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Assessment Report
on the
Ashley Project LiDAR and Orthophoto Survey
Matachewan Area, Northeastern Ontario, Canada

Project Location
Latitude 48°00'22" North and Longitude 80°54'48"
506,646m East and 5,316,983m North (UTM NAD83 Zone 17N)
Timiskaming District
Larder Lake Mining Division
Province of Ontario, Canada

Prepared for

ASHLEY GOLD CORP.

(Operator)
1130 W. Pender St. (Suite 820)
Vancouver, British Columbia
Canada, V6E-4A4

(Owners)
David Lefort
Jacques Robert
9640355 Canada Corp.
Randall Salo

Prepared by:
Shannon J. Baird M.Sc., P.Geo,
Exploration Manager
Ashley Gold Corp.

August 27th, 2022

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1 SUMMARY

From October 11th, 2020 to October 14th, 2020, Pioneer Exploration Consultants Ltd. (Pioneer) completed an 18.79km^2 Ultra-High Resolution Airborne LiDAR (50 points/meter) and Orthophoto (5-10cm) survey over an area 18 km (as the crow flies) west of Matachewan, Ontario. The survey was flown by Heli Explore using an AS 350 B2 helicopter on October 14th. Survey ground control points were collected on October 11th. The survey was flown at the request of Ashley Gold Corp. Logistics and instrumentation reports are included as appendices to this report.

The aim of the LiDAR survey was to acquire high-definition elevation data capable of being interpreted by a structural specialist for new target generation and to better understand current structurally controlled deposit style. The secondary focus of the survey was to accurately locate historic pits and trenching performed by previous operators.

The LiDAR and full project data set was handed over to a structural geologist for field and digital interpretation and will be the subject of a future assessment report.

All maps in this report and survey data are in UTM NAD83 Zone 17 North datum.

2 PROPERTY DESCRIPTION AND LOCATION

2.1 Property Description

The Ashley Project (the Project or the Property) is comprised of 115 claims contained within three, non-contiguous, but proximal blocks of claims (including 65 single cell mining and 50 boundary cell mining claims) or approximately 1,735 ha or 17.35km^2 (Figure 1). The property is jointly and equally held by David Lefort, Jacques Robert, 9640355 Canada Corp., and Randall Salo and operated by Ashley Gold Corp under the option right to earn 100% interest with a 2% NSR. Table 1 provides a description of the current mining claims covered by this Assessment Report.

All project claims listed in Table 1 were directly surveyed during this work program.

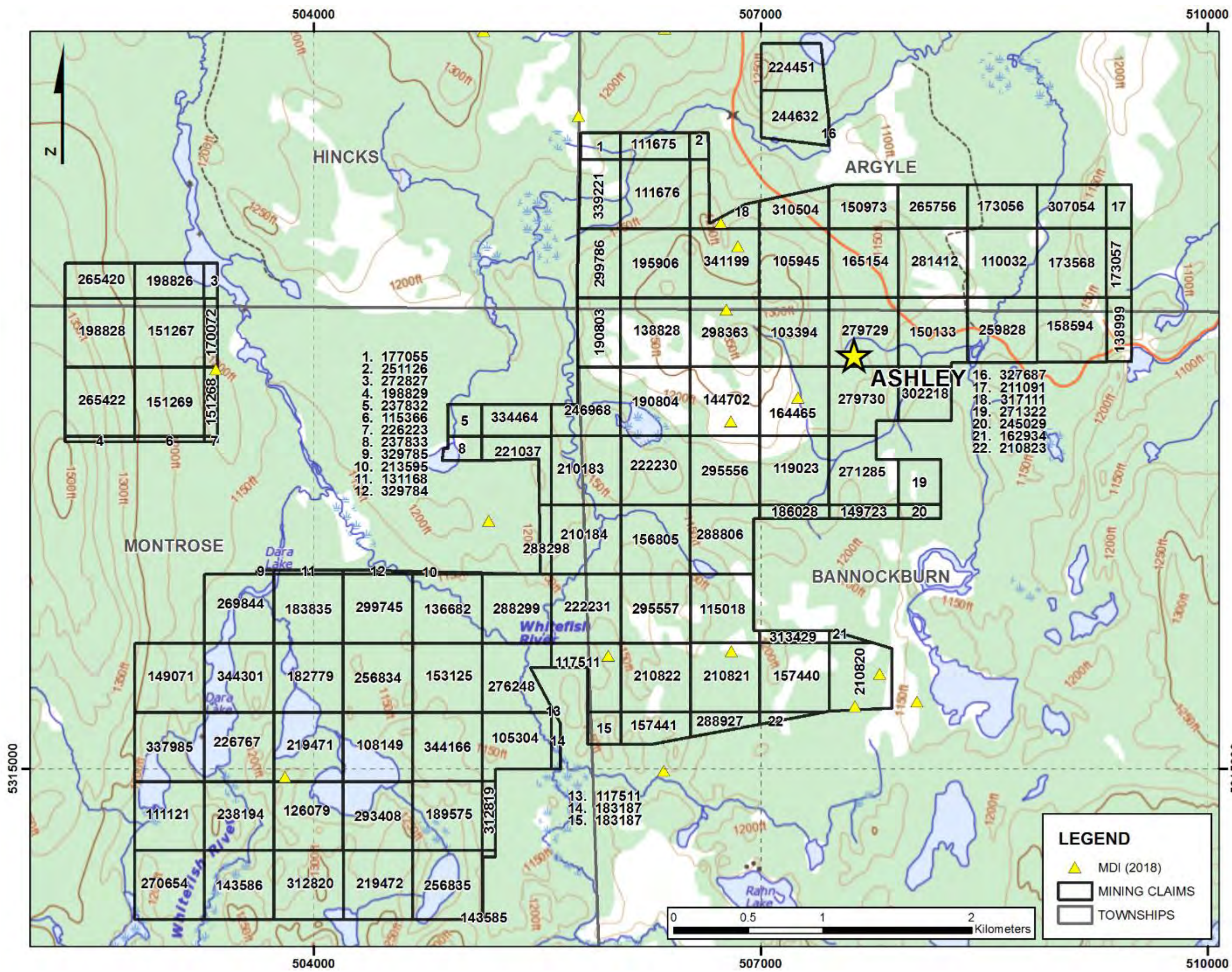

Figure 1. The Ashley Project Claims Location Map.

Table 1. Ashley Project Active Claims Status.

Tenure ID	Township / Area	NTS	Area (Hectares)	Tenure Type	Anniversary Date	Ownership
103394	ARGYLE, BANNOCKBURN	41P/15	21.60	Single Cell Mining Claim	2027-04-30	Each claim cell is equally owned by four owners [i.e. JACQUES ROBERT (25%), DAVID LEFORT (25%), RANDALL SALO (25%), 9640355 CANADA CORP. (25%)]
105304	MONTROSE	41P/15	18.46	Boundary Cell Mining Claim	2026-07-27	
105945	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-30	
108149	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
110032	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-11	
111121	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
111675	ARGYLE	42A/02	8.39	Boundary Cell Mining Claim	2026-04-11	
111676	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-11	
115018	BANNOCKBURN	41P/15	20.03	Boundary Cell Mining Claim	2026-07-27	

115366	MONTROSE	41P/15	1.78	Single Cell Mining Claim	2026-07-24	
117511	BANNOCKBURN, MONTROSE	41P/15	14.38	Boundary Cell Mining Claim	2026-07-27	
119023	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-06-08	
126079	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
131168	MONTROSE	41P/15	1.33	Boundary Cell Mining Claim	2026-07-27	
136682	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
138828	ARGYLE, BANNOCKBURN	41P/15	21.60	Single Cell Mining Claim	2026-04-11	
138999	ARGYLE, BANNOCKBURN	41P/15	7.29	Boundary Cell Mining Claim	2026-04-11	
143585	MONTROSE	41P/15	0.46	Boundary Cell Mining Claim	2026-07-27	
143586	MONTROSE	41P/15	21.62	Single Cell Mining Claim	2026-10-20	
144702	BANNOCKBURN	41P/15	21.60	Single Cell Mining Claim	2026-07-27	
149071	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
149723	BANNOCKBURN	41P/15	4.27	Boundary Cell Mining Claim	2026-04-11	
150133	ARGYLE, BANNOCKBURN	41P/15	21.31	Boundary Cell Mining Claim	2026-04-30	
150973	ARGYLE	42A/02	13.60	Boundary Cell Mining Claim	2026-04-09	
151267	HINCKS, MONTROSE	41P/15	21.60	Single Cell Mining Claim	2026-07-24	
151268	MONTROSE	41P/15	4.22	Boundary Cell Mining Claim	2026-07-24	
151269	MONTROSE	41P/15	21.60	Single Cell Mining Claim	2026-07-24	
153125	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
156805	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
157440	BANNOCKBURN	41P/15	21.60	Boundary Cell Mining Claim	2026-07-27	
157441	BANNOCKBURN	41P/15	9.40	Boundary Cell Mining Claim	2026-07-27	
158594	ARGYLE, BANNOCKBURN	42A/02	20.24	Boundary Cell Mining Claim	2026-04-11	
162934	BANNOCKBURN	41P/15	1.30	Boundary Cell Mining Claim	2026-07-27	
164465	BANNOCKBURN	41P/15	21.60	Single Cell Mining Claim	2027-06-08	
165154	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-30	
170072	HINCKS, MONTROSE	42A/02	4.23	Boundary Cell Mining Claim	2026-07-24	
173056	ARGYLE	42A/02	13.56	Boundary Cell Mining Claim	2026-04-11	
173057	ARGYLE	42A/02	7.83	Boundary Cell Mining Claim	2026-04-11	
173568	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-11	
177055	ARGYLE, HINCKS	42A/02	4.83	Boundary Cell Mining Claim	2026-04-11	
182779	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
183187	BANNOCKBURN, MONTROSE	41P/15	6.90	Boundary Cell Mining Claim	2026-07-27	
183835	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
186028	BANNOCKBURN	41P/15	4.24	Boundary Cell Mining Claim	2026-03-30	
189575	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	

190803	ARGYLE, BANNOCKBURN, HINCKS, MONTROSE	42A/02	13.36	Boundary Cell Mining Claim	2026-04-11	
190804	BANNOCKBURN	41P/15	21.60	Single Cell Mining Claim	2026-04-08	
195906	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-11	
198826	HINCKS	42A/02	10.99	Single Cell Mining Claim	2026-07-24	
198828	HINCKS, MONTROSE	42A/02	21.60	Single Cell Mining Claim	2026-07-24	
198829	MONTROSE	41P/15	1.77	Single Cell Mining Claim	2026-07-24	
210183	BANNOCKBURN, MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
210184	BANNOCKBURN, MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
210820	BANNOCKBURN	41P/15	18.55	Boundary Cell Mining Claim	2026-07-27	
210821	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
210822	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
210823	BANNOCKBURN	41P/15	1.73	Boundary Cell Mining Claim	2026-07-27	
211091	ARGYLE	42A/02	4.91	Boundary Cell Mining Claim	2026-04-11	
213595	MONTROSE	41P/15	0.73	Single Cell Mining Claim	2026-07-27	
219471	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
219472	MONTROSE	41P/15	21.62	Single Cell Mining Claim	2026-07-27	
221037	MONTROSE	41P/15	9.92	Single Cell Mining Claim	2026-07-14	
222230	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
222231	BANNOCKBURN, MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
224451	ARGYLE	42A/02	13.13	Boundary Cell Mining Claim	2026-05-29	
226223	MONTROSE	41P/15	0.35	Boundary Cell Mining Claim	2026-07-24	
226767	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
237832	MONTROSE	41P/15	4.78	Boundary Cell Mining Claim	2026-04-11	
237833	MONTROSE	41P/15	4.01	Single Cell Mining Claim	2026-04-11	
238194	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
244632	ARGYLE	42A/02	15.22	Boundary Cell Mining Claim	2026-05-29	
245029	BANNOCKBURN	41P/15	2.60	Boundary Cell Mining Claim	2026-04-11	
246968	BANNOCKBURN, MONTROSE	41P/15	17.11	Boundary Cell Mining Claim	2026-04-11	
251126	ARGYLE	42A/02	2.24	Boundary Cell Mining Claim	2026-04-11	
256834	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
256835	MONTROSE	41P/15	21.62	Single Cell Mining Claim	2026-07-27	
259828	ARGYLE, BANNOCKBURN	42A/02	20.31	Boundary Cell Mining Claim	2026-04-11	
265420	HINCKS	42A/02	11.00	Single Cell Mining Claim	2026-07-24	
265422	MONTROSE	41P/15	21.60	Single Cell Mining Claim	2026-07-24	
265756	ARGYLE	42A/02	13.59	Boundary Cell Mining Claim	2026-04-11	
269844	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	

270654	MONTROSE	41P/15	21.62	Single Cell Mining Claim	2026-10-20	
271285	BANNOCKBURN	41P/15	19.21	Boundary Cell Mining Claim	2026-06-08	
271322	BANNOCKBURN	41P/15	8.58	Boundary Cell Mining Claim	2026-04-11	
272827	HINCKS	42A/02	2.16	Boundary Cell Mining Claim	2026-07-24	
276248	MONTROSE	41P/15	19.67	Single Cell Mining Claim	2026-07-27	
279729	ARGYLE, BANNOCKBURN	42A/02	21.60	Single Cell Mining Claim	2027-04-30	
279730	BANNOCKBURN	41P/15	20.08	Boundary Cell Mining Claim	2027-06-08	
281412	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-11	
288298	MONTROSE	41P/15	3.84	Single Cell Mining Claim	2026-07-27	
288299	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
288806	BANNOCKBURN	41P/15	20.08	Boundary Cell Mining Claim	2026-07-27	
288927	BANNOCKBURN	41P/15	5.74	Boundary Cell Mining Claim	2026-07-27	
293408	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
295556	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
295557	BANNOCKBURN	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
298363	ARGYLE, BANNOCKBURN	42A/02	21.60	Single Cell Mining Claim	2026-04-30	
299745	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
299786	ARGYLE, HINCKS	42A/02	13.29	Boundary Cell Mining Claim	2026-04-11	
302218	BANNOCKBURN	41P/15	12.90	Boundary Cell Mining Claim	2026-04-30	
307054	ARGYLE	42A/02	13.53	Boundary Cell Mining Claim	2026-04-11	
310504	ARGYLE	42A/02	10.97	Single Cell Mining Claim	2026-04-09	
312819	MONTROSE	41P/15	4.13	Boundary Cell Mining Claim	2026-07-27	
312820	MONTROSE	41P/15	21.62	Single Cell Mining Claim	2026-07-27	
313429	BANNOCKBURN	41P/15	3.85	Boundary Cell Mining Claim	2026-07-27	
317111	ARGYLE	42A/02	10.05	Single Cell Mining Claim	2026-04-11	
327687	ARGYLE	42A/02	0.03	Boundary Cell Mining Claim	2026-05-29	
329784	MONTROSE	41P/15	1.21	Boundary Cell Mining Claim	2026-07-27	
329785	MONTROSE	41P/15	0.33	Boundary Cell Mining Claim	2026-07-27	
334464	MONTROSE	41P/15	9.83	Boundary Cell Mining Claim	2026-04-11	
337985	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
339221	ARGYLE, HINCKS	42A/02	12.79	Boundary Cell Mining Claim	2026-04-11	
341199	ARGYLE	42A/02	21.60	Single Cell Mining Claim	2026-04-30	
344166	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-07-27	
344301	MONTROSE	41P/15	21.61	Single Cell Mining Claim	2026-10-20	
		Total (ha)	**1735.02**			

2.2 Property Location

The Project is located in northeastern Ontario (Figure 2) approximately 65km west-southwest of Kirkland Lake and 60km southeast (as the crow flies) of Timmins, Ontario within the Timiskaming District of the Larder Lake Mining Division, approximately 26km west of Matachewan, Ontario, within the western Abitibi Greenstone belt. The approximate centroid of the Project is 48°00'22"N and 80°54'48"W (UTM coordinates 506464E and 5316983N, NAD 83, Zone 17). The Project lies in the townships of Argyle, Bannockburn, Montrose, and Hincks on topographic maps National Topography System NTS map sheets 41P/15 and 42A/02.

Figure 2. The Ashley Project Location Map Within Ontario.

3 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

3.1 Accessibility

Access to the Ashley Project can be easily achieved by first entering the town of Matachewan, Ontario by several paved highway routes from the surrounding cities of Kirkland Lake (60km, ~45 minutes), Temiskaming Shores (100km, ~1 hour), and Timmins (170km, ~2 hours) via highways 66, 65, and 11 respectively. From Matachewan, the Project is accessed by heading west approximately 26 kilometers (33 minutes) along Highway 566, past the Young-Davidson Gold Mine (Alamos Gold) on an all-weather, paved, and packed gravel logging road. A packed gravel logging and mine access road branches off southwest and leads directly to the old Ashley Gold Mine site approximately 1 kilometer from the highway and is easily accessible by truck or SUV during most of the year. Alternatively, access to the property could also be achieved via a network of maintained logging roads directly from Timmins, Ontario, via "Pine St. and Hwy 566, however, a 4x4 vehicle and satellite communication is recommended if this route is utilized and should only be used during summer months.

3.2 Local Resources

Matachewan, Ontario, a small growing community can be utilized for lodging, fuel, core logging, and limited food supplies, and Kirkland Lake, an established town of 8,248 is resource based and home to numerous mining contractors and businesses. Matachewan being the first point of contact for Alamos Gold's Matachewan Young-Davidson Mine operations and Kirkland Lake being host to the mining developments of Kirkland Lake Gold.

The Project area is also well serviced by mining and milling industries. The closest hospitals and airports/heli-bases are located in Timmins and Kirkland Lake, while the nearest CN Rail station depot is located in Matheson, Ontario approximately 70km northeast of the Project area.

Qualified personnel can be found easily throughout the Abitibi and Sudbury regions as they have rich histories of forestry, mineral exploration, and production.

3.3 Infrastructure

High tension power is available up to Alamos Gold's Young-Davidson mine located approximately 22 kilometers southeast and residential power lines are located up to 13 kilometers east of the Project along Highway 566 and could easily be extended to the Ashley Project site. The project is situated near sources of water that could be utilized for future exploration and development. An up to 8,000 tpd mill is located at Alamos Gold's Young-Davidson mine which is calibrated to process ore similar to that found on the Ashley Project and is not at full capacity.

A nearby, multi-cabin hunting and fishing lodge named Argyle Lake Lodge can be rented and utilized for accommodation of drillers and workers during the months of May to October.

No usable infrastructure currently exists within the Project boundaries, nor is planned for the Project's current stage. The author is not qualified to assess on-site suitability for infrastructure development, however, there potentially exists sufficient surface area within the current claims to utilize in potential future tailings, waste disposal, heap leach pad areas, and processing plants.

3.4 Physiography and Climate

The Ashley Project is within a typical boreal forest environment that has been burned by forest fires and logged repeatedly. Topography, for the most part, is low relief with generally poor bedrock exposure in low-lying outcrops and isolated ridges, and gently rolling sand plains related to past glacial activity. Elevations range from 350m to 370m above mean sea level. Limited bedrock exposures have been trenched in the past, but most of the property is covered with a sandy, boulder till. Overburden depths are generally less than 10m as judged from past drilling. The thin cover supports growths of pine and birch vegetation, with lesser spruce, fir and poplar depending on the soil type and drainage. Low-lying areas in the northeast and southwest parts of the property are characterized by cedar and cedar-alder swamps, with variations of alder, cedar, and cattail swamps along the Whitefish River system at the western fringes of the claims. The climate is northern temperate with warm summers and cold winters. Temperatures range from +30 degrees Celsius in the summer to -40 degrees Celsius in the winter. The ground is usually covered with snow between mid-November and mid-April making it inaccessible for general geological ground work. However, thanks to the abundance of continually maintained roads and trails and proximity to large water sources, the Project has a year-round operating season for activities such as drilling and ground geophysics.

4 HISTORY

Gold was discovered at the Ashley Gold Mine in 1931. Historic reports show that between 1932 and 1936, approximately 50,123 ounces of gold and 7,344 ounces of silver was mined and recovered from the Ashley Gold Mine at an average grade of 0.32oz (~11g) Au/t ore. It is postulated that a severe depression of gold prices led to the mine shutting down. Soon after, several gold showings, including the Garvey, Sunisloe, Ezra, McGill, and Montrose were discovered in the vicinity.

Some historic regional exploration work (e.g. geophysical and geochemical surveys) have more recently been carried out on large portions of the Ashley Project, however, the majority of historical work within the Ashley Project and immediate vicinity is diverse but scattered, focusing on several prospects and potential areas within the Project's region since the former Ashley Mine was discovered and developed. Each company carried out site-specific prospecting and/or exploration work on isolated claim groups or survey blocks within the Project area based on the "patchwork" and ever-changing ownerships since 1930 without an amalgamated regional view and approach for systematic exploration.

4.1 Historic Work Performed

A summary of all historic exploration work conducted on the Project is presented in Table 2.

It is evident that the Project area has been subject to numerous boundary modifications based on ownerships in the past years that resulted in a very narrow-focused exploration mindset isolated to a few specific zones at any given time and hindered the systematic exploration approach that is really required to properly investigate the Ashley Project. A few companies (e.g., Petromet in 1982; Homestake in 1990; Kiernicki in 1990; Mhakari in 2009; and Prosper in 2016/2017) did, however carry out relatively systematic work over specific areas, but in general the historical work can be classified as individual prospecting for each potential prospect and area.

The following are summaries of a few significant works conducted by previous operators:

During the period of 1980 to 1983, Petromet Resources Limited acquired the Ashley Gold Mine property and carried out geological, geophysical, trenching, sampling, and diamond drilling while exploring and aiming to develop the Ashley Gold Mine. The work included prospecting, mapping, and geophysics on the Garvey and Garvey South occurrences as well.

In 1998, Patrician Gold Mines completed grid mapping and reconnaissance geochemical sampling of the Garvey veins and a four (4) kilometer grid for geological mapping and collected 98 samples from on or near the various Garvey vein occurrences.

A significant amount of exploration was carried out on the Project area by Phoenix Matachewan Resources between 2002 and 2004. The entire property was prospected with approximately 213 samples being collected and assayed for gold. Some 43 of those samples were also analyzed for multi-elements by ICP-MS. Approximately 115 line-km were cut in preparation for IP and magnetometer surveys that were completed along the cut grid. A 16-hole drill program (news release dated July 21, 2009) was also apparently completed in 2004 testing for high grade, near surface mineralization at the Garvey occurrence. They reported intersections that range from 0.7 g/t Au across 0.5 meters up to 24 g/t Au across 0.6 meters. however, no record of this drilling was filed for assessment and no other records exist; therefore, the author cannot comment further.

Six (6) airborne geophysical surveys have been conducted by various operators over the years encompassing at least a portion of the Project area. The most recent and significant of these was a helicopter-borne multi-parameter geophysical survey conducted by Mustang Mineral Corp. in 2004, however, the electromagnetic (EM) survey was targeting Ni-Co-PGM mineralization, but the acquired data could be re-processed to potentially outline gold-bearing anomalies as well.

In 2015, an approximate 47 line-km prospecting mission was carried out by four prospectors (current Property Owners) within the Ashley Project. In total, 74 grab samples and 14 soil samples from different localities were collected, catalogued, and sent for assay including the five (5) main occurrences. The grab sample assay results returned with promising gold values ranging from below detection (<0.02 g/t Au) up to 672 g/t Au with five of the samples having values greater than 100 g/t Au.

The most significant modern exploration on the Project area was carried out by Prosper Gold Corp between 2016 and 2017. In 2016, the entire Project and surrounding area was flown with airborne magnetics, gravimetric, conductance, and radiometrics in conjunction with a large B-horizon soil survey over two grids covering approximately 2,628ha resulted in the collection and analysis of 4,538 soil samples. A 23-hole diamond drill (NQ) program was completed, totaling approximately 8,591 meters mainly within the Ashley Mine to Garvey corridor, however, all the 2016 drill data including locations, downhole logging, sampling, and physical properties was apparently lost and not filed for assessment. In 2017, Prosper Gold completed a 24-hole diamond drill (NQ) program, totaling 8,911.7 meters throughout the area, however, only nine (9) of the holes totaling approximately 2,634 meters were within the current Project bounds.

Table 2. Summary of Historic Exploration Work Carried Out on the Project to Date.

*Note: the quantity represents the number of exploration programs and does not indicate quantities for units.

Exploration Activities	# of Surveys	Type of Work	Remarks
Airborne Geophysics	7	Magnetic, electromagnetic, radiometric	The Prosper surveys cover all of Project.
Ground Geophysics	18	Mag, VLF, EM, IP	Carried out on specific targets.
Soil Sampling	1	Grid-sampling	Grid sampling covers almost all Project.
Geological Mapping	3	Trenching, mapping	Some of the mapping program also includes sampling programs.
Rock Sampling	2	Grab sampling, chip sampling	Focused on specific areas.
Prospecting	6	Traversing and sampling	Prospecting programs focused on specific area and do not cover the whole property.
Stripping and Trenching	4	Bed rock stripping	Focused on specific areas in the Project.

5 GEOLOGICAL SETTINGS AND MINERALIZATION

5.1 Regional Geology

The Ashley Project is located within the western Abitibi Greenstone Belt, which is the largest preserved Archean greenstone belt in the world and one of the most continuous units of the Superior Geologic Province and is underlain by Archean greenstone deposited approximately 2.7 Ga (Figure 10). The Abitibi Greenstone Belt extends for 750km from the Grenville Province in the east to the Kapuskasing Gneiss Belt in the west, and for over 170km from the Opatica Gneissic belt in the north to the Proterozoic Huronian sediments in the south. The belt contains abundant orogenic gold deposits, volcanogenic massive sulfide, and copper-nickel (PGE) deposits (Card and Poulsen 1998) (Figure 3). Mafic to felsic volcano-sedimentary strata predominate throughout the belt, but ultramafic volcanic and alkali-intrusive rocks are common. Sedimentary rocks consist of both chemical and clastic varieties and occur as both intravolcanic sequences and as unconformably overlying sequences and generally metamorphosed to greenschist facies. A wide spectrum of mafic to felsic, pre-tectonic, syn-tectonic, and post-tectonic intrusive rocks are present. All lithologies are cut by late, generally northeast-trending Proterozoic diabase dykes.

Sub-horizontal sedimentary rocks of the Proterozoic Cobalt Group unconformably overlies the Archean rocks south of the Ashley Project area. They consist primarily of sandstone, arkose, conglomerate, wacke, argillite, and siltstone classified as Gowganda Formation. Huronian Cobalt Group metasedimentary rocks are found at the southwest side and southeast corner of the Ashley Project area.

The western Abitibi Greenstone Belt is separated into eight volcano-sedimentary assemblages based on lithology and stratigraphic relations (Table 3). These Assemblages are intruded by four suites of plutonic rocks differentiated by lithology and timing relationships (Ayer et al., 2005).

The Abitibi Greenstone Belt rocks have undergone a complex sequence of deformation events ranging from early folding and faulting through later upright folding, faulting, and ductile shearing resulting in the development of two large, dominantly east-west trending, steeply dipping crustal-scale deformation corridors of branching, high strain zones (“breaks”) that form lozenge-like patterns. The Destor-Porcupine system on the north and the regional Larder Lake-Cadillac Fault Zone (LLCFZ) (Figure 4) that is believed to cut across the Ashley Project within a direct splay known as the Galer Fault. The LLCFZ has a sub-vertical dip, and generally strikes east-west. The LLCFZ is characterized by chlorite-talc-carbonate schist, and the deformation zone can be followed for over 300km from west of Kirkland Lake, Ontario and the Ashley Project eastward to Val d’Or, Quebec. It is believed that early, dominantly extensional deformation of the LLCFZ may be related to extrusion of the Timiskaming alkaline metavolcanic and metasedimentary rocks significant to economic mineral deposits.

Table 3. Geological assemblages/formations of the western Abitibi Greenstone Belt

***(after Hedalen et al., (2019).**

Assemblage	Age (Ma)	Thickness (km)	Dominant Rock Types
Timiskaming	2677 - 2670	<3	Polymictic conglomerate and sandstone in subaerial alluvial fan, fluvial and deltaic settings; local alkaline volcanic rocks
Porcupine	2690 - 2685	<3	Local calc-alkaline felsic pyroclastic rocks overlain by turbiditic argillite to wacke
Blake River	2704 - 2695	~11-17	Minor metaclastic rocks and high Mg and Fe tholeiite, overlain by mafic to felsic tholeiitic to calc-alkaline volcanic rocks
Tisdale	2710 - 2704	~10-15	Mafic volcanic rocks with ultramafic and intermediate to felsic volcanic rocks, iron formation; overlain by intermediate to felsic, calc-alkaline, amygdaloidal flows, heterolithic volcaniclastic rocks
Kidd-Munro	2719 - 2711	~10	Intermediate to felsic calc-alkaline volcanic rocks, overlain by mafic volcanic rocks with local ultramafic and felsic volcanic rocks and graphitic metasedimentary rocks
Stoughton - Roquenmare	2723 - 2720	<12	Tholeiitic basalts with komatiites and local felsic volcanic rocks
Deloro	2734 -2724	~5	Mafic to felsic calc-alkaline volcanic rocks with local tholeiitic mafic volcanic rocks capped by iron formation
Pacaud	2750 - 2735	~5	Ultramafic, mafic, and felsic volcanic rocks with minor iron formation
Pre – 2750 Ma	>2750	~5	Intermediate to felsic, calc-alkaline pyroclastic rocks capped by iron formation

Gold deposits in the Abitibi Greenstone Belt are spatially related to the two fault systems and follow them along the entirety of known strike length and splays for some 300km. Canada's largest producing gold camps are along these two fracture systems. Intense ductile deformation followed Timiskaming timing and resulted in the Larder Lake-Cadillac Fault Zone, the southern structural corridor. This event is also thought to have produced D2 structures with reverse-dextral movement. Following the D2 event, deformation changed to dominantly NW-SE extension. This produced brittle-ductile northeast striking, steeply south dipping faults characteristic of the Kirkland Lake fault zone and referred to as D4 structures. Much of the gold in the Larder Lake deposits is associated with the D2 event, while Kirkland Lake deposits relate to D4 structures.

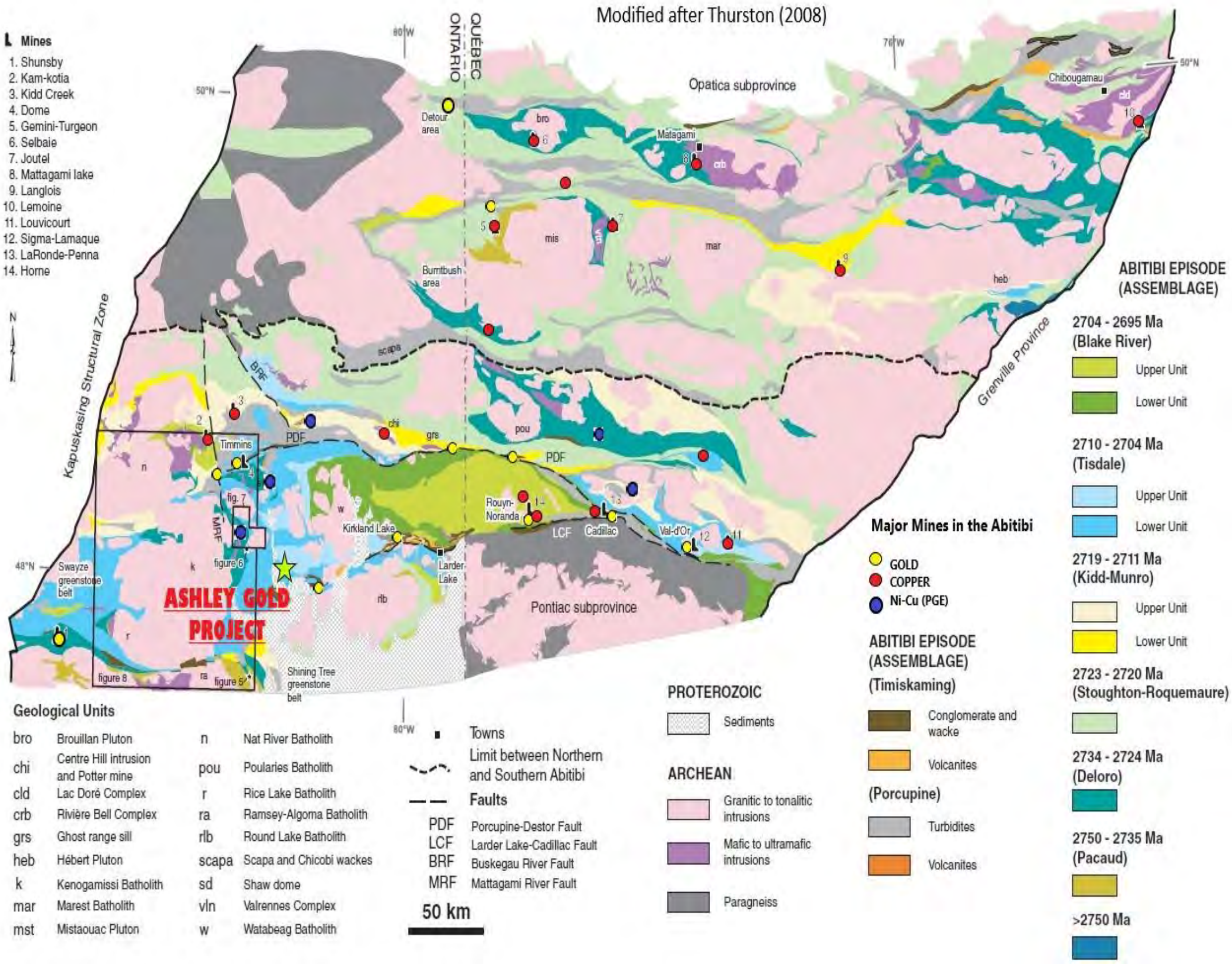

Figure 3. Abitibi Greenstone Belt Geology with Major Cu, Au, and Ni-Cu (PGE) Mines

North trending Matachewan diabase dykes, obvious from, and accurately defined by, total field magnetic surveys, intruded the Archean rocks in a concluding event. They are widespread and voluminous near Matachewan but less so on the Ashley Project area (Rainsford, 2005). Sudbury diabase and Olivine diabase dykes are also present throughout the region. Surficial deposits consist of glacial till with relatively little glaciofluvial and glaciolacustrine material. Grooves, striae, chattermarks, roches moutonnee, crag, tail features, and glacial flutings indicate that glacial ice flow was to the south-southeast (Bajc and Crabtree, 2001).

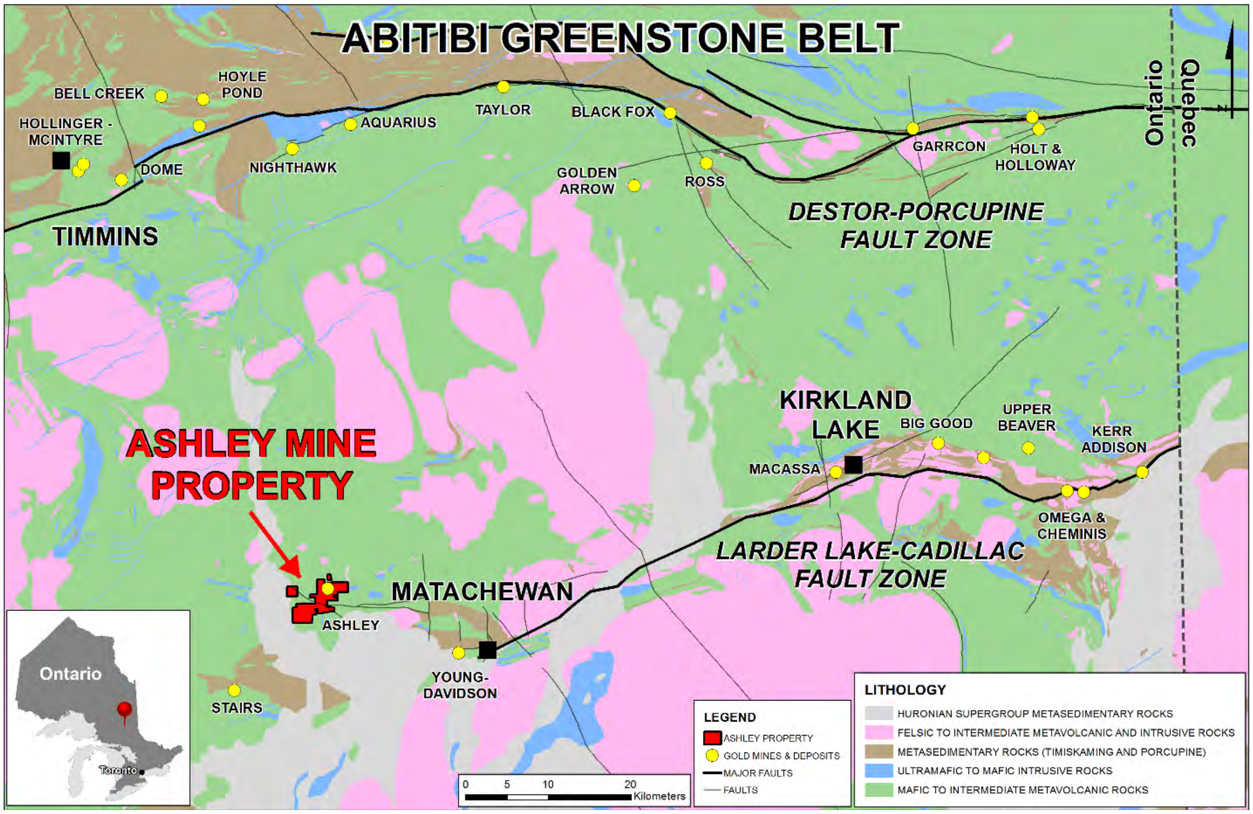

Figure 4. Local Regional Geology Including Major Producers and Project Location.

5.2 Property Geology

From south to north the geology of the Ashley Project area includes Archean, north-dipping, lower mafic, calc-alkalic volcanic flows (Lower Tisdale) (Prefontaine et al., 2019), overlain by tholeiitic basalt (Upper Tisdale) with pebble metaconglomerate, metasiltstone, and metasandstone (Timiskaming) along their contact. The Montrose formation (2714-2711 Ma) of the Kidd-Munro assemblage is overlain by the Geikie (circa 2704 Ma) and Little Night Hawk (2703-02 Ma) formations of the Tisdale assemblage. Strata trend toward WNW (Figure 5), dip steeply NNE and the sequence generally faces north. Intrusive rocks include peridotite, pyroxenite, syenite, diorite, and diabase. Metamorphism in the Archean bedrock ranges from sub-greenschist to lower amphibolite facies. A majority of the Project geology was extracted from Hedalen et al., (2019).

The Upper Tisdale Assemblage on the Ashley Project consists of calc-alkaline mafic to felsic metavolcanics readily distinguished by feldspar phenocrysts. Trachytoid-textured flows have been described in the Upper Tisdale close to syenite intrusions. The contact between the Lower and Upper Tisdale metavolcanics coincides with or parallels the Larder Lake-Cadillac Deformation

Zone. Thin sheets of syenite porphyry, metasiltstone, and metasandstone are found locally along the contact. Whether the contact is conformable or deformed is unknown.

Dykes and irregular shaped plugs of intermediate to felsic feldspar-quartz porphyry are found throughout the Project and are most common and volumetrically important in the center of the Project, close to the Upper-Lower Tisdale contact. Larger bodies of intermediate to felsic stocks, up to a kilometer across, are typically porphyritic, medium-grained, and grey to pink coloured. They tend to intrude the Upper Tisdale Assemblage. Smaller porphyries and syenite dykes on the scale of meters or tens of meters range in colour from pink to red. They are generally aligned with the foliation and Larder Lake-Cadillac trend. Syenite porphyries are also exposed as host to or associated with quartz veins. Hematitic and potassic alteration is common especially where fabric and/or quartz veining is well-developed.

Several north trending diabase dykes are known within the Project bounds. Regional metamorphic gradients within the western Abitibi sub province may be important to the localization of gold deposits (Thompson, 2005 and Ayer et al., 2005). Thompson (2005) identified a roughly circular metamorphic halo grading from lower greenschist to transitional greenschist amphibolite facies broadly centered on the Hincks-Argyle township boundary just north of the historic Ashley Mine. The halo may mark a buried alkalic intrusion, especially given that several small alkaline and porphyritic intrusive bodies are exposed within it.

The Larder Lake-Cadillac Fault Zone with its branch, the Galer Fault (Figure 6) dominates the structural geology of the Project area. The system, traced for 350km plus eastward from the Project, is a NE-SW trending, steep dipping, anastomosing zone of concentrated strain with strike slip and vertical components with the Galer splay trending off in a NW-SE orientation. The deformation zone incorporates slices of intrusive rocks, Timiskaming sedimentary rocks, and ultramafics along its length. The breaks appear to also track stratigraphic discontinuities. The northern structural break coincides with the Lower-Upper Tisdale transition. The southern break, the Galer fault, is marked by a zone of deformation containing slices of sedimentary and intrusive rocks. The two structural breaks transect the roughly circular metamorphic gradient.

The auriferous quartz veins on the Ashley Project are hosted by Geikie formation tholeiitic flows. Veins of the Ashley system appear to be within a minimum 1,500m by 500m, northwest-southeast trending corridor on the north-end of the Project mostly consisting of massive to pillowed mafic metavolcanics of the Geikie formation (Tremblay, 1982). The pillows are elongated in a northwest direction and face northeast illustrating that the stratigraphic units strike northwest and dip steeply with tops facing northeast (McLellan, 2019).

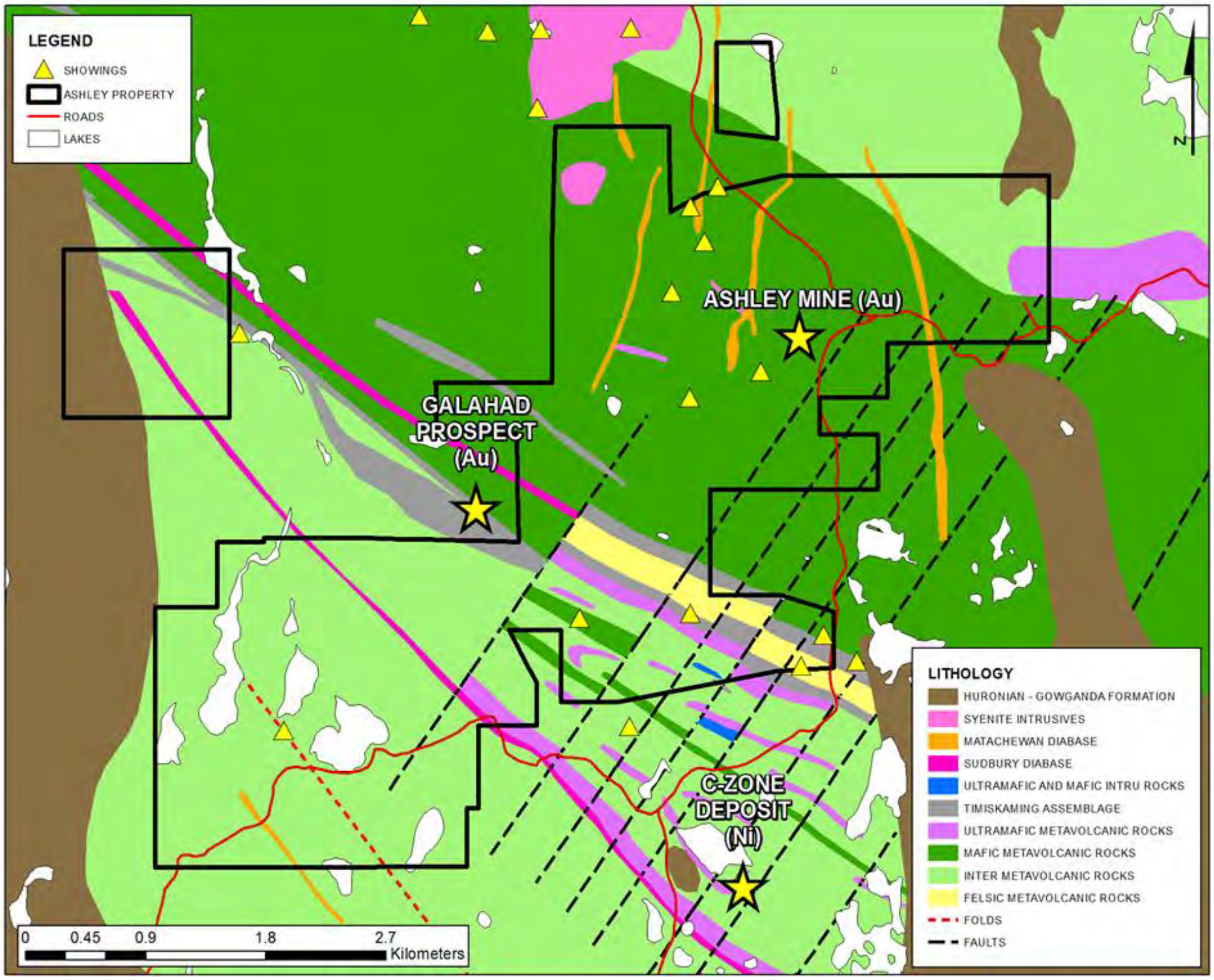

Figure 5. Ashley Project Local Geology and Gold Occurrences.

5.2.1 Lithological Descriptions

The lithologies found within the Ashley Project are best described by Tremblay (1982) and summarized in Table 4. Based on exposed outcrops on the Project, the metabasalts are the most common rocks and can be classified into three distinct facies (massive, pillowed, and variolitic/hyaloclastic). Table 4 provides a description summary of lithologies within the Project.

Table 4. Lithological description of different rock units within Ashley Project

**(summarized from Tremblay, 1982)*

Lithology	Descriptions
Diabase Dykes	Matachewan diabase dykes – the youngest rocks exposed on the property. Strike N-S to NNW. The biggest dyke recorded to be 50–75m wide. Dykes are medium grained, dark grey in colour and contain equal proportions of feldspar and mafic minerals. They are generally magnetic and contain fine-grained disseminated magnetite.
Feldspar Porphyry Dykes	The feldspar porphyry dykes are brick red on weathered and fresh surfaces. Phenocrysts consist of euhedral tabular feldspar which are sometimes zoned and vary in size from 5mm to 1.2cm. Minor quartz phenocrysts up to 3mm are also noted. The groundmass is fine-grained crystalline consisting predominantly of pink feldspar with minor quartz.
Quartz Feldspar Porphyry	Has a pinkish buff weathered surface while the fresh surface is greenish. Phenocrysts are prominent on the weathered surface and are comprised of 2–3mm anhedral quartz and euhedral tabular plagioclase from 3-5mm in a fine-grained crystalline felsic groundmass.
Porphyry	The quartz-feldspar porphyry body mapped on the W part of the property is interpreted to be a stock. Contacts are interpreted as faults from the ground magnetic data. Contacts between porphyries and volcanics are usually sharp and display only minor thermal metamorphism in the country rock. xenoliths are absent in the porphyries.
Andesite Pyroclastic	Greenish-buff on weathered surface and grey-green on the fresh surface. Fragments are prominent on the weathered surface and occur as subrounded clasts ranging from 2 to 18cm. Most clasts consist of porphyritic andesites containing anhedral feldspar phenocrysts in a porphyritic andesite matrix. Greywacke fragments were noted.
Massive Rhyolite	Massive rhyolite has a characteristic bone-like weathered surface and a light grey-green fresh surface. Unit is fine-grained to very fine-grained, has a sugary texture and contains small (1mm) scattered subhedral to euhedral quartz phenocrysts.
Intermediate-Felsic Metavolcanics	Felsic to intermediate flows and pyroclastics overlie metabasalts. On NE end of the Project, a NW trending massive rhyolite unit overlies the metabasalts. To the NW, metabasalts are overlain by an intermediate pyroclastic sequence. The sequence is disrupted by faults and/or intrusions in the western part of the Project. The pyroclastic sequence is indicated to occupy synclinal basin whose axis is located north of the property.
Variolitic Basalts	Occur as round to oval, light-colored felsic blebs within a fine-grained black basaltic matrix. The varioles vary from 3mm to 3cm in diameter and may combine to form irregular felsic zones within the basalt. Most common within pillowed lavas.
Pillowed Basalts	Two types are identified: 1) pillowed basalt with pillows usually less than 0.5m long and with pillow rims usually less than 1cm wide; and 2) pillowed basalt with pillows approximately 1m long and characterized by thick 2cm+ pillow rims. The pillow basalts are generally fine-grained to aphanitic.
Massive Basalts	Massive basalts vary from fine-grained, aphanitic to medium-grained, gabbroic rocks. The fine-grained basalts are black in colour. Near quartz veins the basalts become silicified and epidotized containing sulfide (pyrite) disseminations. Medium-grained, massive basalts are greenish black, crystalline, and often contain fine disseminated magnetite.

5.3 Structure

Structures on the Ashley Project studied and described by Tremblay (1982) are the following:

The volcanic sequence is north-facing and trends from NNW on the southeastern part of the Project to northwest on the northern part of the Project (Figure 6). Most of the information on stratigraphic trends is provided by pillow lavas. A variolitic basalt unit mapped in the central part of the Project substantiates the trends indicated by pillow lavas. The mafic volcanic sequence is located on the south limb of a major synclinal basin whose core is occupied by the intermediate pyroclastics and minor rhyolite mapped on the northern part of the property. The axis of this fold was not mapped but regionally it is indicated to trend E-W. The change in trend from NNW to NW probably reflects a broad open fold with a N-S axis.

Several faults are interpreted on the Project (Figure 6). Two moderately dipping faults were reported in the Ashley Mine underground workings. One fault was reported as NE trending and the second fault was subparallel to the Ashley vein (north-south).

Three ENE trending faults and one NNE trending fault were interpreted from both ground magnetics data and geological mapping. The first fault trends ENE through Petromet's 1982 BL100N survey grid line at the approximate 115W survey line marker (Figure 6). A left lateral displacement of some 500 meters is indicated by both the interpreted displacement of a diabase dyke and the displacement of the basalt-andesite pyroclastic contact. A second ENE-trending fault passes through BL100N near line 122E. This fault is indicated to be the contact between volcanic lithologies to the east and the quartz feldspar porphyry stock to the west. A third ENE-trending fault-is interpreted to extend through BL100N survey grid line at the approximate 127W survey line marker. This fault is indicated to occur in the quartz feldspar porphyry stock. An NNE-trending fault is interpreted to extend through BL100N near the line 129W marker. This fault is at the contact between mafic volcanic lithologies to the west and the quartz feldspar porphyry stock. The sense of movement on the last three faults is not known but the two ENE faults could be interpreted as the faults bounding a horst block of quartz feldspar porphyry.

Three main fracture patterns and joint fracture sets were identified. The first joint set trends N-S to NNW and is generally steeply dipping (~90°). This set is related to the diabase dyke trend and probably reflects the fracture pattern controlling these dykes. The second joint set trends E-W to ENE and dips shallowly (20-40°) to the north. The Garvey and Garvey South veins are likely controlled by this fracture set. A third joint set (less prevalent than the above joint sets) trends NE to NNE and generally dips moderately (30-50°) NW or SE. The northeast trending vein explored for 200 meters on the second level of the Ashley Mine may be controlled by a fracture zone related to this joint set. The 10cm wide Garvey quartz veins exposed in the Petromet, 1982 trenching is also indicated to be controlled by this joint set.

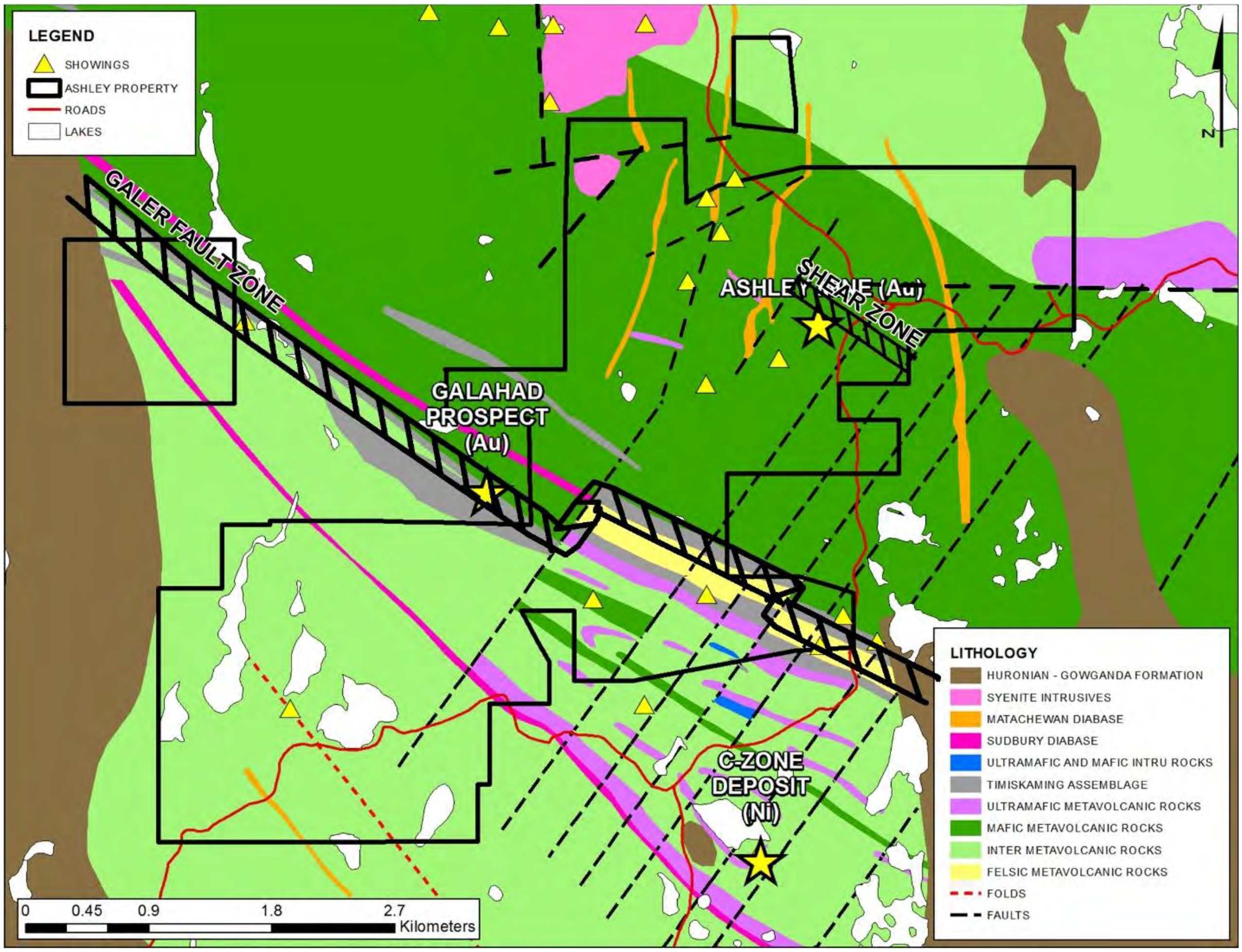

Figure 6. Structures on the Ashley Project.

5.4 Mineralization

Gold mineralization occurs in several quartz veins situated at varying localities and orientations throughout the Project (Figure 7). The veins are characteristically shallow dipping (between 30 and 55 degrees), vary from 1-2 feet (30-60cm) thick, and have associated pyritized, hematized, and epidotized basaltic host wall rocks. Wallrock alteration rarely extends more than a few centimeters beyond vein contacts and hydrofracturing. Native gold and gold tellurides are documented to occur within quartz and quartz-carbonate veins throughout the Project. Higher grade gold areas located within the Ashley Mine and Garvey surface exposures reportedly contained much visible gold and associated tellurides.

The following zones/occurrences have been explored by previous workers on the Ashley Project.

5.4.1 Ashley Vein

The Ashley quartz vein which has been subject to mining activities between 1932 and 1936 occurs predominantly in Archean basalt and is known to extend at least 610m. The vein strikes approximately 170° and has an average dip between 40° and 50° west. The vein is not exposed at surface and has been studied during underground workings at the former Ashley Mine by previous explorers (Rickaby 1932). Historical reports of ore minerals within the Ashley vein include pyrite, galena, sphalerite, chalcopyrite, altaite, native gold, and specularite which occur along fractures in the quartz. The course-grained pyrite was usually an indicator of high-grade ore. Fine-grained galena and altaite and course crystals of sphalerite are lesser constituents of the quartz vein. Native gold occurs as fine particles and small blebs associated with pyrite and altaite.

5.4.2 No. 1 Vein

The No. 1 vein surface expression is located 30m east of the Ashley Mine shaft. The vein strikes 155° and dips an average 30° west. The No. 1 vein is generally less than 30cm thick and consists of quartz containing variable quantities of sulfides, gold, and tellurides. Sulfides consist of blebs and aggregates of pyrite and minor chalcopyrite, galena, and sphalerite in the vein, and disseminations of pyrite in the adjoining iron carbonate altered basalts. Altered basalt around the quartz vein consists of variable degrees of silicification, carbonatization, epidotization, and hematization. The vein occupies a fracture zone in the basalt and there is generally no evidence of shearing in the vein or hosted basalt.

5.4.3 Garvey Vein

The Garvey occurrence is located 1.4km NW of the Ashley Mine, hosted between the massive and pillowed basalts of the Lower Tisdale Assemblage. Previous work has blasted and exposed the thicker part of the vein on the west bank of a narrow, deeply incised creek that appears to possibly be a significant north-south structure in the area. The Garvey quartz vein typically varies between 20cm and 50cm wide, strikes between 220° and 240°, and dips 20° to the north. The quartz is milky bull white and exhibits a sugary texture. Fine flaky visible gold has been described to occur within the quartz vein and is associated with pyrite, galena, and trace sphalerite and chalcopyrite. Three grab samples of the vein were collected by Walker, (2009), one of the host rocks and the two of the quartz veins approximately 100m apart along strike. Grab samples of the quartz vein assayed 45.0 g/t and 26.1 g/t Au, confirming the presence of high-grade gold within the vein and along its strike. The host rock reported an assay of 60 ppb Au. A bulk sample of 26 tons taken from the vein reported to have yielded 0.86 oz Au/t (Tremblay, 1982).

Drilling at the Garvey vein in 2004 by Phoenix Matachewan Inc., completed approximately 14 drill holes (press release dated July 26, 2004) to test the potential for a high grade, low tonnage, near surface deposit. They reported intersections ranging from 0.7 g/t Au across 0.5m up to 24 g/t Au across 0.6m. No assessment work was filed for this data and cannot be verified.

5.4.4 Garvey South

The Garvey South vein is located along the Argyle and Bannockburn Township boundary, approximately 500m south of the Garvey occurrence. Several trenches are present in the area, including two deep pits developed by previous explorers over and adjacent to the vein surface exposure. Gold is associated with a 100° striking quartz vein, dipping 20° to the south that has been traced for at least 135m and observed ranging from less than 1cm up to 30cm wide. Host rock alteration adjacent to the quartz vein is typically comprised of silicification, iron carbonate, and pyrite haloed up to 10cm away from the quartz vein. Reported historic grab samples from the Garvey South occurrence range from below detection (<0.01 g/t) up to 29 g/t Au. Drilling completed by Ashley Mining Corporation in 1938 reported "good" gold values from two drill holes on the east end of the vein and low gold values in the remaining five drill holes (Tremblay 1982) but these files were lost in a subsequent fire. Grab samples collected during prospecting completed by Walker, (2009), reported 3.7 g/t, 0.4 g/t, and 0.3 g/t Au from the Garvey South quartz veining and 0.5 g/t Au from the iron carbonate altered host rock basaltic metavolcanics.

5.4.5 Garvey East

The Garvey East occurrence, alternatively known as the Garvey Parallel occurrence is located approximately 50m to 60m northeast of the Garvey occurrence proper, striking approximately 240° and dipping 30° to the north. The Garvey East vein has not been detail studied by previous explorers and remains subject to further exploration work. Previous historic grab samples (Jones and Wagg, 2003) from the occurrence are reported as 0.35 oz/t, 0.03 oz/t, and 0.195 oz/t Au, equivalent to approximately 11.20 g/t, 0.96 g/t, and 6.24 g/t Au collected from a shallow dipping quartz vein and porphyry.

5.4.6 Ashley West / Kiernicki

The Ashley West occurrence was discovered during a stripping program by Fred Kiernicki in 1987 approximately 400m south-southwest of the Garvey South occurrence. It was characterized as a series of hematized breccias and fracture zones with quartz stringers, silicification, and pyrite. A single grab sample from the occurrence was reported to be 0.34 oz/t Au (10.88 g/t Au equivalent). A vertical 242-foot drill hole was completed in 1991 that intersected several quartz veins, however, the highest gold assay reported was only 0.004 oz Au/t. (Kiernicki, 1991).

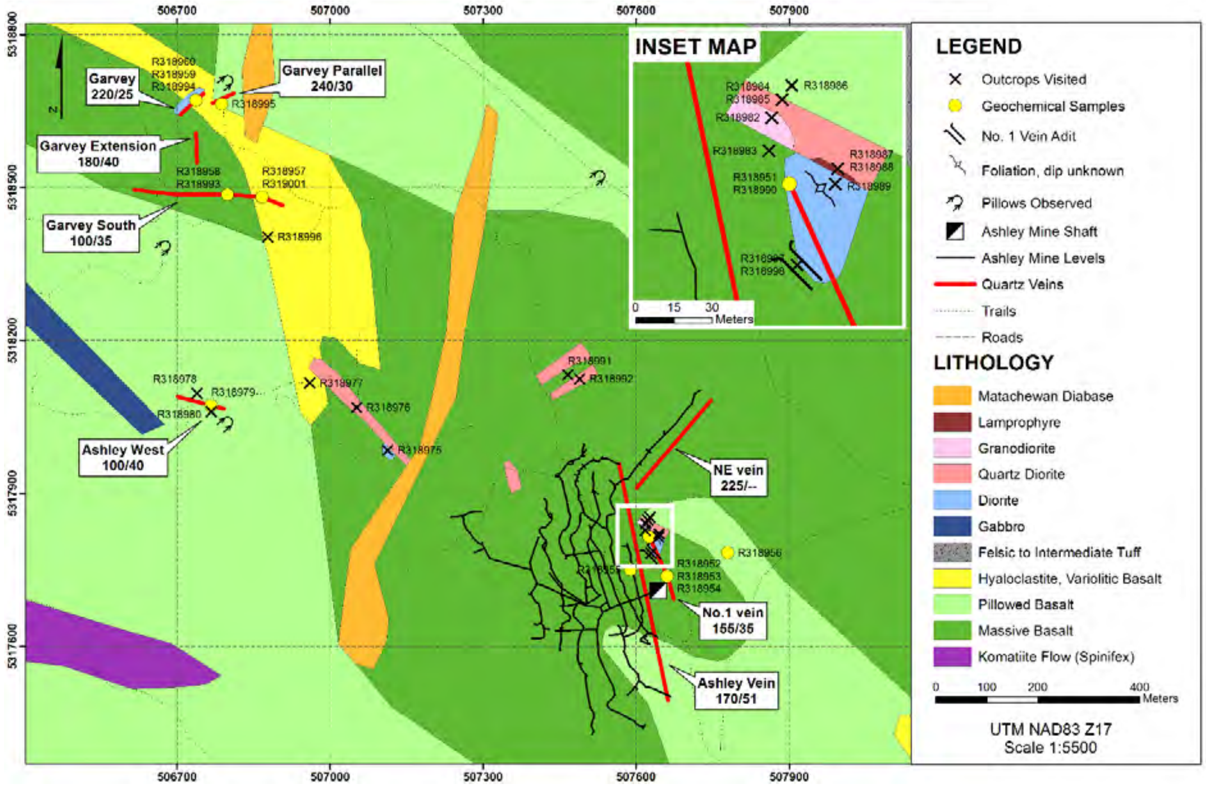

Figure 7. Ashley Project Gold-Bearing Quartz Vein Locations.

6 DEPOSIT TYPES

Despite being explored and locally mined, the overall Ashley Project is still considered to be an early-stage project in need of systematic exploration using modern techniques. Considering the regional geological settings in conjunction with associated structures, there exists high potential for discovery of syenite-hosted and Archean lode gold deposits on the Project as suggested by Hedalen et al., (2019) and agreed with by the author.

6.1 Syenite-hosted gold deposits

The syenite-hosted gold deposits commonly associated with quartz-monzonite to syenite stocks and dikes are well represented in the Abitibi Greenstone Belt, particularly within the Porcupine and Kirkland Lake districts of northern Ontario.

According to Robert (2004), the syenite-hosted gold deposits occur mainly along major fault zones (Figure 8), in association with preserved alluvial-fluvial, Timiskaming-type, sedimentary rocks. Robert (2004) describes the gold mineralization in these deposits as being represented by disseminated sulfide replacement zones, with variably developed stockworks of quartz-carbonate-K-feldspar veinlets within zones of carbonate, albite, K-feldspar, and sericite alteration. Syenitic intrusions are broadly contemporaneous with deposition of Timiskaming sedimentary rocks and together with disseminated gold mineralization; they have been overprinted by subsequent regional folding and related penetrative cleavage.

Disseminated gold mineralization occurs within the composite syenitic stocks or along their margins, along satellite dikes and sills, and along faults and lithologic contacts away from intrusions. It has been interpreted that the mineralized bodies are proximal to distal components of large magmatic-hydrothermal systems centered on, and possibly genetically related to, the composite syenitic stocks (Robert, 2004).

The Young-Davidson deposit, also located in the Abitibi Greenstone Belt, just west of Matachewan, Ontario can be classified as an Archean, syenite-hosted gold deposit. The gold mineralization is primarily related to quartz veinlet stockworks and disseminated pyrite mineralization, mostly enclosed within the syenite intrusion boundaries, or very close to the contacts with the enclosing rocks and is frequently associated with broader zones of potassic alteration (Volk, 2017). This type of mineralization is similar to the Yilgarn block (Kalgoorlie, Western Australia). However, in the Yilgarn block, the gold mineralization is related to the contacts of granitoid host rocks (Evans, 2007).

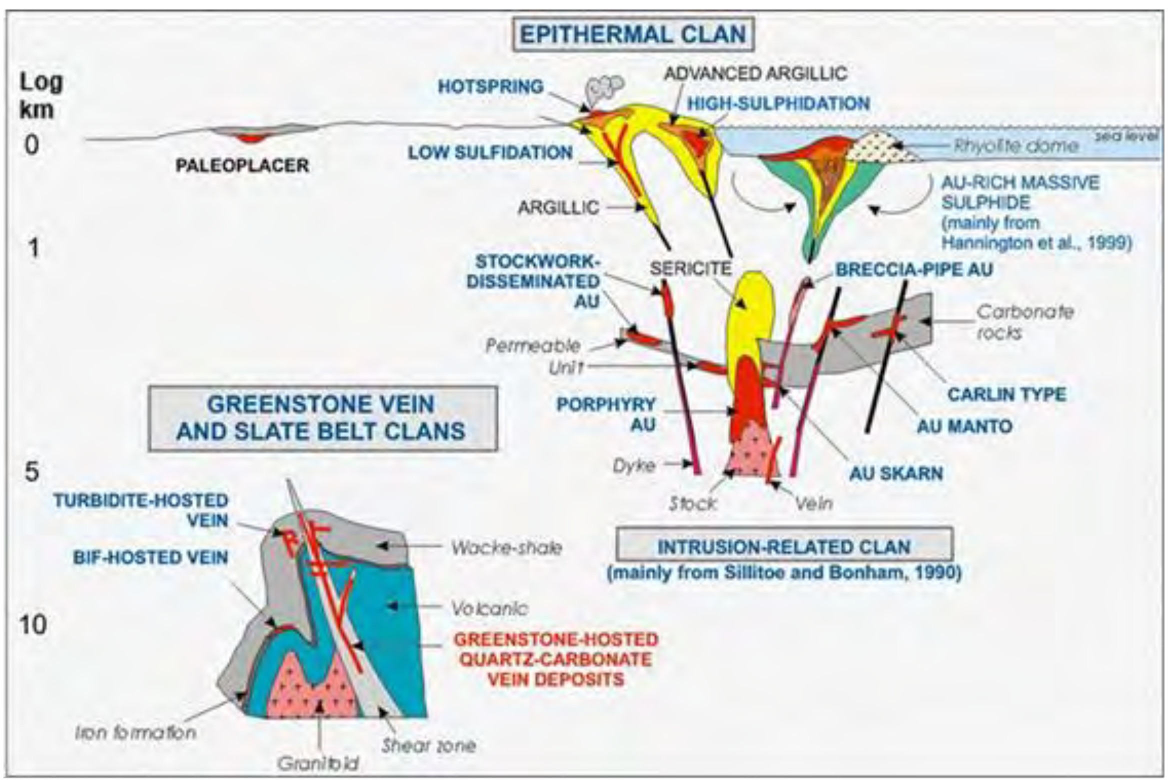

Figure 8. Formation Setting of Archean Lode and Syenite-hosted Gold Deposits.

6.2 Archean Lode gold deposits

Gold deposits along both the southern and northern limbs of the Abitibi sub-province are generally referred to as Archean lode gold deposits. Gold in these deposits is typically hosted in quartz and/or carbonate veins within structures that are related to regional scale deformation and alteration, and several are considered to be world-class deposits. The zones of deformation and alteration represent long-lived structures that have controlled the development of the volcano-sedimentary terrain and its associated intrusives. The primary event responsible for the vast majority of gold in the deposits is typically related to post-peak alteration and deformation. Regionally, each area is characterized by multi-stage volcanic, sedimentary, and intrusive development with multiple phases of alteration and deformation. Individual gold deposits within a particular region often display common associations and controls (Colvine et al., 1984).

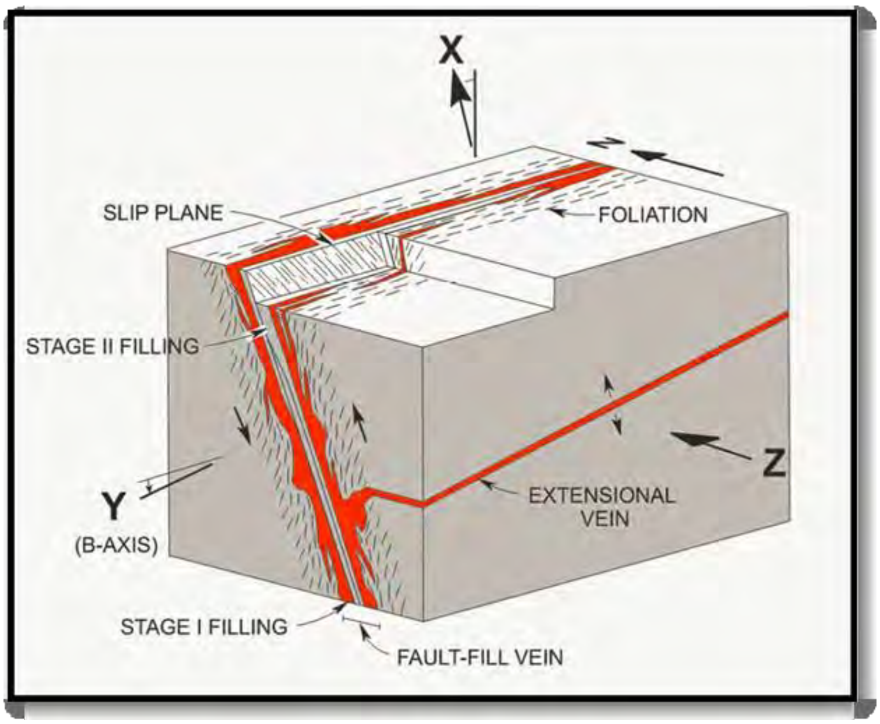

Figure 9. Illustration of Gold-Bearing Veins Related to Host Rock Deformation

**(Dube and Gosselin, 2009).*

Gold deposits of the Larder Lake-Cadillac Deformation Zone within Ontario include the Kirkland Lake, Macassa, Kerr-Addison, Upper Beaver, Chesterville, McBean, Anoki, Cheminis, and Omega gold mines. The deposits are considered to be the result of a regional-scale hydrothermal system that corresponds to an approximately 20km long segment of the deformation zone (Ayer et al., 2005). Most of the gold mined was extracted from sulfide rich replacement ores in tholeiitic mafic metavolcanics that are referred to as “flow ore". The second most common host rock is native gold-bearing quartz stockwork in carbonate-fuchsite altered meta-ultramafic rocks that are referred to as “green carbonate ore". At the Anoki and McBean gold deposits, gold also occurs associated with sulfidation and quartz veining of Timiskaming assemblage clastic rocks spatially associated with feldspar-phyric dykes and as quartz veins in cherty to graphitic exhalite horizons in basalts. Majority of the gold in these deposits is considered related to the D2 structures. The D2 structures of the Larder Lake-Cadillac Deformation Zone are considered equivalent to the D3 structures along the northern limb of the Abitibi sub-province, which is related to the vast majority of gold deposits in the Timmins gold camp (Ayer et al., 2005).

A simplified schematic of the structural characteristics of Archean lode-gold deposits is presented in Figure 9. The schematic illustrates the relationship of the veining and the stages of mineralization within the structures produced during deformation. Of key importance is the formation of shallow dipping extensional veins projecting outward from the primary vein. Some of the gold-bearing quartz veins (e.g. No. 1 vein) in the area around the historical Ashley Mine are shallow dipping veins and may represent extensional veins connected to a much larger gold-bearing structure. Shallow dipping veins are more likely to outcrop than vertical veins, especially in areas with moderate topographic relief.

7 EXPLORATION RESULTS

From October 11th, 2020 to October 14th, 2020, Pioneer Exploration Consultants Ltd. (Pioneer) of completed an 18.79km^2 Ultra-High Resolution Airborne LiDAR (50 points/meter) and High-Resolution Orthophoto (5-10cm) survey over the entire Ashley Mine Project area located approximately 18km (as the crow flies) west of Matachewan, Ontario. Survey ground control points were collected on October 11th and the survey was flown by Heli Explore using an AS 350 B2 helicopter on October 14th. The survey was flown at the request of Ashley Gold Corp. Logistics and instrumentation reports are included in this report as APPENDIX D AND APPENDIX E.

The aim of the LiDAR survey was to acquire ultra-high-definition digital elevation data capable of being interpreted by a structural specialist for new target generation and to better understand current structurally controlled deposit style. The secondary focus of the survey was to accurately locate historic pits and trenching performed by previous operators for future clearing.

The LiDAR and full project data set was handed over to a structural geologist for field and digital interpretation and will be the subject of a future assessment report.

All maps in this report and survey data are in UTM NAD83 Zone 17 North datum.

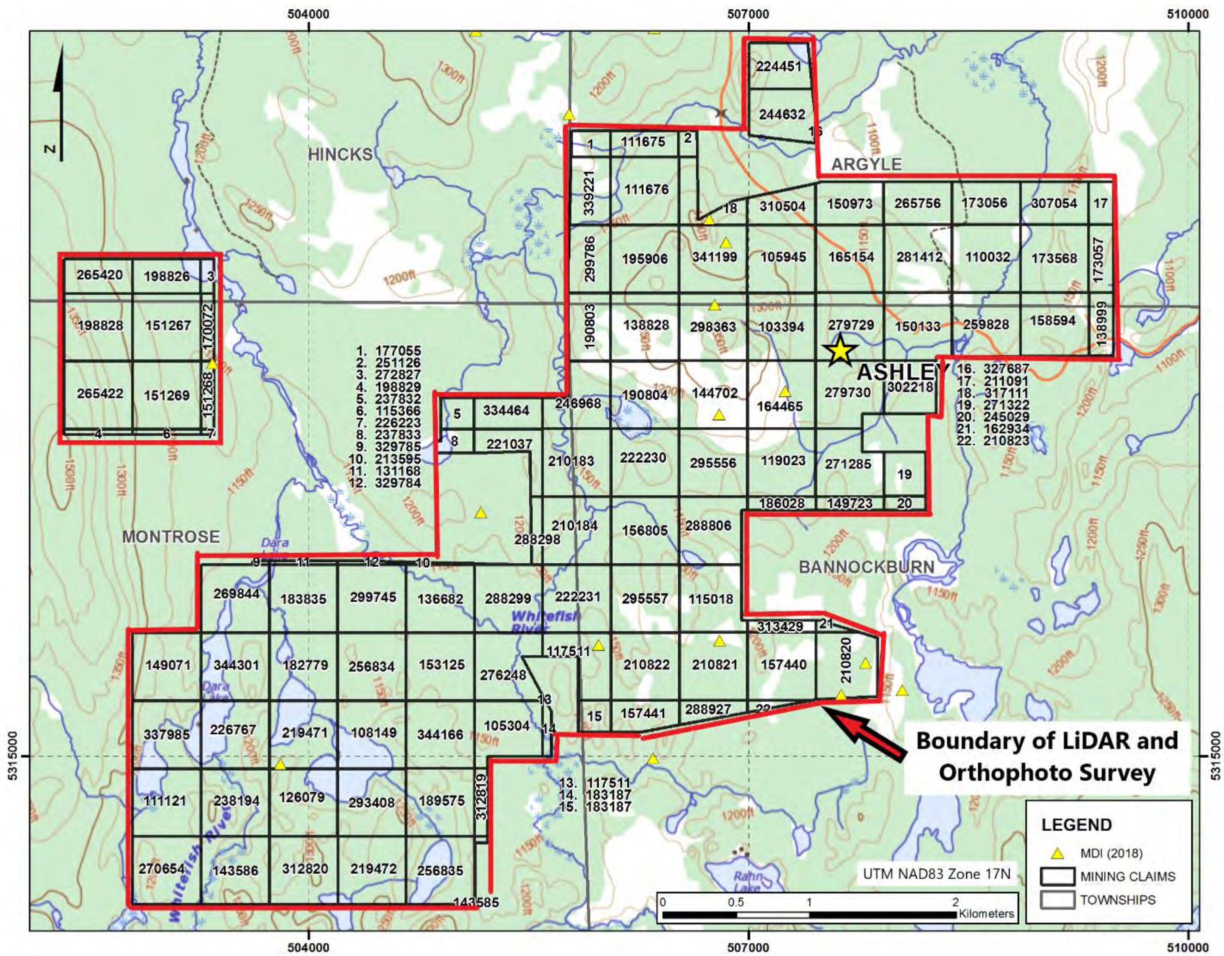

Figure 10. LiDAR and Orthophoto Survey Boundary Location with Claims

7.1 Ultra-High-Definition LiDAR Survey

LiDAR (Light Detection and Ranging) data is provided as a raw .laz point cloud file as well as a Digital Elevation Model (DEM) in GeoTiff image format that can be loaded directly into a GIS software package, however, the raw imagery given doesn't allow any detailed features to be visible (Figure 11). The DEM must be manipulated either by using a hillshade 3D analyst tool or by loading it as a surface in a 3D modeling program. As an initial processing step before handing the data over to a structural specialist, hillshade rasters were created from the raw DEM data by loading it into a GIS program and choosing the azimuth and inclination of a "sun source". Figure 12 shows a Project-wide overview of the LiDAR survey data with a hillshade light source at an azimuth of 045º and an inclination of 045º. A more detailed interpretation will follow in an upcoming assessment report; however, several features are clearly visible such as glacial ice direction striations of the overburden at ~170º (Figures 12 and 13), roads, trails, trenches, pits, and the historic mine site with its waste rock pile (Figure 13) and inclined shaft opening.

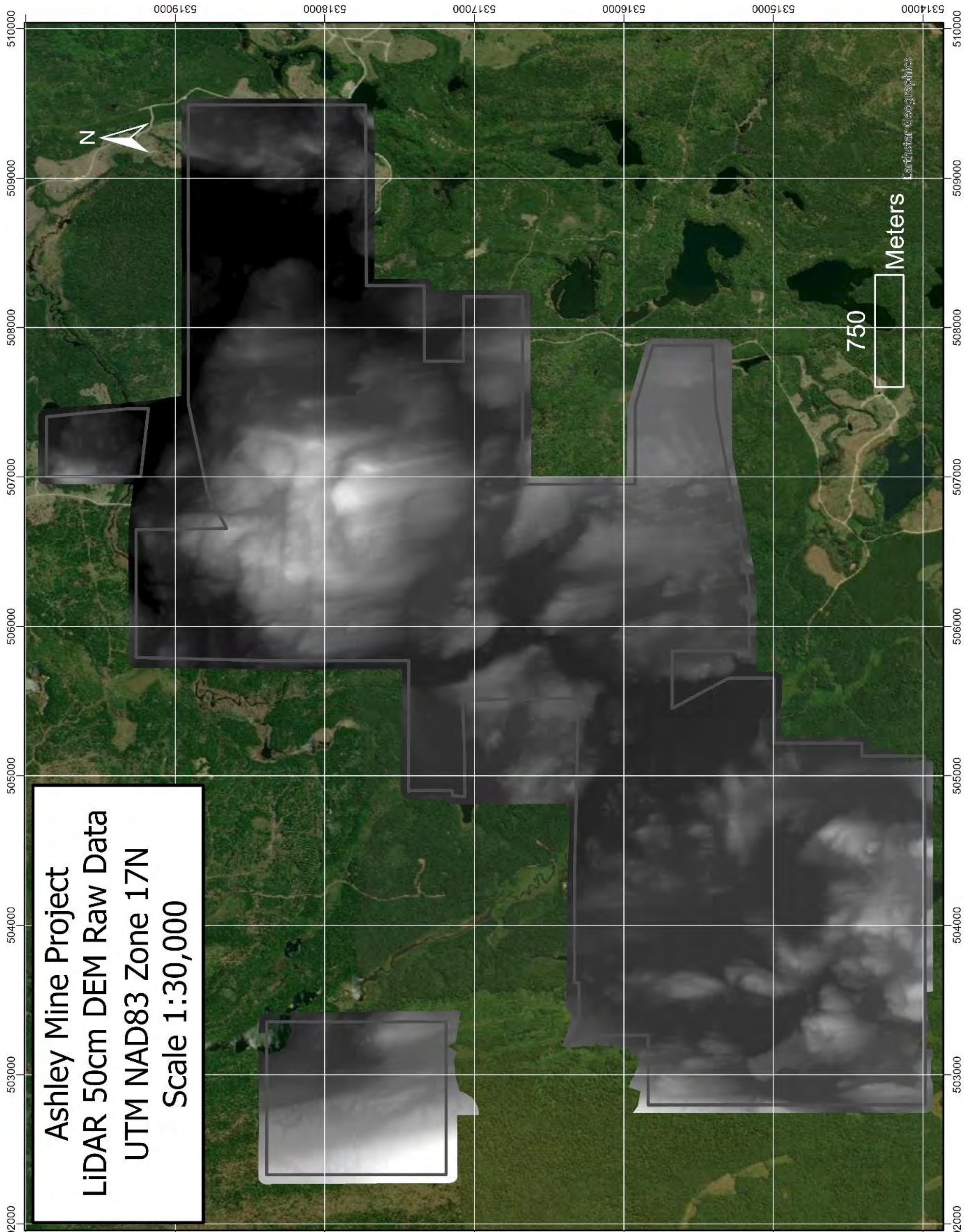

Figure 11. LiDAR Raw DEM Overview of the Ashley Project

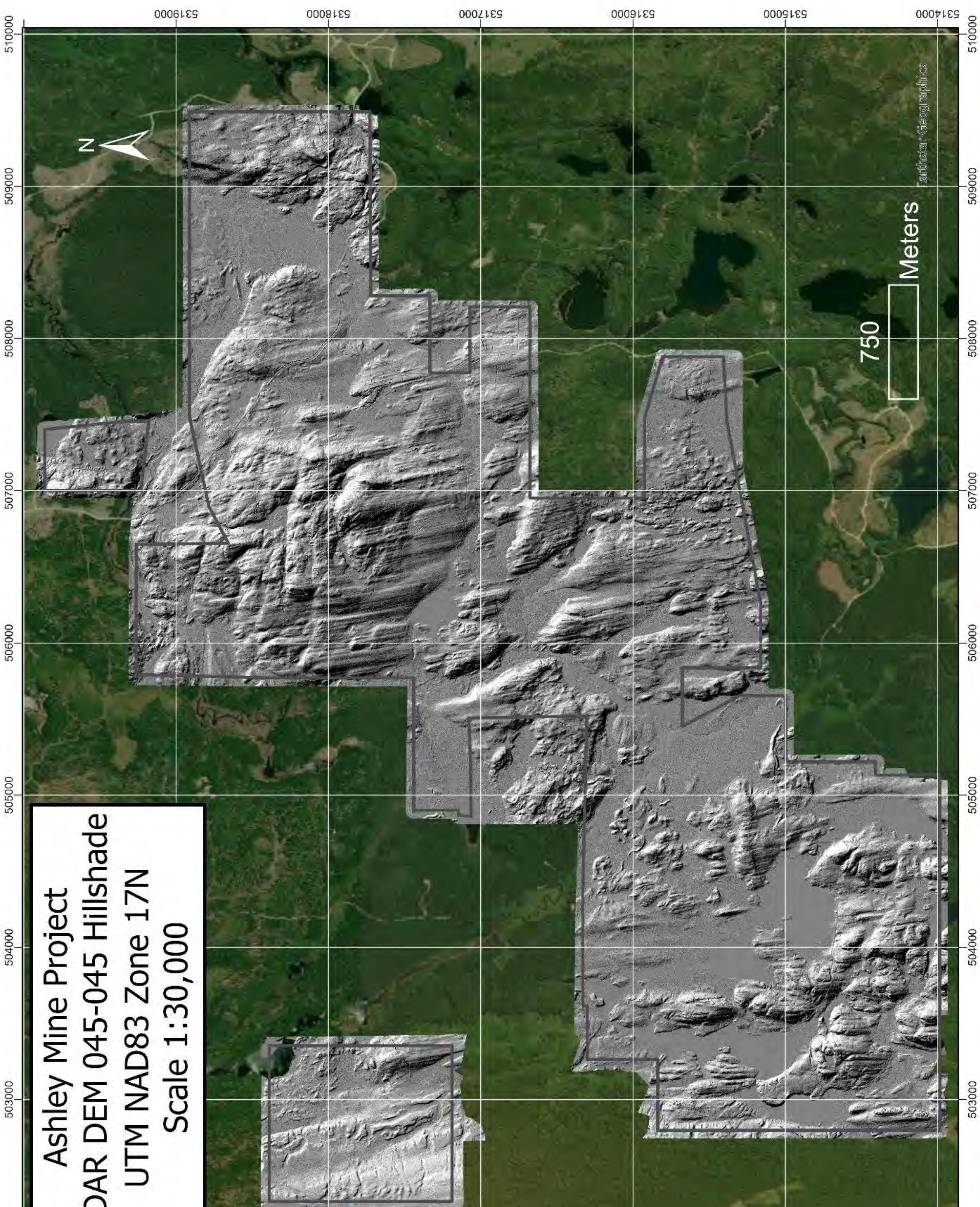

Figure 12. LiDAR DEM Hillshade Overview of the Ashley Project

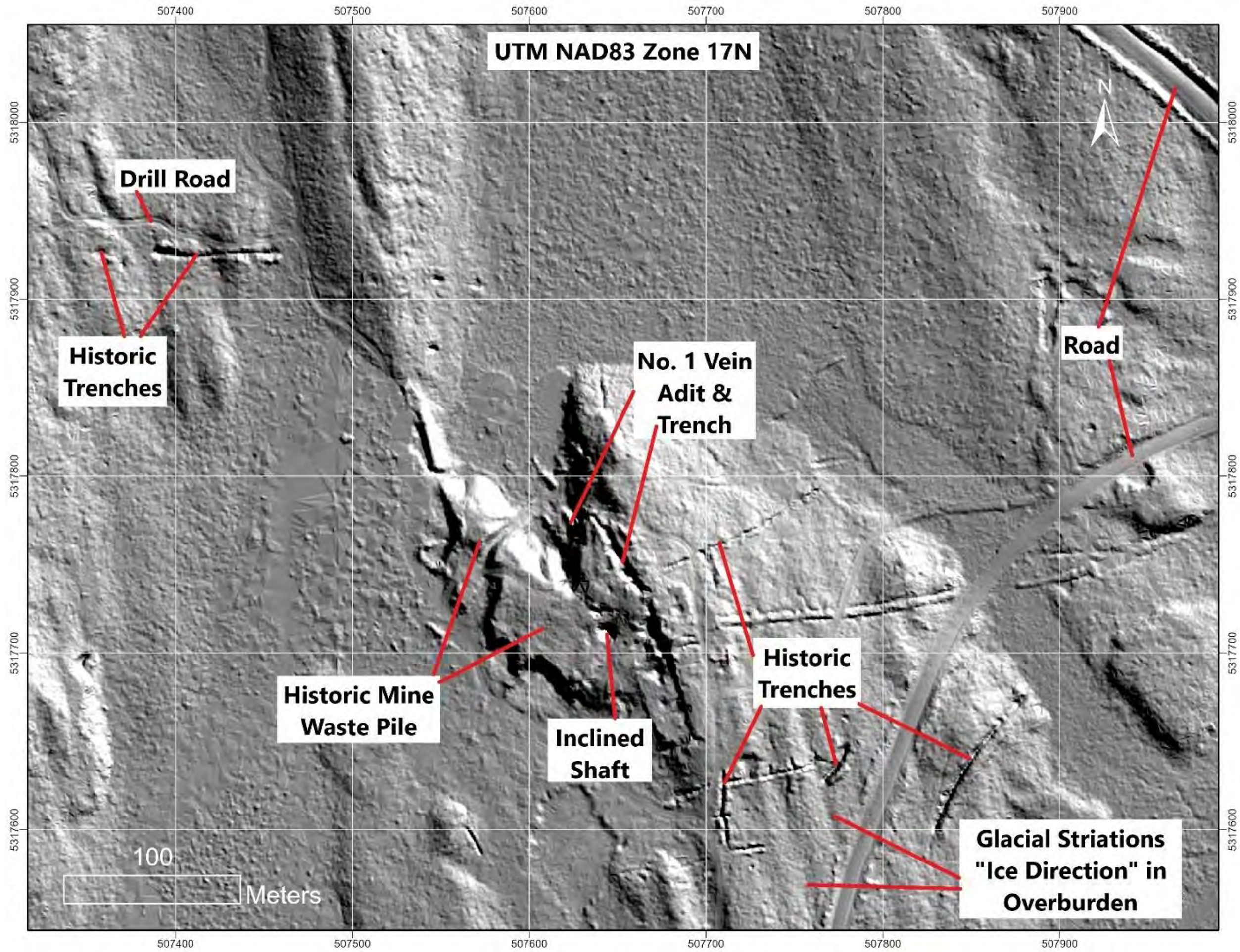

Figure 13. LiDAR Image of the Historic Ashley Mine Demonstrating High-Quality of Data

7.2 High-Resolution Orthophotos

High-Resolution (5-10cm) orthophotos were acquired during the LiDAR survey and provided as a series of 32 georeferenced tiles in GeoTiff image format that can be loaded directly into a GIS software package. For convenience, the 32 individual orthophotos were “stitched” together into a single large orthophoto mosaic GeoTiff image (Figure 14) using QGIS open-source GIS software. Large format figures can be found in APPENDIX F.

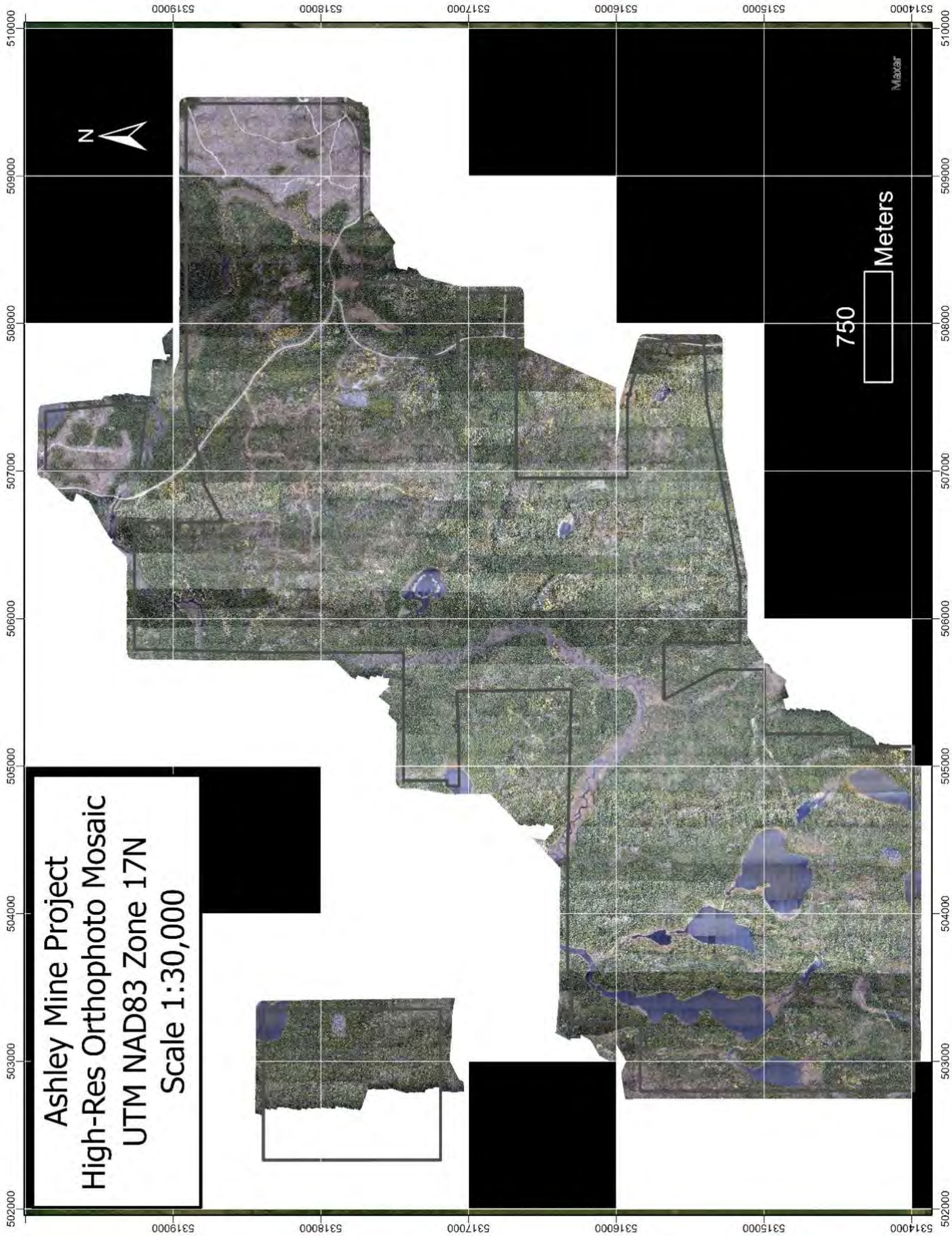

Figure 14. High-Resolution Orthophoto Mosaic Overview of the Ashley Project

8 DATA VERIFICATION

For data verification and quality control procedures refer to the survey operators logistics and instrumentation reports in APPENDIX D and APPENDIX E, respectively.

9 INTERPREATION AND CONCLUSION

Despite being sporadically worked on for the last 90 years, most of the Ashley Project is still at a relatively early stage of exploration. Given the geology and presence of high-strain fault and shear systems encountered historically, there exists potential for both syenite-hosted and Archean lode-gold deposits on the Project. The presence of a multitude of intrusive dikes of varying phases and composition suggests that extensional structures and associated hydrothermal activity is relatively widespread on the Project. Prosper Gold Corp's 2016-2017 diamond drilling program captured a significant amount of information and insight into the geology and localized deformational zones on the Project and can be used as a base to expand upon.

The Ashley Project's strong gold potential is supported by exploration, drilling, and historic waste dump testing. Drill intersections suggest a potential exists for expansion on known intercepts along strike and down-dip and that there are multiple gold intercepts within a large number of historic holes suggesting a "stacked" or sheeted vein system that can probably be used to vector towards a larger "feeder zone". Detailed structural interpretation should shed further light on this theory.

10 RECOMMENDATIONS

As a next step, additional exploration work is recommended to gain a better overall understanding of the Project, including detailed review of the LiDAR survey data by a structural specialist including "ground-truthing" anomalies and trenches discovered, review of historic core, and further structural/geological interpretation of the vein systems in preparation for exploration drilling. The operator should also digitize and compile all existing data into a property-scale 3D geological interpretation model to generate new targets and understand existing ones better.

Understanding the structural geology is critical to the success of the Project. Detailed review of this ultra-high-resolution LiDAR survey is proposed to better distinguish the near-surface shear patterns and outline potential unknown structures and better constrain the width, extent, and characteristics of the mineralized veins and structures.

After all detailed review is finalized, outcrop stripping/washing/mapping and trenching/sampling should be completed over "high-priority" targets followed up by exploration drilling to test continuity between known mineralized zones in terms of lateral and down-plunge extensions, to potentially discover new occurrences and "feeder zones", and to expand the current mineralization and alteration footprint at the Project scale.

The historic diamond drilling programs on the Ashley Project have served, in apart, to outline areas that merit further drill testing. Specifically, further diamond drilling should focus on stepping out and deeper from the Ashley and Garvey veins to target potential "feeder zones", as well as stepping out eastward form the Galahad target area drilled by Prosper Gold in 2017. Additional recommended exploration could include ground IP and MAG/EM geophysics surveys, to further define pertinent magnetic lineaments and to outline zones of silicification especially west of the Ashley Mine and east of the Galahad target area. These grids should overlap to an extent with the 2017 Prosper Gold drilling, to provide some context to the geophysical results. After the ground geophysical surveys, high priority targets outlined could be tested with diamond drilling.

The author has prepared a cost estimate for the "next-phase" recommended work program to serve as a guideline for the Project. The estimated exploration budget (Table 5) of Phase 1 is **C$250,000** and a Phase 2 contingent on Phase 1 results an additional **C$500,000** (incl. 10% for contingencies).

The author believes that the recommended work program and proposed expenditures are appropriate and well thought out for the next stage of exploration, and that the proposed budget reasonably reflects the type and amount of the contemplated activities.

Table 5. Estimated Phase 1 & 2 Exploration Budget for the Ashley Project

Work Program	Cost Estimate
PHASE 1	
In-Depth Structural Analysis and Modeling by Specialist	$35,000
Digitization and GIS Compilation of all Historical Data	$15,000
Outcrop Vein Stripping/Washing/Channel Sampling/Prospecting	$65,000
Ground Geophysics (EM, IP, MAG etc.)	$110,000
Compilation of all Available Data into a 3D Model	$25,000
PHASE 1 - Exploration Subtotal	**$250,000**
PHASE 2	
Drilling of New Targets (3,000m - All-in)	$450,000
PHASE 2 - Exploration Subtotal	**$450,000**
Contingency (10%)	$50,000
EXPLORATION TOTAL	**$750,000**

APPENDIX A: REFERENCES

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APPENDIX B: STATEMENT OF QUALIFICATIONS

I, Shannon Baird, P.Geo., M.Sc.., (PGO No. 1953, EGBC No. 35744), do hereby certify that:

1. I am President and Principal Geologist at PrometheX Ltd., located at 116 Fourth Avenue, Sudbury, Ontario, Canada, P3B-3R8
2. This certificate applies to the report entitled "Assessment Report on the Ashley Project LiDAR and Orthophoto Survey, Matachewan Area, Northeastern Ontario, Canada" dated August 27, 2022. The Assessment Report was prepared for Ashley Gold Corp. to apply work credit.
3. I am a member in good standing of the Association of Professional Geoscientists of Ontario (PGO license No. 1953), and the Association of Professional Engineers and Geoscientists of British Columbia (EGBC license No. 35744). I obtained a Bachelor of Science (Geology) degree and a Master of Science (Applied Economic Geology) degree from Laurentian University (Sudbury, Ontario) in 2007 and 2011, respectively.
4. I have practiced my profession continuously as a geologist for a total of seventeen (17) years since 2005. I acquired my expertise in mineral exploration with Inco Ltd. (VALE) and Wallbridge Mining in Ontario, and as Exploration Manager of Carube Copper Corp (C3 Metals) from 2010 to 2020 in Jamaica, Peru, United States, British Columbia, Nova Scotia, Ontario, and Quebec and numerous project and company evaluations across the globe. I have been President and Principal Geologist of PrometheX Ltd. since October 2020.
5. I have read the definition of a qualified person ("QP") set out in Regulation 43-101/National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a QP for the purposes of this report.
6. I visited the property one (1) time prior to this survey from October 04, 2020 to October 05, 2020.
7. I am the author of this Assessment Report and responsible for items held within.
8. I personally planned the exploration survey and acquired/compiled the final data for this report.

Signed this 27th day of August 2022 in Sudbury, Ontario, Canada.

(Original signed and sealed)

Shannon Baird, P.Geo., M.Sc.
Shannon.Baird@PrometheX.com

APPENDIX C: STATEMENT OF EXPENDITURES

Work Performed	Description of Work	From (date)	To (date)	# Units of Work	Cost Per Unit	Actual Costs	Comments
Exploration and Data Management	*Project and data management, survey data tile stitching and compilation, LiDAR hillshades DEM creation, Orthophoto Mosaic stitching and rendering, and assessment report writing*	24-Aug-22	27-Aug-22	4 person-days	$600	$2,712	*Shannon Baird (Exploration Manager - Geologist)*
Airborne Survey	*18.79km^2 of Ultra-High-Resolution Airborne LiDAR (50 points/meter) and High-Resolution Orthophoto (5-10cm) survey*	11-Oct-20	14-Oct-20	18.79km^2	N/A	$26,809	*Pioneer Exploration Consultants Ltd.*
		TOTAL EXPENDITURES				**$29,521**	

APPENDIX D: LiDAR SURVEY LOGISTICS REPORT

Ashley Gold

Airborne LIDAR Survey Logistics Report

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

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Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

Introduction

From October 11th, 2020 to October 14th, 2020, Pioneer Exploration Consultants Ltd. (Pioneer) completed an airborne LIDAR survey over an area 18 km west of Matachewan, Ontario. The survey was flown by Heli Explore using an AS 350 B2 helicopter on October 14th. Survey ground control points (GCPs) were collected on October 11th. The survey was flown at the request of Ashley Gold.

This report covers data acquisition, instrument descriptions, data processing and presentations. The digital data delivery is described later in this report. This report does not include any geological interpretations of the dataset. Key survey personnel are listed in Table 1.

Table 1: Personnel involved with the project.

Data Collection	Michael Burns, Kiyavash Parvar
Ground Crew	Ali Diab
Data Processing and QA/QC	Jean-François Dionne

Location

The LIDAR survey area is located 18 km west of Matachewan, Ontario. The project was staged from the Heli Explore hangar in La Sarre, QC. The survey area boundary is illustrated in Figure 1, along with the location of the project in relation to Matachewan.

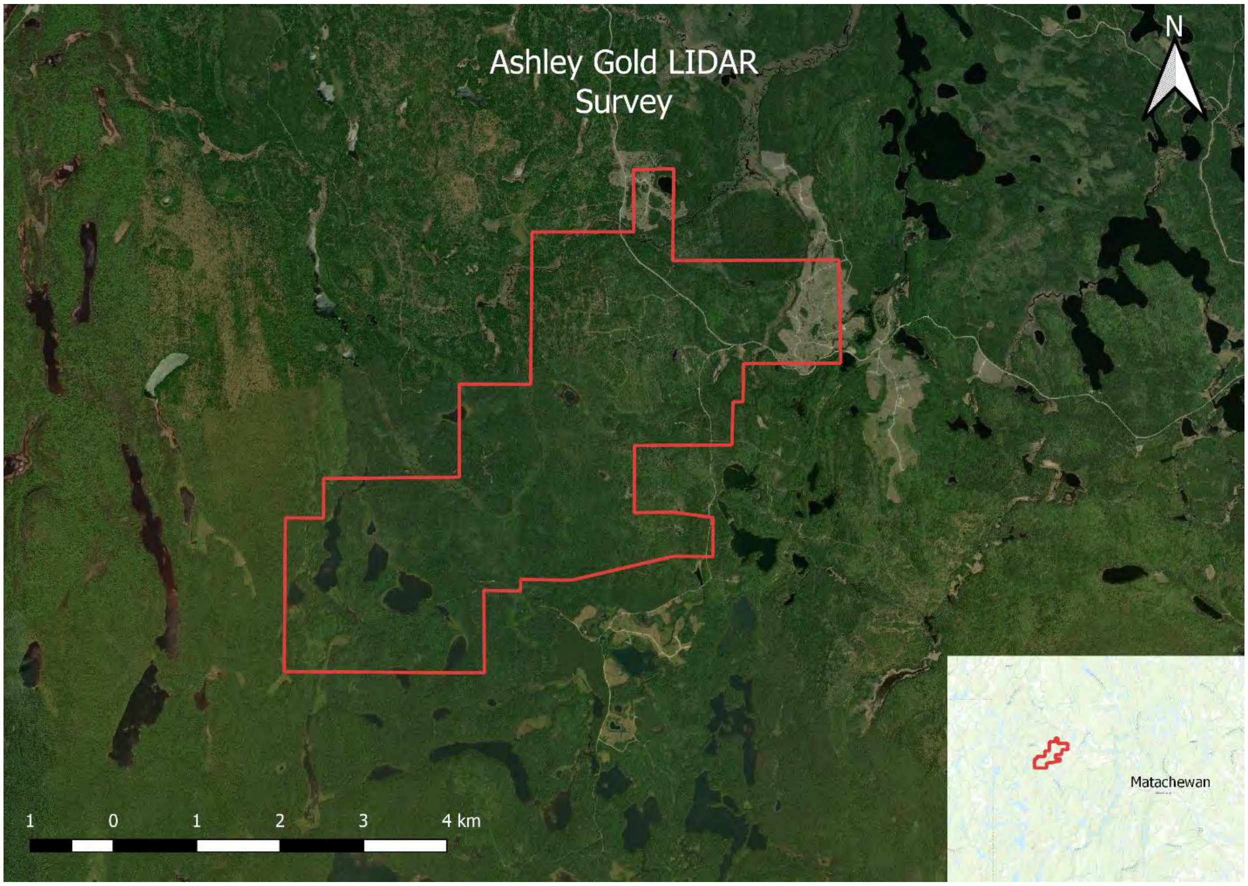


Figure 1: The Ashley Gold LIDAR survey boundary is shown in red, and inset is shown the location of the project relative to Matachewan.

Data Processing and Calibration

LIDAR Calibration

The calibration process considered all errors inherent with the equipment including errors in GPS, IMU, and sensor specific parameters. Adjustments were made to achieve a flight line to flight line data match (relative calibration) and subsequently adjusted to control for absolute accuracy. Process steps to achieve this are as follows:

1. Rigorous LiDAR calibration: all sources of error such as the sensor's ranging and torsion parameters (lever arms values), atmospheric variables, GPS conditions, and IMU offsets were analyzed and removed to the highest level possible. This method addresses all errors, both vertical and horizontal in nature. Ranging, atmospheric variables, and GPS conditions affect the vertical position of the surface, whereas IMU offsets and torsion parameters affect the data horizontally. The horizontal accuracy is proven through repeatability: when the position of features remains constant no matter what direction

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

the plane was flying and no matter where the feature is positioned within the swath, relative horizontal accuracy is achieved.

2. Absolute horizontal accuracy is achieved through the use of differential GPS with base lines shorter than 75 kilometres. The base station is set at a temporary monument that is Post Processed using NRCAN PPP over an observation period of over 6 hours to achieve an absolute position of less than 2.5cm in both horizontal and vertical accuracy locally. The same position is used for every lift, ensuring that any errors in its position will affect all data equally and can therefore be removed equally.

3. Novatel Inertial Explorer software is used to post process GPS base station in a first pass to achieve positional accuracy of the sensor. In a second operation IMU information is processing in a forward and backward solution to augment Yaw, Pitch, and Roll accuracies in a tightly coupled method without the use of any fitting mathematical methods. Additional input parameters can be used to lower inaccuracies of solutions including speed of initial forward momentum and fine adjustments of torsion parameters (lever arms values).

4. Vertical accuracy is achieved through the adjustment to ground control survey points within the finished product based off the position post processed at the base position to produce a locally coherent absolute position. Although the base station has absolute vertical accuracy, adjustments to sensor parameters introduces vertical error that must be normalized in the final (mean) adjustment. The minimum expected horizontal accuracy was tested during the boresight process to meet or exceed the ASPRS Standard for Spatial Data Accuracy for a Horizontal accuracy of 0.15 meter RMSE or better and a Vertical Accuracy of RMSE(z) ≤ 9.25 cm

Final Project Deliverables

1. Classified bare earth .LAZ v.1.2 point cloud
2. Digital Elevation Surface 0.5m resolution in GeoTiff format .tif
3. Digital Terrain Model (DTM) 0.5m resolution in Geotiff format .tif
4. Intensity Image in Geotiff format .tif

Projections and Datums

UTM Projection

Horizontal Datum: NAD83 (CSRS) Zone 11 North

Vertical Datum: NRCAN Canadian Vertical Adjustment Geoid CGG2013a

Units: Meters

Pioneer Exploration Consultants Ltd.

info@pioneerexploration.ca
t. 1-306-715-6802

LIDAR Post-Processing and Qualitative Assessment

Data Classification and Editing

Pioneer Exploration Consultants Inc. completed processing on the LIDAR data using Green Valley LiDAR 360 software. The initial step is the setup of the Li360 project, which is done by importing a project defined tile boundary index encompassing the entire project area. The acquired 3D laser point clouds, in LAS binary format, were imported into the Li360 project and tiled according to the project tile grid. Once tiled, the laser points were classified using a proprietary routine in Li360. This routine removes any obvious outliers from the dataset following which the ground layer is extracted from the point cloud. The ground extraction process encompassed in this routine takes place by building an iterative surface model.

This surface model is generated using three main parameters: building size, iteration angle and iteration distance. The initial model is based on low points being selected by a "roaming window" with the assumption is that these are the ground points. The size of this roaming window is determined by the building size parameter. The low points are triangulated and the remaining points are evaluated and subsequently added to the model if they meet the iteration angle and distance constraints. This process is repeated until no additional points are added within iterations. A second critical parameter is the maximum terrain angle constraint, which determines the maximum terrain angle allowed within the classification model.

Li360 was also used to create model key points. An algorithm is defined that intelligently thins bare earth ground points so that points necessary to define breaks and elevation changes in the terrain are kept while unnecessary or redundant points are not included in the model key points. The model key points are then written to its own file, according to the project tile grid.

Li360 was used to create the bare earth only LiDAR tiles, first return only LiDAR tiles, and last return only LiDAR tiles. For bare earth only LiDAR tiles, class 2 points are filtered from the full point cloud data and written to its own file, according to the project tile grid.

For first return and last return tiles, the desired echo return is filtered from the full point cloud and written to its own file, according to the project tile grid. The first return and last return files include the desired return from all classes. The points for these files are located in class 1.

After all processing and classification has been completed, Li360 software is used to update the LAS version, projection information, creation day, and creation year of every LiDAR file.

APPENDIX E: LiDAR SURVEY INSTRUMENT SPECS REPORT

Lightweight Airborne Laser Scanner with Online Waveform Processing

RIEGL VUX®-1LR

- *15 mm survey-grade accuracy*
- *scan speed up to 200 scans / second*
- *measurement rate up to 750,000 meas./sec*
- *operating flight altitude more than 1,700 ft*
- *field of view up to 330° for practically unrestricted data acquisition*
- *regular point pattern, perfectly parallel scan lines*
- *cutting edge RIEGL technology providing:*
  - *echo signal digitization*
  - *online waveform processing*
  - *multiple-time-around processing*
- *multiple target capability - practically unlimited number of target echoes*
- *NEW* Smart Waveform Data Output optional
- *compact (227x180x125 mm), lightweight (3.5 kg), and rugged*
- *easily mountable to helicopters, gyrocopters, and other small manned aircrafts*
- *mechanical and electrical interface for IMU mounting*
- *electrical interfaces for GPS data string and Sync Pulse (1PPS)*
- *LAN-TCP/IP interface*
- *scan data storage on internal 240 GByte SSD Memory*

The *RIEGL* VUX-1LR is a very lightweight and compact laser scanner, meeting the challenges of airborne laser scanning by helicopter, gyrocopter, and other small aircraft both in measurement performance as well as in system integration. With regard to the specific constraints and flight characteristics, the *RIEGL* VUX-1LR is designed to be mounted in any orientation and even under limited weight and space conditions. Modest in power consumption, the instrument requires only a single power supply. The entire data set of an acquisition campaign is stored onto an internal 240 GByte SSD and/or provided as real-time line scan data via the integrated LAN-TCP/IP interface.

The *RIEGL* VUX-1LR provides highspeed data acquisition using a narrow infrared laser beam and a fast line scanning mechanism. High-accuracy laser ranging is based on *RIEGL´s* unique echo digitization and online waveform processing, which enables achieving superior measurement results even under adverse atmospheric conditions, and the evaluation of multiple target echoes. The scanning mechanism is based on an extremely fast rotating mirror, which provides fully linear, unidirectional and parallel scan lines, resulting in excellent regular point pattern.

Typical applications include

- *Corridor Mapping: Power Line, Railway Track and Pipeline Inspection*
- *Topography in Open-Cast Mining*
- *Terrain and Canyon Mapping*
- *Surveying of Urban Environments*
- *Archeology and Cultural Heritage Documentation*
- *Agriculture & Forestry*
- *Resources Management*
- *Rapid Response in Small Scale Surveying (Collision Investigation, Risk Prevention)*

visit our website
www.riegl.com

RIEGL® LASER MEASUREMENT SYSTEMS

Technical Data *RIEGL* VUX®-1LR

Laser Product Classification — Class 1 Laser Product according to IEC 60825-1:2014
The following clause applies for instruments delivered into the United States: Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

CLASS 1
LASER PRODUCT

Range Measurement Performance

Measuring Principle — time of flight measurement, echo signal digitization, online waveform processing, multiple-time-around-processing

Laser Pulse Repetition Rate PRR [1]	*50 kHz*	*100 kHz*	*200 kHz*	*400 kHz*	*600 kHz*	*820 kHz*	
						full power	*reduced power* [2]
Max. Measuring Range [2,4]							
natural targets ρ ≥ 20 %	820 m	600 m	430 m	300 m	250 m	215 m	110 m
natural targets ρ ≥ 60 %	1350 m	1000 m	720 m	520 m	430 m	370 m	180 m
Max. Operating Flight Altitude AGL [1,5]	530 m (1740 ft)	380 m (1250 ft)	270 m (880 ft)	190 m (620 ft)	160 m (520 ft)	140 m (460 ft)	70 m (230 ft)
Max. Number of Targets per Pulse [6]	practically unlimited (details on request)						

1) Rounded values.
2) Laser power optimized (reduced) for measurements of short ranges with high pulse repetition rate.
3) Typical values for average conditions. Maximum range is specified for flat targets with size in excess of the laser beam diameter, perpendicular angle of incidence, and for atmospheric visibility of 23 km. In bright sunlight, the max. range is shorter than under overcast sky.
4) Ambiguity to be resolved by post-processing with RiMTA software.
5) Reflectivity ρ ≥ 20%, flat terrain assumed, scan angle ±45° FOV
6) If more than one target is hit, the total laser transmitter power is split and, accordingly, the achieveable range is reduced.

Minimum Range	5 m
Accuracy [7,9]	15 mm
Precision [8,9]	10 mm
Laser Pulse Repetition Rate [1,10]	up to 820 kHz
Max. Effective Measurement Rate [1]	up to 750 000 meas./sec. (@ 820 kHz PRR & 330° FOV)
Echo Signal Intensity	for each echo signal, high-resolution 16 bit intensity information is provided
Laser Wavelength	near infrared
Laser Beam Divergence	0.5 mrad [11]
Laser Beam Footprint (Gaussian Beam Definition)	50 mm @ 100 m, 250 mm @ 500 m, 500 mm @ 1000 m

7) Accuracy is the degree of conformity of a measured quantity to its actual (true) value.
8) Precision, also called reproducibility or repeatability, is the degree to which further measurements show the same result.
9) One sigma @ 150 m range under *RIEGL* test conditions.
10) User selectable.
11) Measured at the $1/e^2$ points. 0.50 mrad corresponds to an increase of 50 mm of beam diameter per 100 m distance.

Scanner Performance

Scanning Mechanism	rotating mirror
Field of View (selectable)	up to 330° (full range measurement performance)
Scan Speed (selectable)	10 - 200 revolutions per second, equivalent to 10 - 200 scans/sec
Angular Step Width Δ θ (selectable) between consecutive laser shots	0.004° ≤ Δ θ ≤ 1.5°
Angle Measurement Resolution	0.001°
Internal Sync Timer	for real-time synchronized time stamping of scan data
Scan Sync (optional)	scanner rotation synchronization

Data Interfaces

Configuration	LAN 10/100/1000 Mbit/sec
Scan Data Output	LAN 10/100/1000 Mbit/sec or USB 2.0
GNSS Interface	Serial RS232 interface for data string with GNSS-time information, TTL input for 1PPS synchronization pulse
Internal Memory	240 GByte SSD
External Camera	TTL input/output
External GNSS Antenna	SMA connector

General Technical Data

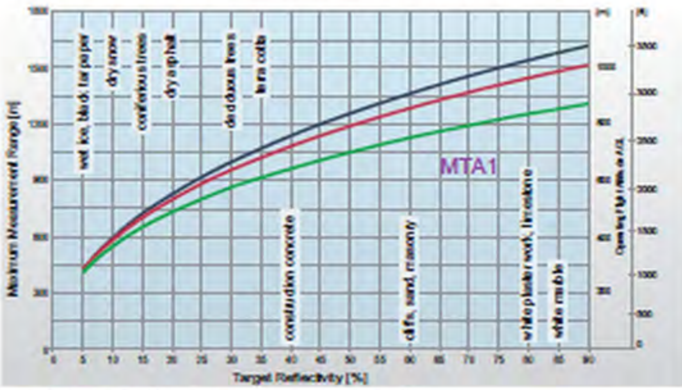
Power Supply Input Voltage / Consumption [12]	11 - 34 V DC / typ. 65 W
Main Dimensions [12]	
VUX-1UAV without / with Cooling Fan	227 x 180 x 125 mm / 227 x 209 x 129 mm
Weight [12]	
VUX-1UAV without / with Cooling Fan	approx. 3.5 kg / approx. 3.75 kg
Humidity	max. 80 % non condensing @ 31°C
Protection Class	IP64, dust and splash-proof
Max. Flight Altitude (operating / not operating)	16 500 ft (5 000 m) above MSL / 18 000 ft (5 500 m) above MSL
Temperature Range [13]	-10°C up to +40°C (operation) / -20°C up to +50°C (storage)

Optional Components (integrated)

Embedded GNSS-Inertial System	high performance multi-channel, multi-band GNSS receiver, solid-state MEMS IMU

12) without external IMU/GNSS, cooling fan device not in operation
13) The instrument requires air convection with a minimum flow rate of 5 m/s for continuous operation at +15 °C and above. If the necessary flow rate cannot be provided by the moving platform, the cooling fan device (included in the scope of delivery) has to be used.

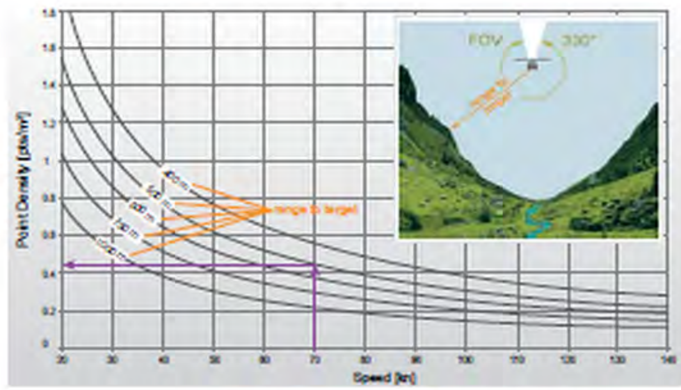
PRR = 50 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"

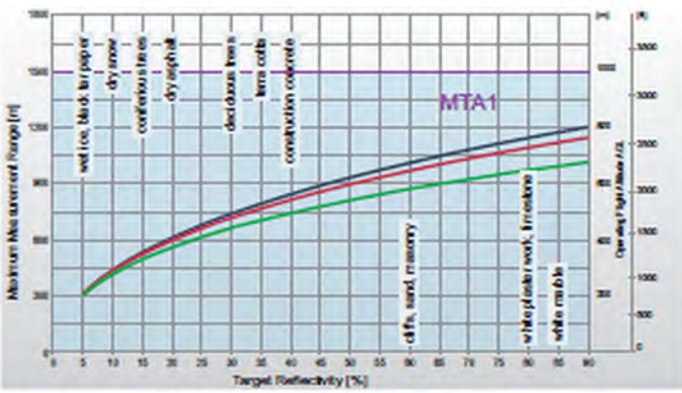
@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 50 kHz



Example: VUX-1LR at 50,000 pulses/second
range to target = 500 m, speed = 70 kn
Resulting Point Density ~ 0.44 pts/m²

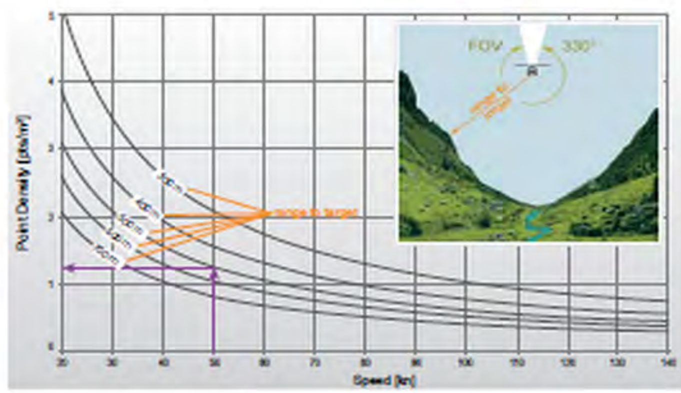
PRR = 100 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"

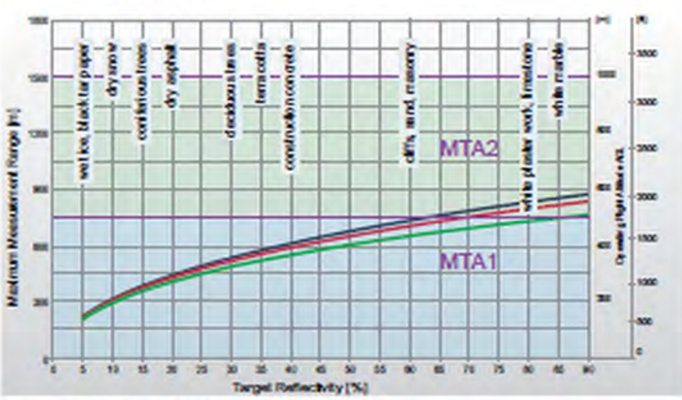
@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 100 kHz



Example: VUX-1LR at 100,000 pulses/second
range to target = 500 m, speed = 50 kn
Resulting Point Density ~ 1.2 pts/m²

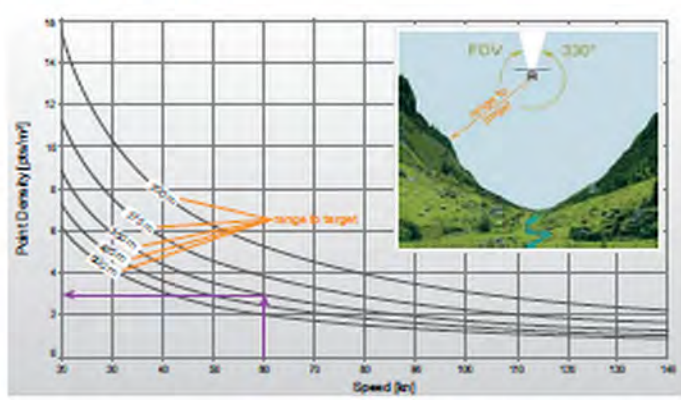
PRR = 200 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"
MTA2: two transmitted pulses „in the air"

@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 200 kHz

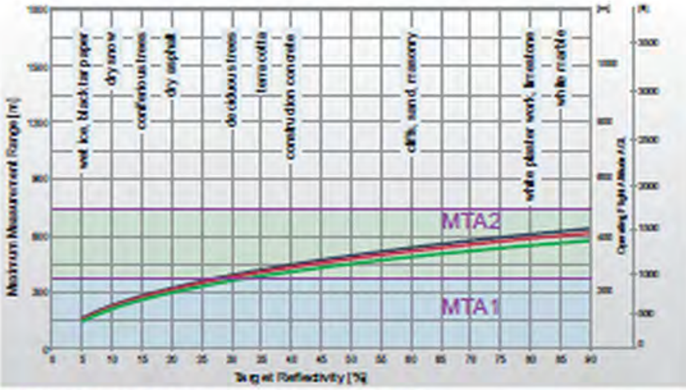


Example: VUX-1LR at 200,000 pulses/second
range to target = 350 m, speed = 60 kn
Resulting Point Density ~ 3.0 pts/m²

The following conditions are assumed for the Operating Flight Altitude AGL

- ambiguity resolved by multiple-time-around (MTA) processing & flight planning
- target size ≥ laser footprint
- average ambient brightness
- operating flight altitude given at a FOV of ±45°

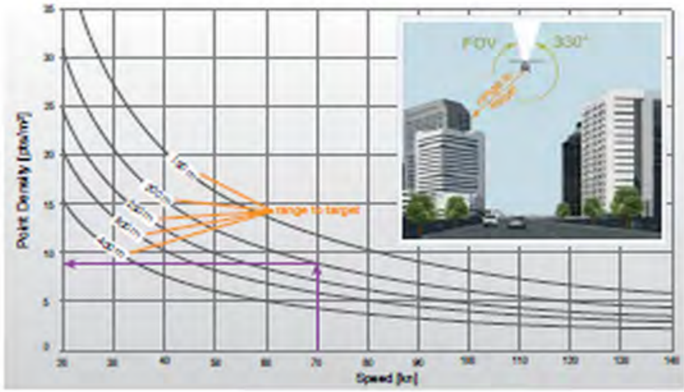
PRR = 400 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"
MTA2: two transmitted pulses „in the air"

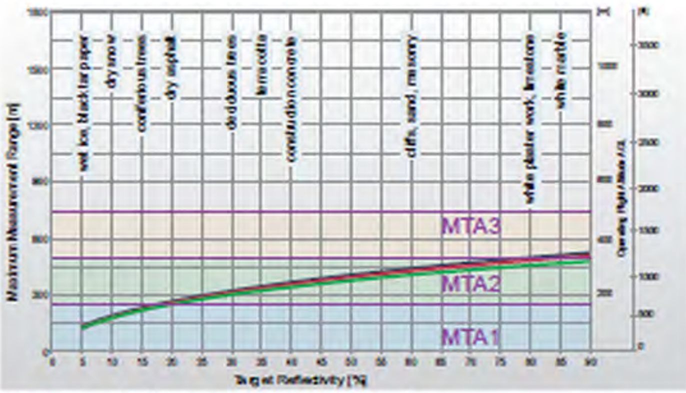
@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 400 kHz



Example: VUX-1LR at 400,000 pulses/second
range to target = 200 m, speed = 70 kn
Resulting Point Density ~ 8.8 pts/m²

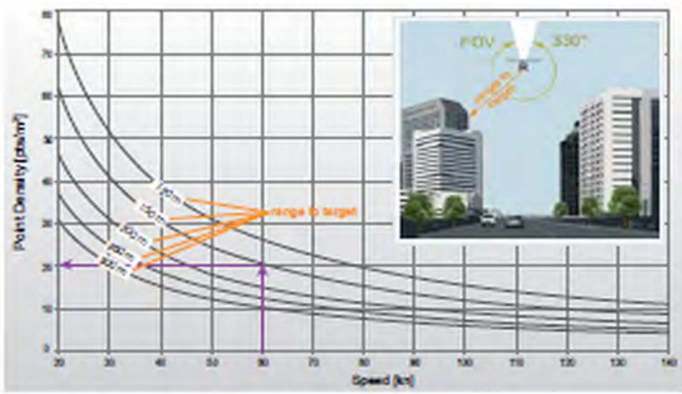
PRR = 600 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"
MTA2: two transmitted pulses „in the air"
MTA3: three transmitted pulses „in the air"

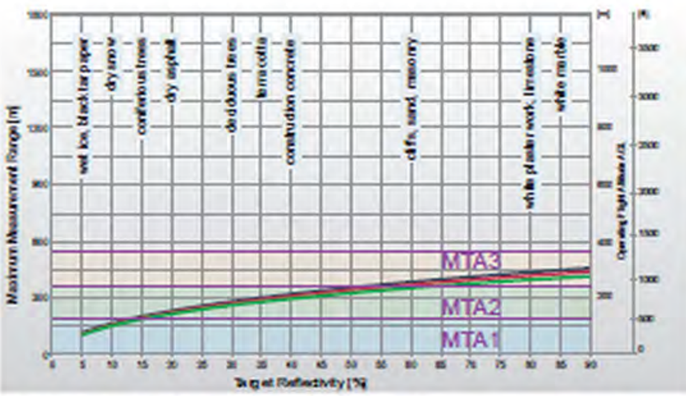
@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 600 kHz



Example: VUX-1LR at 600,000 pulses/second
range to target = 150 m, speed = 60 kn
Resulting Point Density ~ 21 pts/m²

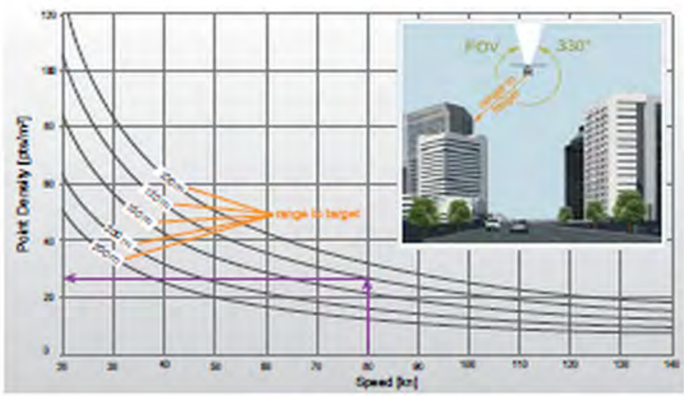
PRR = 820 kHz



MTA1: no ambiguity / one transmitted pulse „in the air"
MTA2: two transmitted pulses „in the air"
MTA3: three transmitted pulses „in the air"

@ visibility 23 km
@ visibility 15 km
@ visibility 8 km

PRR = 820 kHz

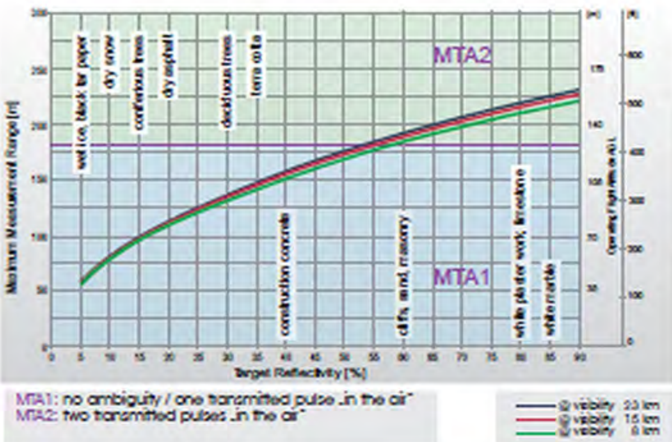


Example: VUX-1LR at 820,000 pulses/second
range to target = 120 m, speed = 80 kn
Resulting Point Density ~ 26 pts/m²

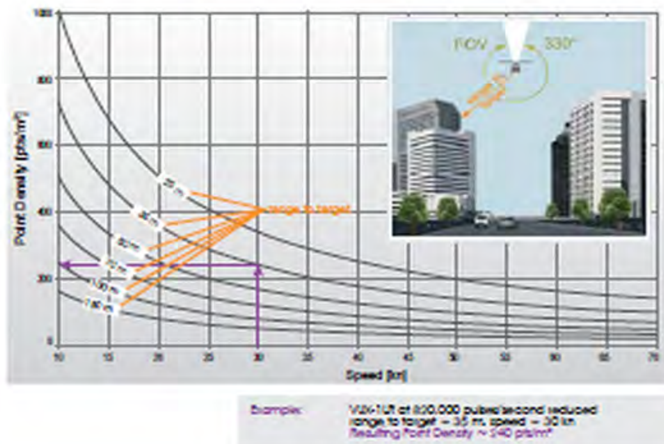
The following conditions are assumed for the Operating Flight Altitude AGL

- ambiguity resolved by multiple-time-around (MTA) processing & flight planning
- target size ≥ laser footprint
- average ambient brightness
- operating flight altitude given at a FOV of ±45°

PRR = 820 kHz reduced power



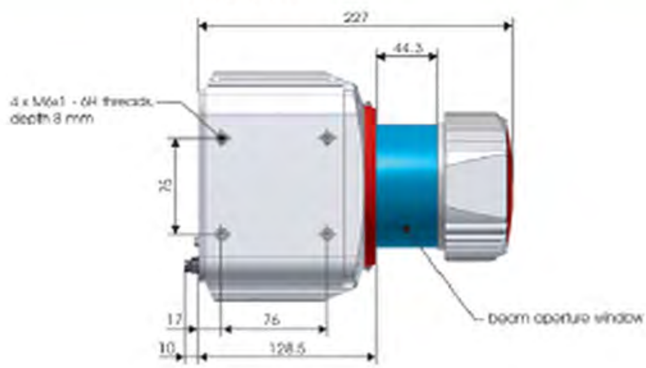
PRR = 820 kHz reduced power



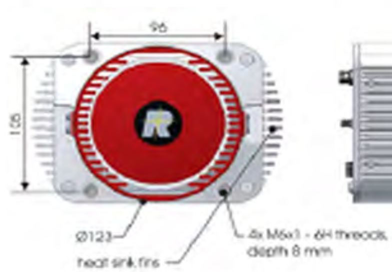
Dimensional Drawings *RIEGL* VUX®-1LR

bottom view

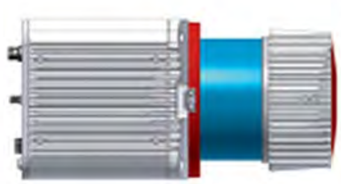
all dimensions in mm



front view



side view



rear view

RIEGL VUX®-1LR with Cooling Fan Device

front view

side view

rear view

RIEGL VUX®-1LR Additional Equipment and Integration

Cooling Fan

***RIEGL* VUX-1LR with Protective Cap**

***RIEGL* VUX-1LR with external IMU-Sensor** (*RIEGL* VUX-SYS)

Additional Equipment for *RIEGL* VUX-1LR

Cooling Fan

Lightweight structure with two axial fans providing forced air convection for applications where sufficient natural air flow cannot be guaranteed. Power supply is provided via a connector on the rear side of the *RIEGL* VUX-1LR. The cooling fan can be mounted either on the top side or on the bottom side of the *RIEGL* VUX-1LR and is included in the scanner's scope of delivery.

The cooling fan has to be mounted whenever the environmental conditions/ temperatures require (see "temperature range" on page 2 of this data sheet).

Protective Cap

To shield the glass tube of the *RIEGL* VUX-1LR from mechanical damage and soiling, a protective cap is provided to cover the upper part of the instrument during transport and storage.

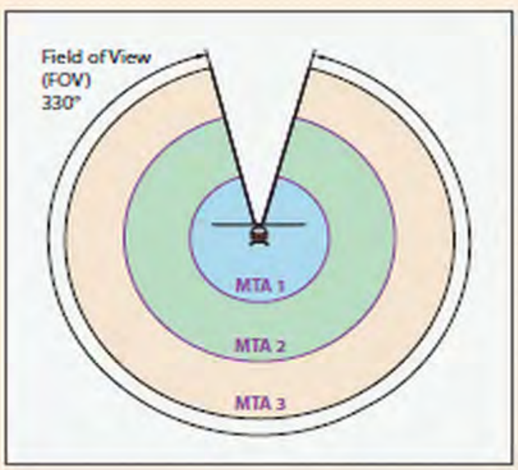
Options for *RIEGL* VUX-1LR Integration

RIEGL provides user-friendly, application- and installation-oriented solutions for integration of the VUX-1LR LiDAR sensor:

- ***RIEGL* VUX-SYS**
  Complete airborne laser scanning system for flexible use in UAS/UAV/RPAS, helicopter, gyrocopter and ultra-light aircraft installations comprising the *RIEGL* VUX-1LR, an IMU/GNSS unit and a dedicated control unit.
- ***RIEGL* VP-1**
  Small and lightweight pod with integrated *RIEGL* VUX-SYS to be mounted on standard hard points and typical camera mounts of manned helicopters
- **RiCOPTER**
  Ready to fly remotely piloted aircraft system with *RIEGL* VUX-SYS integrated

Details to be found on the relevant datasheets and infosheets.

Multiple-Time-Around Data Acquisition and Processing



In time-of-flight laser ranging a maximum unambiguous measurement range exists, which is defined by the laser pulse repetition rate and the speed of light. In case the echo signal of an emitted laser pulse arrives later than the emission of the subsequently emitted laser pulse, the range result becomes ambiguous - an effect known as **„Multiple-Time-Around" (MTA)**.

The *RIEGL* VUX-1LR allows ranging beyond the maximum unambiguous measurement range using a sophisticated modulation scheme applied to the train of emitted laser pulses. The dedicated post-processing software RiMTA provides algorithms for multiple-time-around processing, which automatically assign definite range results to the correct MTA zones without any further user interaction required.

RIEGL® LASER MEASUREMENT SYSTEMS

RIEGL Laser Measurement Systems GmbH
Riedenburgstraße 48
3580 Horn, Austria
Phone: +43 2982 4211 | Fax: +43 2982 4210
office@riegl.co.at
www.riegl.com

RIEGL USA Inc.
Orlando, Florida | info@rieglusa.com | www.rieglusa.com

RIEGL Japan Ltd.
Tokyo, Japan | info@riegl-japan.co.jp | www.riegl-japan.co.jp

RIEGL China Ltd.
Beijing, China | info@riegl.cn | www.riegl.cn

www.riegl.com

APPENDIX F: LARGE FORMAT MAPS

- Figure 11 at 33"x44" (LiDAR Raw DEM Overview of the Ashley Project)
- Figure 12 at 33"x44" (LiDAR DEM Hillshade Overview of the Ashley Project)
- Figure 14 at 33"x44" (High-Resolution Orthophoto Mosaic Overview of Ashley Project)

Ashley Mine Project
LiDAR 50cm DEM Raw Data
UTM NAD83 Zone 17N
Scale 1:30,000
N
750
Meters
Earthstar Geographics
502000
503000
504000
505000
506000
507000
508000
509000
510000
5319000
5318000
5317000
5316000
5315000
5314000


Ashley Mine Project
LiDAR DEM 045-045 Hillshade
UTM NAD83 Zone 17N
Scale 1:30,000
N
750
Meters
Earthstar Geographics
502000
503000
504000
505000
506000
507000
508000
509000
510000
5319000
5318000
5317000
5316000
5315000
5314000

Ashley Mine Project
High-Res Orthophoto Mosaic
UTM NAD83 Zone 17N
Scale 1:30,000
N
750
Meters
Maxar
502000
503000
504000
505000
506000
507000
508000
509000
510000
5319000
5318000
5317000
5316000
5315000
5314000