

**KINROSS**

**Fort Knox**

**ANNUAL ACTIVITY REPORT  
for  
REPORTING YEAR 2017**



February 2018

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# 1. INTRODUCTION

Fairbanks Gold Mining, Inc. (FGMI), a wholly owned subsidiary of Kinross Gold Corporation, has prepared this annual report to comply with the conditions described in Section 11.b. of the Amended and Restated Millsite Lease ADL Nos. 414960 and 414961 and the ADEC Waste Management Permit 2014DB0002 Modification #1 for the Fort Knox Mine.

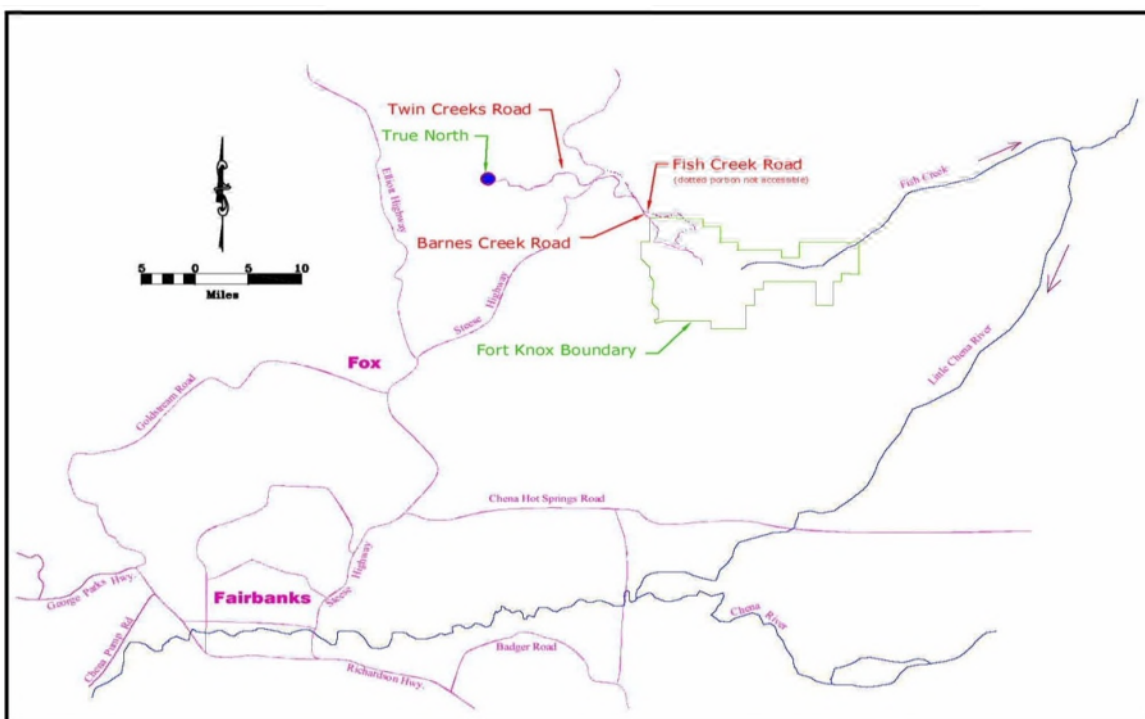
The Kinross Fort Knox mine includes the open pit mine, mill, tailings storage facility, water storage reservoir and the Walter Creek Heap Leach facility. Major reclamation activities at the True North Mine were completed in 2012. Post-closure monitoring and maintenance activities continue at True North. These facilities are located within the Fairbanks North Star Borough, approximately 25 highway miles northeast of Fairbanks, Alaska (Figure 1).



The milling and mining operations at Fort Knox continue to operate 24 hours a day, 365 days a year. As of the end of 2017, FGMI employed 627 people. Fort Knox produced 381,114 gold equivalent ounces in 2017.

This report describes the permitting, mining, milling, heap leach and reclamation activities during calendar year 2017 and planned activities for 2018.

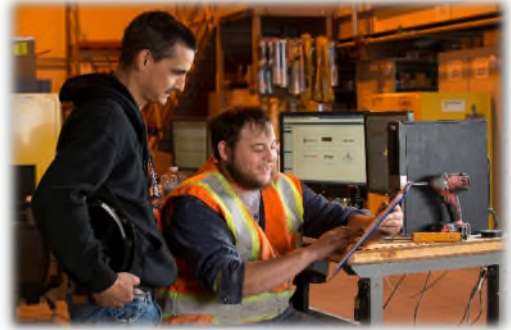
Figure 1. Facility Locations



## 2. SUMMARY OF ACTIVITIES

In 2017, Fort Knox had a range of activities underway in the areas of production, construction, and permitting. In summary, these activities included:

- Completed construction of Stages 6 and 7 of the Walter Creek Heap Leach Facility;
- Began construction of Stage 8 of the Walter Creek Heap Leach Facility;
- Completed the construction of the last 7 feet of the TSF Dam's 17-foot raise to elevation 1,557 feet above mean sea level (fmsl);
- Received approval for construction of the Barnes Creek Heap Leach Facility;
- Onsite land farming continued at the Yellow Pup Waste Rock Dump for the 2013 Fuel Island decommissioning material from 2015;
- Received approval and completed construction of the upper access to the Walter Creek Heap Leach Facility from the upper Barnes Creek Waste Rock Dump area;
- Mining of Phases 7 & 8 ore continued;
- Received approval and began construction of a reverse osmosis (RO) treatment system for the intercept/seepage water system;
- Initiated TSF Closure Panel evaluation, and;
- True North reclamation completed in August 2012 and is under post-closure monitoring.



In 2018, the major activities planned include:

- Continue mining of Phases 7 & 8 with the start of the East Wall portion of Phase 8;
- Perform 3<sup>rd</sup> party audit specified by the Waste Management Permit 2014DB0002 Modification #1;
- Obtain approval for the Phase 9 pit expansion;
- Complete construction of Stage 8 of the Walter Creek Heap Leach Facility;
- Begin construction of Stages 9 and 10 of the Walter Creek Heap Leach Facility;
- Obtain approval for the Fish Creek East Waste Rock Dump;
- Obtain approval for the expansion of the Barnes Creek Waste Rock Dump;
- Obtain approval for the expansion of the Yellow Pup Waste Rock Dump;
- Obtain approval for including the 709-acre parcel G to the mine lease;
- Begin construction of the Barnes Creek Heap Leach Facility, and;
- Complete construction of the RO treatment system for the intercept/seepage water system.

## 3. PERMITTING ACTIVITIES

The following is a list of the approved plans and permits issued to FGMI in 2017:

- In January, ADNRC approved the Plan of Operations amendment for the Heap Leach Expressway;
- In March, ADNRC Dam Safety issued Certificate of Approval to Operate a Dam for Walter Creek Heap Leach Pad Dam (NID ID#00310);
- In April, ADNRC issued seasonal burning permit F96240;
- In May, Alaska Department of Revenue issued the annual Mining License;

- In May, ADNR issued approval for construction of the Barnes Creek Heap Leach Facility;
- In May, ADEC issued Modification #1 to the Waste Management Permit #2014DB0002 for the installation of the Barnes Creek Heap Leach facility;
- In May, ADEC issued Air Quality Control Operating Permit AQ0053TVP03;
- In June, ADNR issued Certificate of Approval to Operate a Dam for the Fort Knox Tailings Dam (NID ID#AK00212);
- In July, ADEC issued Modification #1 to APDES Permit AK0053643 for electronic reporting requirements;
- In July, ADNR Dam Safety issued Certificate of Approval to Construct a Dam for the Barnes Creek Heap Leach Dam (NID ID#AK00315);
- In September, ADNR acknowledged receipt of the Fort Knox Mine Reclamation and Closure Plan (F20149852RCP) Irrevocable Standby Letter of Credit No. S18572/260177 for \$97,032,274.00;
- In October, ADNR Dam Safety issued Temporary Certificate of Approval to Operate a Dam for Walter Creek Heap Leach Pad Dam (NID ID#AK00310);
- In November, ADNR approved Plan of Operations amendment for the Powder Magazine relocation;
- In November, ADNR issued Certificate of Appropriation LAS 13986 for 5,806.57 acre feet per year;
- In November, ADNR Dam Safety issued Certificate of Approval to Modify a Dam for the Walter Creek Heap Leach Pad Dam (NID #AK00310) through Stage 10 configuration;
- In November, ADNR issued Temporary Certificate of Approval to Operate a Dam for the Walter Creek Heap Leach Pad Dam (NID ID#AK00310);
- In December, Bureau of Alcohol, Tobacco, Firearms, and Explosives issued letter of timely application to renew Federal explosive license/permit (File #9-AK-12031), and;
- In December, ADNR issued Appropriate Water LAS 28161 for 13,255 acre feet per year;

The following is a list of the planned permitting activities for FGMI in 2018:

- Submit Air Quality Title I Permit AQ0053MSS004 Owner Request Limit permit modification application;
- Submit lease amendment for inclusion of the 709-acre Parcel G property;
- Submit Plan of Operations amendment for clearing and grubbing of land needed for underliner material for the Walter Creek Heap Leach Facility construction through Stage 10;
- Submit Plan of Operations amendments for constructing causeways on the TSF for increasing TSF capacity;
- Submit Plan of Operations amendment for construction of the TSF dam spillway;
- Submit application for reroute of RS644 associated with 709-acre Parcel G property;
- Obtain approval for the Phase 9 pit expansion;
- Obtain approval for the Fish Creek East Waste Rock Dump;
- Obtain approval for the expansion of the Barnes Creek Waste Rock Dump, and;
- Obtain approval for the expansion of the Yellow Pup Waste Rock Dump.

## 4. LAND STATUS

The project area encompasses approximately 7,982 acres, of which there are no federal lands. The project area includes the Amended and Restated Millsite Lease, Upland Mining Lease, private land. The Amended and Restated Millsite Lease contains approximately 5,828 acres of State of Alaska land. FGMI private land holding is approximately 2,154 acres, which includes the private land of the Upland Mining Lease (approximately 1,179 acres).

## 5. SAFETY

### PEOPLE

Putting people first is a Kinross core value, supporting a belief that we must never, under any circumstances, compromise on safety. Health and Safety is our number one priority – among employees, contractors, suppliers and the communities in which we operate. Kinross is committed to applying industry standards, best management practices, responsible science and meeting regulatory requirements.



The Fort Knox mine is subject to all the Kinross corporate and Kinross Fort Knox health and safety policies. These policies commit Kinross employees and contractors to be accountable for safe project execution, commissioning and eventual operation. The policies are designed to prevent harm to people, processes and property and provide the minimum standard to which the project will be executed.

Since early infrastructure work was completed twenty years ago, all major health and safety procedures have been developed, are in practice and have matured to the world class safety culture we have today.

As the mine is advanced, the risk profile and appropriate mitigation plans are continually developed to a higher level of detail and, in many cases, implemented in the same detail as other projects of the past. Hazard identification and risk assessments are undertaken at all of our projects milestones to ensure that risks are managed at the earliest possible stage.

The Administration Group (Warehouse, Health & Safety, Environmental, Accounting, Human Resources, and Technical Services) has not had a loss time incident (LTI) since April 2005. In 2017 the Mine Operations Department has worked over one million man hours since their last loss time incident (LTI).

All employees within the Fort Knox Team; whether Exempt or Non-Exempt, are a part of the safety culture. Behavioral based safety



programs such as SOS (See It, Own It, Solve It) and employee direct engagements using the DuPont STOP audit process allows us to be aware of our own safe behavior along with our coworkers. Fort Knox's own internal Living Our Values Awards (Gold Pan Awards) during the Holiday Season helps us remember our core values while also recognizing outstanding employees. A few other safety programs used mine wide include Field Level Risk Assessment (FLRA), Job Hazard Analysis (JHA) and Permit to Work (PTW). PTW programs include confined space entry, hot work, working and heights and trenching, excavation and ground penetration.

## **INTERNATIONAL CYANIDE MANAGEMENT CODE**

Kinross Fort Knox is a signatory company of the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (Code). The Code's development occurred in the early 2000s and implemented in 2005 for safe and responsible management of cyanide by an international multi-stakeholder committee under the auspices of the United Nations Environment Program (UNEP) and is administered by the International Cyanide Management Institute (ICMI). As a signatory company, Fort Knox is required to meet the Code's Principles and Standards of Practice criteria, which is verified by strict independent third-party auditing. Fort Knox achieved Code certification in February 2008, received recertification in September 2011 and most recently February 2015. Fort Knox certification summary audit reports may be found at <http://www.cyanidecode.org>.

## **MINE ACCESS**



FGMI continues to maintain the mine access roads from the Steese Highway to Fort Knox and True North (Figure 1). The road surface is graded to insure a smooth running surface and proper drainage. During the winter months, the Fort Knox road is kept free of snow and is sanded as necessary to maintain safe operating conditions. The True North road is plowed for snow as needed during the winter months since access to the site is not routinely required. In the summer months, FGMI uses calcium chloride and water for dust

suppressants on the Fort Knox access and mine-site roads (Figure 2). These measures have limited the amount of fugitive dust on these roads.

FGMI Security continues to patrol the mine site and access roads to ensure the safety of our employees, contractors, guests, and the public. Access is limited based on need and function. Safety training is tailored in a similar manner.

Figure 2. Local Roads and Mine Facilities



## ***Recreational Trails***

During the initial Millsite Lease application process a series of public meetings were held to identify trail systems that would potentially be affected by mining activities. In 2011, Fort Knox initiated meetings with ADNR Trails and Easement Section to start the process of rerouting trails for future use. Meetings with ADNR continued in 2013. A formal application was submitted to the Trails and Easement Section with an alternate route in 2013. As part of this process, a public notice and comment period occurred in 2014. In 2015, ADNR executed the entry authorization for the approved Administrative Reroute of RST 644 Cleary Summit to Gilmore Dome Trail.

## **6. MINE OPERATIONS**

### **PIT PRODUCTION**

In 2017, FGMI mined 60.45 million tons of ore and waste from the Fort Knox pit with an average production rate of 165.6 thousand tons per day (Table 1).



Table 1. Fort Knox Annual Mining Rates

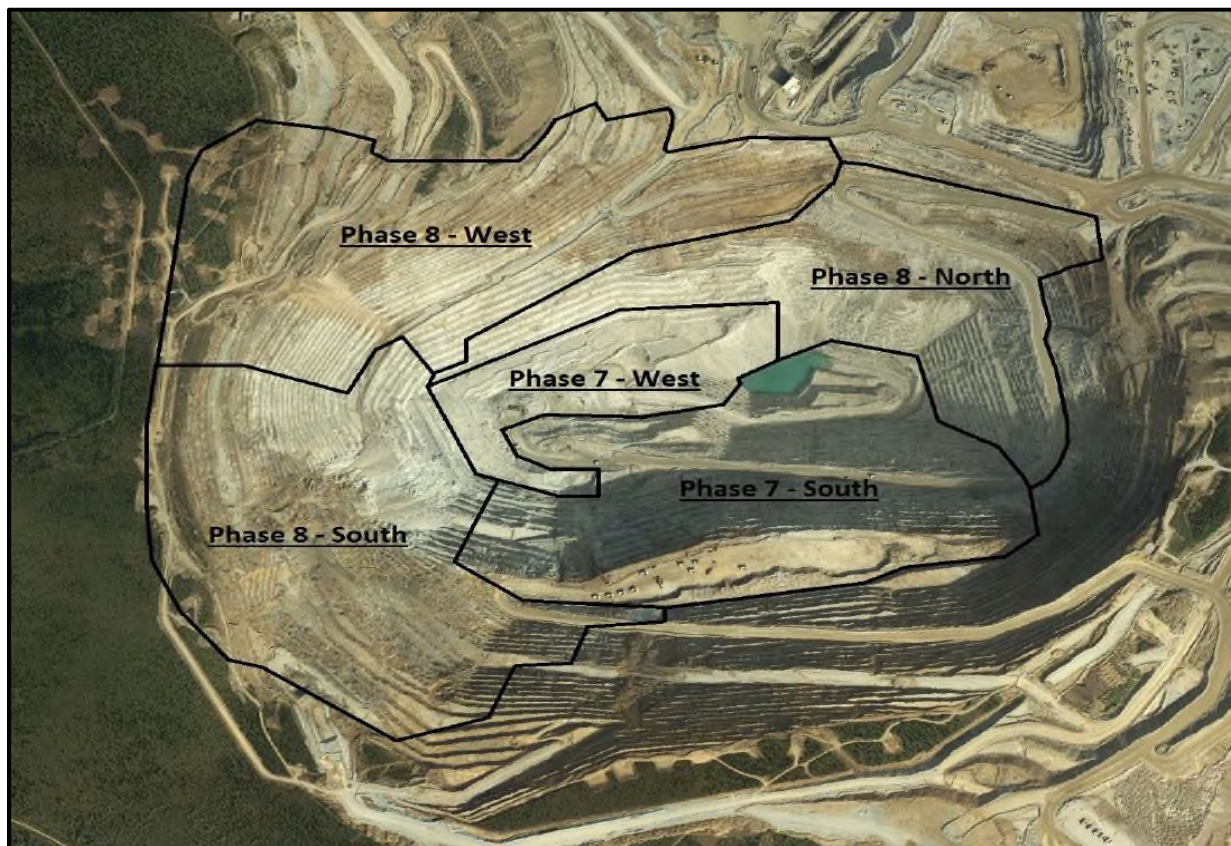
<b>Year</b>	<b>Mill Ore (Million Tons)</b>	<b>Transition Grade Ore (Million Tons)</b>	<b>Leach Grade Ore (Million Tons)</b>	<b>Waste (Million Tons)</b>	<b>Total (Million Tons)</b>
1996	.96	.36	0	15.36	16.68
1997	12.57	4.88	0	14.93	32.38
1998	13.83	5.27	0	14.19	33.29
1999	14.10	4.09	0	12.16	30.35
2000	15.51	2.20	0	17.89	35.60
2001	12.09	1.24	0	12.62	25.95
2002	11.73	.86	0	12.00	24.59
2003	11.08	2.09	0	17.43	30.60
2004	10.80	6.80	0	24.09	41.69
2005	13.23	5.86	0	44.16	63.25
2006	12.39	3.68	0	35.00	51.07
2007	11.71	10.31	0	23.92	45.94
2008	12.78	3.82	13.3	16.40	46.30
2009	11.96	4.11	12.70	20.03	48.80
2010	11.95	1.35	8.52	20.59	42.41
2011	3.96	.13	4.76	25.70	34.55
2012	10.42	3.19	14.98	34.53	63.12
2013	9.38	4.88	9.59	39.43	63.28
2014	6.83	4.94	4.64	32.83	49.24
2015	10.94	3.35	10.80	35.77	60.86
2016	10.93	7.38	16.69	30.24	65.24
2017	8.95	4.77	15.33	31.40	60.45
<b>Total</b>	<b>238.1</b>	<b>85.56</b>	<b>111.31</b>	<b>530.67</b>	<b>965.64</b>

Mining operations continue 24-hours a day, 365-days per year at the Fort Knox Mine. Ore and waste are mined using standard drilling and blasting techniques with shovel and haul truck fleets to move the material. Blast holes are sampled and assayed for production grade control purposes and material is hauled to the rock dumps, primary crusher, heap leach, or low-grade stockpiles depending on grade.

In 2015, mining within the Fort Knox open pit occurred in Phase 7 and Phase 8 (Figure 3). Phase 7 stripping commenced in the 4<sup>th</sup> quarter of 2008. Stripping for phase 7 continued into 2012 before sustained ore was achieved.

Mining activities continued in 2017 for the final pit layback area known as Phase 8. This phase of the pit delivered ore to the mill and the leach pad beginning in 2015 and will continue until mining activities end in 2019.

Figure 3: Fort Knox Pit Phases



## DEWATERING

As of the end of 2017, the dewatering system is comprised of 37 pit dewatering wells and three Fish Creek wells (located north and out of the pit in the Barnes Creek/Fish Creek drainage). Through the course of 2017, two wells (DW-237 and DW-276) were lost due to internal failures. Two wells (DW-214 and DW-242) were mined out. Seven new wells were added; three in the west wall (DW-416, DW-420, and DW-445), one in the east wall (DW-449), one in the south wall (DW-421), one in the north wall (DW-430), and one in the pit bottom (DW-449).

The average pumping rate from the dewatering system in 2017 was 2,096 gpm, which was 1% lower than 2016. Approximately 68% of dewatering flow was pumped to the tailings impoundment. Approximately 14% was pumped directly from the Fish Creek wells to the Mill. Approximately 18% was discharged to the freshwater reservoir. Total Fish Creek production for the year was 665,569,000 gallons. Pit production was 436,299,000 gallons. Fish Creek flow to the Mill was 153,942,000 gallons.

Select piezometers are monitored weekly for changes in water levels and all piezometers are monitored quarterly.

Since the Tailings Storage Facility (TSF) design did not have capacity to contain all water until the end of mine life, an Alaska Pollutant Discharge Elimination System (APDES) permit application was submitted to the Alaska Department of Environmental Conservation (ADEC),

Division of Water in early 2012. ADEC granted FGMI an APDES permit in August 2012 and effective October 2012 to discharge non-process and non-contact groundwater extracted from pit dewatering wells into the Old Fish Creek Channel (Outfall 001) from which it will flow to the freshwater reservoir. Since receiving the APDES permit and until March 3, 2015, there had been no discharge of dewatering well water. Discharge of dewatering well groundwater that did not require treatment began on March 4, 2015. The APDES permit was administratively extended by ADEC.

On June 24, 2016, the reverse osmosis water treatment system for the dewatering well groundwater that requires treatment before discharge to Outfall 001 became operational. Discharge monitoring at Outfall 001 demonstrated compliance with all permit effluent limits throughout 2017.

The total dewatering well groundwater (treated and non-treated) discharged to Outfall 001 was 618 acre feet in 2017.

## 7. MILL OPERATIONS

Mill feed is first crushed to minus 6 inches in the primary gyratory crusher located near the Fort Knox pit and then conveyed to a coarse-ore stockpile located near the mill. The crushed material is conveyed to a semi-autogenous (SAG) mill. The SAG mill operates in open circuit and feeds two ball mills. The ball mills operate in closed circuit through cyclone packs. The cyclone packs regulate the size of material that is allowed to move beyond the grinding circuit. A gravity gold recovery circuit operates in conjunction with the grinding circuit. It consists of three Knelson concentrators.

Correctly sized material flows into a high rate thickener and then into leach tanks where cyanide is used to dissolve the gold. Activated carbon is used in the carbon-in-pulp circuit to absorb the gold from the cyanide solution. Carbon particles loaded with gold are removed from the slurry by carbon screens and are transferred to the gold recovery circuit. In this circuit, the gold is stripped from the carbon using a strong alkaline cyanide solution in conjunction with high temperature and high pressure. The gold is recovered from this solution by electro-winning, where it is plated onto a cathode. The gold is removed from the cathode mechanically and melted into doré bars for shipment to an offsite refinery for final processing.



Some hard ore of a critical size is rejected from the SAG mill in order to increase throughput. This material is crushed and stockpiled for use on the Walter Creek Heap Leach Facility. Mill tailings are discharged into the TSF below the mill. Table 2 displays a summary of the tonnage milled from November 1996 through December 31, 2017.

The mill continues to focus on operational improvements to increase throughput, recovery, efficiency and reliability.

Table 2. Fort Knox Annual Milling Rates

<b>Year</b>	<b>Mill Production (Million Tons)</b>
1996	0.77
1997	12.16
1998	13.74
1999	13.82
2000	14.99
2001	15.66
2002	15.26
2003	15.08
2004	14.59
2005	14.38
2006	14.84
2007	14.02
2008	15.11
2009	14.14
2010	14.56
2011	14.88
2012	14.55
2013	13.96
2014	14.92
2015	14.82
2016	14.57
2017	13.75
<b>Total</b>	<b>304.57</b>

The projected mill throughput for 2018 is approximately 11.03 million tons.

## 8. HEAP LEACH

The Walter Creek Valley Heap Leach Facility was brought into production in 2009. On October 13, 2009, ADNR issued a Certificate of Approval to operate the heap leach dam. On October 14, 2009, FGMI began filling the in-heap storage pond. In November 2009, FGMI had the first gold pour from heap leach production. In 2017, approximately 22.34 million tons of ore were placed on the heap leach. Since the loading of heap leach ore began in 2009, a total of approximately 215 million tons have been placed on the heap leach, and 1,000,000 ounces of gold have been produced.



In 2011, construction of Stage 3 of the heap leach pad began and its construction completed in 2013. The Stage 4 construction of the heap leach pad began in 2012 and was completed in 2014. The Stage 5 construction began in 2012 with clearing and grubbing, and construction was completed in 2015. The Booster Pump Station was constructed in 2015. Stage 6 clearing and grubbing occurred in

2015 and construction continued and was completed in 2017. Stage 7 construction began and was completed in 2017. Projected heap leach ore placement for 2018 is 21.53 million tons.

## **9. TAILINGS STORAGE FACILITY (TSF)**

The TSF consists of deposited tailings, decant pond, dam, seepage interception system, and the seepage monitoring system. The tailings depositional area is within the Fish Creek drainage and includes portions of the Walter Creek, Pearl Creek, and Yellow Pup drainages.

The TSF has three distinct ponds: the barge pond, north pond and south pond where the decant water pools. These ponds are located within the tailings deposition area upstream of the TSF dam. The barge pond is approximately 18 acres. The north pond fluctuates in size but covers an area that generally ranges from 300 to 400 acres. The south pond will fluctuate slightly, but should remain close to 245 acres. A bathymetric survey conducted in September 2017 showed the decant pond contains approximately 11,032 acre-feet of water. The increase in the pond's volume is attributed to the area's abnormal rainfall throughout 2014 - 2016. Water management activities continue to be evaluated and implemented [i.e., storm water control, dewatering well groundwater discharge (APDES Permit No. AK0053643)] to reduce the additional volume created by the abnormal precipitation events.

The TSF dam is approximately 4,600 feet long and has a crest height of 377 feet. It impounds all of the tailings generated by the mill. The TSF and the mill form a closed system for process water. Water used in the mill is pumped from the decant pond, and this process water is returned to the decant pond in the tailings slurry after the slurry has been processed to comply with cyanide threshold levels in accordance with the mine's Waste Management Permit.

### **TAILINGS DEPOSITION**

During the 2011 through 2017 construction seasons, tailings were deposited along the dam face by spigoting. The main tailings line ran along the upstream dam face at the 1,557 fmsl elevation of the engineered random fill. The tailings flowed into 8-inch spigot pipes evenly spaced along the dam face. The spigot lines were extended towards the tailings surface at an elevation of 1547 fmsl. The purpose of the spigoting is to develop a beach 300 to 500 feet in width against the upstream face of the dam. The beach will improve the dam's Factor of Safety and enhance its long term stability.

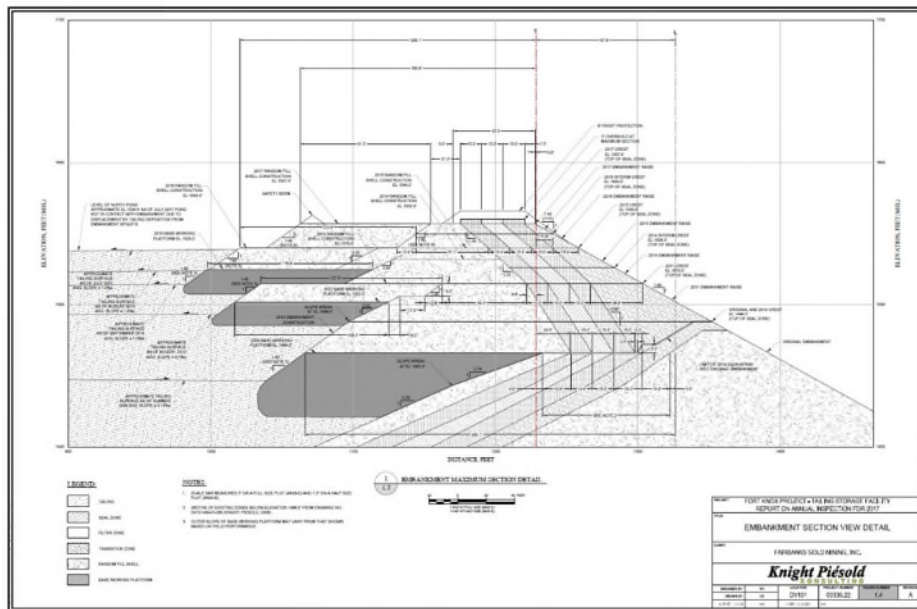
### **TSF DAM RAISE**

Construction of a 52-foot raise of the TSF dam began in 2011 by raising the dam 27 feet. The raising of the dam 52 feet was necessary for increases in planned production with the addition of Phase 7 and would have exceeded the capacity of the TSF without the 52-foot raise. The dam raise is a modified centerline construction as depicted in Figure 4.

Construction of the 52-foot dam raise required three years. A 27-foot raise was completed during 2011, an 11-foot raise was completed in 2014, and the remaining 14 feet was completed in 2015. The base working platform for the 25-foot raise was constructed during 2013. The dam was constructed to its design height of elevation 1,540 fmsl in 2015. A 17-foot raise to elevation 1,557

fmsl was approved by ADNR in 2016 for a two-year construction process. The first 10-foot raise was completed in 2016 and the second and final 7-foot raise was completed in 2017.

Figure 4. TSF Modified Centerline Design



## TSF INTERCEPTOR SYSTEM

The TSF dam is designed as a flow through dam. The primary flow path is within the upstream random fill shell and filter zone into the fractured bedrock foundation and beneath the seal zone to the downstream toe. The secondary flow path is within the tails from hydraulic head pressures and tailing consolidation into the fractured bedrock.

The seepage is captured by the pump back system and the interceptor system. The pump-back system includes a pump-back sump together with a pumping and piping system designed to return the seepage to the TSF. The interceptor system is a series of interceptor wells developed downstream of the dam (Figure 5).

Most of the seepage passing beneath the dam feeds into a large lined sump. The interceptor system collects the remaining water and is pumped to the sump. All the water from the sump is pumped back to the barge pond at an average rate of 2,039 gpm for 2017.

The interceptor well system continues to function as designed, maintaining a continuous cone of depression across the Fish Creek valley. The interceptor wells operate continuously with individual pumping rates ranging from approximately 5 gpm to 119 gpm (Table 3). These wells form a hydraulic barrier preventing any seepage from migrating further downstream and assuring the TSF operates as a zero discharge facility.

In 2016 Fort Knox contracted with a third party to:

- Perform an aquifer test at the interception system;
- Optimize the existing interception system;

- Determine effective pumping rates for each well;
- Assess seepage capture performance, and;
- Evaluate redundancy in seepage collection and suggest wells to be shut off.

Results from Optimization Tests performed by the third party company concluded IW-5; MW-1 and MW-3 could be shut off. This occurred in the last quarter of 2016

In 2017 seven monitoring wells with sampling pumps were installed between the interceptor wells and the compliance monitoring wells. The purpose of these wells is to monitor the water quality. These wells were constructed with the option to be converted to interceptor wells (Figure 6).

A line of groundwater compliance monitoring wells MW-5, MW-6, and MW-7 located immediately downstream of the interception system and pre-compliance wells are monitored to insure that no process water is escaping the system and moving downstream (Figure 6).

Figure 5. Operating Interceptor System

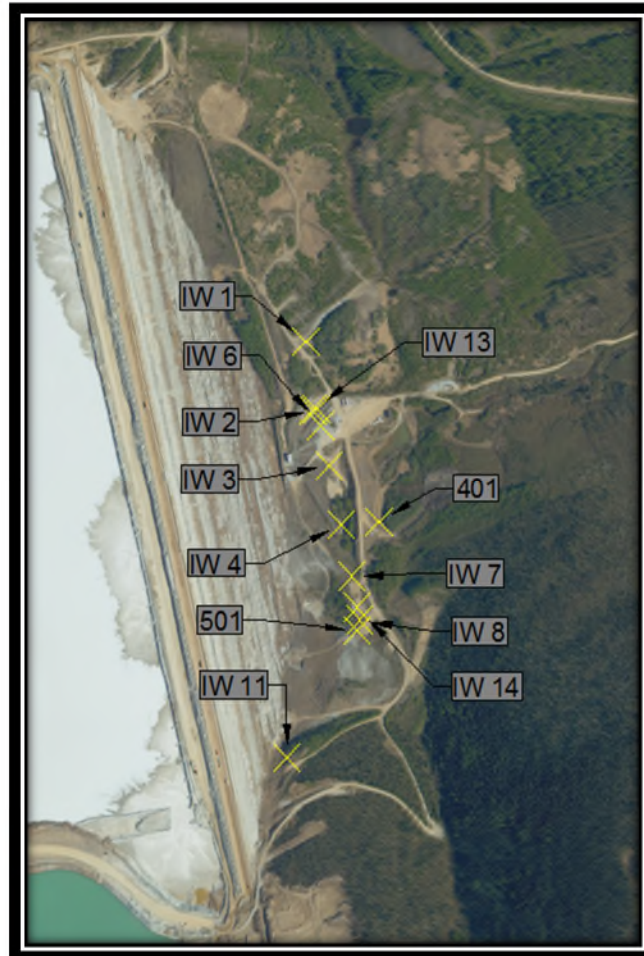


Figure 6. PMW Wells



Table 3. TSF Interceptor System Pumping Rates

Well ID	Approximate Average Pumping Rate (gpm)	Well Depth (ft)
IW-1	79	320
IW-2	11	329
IW-3	53	310
IW-4	30	330
IW-6	27	380
IW-7	9	197
IW-8	119	184
IW-11	18	296
IW-13	76	480
IW-14	53	405
Well 401	5	36
Toe Drain (501)	65	n/a
<b>Total</b>	<b>545</b>	



## TSF DECANT AND SEEPAGE METALS CONCENTRATIONS

Antimony, arsenic, lead, and selenium concentrations continue to be analyzed in the TSF decant and seepage reclaim (Figures 6, 7, 8, and 9). These metal concentrations increased significantly as a result of introducing True North ore into the mill tailings beginning in 2001 and ending in 2004. Since 2004, the metals have trended down and remained low with the exception of lead. Lead nitrate was used in the milling process in 2008 and 2009 causing the lead concentrations in the decant water to elevate during this period.

Figure 6. Average Quarterly Antimony Concentrations in Seepage Reclaim & Decant

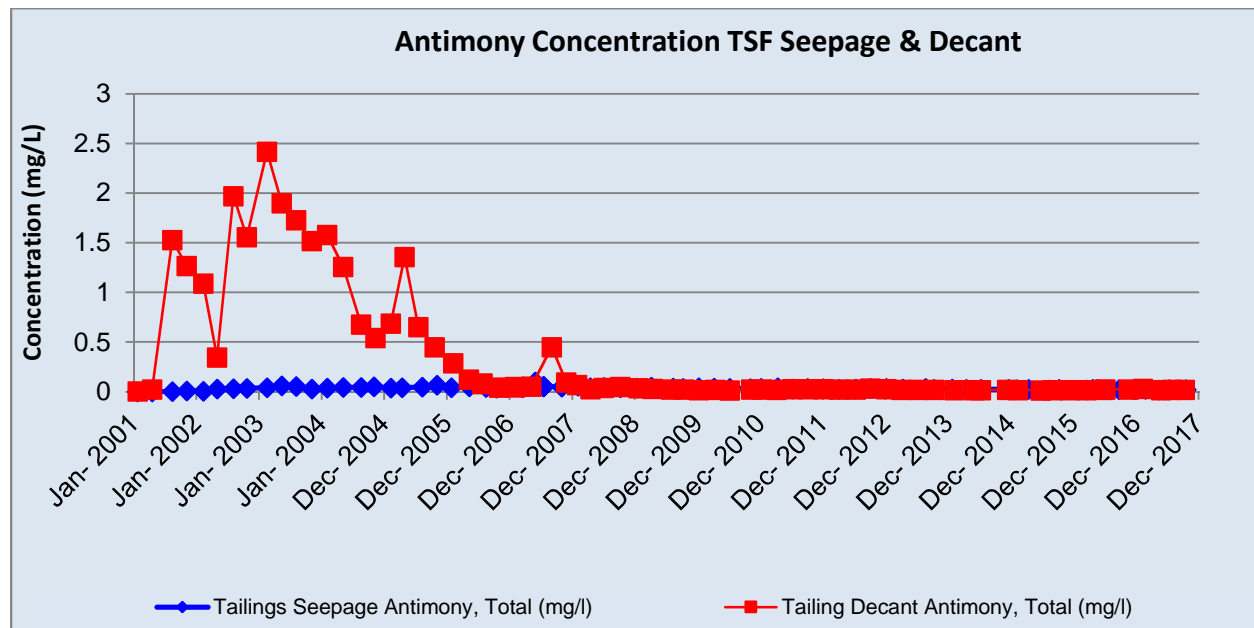


Figure 7. Average Quarterly Arsenic Concentrations in Seepage Reclaim & Decant

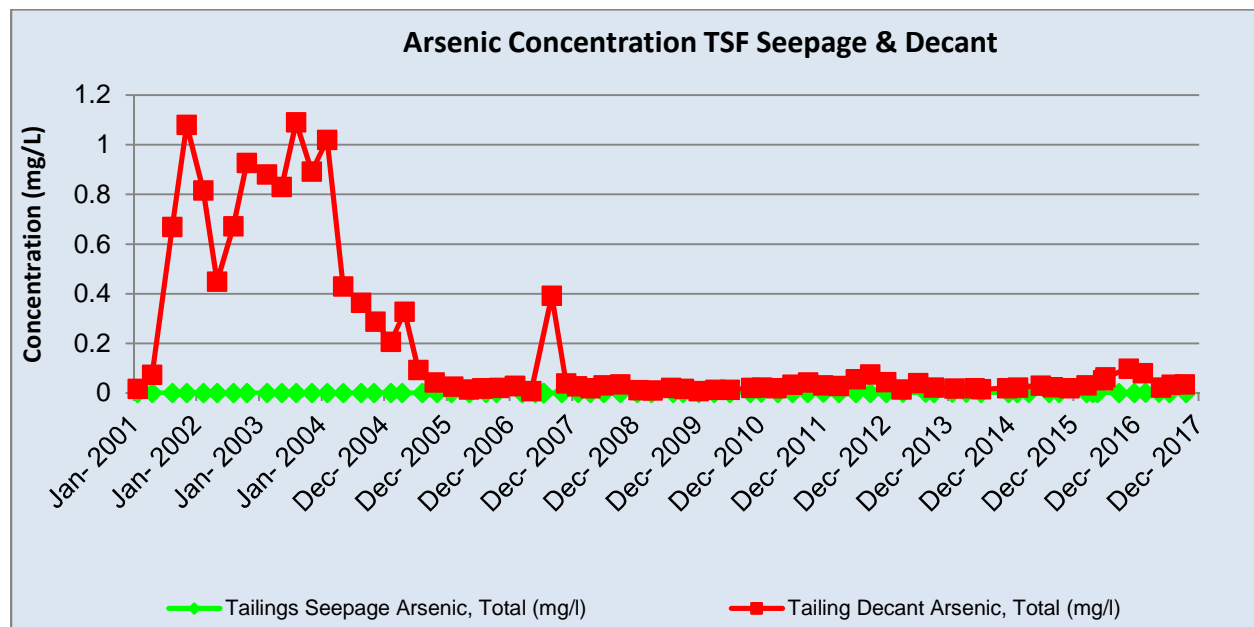


Figure 8. Average Quarterly Lead Concentrations in Seepage Reclaim & Decant

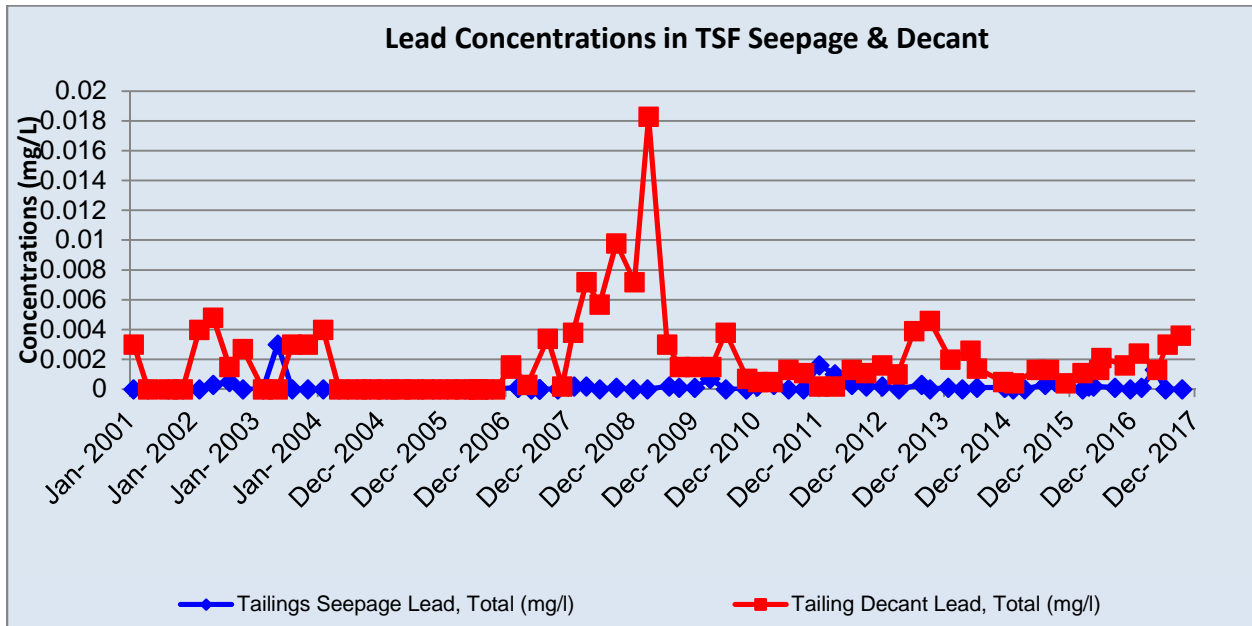
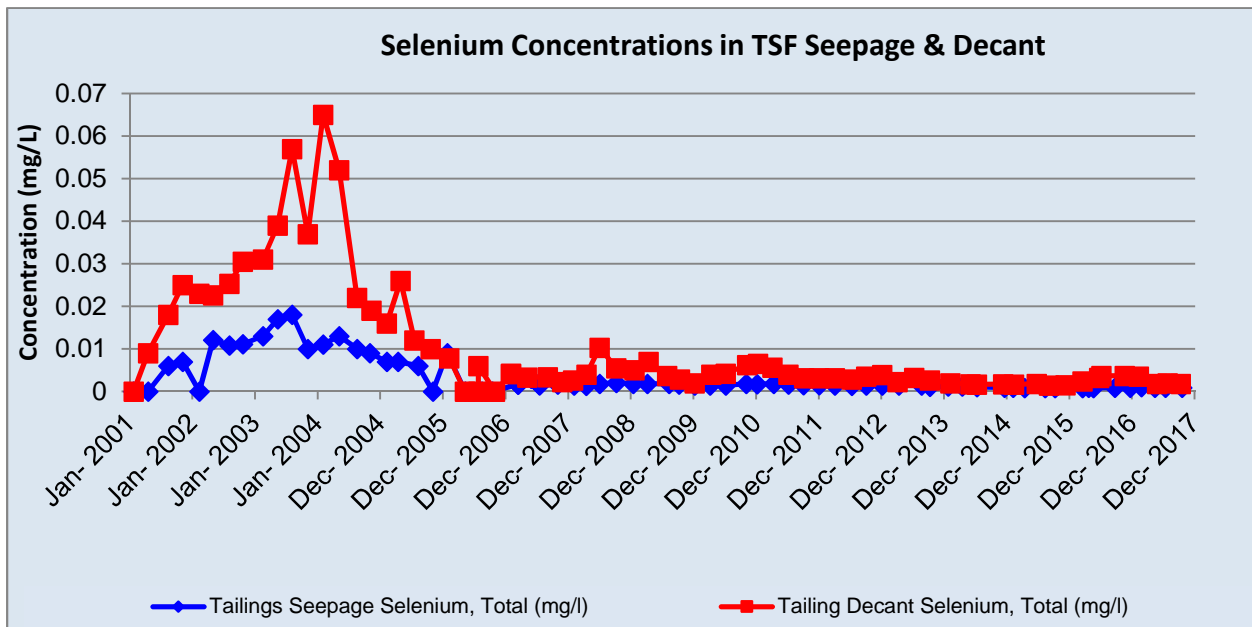


Figure 9. Average Quarterly Selenium Concentrations in Seepage Reclaim & Decant



## 10. FRESH WATER SUPPLY RESERVOIR and WETLANDS

The Alaska Department of Fish and Game (ADF&G) continues with their work on the water supply reservoir (WSR) and associated wetlands. In the 2017 annual technical report prepared by ADF&G summarizing their work on the WSR and wetlands, certain conclusions were stated:



- Populations of Arctic grayling and burbot have been established in the WSR.
- The post-mining goal for the Arctic grayling population was set at 800 to 1,600 fish greater than 200 mm in length, and the spring 2016 population estimate for Arctic grayling was 4,396 fish greater than 200 mm in length, which is a decrease from the estimated 2015 population.
- A goal for burbot population was not previously set, but a small population of fish larger than 400mm is present.
- Active management of beaver

populations within the developed wetlands appears to maintain a critical component to Arctic grayling population within the developed wetlands and WSR appears to remain a critical component to the productive capacity of the wetland complex for Arctic grayling.

## 11. RECLAMATION

### FORT KNOX

Reclamation activities in 2017 consisted of a wetland vegetation plot trial.

Reclamation planned in 2017 will include wetland and upland vegetation plot trial and continued stabilization of disturbed areas.

Growth media is stockpiled for use in final reclamation and closure. It is estimated that approximately 3.6 million cubic yards (cy) are required for final reclamation. Table 4 summarizes the volumes of growth media stockpiled that exist and are planned. A survey to determine the amount of growth media available will be done after the dam raise and heap leach construction has been completed. A portion of the growth media stockpiled and available borrow sources have been used because of its suitability for use as engineered seal and filter material for the TSF dam and engineered sub-base for the heap leach. Potential borrow sources are being identified for continuing construction activities.

Table 4. Fort Knox Growth Media Stockpile and Borrow Quantities

Site	Volume (cy)
Yellow Pup GM Stockpile	1,276,798
Walter Creek GM Stockpile	2,266,630
Tailings South GM Stockpile	296,100
Tailings North GM Stockpile	3,186,400
Barnes Creek	425,029
<b>Total</b>	<b>7,450,957</b>

## TRUE NORTH MINE

Production from the True North Mine was terminated at the end of 2004. In 2009, the decision was made to abandon remaining reserves and to not continue with any additional mining at True North. FGMI submitted updated reclamation plans for True North in May 2012. The reclamation plan approval was issued by ADNR on July 26, 2012.

The True North annual inspection by ADNR performed on October 2, 2012 concluded all major earthwork and reclamation appeared to be complete, and FGMI could continue with post-closure monitoring and maintenance. A summary of reclamation work is shown in Table 5.

The reclamation plan prescribed the a seed mix of 50% Arctared Red Fescue, 20% Tundra Glaucous Bluegrass, 20% Gruening Alpine Bluegrass, and 10% Tufted Hairgrass. The seed application rate was approximately 9 lbs/acre. Fertilizer was applied at a rate of 300 lbs/acre with a Nitrogen (N) -Phosphorous (P) - Potassium (K) analysis of 20-20-10. The final application of fertilizer was broadcast on 113 acres in 2014. The vegetation, natural reinvasion and applied is successfully mitigating erosion a precursor to establishing post-mining land use.

The 2016 annual inspection included reviewing areas that have historically subsided, and some erosion issues due to the 2014 summer's record rainfall. These issues were remediated during the 2016 construction season. The reoccurring subsidence cracks covering 4.6 acres of the Hindenburg waste rock dump continue to slow down, and FGMI will continue to monitor and regrade when necessary.

A reroute plan for the True North RS2477 trails was submitted to ADNR for review and comment. The reroutes were incorporated into the True North Reclamation Plan and were reestablished during reclamation. ADNR (Easement Section) was onsite in August 2014 to view the trails. FGMI will continue to work with ADNR in 2018 to finalize the trail system.



Table 5. Reclamation Work Completed at True North

Area	Graded (acre)	Growth Media Placement (acre)	Scarified (acre)	Seeded and Fertilized (acre)
<b>Dumps</b>				
East Pit Dump	47.5	-	47.5	47.5
Zep and Hindenburg Dump	86.3	-	86.3	86.3
Spruce Creek (within Zep&Hind dump footprint)	10	-	10	10
Mid Shepard Dump	16.28	14.2	14.2	14.2
South Shepard Dump	68.6	-	68.6	68.6
North Shepard Dump	21.3	-	21.3	21.3
East Shepard Dump	4.2	4.2	4.2	8.9
Hindenburg Dump	8.5	-	8.5	8.5
North Central Dump	13.1	-	13.1	13.1
North Louis Dump	17.7	-	17.7	17.7
South Louis Dump	19.2	-	19.2	19.2
Lower AB Dump	13.6	13.6	13.6	13.6
Upper Louis Dump	16.4	-	16.4	16.4
<b>Pits</b>				
Hindenburg Pit	32.4	32.4	32.4	32.4
North Central Pit	12.3	12.3	12.3	12.3
Shepard Pit	38.5	38.5	38.5	38.5
<b>Stockpads</b>				
Upper A Stockpad	5.6	5.6	5.6	5.6
Upper B Stockpad	1.5	1.5	1.5	1.5
<b>Roads</b>				
Louis Road (with-in Louis Dump)	5.7	-	5.7	5.7
ANFO Pad / Explosives Road	16.4	16.4	16.4	16.4
Shop Pad	21.4	-	21.4	21.4
<b>Growth Media</b>				
Shop Pad Growth Media	2.3	-	2.3	2.3
East Pit Growth Media	3	-	3	3
Hindenburg Growth Media	2.2	-	2.2	2.2
<b>Total</b>	<b>483.98</b>	<b>138.7</b>	<b>481.9</b>	<b>486.6</b>

## 12. FINANCIAL ASSURANCE

As required by ADNR, ADEC and ACOE, the financial assurance amounts were revised and updated to reflect current plans for Fort Knox and True North. The annual adjustment of financial assurance amount approved by the agencies in 2017 are \$97,032,274.10 for Fort Knox and \$ 622,817.34 for True North. The financial assurance letter of credit (Irrevocable Standby Letter of Credit No. S18572/260177, Amendment No. 9) was issued by the Bank of Nova Scotia on July 17, 2017 and provided to ADNR. Table 6 reflects the financial assurance for Fort Knox and True North.

Table 6. Financial Assurance Amounts

<b>Plan/Permit/Lease #</b>	<b>Amount (\$)</b>
Fort Knox Reclamation and Closure Plan	\$97,032,274.10
True North Reclamation and Closure Plan	\$ 622,817.34
<b><i>Total</i></b>	<b><i>\$97,655,091.44</i></b>

## 13. MINE WATER USEAGE (WATER BALANCE)

The Fort Knox water balance tracks water movement throughout the mine-site, including natural processes such as precipitation, evaporation, and seepage as well as mine operation water needs. The water balance that Fort Knox uses was built using GoldSim software. GoldSim is a graphical simulation software that facilitates the construction of complex models allowing FGMI to predict future water conditions.

The Fort Knox water balance focuses on mining and milling activities and is calibrated relative to measured bathymetric data on a quarterly basis. In doing so the confidence in the models predictions increases with each iteration and our mine planning and mine closure design may be continually optimized. Data used in calibration activities includes: tailing pond water levels, tailing pond bathymetry, seepage and interception rates, precipitation and evaporation records, dewatering pumping schedules, production data, mill water flows, tailings deposition schedules, and information on mine process changes.

The water balance is continually updated with the most current information, including natural water inflows/outflows and water use throughout the mine-site. The dynamic nature of the water balance enables FGMI to actively manage water on site, with the goal of minimizing water use and maximizing efficiency. Water uses at Fort Knox are summarized in Table 7.

Table 7. Fort Knox Water Summary for 2017

<b>Water Summary</b>	<b>Volume (acre-ft/year)</b>
Fresh Water Reservoir (WSR) to Mill	0
Fresh Water Reservoir (WSR) to TSF	0
TSF to Mill	14,554
Mill to TSF (Estimated water in tailings slurry)	10,205
Heap Leach	0 (relative to TSF)
Pit Dewater to TSF	1,315
Pit Dewater Groundwater to Fish Creek Outfall 001 (APDES Discharge Permit AK0053643)	618
Seepage Reclaim	3,235

## 14. EXPLORATION

FGMI continues with an exploration program in the pit and in the surrounding area. Exploration in the vicinity of the Fort Knox mine in 2017 consisted of the following:

- Gilmore Project  
In 2014, the Bureau of Land Management (BLM) issued Land Use Permit Number FF096399 to Fort Knox that allows mineral assessment of lands withdrawn from mineral entry (PLO 3708) immediately west of the Fort Knox Mine. In 2017, FGMI completed the mineral assessment project authorized by the BLM permit, which expired on September 21, 2017.

## 15. COMMUNITY AFFAIRS

### FORT KNOX EXTERNAL STAKEHOLDER FEEDBACK PROCEDURE



Stakeholder feedback, be it positive or negative, is instrumental in providing Fort Knox with a platform upon which its operational and social performance can be regularly evaluated and modified to meet commitments to leading practice and continuance improvement. The objective of our procedure is to outline Fort Knox’s commitment to demonstrate a transparent and trustworthy approach to issues management and to ensure that stakeholders can effectively communicate with Fort Knox.

External stakeholder feedback should be directed to the External Affairs Manager, Anna Atchison (907-490-2218) who serves as the primary site point of contact, working closely with the General Manager and appropriate department managers.

## COMMUNITY COMMITMENT

Fort Knox's commitment to the community in 2017 was demonstrated by its employees donating approximately 2,292 hours of recorded volunteer service to Fairbanks area organizations. These hours included Fort Knox sponsored events, activities supporting local organizations, and employees who volunteer their own personal time to area organizations.



## COMMUNITY INVESTMENT

Fort Knox showed further commitment to the Fairbanks community by donating to 86 area non-profit organizations throughout 2017. This included the first of two \$300,000 gifts to the University of Alaska Fairbanks for a mining-related scholarship fund.

## COMMUNITY ENGAGEMENT

Mine tours are an important part of our community engagement. In 2017, Fort Knox provided tours to 357 local elementary students, and 160 community tour visitors. The community tours were conducted through a partnership with the Fairbanks Community Food Bank. Miscellaneous tours were also provided to high school and college students.

