



AKHM
ALEXCO KENO HILL
MINING CORP.

TRAFFIC MANAGEMENT PLAN

KENO HILL SILVER DISTRICT MINING OPERATIONS

September 2017

ALEXCO KENO HILL MINING CORP.



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1 INTRODUCTION

The Traffic Management Plan describes procedures and protocols for site access, traffic routing and management, and company policy with respect to vehicle and employee transportation during the Keno Hill Silver District (KHSD) Mining Operations, as authorized by QML-0009 and its amendments. The previous Traffic Management Plan addressed traffic associated with the Bellekeno, Lucky Queen, Onek and Flame and Moth Mines. The updated Traffic Management Plan also addresses mine-related traffic associated with the development and production of the Birmingham deposit.

Public, employee and contractor safety is the primary goal of this plan. Alexco recognizes that the project area has a short but busy tourism season. The safety of tourists, who may lack local familiarity, are a special consideration during the summer season.

Road construction details are presented in the Road Construction Plans submitted under QML-0009.

2 SITE ACCESS – GENERAL

In the interest of site security and public safety, access to operational areas related to mining in the KHSD will be restricted to authorized site personnel through the usage of signs and gates where appropriate. Facilities that potentially present danger to persons or wildlife such as the electrical substation and settling ponds will be fenced or barricaded as appropriate to prevent access.

All mine traffic on haul routes will be radio controlled. Signage will be installed at appropriate locations in order to warn the public of haul routes.

In the event that temporary closure occurs, access to mine and mill sites will be further restricted through the use of fences and gates as appropriate. Access to adits, shafts, raises and all openings to underground workings will be securely blocked by means of a temporary but robust barrier. Buildings and ancillary facilities will be locked and secured. The Decommissioning and Reclamation Plan prepared under QML-0009 contains additional details on site access controls during closure and post closure.

A number of additional general measures related to site access, road management and public safety and construction events notification are presented here:

- Private employee off-road vehicles will be prohibited on the mine access roads and at the mine site.
- Existing trails and disturbed areas will be used where possible to minimize the addition of new linear corridors and there will be no unnecessary disturbance to the organic mat and soils.
- Snow clearing equipment will be available on site to maintain the mine access roads.
- Snow plows on the access road will create breaks in the snow berm every 0.5 km to allow for wildlife to escape from the access road.

- Signage posted near all construction sites.
- Weekly events notice to be updated and posted when general activities change within the district at three locations (Post Office in Keno City, Post Office in Elsa, and Keno City Snack Bar).
- 40 km/hr speed limit within or near the town;
- No use of engine retarder brakes within 1 km of the center of Keno City;
- Review of highway access, signage and sign placement with YG Highways & Public Works;
- In accordance with the Occupational Health and Safety Regulations for public roads, use of flashing devices on all vehicles/machinery and equipment that will cross, travel on or may otherwise pose a risk to users of public roads.

3 EMPLOYEE TRANSPORTATION

To the extent possible employees will use project bussing and pool transportation from Mayo/Elsa to the mine and mill site, thereby reducing overall vehicle traffic. Fleet vehicles will be utilized by staff as necessary.

4 SPEED LIMITS

Speed limits will be enforced for mine traffic and posted along the access and site roads (maximum 40 km/hr, reduced to 20 km/hr at blind corners and bridge crossings). Mine traffic on the mine and mill access roads will be radio controlled for safety and speed control.

Employees and contractors will be educated on safety including traffic protocols and speed limits during mandatory orientation. Routine traffic inspections and/or speed indicator signs will be used to encourage safe and responsible driving and ensure that Alexco's traffic and safety protocol are adhered to.

Alexco will investigate and take appropriate modification of policy and/or disciplinary action in the event of any traffic incidents or complaints.



5 COMMUNICATIONS AND NOTIFICATION PROTOCOLS

Mine traffic along all haul and access roads, including the Silver Trail Highway to/from Flat Creek Camp are radio-controlled. Road location/travel direction signs (e.g. BKR 7 Up, road abbreviation/kilometre marker/direction) are installed at various locations along all of the mine access roads. Employees, contractors and supply vehicles identify their location and travel direction as they travel the mine access and haul roads to alert any oncoming traffic. This system is integral to the safe operation of the mine access roads and is one of the primary reasons public access is prohibited on the active mine areas. The two channels used for traffic notification and routine onsite communication, which are publicly accessible, are:

- Alexco Channel 3 (Receive TX 157.61; Transmit RX 151.97)
- Alexco Channel 4 (Receive TX 154.1; Transmit RX 154.1)

Alexco anticipates that any road maintenance/upgrades will require only single-lane temporary closures. Signage warning of construction activities on the roadway will be placed at appropriate distances from the construction site, in consultation with Highways & Public Works. For significant upgrade/maintenance events (those requiring more than one day to complete), written notification will be distributed to Keno City residents and Highways & Public Works will be notified. Routine road maintenance (grader/snow plow) of the mine access roads including the Wernecke Road will occur on a routine basis as road conditions dictate. The Wernecke Road is used for access to a local residence and maintenance of this road will be made in an effort to accommodate recreational access by local residences but the primary objective is for the safety of employees, contractors and residents. During periods when the Lucky Queen mine is not in active development or operations the Wernecke Road will not be maintained.

A public notice is posted at multiple locations in Keno City to communicate to residents any new activities that may be occurring or scheduled. Contact information for AKHM senior management is included in this notice and any concerns regarding road maintenance or traffic management can be forwarded to AKHM management through this notification system.

6 ROAD MANAGEMENT

AKHM's Road Management Plan (RMP) consists of mitigation measures and best practices to minimize damage to permafrost, vegetation and sensitive wildlife habitat during construction, use and reclamation of access routes as well as to ensure public and workers safety. This RMP is adaptive and will be updated as needed as the Project evolves.

AKHM commits to the following best road management measures:

- Ensuring that the bridge at Lightning Creek is capable of supporting the weights that will be crossing it.
- All vehicles will be operated to avoid rutting and gouging of roads and trails.
- Off road and trail routes will be reconnoitered and will be used in a way that minimizes ground disturbance, including damage to permafrost and sensitive wildlife habitat.
- If rutting, gouging, ponding or permafrost degradation occurs off road or trail, vehicle use will be suspended or relocated to ground that is capable of bearing the weight of the vehicle without cause such damage.
- Use of skids on permafrost or wet ground will only be permitted outside of winter where it is not reasonable to use any other means of transporting equipment.
- Routes for temporary trails will be reconnoitered and flagged.
- Temporary trails will be blocked to prevent further vehicular access.

With regards to construction, use and reclamation of access routes, AKHM will adhere to the following guidelines:

- Ensuring that soil conditions beneath and in proximity to the proposed right-of-way are stable to support the intended construction and use.
- No acid generating or metal leaching material will be used for road construction.
- All construction and upgrades that utilize non-acid metal leaching (AML) waste rock will be done in a manner conducive to monitoring run-off as per the updated Waste Rock Management Plan.
- New roads will be constructed in such a way that minimizes permafrost degradation.
- Access routes will be constructed and maintained in the following manner:
 - Routes will be selected from topographic maps and aerial photos and walked and flagged prior to earthmoving;
 - Routes will avoid creek crossings and will aim to minimize amount of earthmoving;
 - Routes will be located on well drained ground;
 - Areas where ponding occurs will be avoided;
 - Seeps, marshes and springs will be avoided;
 - Disturbed areas will be stabilized to prevent long term soil erosion, slumping and subsidence, and to provide conditions suitable to the re-establishment of the vegetative mat; and
 - If rutting and gouging that could lead to ongoing erosion, ponding, or permafrost degradation occurs, vehicle use will be suspended or relocated to ground that is capable of bearing the vehicle and the former routes must be restored in compliance with the operating conditions for re-establishment of the vegetative mat and erosion control.

Regarding access restriction, AKHM will abide by the guidelines below.

- All roads in the project area that are not public roads will be secured so as to deny access by the public.
- Monitoring will be conducted with respect to secure areas.
- Traffic will be appropriately controlled on the mine access road.
- Erecting signage to alert visitors to mining activity, and restrict access between the Signpost Road and the Haul Road and to the Onek Pit.
- Ensuring that all adits and other historic mine workings within the project area are secured from public access or, at a minimum, well signed to inform the public and site employees of any risk.

7 TRAFFIC ROUTING AND VOLUMES – BELLEKENO MINE

Mine traffic associated with the Bellekeno Mine has been redirected around Keno City to ensure that direct ore haulage traffic is routed around the community and potential impact to the local community is minimized. Figure 1 shows the routing of traffic around the community along the “Bellekeno Project Bypass Road”, which consists of two portions:

- Bellekeno Project Bypass North consists of the section of former haul road between Duncan Creek road and the Silver Trail Highway to the west of Keno. This portion of the bypass ensures that all mill traffic and concentrate haul will bypass Keno City.
- Bellekeno Project Bypass South is the section of road connecting the Sourdough Trail on the south side of Lightning Creek to the Duncan Creek Road across Lightning Creek.

A portion of the Bellekeno haul road will be re-routed for the proposed dry stack tailings facility shown on Figure 1. There will continue to be occasional light vehicle traffic and vendor delivery within Keno City.

Table 1 summarizes the volume of traffic in the Keno City area for the operations phases related to the Bellekeno mine.

Table 1 Estimated Daily Traffic Count – Operations Phase Bellekeno Mine

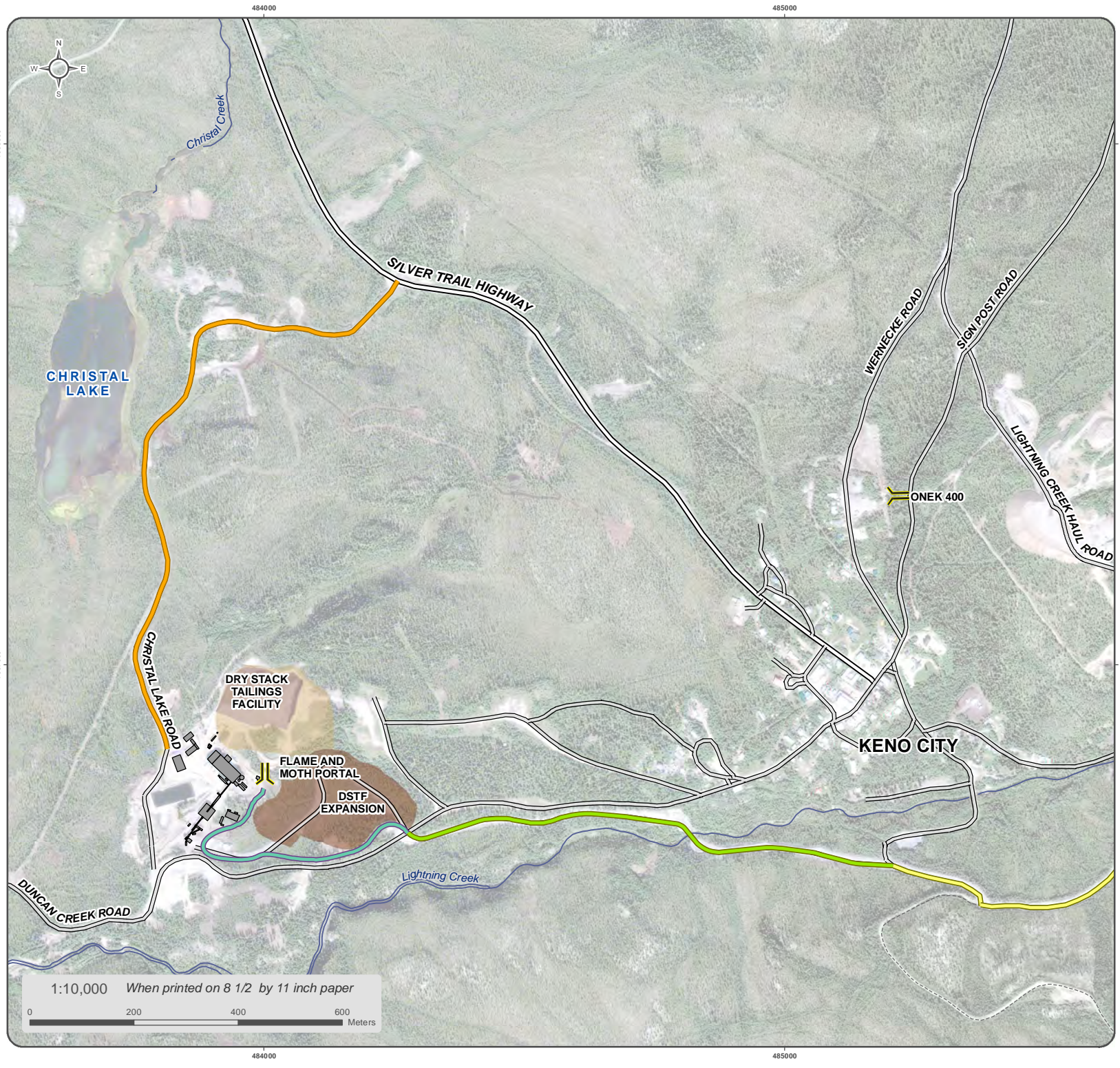
Vehicle Type – One way traffic count	Travel Direction	Shift Change	Day Shift	Shift Change	Night Shift
		6 am – 8 am	7 am – 7 pm	4 pm- 6 pm	7 am – 7 pm
Light Trucks (< 1 ton) and Autos	Elsa to Mine/Mill	4	8	4	6
Buses	Elsa to Mine/Mill	2		2	
Heavy Trucks (>5 tonne) bulk materials	Elsa to Mine/Mill		8		
Ore Trucks (>20 tonne) hauling ore	Mine to Mill		14		
Ore Trucks (>20 tonne) hauling tailings or empty	Mill to Mine		14		
Total round trips per day		6	44	6	6

Notes:

- 1) Warehouse receiving and shopping normally confined to hours between 8 am and 4 pm. This will minimize heavy traffic during shift changes. Normally no heavy truck deliveries on night shift.
- 2) Bulk materials include fuel, reagents, materials, supplies and concentrate haulage.
- 3) Above values are considered typical of daily traffic anticipated during operations. Variations up to 50% are possible on any given day.
- 4) Based on 408 t/d production rate which results in highest ore haulage traffic count.

FIGURE 1
BELLEKENO BYPASS ROAD

SEPTEMBER 2017



- Adit/Portal
- Bellekeno Haul Road
- Bellekeno Project Bypass Road North
- Bellekeno Project Bypass Road South
- Proposed Haul Road
- Silver Trail Highway
- Road
- Limited-Use Road
- Existing Building
- DSTF 322k Tonnes Design
- Current DSTF
- DSTF Phase II Expansion

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1:10,000 When printed on 8 1/2 by 11 inch paper



8 TRAFFIC ROUTING AND VOLUMES – ONEK AND LUCKY QUEEN MINES

The Keno City Bypass Road is developed from the Wernecke Road, crossing Sign Post Road, along the historic Onek waste rock storage area, to the Onek 990 Portal, crossing Lightning Creek Road and the Onek Access Bridge across Lightning Creek to the Bellekeno Haul Road (Figure 2). The Bypass Road is approximately 2.1 km long and 6 – 9 m wide to safely accommodate passing vehicles. The road maybe restricted to one-way travel where conditions prevent construction to 9 m wide.

There are stop signs to stop mine traffic at the intersections with Wernecke Road, Sign Post Road and Lightning Creek Road. Signage warning of crossing mine traffic are installed in both directions from the intersection, in accordance with regulatory requirements. Appropriate line-of-sight distances will be maintained to ensure crossing trucks and approaching traffic on the Wernecke Road are able to see each other. The line-of-sight distance requirements of YG Highways & Public Works Transport Branch and the Highway Access/ Works within a Right-of-Way permits will be adhered to in order to ensure public and worker safety.

Signage warning of crossing/turning mine dump trucks (over the highway dump trucks) are installed along Sign Post Road, Lightning Creek Road, Bellekeno Haul Road and Wernecke Road in accordance with the requirements and direction of YG Highways & Public Works Transport Branch officials.

During mine production, heavy truck traffic from Lucky Queen and Onek will be routed along the Keno City Bypass Road to/from the Bellekeno Haul Road. Light truck traffic to/from Lucky Queen will continue to be routed through Keno City during mine operations. Table 2 presents traffic volumes during operations on different sections of the access routing shown on Figure 2.

It is anticipated that up to 16 roundtrips per day of ore haul truck traffic will travel along the Bellekeno Haul Road with Lucky Queen and Onek Mines operating.

Table 2 Estimated Traffic Volumes along Key Traffic Management Routes (roundtrips/week)

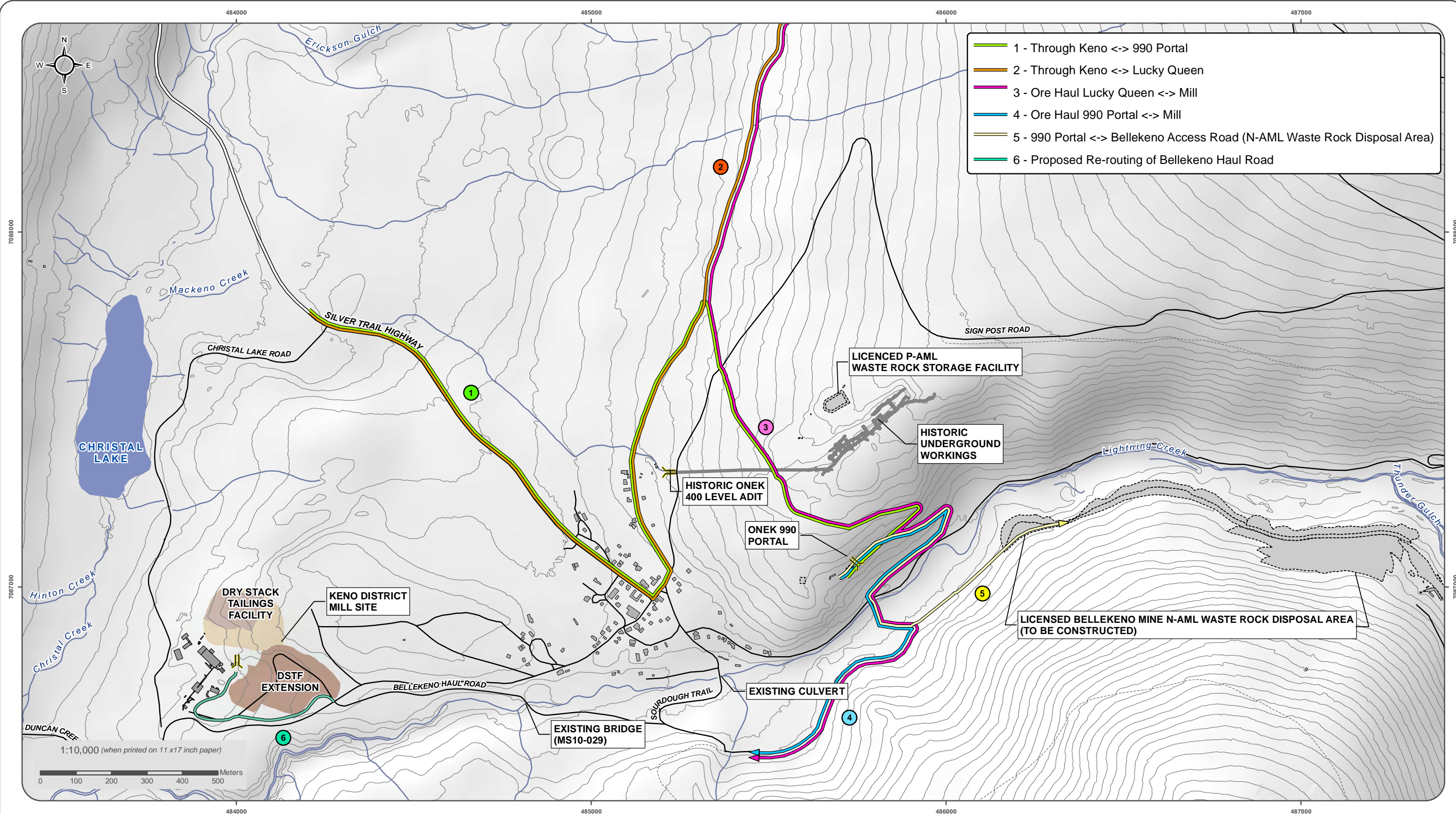
Vehicle Type	Route				
	1	2	3	4	5 ¹
Light truck	7	28	10	10	80-100
Water truck	-	2	-	-	1
Sewage truck	-	2	-	-	1
Grader/Sand Truck	1	1	-	-	2
Semi trailer loads	-	7	-	-	-
Ore haul truck	-	-	25	-	-
Dump truck	-	-	-	49	28
Total	8	40	35	59	112-132

Note: ¹ Some of this traffic will also have to travel the Silver Trail Highway (Route 1).

The Keno City Bypass Road will be a radio controlled road accessible to mine traffic only. Signs will be installed at the road access points prohibiting public traffic from traveling on it. The maximum speed limit will be 40 km/h, reduced to 20 km/h at blind corners and road crossings.



Alexco will continue to work with tourism and heritage representatives and the community to develop signage to be installed along the Silver Trail Highway to Keno and within Keno that shows a road/trail map of the area indicating the roads that are in active mining use, identifies key tourist features, and lists general safety precautions and traffic management procedures for active roads.



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



0 100 200 300 400 500 Meters

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-  Adit
-  Existing Features
-  Building/Structure
-  DSTF 322k Tonnes Design
-  Current DSTF
-  DSTF Phase II Expansion
-  Waterbody
-  Watercourse
-  Silver Trail Highway
-  Road
-  Limited-Use Road
-  Contours (100 ft intervals)



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**FIGURE 2
LUCKY QUEEN, ONEK 990 AND
BELLEKENO ACCESS ROUTES**

SEPTEMBER 2017

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9 TRAFFIC ROUTING AND VOLUMES – FLAME & MOTH MINE

Mine traffic associated with the Flame & Moth mine will use the Christal Lake Road and a short haul road (~175m) to be constructed between the portal and the crusher pad, as shown in Figure 1. The Bellekeno Project Bypass Road North will be re-routed to allow development of the DSTF expansion. As the mine operations at Flame & Moth begin, traffic from other deposits are expected to decrease, and the net level of traffic for the district should remain the same. A decrease in traffic along the Bellekeno Bypass Road is expected during Flame & Moth operations. There will be no additional traffic through Keno City for the Flame and Moth Mine.

Table 3 summarizes the volume of traffic in the Keno City area for the mine development phase at Flame & Moth. These estimates are for traffic in/out of the Christal Lake Road since this is the only access road envisioned for the Flame and Moth Mine.

Table 3 Estimated Traffic During Development – Flame & Moth

Vehicle Type	Average Traffic Volume (roundtrips/week)
Light Truck	50
Water truck	2
Sewage truck	2
Semi trailer loads (mining equipment, building supplies, construction equipment, etc)	7
Grader	1
Total	62

During mine production, all heavy and light truck traffic will be routed along the Christal Lake Road. Table 4 presents traffic volumes during operations on the Christal Lake Road and the Flame & Moth haul road.

Table 4 Estimated Daily Traffic Count – Operations Phase Flame & Moth

Vehicle Type – One way traffic count	Travel Direction	Shift Change	Day Shift	Shift Change	Night Shift
		6 am – 8 am	7 am – 7 pm	4 pm- 6 pm	7 am – 7 pm
Light Trucks (< 1 ton) and Autos	Elsa to Mine/Mill	4	8	4	6
Buses	Elsa to Mine/Mill	2		2	
Heavy Trucks (>5 tonne) bulk materials	Elsa to Mine/Mill		3		
Ore Trucks (>20 tonne) hauling ore	Mine to Crusher		14		
Ore Trucks (>20 tonne) hauling tailings or empty	Crusher to Mine		14		
Total round trips per day		6	44	6	6

Notes:

- 1) Warehouse receiving and shopping normally confined to hours between 8 am and 4 pm. This will minimize heavy traffic during shift changes. Normally no heavy truck deliveries on night shift.
- 2) Bulk materials include fuel, reagents, materials, supplies and concentrate haulage.
- 3) Above values are considered typical of daily traffic anticipated during operations. Variations up to 50% are possible on any given day.
- 4) Based on 408 t/d production rate which results in highest ore haulage traffic count.

10 TRAFFIC ROUTING AND VOLUMES – BIRMINGHAM MINE

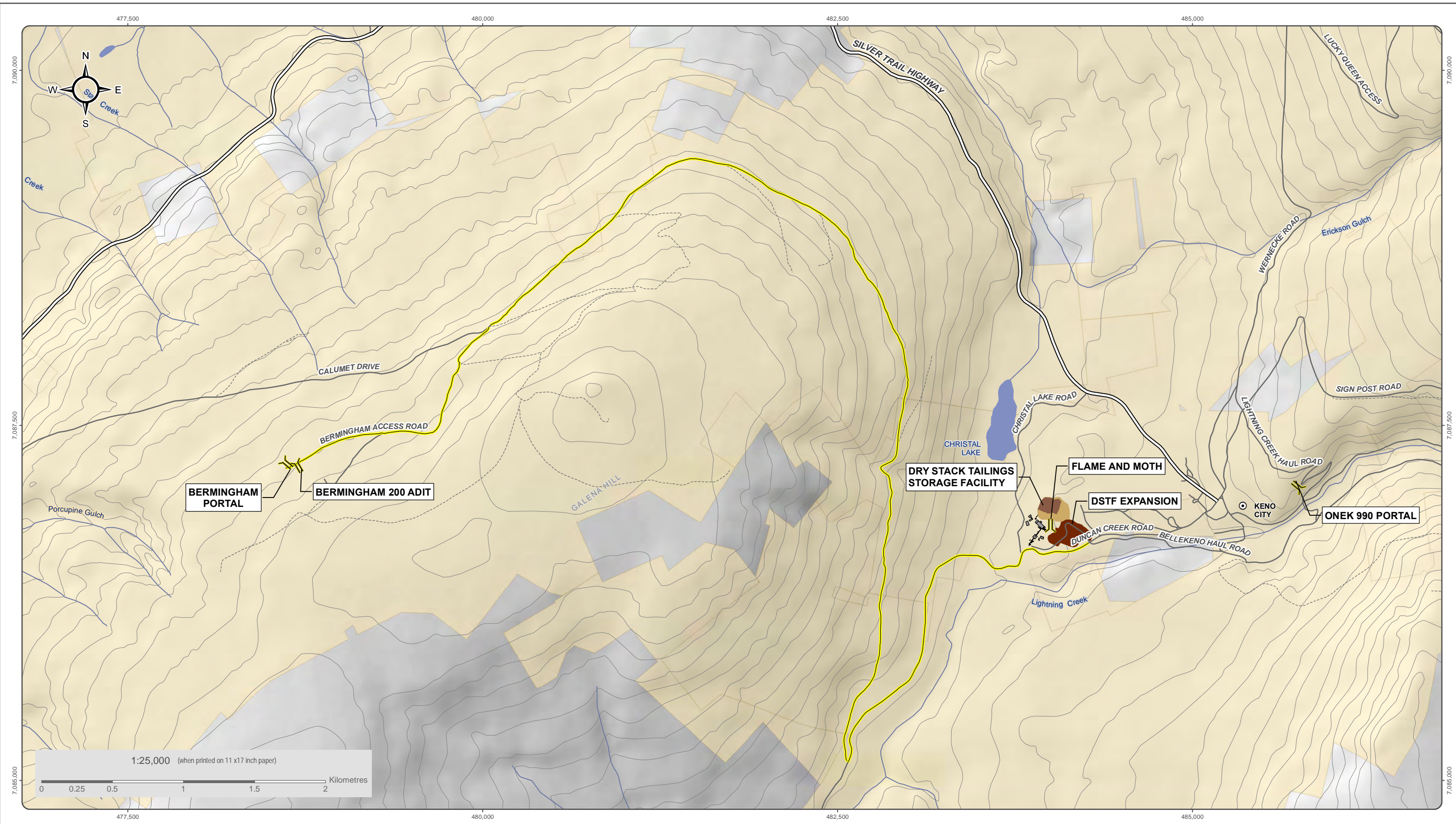
Mine traffic associated with the Birmingham mine will use the Calumet Road and a short section of the Duncan Creek road between the Mill and the Birmingham Mine, as shown in Figure 3. As the mine operations at Birmingham begin, traffic from other deposits is expected to decrease, and the net level of traffic for the district should remain the same. A decrease in traffic along the Bellekeno Bypass Road is expected during Birmingham operations as Bellekeno mine operations are expected to cease during the active operations period at Birmingham. There will be no additional traffic through Keno City for the Birmingham Mine. Estimated traffic volumes associated with mining activities at Birmingham are shown in Table 1 below.

Table 5 Estimated Daily Traffic Count – Birmingham

Vehicle Type – One way traffic count	Travel Direction	Shift Change	Day Shift	Shift Change	Night Shift
		6 am – 8 am	7 am – 7 pm	4 pm- 6 pm	7 am – 7 pm
Light Trucks (< 1 ton) and Autos	Elsa to Mine/Mill	4	12	4	6
Buses	Elsa to Mine/Mill	2		2	
Heavy Trucks (>5 tonne) bulk materials	Elsa to Mine/Mill		3		
Ore Trucks (>20 tonne) hauling ore	Mine to Crusher		8		
Ore Trucks (>20 tonne) hauling tailings or empty	Crusher to Mine		8		
Total round trips per day		6	31	6	6

Notes:

- 1) Warehouse receiving and shopping normally confined to hours between 8 am and 4 pm. This will minimize heavy traffic during shift changes. Normally no heavy truck deliveries on night shift.
- 2) Bulk materials include fuel, reagents, materials, supplies and concentrate haulage.
- 3) Above values are considered typical of daily traffic anticipated during operations. Variations up to 50% are possible on any given day.
- 4) Based on 408 t/d production rate which results in highest ore haulage traffic count.



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- ⊙ Place of Interest
- ⏏ Adit
- Alexco/ERDC Quartz Claims

- DSTF 322k Tonnes Design
- Current DSTF
- DSTF Phase II Expansion

- Waterbody
- Watercourse
- == Silver Trail Highway
- Other Road
- - - Limited-Use Road



**ALEXCO KENO HILL MINING CORP.
BERRINGHAM**

**FIGURE 3
TRAFFIC ROUTING AND TRAFFIC MANAGEMENT –
BERRINGHAM MINE**

SEPTEMBER 2017

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