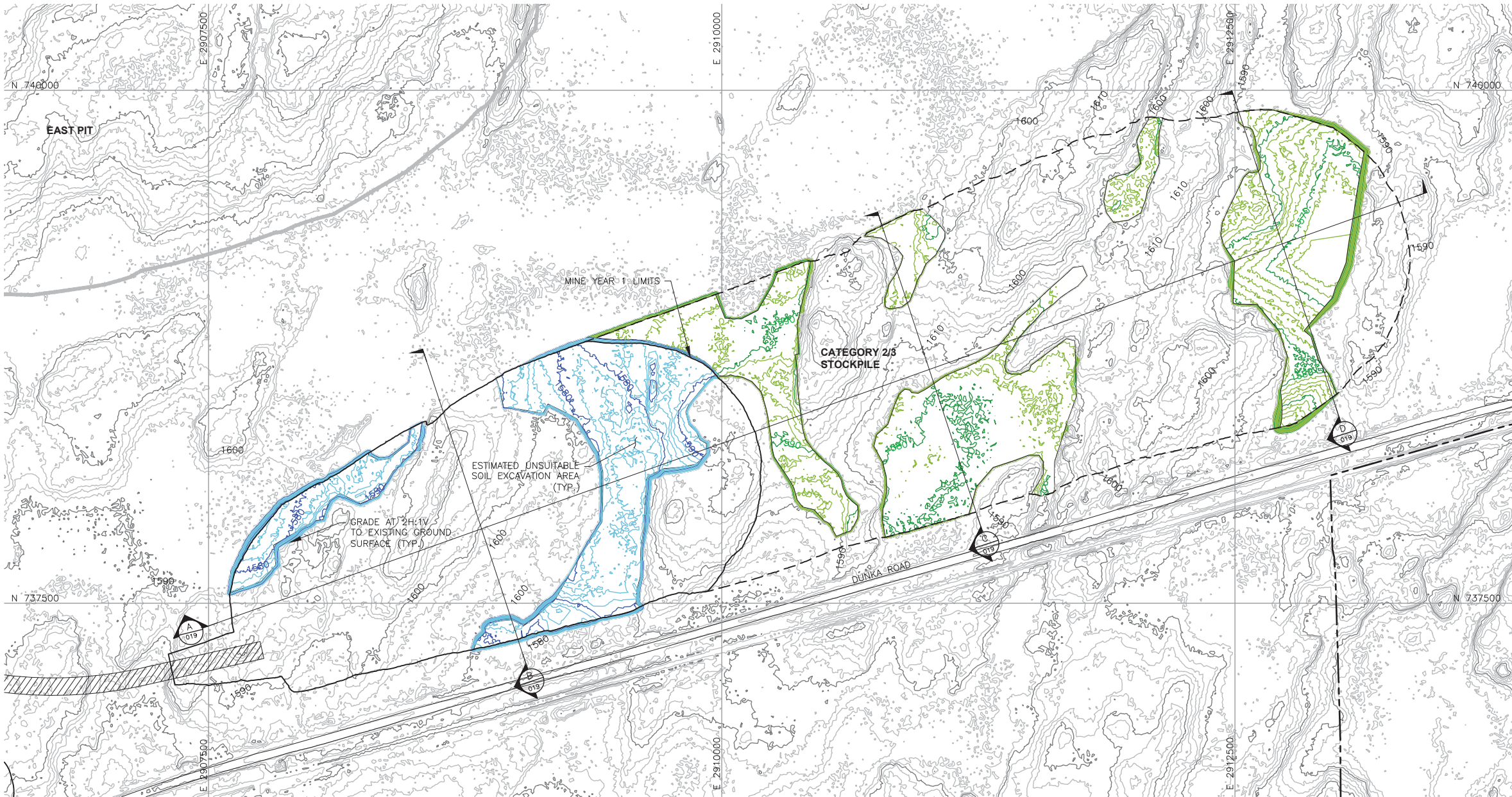
| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | | I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNATURE  PRINTED NAME BRENT R. BRONSON DATE 8/21/17. LICENSE # 46492 |
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| A | 12/02/11 | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | ISSUED | VERSION | DATE | |
| B | 2/15/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | FOR PERMITTING | G | 8/21/17 | |
| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | | |
| | | | | | | |
| | | | | | | |

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H034.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:45 AM

INCHES

2

1



LEGEND



EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)



PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY



PROPOSED MAXIMUM FOOTPRINT EXCAVATION TOPOGRAPHY



MINE SITE BOUNDARY



MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)



MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



HAUL ROADS



CROSS SECTION IDENTIFIER



SHEET WHERE SECTION IS LOCATED

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
SUBGRADE EXCAVATION PLAN



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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Ph: (303) 980-0540
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|--------|----------|---|--------------------------------|---------|---------|
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| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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MTM

CHECKED:
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GOLDER PROJECT NO.:
113-2209

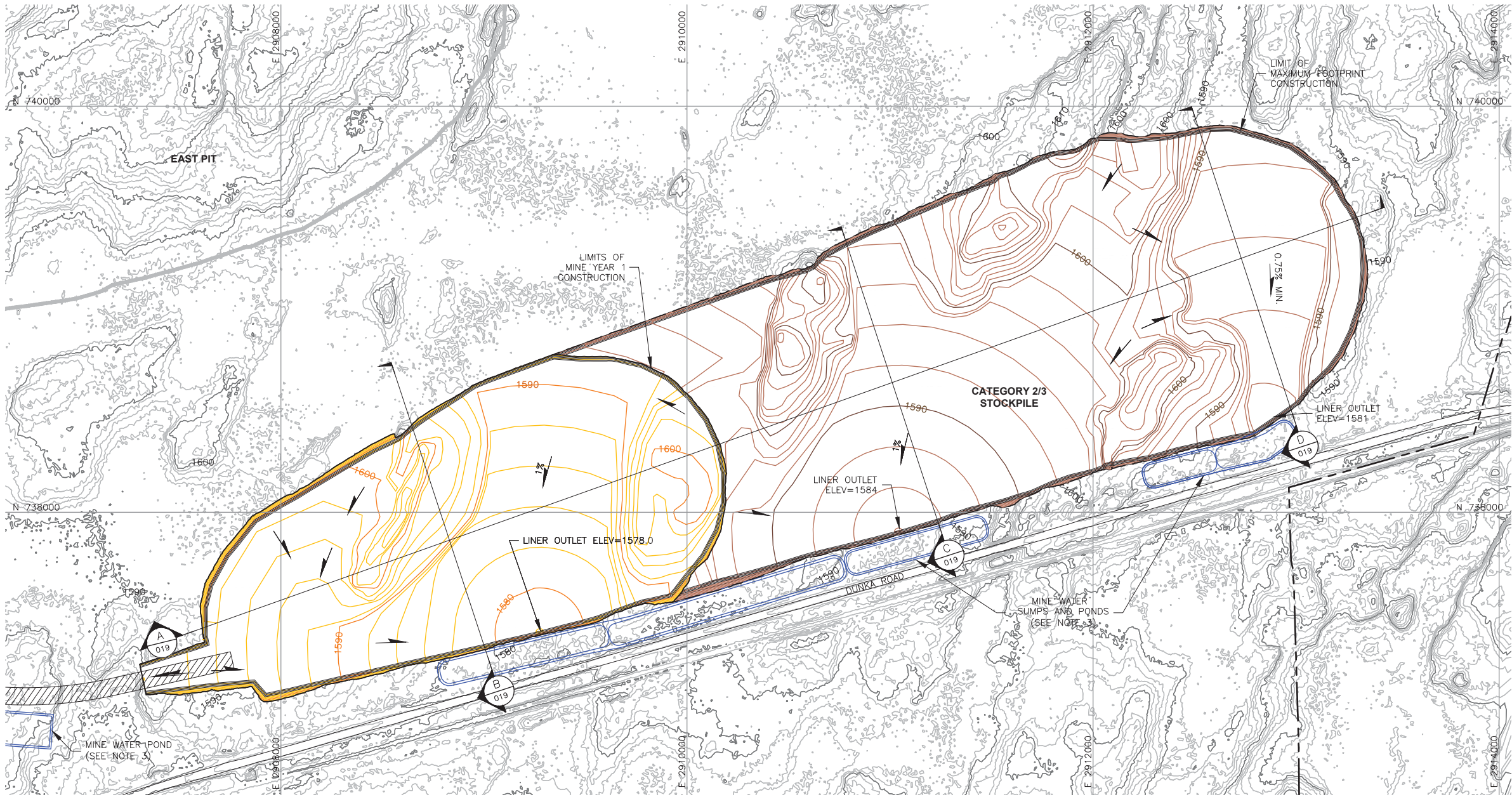
SCALE:
AS SHOWN

DWG. NO.
SKP-014

REV

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\113209H035.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:47 AM

INCHES
1
2



LEGEND

- EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
- PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY
- PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY
- MINE SITE BOUNDARY
- CROSS SECTION IDENTIFIER
- SHEET WHERE SECTION IS LOCATED
- SLOPE
- MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)
- MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- HAUL ROADS
- MINE WATER SUMP/POND (SEE NOTE 3)

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
FOUNDATION GRADING PLAN
MINE YEAR 1 AND MAXIMUM



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

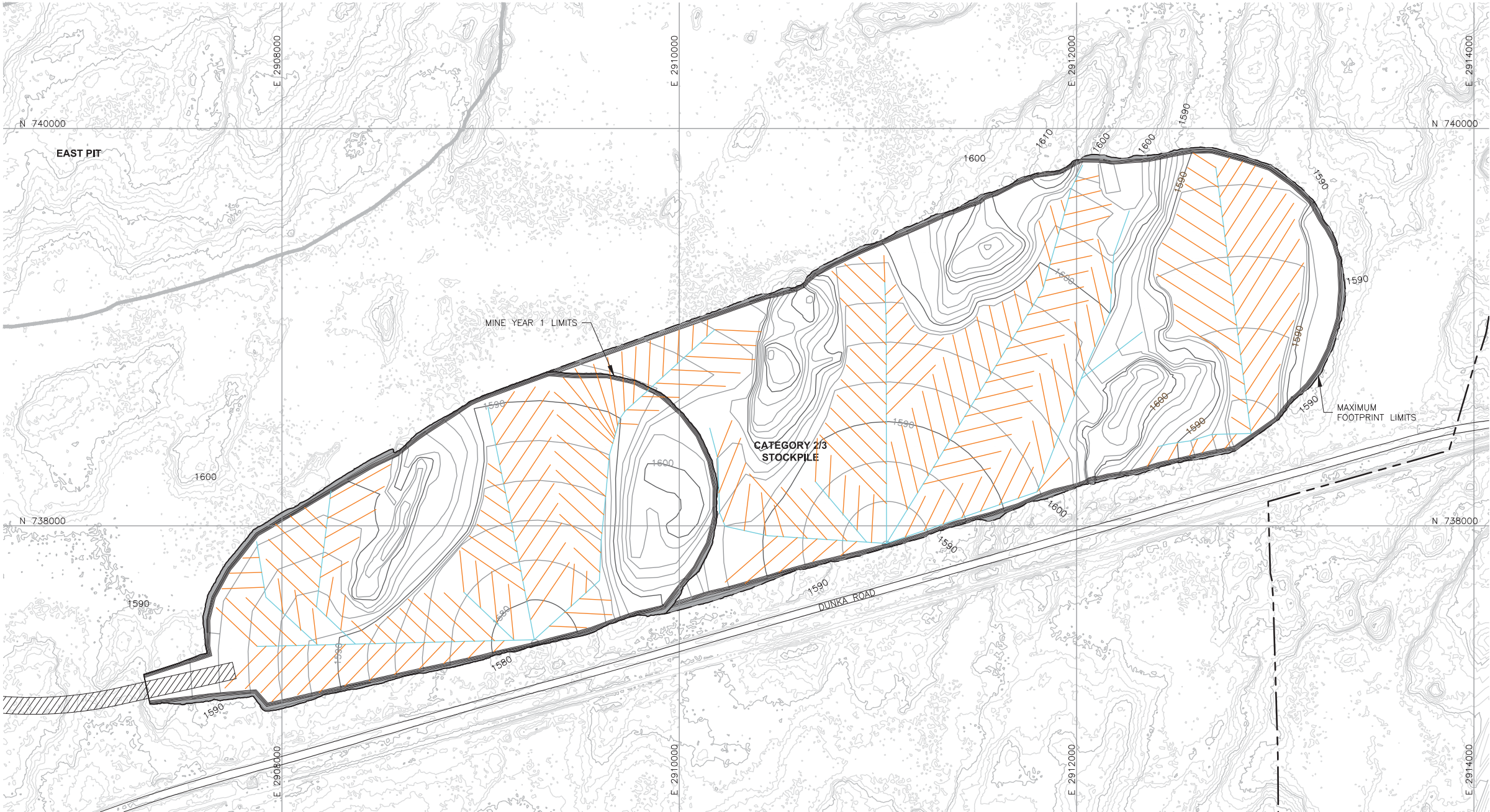
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CHECKED: *gg*
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SCALE: AS SHOWN

DWG. NO. SKP-015

REV


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INCHES
1
2



| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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DATE 8/21/17 LICENSE # 46492

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POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA














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REV

LEGEND

-  EXISTING GROUND TOPOGRAPHY
-  PROPOSED GRADING TOPOGRAPHY
-  MINE SITE BOUNDARY
-  MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)
-  MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  HAUL ROADS
-  TERTIARY COLLECTION PIPING (SEE NOTE 3)
-  4-INCH
-  SECONDARY COLLECTION PIPING (SEE NOTE 3)
-  6-INCH

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- ACTUAL NUMBER AND LOCATION OF UNDERDRAIN PIPES AND SUMPS WILL NEED TO BE DETERMINED DURING CONSTRUCTION BASED ON ENCOUNTERED FIELD CONDITIONS. SEE DETAIL 5 ON DRAWING 035 FOR UNDERDRAIN.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

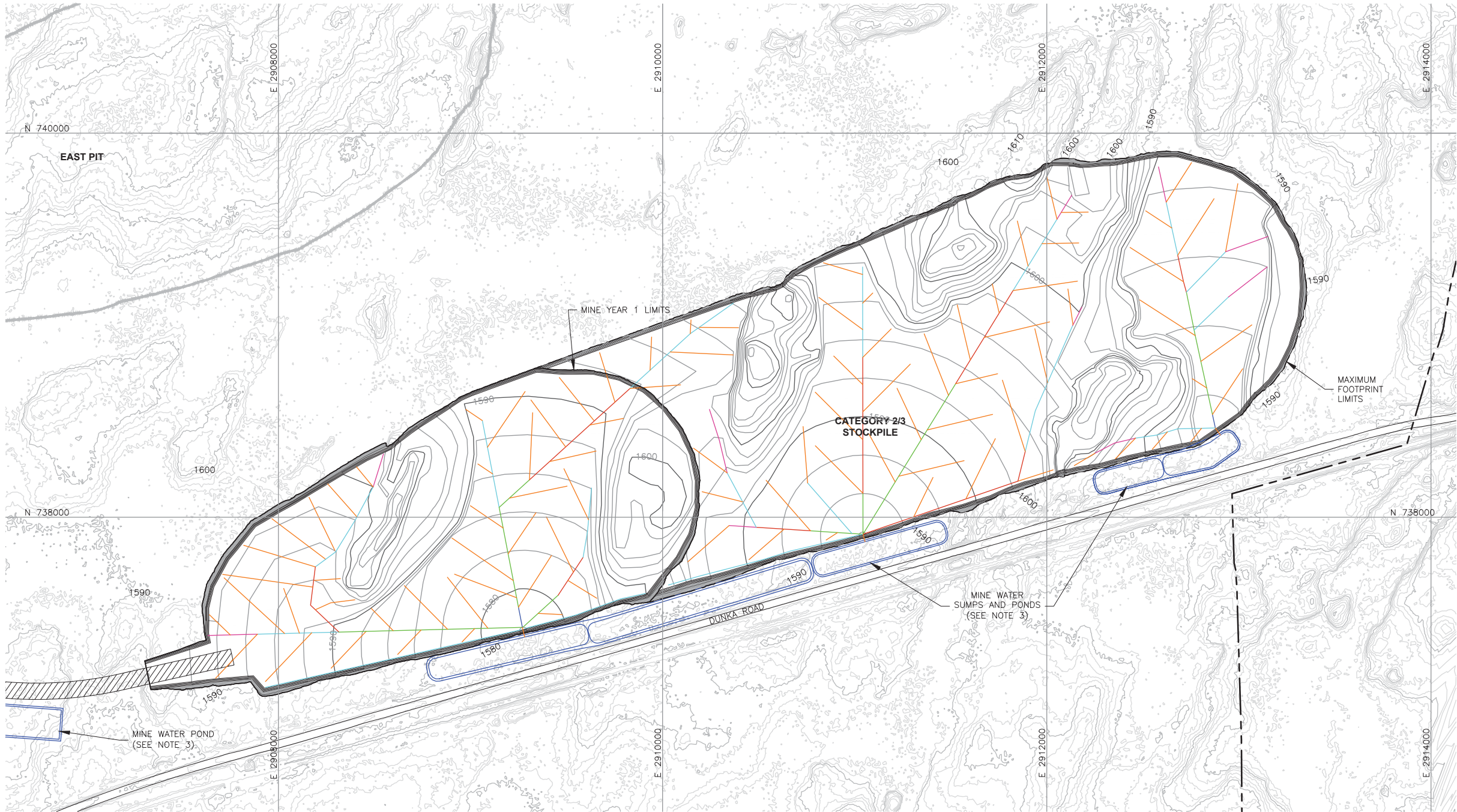
- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
UNDERDRAIN PIPING PLAN
MINE YEAR 1 AND MAXIMUM

CADD USER: Jenkins, Crystal FILE: N:\1\113-2209_H SKP FEB2013\1132209H01.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:51 AM

INCHES
1
2



LEGEND

- EXISTING GROUND TOPOGRAPHY
- PROPOSED GRADING TOPOGRAPHY
- MINE SITE BOUNDARY
- MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)
- MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- HAUL ROADS
- MINE WATER SUMP/POND (SEE NOTE 3)
- TERTIARY COLLECTION PIPING
- 4-INCH
- PRIMARY AND SECONDARY COLLECTION PIPING
- 4-INCH
- 6-INCH
- 8-INCH
- 10-INCH
- 12-INCH

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
OVERLINER DRAINAGE PIPING PLAN
MINE YEAR 1 AND MAXIMUM



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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MTM

GOLDER PROJECT NO.:
113-2209

SCALE:
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SKP-017

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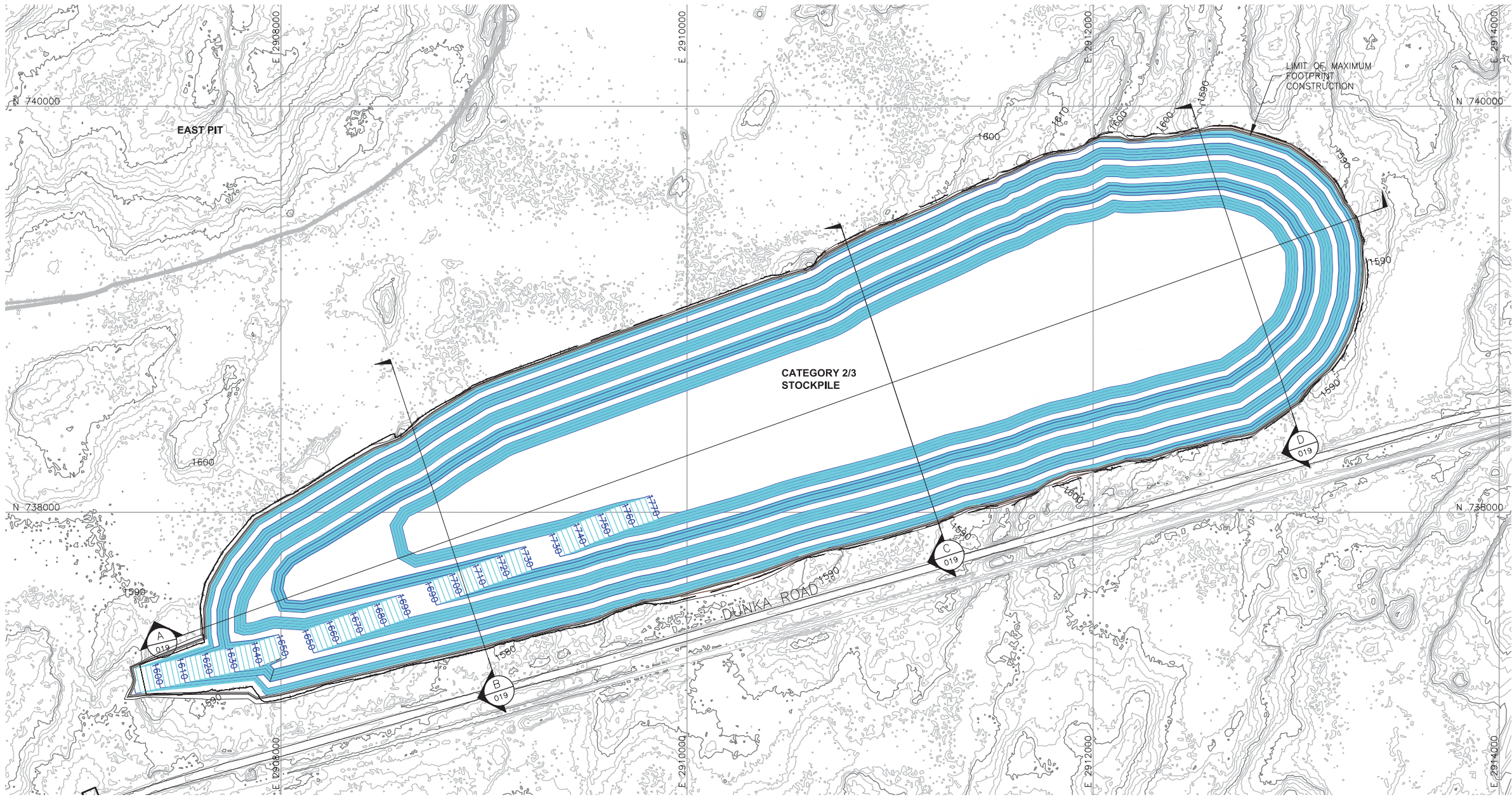
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|--------|----------|---|--------------------------------|---|---------|
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| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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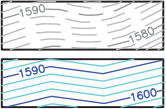
INCHES

2

1



LEGEND



MINE SITE BOUNDARY



MINE YEAR 1 WASTE ROCK STOCKPILE
OUTLINES (SEE NOTE 2)

MAXIMUM ORE, WASTE ROCK STOCKPILE
OUTLINES (SEE NOTE 2)



PROPOSED HAUL ROAD



MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002 AND NOTES ON DRAWING 019.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
MAXIMUM CAPACITY CONFIGURATION



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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| SIGNATURE | | |
| PRINTED NAME | BRENT R. BRONSON | |
| DATE | 8/21/17 | LICENSE # 46492 |

| | |
|---------------------|----------|
| DRAWN: | MTM |
| CHECKED: | |
| GOLDER PROJECT NO.: | 113-2209 |
| SCALE: | AS SHOWN |

DWG. NO. SKP-018

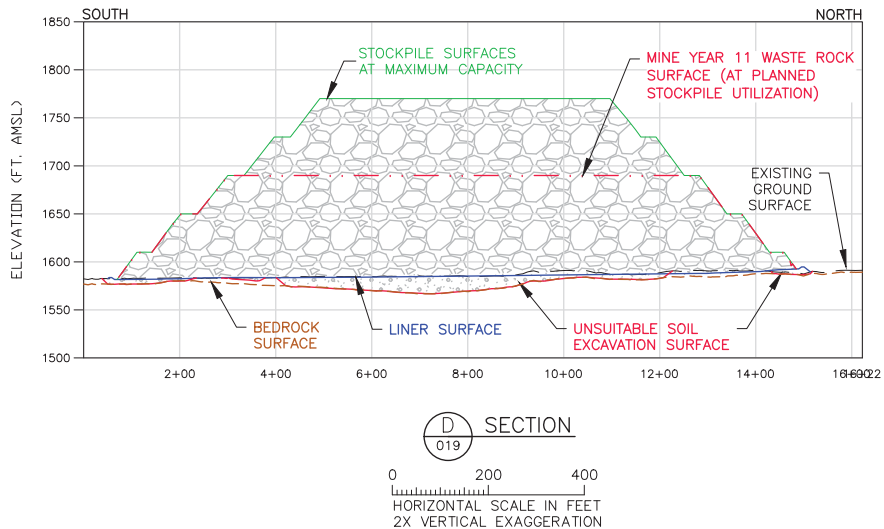
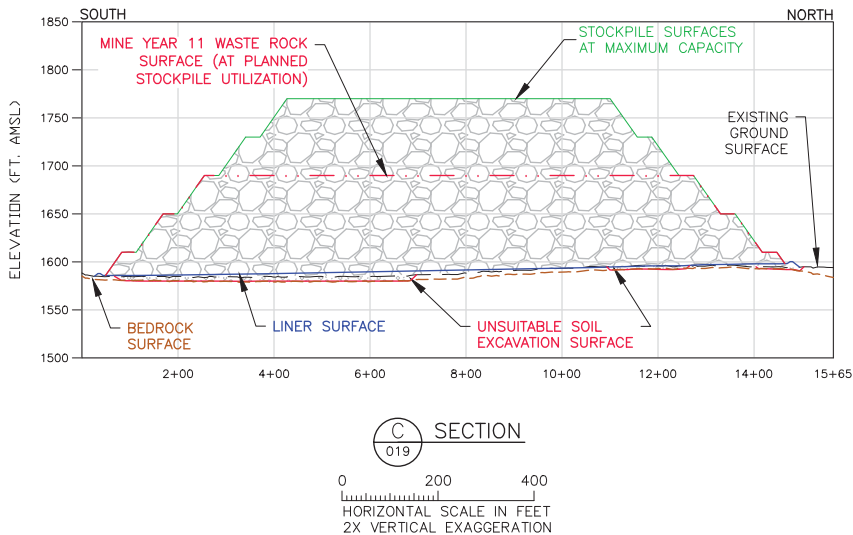
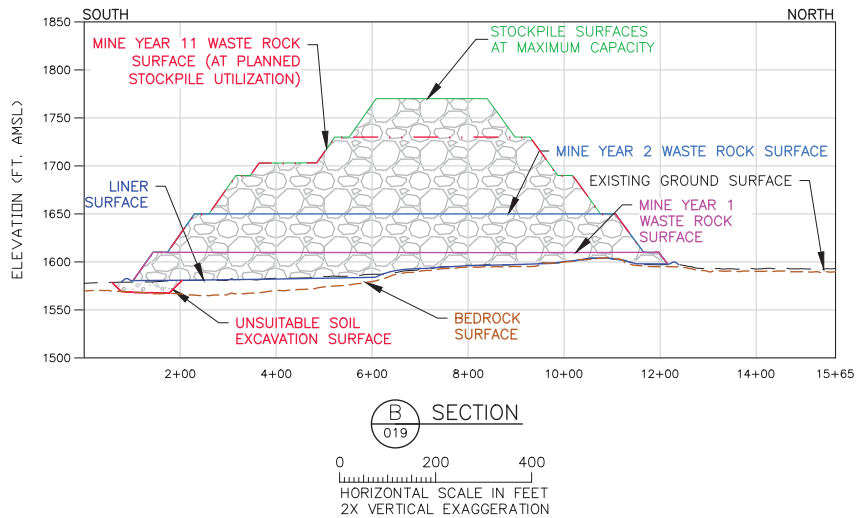
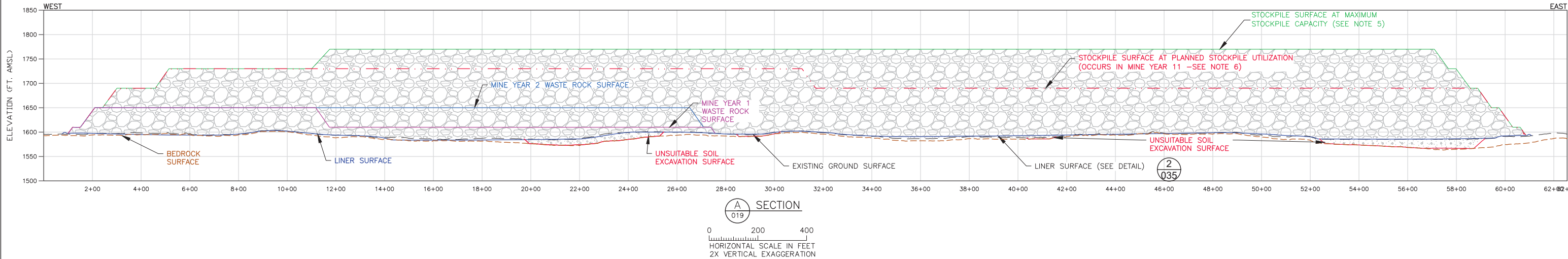
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CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H01.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 10:56 AM

2

1

INCHES



NOTES

1. STOCKPILE INTERBENCH SLOPES AT ANGLE OF REPOSE.
2. THIS DESIGN CONSERVATIVELY ASSUMES THAT ALL LOWLAND/WETLAND SOILS ARE GEOTECHNICALLY UNSUITABLE AND WILL REQUIRE EXCAVATION AND REPLACEMENT WITH STRUCTURAL FILL TO THE DESIGN FOUNDATION BASE GRADE. GEOTECHNICAL PROPERTIES OF THE FOUNDATION SOILS WILL BE CONFIRMED PRIOR TO FINAL DESIGN.
3. MAXIMUM DEPTH OF UNSUITABLE MATERIAL SUBGRADE EXCAVATION LIMITED TO 20 FEET FOR THIS DESIGN. THE ACTUAL DEPTH OF UNSUITABLE SOIL EXCAVATION WILL BE CONFIRMED BY PHASE II GEOTECHNICAL INVESTIGATION.
4. SEE CROSS SECTION LOCATIONS ON DRAWINGS 3, 4, 5, 14, 15 AND 18.
5. MAXIMUM STOCKPILE CAPACITY - THE TOTAL CAPACITY OF THE WASTE ROCK STOCKPILE IF FILLED TO THE MAXIMUM ELEVATIONS NOTED.
6. PLANNED STOCKPILE UTILIZATION - THE PORTION OF THE TOTAL WASTE ROCK STOCKPILE CAPACITY PLANNED TO BE UTILIZED.

LEGEND

- MINE YEAR 1 LIMITS
- MINE YEAR 2 LIMITS
- MINE YEAR 11 LIMITS
- MAXIMUM CAPACITY
- LINER SURFACE
- EXISTING GROUND SURFACE
- UNSUITABLE SOIL EXCAVATION SURFACE
- BEDROCK SURFACE

PLANT DRAWING NUMBER:

CATEGORY 2/3 STOCKPILE
DESIGN SECTIONS



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
Fax: (303) 985-2080
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SPECIFICATION, OR REPORT WAS
PREPARED BY ME OR UNDER MY DIRECT
SUPERVISION AND THAT I AM A DULY
LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF
MINNESOTA.

SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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MTM

CHECKED: *gg*
GOLDER PROJECT NO.:
113-2209

SCALE:
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DWG. NO.
SKP-019

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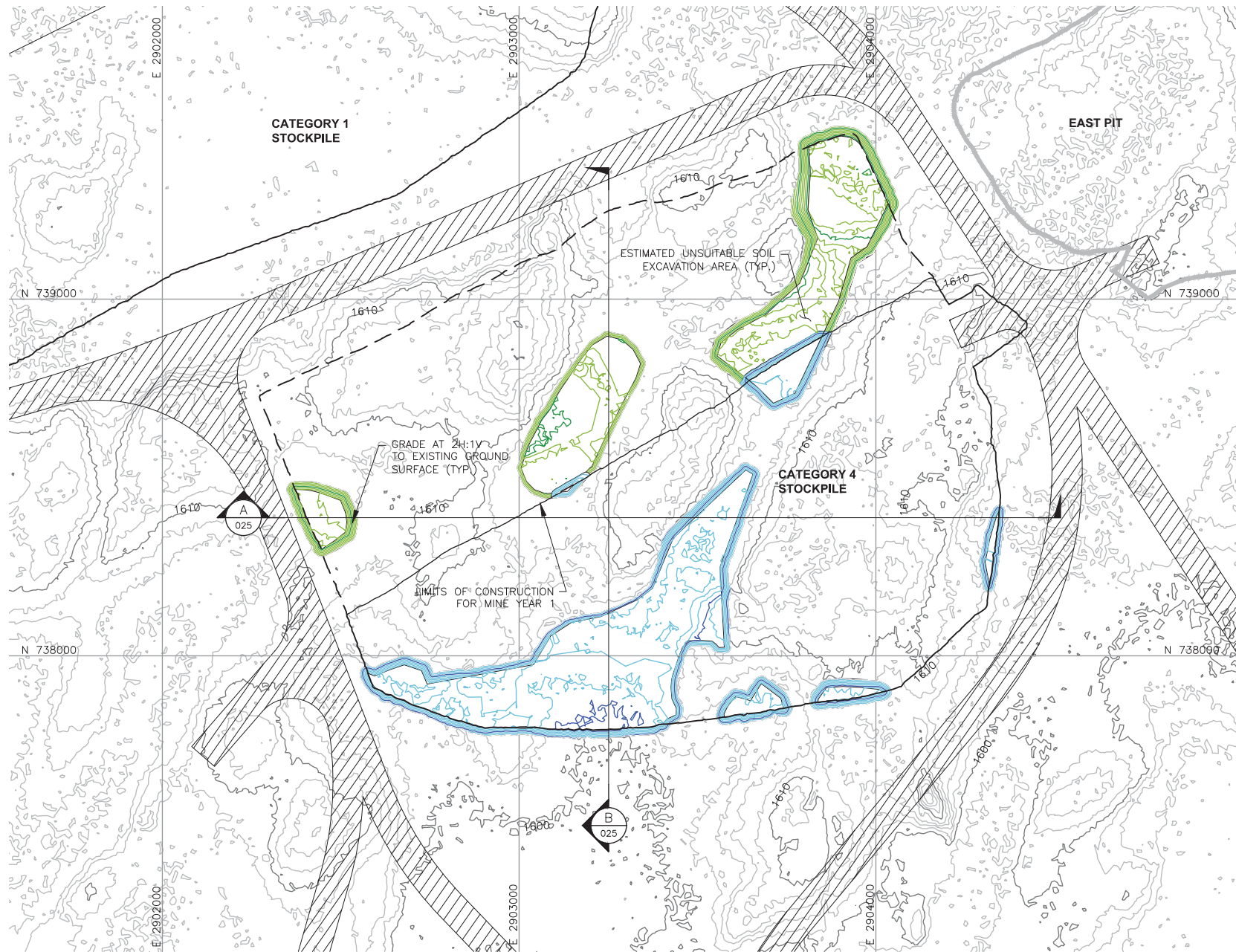
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| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |
| | | | | | |
| | | | | | |

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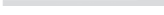


INCHES

2

1



LEGEND

-  EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
-  PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY
-  PROPOSED MAXIMUM FOOTPRINT EXCAVATION TOPOGRAPHY
-  MINE SITE BOUNDARY
-  MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-  HAUL ROADS
-  MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)
-  CROSS SECTION IDENTIFIER
-  SHEET WHERE SECTION IS LOCATED

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE
SUBGRADE EXCAVATION PLAN




POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES, INC.
44 UNION BOULEVARD, SUITE 300
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Ph: (303) 980-0540
Fax: (303) 985-2080
www.golder.com

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---|---------|
| A | 12/02/11 | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | FOR PERMITTING | G | 8/21/17 |
| B | 2/15/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |


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SIGNATURE 

PRINTED NAME BRENT R. BRONSON

DATE 8/21/17 LICENSE # 46492

DRAWN: MTM

CHECKED: 

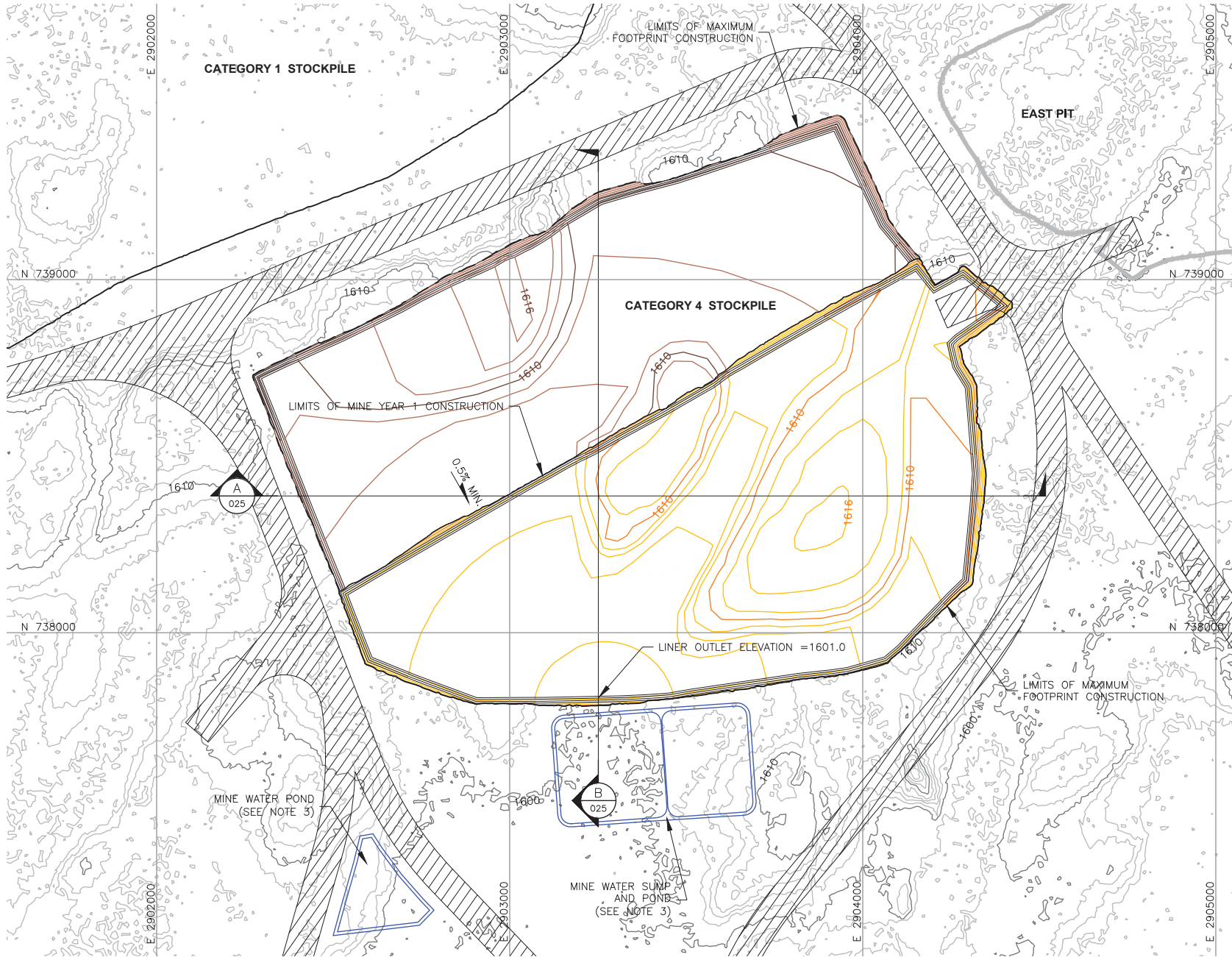
GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN

DWG. NO. SKP-020

REV

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209HO13.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:01 AM



LEGEND

- EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
- PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY
- PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY
- MINE SITE BOUNDARY
- CROSS SECTION IDENTIFIER
- SHEET WHERE SECTION IS LOCATED
- SLOPE
- MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- HAUL ROAD
- MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)
- MINE WATER SUMP/POND (SEE NOTE 3)

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE
FOUNDATION GRADING PLAN
MINE YEAR 1 AND MAXIMUM



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
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Ph: (303) 980-0540
Fax: (303) 985-2080
www.golder.com

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| B | 2/15/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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SIGNATURE *B. Bronson*

PRINTED NAME BRENT R. BRONSON

DATE 8/21/17 LICENSE # 46492

DRAWN: MTM

CHECKED: *gg*

GOLDER PROJECT NO.: 113-2209

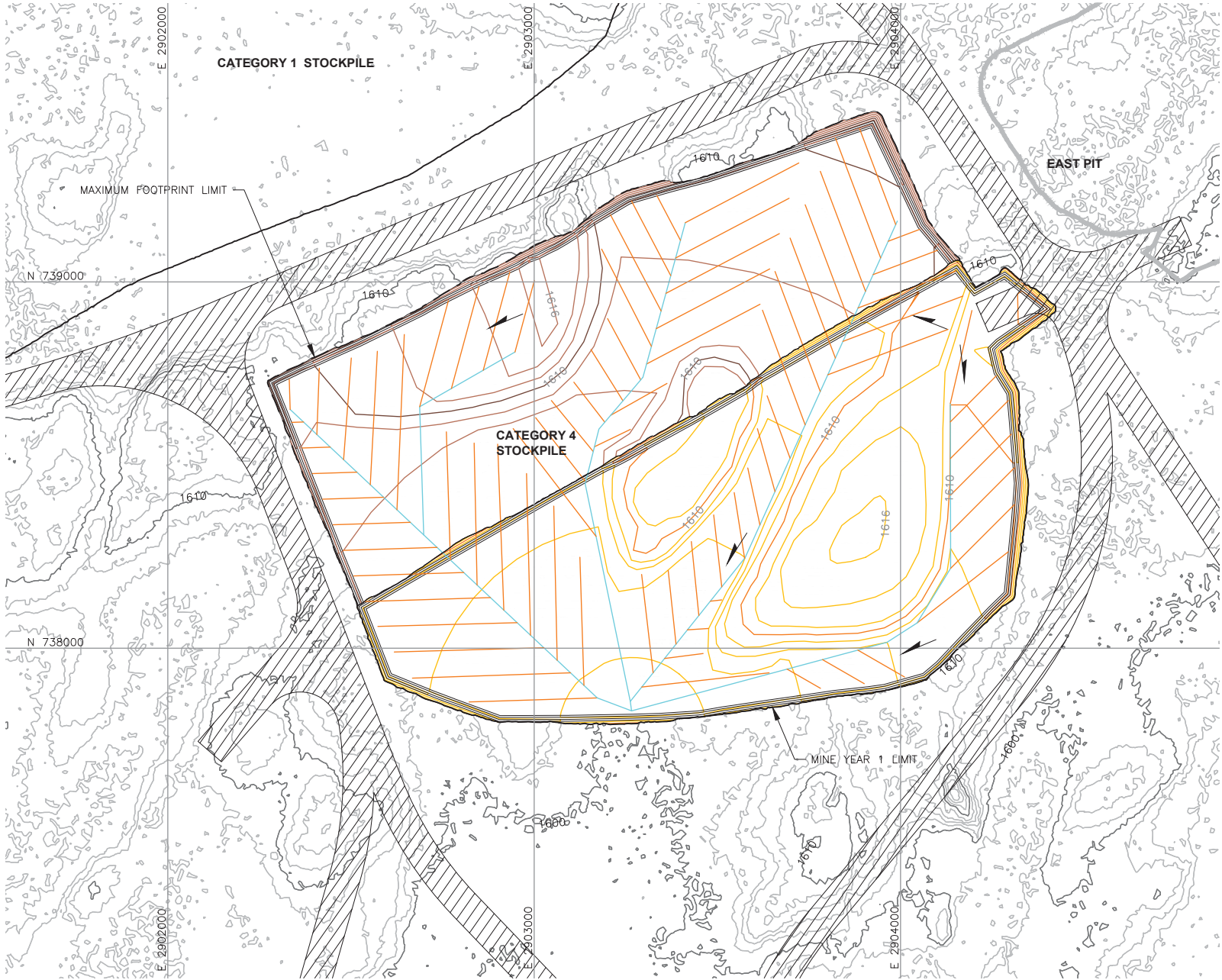
SCALE: AS SHOWN

DWG. NO. SKP-021


REV


2 CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\H SKP FEB2013\113209HD14.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:03 AM


1 INCHES





LEGEND


- 


EXISTING GROUND TOPOGRAPHY
- 


PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY
- 


PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY
- 


MINE SITE BOUNDARY
- 


MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)
- 


SLOPE
- 


MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- 

MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- 

HAUL ROADS
- 

TERTIARY COLLECTION PIPING (SEE NOTE 3)
- 

4-INCH
- 

SECONDARY COLLECTION PIPING (SEE NOTE 3)
- 




6-INCH

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. ACTUAL NUMBER AND LOCATION OF UNDERDRAIN PIPES AND SUMPS WILL NEED TO BE DETERMINED DURING CONSTRUCTION BASED ON ENCOUNTERED FIELD CONDITIONS. SEE DETAIL 5 ON DRAWING 035 FOR UNDERDRAIN.
4. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.


REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

| | | |
|---|--|-----|
| PLANT DRAWING NUMBER: | | |
| CATEGORY 4 STOCKPILE UNDERDRAIN PIPING PLAN MINE YEAR 1 AND MAXIMUM | | |
|  | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | |
|  | GOLDER ASSOCIATES INC. 44 UNION BOULEVARD, SUITE 300 LAKEWOOD, CO USA 80233 Ph: (303) 980-0540 Fax: (303) 985-2080 www.golder.com | |
| DRAWN: MTM | GOLDER PROJECT NO.: 113-2209 | |
| CHECKED:  | | |
| SCALE: AS SHOWN | DWG. NO. SKP-022 | REV |

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---|---------|
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| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |
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SIGNATURE 

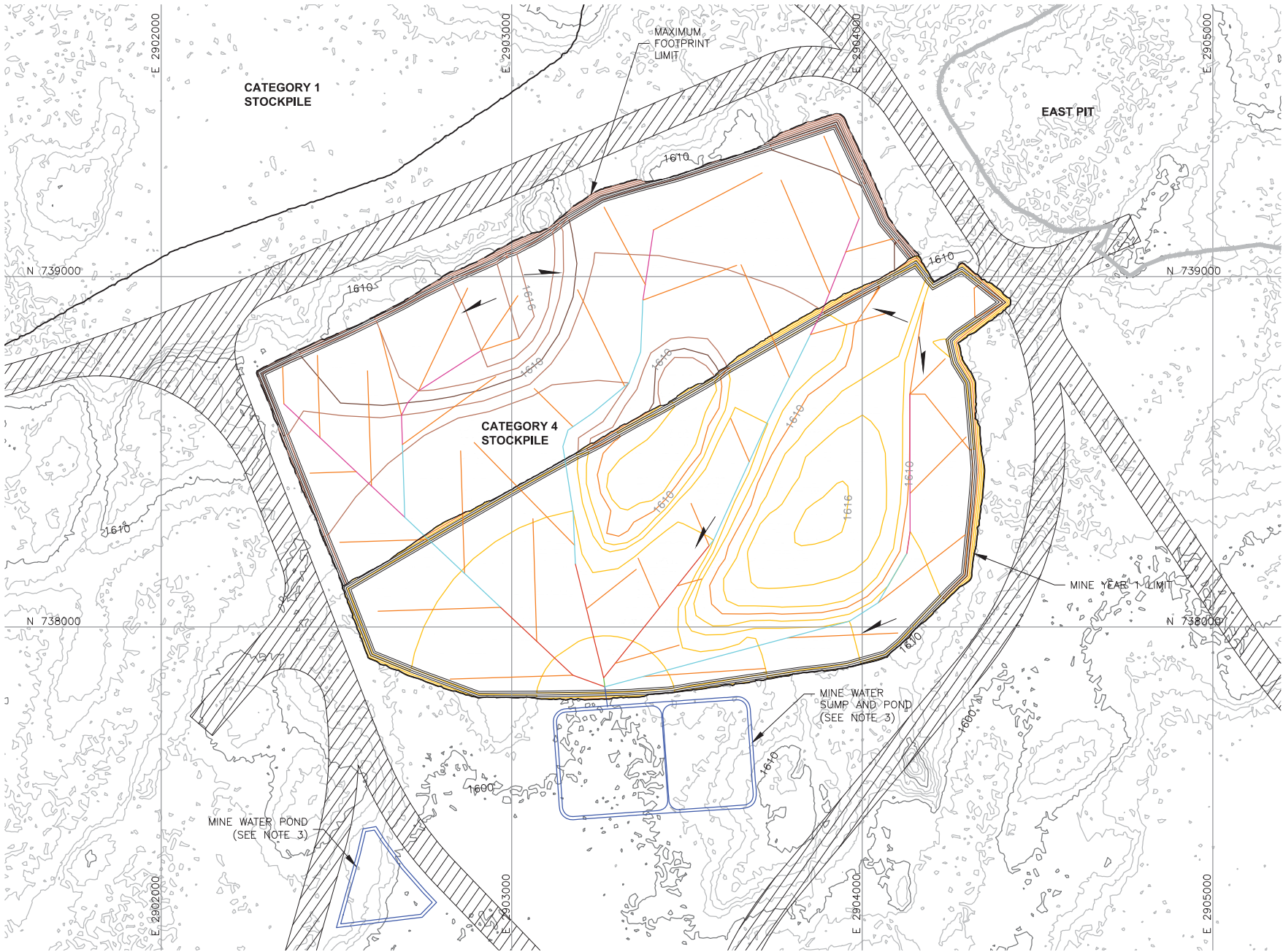
PRINTED NAME BRENT R. BRONSON

DATE 8/21/17 LICENSE # 46492

2 CADD USER: jenkins, Crystal FILE: N:\11\13-2209\H_SKP FEB2013\13209HD15.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 4:40 PM

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1



| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
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DATE 8/21/17 LICENSE # 46492

DRAWN: MTM

CHECKED:

GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN

POLYMET MINING

POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
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www.golder.com

DWG. NO. SKP-023

REV

LEGEND

- EXISTING GROUND TOPOGRAPHY
- PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY
- PROPOSED MAXIMUM FOOTPRINT GRADING TOPOGRAPHY
- MINE SITE BOUNDARY
- MINE YEAR 2 PIT BOUNDARIES (SEE NOTE 1)
- SLOPE
- MINE YEAR 1 WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- MAXIMUM WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- HAUL ROADS
- MINE WATER SUMP/POND (SEE NOTE 3)
- MINE YEAR 1 - TERTIARY COLLECTION PIPING

4-INCH
- MINE YEAR 1 - PRIMARY AND SECONDARY COLLECTION PIPING

4-INCH

6-INCH

8-INCH

10-INCH

12-INCH

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

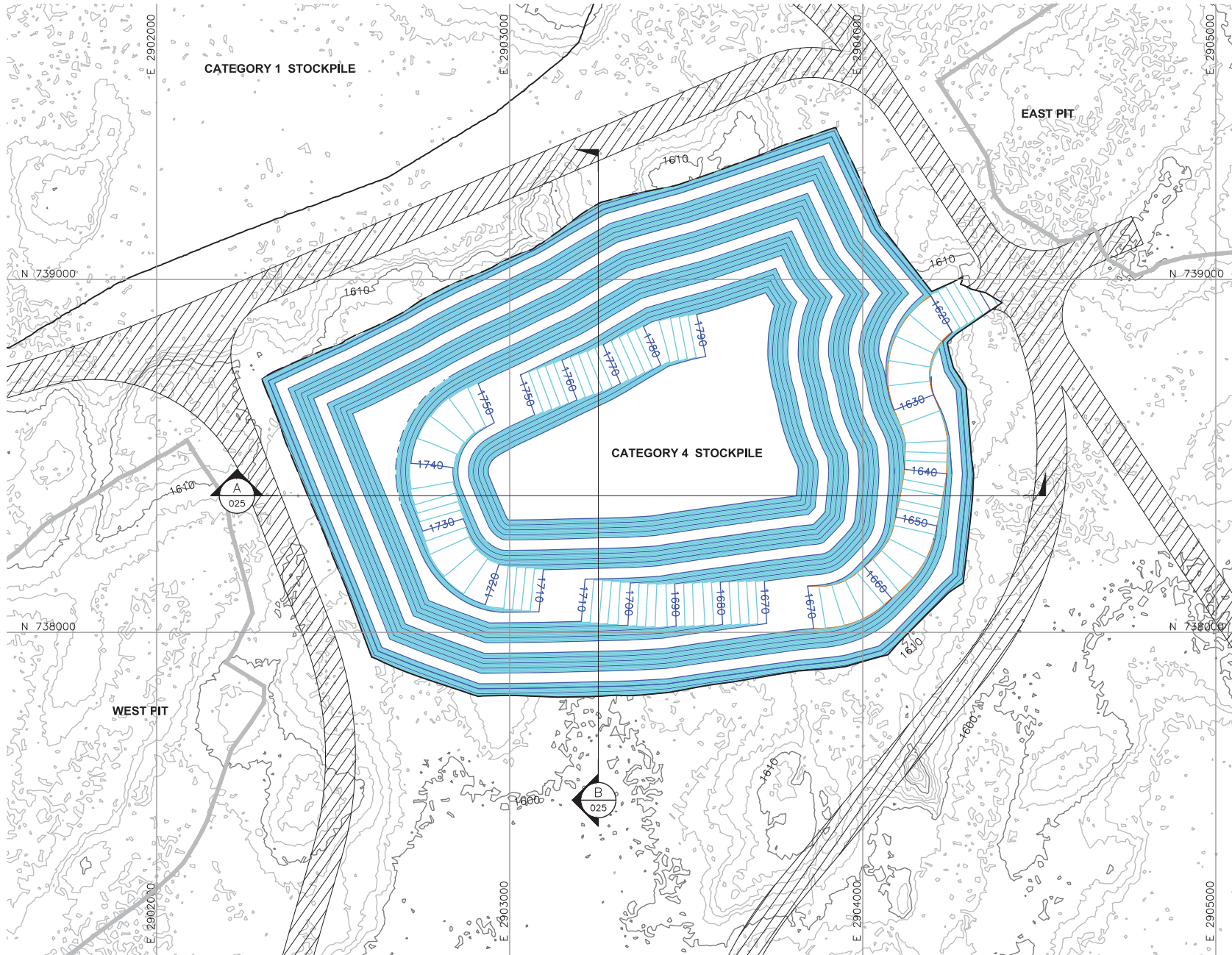
CATEGORY 4 STOCKPILE
OVERLINER DRAINAGE PIPING PLAN
MINE YEAR 1 AND MAXIMUM

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H006.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:08 AM

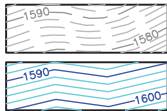
INCHES

2

1



LEGEND



EXISTING GROUND TOPOGRAPHY
(SEE REFERENCE 1)

GRADING TOPOGRAPHY AT
MAXIMUM STOCKPILE CAPACITY

MINE SITE BOUNDARY



CROSS SECTION IDENTIFIER

SHEET WHERE SECTION IS LOCATED

MINE YEAR 1 WASTE ROCK
STOCKPILE LIMIT (SEE NOTE 1)

MAXIMUM WASTE ROCK STOCKPILE LIMIT



PROPOSED HAUL ROAD

MINE YEAR 11 PIT BOUNDARIES (SEE NOTE 1)

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002 AND NOTES ON DRAWING 025.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

CATEGORY 4 STOCKPILE
MAXIMUM CAPACITY CONFIGURATION



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
Fax: (303) 985-2080
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PREPARED BY ME OR UNDER MY DIRECT
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LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF
MINNESOTA.

SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

DRAWN:
MTM

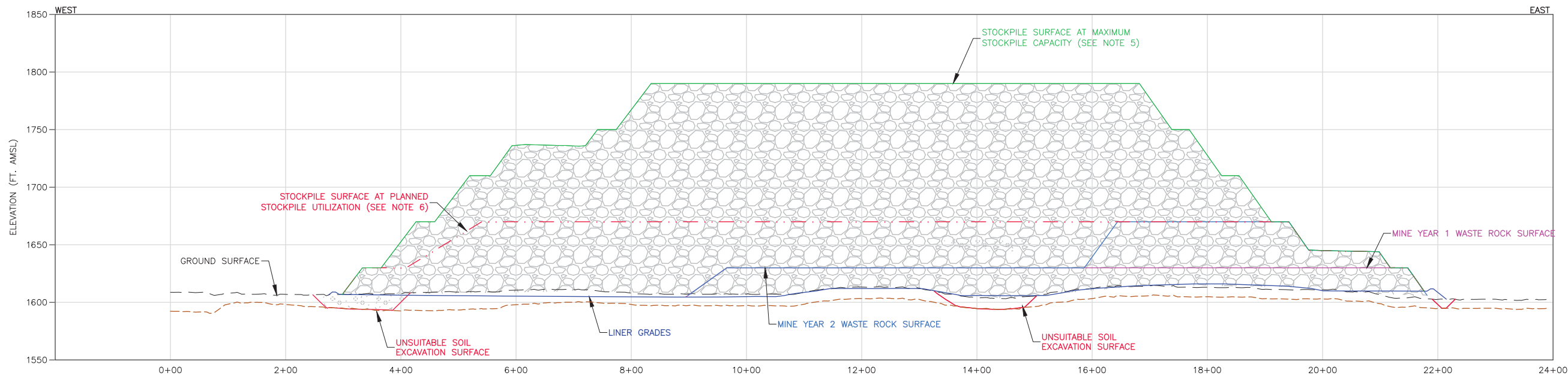
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GOLDER PROJECT NO.:
113-2209

SCALE:
AS SHOWN

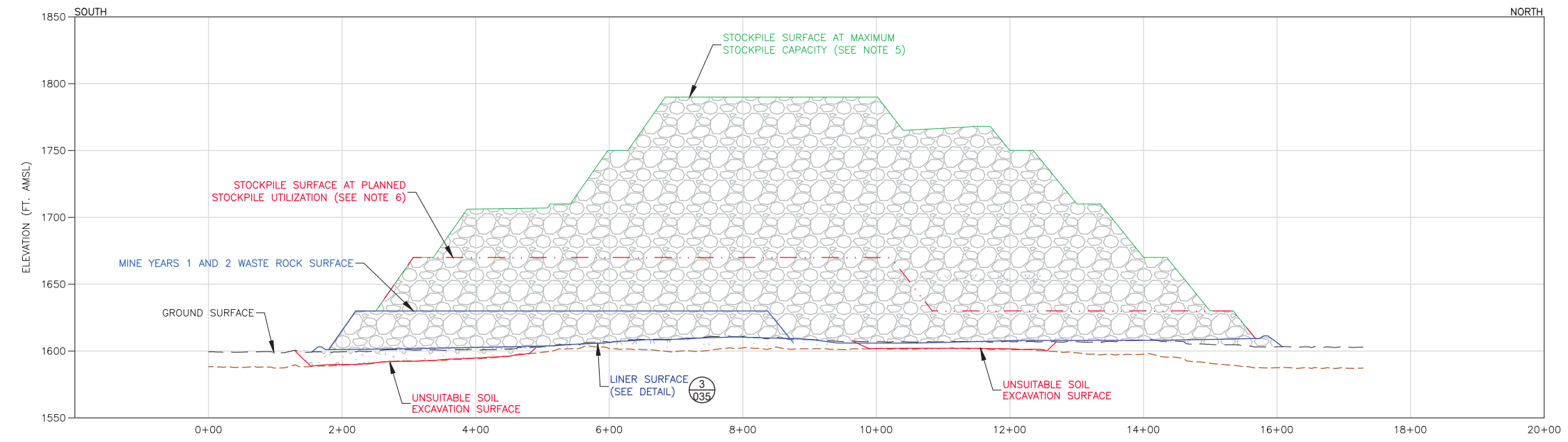
DWG. NO.
SKP-024

REV

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| A | 12/02/11 | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | ISSUED | VERSION | DATE |
| B | 2/15/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | FOR PERMITTING | G | 8/21/17 |
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |



A SECTION
025
0 100 200
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION




B SECTION
025
0 100 200
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION

- LEGEND**
- MINE YEAR 1 LIMITS
 - MINE YEAR 2 LIMITS
 - MINE YEAR 11 LIMITS
 - MAXIMUM CAPACITY
 - LINER SURFACE
 - EXISTING GROUND SURFACE
 - UNSUITABLE SOIL EXCAVATION SURFACE
 - BEDROCK SURFACE


- NOTES**
- STOCKPILE INTERBENCH SLOPES AT ANGLE OF REPOSE.
 - THIS DESIGN CONSERVATIVELY ASSUMES THAT ALL LOWLAND/WETLAND SOILS ARE GEOTECHNICALLY UNSUITABLE AND WILL REQUIRE EXCAVATION AND REPLACEMENT WITH STRUCTURAL FILL TO THE DESIGN FOUNDATION BASE GRADE. GEOTECHNICAL PROPERTIES OF THE FOUNDATION SOILS WILL BE CONFIRMED PRIOR TO FINAL DESIGN.
 - MAXIMUM DEPTH OF UNSUITABLE MATERIAL SUBGRADE EXCAVATION LIMITED TO 20 FEET FOR THIS DESIGN. THE ACTUAL DEPTH OF UNSUITABLE SOIL EXCAVATION WILL BE CONFIRMED BY PHASE II GEOTECHNICAL INVESTIGATION.
 - SEE CROSS SECTION LOCATIONS ON DRAWINGS 3, 4, 5, 20, 21 AND 24.
 - MAXIMUM STOCKPILE CAPACITY – THE TOTAL CAPACITY OF THE WASTE ROCK STOCKPILE IF FILLED TO THE MAXIMUM ELEVATIONS NOTED.
 - PLANNED STOCKPILE UTILIZATION – THE PORTION OF THE TOTAL WASTE ROCK STOCKPILE CAPACITY PLANNED TO BE UTILIZED.

PLANT DRAWING NUMBER:

**CATEGORY 4 STOCKPILE
DESIGN SECTIONS**




POLYMET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
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| | | | | |
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| SCALE: | AS SHOWN | DWG. NO. | SKP-025 | REV |
|--------|----------|----------|---------|-----|

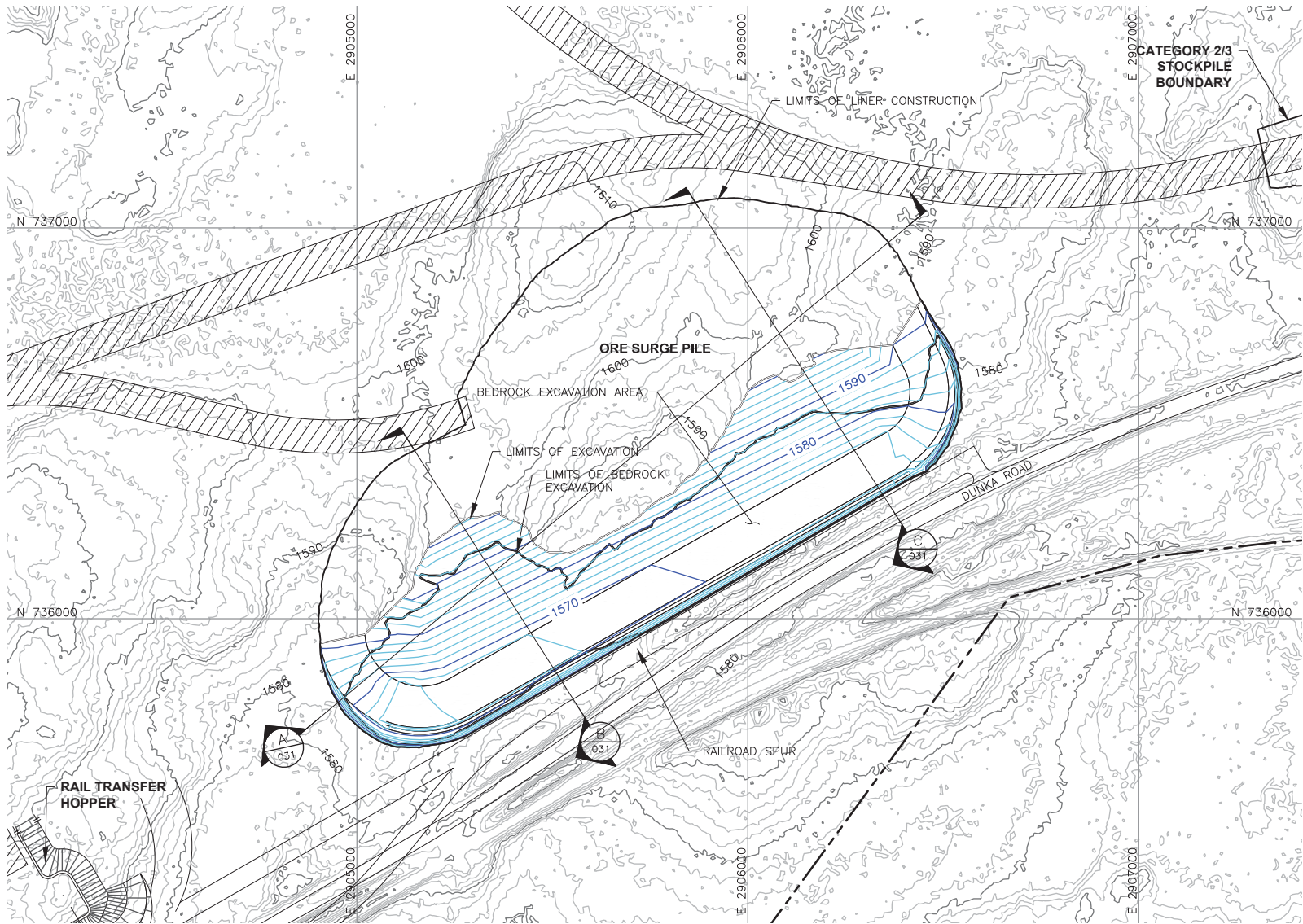
| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | | I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNATURE  PRINTED NAME BRENT R. BRONSON DATE 8/21/17 LICENSE # 46492 |
|--------|----------|---|--------------------------------|---------|---------|---|
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | NOT APPROVED FOR CONSTRUCTION. | | | |
| | | | | | | |

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H017.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:12 AM

INCHES

2

1



| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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SIGNATURE *B. Bronson*

PRINTED NAME BRENT R. BRONSON


DATE 8/21/17 LICENSE # 46492

DRAWN: MTM


CHECKED: *gg*

GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA





GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
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www.golder.com


DWG. NO. SKP-026


REV


LEGEND


- 


EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
- 

PROPOSED MINE YEAR 1 EXCAVATION TOPOGRAPHY
- 

MINE SITE BOUNDARY
- 

MINE YEAR 1 ORE STOCKPILE OUTLINES (SEE NOTE 2)
- 

HAUL ROADS
- 

CROSS SECTION IDENTIFIER
- 

SHEET WHERE SECTION IS LOCATED

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

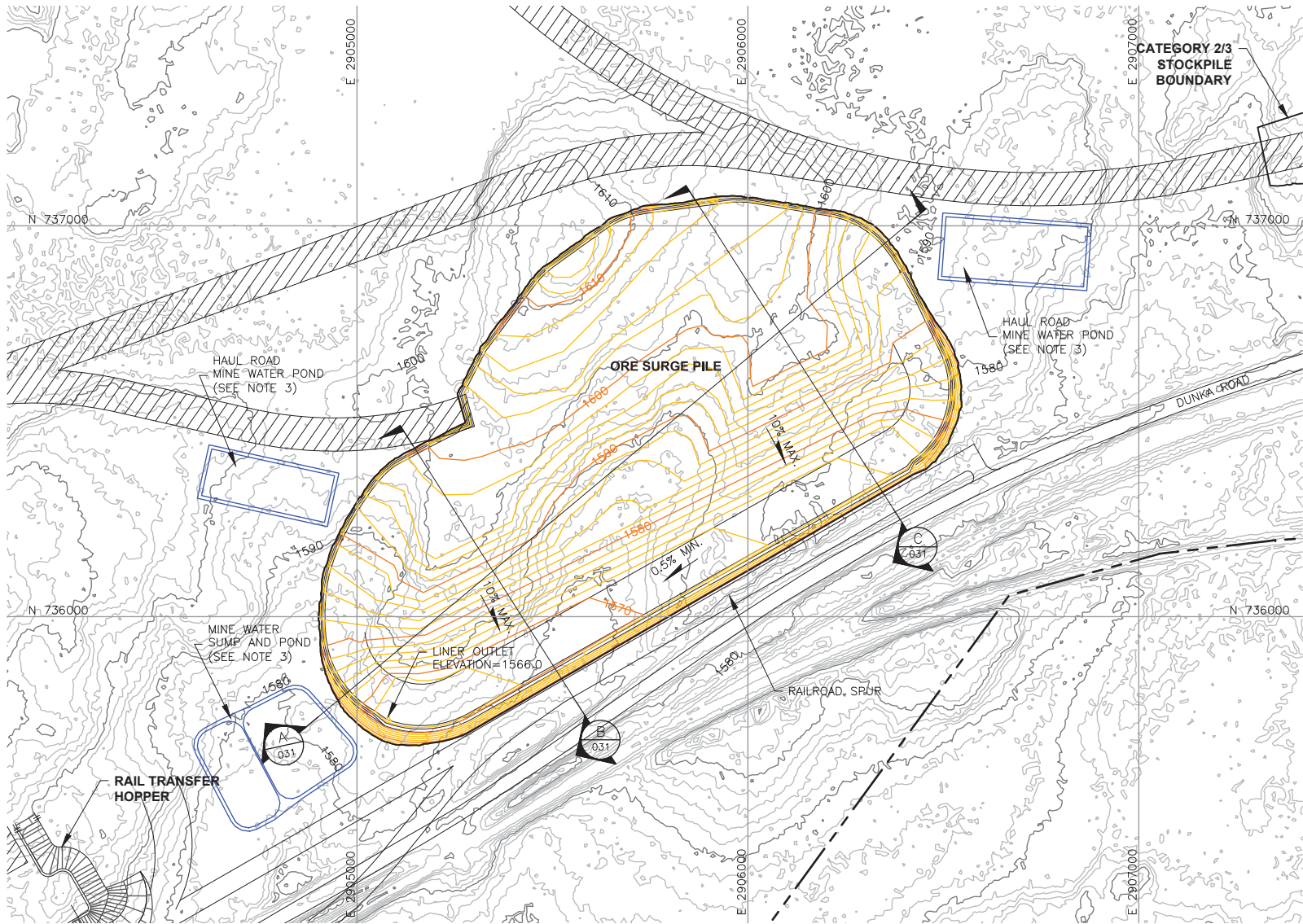
ORE SURGE PILE
SUBGRADE EXCAVATION PLAN

CADD USER: Jenkins, Crystal FILE: N:\11\113-2209\1132209H018.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:15 AM

INCHES

2

1



| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
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SIGNATURE *B. Bronson*

PRINTED NAME BRENT R. BRONSON


DATE 8/21/17 LICENSE # 46492

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GOLDER PROJECT NO.: 113-2209

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NORTHMET PROJECT
HOYT LAKES, MINNESOTA





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REV


LEGEND


- 


EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 1)
- 

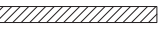
PROPOSED MINE YEAR 1 GRADING TOPOGRAPHY
- 


MINE SITE BOUNDARY
- 

CROSS SECTION IDENTIFIER
- 

SHEET WHERE SECTION IS LOCATED
- 

SLOPE
- 

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- 

HAUL ROADS
- 

MINE WATER SUMP/POND (SEE NOTE 3)

NOTES

- OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
- STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

- EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
- COORDINATE SYSTEM REFERENCE IS MINNESOTA STATE PLANE.
- VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

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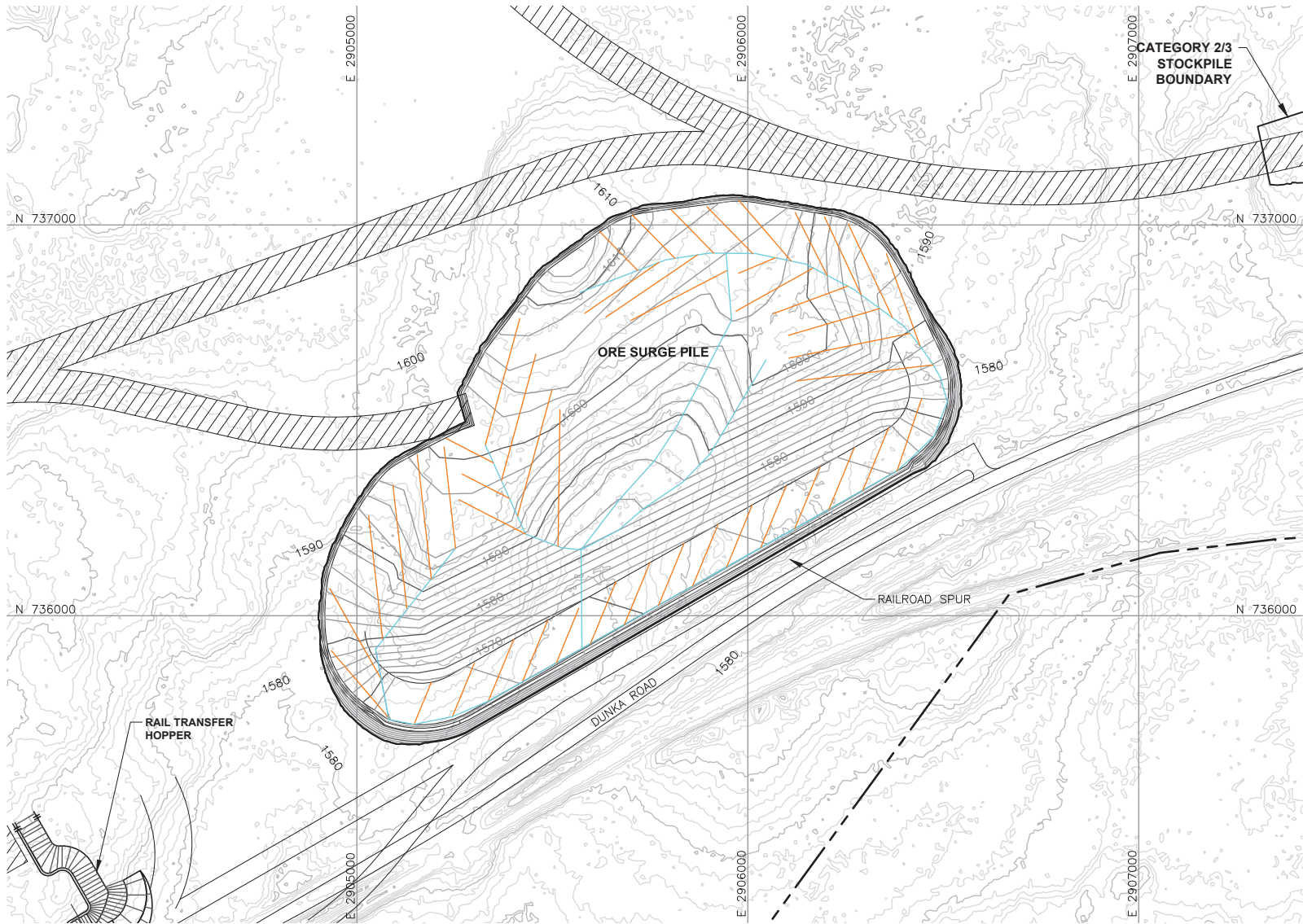
ORE SURGE PILE
FOUNDATION GRADING PLAN

CADD USER: Jenkins, Crystal FILE: N:\1\113-2209\LH SKP FEB2013\1132209M019.DWG PLOT SCALE: 1:1 PLOT DATE: 8/18/2017 11:17 AM

INCHES

2

1



LEGEND

-
- EXISTING GROUND TOPOGRAPHY
-
- PROPOSED GRADING TOPOGRAPHY
-
- MINE SITE BOUNDARY
-
- MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
-
- HAUL ROADS

TERTIARY COLLECTION PIPING (SEE NOTE 3)

4-INCH

SECONDARY COLLECTION PIPING (SEE NOTE 3)

6-INCH

NOTES

1. OPEN PIT AND HAUL ROAD LAYOUTS PROVIDED BY BARR ENGINEERING IN OCTOBER 2011.
2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. ACTUAL NUMBER AND LOCATION OF UNDERDRAIN PIPES AND SUMPS WILL NEED TO BE DETERMINED DURING CONSTRUCTION BASED ON ENCOUNTERED FIELD CONDITIONS. SEE DETAIL 5 ON DRAWING 035 FOR UNDERDRAIN.
2. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

1. EXISTING GROUND TOPOGRAPHY PROVIDED BY BARR ENGINEERING, AUGUST 2011.
2. COORDINATE SYSTEM REFERENCE IS NAD83 MINNESOTA STATE PLANE NORTH.
3. VERTICAL DATUM REFERENCE IS FEET ABOVE MEAN SEA LEVEL (AMSL).

PLANT DRAWING NUMBER:

ORE SURGE PILE
UNDERDRAIN PIPING PLAN



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SCALE:
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DWG. NO.
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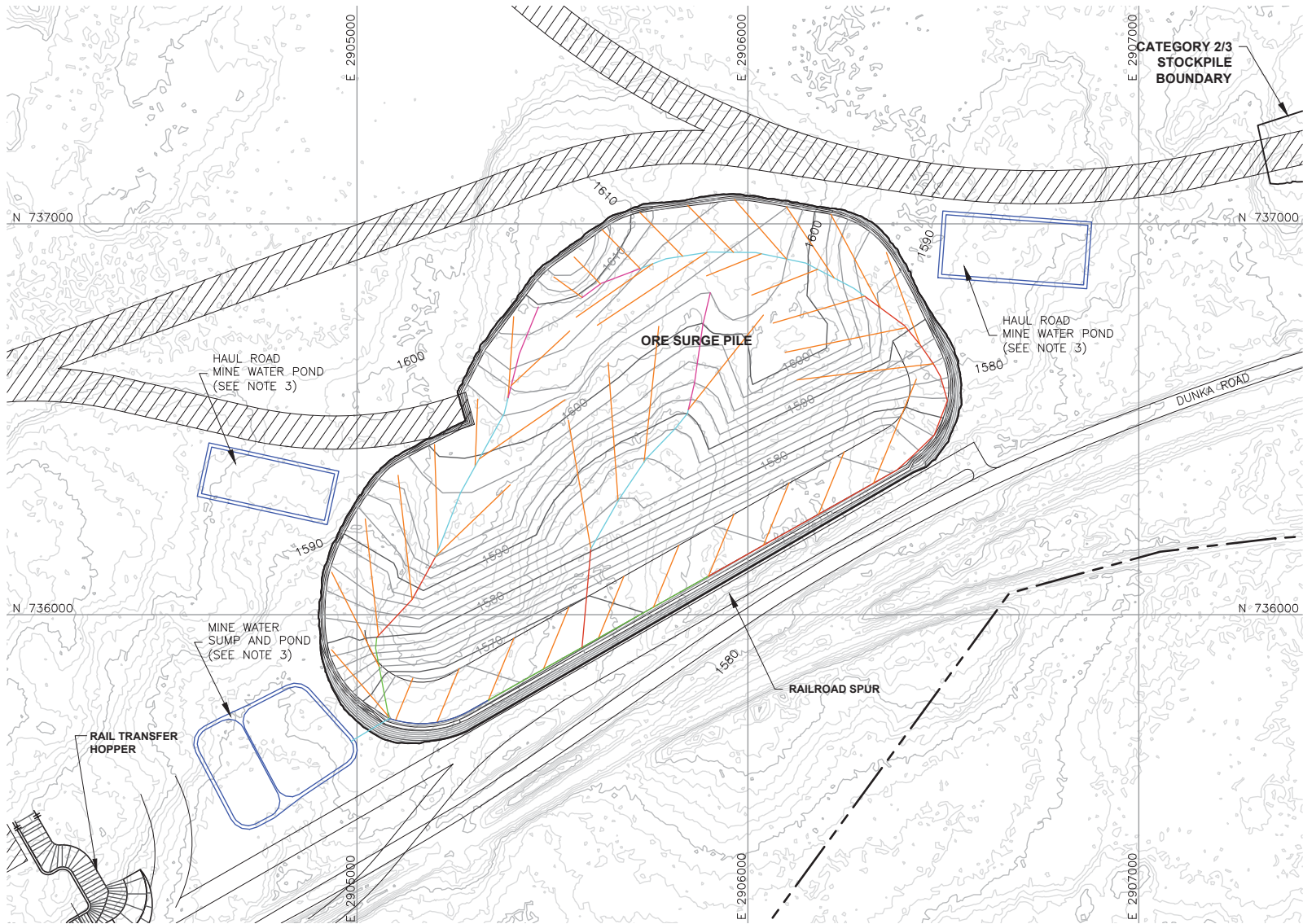
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INCHES


2


1





LEGEND


- 

EXISTING GROUND TOPOGRAPHY
- 

PROPOSED GRADING TOPOGRAPHY
- 

MINE SITE BOUNDARY
- 

MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)
- 

HAUL ROADS
- 

MINE WATER SUMP/POND (SEE NOTE 3)

MINE YEAR 1 – TERTIARY COLLECTION PIPING

4-INCH

MINE YEAR 1 – PRIMARY AND SECONDARY COLLECTION PIPING

4-INCH

6-INCH

8-INCH

10-INCH

12-INCH

NOTES

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- SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

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PLANT DRAWING NUMBER:

ORE SURGE PILE
OVERLINER DRAINAGE PIPING PLAN



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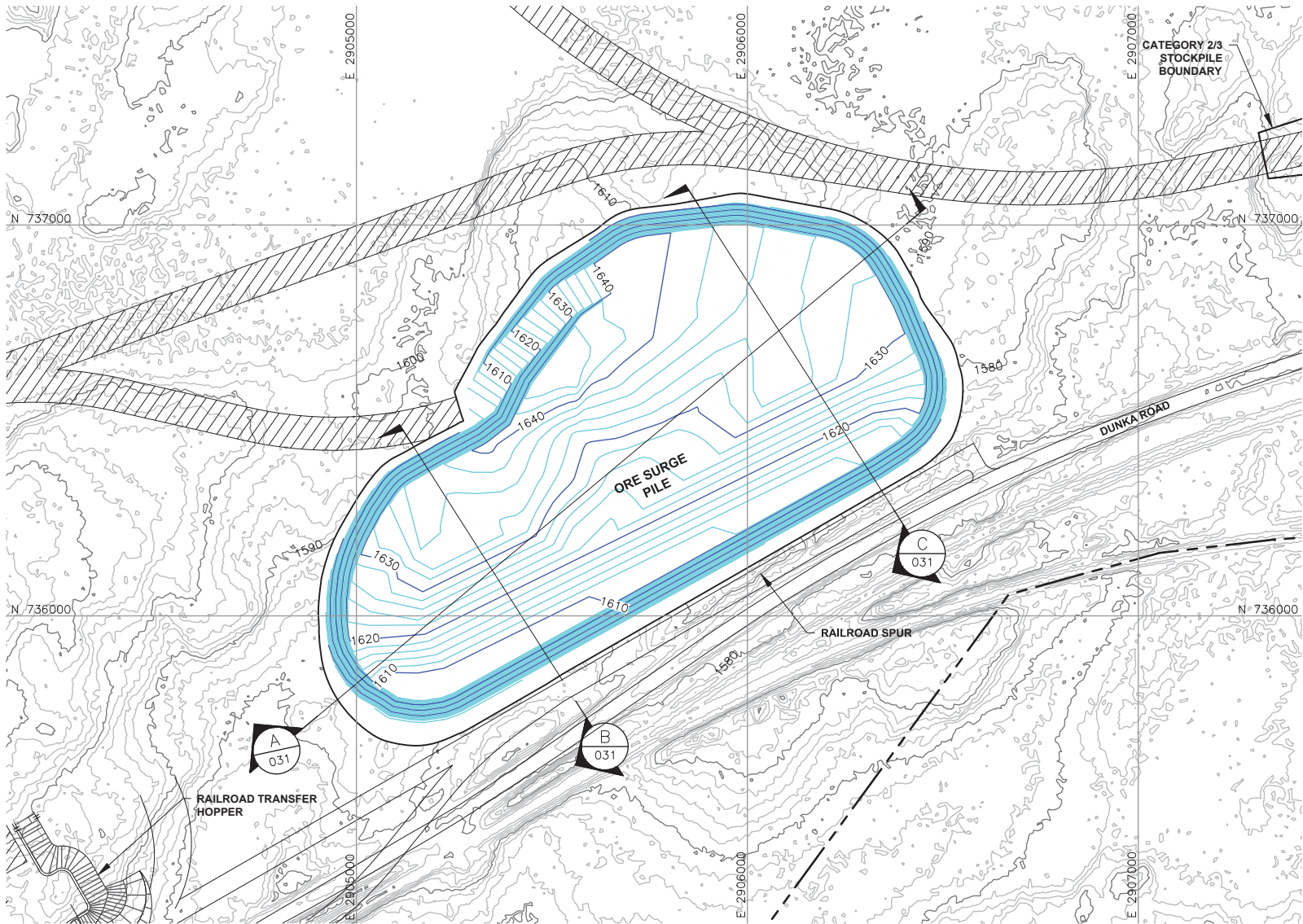
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INCHES

2

1



LEGEND



EXISTING GROUND TOPOGRAPHY



PROPOSED STOCKPILE LAYOUTS



HAUL ROADS



MINE SITE BOUNDARY



MINE YEAR 1 PIT BOUNDARY (SEE NOTE 1)



MINE YEAR 1 ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



MAXIMUM ORE, WASTE ROCK STOCKPILE OUTLINES (SEE NOTE 2)



CROSS SECTION IDENTIFIER



SHEET WHERE SECTION IS LOCATED

NOTES

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2. STOCKPILE LAYOUTS PROVIDED BY BARR ENGINEERING IN APRIL 2011 AND MODIFIED BY GOLDER.
3. SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

REFERENCES

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PLANT DRAWING NUMBER:

ORE SURGE PILE
TYPICAL CONFIGURATION



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PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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113-2209

SCALE:
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SKP-030

REV

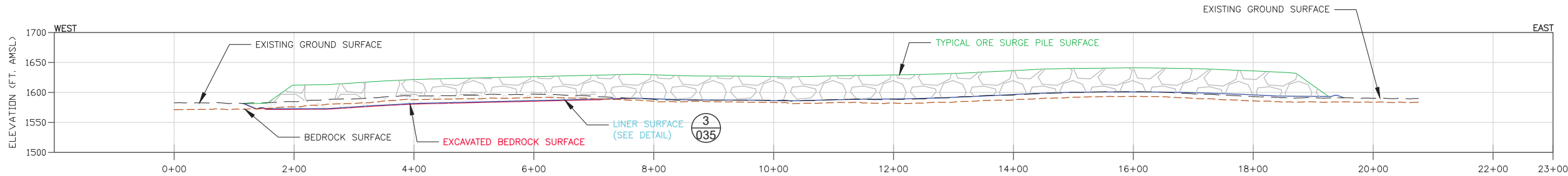
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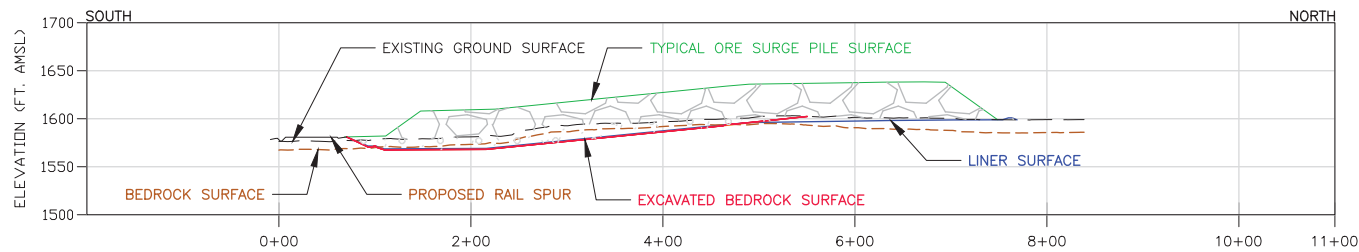
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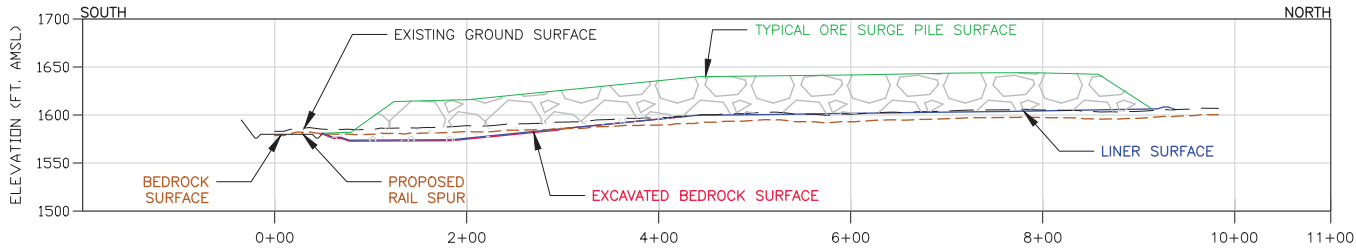
A SECTION
031

0 100 200
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



B SECTION
031

0 100 200
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



C SECTION
031

0 100 200
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION

LEGEND

- ORE LIMITS AT TYPICAL CAPACITY
- LINER SURFACE
- EXISTING GROUND SURFACE
- OVERBURDEN SOIL AND BEDROCK EXCAVATION SURFACE
- BEDROCK SURFACE

NOTES

- STOCKPILE SIDE SLOPES AT ANGLE OF REPOSE.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
- SEE CROSS SECTION LOCATIONS ON DRAWINGS 3, 4, 5, 26, AND 27

PLANT DRAWING NUMBER:

ORE SURGE PILE
DESIGN SECTIONS



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SKP-031

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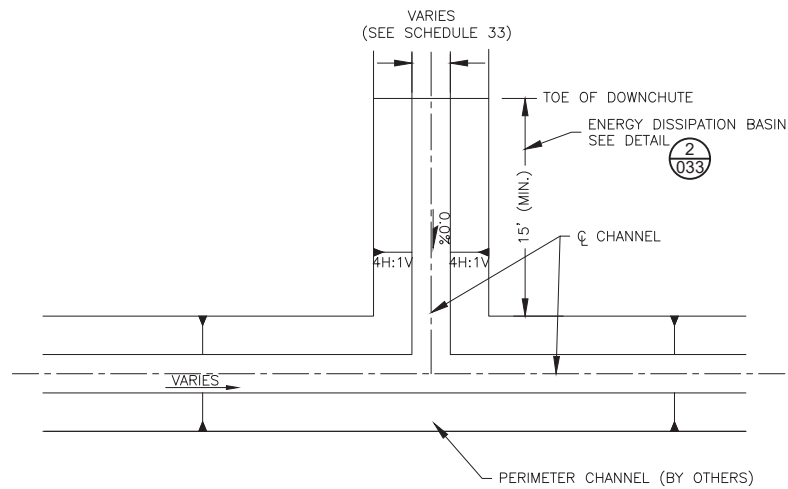
DATE 8/21/17 LICENSE # 46492

SCALE: AS SHOWN

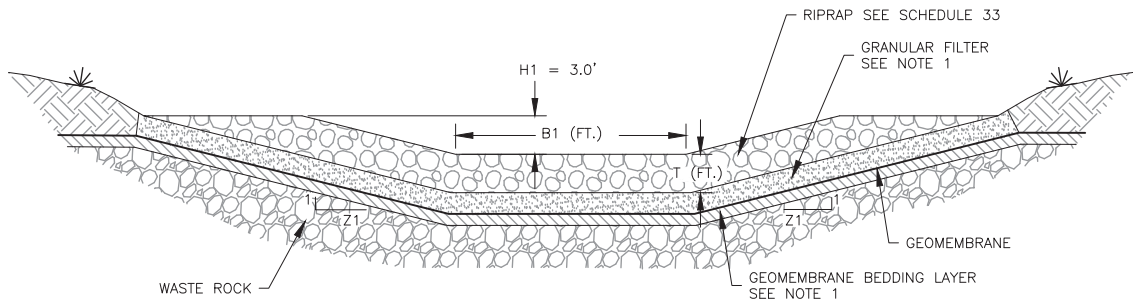
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| DWG. NO. | |
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SKP-032

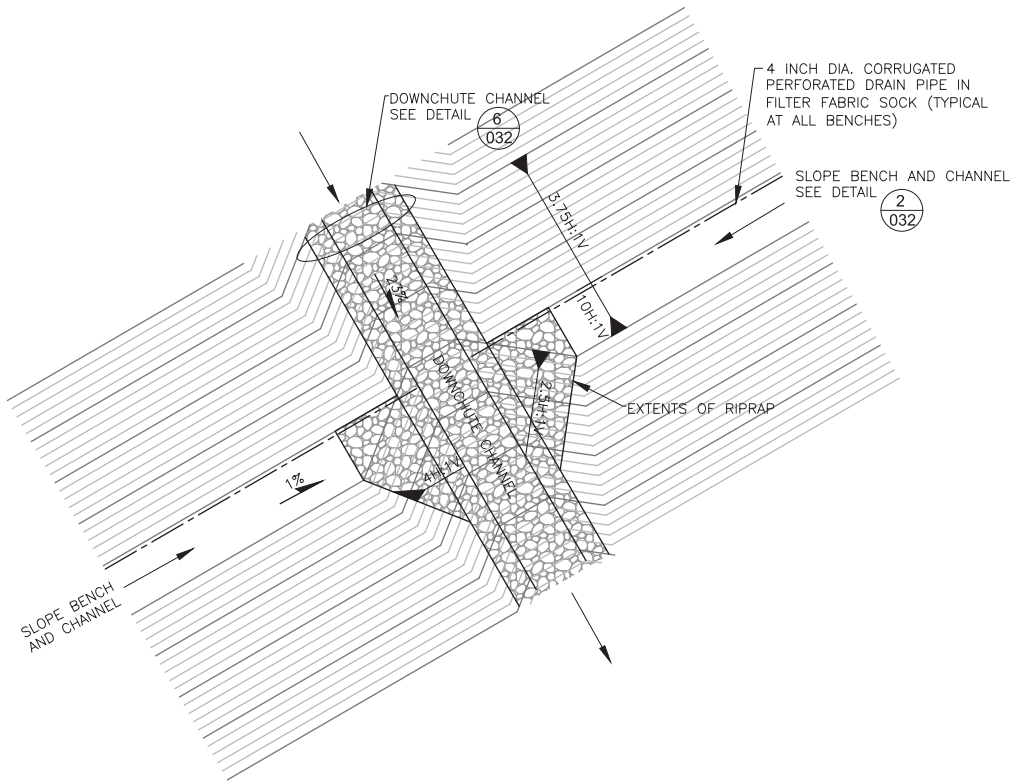
KEY



1
033 DOWNCHUTE CHANNEL CONFLUENCE DETAIL
N.T.S.



2
033 TYPICAL ENERGY DISSIPATION BASIN
(SEE SCHEDULE 33 FOR DIMENSIONS)
N.T.S.



3
033 SLOPE BENCH AND CHANNEL TO DOWNCHUTE TRANSITION
N.T.S.

SCHEDULE 33: RIPRAP-LINED CHANNEL DIMENSIONS

| CHANNEL ID | BOTTOM WIDTH, B1 (FT) | SIDE SLOPE, Z1 (H:1V) | MIN. DEPTH, H1 (FT) | RIPRAP SIZE, D ₅₀ (IN) | RIPRAP LAYER THICKNESS, T (FT) | MAX SLOPE, (FT/FT) |
|------------|-----------------------|-----------------------|---------------------|-----------------------------------|--------------------------------|--------------------|
| DC1-A | 20 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-B | 20 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-C | 25 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-D | 20 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-E | 25 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-F | 20 | 4 | 3 | 9 | 1.5 | 0.23 |
| DC1-G | 20 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-HRE | 8 | 4 | 3 | 9 | 1.5 | 0.06 |
| DC1-H | 20 | 4 | 3 | 9 | 1.5 | 0.23 |
| DC1-HRS | 8 | 4 | 3 | 9 | 1.5 | 0.06 |
| DC1-HRU | 8 | 4 | 3 | 9 | 1.5 | 0.07 |
| DC1-I | 20 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-J | 20 | 4 | 3 | 18 | 3 | 0.23 |
| DC1-K | 25 | 4 | 3 | 12 | 2 | 0.23 |
| DC1-L | 25 | 4 | 3 | 12 | 2 | 0.23 |

NOTES

- ENERGY DISSIPATION BASIN DETAIL REPRESENTS PRELIMINARY DESIGN. DETAILED DIMENSIONS AND TECHNICAL SPECIFICATIONS TO BE PROVIDED PRIOR TO CONSTRUCTION, I.E. AS A PART OF FINAL DESIGN.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE RECLAMATION
AND OPERATIONS SURFACE WATER
MANAGEMENT DETAILS – SHEET 2 OF 2



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NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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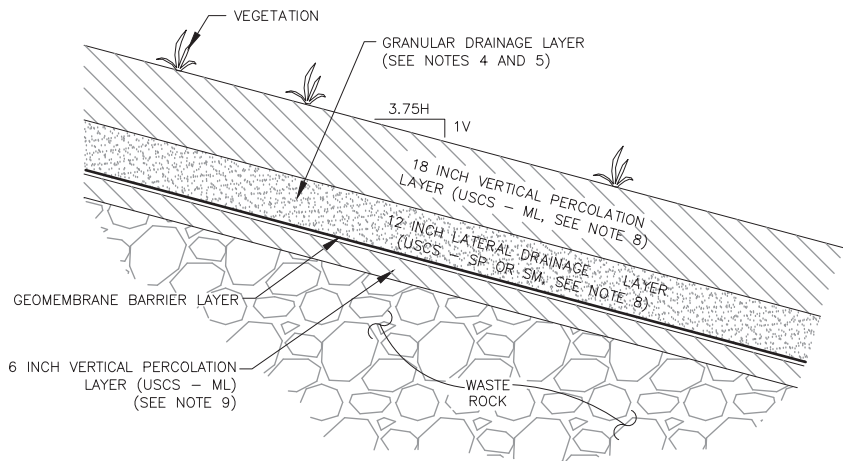
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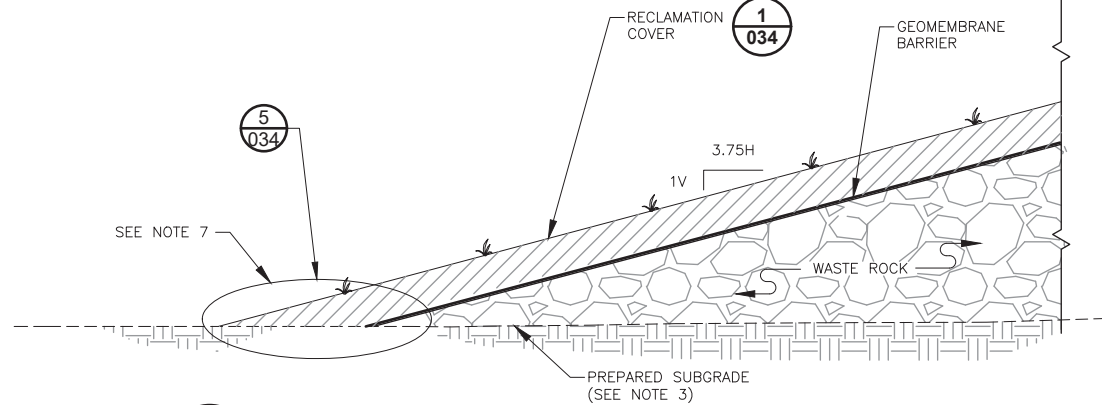
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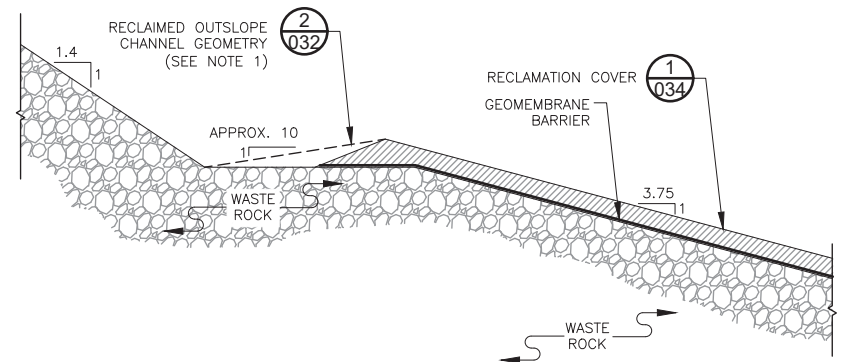
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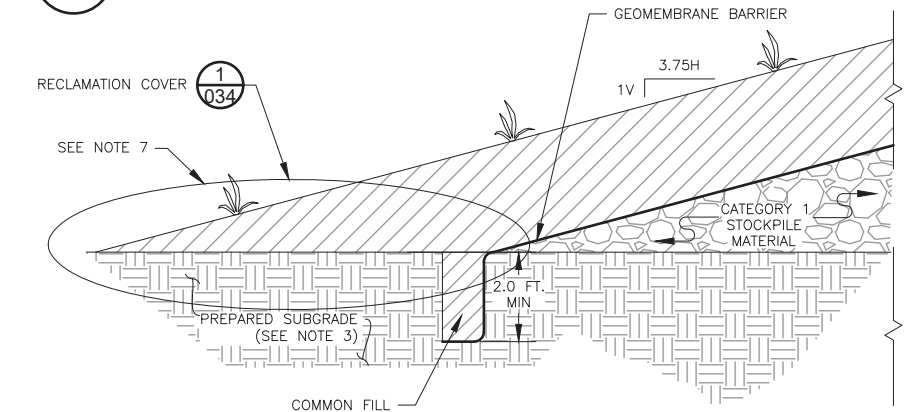
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034 **TYPICAL CATEGORY 1 RECLAMATION COVER DETAIL**
N.T.S.



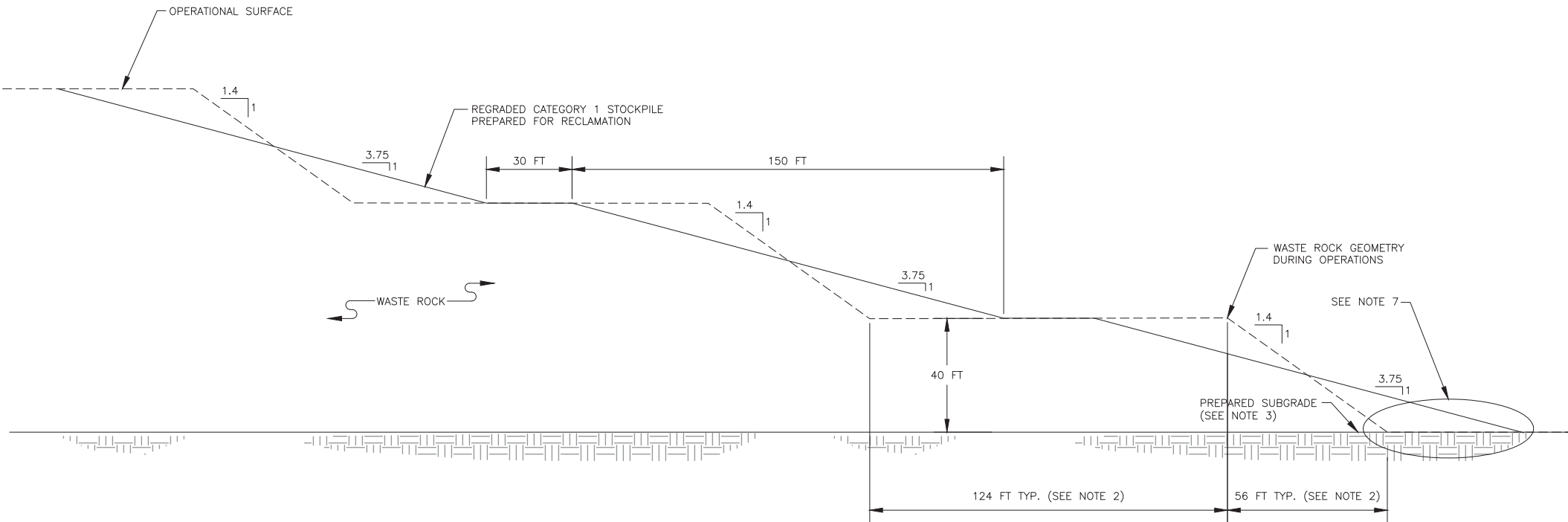
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034 **CATEGORY 1 RECLAMATION COVER DESIGN SECTION**
N.T.S.



3
034 **RECLAMATION TO OPERATIONAL AREA TIE IN DETAIL**
N.T.S.



5
034 **GEOMEMBRANE COVER ANCHOR TRENCH DETAIL**
N.T.S.



4
034 **CATEGORY 1 STOCKPILE TYPICAL GEOMETRY DURING OPERATIONS AND REGRADED FOR RECLAMATION**
N.T.S.

NOTES

- TEMPORARY SLOPE BENCH CHANNEL SHOULD BE CONSTRUCTED WITH MINIMUM DEPTH OF 2.4 FT. ON THE BENCHES BY GRADING CHANNEL SIDE SLOPES TO 10H:1V ON 30 FT. WIDE BENCHES.
- STOCKPILE GEOMETRY DURING OPERATIONS BASED ON ASSUMED WASTE ROCK ANGLE OF REPOSE OF 35.5 DEGREES (1.4H:1V).
- GEOTECHNICALLY UNSUITABLE SOILS TO BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL WITHIN 100 FT. OF CATEGORY 1 STOCKPILE PERIMETER LIMITS.
- ON TOP OF STOCKPILE ON 1% SLOPE AREAS, PLACE 4 INCH DIAMETER PERFORATED CORRUGATED POLYETHYLENE PIPE (CPEP) WITH FILTER FABRIC SOCK AT 75 FOOT SPACING TO FACILITATE DRAINAGE OF GRANULAR DRAINAGE LAYER TO TOP SURFACE CHANNEL. PIPE LOCATION TO BE FIELD FIT.
- AT STOCKPILE BENCHES, PLACE 4 INCH PERFORATED CPEP DRAIN PIPE WITH FILTER FABRIC SOCK AT BASE OF COVER SYSTEM GRANULAR DRAINAGE LAYER AT SLOPE-BENCH INTERSECTION WITH OUTFLOW DIRECTED TO DOWNCHUTE CHANNELS.
- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
- EDGE OF LINER TO TIE IN TO CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM.
- REFER TO UNIFIED SOIL CLASSIFICATION SYSTEM FOR COVER SOIL DESCRIPTION.
- PLACE ADDITIONAL SOIL FILL AS NEEDED TO FILL VOIDS ON WASTE ROCK SURFACE/FINAL SLOPE PRIOR TO PLACEMENT OF 6-INCH VERTICAL PERCOLATION LAYER. THIS SOIL FILL IS NOT SHOWN ON THE TYPICAL COVER DETAIL.

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
PHASED COVER DESIGN



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HOYT LAKES, MINNESOTA



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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

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GOLDER PROJECT NO.:
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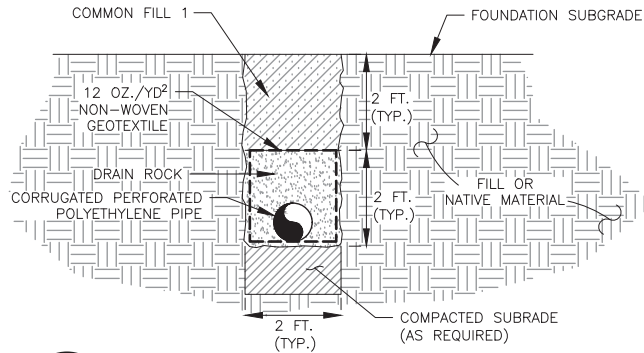
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SKP-034

REV

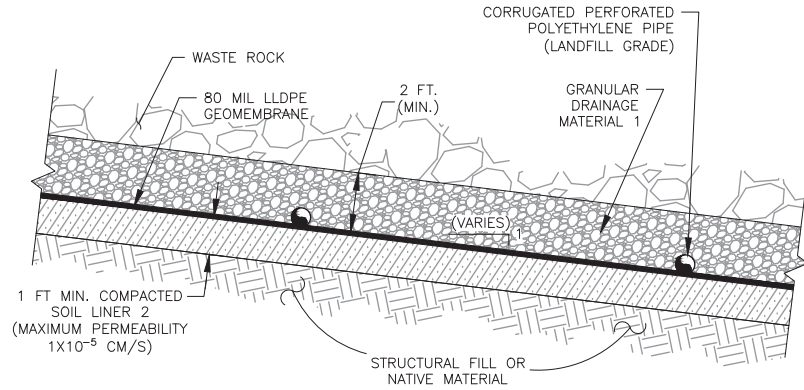
| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| A | 12/02/11 | ISSUED FOR REVIEW FOR INCLUSION IN ROCK AND OVERBURDEN MANAGEMENT PLAN (ROMP) | ISSUED | VERSION | DATE |
| B | 2/15/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | FOR PERMITTING | G | 8/21/17 |
| C | 5/29/13 | ISSUED FOR REVIEW FOR INCLUSION IN ROMP | | | |
| D | 1/14/14 | ISSUED FOR AGENCY REVIEW | | | |
| E | 4/10/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR CONSTRUCTION | | |
| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |

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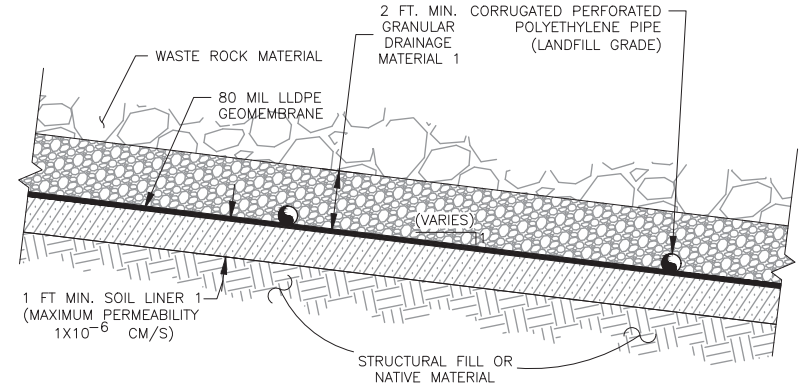
INCHES
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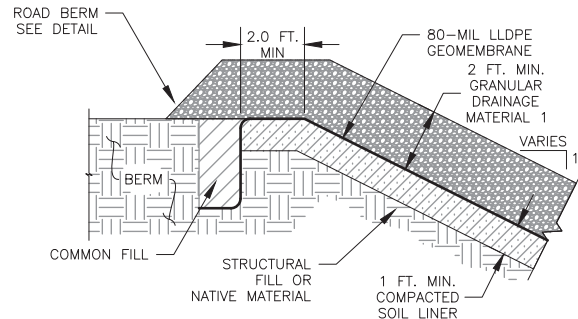
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035 **TYPICAL FOUNDATION UNDERDRAIN**
N.T.S.



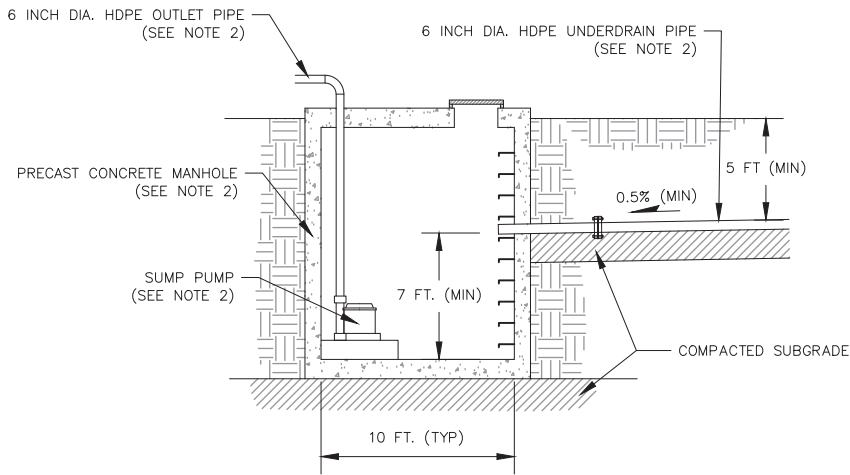
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035 **CATEGORY 2/3 STOCKPILE LINER**
N.T.S.



3
035 **CATEGORY 4 STOCKPILE AND ORE SURGE PILE LINER**
N.T.S.



4
035 **GEOMEMBRANE LINER ANCHOR TRENCH DETAIL**
N.T.S.



5
035 **UNDERDRAIN SUMP MANHOLE**
N.T.S.

NOTES

- SEE GENERAL NOTES AND LEGEND ON DRAWING 002.
- UNDERDRAIN SUMP MANHOLE DIMENSIONS, SUMP PUMP CAPACITY AND PIPE DIMENSIONS ARE PRELIMINARY AND WILL BE SIZED BASED ON ENCOUNTERED FIELD CONDITIONS. UNDERDRAIN SUMPS WILL BE PUMPED TO MINE WATER SUMPS (SEE MECHANICAL INFRASTRUCTURE PERMIT SUPPORT DRAWINGS).

PLANT DRAWING NUMBER:

CONSTRUCTION DETAILS

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
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| F | 5/22/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| G | 8/21/17 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | NOT APPROVED FOR CONSTRUCTION. | | |
| | | | | | |

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SIGNATURE *B. Bronson*
PRINTED NAME BRENT R. BRONSON
DATE 8/21/17 LICENSE # 46492

DRAWN: MTM

CHECKED: *gg*

GOLDER PROJECT NO.: 113-2209

SCALE: AS SHOWN



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
Fax: (303) 985-2080
www.golder.com

DWG. NO. SKP-035

REV

Errata Sheet

Poly Met Mining, Inc. NorthMet Project

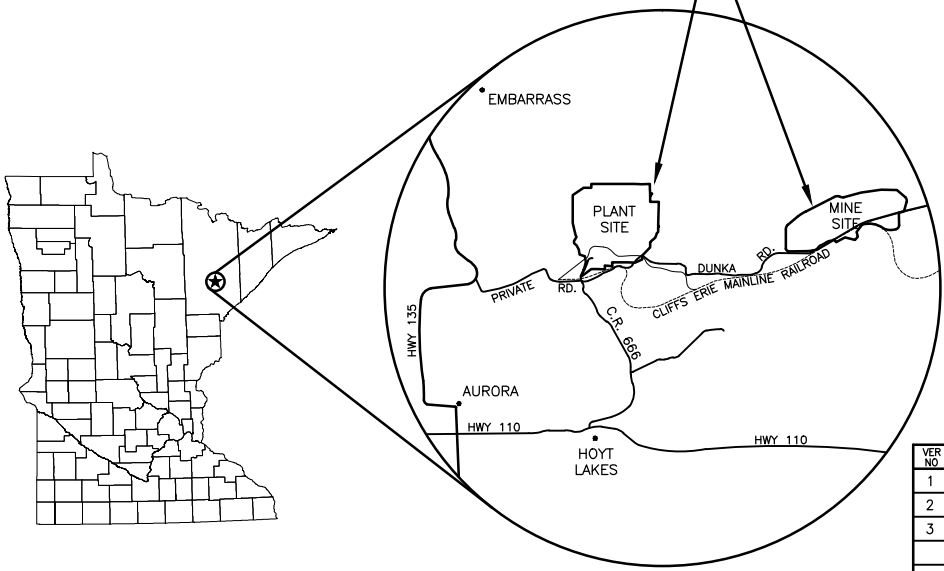
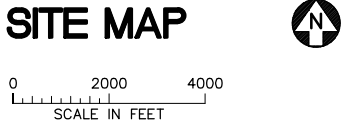
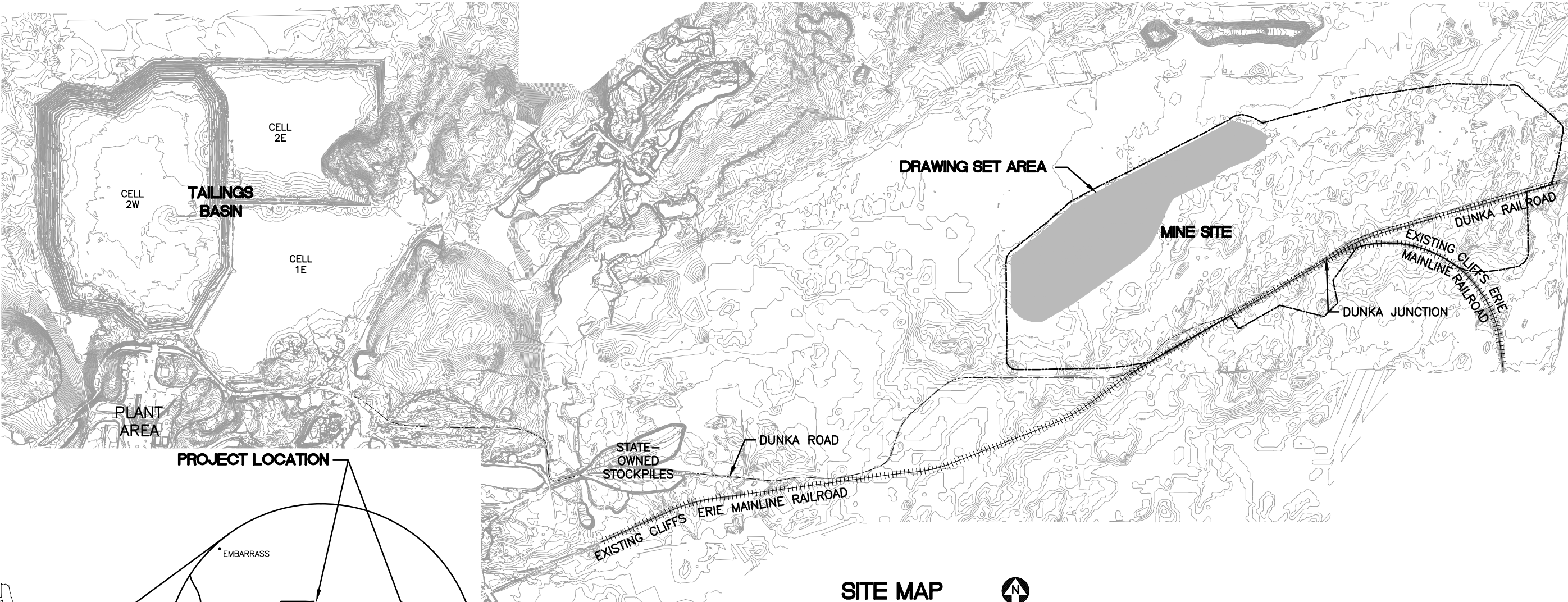
Permit Application Support Drawings: Category 1 Stockpile Groundwater Containment System

August 2017 (version 3)

Engineering design is currently in progress. The table below lists changes that have been identified to-date and have not yet been incorporated in the attached permit application support drawings within this set. Final design will incorporate these changes along with additional site-specific information (e.g., supplementary geotechnical data); therefore, additional adjustments may be made during final design that will be incorporated into the final design drawing set.

| Drawing Sheet(s) | Change |
|---|---|
| Global change to all sheets, as needed | The terminology "mine drainage" as noted in these drawings will be changed to "mine water". |
| GCS-003 | To meet construction stormwater requirements, a temporary berm will be added on the west side of the Mine Year 0 Category 1 Stockpile footprint to control mine water runoff as the stockpile is built out. |
| GCS-003, GCS-004, GCS-005, GCS-006, GCS-007, GCS-008, GCS-009 | The "Mine Site Boundary" will be replaced by the "Mining Area Boundary" as shown on figures included in the Permit to Mine Application. |

POLY MET MINING, INC. NORTHMET PROJECT
PERMIT APPLICATION SUPPORT DRAWINGS
CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM
HOYT LAKES, MINNESOTA



| VER. NO. | DATE | DESCRIPTION | ISSUE STATUS | | |
|----------|----------|---|--------------------------------|---------|---------|
| | | | ISSUED | VERSION | DATE |
| 1 | 10/18/11 | ROCK AND OVERBURDEN MANAGEMENT PLAN -- VERSIONS 5, 6, 7 -- ATTACHMENT C | ISSUED | | |
| 2 | 05/28/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| 3 | 07/25/17 | PERMIT APPLICATION UPDATES | FOR PERMITTING | 3 | 7/25/17 |
| | | | FOR CONSTRUCTION | | |
| | | | NOT APPROVED FOR CONSTRUCTION. | | |

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PRINTED NAME **THOMAS J. RADUE**
SIGNATURE *Thomas J. Radue*
DATE **7/25/17** LICENSE# **20951**

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM LOCATION MAP AND SITE MAP

POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA

BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. **GCS-001** REV

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-21-GS-002.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:02 AM

INCHES

1

2

GENERAL LEGEND

| | |
|--|---|
| | EXISTING CONTOUR - MAJOR |
| | EXISTING CONTOUR - MINOR |
| | MINE SITE BOUNDARY |
| | PROPOSED SUMP OVERFLOW PIPE |
| | PROPOSED MINE WATER PIPE (PUMPED FLOW) |
| | PROPOSED MINE WATER PIPE (GRAVITY FLOW) |
| | PROPOSED SUMP MANHOLE |
| | PROPOSED ACCESS ROADS |
| | HAUL ROAD |

ABBREVIATIONS

| | | |
|------|---|--------------------------------|
| CAT | - | CATEGORY |
| DWG | - | DRAWING |
| EL | - | ELEVATION |
| GCS | - | GROUNDWATER CONTAINMENT SYSTEM |
| MH | - | MANHOLE |
| NTS | - | NOT TO SCALE |
| PVI | - | PROFILE VERTICAL INTERSECTION |
| STA | - | STATION |
| WWTS | - | WASTE WATER TREATMENT SYSTEM |

SHEET INDEX

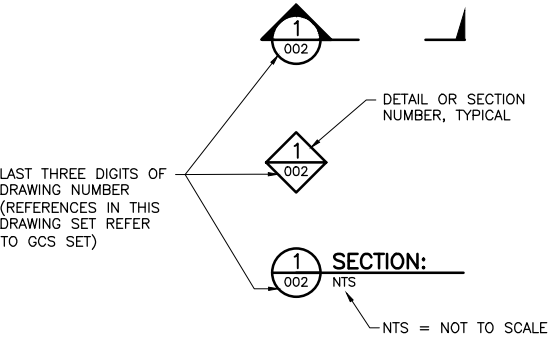
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| | |
|------------------|---------------------------|
| GENERAL DRAWINGS | |
| GCS-001 | LOCATION MAP AND SITE MAP |
| GCS-002 | LEGEND AND SHEET INDEX |
| GCS-003 | MINE YEAR 0 LAYOUT |
| GCS-004 | MINE YEAR 2 LAYOUT |
| GCS-005 | MINE YEAR 3 LAYOUT |
| GCS-006 | MINE YEAR 5 LAYOUT |
| GCS-007 | MINE YEAR 6 LAYOUT |
| GCS-008 | MINE YEAR 20 LAYOUT |
| GCS-009 | CLOSURE CONFIGURATION |
| GCS-010 | TYPICAL CROSS SECTIONS |
| GCS-011 | TYPICAL CROSS SECTIONS |
| GCS-012 | NORTH PROFILES |
| GCS-013 | SOUTH PROFILES |
| GCS-014 | DISCHARGE PROFILES |

NOTES

- COORDINATE SYSTEM IS MINNESOTA STATE PLANE NORTH ZONE, NAD83.
- ELEVATIONS ARE MEAN SEA LEVEL (MSL), NAVD88.
- EXISTING TOPOGRAPHIC INFORMATION SHOWN ON THE DRAWINGS WAS PREPARED BY AEROMETRIC, INC. FROM LIDAR DATA COLLECTED ON MARCH 17, 2010.

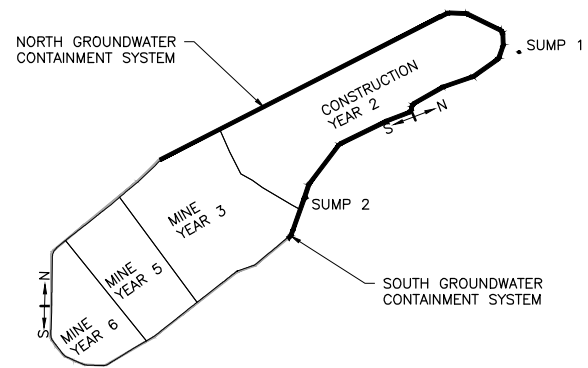
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|--------|----------|------|---|--------------------------------|---------|---------|---|---------------------------------|---|--|-----|--|--|
| 1 | 10/18/11 | | ROCK AND OVERBURDEN MANAGEMENT PLAN – VERSIONS 5, 6, 7 – ATTACHMENT C | ISSUED | VERSION | DATE | | CAD |  | BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 | | | |
| 2 | 05/28/15 | | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR PERMITTING | 3 | 7/25/17 | | TJR | | | | | |
| 3 | 07/25/17 | | PERMIT APPLICATION UPDATES | FOR CONSTRUCTION | | | | BARR PROJECT NO.: 23/69-0C29 | | | | | |
| | | | | NOT APPROVED FOR CONSTRUCTION. | | | DATE 7/25/17 | LICENSE# 20951 | SCALE: AS SHOWN | DWG. NO. GCS-002 | REV | | |

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INCHES

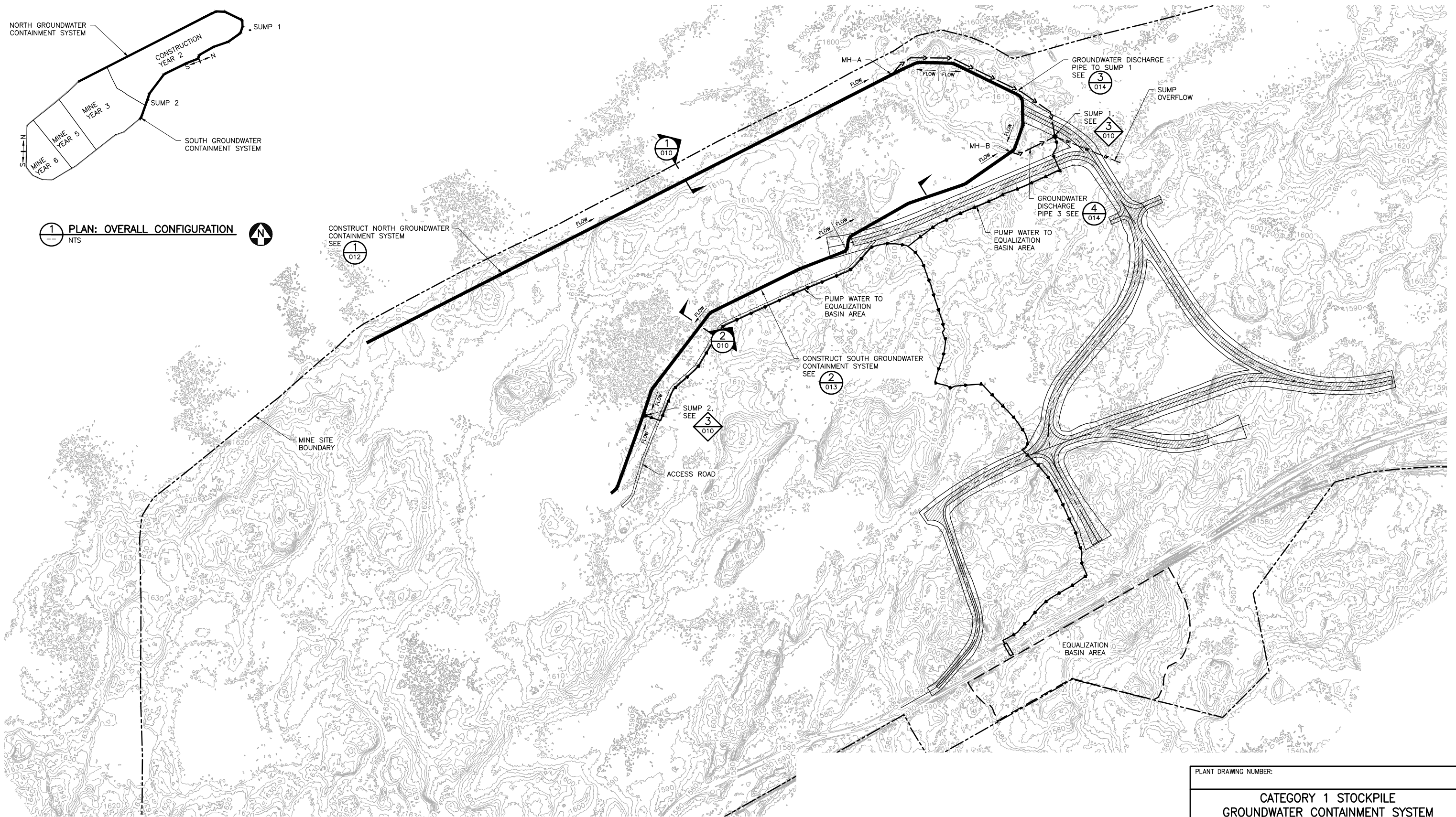


1 PLAN: OVERALL CONFIGURATION
NTS



CONSTRUCT NORTH GROUNDWATER
CONTAINMENT SYSTEM
SEE 1
012

MINE SITE BOUNDARY



2 PLAN: GCS - MINE YEAR 0 LAYOUT

0 500 1000
SCALE IN FEET





| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
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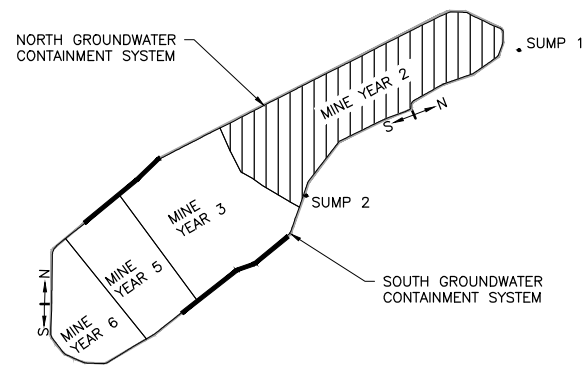
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

| | |
|---|--|
| PLANT DRAWING NUMBER: | |
| CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM CONSTRUCTION YEAR 2 | |
|  POLYMET MINING | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA |
|  BARR | BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 |
| DWG. NO. GCS-003 | REV |

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-21-CS-004.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:06 AM

INCHES
1
2



1 PLAN: OVERALL CONFIGURATION
NTS



EXTEND NORTH GROUNDWATER
CONTAINMENT SYSTEM
SEE

1
012

MINE YEAR 2 CATEGORY
1 STOCKPILE FOOTPRINT

1
010

ACCESS ROAD

SUMP OVERFLOW SEE

3
010

EXTEND SOUTH GROUNDWATER
CONTAINMENT SYSTEM
SEE

2
013

WEST PIT

2
010

EQUALIZATION
BASIN AREA

PUMP WATER TO
EQUALIZATION
BASIN AREA

PUMP WATER TO
EQUALIZATION
BASIN AREA

SUMP
OVERFLOW

EAST PIT

2 PLAN: GCS - MINE YEAR 2 LAYOUT

0 500 1000
SCALE IN FEET



| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
| 1 | 10/18/11 | ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C | ISSUED | VERSION | DATE |
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD

CHECKED: TJR

BARR PROJECT NO.:
23/69-0C29

SCALE:
AS SHOWN

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
MINE YEAR 2 LAYOUT



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

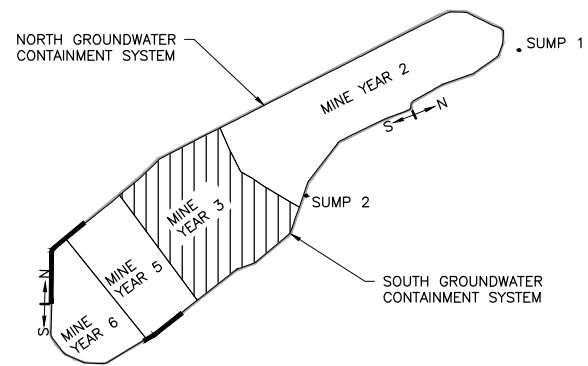
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GCS-004

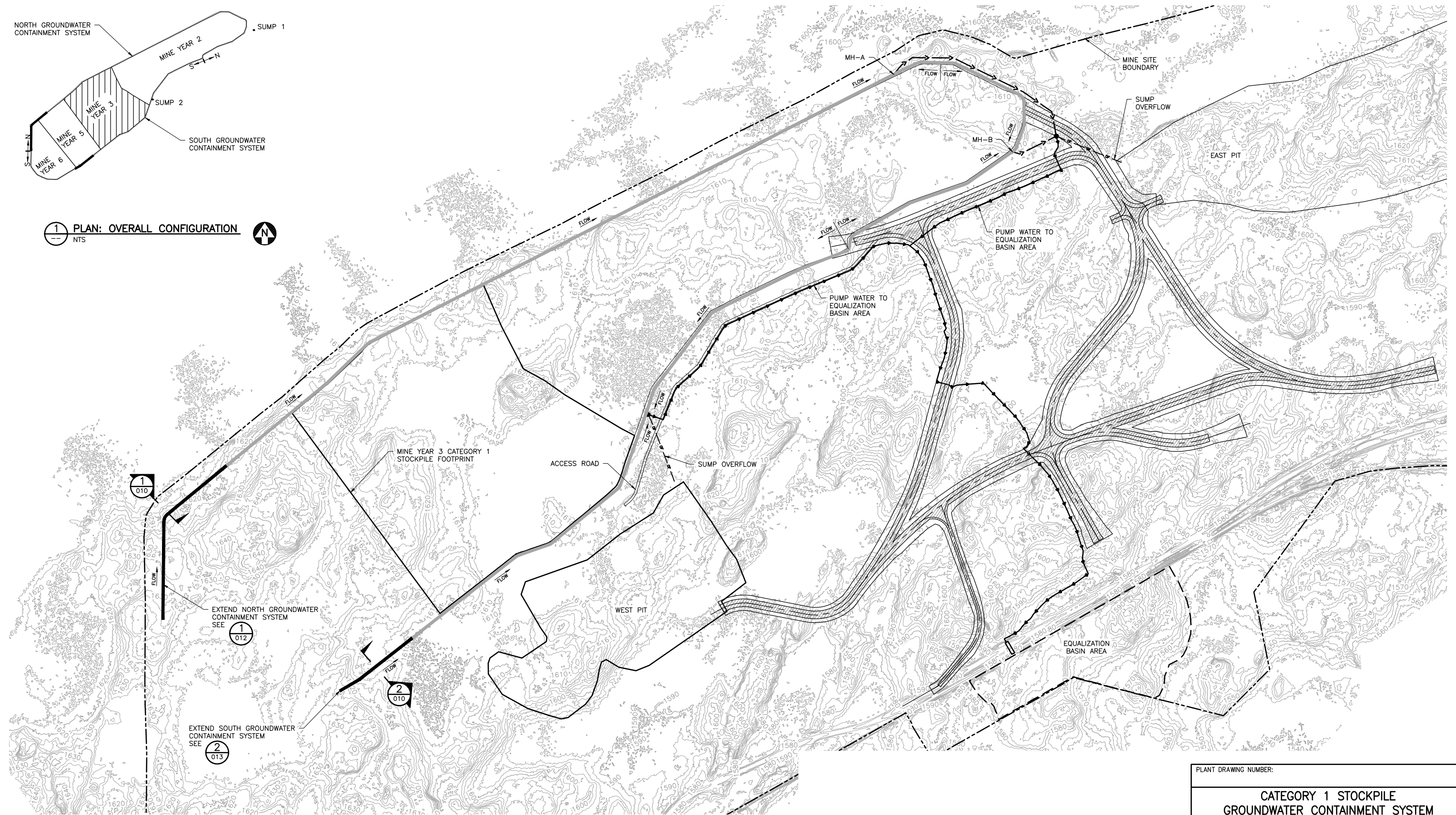
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INCHES
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2



1 PLAN: OVERALL CONFIGURATION
NTS



2 PLAN: GCS - MINE YEAR 3 LAYOUT

0 500 1000
SCALE IN FEET





| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
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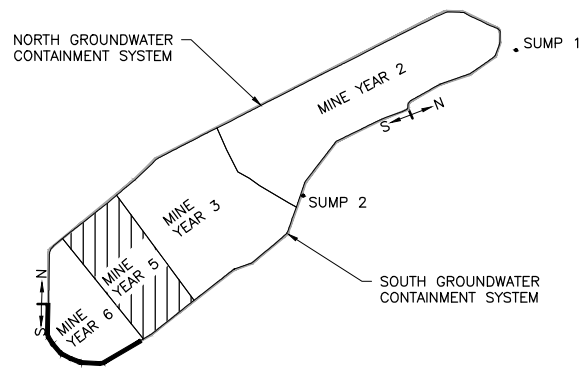
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

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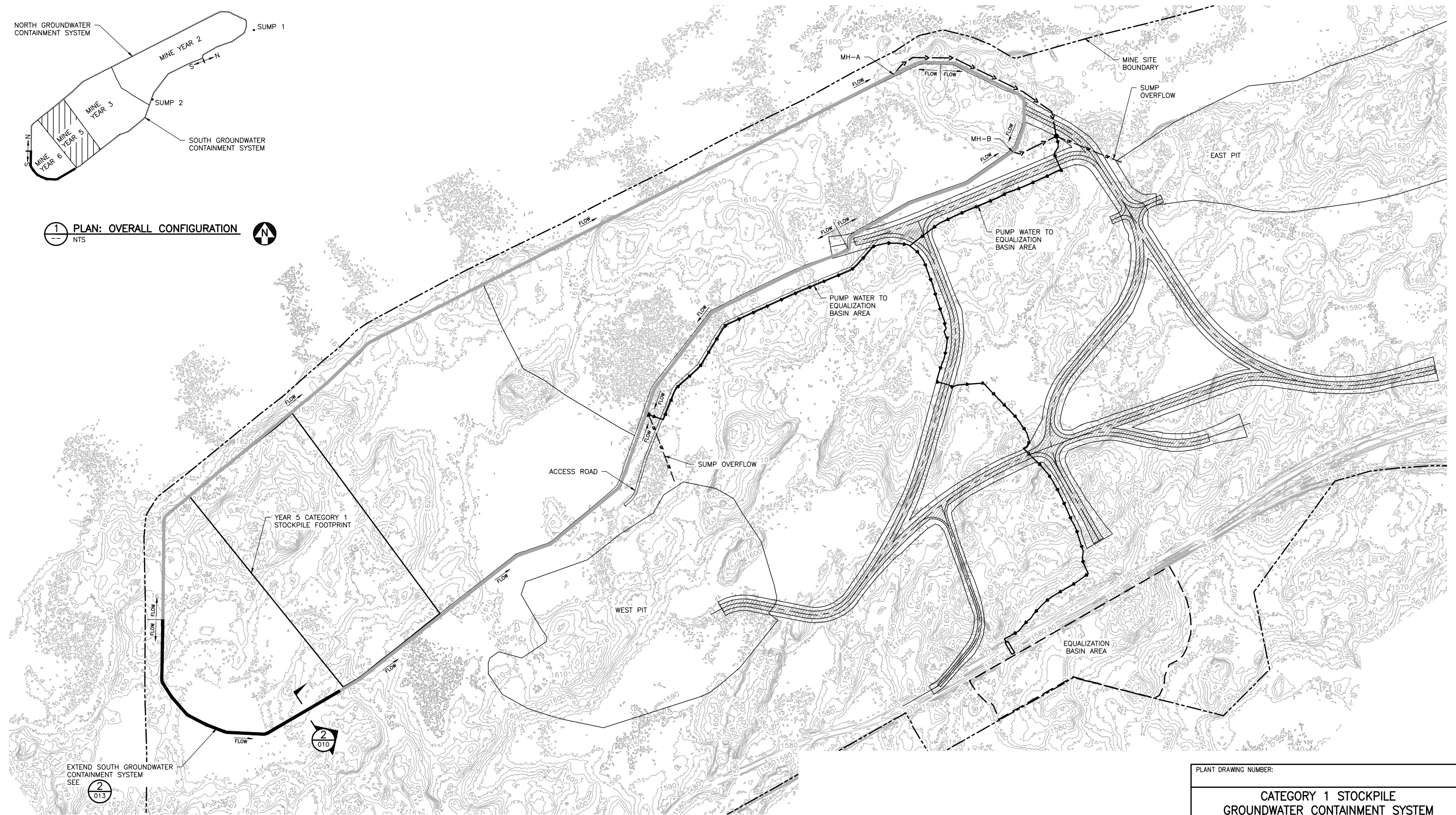
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|  | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA |
|  | BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 |
| DWG. NO. GCS-005 | REV |

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INCHES
1
2



1 PLAN: OVERALL CONFIGURATION
NTS



EXTEND SOUTH GROUNDWATER CONTAINMENT SYSTEM SEE 2 013

2 PLAN: GCS - MINE YEAR 5 LAYOUT

0 500 1000
SCALE IN FEET





| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
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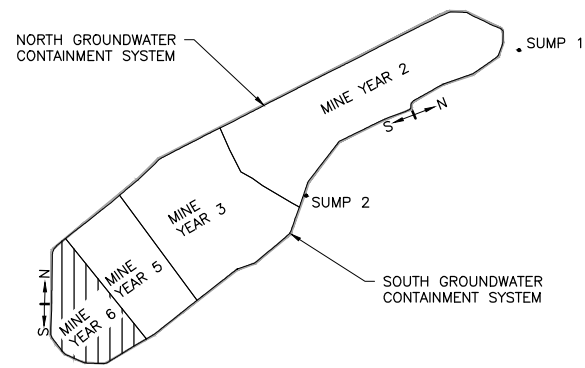
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

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|---|--|
| PLANT DRAWING NUMBER: | |
| CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM MINE YEAR 5 LAYOUT | |
|  | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA |
|  | BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 |
| DWG. NO. GCS-006 | REV |

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-21-CS-007.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:15 AM

INCHES
1
2



1 PLAN: OVERALL CONFIGURATION
NTS





2 PLAN: GCS - MINE YEAR 6 LAYOUT
SCALE IN FEET

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
| 1 | 10/18/11 | ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C | ISSUED | VERSION | DATE |
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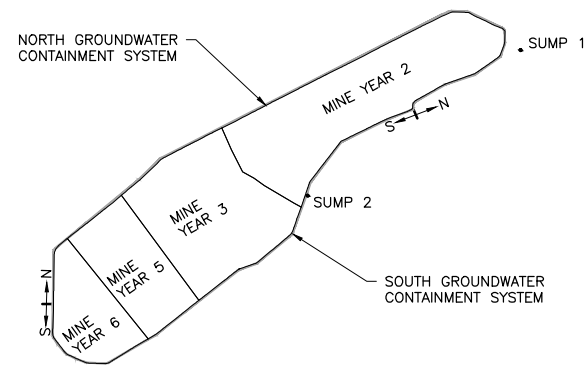
PRINTED NAME THOMAS J. RADUE
SIGNATURE Thomas J. Radue
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
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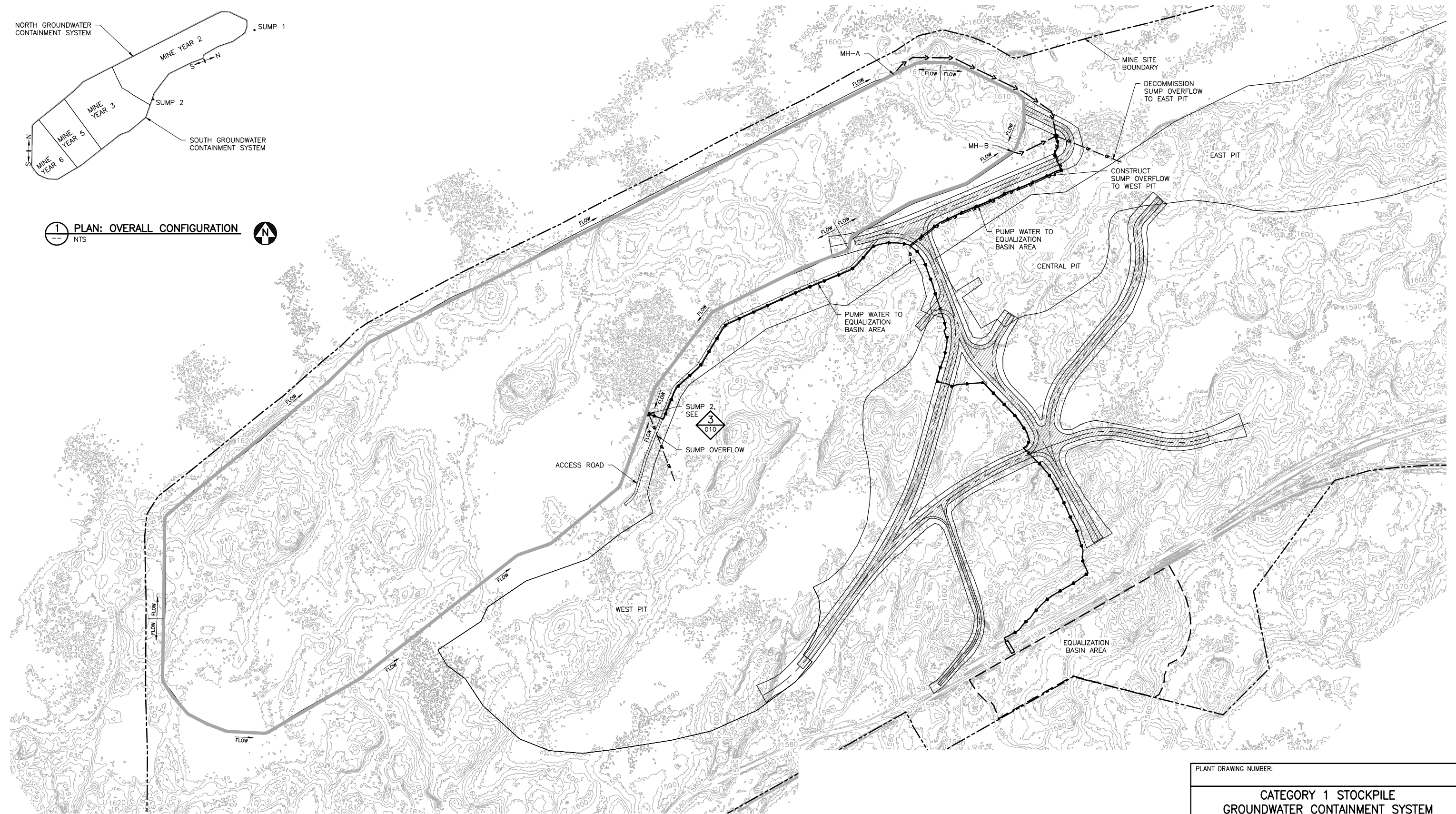
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| PLANT DRAWING NUMBER: | |
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|  | POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA |
|  | BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 |
| DWG. NO. GCS-007 | REV |

CADD USER: Crislian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-21-CS-008.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:18 AM

2
1
INCHES



1 PLAN: OVERALL CONFIGURATION
NTS



2 PLAN: GCS - MINE YEAR 20 LAYOUT

0 500 1000
SCALE IN FEET





| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
| | | | ISSUED | VERSION | DATE |
| 1 | 10/18/11 | ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C | ISSUED | | |
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| | | | | | |
| | | | FOR CONSTRUCTION | | |
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| | | | | | |

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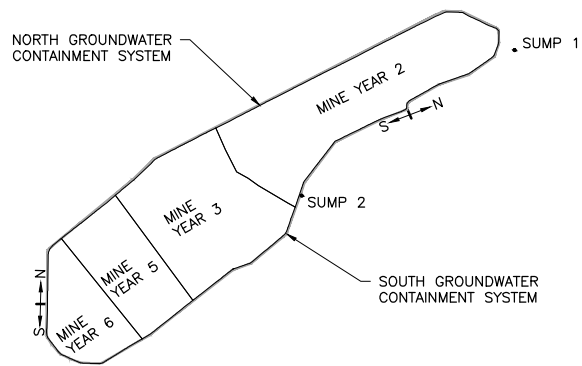
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

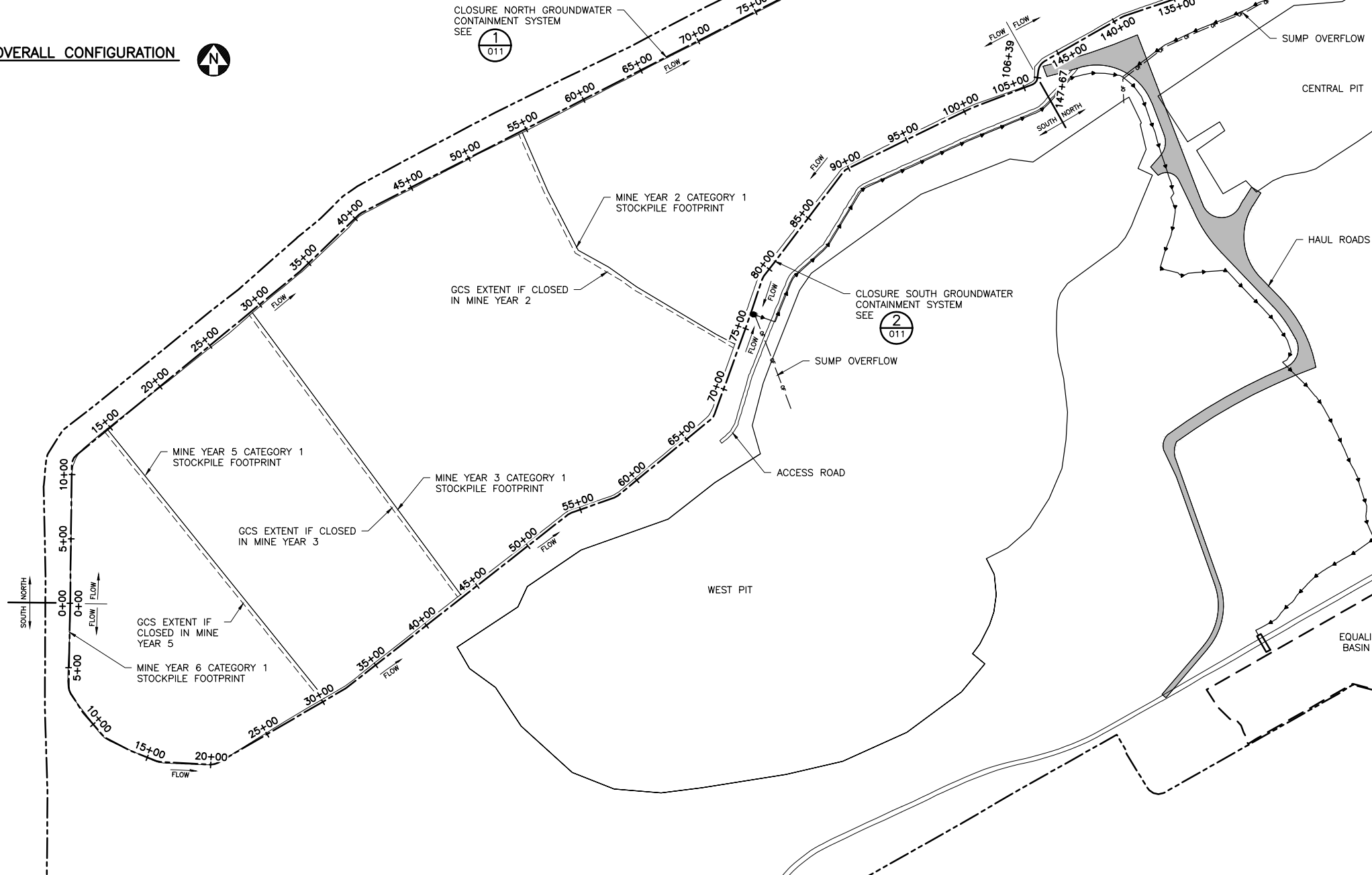
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| PLANT DRAWING NUMBER: | |
| CATEGORY 1 STOCKPILE GROUNDWATER CONTAINMENT SYSTEM MINE YEAR 20 LAYOUT | |
|  POLYMET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | |
|  BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 | |
| DWG. NO. GCS-008 | REV |

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMI-21-CS-009.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:20 AM

INCHES
1
2



1 PLAN: OVERALL CONFIGURATION
NTS



2 PLAN: CLOSURE CONFIGURATION

0 500 1000
SCALE IN FEET





| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
|--------|----------|---|--------------------------------|---------|---------|
| | | | ISSUED | VERSION | DATE |
| 1 | 10/18/11 | ROCK AND OVERBURDEN MANAGEMENT PLAN - VERSIONS 5, 6, 7 - ATTACHMENT C | | | |
| 2 | 05/28/15 | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | | | |
| 3 | 07/25/17 | PERMIT APPLICATION UPDATES | FOR PERMITTING | 3 | 7/25/17 |
| | | | | | |
| | | | FOR CONSTRUCTION | | |
| | | | | | |
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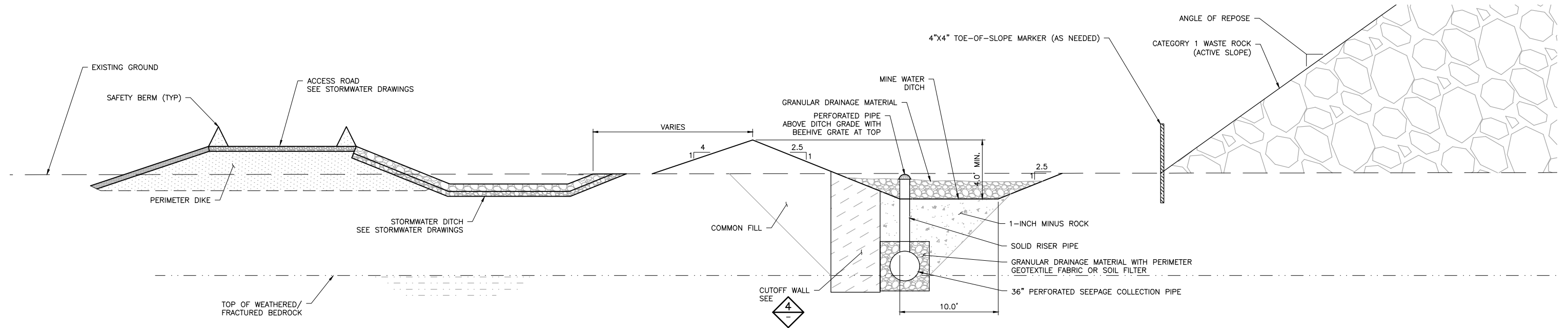
PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

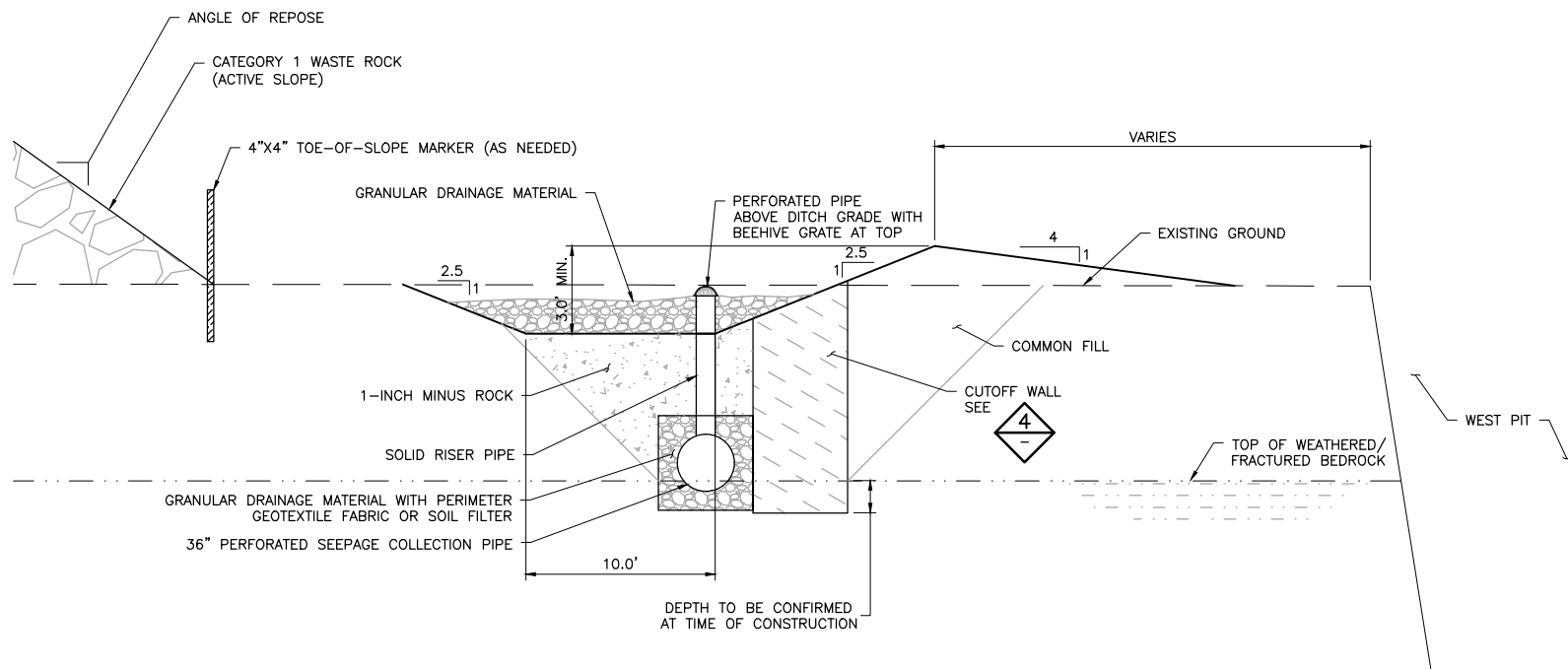
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| PLANT DRAWING NUMBER: | |
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|  POLYMET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | |
|  BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 | |
| DWG. NO. GCS-009 | REV |

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690229.10\PERMIT_NMM-21-CS-010.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:48 AM

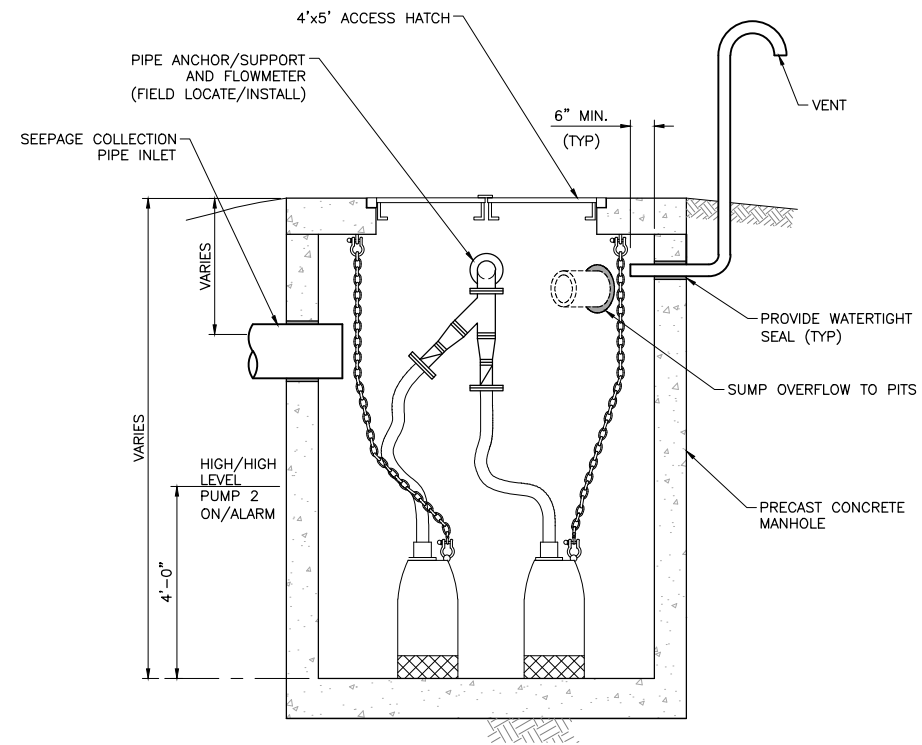
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INCHES



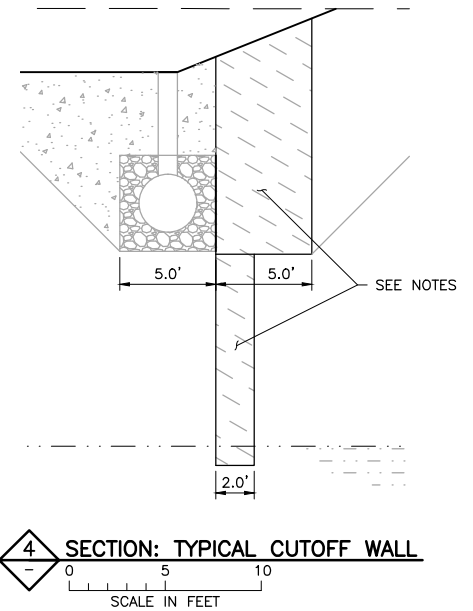
1 SECTION: NORTH GROUNDWATER CONTAINMENT SYSTEM TYPICAL SECTION - ADJACENT TO ACTIVE STOCKPILE
SCALE IN FEET



2 SECTION: SOUTH GROUNDWATER CONTAINMENT SYSTEM TYPICAL SECTION - ADJACENT TO ACTIVE STOCKPILE
SCALE IN FEET



3 SECTION: TYPICAL SUMP
NTS



- NOTES:
- CUTOFF WALL WILL BE A HYDRAULIC BARRIER CONSTRUCTED OF COMPACTED SOIL, GEOSYNTHETIC CLAY, OR APPROVED ALTERNATE.
 - USE TRENCHLESS TECHNOLOGY TO CONSTRUCT 2' WIDE TRENCH DOWN TO COMPETENT BEDROCK IN AREAS WHERE COLLECTION PIPE IS LOCATED ABOVE BEDROCK. SEE

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| 3 | 07/25/17 | PERMIT APPLICATION UPDATES | FOR CONSTRUCTION | | |
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PRINTED NAME THOMAS J. RADUE
SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951

DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
TYPICAL CROSS SECTIONS

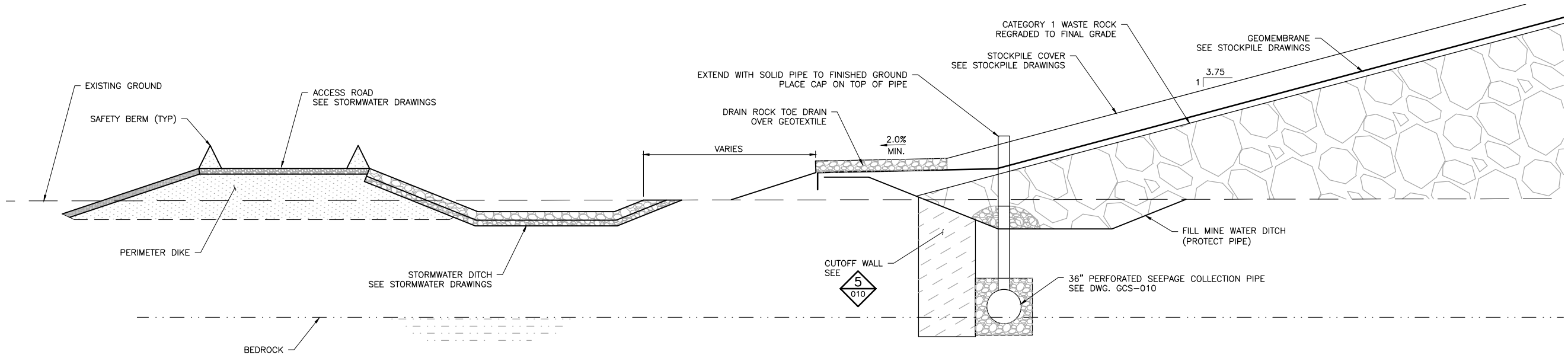
POLYMET MINING

POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

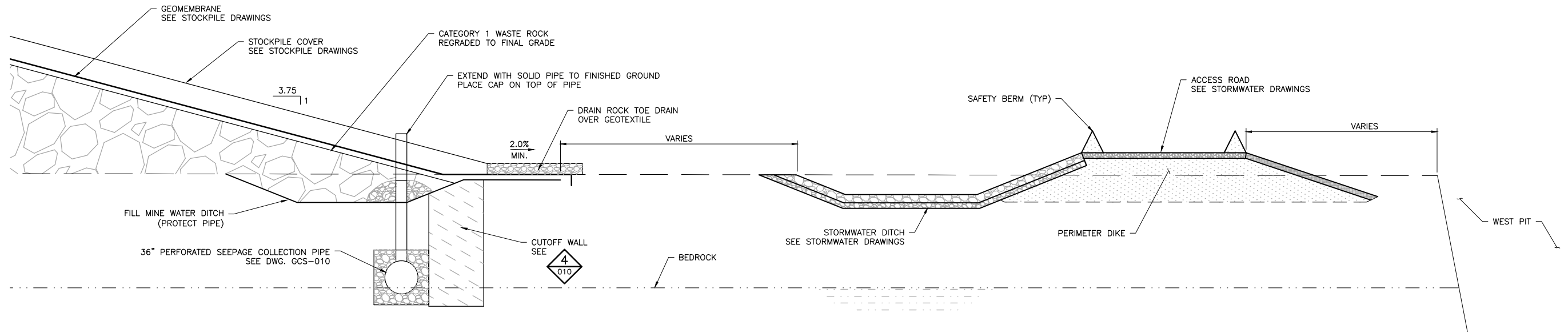
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. GCS-010

REV



1 SECTION: CLOSURE NORTH GROUNDWATER CONTAINMENT SYSTEM TYPICAL SECTION – ADJACENT TO RECLAIMED STOCKPILE



2 SECTION: CLOSURE SOUTH AND GROUNDWATER CONTAINMENT SYSTEM TYPICAL SECTION – ADJACENT TO RECLAIMED STOCKPILE

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29\10\PERMIT_NMM-21-GS-011.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:50 AM

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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| | | | ISSUED | VERSION | DATE |
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SIGNATURE *Thomas J. Radue*
DATE 7/25/17 LICENSE# 20951


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CHECKED: TJR
BARR PROJECT NO.: 23/69-OC29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
TYPICAL CROSS SECTIONS



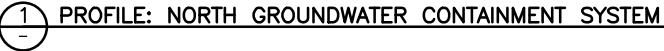
POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA





BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. GCS-011

REV



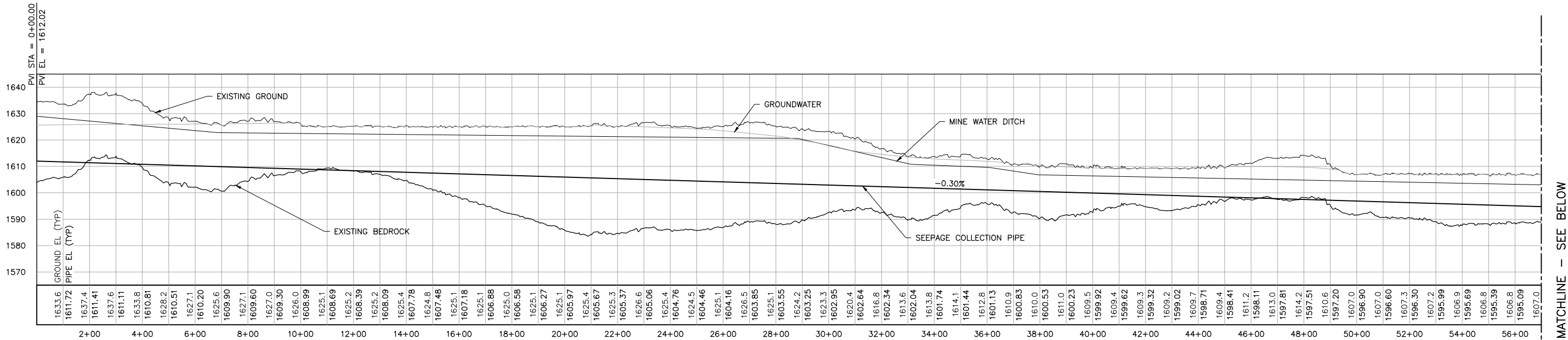
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| PLANT DRAWING NUMBER: | |
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|  | <p align="center">POLY MET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA</p> |
|  | <p>BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277</p> |
| DWG. NO. | REV |
| GCS-012 | |

CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690229.10\PERMIT_NMM-21-CS-013.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:23 AM

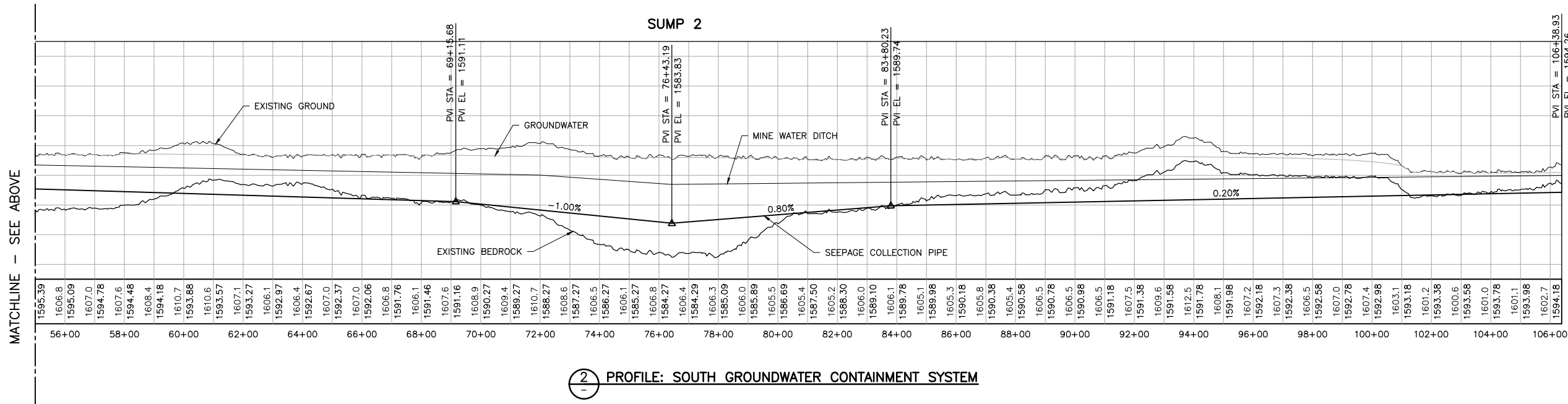
2

1

INCHES



MATCHLINE - SEE BELOW



2 PROFILE: SOUTH GROUNDWATER CONTAINMENT SYSTEM

NOTE:
ALL GROUNDWATER AND BEDROCK PROFILES SHOWN ARE APPROXIMATE.

| VER NO | DATE | DESCRIPTION | ISSUE STATUS | | |
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PRINTED NAME THOMAS J. RADUE
SIGNATURE Thomas J. Radue
DATE 7/25/17 LICENSE# 20951


DRAWN: CAD
CHECKED: TJR
BARR PROJECT NO.: 23/69-0C29
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
SOUTH PROFILES



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NORTHMET PROJECT
HOYT LAKES, MINNESOTA



BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
SUITE 200
MINNEAPOLIS, MN.
Ph: 1-800-632-2277

DWG. NO. GCS-013

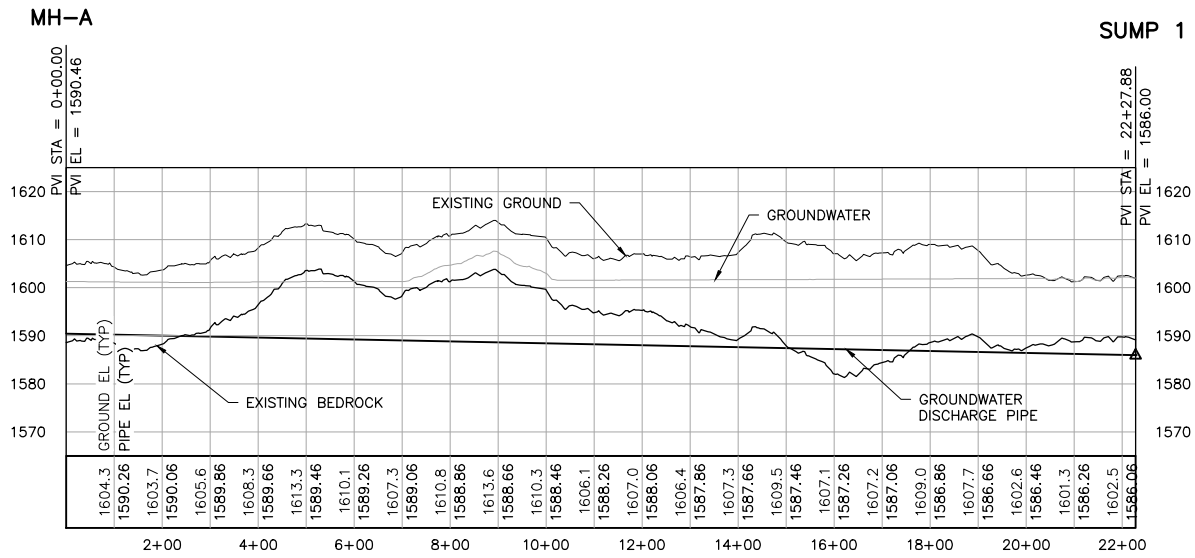
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CADD USER: Cristian A. Diaz FILE: K:\DESIGN\23690C29.10\PERMIT_NMM-21-CS-014.DWG PLOT SCALE: 1:2 PLOT DATE: 7/25/2017 11:22 AM

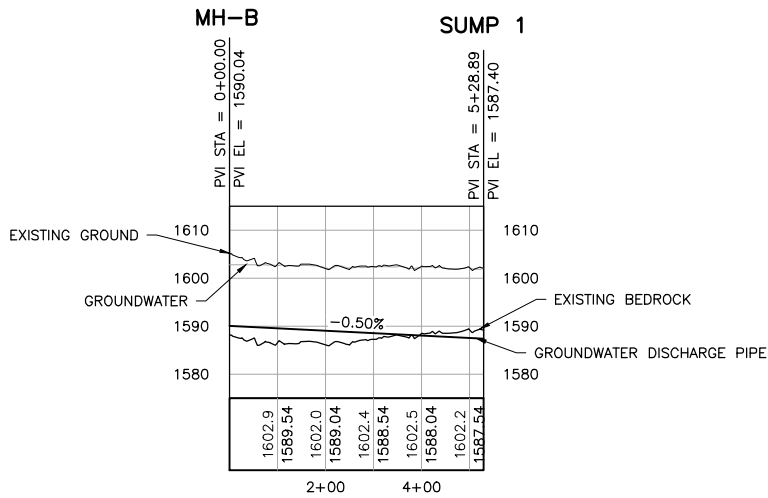
2

1

INCHES




3 PROFILE: MANHOLE A GROUNDWATER DISCHARGE PIPE TO SUMP 1




4 PROFILE: MANHOLE B GROUNDWATER DISCHARGE PIPE TO SUMP 1

NOTE:
ALL GROUNDWATER AND BEDROCK PROFILES SHOWN ARE APPROXIMATE.


| VER NO | | DATE | DESCRIPTION | ISSUE STATUS | | | | | POLYMET MINING, INC. NORTHMET PROJECT HOYT LAKES, MINNESOTA | | | |
|--------|----------|------|---|--------------------------------|---------|---------|---|-------------------|---|---|---------|-----|
| 1 | 10/18/11 | | ROCK AND OVERBURDEN MANAGEMENT PLAN – VERSIONS 5, 6, 7 – ATTACHMENT C | ISSUED | VERSION | DATE | I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. | DRAWN: | CAD |  BARR ENGINEERING CO. 4300 MARKETPOINTE DRIVE SUITE 200 MINNEAPOLIS, MN. Ph: 1-800-632-2277 | | |
| 2 | 05/28/15 | | ISSUED FOR INCLUSION IN PERMIT APPLICATIONS | FOR PERMITTING | 3 | 7/25/17 | | CHECKED: | TJR | | | |
| 3 | 07/25/17 | | PERMIT APPLICATION UPDATES | | | | | BARR PROJECT NO.: | 23/69-0C29 | | | |
| | | | | FOR CONSTRUCTION | | | PRINTED NAME <u>THOMAS J. RADUE</u> SIGNATURE <u>Thomas J. Radue</u> DATE <u>7/25/17</u> LICENSE# <u>20951</u> | SCALE: | AS SHOWN | DWG. NO. | GCS-014 | REV |
| | | | | NOT APPROVED FOR CONSTRUCTION. | | | | | | | | |

PLANT DRAWING NUMBER:

CATEGORY 1 STOCKPILE
GROUNDWATER CONTAINMENT SYSTEM
DISCHARGE PROFILES



POLY MET MINING, INC.
NORTHMET PROJECT
HOYT LAKES, MINNESOTA



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