

RECLAMATION OBJECTIVE

THE RECLAMATION OBJECTIVE IS TO RESTORE THE LAND SURFACE AND GROUNDWATER APPROXIMATELY TO PRE-MINING LEVELS, AND TO REVEGETATE THE SITE WITH PLANT COMMUNITIES ASSOCIATED WITH PINE FLATWOODS OR DEPRESSIONAL WETLANDS.

MINING & RECLAMATION SCHEDULE

UPON PERMIT APPROVAL, TPM ESTIMATES IT WILL TAKE 6 TO 12 MONTHS TO SET-UP FACILITIES AND PREPARE THE SITE PRIOR TO INITIATION OF MINING. MINING OF THE 582 ACRES OF THE DEMONSTRATION MINE SITE IS ANTICIPATED TO TAKE 4 TO 5 YEARS. RECLAMATION WILL BE COMPLETED WITHIN 24 MONTHS AFTER MINING IS COMPLETED. THE TOTAL LIFE OF THE MINE, FROM SET UP TO COMPLETE RECLAMATION, IS ANTICIPATED TO BE 7 TO 8 YEARS.

RECLAMATION PROCEDURES & METHODS

SURFACE TOPOGRAPHY WILL BE RESTORED BY USING POST-PROCESSED SANDS AND MINE TAILINGS (SAND AND HUMATE) TO BACK-FILL THE EXCAVATION PIT. TOP SOIL WILL BE STOCKPILED PRIOR TO MINING AND REPLACED AFTER THE EXCAVATION IS BACK-FILLED.

GROUNDWATER LEVELS ARE EXPECTED TO RETURN NATURALLY AFTER THE DRAGLINE HAS MOVED AT LEAST 1,000 FEET TO THE NORTH. TO ENSURE GROUNDWATER HYDROLOGY IS NOT AFFECTED BY THE HOMOGENIZATION OF SOILS, A LOW PERMEABILITY LAYER WILL BE PLACED FROM 7 TO 10 FEET BELOW THE LAND SURFACE. GROUNDWATER LEVELS WILL BE MONITORED, AND THE ADAPTIVE MANAGEMENT PLAN WILL BE FOLLOWED TO ADDRESS ANY UNEXPECTED OCCURRENCES.

1 - ONCE THE MINE PIT REACHES APPROXIMATELY 500 FEET IN LENGTH, TAILINGS FROM THE WET CONCENTRATION PLANT WILL BE PLACED WITHIN THE PIT, AS THE MINE PIT PROGRESSES, TAILINGS DEPOSITION (BACKFILLING) WILL OCCUR CONTINUOUSLY, CONCURRENT WITH THE RATE OF MINING.

2 - PITS WILL BE FILLED TO THE APPROXIMATE PRE-MINING TOPOGRAPHY AND GRADES - LESS THE DEPTH OF TOPSOIL. HEAVY EQUIPMENT WITH ONBOARD GPS TECHNOLOGY OR A PEDESTRIAN SURVEY CREW UTILIZING GPS TECHNOLOGY WILL VERIFY RECLAIMED ELEVATIONS.

3 - TOPSOIL WILL BE REPLACED AND FINAL GRADING WILL MIMIC THE PRE-MINING SURFACE. TOP SOIL WILL BE REPLACED AFTER THE DRAG LINE HAS PROGRESSED AT LEAST ONE TRANSECT TO THE NORTH OF THE TRANSECT BEING RESTORED. (THIS DISTANCE IS NECESSARY TO ENSURE THE TOP SOIL IS NOT REMOVED WHEN THE ADJACENT TRANSECT IS EXCAVATED.)

4 - GROUNDWATER LEVELS WILL BE RESTORED NATURALLY ONCE THE DRAGLINE HAS MOVED AT LEAST 1,000 FEET TO THE NORTH. MONITORING WELLS WILL BE CHECKED AT SUCH TIME TO ENSURE GROUNDWATER LEVELS HAVE BEEN RESTORED AND/OR TO INITIATE APPROPRIATE ADAPTIVE MANAGEMENT.

5 - REVEGETATION WILL BEGIN WITH THE REPLACEMENT OF TOP SOIL. TEMPORARY VEGETATION/SEEDING (SHEETS 8, 9 & 10) WILL BE USED AS NEEDED AND REQUIRED FOR EROSION CONTROL. EROSION CONTROL MEASURES WILL REMAIN IN PLACE UNTIL ADEQUATE VEGETATIVE COVER HAS BEEN ESTABLISHED.

6 - NATURAL PLANT COMMUNITIES ARE EXPECTED TO DEVELOP FROM THE SEEDBANK IN THE TOPSOIL, WHICH WILL BE PRESERVED AND REPLACED. THEREFORE, NO SUPPLEMENTAL PLANTING OF HERBACEOUS OR SHRUB VEGETATION IS ANTICIPATED. TREES WILL BE PLANTED 1 TO 2 YEARS AFTER THE START OF MINING IN THE APPROPRIATE SEASONS ACCORDING TO THE PRE-MINING HABITAT CLASSIFICATIONS DESCRIBED BELOW AND SHOWN ON SHEET 12. THE GROWING SEASON, AS INDICATED BY NRCS A&GIS WEETS TABLE (WEETS STATION: FOLKSTON 9 SW GA. YEARS: 1971-2000) FOR THE PROBABILITY OF TEMPERATURES ABOVE 28 DEGREES FAHRENHEIT, IS BETWEEN FEBRUARY 12 AND DECEMBER 20. STABLE GROWTH WILL BE DETERMINED WHEN PLANTED VEGETATION MAINTAINS A SURVIVABILITY RATE OF 50 PERCENT. FORESTED SYSTEMS WILL REQUIRE DECADES TO REACH MATURITY.

MESIC PINE FLATWOODS (UPLAND & NON-JURISDICTIONAL WETLAND)

- MESIC PINE FLATWOODS WILL BE PLANTED WITH LONGLEAF PINE (*Pinus palustris*) AND/OR SLASH PINE (*Pinus elliotti*).
- PLANTING WILL OCCUR IN LATE FALL/WINTER AS SITE AND WEATHER/CLIMATIC CONDITIONS ALLOW.
- NO FERTILIZERS WILL BE UTILIZED.
- RECLAMATION WILL BE DEEMED SUCCESSFUL WHERE TREE VEGETATION MAINTAINS A SURVIVABILITY RATE OF 50 PERCENT.

WET PINE FLATWOODS (NON-JURISDICTIONAL WETLAND)

- WET PINE FLATWOODS WILL BE PLANTED SLASH PINE.
- PLANTING WILL OCCUR IN LATE FALL/WINTER AS SITE AND WEATHER/CLIMATIC CONDITIONS ALLOW.
- NO FERTILIZERS WILL BE UTILIZED.
- RECLAMATION WILL BE DEEMED SUCCESSFUL WHERE TREE VEGETATION MAINTAINS A SURVIVABILITY RATE OF 50 PERCENT.

DEPRESSIONAL WETLANDS (NON-JURISDICTIONAL)

- DEPRESSIONAL WETLANDS WILL BE PLANTED WITH POND CYPRESS (*Taxodium ascendens*), SWAMP TUPELO (*Nyssa biflora*), POND PINE (*Pinus serotina*), AND/OR SLASH PINE. SUPPLEMENTAL SAPPLINGS INCLUDING LOBLOLLY BAY (*Gordonia lasianthus*), SWAMP BAY (*Persea palustris*), SWEETBAY (*Magnolia virginiana*) MAY BE ADDED TO THE PLANTING SUITE AS INDICATED BY OBSERVED HABITAT CONDITIONS.
- PLANTING WILL OCCUR IN LATE FALL/EARLY SPRING AS SITE AND WEATHER/CLIMATIC CONDITIONS ALLOW.
- NO FERTILIZERS WILL BE UTILIZED.
- RECLAMATION WILL BE DEEMED SUCCESSFUL WHERE TREE VEGETATION MAINTAINS A SURVIVABILITY RATE OF 50 PERCENT.

7 - ALTHOUGH RECLAIMED HABITATS AND THE ASSOCIATED PLANTINGS ARE ANTICIPATED TO FOLLOW THE SCHEDULE OUTLINED IN #4 AND AS SHOWN ON SHEET 12, ACTUAL TREE SPECIES TO BE PLANTED WILL DEPEND ON NATURAL HERBACEOUS/SHRUB RECRUITMENT AND DIRECT OBSERVATION OF HYDROLOGY AND TARGET SPECIES AS OUTLINED IN THE TABLE BELOW. PRIOR TO PLANTING, THE PREVIOUSLY MINED AREA WILL BE MAPPED BASED ON NATURALLY RE-ESTABLISHING PLANT COMMUNITIES. ON-SITE VEGETATION COMMUNITIES WILL BE IDENTIFIED AND MAPPED TO ROUGHLY FOLLOW THE GUIDE TO THE NATURAL COMMUNITIES OF FLORIDA (2010 EDITION).

HABITAT SUMMARY AND PROPOSED PLANTINGS BY TARGET SPECIES OBSERVED DURING VEGETATION MAPPING		
HABITAT	PLANTINGS	TARGET SPECIES OBSERVATIONS
MESIC PINE FLATWOODS	LONGLEAF PINE, SLASH PINE	BUNCHGRASSES (<i>Aristida sp.</i> , <i>Andropogon sp.</i> , <i>Sporobolus sp.</i> , <i>Dichanthelium sp.</i>), SAW PALMETTO (<i>Serenoa repens</i>), GALLBERRY (<i>Ilex glabra</i>), FETTERBUSH (<i>Lyonia lucida</i>), AND DWARF LIVE OAK (<i>Quercus minima</i>).
WET PINE FLATWOODS	SLASH PINE	BUNCHGRASSES (<i>Aristida sp.</i> , <i>Andropogon sp.</i> , <i>Ctenium aromaticum</i> , <i>Muhlenbergii sp.</i> , <i>Sporobolus sp.</i> , <i>Rhynchospora sp.</i>), LARGE GALLBERRY (<i>Ilex coriacea</i>), FETTERBUSH, SWEETBAY, SAW PALMETTO
DEPRESSIONAL WETLAND - DOME/DEPRESSION SWAMP	POND CYPRESS, SWAMP TUPELO	VIRGINIA CHAIN FERN (<i>Anchistia virginica</i>), ROYAL FERN (<i>Osmunda regalis</i>), CINNAMON FERN (<i>Osmunda cinnamomea</i>), MAIDENCANE (<i>Panicum hemitomon</i>), REDROOT (<i>Lachnanthes caroliniana</i>), BEAKSEDGES (<i>Rhynchospora sp.</i>), AND SEDGES (<i>Carex sp.</i>).
DEPRESSIONAL WETLAND - SHRUB BOG	POND PINE, SLASH PINE	TITI (<i>Cyrilla racemiflora</i>), BLACK TITI (<i>Cliftonia monophylla</i>), SWEET PEPPERBUSH (<i>Clethra alnifolia</i>), FETTERBUSH, LARGE GALLBERRY, AND LAUREL GREENBRIER (<i>Smilax laurifolia</i>).
DEPRESSIONAL WETLAND - BAYGALL	LOBLOLLY BAY, SWAMP BAY, SWEETBAY	LOBLOLLY BAY, SWAMP BAY, SWEETBAY, FETTERBUSH, DAHOON (<i>Ilex cassine</i>), LARGE GALLBERRY, TITI, BLACK TITI, WAX MYRTLE (<i>Myrica cerifera</i>), DOGHOBBLE (<i>Leucothoe sp.</i>), SWEETSPIRE (<i>Itea virginica</i>).

8 - RECLAMATION AREAS WILL BE MONITORED FOR TWO YEARS FOLLOWING PLANTING PENDING RELEASE OF THE MINE FROM THE RECLAMATION ACTIVITIES.

PERFORMANCE CRITERIA FOR RECLAMATION

SPECIFIC REQUIREMENTS THAT TPM WILL ADHERE TO FOR THIS RECLAMATION PLAN ARE:

- GRADE ALL PEAKS, RIDGES, AND VALLEYS RESULTING FROM SURFACE MINING AND BACKFILL ALL PITS AND TRENCHES RESULTING FROM SAME IN A MANNER TO MINIMIZE ANY HAZARDOUS EFFECTS OF MINING ADJACENT TO ANY STATE OR COUNTY MAINTAINED PUBLIC ROAD.
- BACKFILL ALL AFFECTED LANDS AS STATED IN THE RECLAMATION PROCEDURES OF THIS PLAN UTILIZING POST-PROCESSED SANDS, MINE TAILINGS (SAND AND HUMATE), AND/OR BORROW FROM AFFECTED (PERMITTED) LAND UNLESS APPROVAL FROM THE DIVISION IS OBTAINED TO UTILIZE OTHER MATERIALS. SOUND ENGINEERING PRINCIPLES SHALL BE APPLIED TO ENSURE THAT AFFECTED LANDS, AS RECLAIMED, MEET THE INTENDED USE.
- APPLY EROSION CONTROL MEASURES TO PROTECT THE TOPSOIL COVER UNTIL AN ADEQUATE VEGETATIVE COVER IS ESTABLISHED. EROSION CONTROL MEASURES MAY INCLUDE SCARIFYING THE LAND SURFACE PARALLEL TO CONTOURS.
- NO HIGHWALLS WILL REMAIN ON SITE.
- ALL AFFECTED LAND WILL BE GRADED TO MIMIC PRE-MINING TOPOGRAPHY AND BLENDED INTO THE EXISTING LANDSCAPE, UNLESS OTHERWISE AMENDED.
- CONSTRUCTED SLOPES WILL NOT EXCEED THREE HORIZONTALS TO ONE VERTICAL (3:1) EXCEPT WHERE MAY BE APPROVED OTHERWISE IN THIS PLAN. FILL AND CUT SLOPES SHALL BE DESIGNED AND CONSTRUCTED TO PROHIBIT SLUMPING OR SHEAR FAILURES. PRIOR TO FINAL GRADING, ALL SLOPES WILL BE BLENDED IN WITH THE ORIGINAL EXISTING TOPOGRAPHY. SLOPE GRADES SHALL BE UNIFORM. MECHANICAL OR VEGETATIVE OR BOTH STABILIZATION MEASURES SHALL BE EMPLOYED AS SOON AS PRACTICAL TO PREVENT EROSION.
- SPOIL OR REFUSE, WHEN USED AS BACKFILL MATERIAL, FOR BERM OR OTHER CONSTRUCTION, WILL BE SEGREGATED AS NECESSARY, EMLACED AND COMPACTED IN ACCORDANCE WITH SOUND ENGINEERING PRACTICES TO PROVIDE FOR THE PURPOSE INTENDED. ALL NEW LANDFORM STRUCTURES CREATED WITH THE USE OF SPOIL OR REFUSE MATERIALS SHALL BE CONSTRUCTED IN A MANNER TO PROTECT AGAINST FAILURE, SUBSIDENCE AND/OR EROSION AND WILL BE PERMANENTLY STABILIZED UPON COMPLETION OF CONSTRUCTION.
- NO LAKES OR PONDS ARE PROPOSED AS PART OF THE RECLAMATION PLAN.
- WITHIN APPROXIMATELY 180 DAYS OF COMPLETION OF MINING ACTIVITIES, COMMENCEMENT OF DECOMMISSIONING OF THE PONDS WILL BEGIN IN THE FOLLOWING MANNER:
 - PROCESS WATER WILL BE ELIMINATED FROM EACH POND BY THE FOLLOWING OR A COMBINATION OF THE FOLLOWING:
 - PUMPING TO TANKER TRUCKS FOR TRANSPORT TO AN OFF-SITE FACILITY FOR DISPOSAL IN ACCORDANCE WITH STATE AND/OR FEDERAL REQUIREMENTS.
 - UTILIZING AN ENGINEER DESIGNED EVAPORATION SYSTEM OR ALTERNATIVE TECHNOLOGY CAPABLE OF ELIMINATING LIQUIDS.
 - UNDER NO CIRCUMSTANCES WILL PROCESS WATER BE DISCHARGED AT THE FACILITY WITHOUT PRIOR AUTHORIZATION FROM THE GEORGIA EPD (I.E., A PERMIT IS OBTAINED THAT WILL ALLOW FOR THE DISCHARGE OF PROCESS WATER AT THE FACILITY).
 - AFTER THE ELIMINATION OF PROCESS WATER FROM EACH POND, SEDIMENTS THAT HAVE ACCUMULATED ON TOP OF THE LINER SYSTEM AND THE LINER WILL BE REMOVED AND TRANSPORTED TO AN OFF-SITE FACILITY FOR DISPOSAL IN ACCORDANCE WITH STATE AND/OR FEDERAL REQUIREMENTS.
 - NEXT, THE BERM WALLS WILL BE GRADED TO GENERALLY MATCH THE SURROUNDING LAND SURFACE AND THE AREAS WILL BE REVEGETATED.
 - TWIN PINES MINERALS, LLC RESERVES THE RIGHT TO REQUEST THAT THE PONDS REMAIN IN PLACE FOR POTENTIAL REUSE. DURING SUCH TIME, ALL PONDS LEFT IN PLACE WILL BE MAINTAINED IN A MANNER CONSISTENT WITH THAT REQUIRED BY PERMIT DURING THE OPERATIONAL PERIOD OF THE MINE.

- THE OPERATOR WILL PREPARE AND FILE A FINAL RECLAMATION REPORT AND REQUEST FOR RELEASE UPON COMPLETION OF RECLAMATION RESPONSIBILITIES ON AFFECTED ACREAGE.

1. SOIL AMENDMENT PLAN

A SOIL AMENDMENT LAYER OF 10.9% BENTONITE WILL BE APPLIED IN A ~3-FOOT-THICK LAYER. THE PURPOSE OF THIS LAYER IS TO ENSURE THAT THE HOMOGENIZATION OF SOILS DUE TO MINING DOES NOT AFFECT OR ALTER THE EXISTING GROUNDWATER DIVIDE.

1.1 PROCEDURES FOR APPLICATION OF THE BENTONITE LAYER

- THE FOLLOWING PROCEDURES WILL BE USED TO INSTALL THE LOW-PERMEABILITY LAYER:
 - A COVERED FACILITY WILL BE CONSTRUCTED NEAR WHERE SAND TAILINGS EXIT THE PLANT AND ARE LOADED ONTO THE TAILINGS CONVEYOR. THE BENTONITE AND SAND WILL BE LOADED INTO HOPPERS THAT WILL FEED THE CORRECT BLEND (89.1% SAND/10.9% BENTONITE) TO A MINING BOX. ONCE BLENDED, THE AMENDED SOIL MIXTURE WILL BE LOADED ONTO THE MAIN TAILINGS CONVEYOR SYSTEM AND TRANSPORTED TO THE OPEN PIT.
 - THE MIXING PROCESS AND TRANSPORT ON THE MAIN TAILINGS CONVEYOR WILL ONLY TAKE PLACE DURING CERTAIN PERIOD(S) OF THE DAY TO ENSURE THE BENTONITE-SAND BLEND IS NOT DILUTED WITH THE SAND-ONLY TAILINGS.

- PRIOR TO PLACEMENT OF THE SOIL AMENDMENT LAYER, THE PIT WILL BE BACKFILLED TO A LEVEL APPROXIMATELY THREE FEET BELOW THE TOP OF THE HUMATE-CEMENTED CONSOLIDATED BLACK SAND AS MAPPED IN SECTION 1.2.

- ONCE THE BLENDED SAND/BENTONITE MATERIAL REACHES THE END OF THE TAILINGS CONVEYOR, IT WILL BE TRANSFERRED TO A PORTABLE CONVEYOR/STACKER THAT WILL CAST THE BLENDED MATERIAL INTO THE OPEN PIT. THE BLENDED SAND/BENTONITE MATERIAL WILL BE PLACED AT A DEPTH THAT COINCIDES, AS CLOSE AS POSSIBLE, WITH THE TOP THREE FEET OF THE MAPPED HUMATE-CEMENTED CONSOLIDATED BLACK SAND (SEE SECTION 1.2). BASED ON EXISTING DATA FROM ON-SITE BORINGS, THE DEPTHS TO THE TOP OF THE HUMATE-CEMENTED CONSOLIDATED BLACK SAND ARE VARIABLE AND ARE ANTICIPATED TO RANGE FROM 8 TO 25 FEET BGS.

- BECAUSE THE SAND/BENTONITE MIXTURE IS VERY COHESIVE, IT CAN BE CAST INTO THE OPEN PIT WHETHER IT IS WET OR DRY, WITHOUT SEPARATING. BECAUSE BACKFILLING WILL OCCUR WITHIN 500 FEET OF THE LEADING EDGE OF THE DRAG LINE, HOWEVER, GROUNDWATER WILL NOT HAVE TIME TO COMPLETELY FILL THE PIT, AND MOST WATER WILL BE ABSORBED BY THE TAILINGS MATERIAL, WHICH WILL BE VERY DRY AND ABSORBENT. IF GROUNDWATER RISES ABOVE THE ELEVATION WHERE THE SAND/BENTONITE MIXTURE WILL BE PLACED, THE MINE PIT WILL TEMPORARILY BE DEWATERED TO ALLOW PLACEMENT OF THE BLENDED SAND/BENTONITE MATERIAL. WATER WITHDRAWN FROM THE ACTIVE MINING PIT WILL BE PUMPED TO THE MINE PIT WATER MANAGEMENT POND AND SUBSEQUENTLY REUSED BY THE FACILITY.

- THE ELEVATION OF THE TOP OF THE BLENDED MATERIAL WILL BE SURVEYED FOLLOWING EACH SOIL AMENDMENT PLACEMENT EVENT.

- SAND-ONLY TAILINGS WILL BE PLACED ABOVE THE SAND/BENTONITE MIXTURE.

- A TOPSOIL LAYER WILL THEN BE PLACED ON TOP OF THE SAND TAILINGS.

1.2 MAPPING THE HUMATE-CEMENTED CONSOLIDATED BLACK SANDS

THE SOIL AMENDMENT IS INTENDED TO MIMIC THE HYDRAULIC CONDUCTIVITY OF CONSOLIDATED BLACK SANDS THAT UNDERLAY PORTIONS OF THE SITE. TO PROVIDE INFORMATION THAT MAY BE NEEDED FOR ANY FUTURE ADAPTIVE MANAGEMENT RESPONSE, THE PRESENCE OR ABSENCE OF THIS SOIL TYPE WILL BE DOCUMENTED AS THE MINING PROGRESSES.

SOIL BORINGS WILL BE PLACED IN A 200-FOOT BY 200-FOOT GRID. ONE SAMPLE WILL BE COLLECTED FROM THE APPROXIMATE CENTER OF EACH GRID CELL BEFORE THE CELL IS EXCAVATED. THE PRESENCE OR ABSENCE OF HUMATE-CEMENTED BLACK SANDS WILL BE NOTED AND DOCUMENTED.

1.2.1. FIELD IDENTIFICATION OF BLACK SANDS

THE FOLLOWING BLACK HUMATE-STAINED SOIL LAYERS HAVE BEEN IDENTIFIED WITHIN THE MINE SITE:

- UNCONSOLIDATED BLACK SANDS,
- SEMI-CONSOLIDATED BLACK TO DARK BROWN SANDS, AND
- CONSOLIDATED BLACK SANDS

THE CONSOLIDATED BLACK SANDS ARE EASILY DISTINGUISHED FROM THE HIGHER PERMEABILITY UNCONSOLIDATED AND SEMI-CONSOLIDATED BLACK SAND LAYERS DUE TO THE FIRM OR STIFF, CEMENTED CHARACTERISTICS OF THE SAND GRAINS (SEE PHOTOGRAPH 1). RESULTS OF LABORATORY PERMEABILITY TESTING OF HUMATE-CEMENTED CONSOLIDATED BLACK SANDS COLLECTED FROM THE SITE INDICATED VERTICAL HYDRAULIC CONDUCTIVITIES RANGING FROM 10⁻⁷ TO 10⁻⁸ CENTIMETERS PER SECOND (CM/S). DIFFERENCES IN THE APPEARANCE OF THE CONSOLIDATED, SEMI-CONSOLIDATED AND UNCONSOLIDATED BLACK SANDS ARE SHOWN IN THE PHOTOGRAPHS PROVIDED BELOW:



PHOTOGRAPH 1. LOW PERMEABILITY HUMATE-CEMENTED CONSOLIDATED BLACK SAND



PHOTOGRAPH 2. SEMI-CONSOLIDATED BLACK SAND



PHOTOGRAPH 3. UNCONSOLIDATED BLACK SAND

AS SHOWN ABOVE, CONSOLIDATED SANDS ARE EASILY RECOGNIZED IN THE FIELD BASED ON THE FOLLOWING CHARACTERISTICS:

- BLACK OR VERY DARK BROWN COLOR
- FIRM OR STIFF CORE SAMPLES THAT MAINTAIN A CYLINDRICAL SHAPE WHEN RETRIEVED FROM THE BOREHOLE (SIMILAR IN APPEARANCE TO PHOTOGRAPH 1, AS COMPARED TO PHOTOGRAPHS 2 AND 3 ABOVE).
- OFTEN DISPLAY A GREASY APPEARANCE ON THE CORE SURFACE UPON REMOVAL FROM THE SAMPLER

1.2.2. DRILLING PROCEDURES

DRILLING WILL BE PERFORMED BY TPM. A SONIC, GEOPROBE, HOLLOW-STEM AUGER OR EQUIVALENT TYPE DRILL RIG WILL BE USED TO COLLECT SOIL SAMPLES CONTINUOUSLY FROM BOREHOLES IN ADVANCE OF THE MINING. THE BORINGS WILL BE DRILLED ALONG THE CENTER LINES OF THE MINING CUTS AND EXTEND TO THE MAXIMUM DEPTH OF MINING (ABOUT 50 FEET BELOW LAND SURFACE). THE FOLLOWING INFORMATION WILL BE RECORDED AT EACH BOREHOLE BY A GEOLOGIST:

- UNIQUE BORING IDENTIFIER
- DATE OF DRILLING (START/END DATE)

- SURVEYED BORING LOCATION AND ELEVATION DATA
- DEPTH TO SATURATED SOILS AS MEASURED IN THE BOREHOLE OR AS IDENTIFIED IN THE CORE
- LITHOLOGIC DESCRIPTIONS OF SUBSURFACE SOIL TO INCLUDE:
 - SOIL TYPE (UNIFIED SOIL CLASSIFICATION SYSTEM)
 - PERCENTAGE OF CLAY VERSUS SAND (VISUAL ESTIMATE)
 - HUMATE PRESENT AND RELATIVE PERCENT (I.E. LOW, MEDIUM, HIGH; VISUAL ESTIMATE)
 - DEGREE OF CONSOLIDATION OF SANDS (UNCONSOLIDATED, SEMI-CONSOLIDATED, OR CONSOLIDATED)
 - SORTING OF SAND
 - DESCRIPTION OF FINE, MEDIUM, COARSE GRAINS PER SANDY SOIL TYPE
 - COLOR DESCRIPTION USING A MUNSELL OR GSA ROCK COLOR CHART
- BORING TERMINATION DEPTH
- PHOTOGRAPHS OF EACH DRILL SAMPLE RETURN INTERVAL. PHOTOGRAPHS WILL BE REFERENCED WITH THE BORING IDENTIFIER, DATE, AND SAMPLE DEPTH INTERVAL

THE BORING DATA WILL BE COMPILED INTO A DATABASE SYSTEM AND USED TO GENERATE SUBSURFACE BORING LOGS AND CROSS SECTIONS.

1.2.3. GROUNDWATER-LEVEL MONITORING PLAN

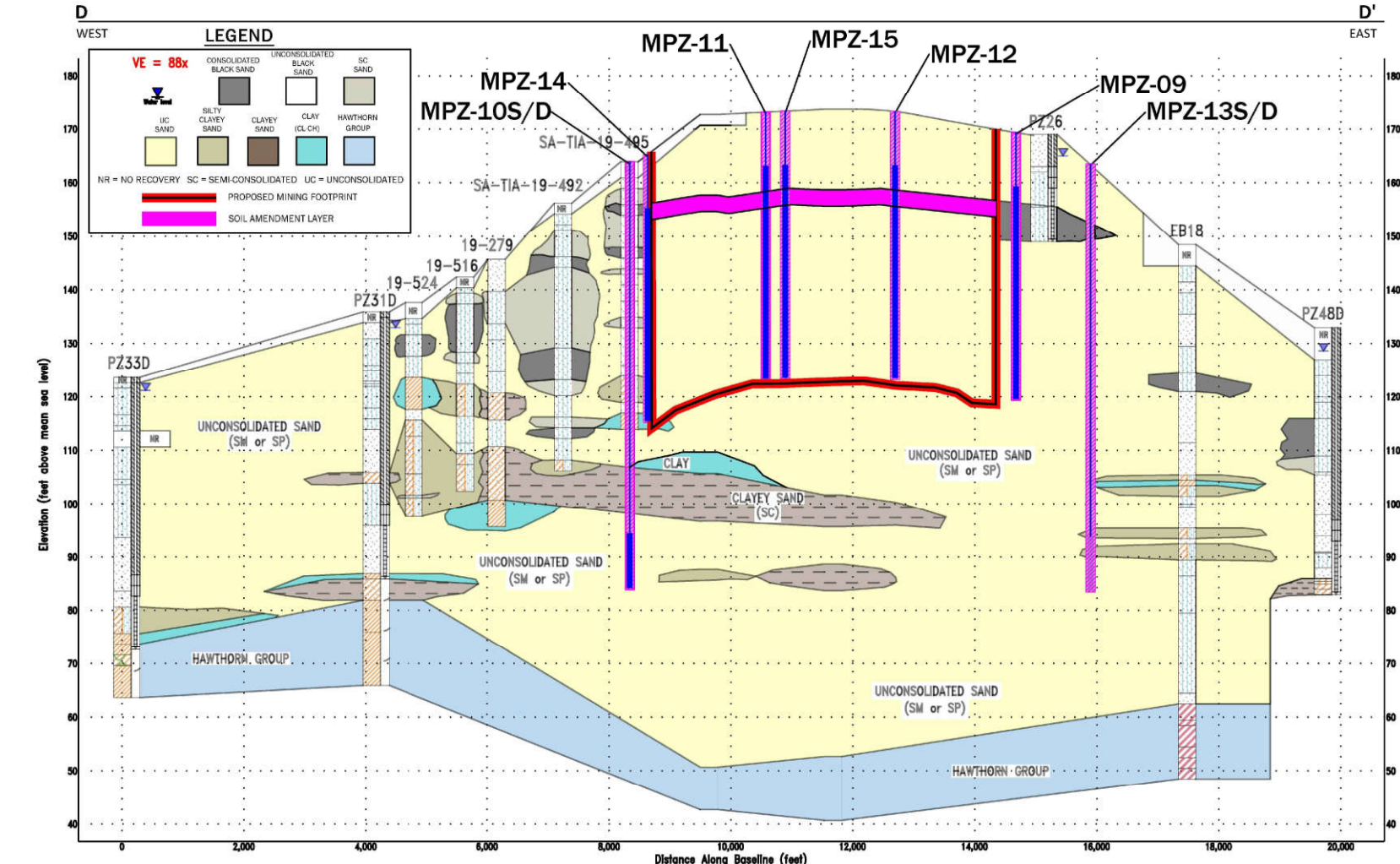
A GROUNDWATER-LEVEL MONITORING PLAN, ACTION LEVELS FOR COMPLIANCE, AND AN ADAPTIVE MANAGEMENT (OR CONTINGENCY) PLAN IF GROUNDWATER LEVELS ARE NOT RESTORED IS INCLUDED IN SECTION 2, SHEET 13 OF THE GROUNDWATER AND SURFACE WATER MONITORING PLAN IN THOSE SPECIFIED AREAS.

1.2.4. PROCEDURES FOR DISCONTINUING THE SOIL AMENDMENT

TPM WILL SUBMIT THE RESULTS (E.G., SOIL BORING LOGS, CROSS-SECTIONS, ISOPACH MAPS, ETC.) OF THE SUBSURFACE MAPPING OF THE HUMATE-CEMENTED, CONSOLIDATED BLACK SANDS TO EPD. IF THE MAPPING DEMONSTRATES THE ABSENCE OF HUMATE-CEMENTED, CONSOLIDATED BLACK SAND WITHIN AN AREA YET TO BE MINED, TPM WILL REQUEST EPD'S AUTHORITY TO PROCEED WITHOUT THE ADDITION OF THE SOIL AMENDMENT LAYER IN THOSE SPECIFIED AREAS. THE BENTONITE LAYER RECREATING THE HUMATE-CEMENTED, CONSOLIDATED BLACK SAND WILL BE CONTINUOUS UNLESS TPM RECEIVES EPD APPROVAL TO DISCONTINUE APPLICATION OF THE SOIL AMENDMENT LAYER IN THOSE SPECIFIED AREAS.

IT IS IMPORTANT TO NOTE THAT IF THE HUMATE-CEMENTED, CONSOLIDATED BLACK SANDS ARE NOT CONTINUOUS AS DEMONSTRATED BY TPM'S PRIOR INVESTIGATIONS, THE ADDITION OF A CONTINUOUS SOIL AMENDMENT LAYER MAY ADVERSELY IMPACT THE LOCAL GROUNDWATER SYSTEM. POTENTIAL IMPACTS INCLUDE:

- ARTIFICIALLY RAISING THE WATER TABLE ABOVE THE LAND SURFACE LEADING TO PONDING OR INCREASED SURFACE WATER RUNOFF.
- REDUCING DOWNWARD FLOW TO DEEPER PARTS OF THE SURFICIAL AQUIFER,
- REDUCING GROUNDWATER DISCHARGE TO THE WEST AND TO THE EAST OF TRAIL RIDGE.



POST-MINING GENERALIZED GEOLOGIC CROSS-SECTION OF THE MINE FOOTPRINT



SHEET 11: POST-MINING RECLAMATION PLAN (1)
TWIN PINES MINERALS, LLC SAUNDERS DEMONSTRATION MINE (ID NO. 2073)
ST. GEORGE, CHARLTON COUNTY, GEORGIA

DRAWN BY: DEK
CHECKED BY: SGR
DRAWING DATE: 11/13/2020
REVISION DATE: 11/19/2021
TTL JOB NO.: 000180200804.00
APPROX. SCALE: N/A