FACT SHEET

(Pursuant to Nevada Administrative Code (NAC) 445A.401)

Permittee Name: **Klondex Hollister Mine Inc.**

Project Name: **Hollister Development Block Project**

Permit Number: **NEV2003107**
Review Type/Year/Revision: **Renewal 2023, Fact Sheet Revision 00**

A. Location and General Description

Location: The Hollister Development Block Project is located within Sections 4, 5, 8, 9, 16, and 17, Township 37 North, Range 48 East, and Sections 32 and 33, Township 38 North, Range 48 East, Mount Diablo Baseline and Meridian, approximately 46 air-miles northwest of the city of Elko, in northwest Elko County, Nevada.

The Midas-Tuscarora road provides all-weather access to the site. To reach the site by automobile, travel on Interstate Highway 80 approximately 16 miles east from Winnemucca, or 109 miles west from Elko (the nearest commercial airport), to the Golconda exit #194. Take Nevada State Route (SR)-789 approximately 12 miles to the turn off onto the county-maintained gravel road SR-18 toward the towns of Midas and Tuscarora. At the road junction to Midas, approximately 32 miles from the SR-789 and SR-18 intersection, veer right and continue toward the town of Tuscarora and Willow Creek Reservoir. Turn right, approximately 9 miles from the Midas turn-off, onto a U.S. Bureau of Land Management (BLM)-marked dirt road access to Antelope Creek and the Ivanhoe Mining District. Continue approximately 9 miles south to the project site.

General Description: The project was originally permitted in 2003 as a small-scale facility (NAC 445A.410) to allow an underground exploration program designed to determine the economic viability of the mineral resource. The Permittee was authorized for off-site processing of up to 36,500 tons of ore per year and a maximum of 120,000 tons of ore over the life of the Project. Identification of off-site processing facilities was required, and all material quantified and characterized. The facility is located within the existing East Open Pit and no new disturbance is anticipated.

Under the original Permit, an exploration decline was driven to access the mineralized vein and develop underground exploration drilling stations. Drifts and vertical raises developed along the vein were used to determine the continuity of mineralization, to evaluate proposed mining methods, and to obtain bulk samples for test processing and evaluation at other permitted facilities located offsite.

As part of the 2008 renewal application, the facility type was changed from a small-scale to a large-scale facility (NAC 445A.394) to facilitate full scale production at an average rate of 750 tons per day and permitted annual rate of 275,000 tons per year. All facilities were originally designed to accommodate full scale production and, consequently, no changes to the mine infrastructure and related facilities were required for the transition from exploration and development activities to the full-scale operation.

Associated components include an engineered waste rock and ore storage facility with a lined fluid collection system, synthetic-lined de-silting and recycled water ponds, a reverse osmosis water treatment plant, a synthetic-lined stormwater basin, and interconnected pumps, sumps and pipelines. Surface support facilities include an administration building and miners' dry, a maintenance shop, and a synthetic-lined fuel storage facility. No processing components are permitted or planned for construction on site. The total surface disturbance will be approximately 80 acres of public land.

B. Synopsis

General: Ivanhoe Gold Company operated the open-pit Hollister Mine, comprised of the East Pit and the West Pit, from 1988 until 1992, when Newmont Mining Corporation (NMC) acquired the property. Following a brief period of exploration for additional open pit reserves, NMC proceeded with reclamation and closure of the facilities. NMC maintains the majority of the area in post-closure monitoring status under Water Pollution Control Permit NEV0088022.

Great Basin Gold Ltd. acquired an interest in the Hollister property from NMC and began exploration work in September 1997. Hecla Ventures Corporation, a wholly owned subsidiary of Hecla Mining Company, was issued the Water Pollution Control Permit for the Hollister Development Block Project in December 2003, and formed a joint venture with Rodeo Creek Gold Inc., a wholly owned subsidiary of Great Basin Gold Ltd. (South Africa with Registered Office in Vancouver, British Columbia), to complete a feasibility study of the Project. In mid-2007, Great Basin Gold Ltd. completed the purchase of the Hecla Ventures Corporation interest in the property and the Water Pollution Control Permit was formally transferred from Hecla Ventures Corporation to Rodeo Creek Gold, Inc. in December 2007.

Waterton Global Mining Company, LLC purchased the assets of Rodeo Creek Gold Inc. in 2013 after Rodeo Creek Gold Inc. filed for Chapter 11 bankruptcy. Water Pollution Control Permit NEV2003107 was formally transferred from Rodeo Creek Gold Inc. to Waterton Global Mining Company, LLC in August 2013. Shortly after, the facility entered temporary closure in December 2013.

Waterton Global Mining Company, LLC submitted a Permit transfer to the Division to transfer NEV2003107 and NEV2003114 to Carlin Resources, LLC (a subsidiary of Waterton Global Mining Company, LLC in April 2015); however, the Permit was never transferred due to the Permit being expired and backlog within the Division. In October 2016, Klondex Hollister Mine Inc. (Klondex) purchased the assets of Carlin Resources, LLC and the facility was taken out of temporary closure.

The Hollister Development Block Project was originally permitted for underground exploration as a continuation of the surface exploration performed by Great Basin Gold and others at the Hollister Mine site. Based on the exploration and feasibility test work completed, an underground gold ore reserve was identified and the Permit was modified for full production, with off-site processing, as part of the 2008 renewal. The Permit, owned and operated by Klondex (the Permittee), is solely for facilities located within the East Pit, which is situated within, but separate from, the greater ‘Hollister’ Project area covered by the NMC Closure Permit (NEV0088022).

The 2018 permit renewal was submitted to the Division in November of 2018 and included a request to expand the Waste Rock Storage Facility (WRSF). Review of the 2018 renewal, and correspondence between the Permittee and the Division continued through June of 2022. Due to Division backlog in 2022 and 2023, the 2018 renewal was not fully processed. The Division received the 2023 permit renewal application in September 2023. The 2023 renewal application cited no additional substantive modifications had been made since the 2018 permit renewal application. Subsequently, the 2018 permit renewal and modifications have been incorporated into the 2023 permit.

Portal and Decline: The portal for the underground decline is collared in the east face of the East Pit at an elevation of approximately 5,555 feet above mean sea level (AMSL). A 30-foot-long steel-arch structure constructed at the portal exterior provides protection from potential rock falls from the highwall above.

The decline is approximately 3,000 feet long and bottoms out at an elevation of approximately 5,000 feet AMSL. The first 50 feet of the decline excavation was driven at a grade of +2% to prevent meteoric water from entering the decline. The remainder of the decline excavation was driven north at a grade of –15% for approximately 2,400 feet, then west at a grade of –4% for 2,400 feet. The decline cross-section is a nominal 15 feet by 15 feet in dimension, which can support full production-scale operations. Ground control incorporates rock bolts, wire mesh, steel sets, and shotcrete. All utility services, such as fresh water, fresh air ventilation, and electrical, are routed via the decline. Ventilation for the underground workings is provided by a series of fans and a 54-inch diameter steel vent tube that conveys exhaust air to the surface. Two vertical escapeways, one constructed at each end of the main production drift, meet U.S. Department of Labor Mine Safety and Health Administration (MSHA) safety requirements and provide additional ventilation. Skid-mounted portable pumps are used to pump groundwater in-flows and water from mining to the surface via the decline.

Second Decline (Secondary Escapeway and Ventilation) – CONCEPT ABANDONED 2008: As part of a minor modification approved 28 January 2008, the Permittee advised the Nevada Division of Environmental Protection (Division) Bureau of Mining Regulation and Reclamation that construction of a second decline, approved as an engineering design change (EDC) Permit modification in July 2007, would be abandoned in favor of constructing two vertical escapeways, one at each end of the main production drift, that would also serve as ventilation shafts. The escapeways were the preferred option to meet MSHA requirements.

Underground Workings: Underground workings consist of crosscuts, production and development drifts, and production raises. Crosscuts, measuring 13 feet by 13 feet, are driven from the exploration decline to intersect the mineralized veins. Production and development drifts, which run generally parallel to or along the vein, respectively, measure 6 to 8 feet wide and 10 feet high. In excess of 12,000 linear feet of drift and cross-cut development had been completed at the time of the 2008 renewal. Production raises, developed vertically along the vein, measure up to 250 feet in length and terminate no closer than 345 feet below ground surface (bgs). Rock support is used depending on ground conditions, and grouting may be used as necessary to control groundwater in-flow.

Underground Mining: 'Overhand drift and fill' is the mining technique used in the underground workings. The technique is especially suited to mining the narrow vein type deposit found at Hollister and will maximize the number of ounces recovered while minimizing both the number of tons mined and the associated cost per ounce. Mining occurs along the strike of the vein and ore is removed in horizontal slices. Most of the small volume of waste rock produced with the overhand drift and fill technique is used to backfill the production stopes as they are mined out and very little material must be hauled to the surface Waste Rock Storage Facility. A cap of concrete is poured on top of the backfill material, which then becomes the floor or working surface for equipment to remove the next slice of the vein.

Groundwater In-Flow Control: Potential for groundwater in-flow into underground workings was monitored during decline development by drilling holes 50 to 100 feet ahead of the advancing decline. If no flows were encountered, the decline was advanced to within 20 feet of the maximum depth of monitor drillhole penetration before a new set of monitor holes was drilled. If water was encountered, cement grout was pumped into the source structure once the decline was within 20 to 30 feet of the source structure. Analysis suggested that grouting would control 50% or more of the total groundwater in-flow. Packers and valves were also used to control flow that developed from pre-existing drill holes and to provide a means of injecting cement grout into these holes for additional flow control. Similar methods are incorporated in the development of production headings, cross-cuts, and stopes.

Underground Exploration Hatter Drift: During underground exploration of the Hatter Drift an unforeseen aquifer was breeched. In the first quarter of 2022 an unexpected water inflow was encountered at the 4541-foot elevation. Water levels have stabilized at the 5021-foot elevation of the and dewatering of approximately 270 gallons per minute (gpm) continues. Klondex is working to update the groundwater model to determine if the volume of water expected in the aquifer is greater than the capacity of the permitted discharge options. The source and potential solutions to the inflow of water are under investigation.

Waste Rock Management: During the underground testing and exploration Project, approximately 100,000 tons of waste rock material was generated and permanently stored in an engineered WRSF located within the southeast portion of the existing East Pit. Additional capacity remains within the expanded 6.6-acre component footprint to contain future waste rock generated during full production and to provide temporary storage of ore and bulk samples prior to shipment off site to approved permitted facilities for processing or testing.

Extensive waste rock characterization was performed on drill core samples of rock types to be encountered in the decline and all underground workings. For the purposes of characterization tests, rock types were classified as andesite, quartzite, and interbedded argillite/siltite (i.e., argillite with silt-sized quartz grains). Quartzite and argillite/siltite comprise over 90% of the rock removed from the decline and underground workings. The characterization work included Acid Base Accounting (ABA) tests, Meteoric Water Mobility Procedure (MWMP) tests, and Kinetic Testing using the British Columbia Humidity Cell Protocol, which at the time (2003) was an acceptable humidity cell test method. It has since been superseded by the ASTM D5744-13, Option ‘A’.

With the exception of one andesite sample, all samples were classified as potentially acid generating (PAG) according to Division guidelines (i.e., the ratio of Acid Neutralizing Potential to Acid Generating Potential (ANP:AGP) < 1.2:1). Test results indicate that, without mitigation, waste rock can be expected to 1) oxidize and produce acidity; 2) lower the pH of water coming into contact with the waste rock; and 3) increase sulfate and metals concentrations and solubilities. However, the same testing indicates that if the pH of water in contact with waste rock is kept above pH 6.5 standard units, all metal and metalloid concentrations in effluent should meet the Division Profile I reference values. Therefore, as a mitigation procedure to maintain the optimum pH at which metals and metalloids are not mobilized, dolomite or an equivalent material is added to all waste rock as each lift is loaded onto the WRSF at a rate of 46 tons dolomite per 1,000 tons of waste rock. In addition, the WRSF is an engineered component constructed and managed as follows.

The WRSF is constructed on a compacted 12-inch-thick low permeability soil base (LPSB) with measured permeability equivalent to no greater than 1 foot of $1x10^{-5}$ centimeters per second (cm/sec) material. The LPSB is constructed over prepared native or approved fill materials in 8-inch lifts compacted to 90% (+4%/-2%) optimum dry density as determined by the modified Proctor (ASTM D-1557) method. Compaction and permeability were confirmed with field quality assurance/quality control (QA/QC).

The surface of the prepared LPSB is graded at 1 to 2 % toward a central 8-inch diameter perforated high density polyethylene (HDPE) fluid collection pipeline placed in a vee-ditch. The fluid collection pipeline is covered with 2 feet of pipe bedding material encased in 12-ounce non-woven textile and discharges to the buried Waste Rock Solution Collection Sump (East Sump).

An EDC, approved by the Division in September 2005, allowed conversion of the original Solution Evaporation Sump to the Waste Rock Solution Collection Sump East Sump (East Sump) through an engineered burial designed to eliminate floating of the sump liner, while maintaining the sump function, during high groundwater conditions. However, harsh weather conditions precluded implementation of the modification and the sump liner was displaced from the key trench by rising groundwater levels driven by large volumes of stormwater reporting to the adjacent unlined stormwater pond.

A second EDC to construct a modification (Modification 2) of the East Sump was approved by the Division in August 2006. The modification consisted of perforating and abandoning in place the original textured 100-mil HDPE sump liner to relieve upwelling pressure. The original sump was then backfilled with inert crushed rock and capped with 6 inches of crushed aggregate to provide a base for a new 100-mil HDPE liner sandwiched between upper and lower protective layers of 8-ounce per square yard (oz/yd^2) non-woven geotextile. Two 18-inch diameter Advanced Drainage Systems N-12 (corrugated exterior, smooth-walled interior HDPE) side slope riser pipes, encased in crushed dolomite and wrapped with 8-oz/yd^2 geotextile, may be used to evacuate and routinely sample solution collected in the sump. The original 12-inch diameter HDPE “lower” sump evacuation riser remains and extends above the East Sump crest to facilitate sampling of solution beneath the liner.

The WRSF has less than 3 horizontal to 1 vertical (3H:1V) slopes on the north and west open sides. Where the WRSF is constructed against the existing steep east and south pit walls, a low-permeability barrier layer (LPBL) was constructed with layers of compacted soil placed against the pit wall. The LPBL provides a barrier equivalent to at least 1 foot of no greater than 1×10^{-5} cm/sec permeability material. Toe drains were constructed of 6-inch diameter perforated HDPE collection pipe encased in drain rock placed at the interface of the LPBL and the underlying LPSB.

The toe drains direct any fluid flow to the main fluid collection system and the fluid evaporation sump.

A minor modification was approved by the Division in January 2008, which allowed construction of an expansion to the original WRSF footprint from approximately 2.4 acres to approximately 6.6 acres. The original WRSF was expanded to the west, over the backfilled location of the existing unlined Stormwater Basin, using the same construction design methods and specifications that were used in the original design, except for the substitution of geosynthetic clay layer (Bentomat ST® GCL, which has a certified hydraulic conductivity of <5 x 10^{-9} cm/sec) over the engineered WRSF base for the LPBL that was used in the original WRSF. Where the WRSF was constructed against existing pit slopes on the south and east, layers of low-permeability soil were placed and compacted in horizontal lifts against the pit slopes and toe drains were installed to prepare for waste rock placement. A geosynthetic clay liner was used on flatter areas in place of a low-permeability soil layer. A second buried waste rock solution collection sump, the West Sump (see below), was also constructed within the expanded WRSF footprint and a new synthetic-lined Stormwater Collection Pond (see below) was constructed at the west edge of the expanded WRSF.

The West Sump was constructed over coarse backfill placed within the original unlined Stormwater Basin excavation to raise the sump floor approximately 5 feet above the original basin floor. The West Sump liner system is comprised of a 100-mil textured HDPE liner sandwiched between layers of 12-ounce geotextile. The West Sump is equipped with a pair of 18-inch diameter standard dimension ratio (SDR)-11 HDPE inclined riser pipes for solution evacuation and a 4-inch diameter SDR-11 HDPE inclined signal port equipped with a water level annunciator. The three pipelines daylight at the crest of the sump sidewall slope. The riser pipes are bedded in coarse crushed dolomite backfill and the balance of the sump void is filled with select waste rock.

Solution collected in the waste rock solution collection sumps (East Sump and West Sump) is routinely characterized and evacuated within twenty days if it does not meet or cannot be treated to meet the Division Profile I water quality standards, or if the 25-year, 24-hour storm event sump design capacity will be compromised. Solution volume in the sumps is monitored with a water level annunciator. Collected solution had previously been evacuated from either sump and conveyed directly to the reverse osmosis (RO) plant for treatment through a dedicated buried pipe-in-pipe conveyance pipeline constructed of a 2.5-inch diameter polyethylene pipe within a 6-inch diameter HDPE pipeline; however, the operation of the RO plant ceased in 2010 and the solution is now shipped off-site. A tee arrangement in the pipeline allows evacuation of the individual sumps and prevents back-flow into the alternate sump. As practical, when storm events generate more than 4-inches of snow, the snow will be removed from the top of the WRSF and placed in the Stormwater Collection Pond (see below).

WRSF Expansion: The 2018 Permit Renewal application included a request to expand the WRSF. The expansion design included an additional 1.8 acres to the north and 0.3-acre to the south, parallel to the existing access road, for a total of 9.3 acres. The subgrade will be graded toward the containment berm at a 2% minimum grade and be constructed of Non-Pag/General backfill compacted to 90%. Where the expansion ties into the East Pit high walls, a prepared subgrade will be constructed in 10-foot vertical lifts. A 6-inch-thick layer of compacted and smooth-rolled minus ½-inch fine grained soil/waste rock or a minimum 20-ounce-per-square-yard non-woven, needle-punched geotextile will be placed on top of the subgrade to form a suitable base for installation of an 80-mil HDPE geomembrane liner. A 3-foot-thick over liner protection layer/drainage layer will then be placed prior to backfilling. The remaining portion of the expansion to the north that does not tie into the East Pit high walls will have an 80-mil HDPE geomembrane with a minimum 2-foot-thick layer of screened 2-inch minus waste rock or other suitable cover material. The southeastern corner of the WRSF will expand the existing geosynthetic clay liner to the northern edge of the access road to provide containment for access road construction and the proposed new ore stockpile area. Neutralizing agents will be added as necessary. A perimeter containment berm will be constructed around the edge of the WRSF expansion areas.

The ore stockpile is planned to be relocated from the current location on the eastern edge of the existing WRSF to the southwestern portion of the proposed expansion. The new ore stockpile base will be constructed of a fiber reinforced 100-ft by 170-ft 10-inch-thick concrete slab. Stormwater runoff from the ore stockpile will collect in a new unlined sump located adjacent to the ore stockpile. The sump will be constructed on the WRSF containment and is intended to collect runoff and trap sediment and will be managed with stockpile operation, including evacuation of collected water within permitted time frames and periodic removal of sediment. The new ore stockpile configuration was originally submitted with the 2018 permit renewal. However, due to Division backlog, a nonfee request to relocate the stockpile was approved by the Division on 25 March 2019. Due to the unexpected inflow of water during exploration into the Hatter drift (discussed above) stockpile relocation was delayed. As of 2023, the stockpile had not been relocated.

The existing west sump access ports will be capped and abandoned. An additional vertical access port to the West Sump will be constructed approximately 80 feet north of the current sump alignment, between the northeastern portion of the designed ore stockpile pad and the 9a and 9b WRSF expansion. The east and lower sump access ports will be extended to the North.

A new triangular-shaped HDPE-lined stormwater sump will be constructed in the southeast corner of the facility expansion. Solution will be transferred from the stormwater sump to a lined v-ditch (below). The sump is 5 feet deep, with 1.5H:1V side slopes, and an 80-mil HDPE liner.

A lined v-ditch along the eastern toe of the expansion will run parallel to the facility adjacent to the existing access road. The ditch will be 6 feet in width at the crest, 1.5 feet deep, with 2H:1V- side slopes, and an 80-mil HDPE liner. The ditch will transfer solution from the stormwater sump to a stormwater pipeline. The ditch will transfer solution from the stormwater sump to a stormwater pipeline. The stormwater pipeline consists of a buried 12-inch diameter HDPE SDR17 pipe inside an 18-inch diameter HDPE SDR 17 outer pipe. The stormwater pipeline will connect the lined v-ditch to a 10,000-gallon double wall transfer tank. A 4-inch HDPE pipeline will take solution from the transfer tank to the desilting pond.

Solution collected in the west sump, and east and lower sumps will continue to be managed in the Desilting Plant, ponds, or shipped off-site for disposal.

Dewatering Water Management System – De-Silting Plant: Groundwater in-flow to the underground workings is collected in sumps, constructed at 50-foot intervals as the workings advance, and is discharged from the lowest underground sump, using a portable air-powered diaphragm pump, via a 6-inch diameter HDPE pipeline placed in the decline and connected to a 6-inch diameter steel discharge pipe located at the Primary De-Silting Basin, which is a reinforced concrete graded sump that also serves the equipment wash bay. Fine sand and larger suspended particles will settle as the fluid flow velocity decreases over the wash bay sump floor. Fluid flows into the deepest portion of the sump through a break in the one-foot-high curb that bounds three sides of the slab. The sump overflows through a broad crested weir, which reports to a foot launder. Floating sorbent pillows prevent hydrocarbons from exiting the sump into the 12-inch diameter steel outlet pipe that connects to a 12-inch diameter HDPE pipeline that discharges into the Coarse Solids/Sand Dewatering Screw concrete containment. Collected sediment can be removed with a front-end loader and placed on the WRSF; the collected sediment is subject to routine quarterly monitoring in accordance with the Permit.

The Coarse Solids/Sand Dewatering Screw and concrete containment were constructed as part of an EDC approved by the Division in November 2007, for an active de-silting system to replace the original passive de-silting system comprised primarily of three 60-mil HDPE lined de-silting basins. The original de-silting basins, each measuring approximately 20 feet wide, 78 feet long, and 5.5 feet deep, were reclaimed by removing the HDPE liners and backfilling the excavations with stockpiled material originally excavated from the basin footprints, placed and compacted in 1-foot lifts.

The active de-silting system dewaters solution from the Primary De-Silting Basin by first pumping it through a 44-inch twin sand dewatering sand screw. Coarse solids material is deposited on the sand screw containment concrete, which can be accessed with a front-end loader for material removal to the WRSF. A 3-foot by 3-foot by 3-foot sump, cast into the downgradient end of the containment structure, is equipped with a pump to return collected discharge and meteoric fluid to the sand screw. The sand screw discharges to a thickener, located on dedicated containment outside the Belt Filter Press Building. Flocculant may be added as necessary, from one of two 10,000-gallon storage tanks located in the Belt Filter Press Building, to enhance physical separation. (The Belt Filter Press Building secondary containment can contain 112% of the volume of the flocculant tank volume, the largest vessel in the facility.) The thickener underflow slurry is pumped to a belt filter press where it is further dewatered to form a filter cake that is stored in the reinforced concrete Fine Material Containment structure, located adjacent to the Belt Filter Press Building, prior to removal to the WRSF. Solution collected in the independent filter press and Fine Material Containment collection sumps is returned to the thickener for further clarification. The clarified mine discharge water from the thickener overflow is pumped via a 12-inch diameter HDPE pipeline to the adjacent Recycled Water Pond (see below).

Dewatering Water Management System – Storage Ponds: All facility ponds are bermed and lined in accordance with NAC 445A.435 and NAC 445A.438. The system is designed to manage the anticipated average flow rate of 190 gpm and a peak flow of 450 gpm from the underground workings.

Two single-lined ponds, constructed with 60-mil HDPE in the north-central portion of the East Pit, had an approximate capacity of 1.4 million gallons each. One pond, designated the Recycled Water Pond (also known as the South Recycled Water Pond or simply the South Pond), receives clarified water from the De-Silting Plant. The single pond capacity will accommodate approximately 5.1 days of flow at the anticipated nominal 190-gpm dewatering rate. The second pond, designated the Surge Water Pond (also known as the North Recycled Water Pond), was designed to 1) receive overflow from the Recycled Water Pond, 2) receive low-pH water from the underground sumps, 3) operate as the primary pond when the Recycled Water Pond is out of service for maintenance, and 4) provide additional water storage capacity if needed.

The Recycled Water Pond has dimensions of approximately 220 feet long, 120 feet wide, and 10 feet deep. The pond is located with the long dimension in an east-west alignment. The pond sides are constructed with an average slope of 3H:1V and the base of the pond is graded to a sump located at the east end. The one textured 60-mil HDPE liner was placed on at least 12 inches of compacted fine-grained bedding material. Overflow from the Recycled Water Pond is diverted to the Surge Water Pond through a pair of 12-inch-diameter HDPE pipelines placed within an HDPE boot located approximately 1-foot below the pond crest.

For water evacuation purposes, the Recycled Water Pond and the Surge Water Pond are each fitted with a 4-inch diameter submersible pump placed in a wet well, constructed at the sump end of each pond. The wet well is fabricated into the bottom of a 10-inch diameter HDPE riser pipe placed along the corner valley of the pond.

The 4-inch diameter evacuation pipeline for each pond reports to a valve box where the clarified water is conveyed to the Utility Water Tank via a 6-inch diameter HDPE pipeline.

The single-lined Surge Water Pond was originally constructed with similar shape, size, and design as the Recycled Water Pond, and is located immediately north of the Recycled Water Pond. However, an EDC was submitted in September 2014 to modify the Surge Water Pond for the purpose of creating new Stormwater Collection Pond #2 to contain potentially acidic stormwater generated in the northern portion of the East Pit. The EDC included the conversion of the west half of the original Surge Water Pond into the new double-lined Stormwater Collection Pond #2, and retention of a modified single-lined Surge Water Pond in the east half of the original Surge Water Pond footprint. The modified Surge Water Pond had a capacity of approximately 0.55 million gallons with a minimum 1-foot freeboard, had 2.5H:1V side slopes, and was to be constructed with a 60-mil HDPE liner.
To address the potentially acidic fluid in the stormwater collection ditch located in the northern portion of the East Pit, a schedule of compliance item in the 2018 Permit required an engineered design addressing the acidic stormwater to be submitted to the Division for review by 25 June 2018. As a result, it was proposed for the overburden stockpile to be relocated to the southwestern region of the WRSF (WRSF Expansion Area 9A). Before the stockpile could be relocated, the east highwall of the East Pit started showing signs of instability after an above average rainfall season. It was reported to the Division that the overburden stockpile was acting as a buttress to the East Pit highwall and removal of the stockpile cannot be conducted safely and would likely accelerate the instability. As a result, Klondex pumps collected fluid to the de-Silting plant and added crushed dolomite to the water collection ditch at the toe of the stockpile.

Dewatering Water Management System – Utility Water Tank: The Utility Water Tank measures approximately 12 feet in diameter, 14.5 feet high, and has an approximate 11,000-gallon capacity. The tank is constructed of UV-stabilized polyethylene and placed on a compacted aggregate base foundation. Depending on its quality, water from the Utility Water Tank is re-used in operations for activities such as underground excavation, diamond drilling, equipment washing, and road dust control. The management of discharge water to the rapid infiltration basins (RIBs) is not authorized by this Permit, but is permitted separately under Water Pollution Control Permit NEV2003114.

Dewatering Water Management System - Reverse Osmosis Plant (Ceased Operation in 2010): Low-pH water in-flow, associated with the Tertiary volcanic rocks penetrated in the upper portion of the decline, was encountered during early development of the underground workings. The water management plan was modified to segregate the low-pH water from the higher quality water penetrated in the lower portion of the decline by constructing a separate collection sump and discharging the low-pH water via a 4-inch diameter HDPE pipeline directly to the

Surge Water Pond for treatment through a RO plant installed as a test facility in July 2006. Treated water from the RO plant was discharged to the Recycled Water Pond. Reject water was returned to the Surge Water Pond for additional treatment through the RO circuit.

The RO Plant was added to the Permit as a permanent component as an EDC modification approved by the Division in January 2008. The RO Plant had the ability to handle a wide variety of feed conditions, including but not limited to, basic or acidic pH adjustments, solids removal, metals removal, polish filtration, and full reverse osmosis that can produce an ultra-pure (permeate) water product meeting drinking water standards. The front-end filtration portion of the RO Plant was capable of treating up to 250 gpm, and the final RO end of the plant was capable of treating 100 gpm to produce approximately 85 gpm ultra-pure water.

The RO Plant had not been operated since 2010 and was not included in the acquisition by the current Permittee in October 2016. Without the RO Plant and through the use of the de-silting plant which includes pH adjustment, the Permittee is still able to maintain a water quality that meets Profile I reference values for discharge into the RIBs, and the solution collected in the Waste Rock Collection Sumps is shipped off-site. Further plans to bring a treatment facility into the operation would require the applicable permitting modification and fee.

Proposed Underground Dewatering Water Management System: The underground production stopes are located along veins within the VininiFormation. Groundwater in the Vinini Formation appears to be recharged from the Tuscarora Mountains to the northeast with flow to the southwest. Groundwater within the Vinini Formation occurs within, and is transmitted through, fracture systems within the rock mass. As mining has progressed, greater groundwater inflows have been experienced in areas where the Vinini quartzite unit is encountered in the underground workings, possibly due to brittle fracture.

Based on the original hydrologic testing and modeling performed in preparation for development of the exploration and bulk testing decline and underground workings, the predicted range of groundwater inflows into the decline prior to development was 335 to 385 gpm and the dewatering management facilities were designed to manage these anticipated peak flows. At the time of the 2008 renewal application, the underground workings had extended beyond the limits modeled and the average inflow rate was approximately 450 gpm. Steady-state simulations had indicated a dewatering rate of 580 gpm would maintain the groundwater elevation at 5,000 feet AMSL and a rate of 730 gpm would maintain the groundwater elevation at 4,700 feet AMSL. Pumping rates of 875 gpm and 1,165 gpm were needed to lower the groundwater elevation 100 feet over periods of 130 and 60 days respectively. Consequently, the Permittee proposed construction of an underground dewatering system at the time of the 2008 renewal. A 2018 Permit schedule of compliance item required submittal of final engineering designs to the Division for review and approval, and Permit modification, prior to construction of any system. With the new groundwater conditions under investigation, the proposed underground dewatering system is obsolete and the schedule of compliance item was deleted in the 2023 Permit Renewal.

Based on the updated 2020 hydrologic testing and modeling the average inflow rates between mid-2014 through 2019 have typically ranged between approximately 200 to 250 gpm. Simulated seepage rates for the Hollister Mine and the Hatter Expansion area ranged from approximately 370 to 760 gpm from 2020 to 2024. The maximum simulated drawdown in 2024 is approximately 660 feet with the elevation range of planned underground development at the Hollister Mine is between approximately 3230 ft and 5600 ft North America Vertical Datum of 1988 (NAVD88). These data do not include the inflow of water from the unexpected aquifer discovered during the Hatter drift exploration (above).

The proposed conceptual underground dewatering system, including all wells, pumps, pipelines and tanks, would be self-contained and installed to prevent groundwater contact with the actual underground workings, equipment, or groundwater that has entered the workings during mining activities. The underground dewatering wells would average 300 feet in depth with 6-inch diameter casings and be equipped with dedicated submersible pumps. Each well would have a pumping capacity of 50 to 200 gpm. The entire underground system would be designed to pump at an average sustained rate of 900 to 1,000 gpm, although actual pumping rates would vary with the depth of the workings.

Water from the underground dewatering system would be pumped from the wells by dedicated pipelines to a central underground storage facility to be located near the western end of the main drift. A single pipeline would be routed up the west “escapeway” raise to convey dewatering water from the underground storage facility to the surface and then transferred by gravity through a buried pipeline for discharge either directly to Little Antelope Creek through a concrete energy dissipation structure or through a treatment plant prior to approved discharge to the creek. Because Little Antelope Creek was identified as a water of the U.S. by the Army Corps of Engineers in 2004, either scenario would require approval of a National Pollutant Discharge Elimination System Permit. Alternatively, the Permittee had proposed investigating seasonal use of the water for private agricultural irrigation purposes or discharge to the permitted rapid infiltration basins (RIBs) (Hollister Development Block Infiltration Project, NEV2003114).

Surface Water Management System: Surface water diversion structures, including ditches and slot drains, HDPE-lined Stormwater Collection Pond (SCP), and facility components are designed to control run-off from the 100-year, 24-hour storm event and contain the 25-year, 24-hour storm event.

The original, unlined Storm Water Basin, installed by NMC as part of the original closure design, was replaced as part of a minor modification approved by the Division in January 2008, with a single HDPE-lined SCP. The SCP, shaped roughly like an isosceles triangle in plan view, is located in the southwest corner of the East Pit, at the west limit of the WRSF. The SCP design capacity is approximately 100,000 cubic feet (about 750,000 gallons and more than three times the capacity of the original pond), excluding a 2-foot freeboard. The SCP is designed to contain the 25-year, 24-hour storm event volume and convey the 100-year, 24-hour storm event run-off excess volume by gravity to the Recycled Water Pond via three 12-inch diameter SDR 21 HDPE pipelines placed in an overflow channel routed around the west edge of the WRSF. The SCP liner system is constructed of a single layer of 60-mil textured HDPE placed over a protective layer of 8-ounce geotextile placed on native or granular fill material.

Transwood Temporary Ore Storage Facility (Never constructed): An EDC was approved by the Division in April 2008 that authorized construction of the Transwood Temporary Ore Storage Facility. The facility, located on the west side of the town of Winnemucca, has rail siding access to the adjacent Union Pacific Railroad tracks. The facility provides secure temporary storage of the high-grade ore within engineered containment prior to loading into rail cars or over-the-road trucks for transport to processing facilities.

The facility is comprised of an 8-inch thick, steel rebar-reinforced, concrete pad measuring approximately 50 feet by 200 feet in plan. A steel rebar-reinforced stem wall, 1-foot thick by 2 feet high, provides continuous containment on the two narrower sides of the pad and along one longer side. Waterstop material is installed between all pad and stem wall joints. The pad floor slopes toward the longer stem wall, at approximately 2% grade, and at approximately 1% from each of the narrower sides to a grated, 4-foot square by 4-foot deep (approximately 475 gallon capacity) subgrade solution collection sump located centrally along the stem-walled long dimension of the pad. The other long pad dimension, without a stem wall, provides ramp access to the stockpile and is equipped with a low bump-curb to prevent run-on of stormwater from the adjacent area onto the pad.

The stored ore is covered with heavy duty covers anchored to the outside of the stem walls. The covers provide additional security, reduce the potential for wind-blown migration of fines material, and route precipitation away from the ore and the pad to minimize meteoric inputs to the solution collection sump. The Permit requires reporting of the quantities of ore shipped to the facility during the quarter and the tonnage stockpiled at the end of the quarter.

C. Receiving Water Characteristics

The Hollister Development Block Project is located within the Butte Creek Range, north of the Sheep Creek Range, and west of the Tuscarora Mountains. The Project is situated within the regional Humboldt River drainage basin. No sources of drinking water are located within the Project area.

Perennial surface waters in the Project area include Willow Creek, located approximately 8 miles north, and Antelope Creek, located approximately 4 miles to the south. The Project is located in the upper reaches of the Little Antelope Creek drainage basin. Little Antelope Creek, an intermittent stream that flows in response to major storm events and snow melt, is a tributary to Antelope Creek and passes approximately ¼ mile east of the Project area in a north-south direction. Antelope Creek discharges into Rock Creek, located approximately 10 miles west, which eventually discharges to the Humboldt River.

Springs in the project area, none of which are related to the aquifer systems at the project site, include Ivanhoe Spring, Buttercup Spring, and Antelope Spring. Ivanhoe and Buttercup springs are located approximately 3 miles northwest of the Project site, exhibit perennial flow, and appear to originate from recharge to the Big Butte flow dome complex. Antelope Spring is located about 1 mile northwest of the site, is ephemeral, and exhibits flow in response to snowmelt and major storm events. Hydrologic information indicates none of the springs are related to the aquifer at the project site.

Although not hydraulically linked to the groundwater system at the project site, Antelope Spring was sampled during a period of flow to obtain local surface water quality background data. When compared to the Division Profile I reference values, the analytical results indicate generally good water quality except for slightly elevated values for aluminum, lead, and manganese.

A total of seven boreholes were drilled to determine aquifer properties and to provide hydrogeologic data within the facility area. Three of the boreholes, BH-01, BH-02, and BH-04, were completed as piezometers to monitor groundwater levels. In the area of the proposed decline, groundwater occurs under unconfined to semi-confined conditions with a potentiometric surface elevation of approximately 5,400 to 5,500 feet AMSL. The decline portal is at an elevation of 5,555 feet AMSL and the potentiometric surface at the portal is approximately 5,500 feet AMSL.

Groundwater quality samples were collected from five boreholes within the facility area. Analytical values meet all Division Profile I reference values except for three samples with slightly elevated manganese values (0.219, 0.375, and 0.12 milligrams per liter (mg/L)), one sample with a slightly elevated iron value (1 mg/L), two samples with slightly elevated arsenic values (0.0306 and 0.0155 mg/L) and two samples with elevated antimony concentrations (0.0743 and 0.0187 mg/L).

Prior to the construction of facilities at the Hollister Development Block Project, a new well to monitor water quality was drilled south-southeast of the proposed WRSF, downgradient along the north-northwest to south-southeast groundwater gradient trend in the Tertiary volcanic rocks. Groundwater in this area lies at an elevation of approximately 5,425 feet AMSL. The first well, DGW-1, was abandoned in early February 2005, due to uncertainty that the drillhole was completed within the target stratigraphy due to loss of circulation during drilling, a low recharge rate, and generally poor water quality (Profile I exceedances of aluminum, arsenic, beryllium, cadmium, iron, manganese, and thallium with a low pH ranging from 3.2 -5.0 standard units (s.u.)) thought to be associated with contamination by waters along the contact with the underlying Vinini Formation.

A replacement well, DGW-1R, was completed to the northeast of DGW-1 on 14 February 2005, and sampled a week later. Very poor water quality for this drill hole (Profile I exceedances for aluminum, arsenic, beryllium, cadmium, iron, manganese, and thallium with a low pH ranging averaging 3.5 s.u.) has led to speculation that degradation related to previous mining activity in the East Pit (NMC) may be occurring and is being monitored by NMC with oversight by the Closure Branch of the Bureau of Mining Regulation and Reclamation.

Monitoring data shows that water quality in DGW-1R is still poor; aluminum, antimony, arsenic, beryllium, cadmium, fluoride, iron, magnesium, manganese, nickel, sulfate, thallium, total dissolved solids, and zinc concentrations regularly exceed Profile I reference values with a pH ranging from 3.3 to 3.9 s.u.

The Permit monitoring related to the Waste Rock Storage Facility is considered adequate for compliance purposes until the issue is resolved. However, in response to an appeal of the 2008 renewal of the Permit, three additional downgradient monitoring wells, DGW-2A, -2B, and -2C, were installed with discrete screen depths in an attempt to better define water quality within three lithologic horizons identified as ‘historic waste rock,’ ‘Tertiary volcanics,’ and ‘Vinini Formation,’ respectively. A 2018 Permit Schedule of Compliance item required completion and commissioning of the new wells by 31 August 2009. Due to delays in equipment availability and difficult drilling conditions, the wells were completed in September 2009.

Initial water quality in DGW-2A (the historic waste rock zone) presented iron and manganese concentrations exceeding Profile I reference values. The well has been dry since the 4th Quarter of 2018, except for the 3rd Quarter of 2019. Data just prior to the well going dry regularly exceeded Profile I reference values for iron and manganese.

Initial water quality in DGW-2B (the tertiary volcanics) presented manganese and sulfate concentrations exceeding Profile I reference values. Since the initial sample in 2009, the well regularly exceeds Profile I reference values for iron, magnesium, manganese, pH, sulfate, and TDS. In general, water quality has remained constant since the well was constructed.

Initial water quality in DGW-2C (the Vinini formation) also presented manganese and sulfate concentrations exceeding Profile I reference values. Since then, the well regularly meets Profile I reference values with occasional exceedances in Profile I reference values for arsenic, iron, and manganese.

An upgradient monitoring well, W-E-1, is located between the West and the East pits to monitor any groundwater communication along the regional gradient in the tertiary volcanics from the West Pit to the East Pit. This well initially exhibited water quality meeting Profile I with the exception of arsenic, manganese, and iron. It was mostly dry from 2013 to 2017 but indicated degradation had occurred from second quarter of 2017 to the fourth quarter of 2019, with exceedances of Profile I reference values for aluminum, arsenic, beryllium, cadmium, chromium, fluoride, iron, manganese, pH, sulfate, and TDS. Between the fourth quarter of 2019 and the first quarter of 2021 the well regularly exceeded Profile I reference values for arsenic, iron, manganese, and pH. The well was reported dry from third quarter 2021 through the fourth quarter 2022. Although this well was drilled to monitor water quality flowing from the West Pit to the East Pit, the 2008 expansion of the WRSF was expanded towards and sits directly adjacent to W-E-1. The source of the degradation is uncertain at this time and is being investigated.

Eight additional wells were required for installation by August 2018 as a schedule of compliance item with the 2018 renewal to monitor each aquifer (the Tertiary Volcanics and Vinini Formation). The wells would be installed in pairs at 4 locations to monitor the shallow Volcanics Formation and the deeper Vinini Formation. Six of the eight wells (or 3 well pairs) were constructed in October and November of 2019. Due to BLM and Tribal coordination efforts, well installation of the remaining two wells (BH-12-D and BH-12-S) have been postponed. A schedule of compliance item was updated in the 2023 renewal to install these two monitoring wells by December of 2024. The schedule of compliance date was modified in the 2018 renewal.

Initial data from well BH-13S, targeting the Tertiary Volcanics Formation, is unavailable as the well is dry. Water pressure measured at the base of the volcanics unit by piezometer P1 in the adjacent well BH-13D indicates that the entire 600-foot-thick sequence of volcanic rocks is dry at that location. Initial data from MW-H-D is also unavailable due to equipment malfunctions with the pump. It was reported to the division the equipment difficulties are suspected to be attributed to the likely high pH in the well. Initial data from the monitoring wells BH-13-D and MW-G-S regularly exceed Profile I standards for antimony, arsenic, and pH. Currently well BH-13-D does not have an operating pump. Monitoring Well MW-H-S meets Profile I standards for pH; however, it regularly exceeds standards for antimony and arsenic. The pump in MW-H-S is currently not operational. Finally, BH-G-D exceeds Profile I for pH and arsenic. The high pH values reported in the newly installed wells was reported to the Division as suspected cement leakage.

An investigative report and Corrective Action Plan (CAP) for the degradation in the tertiary volcanics (wells W-E-1, DGW-1R, and DGW2B), were required by November 2019 as a schedule of compliance item in the 2018 renewal. An extension was granted for the submittal to allow for the completion of the above monitoring wells. An initial assessment (Phase I) was submitted to the Division in April of 2020 and consisted of the investigative report, identification of potential CAP alternatives, and installation of new monitoring well pairs (above). At the time of the submittal data from the newly installed well pairs was not available. During a presentation to the Division on 3 June 2021, it was reported that there was a potential for concrete leaching occurring in the newly installed well pairs.

Phase II of the CAP development consisted of the rehabilitation of monitoring wells BH-13-D, MW-H-S, MW-G-S, and MW-G-D in July of 2021; hydraulic testing on monitoring wells MW-H-S and MW-G-S in August 2021; and conducting a modeling study of groundwater-flow paths. Rehabilitation of the above referenced wells, by alternating injection and airlift pumping each well, was attempted. After the rehabilitation attempt the wells continued to show elevated pH levels. Isotropic and chemical sampling was completed in the second and fourth quarters of 2022. Samples are currently being analyzed and results will be reported to the Division. Eleven samples were attempted from the WRSF sumps and seven wells, ultimately seven isotope samples were successfully collected in the second quarter of 2022 and ten isotope samples were successfully collected in the fourth quarter of 2022. Samples will be compared with samples taken from the Tertiary Volcanics Formation to compare signatures from fluid generated by the Hollister Developmental Block and water from the monitoring well. Currently, the extent of degradation of the Tv groundwater is not fully defined and final CAP recommendations have not been developed. Results from this investigation are detailed below.

Due to difficulties installing the new monitoring well pairs and backlog in the Division workload, progression of the CAP had stalled. A schedule of compliance item in the 2023 permit renewal requires the Permittee to provide the Division a summary of the status of the investigative report and CAP in order to continue moving forward on the investigation and recommendation development.

Data from ground dewatering suggests a limited hydraulic connection between the Tv units and the Pz aquifer. Data suggests the East pit is a localized area of enhanced recharge of the exposed Pz rocks in the pit floor. This oxidation creation/release is located within the shallow surface materials of activate mining areas and in waste-rock piles that experience seasonal water level fluctuations. Bicarbonate alkalinity can act to buffer acid production in the system. Ephemeral stream flows occur in the buried pre-mining drainage channels below the South and East Overburden Stockpiles during above-average precipitation and act as localized source of recharge to the near-surface groundwater. Degradation of DGW-1R and DGW-2B could be influenced by seepage into the Tv units from unlined waste rock, including the former ephemeral channel south of the East pit. Degradation of DGW-1R predates the issuance of NEV2003107 indicating the preexistence of shallow poor-quality water in the vicinity of the existing East Pit. Due to construction techniques of the WRSF it is unlikely that it is contributing to the poor water quality in either of the nearby wells.

Early hydrogeologic studies suggested that groundwater could be expected to enter the underground workings at rates between 35 and 440 gpm with an average rate of 180 gpm. The water management facilities and separate rapid infiltration designs submitted with the original application were adequate to maintain the water balance for the anticipated average and peak water in-flows from the underground workings plus meteoric water that will enter the system. As mining has progressed, the Permittee has recognized that greater volumes of water will need management. In order to address the issue and support full scale mining at greater depth, the Permittee is designing an underground dewatering system for Division review and approval and is evaluating water management alternatives including, but not limited to, surface discharge to Little Antelope Creek, seasonal use of dewatering water for private agricultural irrigation purposes, and additional disposal through rapid infiltration basins. Any expansion or modification of the water management system will require Division review and approval.

This Permit authorizes no discharge. Profile I parameter maximum concentration limits have been established in the Permit based on pre-development background receiving groundwater characterization and are identical to those in Permit NEV2003114 for the rapid infiltration basin discharge and monitoring wells.

D. <u>Procedures for Public Comment</u>

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate and close, subject to the conditions within the Permit, is being published on the Division website: https://ndep.nv.gov/posts/category/land. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date the public notice is posted to the Division website. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State or intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the

Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

E. **Proposed Determination**

The Division has made the tentative determination to issue the renewed Permit.

F. **Proposed Limitations, Schedule of Compliance, Monitoring, Special Conditions**

See Section I of the Permit.

G. **Rationale for Permit Requirements**

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

The primary method for identification of escaping process solution will be placed on required routine monitoring of leak detection systems as well as routinely sampling downgradient monitoring well(s) and surface water. Specific monitoring requirements can be found in the Water Pollution Control Permit.

H. **Federal Migratory Bird Treaty Act**

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations 10, 15 April 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service (the Service) is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with State permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 2800 Cottage Way, Room

W-2606, Sacramento, California 95825, (916) 414-6464, for additional information.

Prepared by: Natasha Zittel, P.E.
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