CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT



UPDATED HYDROMETEOROLOGY REPORT

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EXECUTIVE SUMMARY

This hydrometeorology report provides climatic and hydrologic information for the Casino Copper-Gold Project in Yukon Territory, Canada. Specific climatic estimates are provided for the Project climate station situated at 1,200 m elevation, along with guidance on scaling these estimates to different elevations within the Project area. Hydrologic estimates are provided for nine gauging stations in the two watersheds that drain the Project area (Dip and Britannia Creek watersheds). The climatic and hydrologic estimates presented in this report are based on the available measured site data, in conjunction with regional regression analyses, which have been used to generate long-term synthetic data series for key climatic parameters and streamflow.

This report supersedes an earlier version, dated June 15, 2010 (KPL, 2010), which presented data collected up to 2009. This updated version incorporates an additional two years of climate and streamflow records (2010-2011) collected in the Project area and provides refined estimates of climatic and hydrologic parameters. Overall, the updated estimates for key parameters are in agreement with previously estimated values.

The estimated values for key climatic parameters, referenced to the Project site climate station at 1,200 m elevation, are presented below:

CLIMATIC PARAMETERS (1,200 M ELEVATION)	VALUE
Mean Annual Temperature	-3 C
Mean January Temperature	-17 C
Mean July Temperature	12 C
Extreme Minimum Temperature	-50 C
Extreme Maximum Temperature	30 C
Mean Annual Precipitation	510 mm
Mean Annual Rainfall	330 mm
Mean Annual Snowfall (Water-Equivalent)	180 mm
Mean Annual Rainfall/Snowfall Distribution	65% / 35%
2-Year 24-Hr Rainfall	29 mm
200-Year 24-Hr Rainfall	56 mm
Mean Annual Wind Speed	2.2 m/s
Maximum Wind Gust Speed	11.1 m/s
Prevailing Wind Direction	Southwesterly
Mean Annual Relative Humidity	68%
Mean Annual Potential Evapotranspiration	300 mm
Mean Annual Maximum Snow Water-Equivalent	140 mm
Mean Monthly Snowmelt for May (Water-Equivalent)	120 mm

Temperature and precipitation can be adjusted to reflect conditions at different elevations according to the following guidelines:

CLIMATIC PARAMETER ELEVATION ADJUSTMENTS	VALUE
Mean Monthly Temperature (April through October)	-0.6 C per 100 m
Mean Monthly Temperature (November through March)	Increases with elevation
Mean Annual Precipitation	+5% per 100 m

The streamflow and unit runoff results for gauging station W4 on Lower Casino Creek are presented below:

HYDROLOGIC PARAMETERS (LOWER CASINO CREEK (W4), DRAINAGE AREA 82 KM^2)	VALUE
Mean Annual Discharge	0.48 m^3/s
Mean Annual Unit Runoff	5.8 l/s/km^2
Mean Annual Runoff (Depth Equivalent)	180 mm/yr
Mean Monthly Discharge for May	1.37 m^3/s
Mean Monthly Unit Runoff for May	16.7 l/s/km^2
Mean Monthly Unit Runoff for May (Depth Equivalent)	45 mm/mo.
Natural Catchment Runoff Coefficient	0.4
2-Year Instantaneous Peak Flow	12 m^3/s
200-Year Instantaneous Peak Flow	40 m^3/s
10-Year, 7-Day Low Flow	0 m^3/s
10-Year Dry Monthly Flow	0.37 m^3/s
10-Year Wet Monthly Flow	3.01 m^3/s

Potential climate change effects have not been considered explicitly in any of the hydrometeorological estimates presented above, except for peak flows. Appropriate allowances for potential climate change effects should be made where necessary.

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SECTION 1.0 - INTRODUCTION

1.1 PROJECT DESCRIPTION

The Casino Copper-Gold Project is located in the Dawson Mountain Range of the Klondike Plateau approximately 300 km northwest of Whitehorse, Yukon Territory, as shown on Figure 1.1. The Casino Project is situated in the Dip Creek and Britannia Creek watersheds. Dip Creek drains southwest, eventually flowing into the White River, which is a tributary of the Yukon River. Britannia Creek drains north directly into the Yukon River.

The Project ore body is situated on a ridge between the Dip Creek and Britannia Creek watersheds. More specifically, the ore body straddles the drainage divide between the Casino Creek sub-watershed (tributary to Dip Creek) and the Canadian Creek sub-watershed (tributary to Britannia Creek). The Project includes an airstrip located in Dip Creek valley and a barge landing on the Yukon River near the Britannia Creek confluence. Access roads to these features will follow the Casino and Dip Creek valleys (to the airstrip) and the Canadian and Britannia Creek valleys (to the barge landing). The main access road to the Project area will connect to Carmacks.

1.2 REGIONAL SETTING

The Project is located within the Boreal Cordillera ecozone, which comprises much of the southern Yukon and a large portion of northern British Columbia, and more specifically within the Dawson Range ecoregion (NRC, 2010). The Boreal Cordillera ecozone is broadly characterized by the presence of several mountain ranges, including the Dawson Range, that trend in the north-westerly direction and include extensive plateau regions. The plateaus consist of flat or gently rolling upland terrain separated by broad valleys and lowlands.

The climate is characterized by long, cold, dry winters and short, warm, wet summers, with conditions varying according to altitude and aspect. Streamflow in the region is typically highest in May due to melting of the winter snowpack. Annual peak instantaneous flows commonly occur in this freshet period on larger rivers, but on smaller streams they may also occur in summer or early autumn due to intense rain or rain on snow events. Flows decrease throughout the winter and minimum flows typically occur in March or April.

The locations of regional climate and streamflow gauging stations operated by the Meteorological Service of Canada (MSC) and the Water Survey of Canada (WSC), respectively, are shown on Figure 1.2.

1.3 REPORT CONTENT

The climatic parameters presented in this report consist of the following:

- Temperature
- Rainfall, snowfall, and total precipitation
- Wind speed and direction
- Relative humidity
- Evapotranspiration, and
- Snowfall, snow accumulation, and snowmelt.

Climatic data were collected on-site at the Project climate station located in the upper Casino Creek sub-watershed at an elevation of 1,200 m. The period of site record extends from 1993 to 1994, and from 2008 to present. The site temperature and precipitation data were compared to the long-term record from the MSC climate station at Pelly Ranch, located 80 km to the east at an elevation of 454 m. Linear regression analyses of temperature and precipitation between the Casino and Pelly Ranch climate stations are described in Section 2.0 of this report along with the results of the analysis: a 54-year synthetic series of monthly temperature and precipitation at the Casino station, from which summary statistics have been computed.

Hydrologic information consists of streamflow, unit runoff, and runoff coefficient. Preliminary streamflow data were collected by Hallam Knight Piésold in 1993 and 1994. A new data collection program was initiated by AECOM in 2008, and continues to be operated at present by Knight Piésold Ltd. (KPL). KPL (2012) provided a comprehensive analysis of all available streamflow data and described a regional regression analysis used to generate a 33-year synthetic daily streamflow series for each of the nine gauging station locations in the Project area. Summary statistics of the 33-year streamflow series are presented in Section 3.0 of this report.

The following key hydrologic statistics for each gauging station presented are:

- Mean annual and monthly discharge and unit runoff
- Peak flows for various return periods from 2 years to 200 years
- 10-year, 7-day low flow
- 10-year wet and dry monthly flows, and
- Runoff coefficient (Lower Casino Creek station only).

SECTION 2.0 - CLIMATE

2.1 DATA SOURCES

2.1.1 Regional Climate Stations

Regional climate stations are operated by the MSC for several locations within the Klondike Plateau region and within 150 km of the Project location. The locations of selected stations are shown on Figure 1.2. The period of record, elevation, and mean annual temperature and precipitation at each station are provided in Table 2.1.

The MSC operated a climate station (Casino Creek, 2100310) within the general Project area, with measured data recorded between 1969 and 1995, with no years of complete record. The station elevation was 1,100 m. Based on the incomplete data for this station, the mean annual precipitation is approximately 400 mm with a mean annual temperature of -4 C.

Seven regional stations, listed in Table 2.1, have greater than 20 complete years of record. These stations are all situated in low-elevation settings (around 370 m to 650 m). Of these stations, Pelly Ranch is located closest to the Project area (approximately 80 km to the east of the Project area). Mean annual precipitation at the seven long-term stations ranges from around 290 mm to 420 mm, and mean annual temperature values ranging from around -3 C to -6 C.

2.1.2 Regional Climate Maps

Natural Resources Canada (NRC) maps of mean annual precipitation and lake evaporation in Yukon Territory are presented on Figures 2.1 and 2.2, respectively. The Project location lies in the middle of a broad zone of relatively low precipitation aligned northwest-southeast between large mountain ranges to the southwest (the St. Elias Mountains near the Pacific Coast) and the northeast (the Mackenzie Mountains along the Northwest Territories border), as shown on Figure 2.1. The zone of less than 400 mm mean annual precipitation roughly coincides with the Klondike Plateau. More specifically, the Project location is shown to lie in an area with less than 300 mm of mean annual precipitation, although this map (Figure 2.1) is based on relatively few regional climate stations and has a low resolution that does not account for local orographic effects. Mean annual lake evaporation in Yukon Territory is shown on Figure 2.2 to be more dependent on latitude than topography, although this map also does not account for local elevation effects. The Project location is shown to lie in an area with slightly less than 300 mm in mean annual lake evaporation.

2.1.3 Project Site Climate Station

In 1993, Hallam Knight Piésold Ltd. was retained by Pacific Sentinel Gold Corp. to undertake an environmental monitoring program for the Casino Project, which included both meteorology and hydrology monitoring programs. The field techniques followed during the program were presented in the report “Casino Project Baseline Environmental and Socioeconomic Studies” (HKPL, 1993). The data collection program involved the installation of a climate station near the Casino exploration camp, which measured both temperature and precipitation. This station operated from 1993 to 1995. A new Project climate station was established at approximately the same location on October 3, 2008, and has been operational since that time. The active climate station is maintained by RWDI Air Inc. The location of the Project climate station in the upper Casino Creek sub-watershed is shown on Figure 2.3. The station elevation is approximately 1,200 m.

The climate station apparatus consists of a 10 m high, free-standing tower equipped with instrumentation, a datalogger and a logger enclosure (RWDI, 2012). The station records air temperature, rainfall, wind speed and direction, relative humidity, barometric pressure, and snow depth. The datalogger is equipped with a satellite modem and can be accessed remotely.

2.1.4 Project Site Snow Course

Yukon Environment has collected 33 years of snowpack data (1977-2011) at a snow course located near the Project site (snow course 09CD-SC01). The snow course is situated at an elevation of 1,065 m, and its location is shown on Figure 2.3. Snow depth and snow water-equivalent (SWE) are measured each year at the beginning of March, April, and May, followed by a measurement in mid-May.

2.2 TEMPERATURE

2.2.1 Region

Mean monthly temperature values for the long-term regional climate stations are presented on Table 2.2. These sites range in elevation from around 370 m to 650 m. Temperatures are warmest in July, with mean monthly temperatures ranging from 14 C to 16 C. Temperatures are coldest in January, with mean monthly temperatures ranging from -25 C to -28 C.

2.2.2 Project Site

2.2.2.1 Long-Term Synthetic Series Generation

The long-term temperature record at Pelly Ranch (2100880) was used as the basis for generating a long-term synthetic series of monthly temperature values at the Project site climate station. The Pelly Ranch record was missing nine months of temperature data between 2008 and 2011, so these were first estimated by regression analysis of monthly temperatures between Pelly Ranch and Dawson A, resulting in a 54-year infilled record available for modelling temperature at the Project site. Separate analyses were performed for each month in which estimated values were required at Pelly Ranch. Monthly temperatures were found to be well-correlated at Pelly Ranch and Dawson A, with coefficients of determination (R^2) values ranging from 0.91 to 0.97.

The concurrent temperature records from the Pelly Ranch and Project site climate stations were then correlated using a standard linear regression. The concurrent monthly temperature values for both stations used in the regression analysis are summarized in Table 2.3.

The concurrent monthly temperatures for the two stations were found to be strongly correlated in the warmer months (April through October), but more weakly correlated in the colder months (November through March). For April through October, the temperatures at the Project site were generally 1 C to 4 C cooler than Pelly Ranch, consistent with the higher elevation at the Project site. For November to March, the temperatures at the Project site were warmer compared to Pelly Ranch by an average of 5 C and up to 15 C. This is attributed to the settling of cold air in valleys during winter and the consequent temperature inversions that are often experienced between valley bottom sites (e.g. Pelly Ranch) and ridges (e.g. Project site) under such conditions. For the regression analysis, two relationships were developed, using a Pelly Ranch temperature threshold of -7 C to partition the data. For the warmer months with monthly temperatures above -7 C at Pelly Ranch (approximately April through October), the coefficient of determination (R^2) was 0.96. For the colder months with monthly temperatures below -7 C at Pelly Ranch (approximately November through March), the coefficient of determination (R^2) was 0.50. A 54-year synthetic series of monthly temperature values for the Project site climate station was generated by applying the two regression relationships to the Pelly Ranch monthly temperature record. For the period of record in which the Pelly Ranch data overlaps the Project site data, the actual measured data from the Project site were inserted into the temperature series for use in lieu of synthetic values.

2.2.2.2 Mean Annual and Monthly Temperature

The estimated long-term mean annual and monthly temperatures at the Project site climate station according to the synthetic temperature series are presented in Table 2.3. The mean annual temperature from the Project site temperature series is -2.9 C (round to -3 C). For comparison, the mean annual temperature recorded at the Project site climate station from 1993 to 2011 was -2.2 C. The mean July temperature at the Project site according to the synthetic temperature series is 11.6 C (round to 12 C), which is 2 C to 4 C cooler than the regional stations discussed in Section 2.2.1 and shown in Table 2.2. The mean January temperature at the Project site according to the synthetic temperature series is -16.8 C (-17 C), which is 8 C to 11 C warmer than the regional stations discussed in Section 2.2.1 and shown in Table 2.2.

2.2.2.3 Extreme Temperatures

The extreme maximum and minimum recorded temperatures at Pelly Ranch according to the 1971-2000 climate normals are 35 C and -60 C, respectively. According to the regression relationships described in Section 2.2.2.1, the corresponding maximum temperature at the Project climate station would be around 30 C. The corresponding minimum temperature at the Project station is more difficult to estimate due to the weaker correlation in winter temperatures, but it would be considerably warmer than -60 C.

The maximum and minimum temperatures recorded at the Project climate station between 2008 and 2011 are 26 C and -40 C, respectively. Based on the site data and the Pelly Ranch estimates, the estimated long-term extreme temperatures for the Project climate station are 30 C and -50 C.

2.3 PRECIPITATION

2.3.1 Region

Mean monthly and annual rainfall, snowfall and total precipitation values for the long-term regional climate stations are presented in Table 2.4. The mean monthly precipitation at all stations is greatest during the summer months of June through August, and lowest during the late winter months of February through April. Most of the precipitation falls in the form of snow during the months of November through March, and in the form of rain during the months of May through September. More snow than rain falls in the shoulder months of April and October, but mixed rain and snow conditions are common. The fraction of annual precipitation that falls in the form of rain/snow at these regional stations ranges from 56%/44% to 71%/29%.

2.3.2 Project Site

2.3.2.1 Long-Term Synthetic Series Generation

The long-term precipitation record at Pelly Ranch (2100880) was used as the basis for generating a long-term synthetic series of monthly precipitation at the Project site climate station. The Pelly Ranch record was missing nine months of precipitation data between 2008 and 2011, so these were first estimated by regression analysis of monthly precipitation between Pelly Ranch and two other stations: Dawson A and Mayo. Monthly precipitation at Pelly Ranch and the two other stations were not well-correlated, with coefficient of determination (R^2) values of 0.28 and 0.49 for Dawson A and Mayo, respectively. The missing monthly precipitation values at Pelly Ranch were estimated by taking the average of the values predicted by the Dawson A and Mayo regression relationships for each given month.

The concurrent precipitation records from the Pelly Ranch and Project site climate stations were correlated using a standard linear regression analysis. The rain gauge at the Project site climate station was not equipped to record snowfall, and rainfall measurements during the winter and shoulder months were likely affected from snow and ice interference. Therefore, only the Project site precipitation records for the months of May through September were considered in the regression analysis. It is assumed that any snow that fell during these months was captured in the rain gauge and recorded as the snow melted, so that the recorded rainfall in the months of May through September can be considered to represent total precipitation. The monthly precipitation values from Pelly Ranch and the Project site that were used in the regression analysis are summarized in Table 2.5.

The monthly precipitation at the two locations was found to be moderately well-correlated (R^2 = 0.63). A linear trendline forced through the origin had a slope of 1.66 (i.e. Project site precipitation exceeded Pelly Ranch precipitation by 66%). The elevation difference between Pelly Ranch (454 m elevation) and the Project site climate station (1,200 m elevation) is 746 m. If the difference in precipitation between the two climate stations were entirely attributable to orographic effects, then the corresponding orographic factor is 7% per 100 m elevation, which is close to the typical value for this region of 5% per 100 m. The 1.66 scaling factor was applied to the entire monthly precipitation record at Pelly Ranch to generate a long-term synthetic series of monthly precipitation at the Project site climate station. In doing so, it was assumed that the observed precipitation ratio between the two sites in the months of May through September is also applicable to the winter months.

2.3.2.2 Mean Annual and Monthly Precipitation

The long-term estimated mean annual and monthly precipitation values at the Project site climate station according to the synthetic precipitation series are summarized in Table 2.5. The mean annual precipitation for the Project site based on the synthetic series is approximately 507 mm, of which 302 mm (60%) falls in the months of May through September. For comparison, the average precipitation for the months of May through September recorded at the Project site climate station from 1993 to 2011 was 329 mm. Mean monthly precipitation values at the Project site, according to the synthetic precipitation series, range from 17 mm in April to 91 mm in July.

The distribution of precipitation between rainfall and snowfall at the Project site was estimated by assuming that 100% of precipitation in the months of May through September falls as rain, 100% of precipitation in the months of November through March falls as snow, and 50% falls in each form in the shoulder months of April and October. The regional rainfall/snowfall distributions presented in Table 2.4 suggest that snowfall amounts may be greater than 50% in April and October, but it is expected that a significant portion of the snowfall in those months would melt relatively soon after falling so knowing the precise ratio of rainfall and snowfall in those months is not overly important. According to this distribution, 65% of annual precipitation falls as rain (329 mm) and 35% falls as snow (179 mm).

In order to reflect the uncertainty in the precipitation estimates, the recommended values for mean annual rainfall, snowfall, and total precipitation are 330 mm, 180 mm, and 510 mm, respectively.

2.3.2.3 Extreme 24-Hour Rainfall

The Rainfall Frequency Atlas of Canada (Hogg and Carr, 1985) provides a methodology for estimating the mean and standard deviations for the annual extreme 24-hour rainfall values. The resulting return period values were estimated using a Gumbel distribution. The results for the Project site climate station are presented in Table 2.6. The 24-hour rainfall depths range from 29 mm for a 2-year return period, to 56 mm for a 200-year return period.

For comparison, the maximum daily rainfall recorded at the Project site from 2009 to 2011 was 31.6 mm, which corresponds to a return period between 2 and 5 years according to the Rainfall Frequency Atlas. The maximum daily rainfall recorded at Pelly Ranch according to the 1971-2000 climate normals is 34.8 mm. Scaled by 1.66 to the Project site (according to the regression relationship for monthly precipitation), this would equate to 57 mm at the Project site, or close to a 200-year return period. Both of the above comparisons are taken to indicate that the extreme 24-hour rainfall estimates predicted by the Rainfall Frequency Atlas are reasonable.

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2.4 WIND SPEED AND DIRECTION

Wind speed and direction are measured on-site at the Project climate station and data are available for the period from October 2008 through October 2011. A regional analysis to account for long-term variability in wind conditions was not deemed necessary.

The Project site wind speed data are presented in Table 2.7. The mean annual wind speed is 2.2 m/s (7.9 km/hr). The mean monthly wind speeds are higher in the spring, summer and autumn and lower in the winter. Monthly means range from 1.7 m/s in November and December, to 2.7 m/s in May. The maximum wind gust speed recorded between 2008 and 2011 was 11.1 m/s (RWDI, 2012). The predominant wind direction was southwesterly.

2.5 RELATIVE HUMIDITY

Relative humidity is measured on-site at the Project climate station and data are available for the period from October 2008 through October 2011. A regional analysis to account for long-term variability in humidity conditions was not deemed necessary.

The Project site relative humidity data are presented in Table 2.8. The mean annual relative humidity is 68%. Mean monthly relative humidity values are lowest in the spring (52% to 63% in the months of March through May) and higher throughout the rest of the year (67% to 76% in the months of June through February).

2.6 EVAPOTRANSPIRATION

In the 2010 hydrometeorology report (KPL, 2010), the Thornthwaite Equation was selected as the preferred method for estimating monthly and annual potential evapotranspiration (PET) at the Project site. The Thornthwaite equation (Thornthwaite, 1948) only requires mean monthly temperature as an input, as shown below. The equation assumes that PET is zero when the mean monthly temperature is below 0 C.

$$ET_0 = \begin{cases} 0, T < 0 \deg C \\ 16\left(\frac{10T_i}{I}\right)^a, 0 \le T \le 26.5 \deg C \\ -415.85 + 32.24T_i - 0.43T_i^2, T \ge 26.5 \deg C \end{cases}$$

Where:

- PET_0 = Potential evapotranspiration (mm/month)
- T_i = Mean monthly temperature (°C)
- I = Heat index, sum of 12 monthly index values (*i*)
- i = Monthly heat index
- a = Empirically derived exponent, which is a function of I

And:

$$i = \left(\frac{T}{5}\right)^{1.514}$$

$$a = 6.75 * 10^{-7} I^3 - 7.71 * 10^{-5} I^2 + 1.79 * 10^{-2} I + 0.49$$

Monthly PET values based on measured temperatures at the Project site climate station, and long-term mean monthly PET values based on the synthetic temperature series for the Project site climate station, are presented in Table 2.9. Potential evapotranspiration values generally provide reasonable estimates of lake evaporation rates, and therefore the long-term values in Table 2.9 are assumed to be appropriate for estimating evaporation from lakes and ponds in the Project area.

The mean annual PET calculated for the period of site data collection is 321 mm. The estimated long-term mean annual PET is 304 mm. To reflect the uncertainties involved in estimating this value, the recommended value of mean annual PET at the Project site climate station is 300 mm.

2.7 SNOW ACCUMULATION AND MELT

The SWE measurements recorded at the Yukon Environment snow course 09CD-SC01 are presented in Table 2.10. The annual maximum SWE was typically recorded at the start of April or the start of May, with an approximately even distribution of occurrences between the two dates. The mean annual maximum SWE over the period of record is 141 mm. This value supports the estimated value of mean annual snowfall (180 mm) that was discussed in Section 2.3.2.2, since some of the snowfall is lost to sublimation or melt during the winter and early spring.

Monthly snowmelt in April and May was calculated from the SWE measurements by taking the difference of the values for April melt, and assuming that the entire snowpack was melted by the start of June. In years where the annual maximum SWE was recorded in May, the monthly melt for April was assumed to be zero. This method likely underestimates April snowmelt because it does not account for temporary snow accumulation and corresponding melt between the early April and early May measurement dates. Conversely, this method likely overestimates May snowmelt because the complete snowpack might not melt before the start of June in some years.

The estimated mean monthly snowmelt rates for April and May are 22 mm and 118 mm, respectively. These values represent 17% and 82%, respectively, of the annual melt after the date of maximum SWE accumulation.

The recommended, rounded value for mean annual maximum SWE is 140 mm. The recommended, rounded value for mean monthly snowmelt in May is 120 mm.

SECTION 3.0 - HYDROLOGY

3.1 REGIONAL STREAMFLOW ANALYSIS

The Water Survey of Canada (WSC) has operated nine streamflow gauging stations in the relative vicinity of the Project site (stations located within a 150 km radius and within the Dawson Range and Klondike Plateau) for varying periods over the past few decades. The locations of the regional WSC stations are presented on Figure 1.2.

All of the regional stations gauge flows from drainage areas much larger than the Project watersheds, and only five of the regional stations are currently active. Of the nine regional gauging stations, Big Creek has the smallest drainage area (1,750 km^2), and was deemed the most representative of the Project area streams. For this reason, Big Creek was selected as a regional surrogate for modelling streamflow at the Project area gauging stations. A more detailed rationale for the selection of the Big Creek gauging station is provided in KPL (2012).

A long-term synthetic flow series was developed for each Project station using a ranked regression modelling approach, which involved regressing ranked daily flows measured at the Project station against concurrent ranked daily flows from the WSC gauging station on Big Creek. The equations describing the regression trends were then applied to the 33-year streamflow record on Big Creek (1975-2010, excluding 1984, and 1994-1995), to produce synthetic daily flow series for the Project stations. A more detailed description of the regression analysis is provided in KPL (2012).

3.2 PROJECT AREA STREAMFLOW

3.2.1 Streamflow Measurement

Ten streamflow gauging stations have been operated in the Project area at various times since 2008. At present, nine streamflow gauging stations are considered to be in active operation, with one site deactivated in 2011 (W1) due to the development and natural destruction of a beaver dam, which interfered with the station's hydraulic control and caused the loss of the 2011 data. The locations of all active and discontinued stations are presented on Figure 3.1, and a simple schematic of the station network is provided on Figure 3.2. There are three stations in the Britannia Creek watershed (including the one deactivated station) and seven stations in the Dip Creek watershed. The latter can be further subdivided into four stations in the Casino Creek sub-watershed and three on the Dip Creek mainstem or the Victor Creek sub-watershed. The drainage areas at the Project gauging stations are provided in an inset table on Figure 3.1. Station W16, located on lower Dip Creek, has the largest drainage area of the Project gauging stations, at 384 km^2. Stations W18 and W11, located in the upper part of Casino Creek sub-watershed, have the smallest drainage areas, at 25 km^2 and 39 km^2, respectively.

An example measured streamflow hydrograph for the Lower Casino Creek gauging station (W4), including winter flow approximations and instantaneous discharge measurements, is shown on Figure 3.3. This hydrograph is indicative of the variable flows that occur in the Project area streams throughout the year, with multiple rain and snowmelt driven peak flow events throughout the spring, summer, and autumn, and low flows from late autumn through early spring.

3.2.2 Mean Monthly Discharge and Unit Runoff

The mean monthly and mean annual long-term synthetic flow estimates for the Project gauging stations are summarized in Table 3.1 (discharge) and Table 3.2 (unit runoff). The unit runoff results presented in Table 3.2 illustrate the following patterns:

- Mean annual unit runoff at the nine Project gauging stations ranges between 5.1 l/s/km^2 and 7.6 l/s/km^2, or 160 mm to 240 mm in annual runoff depth.
- The lowest unit runoff values (5.1 l/s/km^2 to 5.6 l/s/km^2) were estimated in the Britannia Creek watershed (stations W3 and W14), at the Lower Dip Creek station (W16), and in Upper Casino Creek (W11). The low unit runoff at the latter station is thought to be affected by surface flow losses to ground in the vicinity of the gauging station.
- Mean annual unit runoff at the gauging stations other than W11 in the Casino Creek sub-basin (W4, H18, and W18) range from 5.8 l/s/km^2 to 6.5 l/s/km^2, or 180 mm to 200 mm in annual runoff depth.
- Maximum monthly unit runoff occurs in May, corresponding with the month of maximum snowmelt, with mean values ranging between 13 l/s/km^2 and 29 l/s/km^2.
- In the Casino Creek sub-basin (other than station W11), mean May unit runoff ranges from 17 l/s/km^2 to 19 l/s/km^2.
- Mean monthly unit runoff at all stations is estimated to reach a minimum of 0.1 l/s/km^2 in the months of March and April.

At the Lower Casino Creek gauging station (W4), the key streamflow and unit runoff values are as follows:

- Drainage area: 82 km$^{2.}$
- Mean annual discharge: 0.48 m^3/s.
- Mean annual runoff: 5.8 l/s/km^2 or 183 mm/yr.
- Mean monthly discharge for May: 1.37 m^3/s.
- Mean monthly unit runoff for May: 16.7 l/s/km^2 or 45 mm/mo.

3.2.3 Peak Flows

Return period peak flows were calculated based on frequency analysis of the 33-year synthetic flow series for each station. These results were compared against an alternate set of peak flow estimates generated using a regional method (Janowicz, 1989). In general, the peak flow estimates generated by statistical analysis of the synthetic flow series exceeded the regional estimates based on Janowicz (1989). The latter are based on streamflow records from larger watersheds, which might not scale accurately to smaller watersheds with more flashy runoff response. A more detailed description of the peak flow analysis methodology and comparison of results are provided in KPL (2012).

The peak flows generated by statistical analysis of the synthetic series are recommended for adoption for Project design, with the inclusion of a 15% safety factor to account for potentially greater weather extremes and permafrost activity due to climate change. The recommended peak values for each station are presented in Table 3.3.

The highest peak flows per unit area were estimated for the Dip Creek and Victor Creek stations (W9, W16, R2), where the 200-year peak flow values equate to peak unit runoff values of 0.8 to 1.2 $m^3/s/km^2$. The 200-year peak flow values in the Britannia Creek watershed and Casino Creek sub-watershed equate to peak unit runoff values of 0.5 to 0.9 $m^3/s/km^2$.

These peak flow values contain considerable uncertainty due to the extent of rating curve extrapolation required to estimate high flows at the Project gauging stations, and uncertainties in the modelling of extreme flows based on the Big Creek record.

3.2.4 Low Flows

Janowicz (1990) provides a methodology for estimating 10-year 7-day low flows in Yukon Territory, based largely on streamflow records from larger rivers than are found in the Project area. Based on this regional methodology, non-zero flows are predicted in the Project area streams. However, site observations in late winter 2010 found that flows were zero or closely approached zero at all locations in the Project area. On this basis, the 10-year, 7-day low flow at all sites in the Project area is assumed to be zero.

3.2.5 Dry and Wet Monthly Flows

The variability of monthly flows at each Project station was characterized by calculating monthly average flows for a 10-year wet and 10-year dry return period. These monthly average flows were calculated based on the long-term synthetic flow series for each station using the Palisade Decision Tools @RISK statistical software.

For each month at each Project streamflow station, a statistical distribution was fit to the 33 monthly flow values in the synthetic flow series. The 10^{th} and 90^{th} percentile values of the distribution represent the 10-year dry and 10-year wet monthly flows, respectively. The results are presented in Table 3.4 (10-year dry) and Table 3.5 (10-year wet).

In May, the month with greatest mean monthly discharge, the 10-year dry and wet monthly discharge values at gauging station W4 (Lower Casino Creek) are 0.37 m^3/s and 3.01 m^3/s, respectively. They equate to 27% and 220% of the mean monthly discharge for May (1.37 m^3/s).

SECTION 4.0 - WATER BALANCE MODELLING INPUTS

4.1 GENERAL

This section defines additional hydrometeorological parameters required for engineering design and water balance modelling. These parameters help to quantify climatic variability, orographic effects and runoff coefficients for the Project area.

4.2 TEMPERATURE

The standard adiabatic lapse rate for temperature is -0.6 C per 100 m of elevation increase. This lapse rate can be applied to estimate temperatures in the Project area during the spring, summer, and autumn months. In the winter, temperature inversions are the norm, so temperature increases with elevation, but the relationship between elevation and temperature is not well-defined.

4.3 PRECIPITATION

4.3.1 Orographic Effect

The estimated orographic factor for precipitation is 5% per 100 m of elevation increase. This value is based on experience in assessing orographic factor elsewhere in Yukon Territory and British Columbia, and is in general agreement with the equivalent factor of 7% per 100 m between Pelly Ranch and the Project site.

4.3.2 Coefficient of Variation

The year-to-year variability of monthly precipitation in the Project area is quantified by coefficient of variation (Cv) values derived from regional data. The Cv represents the standard deviation normalized by mean. Cv values are typically required as input for stochastic water balance modelling. Monthly Cv values for precipitation in the Casino Creek Project area were estimated as the average monthly values of historical precipitation records for Beaver Creek A, Dawson A and Pelly Ranch. The estimated Cv values are summarised in Table 4.1.

4.4 EFFECTIVE RUNOFF COEFFICIENT

An effective runoff coefficient was estimated for the streamflow gauging station on Lower Casino Creek (W4). The Casino Creek sub-watershed contains no glaciers and therefore there is expected to be a reasonably direct relationship between annual precipitation and unit runoff. The effective runoff coefficient accounts for losses due to sublimation and evapotranspiration.

The effective runoff coefficient of 0.39 was calculated as the ratio of the mean annual unit runoff (183 mm) and mean annual precipitation at the mean elevation of the W4 drainage basin (475 mm). The recommended effective runoff coefficient is rounded to 0.4.

In May, the month with maximum snowmelt and streamflow, the calculated runoff coefficient is only 0.29. This is based on mean monthly snowmelt of 118 mm (no adjustment from snow course at 1,100 m elevation), mean monthly precipitation of 35 mm (adjusted from 37 mm at climate station), and mean monthly unit runoff of 45 mm at gauging station W4. The lower runoff coefficient in May might be related to springtime groundwater recharge, but also reflects uncertainties in the estimation of monthly snowmelt. It is recommended to use the rounded runoff coefficient of 0.4 in all months of the year.

SECTION 5.0 - CONCLUSIONS

The recommend values for key climatic parameters, referenced to the Project site climate station at 1,200 m elevation, are presented below:

CLIMATIC PARAMETERS (1,200 M ELEVATION)	VALUE
Mean Annual Temperature	-3 C
Mean January Temperature	-17 C
Mean July Temperature	12 C
Extreme Minimum Temperature	-50 C
Extreme Maximum Temperature	30 C
Mean Annual Precipitation	510 mm
Mean Annual Rainfall	330 mm
Mean Annual Snowfall (Water-Equivalent)	180 mm
Mean Annual Rainfall/Snowfall Distribution	65% / 35%
2-Year 24-Hr Rainfall	29 mm
200-Year 24-Hr Rainfall	56 mm
Mean Annual Wind Speed	2.2 m/s
Maximum Wind Gust Speed	11.1 m/s
Prevailing Wind Direction	Southwesterly
Mean Annual Relative Humidity	68%
Mean Annual Potential Evapotranspiration	300 mm
Mean Annual Maximum Snow Water-Equivalent	140 mm
Mean Monthly Snowmelt for May (Water-Equivalent)	120 mm

Temperature and precipitation can be adjusted to reflect conditions at different elevations according to the following guidelines:

CLIMATIC PARAMETER ELEVATION ADJUSTMENTS	VALUE
Mean Monthly Temperature (April through October)	-0.6 C per 100 m
Mean Monthly Temperature (November through March)	Increases with elevation
Mean Annual Precipitation	+5% per 100 m

The streamflow and unit runoff results for gauging station W4 on Lower Casino Creek are presented below:

HYDROLOGIC PARAMETERS (LOWER CASINO CREEK (W4), DRAINAGE AREA 82 KM^2)	VALUE
Mean Annual Discharge	0.48 m^3/s
Mean Annual Unit Runoff	5.8 $l/s/km^2$
Mean Annual Runoff (Depth Equivalent)	180 mm/yr
Mean Monthly Discharge for May	1.37 m^3/s
Mean Monthly Unit Runoff for May	16.7 $l/s/km^2$
Mean Monthly Unit Runoff for May (Depth Equivalent)	45 mm/mo.
Natural Catchment Runoff Coefficient	0.4
2-Year Instantaneous Peak Flow	12 m^3/s
200-Year Instantaneous Peak Flow	40 m^3/s
10-Year, 7-Day Low Flow	0 m^3/s
10-Year Dry Monthly Flow	0.37 m^3/s
10-Year Wet Monthly Flow	3.01 m^3/s

Potential climate change effects have not been considered explicitly in any of the hydrometeorological estimates presented above, except for peak flows. Appropriate allowances for potential climate change effects should be made where necessary.

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SECTION 6.0 - REFERENCES

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SECTION 7.0 - CERTIFICATION

This report was prepared, reviewed and approved by the undersigned.

Prepared:

Craig Nistor, P.Geo.
Senior Geoscientist

Reviewed:

Erin Rainey, P.Eng.
Project Engineer

Approved:

Ken Brouwer, P.Eng.
Managing Director

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TABLE 2.1

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

REGIONAL MSC CLIMATE STATIONS

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MSC Station Name	Station ID.	Years of Record	Complete Years of Record	Start Year	End Year	Latitude	Longitude	Elevation (m)	Mean Annual Temperature (C)	Mean Annual Precipitation (mm)
Mayo A	2100700	87	81	1925	2011	63° 37'	135° 52'	504	-3.2	303
Pelly Ranch	2100880	60	51	1951	2011	62° 49'	137° 22'	454	-3.8	304
Carmacks	2100300	45	33	1963	2007	62° 06'	136° 18'	525	-2.8	287
Beaver Creek A	2100160	41	29	1968	2011	62° 24'	140° 52'	649	-5.4	417
Dawson A	2100402	36	27	1976	2011	64° 02'	139° 07'	370	-4.1	324
McQuesten	2100719	26	22	1986	2011	63° 36'	137° 31'	457	-3.3	343
Snag A	2101000	24	22	1943	1966	62° 02'	140° 24'	587	-5.8	371
Casino Creek	2100310	7	0	1969	1995	62° 43'	138° 49'	1100	-4.4	399

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[MSC_WSC_stations.xls]MSC stations

NOTES:

1. DATA OBTAINED FROM THE METEOROLOGICAL SERVICES OF CANADA BRANCH (MSC) OF ENVIRONMENT CANADA.
2. STATIONS WITH LESS THAN FIVE COMPLETE YEARS OF RECORD NOT INCLUDED WITH THE EXCEPTION OF CASINO CREEK.
3. ONLY ONE STATION WAS SELECTED WHERE CLUSTERS OF STATIONS EXIST, SUCH AS DAWSON.
4. MEAN ANNUAL TEMPERATURE AND PRECIPITATION VALUES BASED ON RECORDS TO 2007.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 2.2

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MEAN MONTHLY TEMPERATURES AT REGIONAL CLIMATE STATIONS

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MSC Station Name	Station ID.	Period of Record	Complete Years of Record	Temperature (°C)												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mayo A	2100700	1925-2011	79	-25.4	-19.5	-10.7	-0.1	8.1	13.7	15.3	12.5	6.4	-2.2	-15.3	-22.3	-3.2
Pelly Ranch	2100880	1951-2011	52	-27.3	-20.5	-11.7	0.2	7.9	13.5	15.3	12.6	6.6	-2.5	-15.9	-24.4	-3.8
Carmacks	2100300	1963-2007	31	-25.4	-17.9	-10.1	0.5	7.6	13.5	15.3	12.9	6.8	-1.8	13.9	-22.0	-3.0
Beaver Creek A	2100160	1968-2011	29	-27.0	-20.8	-12.7	-1.8	6.3	12.0	13.8	11.1	4.5	-6.2	-19.1	-24.8	-5.4
Dawson A	2100402	1976-2011	26	-26.1	-21.9	-12.4	0.0	8.3	13.9	15.7	12.5	6.0	-4.4	-17.4	-23.9	-4.1
McQuesten	2100719	1986-2011	22	-24.9	-18.8	-11.1	0.9	8.3	13.7	15.2	12.2	5.8	-3.4	-16.4	-21.3	-3.3
Snag A	2101000	1943-1966	22	-28.1	-22.3	-13.9	-2.9	6.5	12.0	13.9	11.2	5.1	-5.4	-18.9	-27.3	-5.8
Casino Creek	2100310	1969-1995	0	-17.2	-16.7	-12.3	-6.8	2.5	9.6	11.8	9.4	3.2	-5.6	-15.4	-14.8	-4.4

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NOTES:

1. DATA OBTAINED FROM THE METEOROLOGICAL SERVICES OF CANADA BRANCH (MSC) OF ENVIRONMENT CANADA.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 2.3

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY TEMPERATURE DATA USED FOR REGRESSION ANALYSIS

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Climate Station	Elevation (m)	Temperature (°C)												
		Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Pelly Ranch	454	1993	-	-	-	2.2	9.4	13.9	16.0	12.9	6.6	0.6	-14.3	-18.2	
		1994	-27.4	-27.4	-7.8	3.3	8.3	13.5	16.5	15.9	6.1	-1.4	-18.9	-26.6	**-3.8**
		1995	-23.3	-	-	-	-	-	-	-	-	-	-	-	
		2008	-	-	-	-	-	-	-	-	-	-2.5	1.7	-27.4	
		2009	-25.7	-22.4	-12.9	0.2	9.0	15.0	17.2	13.3	8.1	-0.3	-12.8	-18.7	**-2.5**
		2010	-20.8	-13.3	-5.1	3.5	10.0	14.1	15.2	0.8	1.4	1.4	1.7	2.3	**0.9**
		2011	-	-	-	1.2	9.9	14.0	15.6	12.9	8.1	-	-	-	
		Average	**-24.3**	**-21.0**	**-8.6**	**2.1**	**9.3**	**14.1**	**16.1**	**11.2**	**6.1**	**-0.4**	**-8.5**	**-17.7**	**-1.8**
Casino Project Site	1200	1993	-	-	-	1.7	7.7	10.6	12.4	9.8	4.7	-2.3	-10.3	-13.2	
		1994	-21.3	-22.1	-6.7	1.8	5.8	10.3	13.5	13.8	4.1	-2.8	-16.8	-11.7	**-2.7**
		1995	-11.0	-	-	-	-	-	-	-	-	-	-	-	
		2008	-	-	-	-	-	-	-	-	-	-6.7	-10.2	-16.2	
		2009	-18.4	-15.0	-14.2	-2.8	6.0	10.4	14.0	9.4	5.6	-2.8	-13.5	-11.2	**-2.7**
		2010	-13.6	-7.5	-7.7	-0.7	7.2	9.0	11.3	10.6	3.7	-3.4	-8.9	-17.7	**-1.5**
		2011	-	-	-	-2.8	6.0	8.7	10.5	8.1	4.9	-	-	-	
		Average	**-16.1**	**-14.9**	**-9.5**	**-0.6**	**6.5**	**9.8**	**12.3**	**10.3**	**4.6**	**-3.6**	**-12.0**	**-14.0**	**-2.2**
		Long-term est.	**-16.8**	**-14.0**	**-10.2**	**-1.9**	**5.0**	**10.0**	**11.6**	**9.2**	**3.8**	**-4.5**	**-12.1**	**-15.3**	**-2.9**

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Temperature_2011.xls]Table 2.3

NOTES:
1. THE LONG-TERM TEMPERATURE VALUES WERE ESTIMATED BASED ON A REGRESSION ANALYSIS WITH CONCURRENT CASINO AND PELLY RANCH DATA.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 2.4

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MEAN MONTHLY PRECIPITATION AT REGIONAL CLIMATE STATIONS

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MSC Station Name	Station ID.	Period of Record	Elevation (m)	Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Beaver Creek	2100160	1969 - 2005	649	rain (mm)	0.0	0.0	0.0	1.2	30.2	73.0	102.3	57.5	27.5	2.9	0.0	0.0	294.7
				% annual precip.	0.0%	0.0%	0.0%	0.3%	7.2%	17.5%	24.5%	13.8%	6.6%	0.7%	0.0%	0.0%	70.6%
				snow (mm)	14.1	11.1	11.7	11.9	5.9	0.1	0.0	1.2	9.7	25.0	18.5	13.4	122.6
				% annual precip.	3.4%	2.7%	2.8%	2.9%	1.4%	0.0%	0.0%	0.3%	2.3%	6.0%	4.4%	3.2%	29.4%
				precip.(mm)	14.1	11.1	11.7	13.1	36.2	73.1	102.3	58.7	37.2	27.9	18.5	13.4	417.2
				% annual precip.	3.4%	2.7%	2.8%	3.1%	8.7%	17.5%	24.5%	14.1%	8.9%	6.7%	4.4%	3.2%	100.0%
Snag A	2101000	1944 - 1965	587	rain (mm)	0.1	0.0	0.2	2.1	24.1	56.0	74.9	48.1	22.5	1.8	0.3	0.0	230.2
				% annual precip.	0.0%	0.0%	0.1%	0.6%	6.5%	15.1%	20.1%	12.9%	6.0%	0.5%	0.1%	0.0%	61.9%
				snow (mm)	21.7	16.2	15.8	13.2	6.1	0.7	0.0	0.3	5.8	18.6	21.9	21.8	141.9
				% annual precip.	5.8%	4.4%	4.2%	3.5%	1.6%	0.2%	0.0%	0.1%	1.6%	5.0%	5.9%	5.9%	38.1%
				precip.(mm)	21.7	16.2	16.0	15.3	30.2	56.7	74.9	48.4	28.3	20.3	22.2	21.8	372.0
				% annual precip.	5.8%	4.4%	4.3%	4.1%	8.1%	15.2%	20.1%	13.0%	7.6%	5.5%	6.0%	5.9%	100.0%
Pelly Ranch	2100880	1955 - 2006	454	rain (mm)	0.0	0.0	0.2	3.6	23.2	37.0	54.9	38.5	26.2	7.3	0.4	0.0	191.2
				% annual precip.	0.0%	0.0%	0.1%	1.2%	7.6%	12.1%	17.9%	12.6%	8.6%	2.4%	0.1%	0.0%	62.5%
				snow (mm)	19.8	14.7	11.3	6.6	0.5	0.0	0.0	0.0	2.3	15.1	24.4	19.9	114.6
				% annual precip.	6.5%	4.8%	3.7%	2.2%	0.2%	0.0%	0.0%	0.0%	0.7%	4.9%	8.0%	6.5%	37.5%
				precip.(mm)	19.8	14.7	11.5	10.2	23.7	37.0	54.9	38.5	28.5	22.4	24.9	19.9	305.9
				% annual precip.	5.3%	4.0%	3.1%	2.7%	6.4%	9.9%	14.8%	10.3%	7.7%	6.0%	6.7%	5.4%	100.0%
Dawson A	2100402	1977 - 2005	370	rain (mm)	0.0	0.0	0.3	2.2	25.9	40.4	50.6	41.6	32.9	8.9	0.1	0.4	203.3
				% annual precip.	0.0%	0.0%	0.1%	0.6%	7.1%	11.1%	13.9%	11.5%	9.0%	2.4%	0.0%	0.1%	56.0%
				snow (mm)	25.3	17.6	12.8	7.0	2.3	0.0	0.0	0.4	3.9	25.9	35.7	28.8	159.7
				% annual precip.	7.0%	4.9%	3.5%	1.9%	0.6%	0.0%	0.0%	0.1%	1.1%	7.1%	9.8%	7.9%	44.0%
				precip.(mm)	25.3	17.7	13.1	9.2	28.2	40.4	50.6	42.0	36.8	34.7	35.8	29.2	363.0
				% annual precip.	7.0%	4.9%	3.6%	2.5%	7.8%	11.1%	13.9%	11.6%	10.1%	9.6%	9.9%	8.0%	100.0%

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NOTES:

1. ONLY COMPLETE YEARS OF RECORD UP TO 2006 WERE USED.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 2.5

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY PRECIPITATION DATA USED FOR REGRESSION ANALYSIS

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Climate Station	Elevation (m)	Measured Precipitation (mm)													
		Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Pelly Ranch	454	1993	24.9	6.8	34.4	8.8	18.4	16.8	61.9	40.0	20.8	28.1	34.8	7.0	**303**
		1994	24.6	4.8	15.9	7.7	37.8	53.6	36.2	8.6	21.6	27.4	27.4	3.6	**269**
		2007	19.3	7.4	30.1	12.0	3.0	36.8	50.7	24.8	57.7	23.9	18.8	32.0	**317**
		2008	22.0	8.9	1.9	19.0	14.4	23.1	68.2	105.4	32.2	23.0	19.6	16.3	**354**
		2009	34.6	16.6	24.1	13.2	12.6	22.4	11.2	100.4	18.8	20.4	26.6	12.9	**314**
		2010	18.5	2.4	7.0	4.0	9.6	37.4	89.0	38.4	10.9	14.8	14.1	7.8	**254**
		2011	11.8	26.4	2.5	4.4	21.6	98.7	102.0	54.0	14.2	12.3	56.7	25.8	**430**
		Average	**22.2**	**10.5**	**16.6**	**9.9**	**16.8**	**41.3**	**59.9**	**53.1**	**25.2**	**21.4**	**28.3**	**15.0**	**320**
Casino Project Site	1200	1993					62.8	73.7	131.9	43.2	31.6				
		1994					38.0	46.0	96.2	37.8	10.6				
		2007					-	-	-	-	-				
		2008					-	-	-	-	-				
		2009					19.7	96.8	31.3	90.9	27.2				
		2010					21.3	92.6	147.1	-	-				
		2011					21.1	169.6	161.2	98.2	9.2				
		Average					**32.6**	**95.7**	**113.5**	**67.5**	**19.7**				
		Long-term est.	**32.4**	**24.3**	**18.9**	**16.7**	**36.6**	**61.8**	**90.5**	**66.6**	**46.9**	**37.5**	**42.4**	**32.7**	**507**
		Long-term rounded													
		Rainfall est.	**0**	**0**	**0**	**8**	**37**	**62**	**91**	**67**	**47**	**18**	**0**	**0**	**330**
		Snowfall est.	**32**	**24**	**19**	**9**	**0**	**0**	**0**	**0**	**0**	**20**	**43**	**33**	**180**
		Total est.	**32**	**24**	**19**	**17**	**37**	**62**	**91**	**67**	**47**	**38**	**43**	**33**	**510**

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Precip_2011.xls]Table 2.5

NOTES:

1. THE CASINO SITE METEOROLOGICAL STATION, BOTH HISTORICALLY AND PRESENTLY, WAS ASSUMED TO COLLECT ONLY RAINFALL DATA DUE TO THE INSTRUMENT SET-UP, THEREFORE THE PRECIPITATION DATA COLLECTED IN THE MONTHS OF OCTOBER TO APRIL IS PRESENTED FOR INFORMATION PURPOSES ONLY BUT WAS NOT USED IN THE ANALYSIS OF MEAN ANNUAL PRECIPITATION FOR THE SITE.
2. IT WAS ASSUMED THAT PRECIPITATION COLLECTED DURING MAY TO SEPTEMBER FELL AS RAIN, SINCE THE AVERAGE MONTHLY TEMPERATURES DURING THESE MONTHS WAS ABOVE ZERO.
3. THE LONG-TERM PRECIPITATION VALUES WERE ESTIMATED BASED ON A REGRESSION ANALYSIS OF CONCURRENT CASINO AND PELLY RANCH DATA.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	CJN
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 2.6

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

EXTREME 24-HOUR RAINFALL DEPTH AT THE PROJECT SITE CLIMATE STATION

Print Jul/09/12 14:39

Climate Station	Elevation (m)	Return Period (years)	24-Hr Rainfall (mm)
Casino Project Site	1200	2	29
		5	35
		10	39
		15	42
		20	43
		25	45
		50	49
		100	53
		200	56

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Snowpack & IDF.xlsx]Table 2.6

NOTES:

1. 24-HOUR RAINFALL DEPTHS ESTIMATED ACCORDING TO THE RAINFALL FREQUENCY ATLAS OF CANADA (HOGG AND CARR, 1985).

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	22JUN'12	ISSUED WITH REPORT VA101-325/8-11	CJN	EER	KJB

Knight Piésold CONSULTING

TABLE 2.7

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY WIND SPEED AT THE PROJECT SITE CLIMATE STATION

Print Jul/09/12 14:44

Climate Station	Elevation (m)	Wind Speed (m/s)													
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Casino Project Site	1200	2008											1.8	1.5	
		2009	2.0	2.0	2.9	2.2	2.5	2.7	2.5	2.4	2.2	2.3	1.6	1.5	**2.2**
		2010	1.7	1.8	3.0	2.8	2.6	2.5	2.4	2.2	2.4	2.4	1.7	2.1	**2.3**
		2011			2.0	2.7	2.9	2.4	2.2	2.3	2.5	1.9			
		Average	1.8	1.9	2.6	2.6	2.7	2.5	2.4	2.3	2.4	2.2	1.7	1.7	**2.2**

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Summary tables.xlsx]Table 2.7

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 2.8

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY RELATIVE HUMIDITY AT THE PROJECT SITE CLIMATE STATION

Print Jul/09/12 14:41

Climate Station	Elevation (m)	Relative Humidity (%)													
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Casino Project Site	1200	2008											71	69	
		2009	72	67	71	56	51	62	53	75	71	80	78	70	**67**
		2010	77	67	64	57	49	71	72	71	71	76	79	79	**69**
		2011			55	62	56	77	77	75	64	53			
		Average	74	67	63	59	52	70	67	74	68	70	76	72	**68**

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Summary tables.xlsx]Table 2.8

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	TR	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 2.9

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY POTENTIAL EVAPOTRANSPIRATION AT THE PROJECT SITE CLIMATE STATION

Print Jul/09/12 14:46

Climate Station	Elevation (m)	Method	Year	Evapotranspiration (mm)												
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Casino Project Site	1200	Thornthwaite Equation	1993	0	0	0	20	57	71	80	67	40	0	0	0	335
			1994	0	0	0	19	44	68	83	84	35	0	0	0	332
			1995	0	0	0	20	53	76	78	63	53	0	0	0	343
			2008	0	0	0	0	53	74	74	67	39	0	0	0	307
			2009	0	0	0	0	48	70	87	65	45	0	0	0	316
			2010	0	0	0	0	57	66	77	74	36	0	0	0	310
			2011	0	0	0	0	53	68	76	64	46	0	0	0	308
			Measurement Period Average	0	0	0	8	52	71	79	69	42	0	0	0	321
			Long-term Est.	**0**	**0**	**0**	**2**	**45**	**72**	**80**	**68**	**37**	**0**	**0**	**0**	**304**

M:\1\01\00325\12\A\Data\Task 310 - Hydrology\Watershed Model\Climate Inputs\[PET_20120622.xls]Table 2.9

NOTES:

1. POTENTIAL EVAPOTRANSPIRATION VALUES WERE CALCULATED BASED THE THORNTHWAITE EQUATION AND USING THE SYNTHETIC TEMPERATURE SERIES FOR THE PROJECT CLIMATE STATION. THE SYNTHETIC SERIES CONTAINS MEASURED DATA WITHIN THE MEASUREMENT PERIOD.

0	22JUN'12	ISSUED WITH REPORT VA101-325/8-11	CJN	EER	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 2.10

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

MONTHLY SNOWPACK AND SNOWMELT AT THE CASINO CREEK SNOW COURSE

Print Jul/09/12 14:38

Snow Course	Elevation (m)	Year	Annual Maximum SWE (mm)	Monthly Snow Melt (mm)		Monthly Snow Melt (%)	
				April	May	April	May
Casino Creek (09CD-SC01)	1065	1977	125	0	125	0%	100%
		1978	98	12	86	12%	88%
		1979	170	25	145	15%	85%
		1980	95	0	95	0%	100%
		1981	88	0	88	0%	100%
		1982	173	0	173	0%	100%
		1983	120	40	80	33%	67%
		1984	139	0	139	0%	100%
		1985	180	0	180	0%	100%
		1986	168	0	168	0%	100%
		1987	117	0	117	0%	100%
		1988	99	45	54	45%	55%
		1989	136	56	80	41%	59%
		1990	144	44	100	31%	69%
		1991	225	58	167	26%	74%
		1992	207	0	207	0%	100%
		1993	190	0	190	0%	100%
		1994	110	54	56	49%	51%
		1995	104	0	104	0%	100%
		1996	118	8	110	7%	93%
		1997	149	55	94	37%	63%
		1998	88	88	0	100%	0%
		1999	126	0	126	0%	100%
		2000	158	9	149	6%	94%
		2001	147	0	147	0%	100%
		2002	118	0	118	0%	100%
		2003	90	21	60	23%	67%
		2004	152	0	152	0%	100%
		2005	199	106	93	53%	47%
		2006	134	13	121	10%	90%
		2007	124	0	124	0%	100%
		2008	122	111	0	91%	0%
		2009	208	0	208	0%	100%
		2010	128	22	106	17%	83%
		2011	182	0	182	0%	100%
		Mean	**141**	**22**	**118**	**17%**	**82%**

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Snowpack & IDF.xlsx]Table 2.10

NOTES:

1. THE CASINO CREEK SNOW COURSE IS OPERATED BY YUKON ENVIRONMENT.
2. SWE = SNOW WATER-EQUIVALENT.
3. MONTHLY SNOWMELT WAS ESTIMATED BY SUBTRACTION OF CONSECUTIVE SWE MEASUREMENTS. MELT WAS ASSUMED TO BE ZERO IN CASES WHERE SWE INCREASED IN THE LATTER MEASUREMENT.
4. THE SNOWMELT ESTIMATES ASSUME THAT 100% OF SNOW MELTS BY THE END OF MAY, WHICH IS LIKELY NOT VALID IN ALL YEARS, ESPECIALLY IN THOSE YEARS WHERE MAXIMUM SWE OCCURRED IN MID-MAY.
5. MONTHLY SNOWMELT (%) REFERS TO THE FRACTION OF ANNUAL MAXIMUM SWE THAT MELTED IN A GIVEN MONTH.

0	22JUN'12	ISSUED WITH REPORT VA101-325/8-11	CJN	EER	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 3.1

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

LONG-TERM MEAN MONTHLY AND ANNUAL DISCHARGE AT PROJECT STREAMFLOW STATIONS

Print Jul/09/12 15:02:04

Station	Drainage Area (km^2)	Mean Monthly Discharge (m^3/s)												
		January	February	March	April	May	June	July	August	September	October	November	December	**Mean Annual**
Britannia Creek (W14)	45	0.01	0.00	0.00	0.05	0.72	0.51	0.50	0.41	0.30	0.18	0.04	0.02	**0.23**
Canadian Creek (W3)	64	0.01	0.01	0.01	0.07	1.03	0.72	0.71	0.59	0.43	0.25	0.05	0.02	**0.33**
Lower Dip Creek (W16)	384	0.07	0.04	0.04	0.43	6.82	4.03	4.38	3.56	3.75	2.11	0.31	0.14	**2.16**
Upper Dip Creek (W9)	194	0.03	0.02	0.02	0.22	3.92	2.05	2.74	2.24	1.82	1.04	0.16	0.07	**1.20**
Victor Creek (R2)	85	0.01	0.01	0.01	0.10	2.45	1.44	1.24	1.08	0.76	0.44	0.07	0.03	**0.64**
Lower Casino Creek (W4)	82	0.01	0.01	0.01	0.09	1.37	0.79	1.02	0.95	0.84	0.47	0.07	0.03	**0.48**
Middle Casino Creek (H18)	67	0.01	0.01	0.01	0.08	1.22	0.71	0.80	0.86	0.69	0.39	0.05	0.02	**0.41**
Upper Casino Creek (W11)	39	0.01	0.00	0.00	0.04	0.51	0.31	0.44	0.41	0.37	0.23	0.03	0.01	**0.20**
Brynelsen Creek (W18)	25	0.00	0.00	0.00	0.03	0.47	0.31	0.28	0.35	0.28	0.19	0.02	0.01	**0.16**

M:\1\01\00325\06\A\Data\Hydrology\2 - Baseline Report Data\[LT Mean Monthly Unit Runoff.xlsx]Table 3.1 Mean Discharge

0	26JUN'12	ISSUED WITH REPORT VA101-325/8-11	DK	KT	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

Knight Piésold CONSULTING

TABLE 3.2

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

LONG-TERM MEAN MONTHLY AND ANNUAL UNIT RUNOFF AT PROJECT STREAMFLOW STATIONS

Print Jul/09/12 15:02:04

Station	Drainage Area (km^2)	Mean Monthly Unit Runoff ($l/s/km^2$)												
		January	February	March	April	May	June	July	August	September	October	November	December	**Mean Annual**
Britannia Creek (W14)	45	0.2	0.1	0.1	1.1	16.0	11.2	11.1	9.2	6.7	3.9	0.8	0.4	**5.1**
Canadian Creek (W3)	64	0.2	0.1	0.1	1.1	16.0	11.2	11.1	9.2	6.7	3.9	0.8	0.4	**5.1**
Lower Dip Creek (W16)	384	0.2	0.1	0.1	1.1	17.8	10.5	11.4	9.3	9.8	5.5	0.8	0.4	**5.6**
Upper Dip Creek (W9)	194	0.2	0.1	0.1	1.1	20.2	10.6	14.1	11.5	9.4	5.3	0.8	0.4	**6.2**
Victor Creek (R2)	85	0.2	0.1	0.1	1.1	29.0	17.0	14.6	12.8	9.0	5.2	0.8	0.4	**7.6**
Lower Casino Creek (W4)	82	0.2	0.1	0.1	1.1	16.7	9.6	12.4	11.6	10.3	5.7	0.8	0.4	**5.8**
Middle Casino Creek (H18)	67	0.2	0.1	0.1	1.1	18.3	10.6	11.9	12.8	10.3	5.9	0.8	0.4	**6.1**
Upper Casino Creek (W11)	39	0.2	0.1	0.1	1.1	13.2	8.0	11.3	10.6	9.6	6.0	0.8	0.4	**5.1**
Brynelsen Creek (W18)	25	0.2	0.1	0.1	1.1	18.8	12.2	11.3	14.0	11.3	7.6	0.8	0.4	**6.5**

M:\1\01\00325\06\A\Data\Hydrology\2 - Baseline Report Data\[LT Mean Monthly Unit Runoff.xlsx]Table 3.2 mean unit runoff

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	DK	KT	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 3.3

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

RECOMMENDED PEAK FLOW VALUES FOR PROJECT STREAMFLOW STATIONS

Print Jul/09/12 14:49:07

Station	Return Period Peak Instantaneous Discharge (m^3/s)							
	Mean Annual	2 Year	5 Year	10 Year	20 Year	50 Year	100 Year	200 Year
Britannia Creek (W14)	6	5	8	11	13	17	21	25
Canadian Creek (W3)	10	8	14	19	25	35	45	57
Lower Dip Creek (W16)	88	70	125	169	218	292	359	435
Upper Dip Creek (W9)	44	39	68	86	104	126	142	158
Victor Creek (R2)	23	19	32	42	54	71	86	103
Lower Casino Creek (W4)	13	12	20	24	28	33	37	40
Middle Casino Creek (H18)	13	11	20	26	33	44	52	61
Upper Casino Creek (W11)	6	5	8	11	13	16	19	22
Brynelsen Creek (W18)	4	3	5	7	9	11	13	15

M:\1\01\00325\06\A\Data\Hydrology\2 - Baseline Report Data\[Peak Flows_30apr12.xlsx]Table 3.3

0	30APR'12	ISSUED WITH REPORT VA101-325/8-11	DK	CJN	JGC
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 3.4

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

10-YEAR DRY MONTHLY FLOWS AT PROJECT STREAMFLOW STATIONS

Print Jul/09/12 15:01:18

Station	Drainage Area (km^2)	10-Year Dry Monthly Discharge (m^3/s)											
		January	February	March	April	May	June	July	August	September	October	November	December
Britannia Creek (W14)	45	0.00	0.00	0.00	0.00	0.30	0.29	0.10	0.19	0.16	0.15	0.01	0.00
Canadian Creek (W3)	64	0.00	0.00	0.00	0.13	0.42	0.35	0.22	0.25	0.24	0.20	0.02	0.00
Lower Dip Creek (W16)	384	0.01	0.01	0.01	0.00	1.90	1.22	1.32	0.80	1.74	1.22	0.09	0.02
Upper Dip Creek (W9)	194	0.00	0.00	0.00	0.00	0.86	0.60	1.08	1.06	1.00	0.81	0.05	0.01
Victor Creek (R2)	85	0.00	0.00	0.00	0.00	0.52	0.31	0.45	0.47	0.46	0.39	0.02	0.01
Lower Casino Creek (W4)	82	0.00	0.00	0.00	0.00	0.37	0.22	0.21	0.46	0.47	0.28	0.02	0.01
Middle Casino Creek (H18)	67	0.00	0.00	0.00	0.01	0.40	0.30	0.28	0.37	0.41	0.34	0.02	0.00
Upper Casino Creek (W11)	39	0.00	0.00	0.00	0.00	0.17	0.13	0.18	0.23	0.24	0.22	0.01	0.00
Brynelsen Creek (W18)	25	0.00	0.00	0.00	0.02	0.22	0.17	0.04	0.21	0.20	0.18	0.01	0.00

M:\1\01\00325\06\A\Data\Hydrology\2 - Baseline Report Data\[Wet and Dry.xlsx]Table 3.4, 10 Year Dry

0	26JUN'12	ISSUED WITH REPORT VA101-325/8-11	SB	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 3.5

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

10-YEAR WET MONTHLY FLOWS AT PROJECT STREAMFLOW STATIONS

Print Jul/09/12 14:49:48

Station	Drainage Area (km^2)	10-Year Wet Monthly Discharge (m^3/s)											
		January	February	March	April	May	June	July	August	September	October	November	December
Britannia Creek (W14)	45	0.02	0.01	0.01	0.12	1.35	0.81	0.84	0.80	0.50	0.21	0.07	0.04
Canadian Creek (W3)	64	0.02	0.01	0.02	0.27	1.75	1.02	1.06	0.99	0.66	0.29	0.09	0.05
Lower Dip Creek (W16)	384	0.11	0.07	0.08	1.04	14.07	7.26	7.73	8.05	4.62	2.32	0.48	0.27
Upper Dip Creek (W9)	194	0.07	0.04	0.04	0.55	10.55	4.03	4.58	3.54	2.90	1.29	0.29	0.16
Victor Creek (R2)	85	0.03	0.02	0.02	0.37	5.91	2.68	2.39	2.01	1.31	0.56	0.13	0.07
Lower Casino Creek (W4)	82	0.03	0.02	0.02	0.20	3.01	1.61	1.33	1.36	1.17	0.60	0.12	0.07
Middle Casino Creek (H18)	67	0.02	0.01	0.02	0.25	3.14	1.43	1.12	1.20	1.00	0.51	0.10	0.08
Upper Casino Creek (W11)	39	0.01	0.01	0.01	0.08	0.96	0.58	0.60	0.44	0.39	0.27	0.06	0.03
Brynelsen Creek (W18)	25	0.01	0.01	0.01	0.12	1.10	0.62	0.32	0.52	0.39	0.23	0.04	0.02

M:\1\01\00325\06\A\Data\Hydrology\2 - Baseline Report Data\[Wet and Dry.xlsx]Table 3.5 10 Year Wet

0	28JUN'12	ISSUED WITH REPORT VA101-325/8-11	SB	CJN	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 4.1

CASINO MINING CORPORATION
CASINO CREEK COPPER-GOLD PROJECT

MONTHLY PRECIPITATION COEFFICIENT OF VARIATION AT REGIONAL CLIMATE STATIONS

09/07/2012 14:24

Location	Parameter	Coefficient of Variation											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Casino Site (1200 m)	Precipitation	0.53	0.73	0.79	0.91	0.52	0.41	0.46	0.45	0.62	0.54	0.47	0.56

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Precip Cv.xlsx]Table 4.1

NOTES:

1. COEFFICIENT OF VARIATION = STANDARD DEVIATION/ MEAN
2. THE COEFFICIENT OF VARIATION VALUES WERE BASED ON AVERAGE REGIONAL DATA RECORDED AT BEAVER A, PELLY AND DAWSON A.

0	27JUN'12	ISSUED WITH REPORT VA101-325/8-11	CJN	EER	KJB
REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D

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TABLE 4.2

CASINO MINING CORPORATION
CASINO COPPER-GOLD PROJECT

EFFECTIVE RUNOFF COEFFICIENT

Print Jul/09/12 15:03

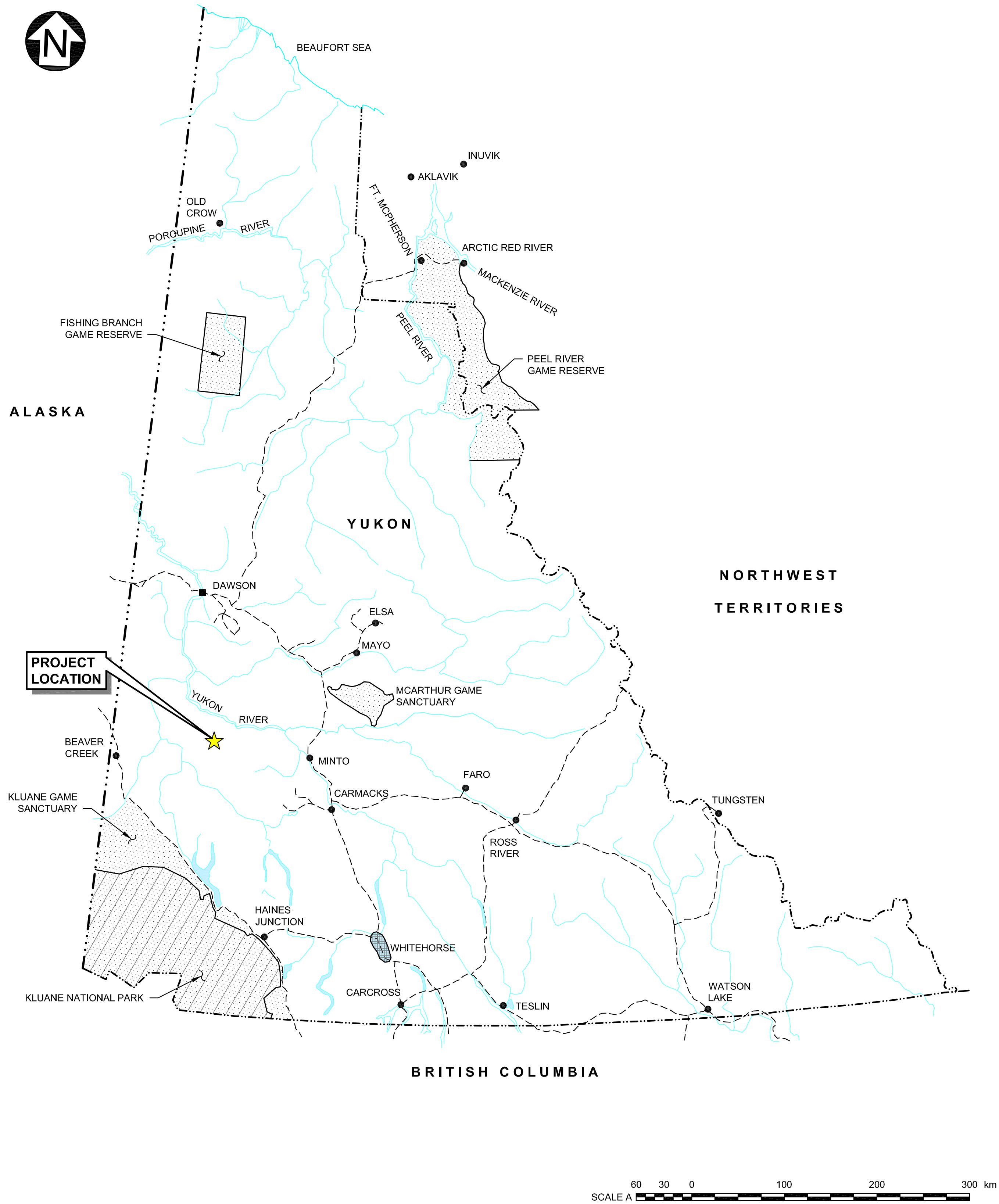
Drainage Basin	Basin Characteristics		Mean Annual Precipitation (mm)		Mean Annual Discharge and Runoff		Effective Runoff Coefficient
	Drainage Area (km^2)	Mean Elevation (m)	El. 1200 m	El. 1066 m	Discharge (m^3/s)	Runoff (mm)	
Lower Casino Creek (W4)	82	1066	507	475	0.48	183	0.4

M:\1\01\00325\08\A\Data\Task 1100 - Hydrometeorology\[Runoff Coeff 2012.xlsx]Table_RC

NOTES:

1. MEAN ANNUAL PRECIPITATION AT MEAN BASIN ELEVATION WAS ESTIMATED USING AN OROGRAPHIC FACTOR OF 5% PER 100 m.

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	28JUN'12	ISSUED WITH REPORT VA101-325/8-11	CJN	EER	KJB



CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

PROJECT LOCATION MAP

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P/A NO. VA101-325/8

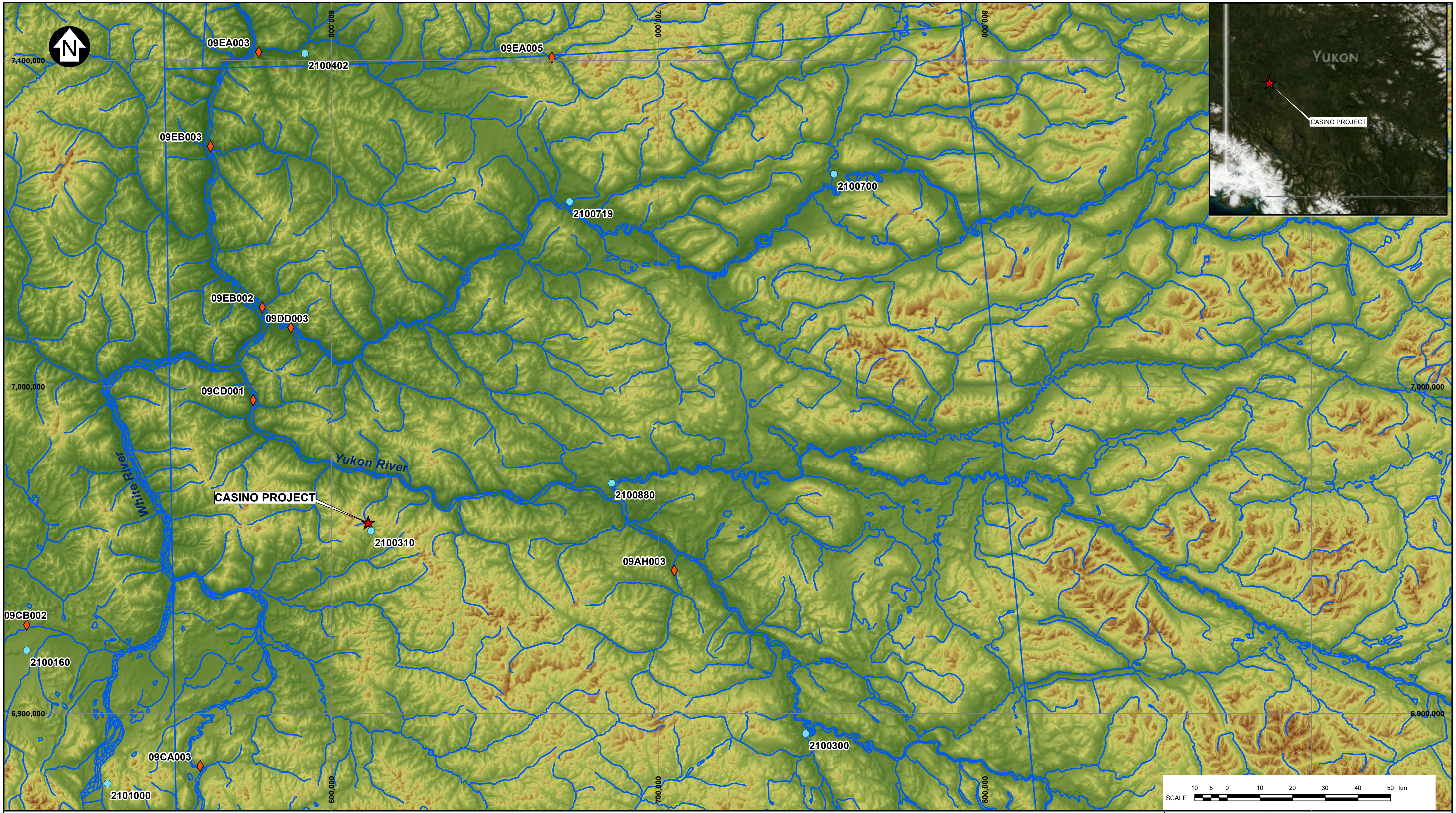
REF NO. 11

FIGURE 1.1

REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	26JUN'12	ISSUED WITH REPORT	CJN	WAL	GRG	KJB

SAVED: M:\1\01\00325\08\A\Acad\FIGS\A01_r0 - 11 REPORT, 6/26/2012 10:35:23 AM, WLAHODA PRINTED: 6/26/2012 10:35:36 AM, Layout1, WLAHODA
XREF FILE(S): IMAGE FILE(S):



LEGEND:

- PROJECT LOCATION
- REGIONAL CLIMATE STATION
- REGIONAL STREAMFLOW GAUGE
- RIVER/CREEK

ELEVATION RANGE (M)

- < 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000
- > 2000

NOTES:

1. BASE MAP: NATURAL RESOURCES CANADA DEM
2. COORDINATE GRID IS IN METRES/DEGREES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.
3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:1,100,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	21JUN'12	ISSUED WITH REPORT	AMD	AMD	CJN	JPH

CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

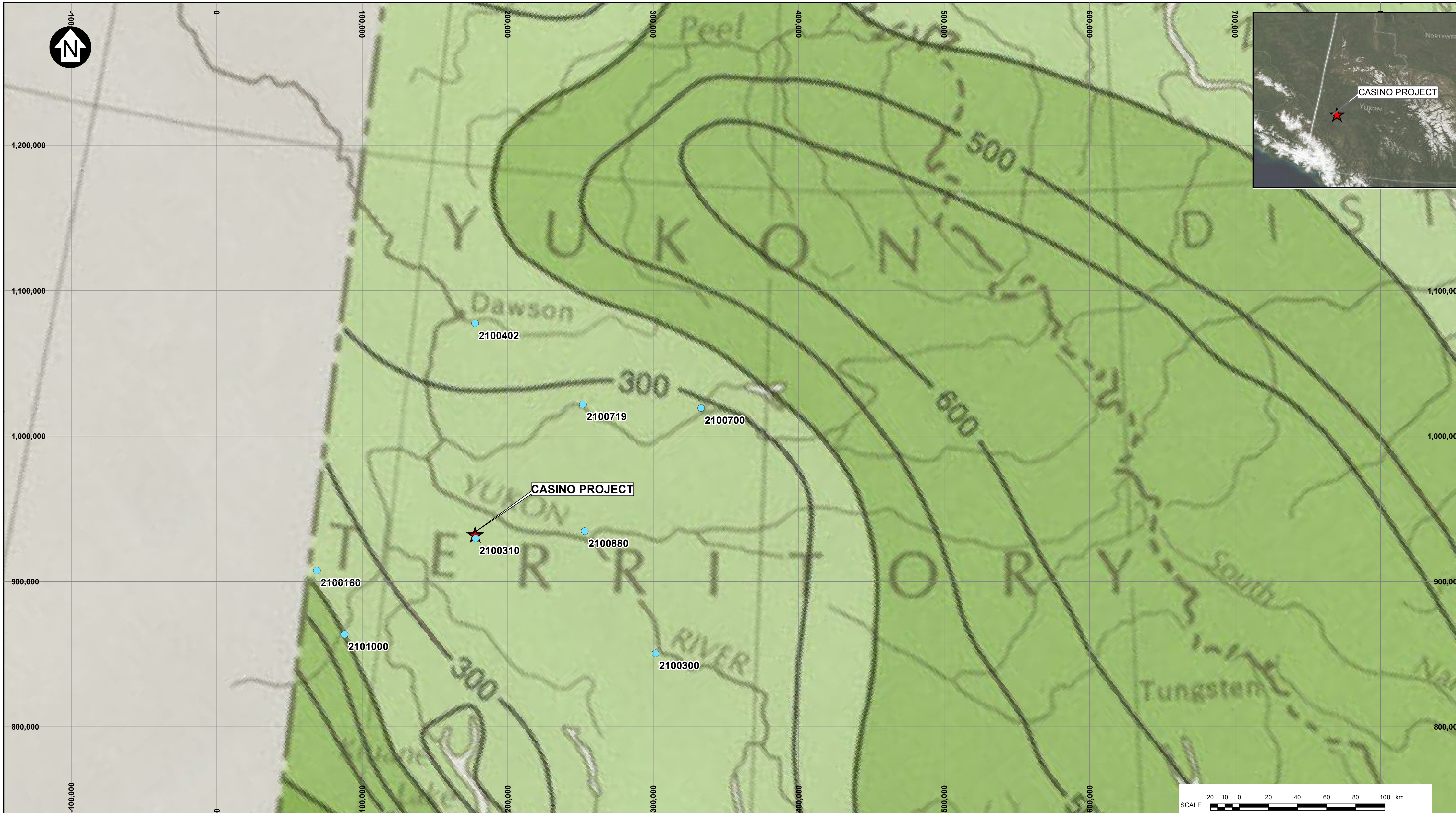
REGIONAL CLIMATE AND STREAMFLOW GAUGING STATIONS

Knight Piésold CONSULTING

P/A NO. VA101-325/8 | REF NO. 11

FIGURE 1.2 | REV 0

KP FIGURE SAVED: M:\1\01\00325\08\A\GIS\Figs\Report 11 - Hydromet\RegionalClimateAndStreamflowStations.mxd; Jul 06, 2012 8:29:04 AM adinca



LEGEND:

- PROJECT LOCATION
- REGIONAL CLIMATE STATION

NOTES:

1. BASE MAP: NATURAL RESOURCES CANADA HYDROLOGICAL ATLAS MEAN ANNUAL LAKE EVAPORATION. VALUES ARE IN MILLIMETRES AND BASED ON 10-YEAR PERIOD 1957-1966.

2. COORDINATE GRID IS IN METRES/DEGREES. COORDINATE SYSTEM: ALBERS CONICAL EQUAL AREA.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:2,500,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	21JUN'12	ISSUED WITH REPORT	AMD	AMD	CJN	KJB

CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

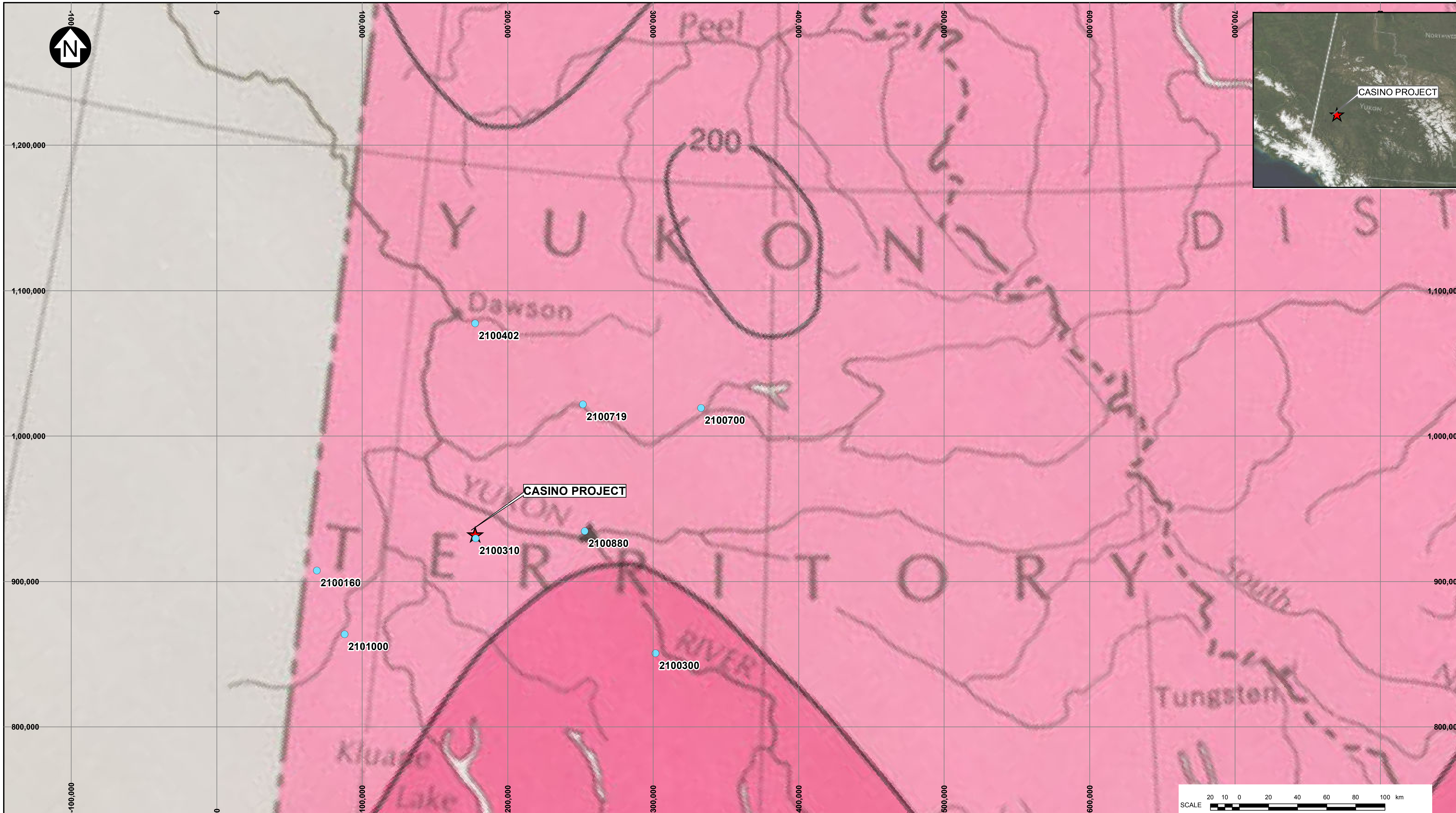
REGIONAL MEAN ANNUAL PRECIPITATION

Knight Piésold CONSULTING

P/A NO.	REF NO.
VA101-325/8	11

FIGURE 2.1 REV 0

KP FIGURE SAVED: M:\1\01\00325\08\A\GIS\Figs\Report 11 - Hydromet\CASI_AnnualPrecipitation.mxd; Jul 06, 2012 8:35:53 AM adinca



LEGEND:

- PROJECT LOCATION
- REGIONAL CLIMATE STATION

NOTES:

1. BASE MAP: NATURAL RESOURCES CANADA HYDROLOGICAL ATLAS MEAN ANNUAL LAKE EVAPORATION. VALUES ARE IN MILLIMETRES AND BASED ON 10-YEAR PERIOD 1957-1966.

2. COORDINATE GRID IS IN METRES/DEGREES. COORDINATE SYSTEM: ALBERS CONICAL EQUAL AREA.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:2,500,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	21JUN'12	ISSUED WITH REPORT	AMD	AMD	CJN	KJB

CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

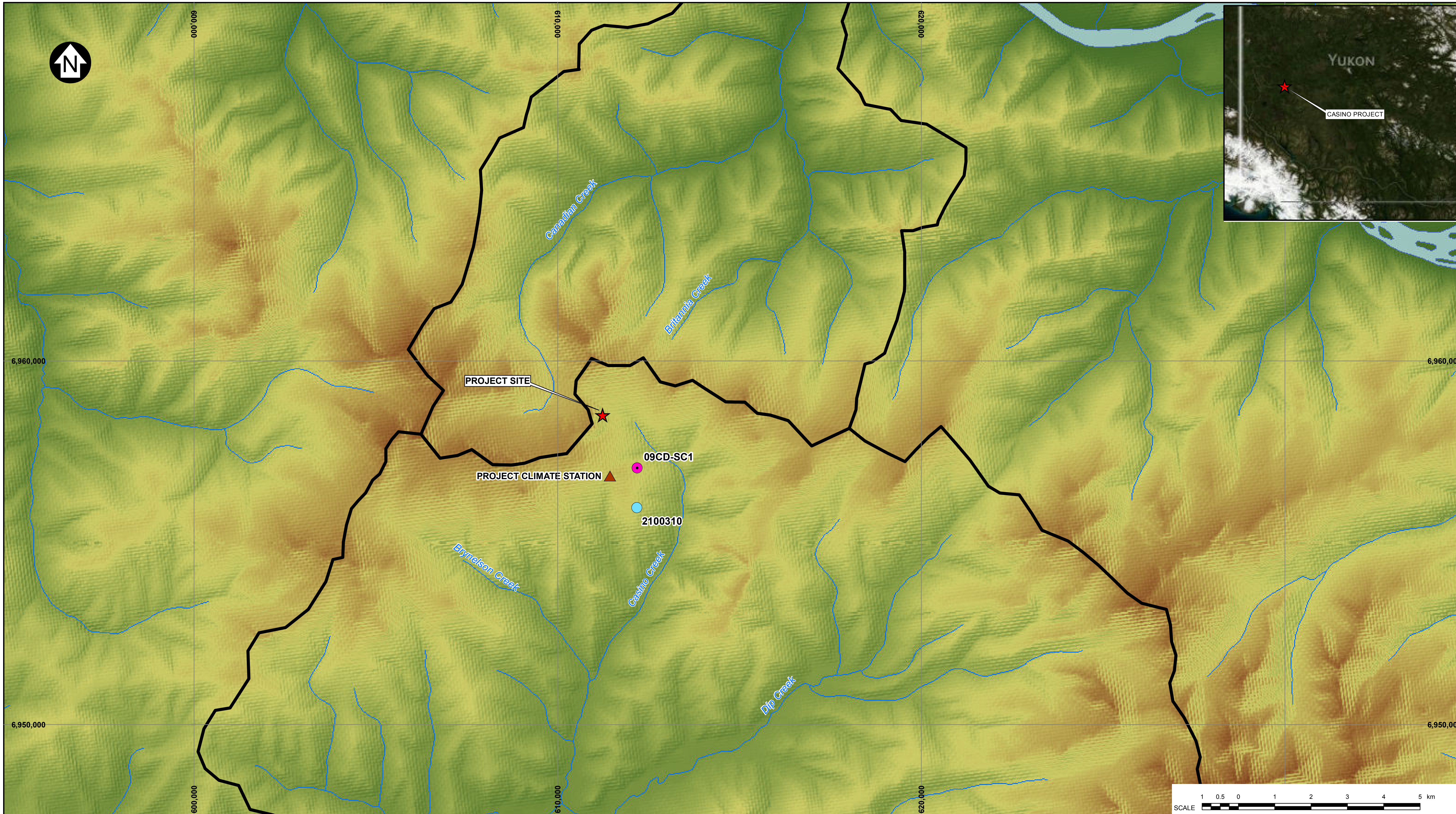
REGIONAL MEAN ANNUAL LAKE EVAPORATION

Knight Piésold CONSULTING

P/A NO. VA101-325/8 | REF NO. 11

FIGURE 2.2 | REV 0

KP FIGURE SAVED: M:\1\01\00325\08\A\GIS\Figs\Report 11 - Hydromet\CAS_AnnualLakeEvaporation.mxd; Jul 06, 2012 8:38:29 AM adinca



LEGEND:

- PROJECT LOCATION
- ACTIVE PROJECT CLIMATE STATION
- DISCONTINUED MSC CLIMATE STATION
- ACTIVE YUKON ENVIRONMENT SNOW COURSE
- RIVER/CREEK
- WATERSHED BOUNDARY

ELEVATION RANGE (M)

- < 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000
- > 2000

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D
0	30JUN'12	ISSUED WITH REPORT	AMD	AMD	CJN	JGC

NOTES:

1. BASE MAP: BING MAPS.

2. COORDINATE GRID IS IN METRES/DEGREES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:100,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

PROJECT SITE CLIMATE STATION AND SNOW COURSE LOCATIONS

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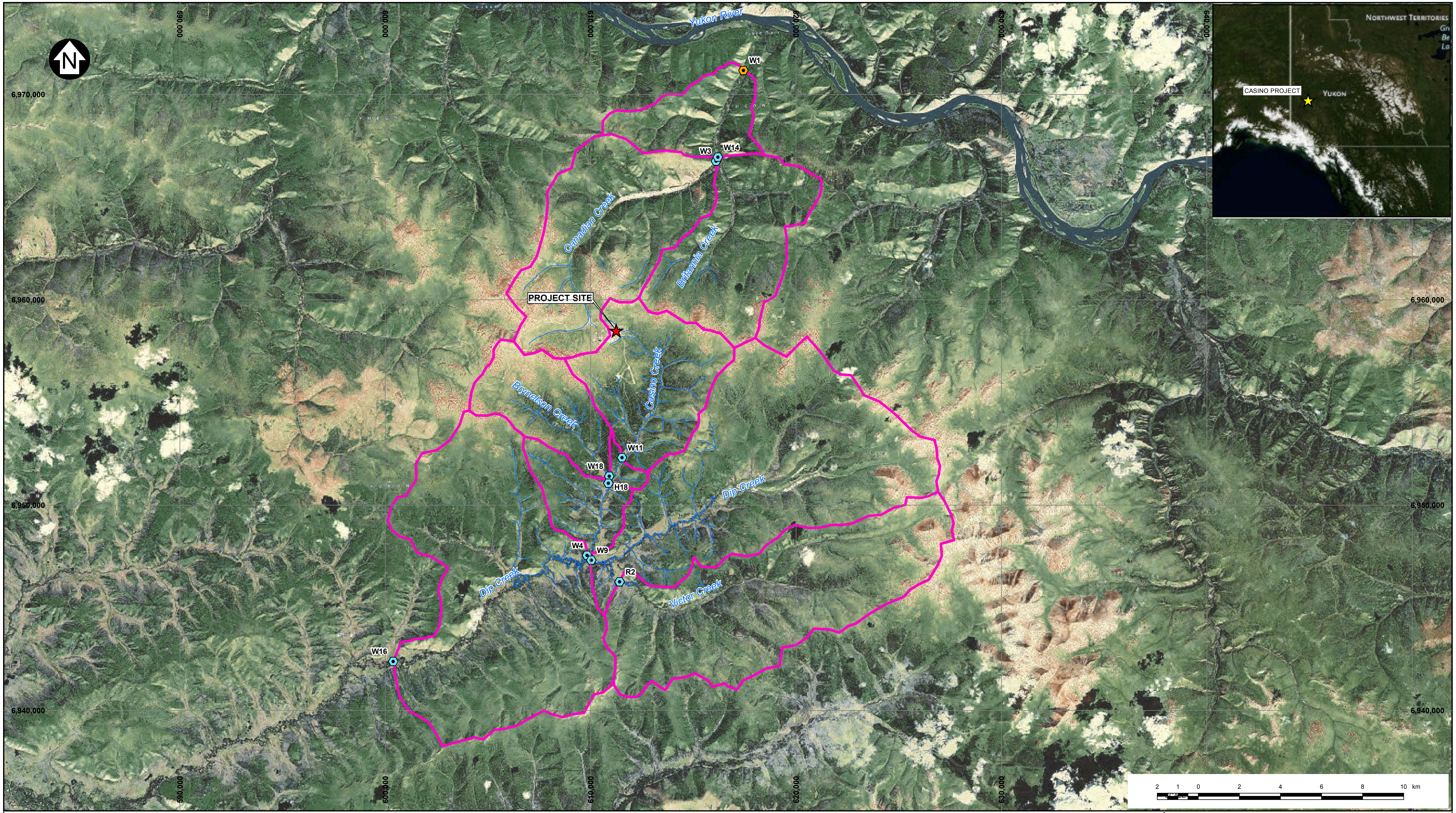
P/A NO.	REF NO.
VA101-325/8	11

FIGURE 2.3 REV 0

KP FIGURE SAVED: M:\1\01\00325\08\A\GIS\Figs\Report 11 - Hydromet\ProjectSiteClimateStations.mxd; Jul 06, 2012 8:40:17 AM adinca



LEGEND:

- PROJECT LOCATION
- ACTIVE STREAMFLOW GAUGING STATION
- DISCONTINUED STREAMFLOW GAUGING STATION
- RIVER/CREEK
- WATERSHED BOUNDARY

Station	Area (km^2)
W14	45
W3	64
W16	384
W9	194
R2	85
W4	82
H18	67
W11	39
W18	25

0	01MAY'12	ISSUED WITH REPORT	AMD	AMD	KT	JGC
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	CHK'D	APP'D

NOTES:

1. BASE MAP: ESRI ARCGIS ONLINE BING MAPS.

2. COORDINATE GRID IS IN METRES/DEGREES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 7N.

3. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:175,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

PROJECT AREA
STREAMFLOW GAUGING STATION LOCATIONS

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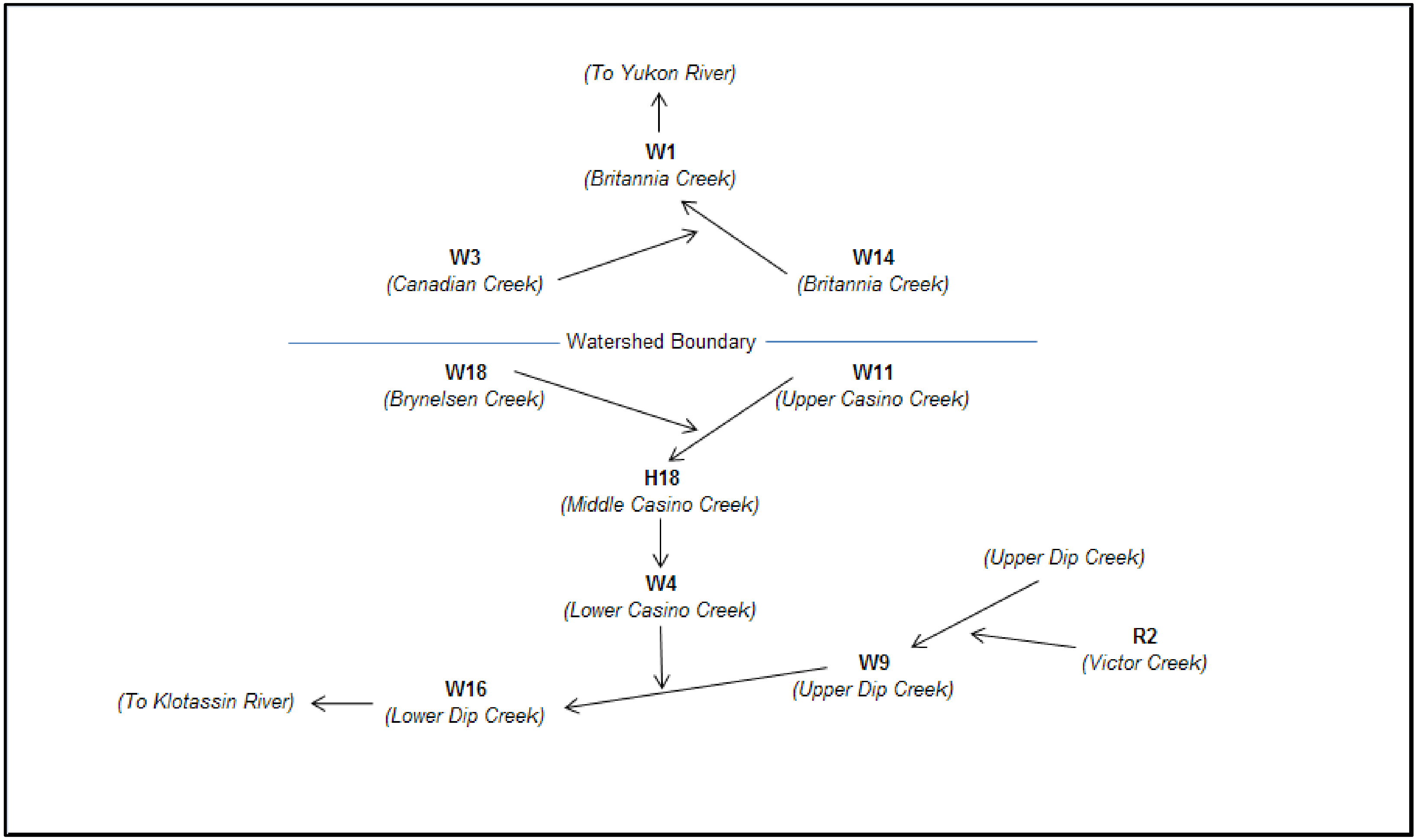
P/A NO. VA101-325/8 | REF NO. 11

FIGURE 3.1 | REV 0

KP FIGURE SAVED: M:\1\01\00325\08\A\GIS\Figs\Report 11 - Hydromet\StreamflowGaugingStationLocations.mxd; Jul 06, 2012 8:42:42 AM; adinca



CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

STREAMFLOW GAUGING NETWORK SCHEMATIC

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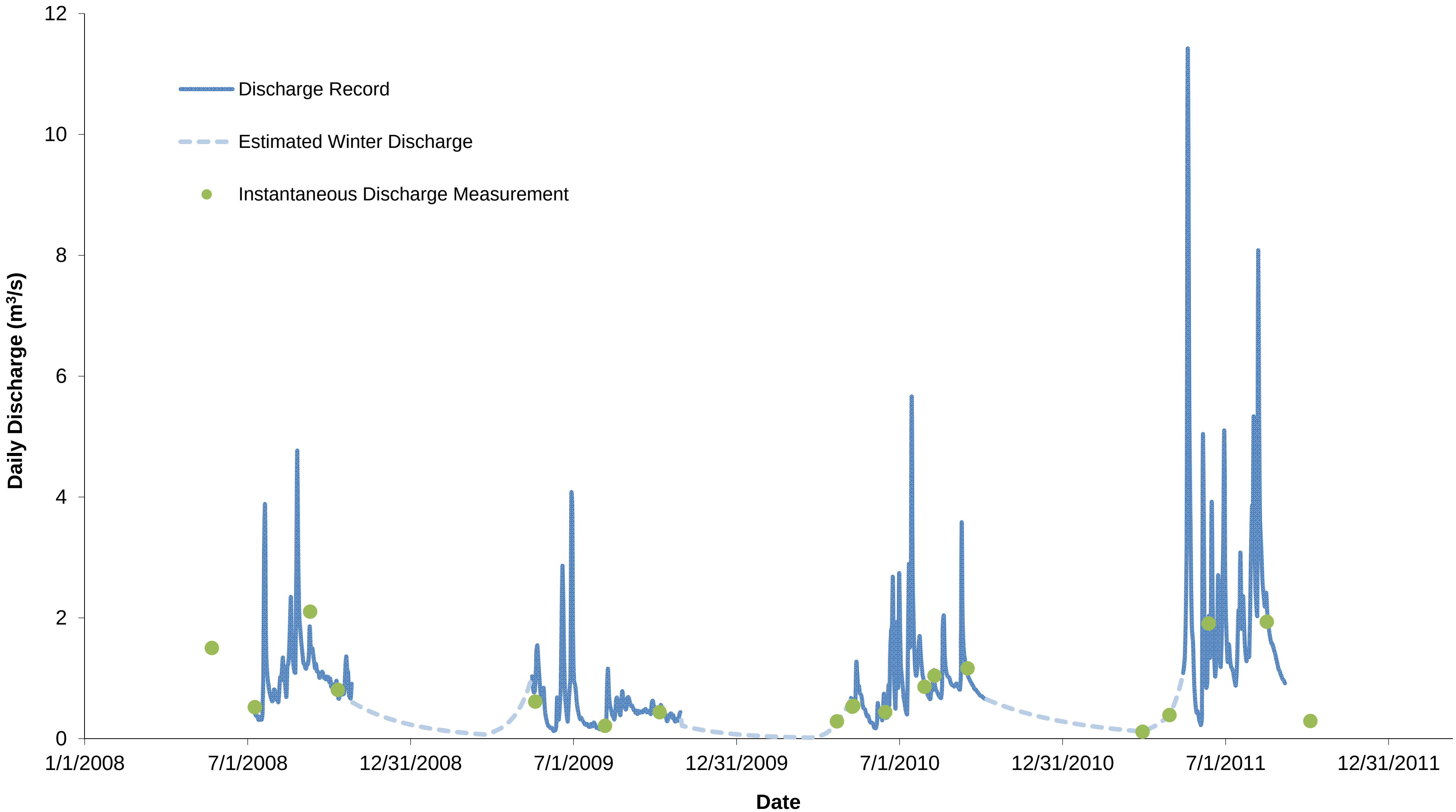
P/A NO. VA101-325/8

REF. NO. 11

FIGURE 3.2

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	3FEB'12	ISSUED WITH REPORT	DK	KT	JGC



CASINO MINING CORPORATION

CASINO COPPER-GOLD PROJECT

LOWER CASINO CREEK STATION (W4)
MEASURED DISCHARGE HYDROGRAPH

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P/A NO. VA101-325/8

REF. NO. 11

FIGURE 3.3

REV 0

REV	DATE	DESCRIPTION	PREP'D	CHK'D	APP'D
0	27APR'12	ISSUED WITH REPORT	DK	KT	JGC