Appendix E

Technical Data

Appendix E: Attachment 1
Social Baseline & Stakeholder Engagement Program

Big Bend Placer Gold Mining Project, Mongolia

Prepared for

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Abbreviations and Acronyms

°C	degrees Celsius
AATA	AATA International, Inc.
aimag	province
airag	fermented horse milk
bagh	sub-district
Comecon	Council for Mutual Economic Assistance
EIA	Environmental Impact Assessment
EIU	Economist Intelligence Unit
EPFI	Equator Principles Financial Institutions
GDP	gross domestic product
GNI	gross national income
IFC	International Finance Corporation
khural	assembly
MBDA	Mongolian Business Development Agency
Minerals Law	Minerals Law of Mongolia
MNT	Mongolain tugrug
MPRP	Mongolian People's Revolutionary Party
NGO	non-governmental organization
ninja	artisanal
SEIA	Social and Environmental Impact Assessment
SEP	Stakeholder Engagement Program
soum	district
STD	sexually transmitted disease
Tg	Tugrug

1.0 Executive Summary

This social baseline study sets out the main socio-economic issues related to the Big Bend placer gold site in Mongolia. It was conducted in accordance with IFC Performance Standards – presenting a range of options of action through a Stakeholder Engagement Program (SEP).

The Big Bend property is currently (July 2008) in the exploration stage, with plans to use the recently acquired mining license in order to begin construction. The socio-economic issues include both the likely and perceived impacts of mining operations on the local communities as well as a review of impacts encountered to date as a result of exploratory drilling. This social section of this SEIA report is not an environmental review, although specific environmental issues are discussed where there is a link between the environment and local livelihoods.

The findings in this social report are the result of a baseline study conducted in Ulaanbaatar and at the mine site (July 2008) as well as a desk review of project documents, legislation and the economic situation of Mongolia (June to August 2008).

This baseline study was commissioned by WMMC because of the strong, stated, company commitment to "proactively interact with current grazers to improve their income from livestock grazing and to reduce their negative impact on the environment". The company has stated that this is "based on mutual agreement to achieve the objectives of both the current grazers and the company to protect and enhance the environment".

In commissioning this report, the company is evidencing its commitment to "a serious improvement in the environment and social conditions while enhancing wildlife and vegetation improvement by restricting and controlling grazing in the surface that it controls". This commitment is an attempt to achieve best practice, going beyond legal requirements and minimum standards.

The current legislative framework, set out in detail in this report, is generally favorable to the mining sector. However, recent legislative changes, such as the 'windfall tax' emphasize the importance of companies demonstrating how their projects are contributing to the development of Mongolia and the communities in which they work. It should be noted, however, that the legislative situation on mining in Mongolia is changing and there are considerable uncertainties about the future. These uncertainties relate in particular to the debates within Mongolia on the impacts of mining on social development. This is why adopting a "best practices" approach, based on international standards, is an advisable approach for dealing with legislative uncertainty. In adopting IFC Performance Standards, the Big Bend project is being proactive in meeting international best practice.

The assessment found that the company has a good level of engagement with a few local government officials, although many government officials have yet to be contacted by the company. When engaging with the government and local herders, it needs to be recognized that this Project takes place in the shadow of over ten years of mining by other companies and that this history determines the "base-line" for community and government engagement. Based on personal observations during this study and also on published reports, there are currently significant environmental impacts to the Tuul River and its floodplain. In much the same way as base-line water quality is affected by other mining operations, so too are local perceptions and expectations affected. This said, the Big Bend project has a generally positive perception amongst local people and herders.

This initial condition provides a good foundation on which to build a strong SEP which emphasizes creating "shared value" for both the company and the local community. The SEP needs to be founded on mutual communication, the shared management of important resources such as water and grazing land, as well as focused on finding ways to prevent disputes through frequent communication.

The current key social impacts of drilling and exploration include:

- a lack of community consultation and information sharing, leading to misconceptions and misunderstandings about the Big Bend project;
- limited local employment creation and secondary employment through occasional local procurement of milk and meat products (with the possibility of expansion in the future);
- a positive social action program by the company with one of the two soum governors (government authorities) helping to provide hospital and school supplies; and
- positive relations with local herders, although problems have occurred with some subcontractors failing to adequately re-fill drill holes.

None of these existing impacts are of the scale or significance to require a reconsideration of mine viability, but further action by the company to improve the management of these issues will cost little and help secure local support for the project. This should be part of the community consultation set out in the SEP.

The following is a list of observations based on the locally perceived impacts of placer mining operations on the local community:

- There are high expectations from the two local soum governments of job creation and employment opportunities – but likely employment creation during construction and operation phases of the project is small (ca. 50 people) and the skill levels of local people may not meet the requirements for many of these jobs;
- Local governors and herders identified opportunities to enhance the positive social impacts of Big Bend operations by allowing local herders

to supply meat, milk and services to the exploration/mine sites, subject to these meeting specified quality, health and safety criteria;

- Concern for grasslands and grazing is a primary issue among local herders and there are worries about the way other operations have failed to properly reclaim mined land in the Tuul River Valley. Big Bend has already committed to environmental restoration (and beneficiation of wetlands) so the challenge here is to communicate and achieve this goal;
- Water is a key issue for local people, both as a source of household water supply as well as for livestock. Other mining operations have polluted the Tuul River to an extent that makes it almost unsuitable for animals and potentially unsafe for humans to drink. This concern needs to be managed carefully;
- There is a need for a proactive information and consultation program to begin as soon as possible, including setting up a grievance redress process;
- Opportunities exist for expanding existing company social programs, and initiating new programs, as the Big Bend site moves towards production.

These issues are elaborated in this report, along with a review of the regulatory framework, economic and legal situation in Mongolia at present.

1.1 Objectives of the Social Report

In July 2008, AATA International, Inc. (AATA) was commissioned by WM Mining LLC[1]. and Ikh Tokhoirol Co. Ltd (Big Bend, 'the company') to prepare a Social Baseline Study and Stakeholder Engagement Program (SEP) for the Big Bend placer mine site in Mongolia.

The rationale for this assessment was that modern mining companies now operate in a global environment which requires advanced environmental and social management. Compliance with physical, chemical, and biological regulations is basic to operations. But there also exists in today's modern world a very high need to achieve and maintain a social license to operate, requiring considerable understanding, knowledge and management of local, national, and international stakeholders, and the communities where the potential mine site is operated. It is the social license to operate which allows the modern mining company to demonstrate "broad community support" as required by IFC Performance Standards and Equator Principles Financial Institutions (EPFIs) which are sensitive to stakeholders at all levels. The SEP is the framework by which the modern mining company creates a meaningful structure for achieving consultation success with governments, communities, and non-governmental organizations (NGOs), and operational success based upon mutual understanding and community engagement.

AATA, through its Senior Social Associate, Dr. Caleb Wall, conducted this social baseline study and SEP as part of a fast-track Social and Environmental Impact Assessment (SEIA) of the existing and proposed placer gold mining operations. The mandate was to ensure compliance with the eight IFC Performance Standards and associated Equator Principles requirements for this project[2]. In conducting this study, AATA coordinated closely with WM Mining, Inc., Ikh Tokhoirol Co. Ltd, and AATA's local Mongolian associates (EcoTrade).

The principal objective of this Social Baseline Study was to examine the existing social and economic context of the potential mine area. Understanding the existing context helps to determine the current and potential impacts, positive and negative, on the affected regions, inform effective management responses, and provide a baseline for future monitoring. The SEP provides a range of options and

[1] The US Parent corporation (LLC) with headquarters in Centennial, Colorado.

[2] The 'Equator Principles' establish a common baseline and framework for International Financial Institutions establishing projects that have likely environmental or social impacts. Adopted in June 2003 the Equator Principles are a voluntary set of guidelines based on the environmental and social policies of the World Bank and the International Finance Corporation (IFC) for managing environmental and social issues in project finance lending. With over 60 financial institutions having now adopted the principles, it is estimated that the Principles now cover approximately 80% of global project lending.

management plans to the company on how the company can enhance its positive social impacts and reduce or mitigate negative impacts.

This Social Baseline Study included the following tasks:

1) Review and evaluate existing and proposed project description, social data, and other related information such as Mongolian and international laws and regulations.
2) Travel to Mongolia for 15-day investigation (Dr. Caleb Wall).
3) Conduct site visit and detailed social related interviews in Ulaanbaatar and on-site, with assistance from EcoTrade, local AATA Associates, anticipating a total of 20 to 40 structured interviews.
4) Prepare a Social Baseline Report, Interview Summary, and SEP.

1.2 Methodology

This assessment adopted a rapid rural appraisal methodology, with a strong focus on in-country data gathering and interviews. The interviews were based on a survey questionnaire which was conducted with 25 respondents. A summary of these survey responses is included in Appendix 3. In addition, numerous ad hoc and informal interviews were held, alongside discussions with Big Bend management, staff, and contractors.

The lead investigator for this assessment was Dr. Caleb Wall, a socio-economic specialist with experience in the mining industry and an international development background. In-country, Dr. Wall was assisted by Nomio Battsengel of EcoTrade. Dr. Wall and Ms. Battsengel were also assisted by two translators provided by Big Bend.

AATA was responsible for quality control of the assessment, with input from Mr. John G. Aronson, President of AATA, Mr. Viktor Raykin, Vice President, International, and with oversight from Synergy Global Consulting (Oxford, UK). Desktop publishing and document control was provided by Ms. Rini Kirkpatrick, Jill Chodak, Carmia Fiechtner, and other AATA staff.

1.3 Scope of this Report

This assessment presents the Social Baseline Study and Initial SEP for Big Bend. The findings and recommendations refer only to this specific mine site – while some issues and management plans may be relevant for other mines in the region, further study is suggested before adopting the lessons of this report at other mine sites. Issues and impacts of concern derive from a review of the project description information provided by Big Bend, schematic design plans and related documents and especially from the field assessment conducted in July 2008.

The brief regulatory review was conducted to ensure applicable social regulations and permitting requirements are identified for the project. This regulatory review is intended as a guide only and should not be taken as specific legal advice.

1.4 Note on Units, Measures and Currencies

All units used in this report are metric. Measures stated are based on best information available from sources.

The currency in Mongolia is the Tugrug (Tg), which is traded on the free-market. The average US$ exchange rate for the 12 months of 2007 was Tg1,170:US$1 (Economist Intelligence Unit [EIU] 2008). The rate as of July 22, 2008 was 1,159:US$1.

2.0 Project Location and Socio-Economic Situation

2.1 Location and Environment

The Big Bend project will likely have significant social and economic impacts at the local level and will contribute to the overall economic development of Mongolia as a country. To understand these likely and potential impacts better, it is useful to have a brief overview of the socio-economic situation of the country and especially of the relevant aimags (provinces) and soums.

2.1.1 Mongolia

Mongolia is a large (over 1.5 million km^2) land-locked country located in Northern Asia which shares borders with China and Russia. In the past century Mongolia has changed from a Buddhist theocracy with strong influence from China, to a Communist state operating largely along Soviet lines and relying on considerable aid and assistance from within the Soviet bloc, to a largely peaceful transition towards democracy and market led development. Throughout this period Mongolia has retained a strong tradition of nomadism. Herders and rural nomadic lifestyles continue to dominate the national culture and lifestyle, despite rapidly rising urbanization across the past century, accelerated in the past decade.

The country possesses considerable wealth in natural resources (oil, coal, copper, molybdenum, tungsten, phosphates, tin, nickel, zinc, wolfram, fluorspar, gold, silver, iron, phosphate), and its varied geography ranges from vast semi desert and desert plains, grassy steppes and mountains in the west and southwest, to the Gobi Desert in south central Mongolia. The climate is continental, with extremes of temperature from -35 degrees Celsius (°C) in winter to over 40°C in summer, with wide fluctuations in between.

> "Mongolia is rich in minerals, with oil reserves and deposits of ores such as copper and gold; the latter two have come to dominate the country's export revenue. Much of the country is dominated by sparsely populated grasslands. Of the land area, 81% is designated as pasture land, where camels, horses, cattle, sheep and goats are reared. The extremely harsh continental climate restricts other agricultural activities. Water is scarce, and the growing season lasts no more than 100 days. Severe winters can devastate the country's livestock and cause extreme hardship for rural populations. Land quality is also adversely affected by desertification, which affects 30% of pasture, and by overgrazing, especially by goats." (Economist Intelligence Unit. Country Profile 2008, Mongolia)

Modern Mongolia still lives in the shadow of a long period of Soviet style rule, which impacts (negatively) on both the political situation and economy of the country. The history of foreign subsidies, of a strong state that provided for its citizens in exchange for the sacrifice of certain political rights, and of central economic planning, all have their continuing impact on Mongolia. While the country is moving quickly through a relatively peaceful transition towards free markets and open politics, internal disputes remain. This is evidenced in the high expectations people have of their government to provide for them – which, in the current windfall period of high commodity prices, is leading to a large number of cash disbursements. There are concerns that this is creating new entitlements which the government will struggle to maintain during a commodity downturn. Indeed, during the field assessment phase of this assignment, elections for the parliament meant that large numbers of buses and other public services were provided free of charge (such as the donation of community radio equipment by a Minister) by politicians wishing to enhance their election appeal.

The Soviet history of Mongolia also influences international relations, with Mongolia attempting to balance between their two large and powerful neighbors, China and Russia, by promoting links with the West, especially the United States of America. Russia remains Mongolia's closest partner in many political and economic spheres, and the Russians are well trusted by (older) Mongolians.

While a relatively poor country, Mongolia has high levels of literacy and the economy is showing signs of strengthening, especially in the mining and minerals sectors, but also in service sectors based in Ulaanbaatar. However, poverty remains a key issue in Mongolia and the government is under considerable international and domestic pressure to deliver economic and social development. To a large extent, the legitimacy of the current government is based on a perceived ability to promote growth, although concerns remain about the rising inequality in the distribution of this wealth. Mining is seen by some as exacerbating this rise in inequality.

A map of the country and administrative aimags is provided in **Figure 1**.

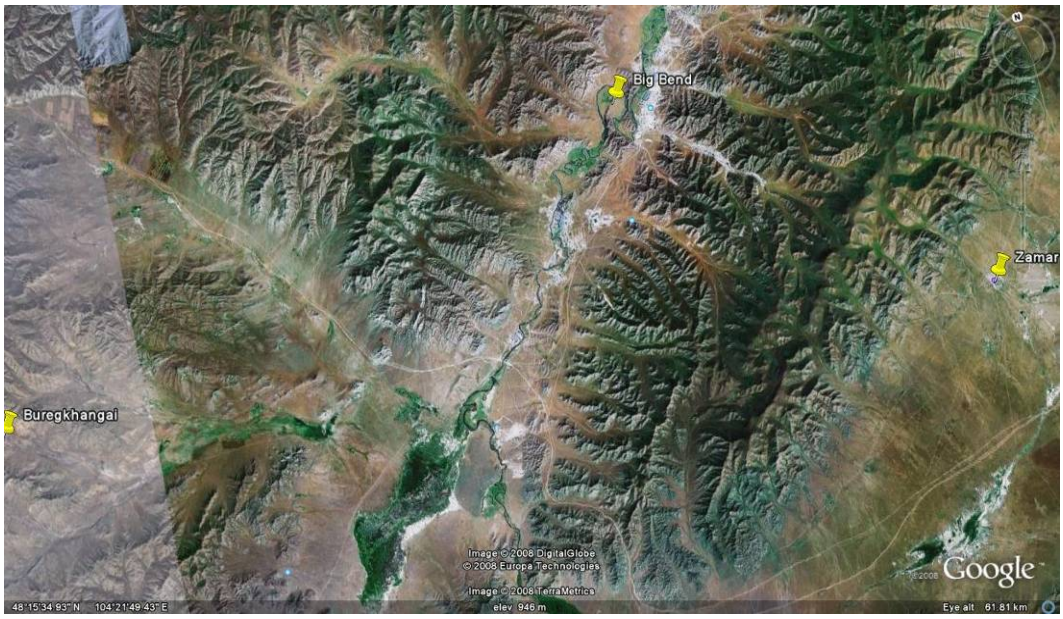
Figure 1: Political Map of Mongolia

2.1.2 Tuul River Valley

The operations of Big Bend fall along the Tuul River Valley, ca. 225Km WNW of Ulaanbaatar. The Tuul River forms the administrative boundary between the Tov and Bulgan Aimags (provinces). The project encompasses part of the Buregkhangai Soum in the Bulgan Aimag and the Zaamar Soum of the Tov Aimag.

The map below **(Figure 2**) shows the Tuul River, running South to North in the center of the map. The eponymous soum centers of Buregkhangai and Zaamar are shown also, and their soum boundaries meet along the river – which forms the internal border for much of the region.

Figure 2: Map of Big Bend and surrounding Soum Centers



Both the Zamaar and Buregkhangai Soums rely heavily on rural production for their livelihoods. Although ten to 13 mining licenses are in operation along this stretch of the Tuul River, the economy remains predominantly rural.

Rural production is centered around seasonal migration of animals for summer pasture, with herders and livestock contributing much of the economic production, especially through wool sales to international markets and the domestic sale of airag (fermented horse milk).

Ninja (artisanal) mining, was until recently a major employer in the region, involving as many as 10,000 individuals in 2006 (many from other regions) is now illegal and government effort has reduced the incidence of ninja miners in the Tuul River valley to approximately 900 in July 2008 (source: Governor of

Zamaar Soum). However, if economic conditions change or if there is a reversal in government approaches to the illegality of ninja mining – this could pose a risk to the project. It should however be noted that these figures are for the entire region (i.e. Zamaar and Buregkhangai soums) and that the number of affected ninja miners in the Big Bend license area is fewer than one hundred.

Of the total area of Zamaar Soum of 281,000 km^2, 87,000 km^2 is currently allocated as mining concessions to over 130 companies (source: Governor of Zamaar Soum). This equates to over 30% of the total land area.

There are currently no air transport links within the Tuul River area and the regional infrastructure for roads relies heavily on unpaved roads across grazing lands and mountains. Because of the arid conditions, these roads are generally suitable for heavy traffic, although uneven road surfaces do lead to higher maintenance requirements. There are concerns that increased vehicle traffic across mountain areas is having an ecological impact.

Figure 3: Tov and Bulgan Aimags - Administrative Soums

2.2 Mongolia: Background Socio-Economic Information

Presented here is a summary of the important socio-economic information for Mongolia as a whole. Specific information on areas surrounding Big Bend is included in **Section 2.4**.

2.2.1 Population and Demographics

The population dynamics of Mongolia are similar to the majority of other developing countries in the Asia-Pacific Region, with population growth rates of 1.2 to 1.5 percent per annum. However, many important changes have marked the demographic patterns of Mongolia since the beginning of the political/economic/social transition in 1990. Over the past 15 years of transition, Mongolia has shown a decreasing fertility rate, increasing life expectancy, decreasing death rate, decreasing infant mortality rate, and a high rate of rural-to-urban migration in the context of an extremely low population density. At the end of 2007, the population of Mongolia was 2.63 million, an increase of 1.4 percent compared to 2006.

Table 1: Selected Indicators of the Mongolian Population, 1989 - 2007

Indicators	**1989**	**2000**	**2005**	**2007**
Total population (*1000)	2,044	2,374	2,562.4	**2.635.2**
Aged 0-4 (%)	15.9	10.4	9.2	**8.9**
Aged 5-14 (%)	26	25.4	23.4	**19.7**
Aged 15-64 (%)	54.1	60.8	63.8	**67.3**
Aged 65+ (%)	4	3.5	3.5	**4.1**
Crude birth rate	35.5	20.4	17.8	**21.7**
Crude death rate	8.3	6.5	6.5	**6.2**
Total fertility rate	4.6	2.2	1.9	**2.3**
Life expectancy	62.9	63.2	65.4	**66.5**
Population growth rate (%)	**2.5**	**1.4**	**1.2**	**1.4**

Source: National Statistical Office of Mongolia (2007)

For the period 1990 to 2005, all regions in Mongolia (i.e., West, East, Central and Khangai) recorded population losses through migration but gains through natural change. Ulaanbaatar is the only location where both in-migration and natural increase contributed to an overall population increase. This is reflected in the high levels of migration towards urban centers, especially the capital Ulaanbaatar as shown in **Table 2**.

Table 2: Natural Increase and Net Migration, 1990 - 2005

Region and the Capital City	1990		1999		2005	
	Natural Increase	Net Migration	Natural Increase	Net Migration	Natural Increase	Net Migration
West	12,691	430	8,495	-14,686	6,623	-14,425
Central	11,643	-1,135	6,296	-1,938	4,913	-16,534
East	5,250	-331	2,702	-4,829	2,322	-4,553
Khangai	14,952	-786	8,311	-8,974	6,461	-13,981
Ulaanbaatar	11,114	2,619	7,552	32,678	8,778	67,462

Source: National Statistical Office of Mongolia (2007)

2.2.2 Economic Indicators: Income, Poverty, Employment, Education

Economic growth is one of the challenges for Mongolia as a nation. At the beginning of the 1990s, the introduction of a free market economy provided a wide variety of opportunities and choices for Mongolia, especially in the realm of mining and export promotion. Economic real growth for 2000 to 2003 was 4.3 percent per annum, improving recently in the period 2004 to 2007 to an annual average growth of 9.1 percent. In 2007, the agricultural sector accounted for 1.6 percent of the gross domestic product (GDP), industries 2.0 percent and the tertiary sector 5.0 percent. The 2007 per capita gross national income (GNI) reached US$1,290, representing a US$295 increase compared to 2006, an upward trend evidenced in **Table 3**.

Table 3: Key Economic Indicators – Mongolia

Year	Gross Domestic Product Growth (%)	Gross Domestic Product per Capita (US$)
2002	4	514
2003	5.6	583
2004	10.6	739
2005	7.3	830
2006	8.6	995
2007	9.9	1290

Source: National Statistical Office of Mongolia (2007)

Mining in Mongolia – An Overview

Mongolia has significant natural mineral resources and gold and coal mining were an important part of the Soviet era economy. Attendant with the economic changes of the 1990s, there has been a large increase in commercial and artisanal mining activities. This presents two problems for Mongolia: reducing poverty and dealing with a large economic windfall from mining.

Mining and Poverty Reduction

Artisanal mining has provided a viable solution for many Mongolians to the adverse effects of the post-Soviet economic restructuring, which resulted in job losses, inflation and declining real incomes – all of which were exacerbated by the loss of herds due to severe winter conditions in the late 1990s.

Artisanal mining in Mongolia is labor intensive (estimated to employ over 100,000 people in 2006), technologically simple and low-cost. It can also be very damaging to the environment if not managed effectively – which is why the government has outlawed (and enforced) ninja mining.

The Tuul river valley, with its extensive placer deposits, has in the past been a center of artisanal ninja mining. Because of the personal safety risks, the impacts to the environment and complaints from large companies, the regional and national government have virtually eliminated ninja mining in the Tuul River valley. However, with the long history of ninja mining in the region – the 2008 situation of under 1000 artisanal miners could easily change if economic conditions or political views on mining change.

Ensuring that artisanal mining remains limited, and thus poses few risks to larger operators, requires concrete steps towards local development and employment creation.

The challenge for the government is to use the mining wealth of the country, through commercial developments, to create meaningful economic opportunities and reduce poverty. These demands have intensified following the July 1, 2008 riots. These riots, the causes of which are disputed, have highlighted the risks associated with having a large and growing urban population of unemployed young people. Whilst the short term political causes of the riots are in dispute, the long term problems associated with unemployment, growing urban poverty and the loss of significant familial and economic linkages with the rural economy are all seen as threats to the legitimacy of the state (regardless of the government in power) and of the ability of economic growth to be distributed evenly.

Managing Mineral Wealth

Triggered by the 2001 discovery of one of the world's largest deposits of copper and gold in Oyu Tolgoi, also in the Dundgobi Aimag, investments in Mongolia's mining sector have grown rapidly, presenting challenges and opportunities for the country. The Oyu Tolgoi site alone is estimated to be worth $38 billion, several times the entire country's GDP.

However, there are concerns that this new found wealth could lead to the 'resource curse', often experienced in other developing countries, with low employment generation, the crowding out of other industries due to 'Dutch disease' economic impacts on foreign exchange (whereby a single resource economy experiences rapid exchange rate inflation which render other productive industries uncompetitive on the world markets). Thus the challenge is for the government, and companies, to find ways to replace the wealth that they extract from below the ground with education, infrastructure, healthcare and viable enterprises that will endure beyond the end of mine life. Achieving this will likely require some considerable improvements in the standards of governance and transparency which are sometimes lacking in modern Mongolia.

The livestock sector remains the key sector of the national economy, and industrial processing of livestock products and related services prevail. Although agriculture has suffered in recent years, with a combination of harsh winters and adverse natural conditions, low commodity prices and overgrazing, all contributing to a reduction in agricultural employment and migration to urban areas. However, agriculture remains the country's largest employment sector. In the primary sector, extractive industries, power and energy, food and textile production dominate. While GDP growth varies from sector to sector, in the past three years, mining has lead the growth and it is rapidly becoming a major source of GDP through direct and indirect impacts on the economy. Increases in the actual physical amount of gold and copper extracted as well as their price gains are the causes of a 31.0 percent expansion of the contribution of this sector in the overall GDP. Industrial processing, which slowed down during 2003 to 2005, improved in 2006, contributing six percent of the GDP.

Unemployment and Poverty

Unemployment is a persistent problem in urban and especially rural Mongolia. While official figures claim unemployment of two to four percent, according to internal figures from development agencies and international finance institutions the number is likely to be between 23 to 35 percent, perhaps higher. In the capital, high rates of unemployment – and under-employment – create a number of social problems including alcoholism, abandoned children, domestic violence and crime. In the regions, unemployment is high in soum centers and aimag capitals. Notably, herders living in rural areas do not consider themselves unemployed.

These high levels of unemployment create many problems associated with poverty.

Poverty rates remain high in Mongolia, although official statistics claim a steady reduction in poverty rates. Poverty is more prevalent in rural areas. Distance from markets, lack of infrastructure, limited opportunities to access education, healthcare and information, and resulting unavailability of jobs have a compound negative impact on rural living standards. Natural disasters of a prolonged winter with limited spring rainfalls in 1999 to 2003[3], combined with over-grazing, resulted in loss of 11.4 million head, or 25 percent, of total livestock and forced large numbers of herder families into poverty.

Between 2003 and 2006, urban poverty has decreased from 30.3 percent to 27.0 percent, whereas rural poverty dropped from 43.4 percent to 38.0 percent. Poverty levels in Ulaanbaatar are low compared to other regions with only one-fifth of the total city population living in poverty. This is attributable to more developed infrastructure and greater business and employment opportunities.

Table 4: Poverty Incidence (%)

By location	1995	1998	2002	2006
Urban	38.5	39.4	30.3	27.7
Ulaanbaatar	35.1	34.1	27.3	20.1
Aimag center	41.9	45.1	33.9	36.2
Rural	33.1	32.6	43.4	38
National average	36.3	35.6	36.1	32.6

Source: National Statistical Office of Mongolia (2007)

Social Services

Access to social services is unequal, based largely on geographic location. Rural residents have less access to education, health care, information, jobs and other development opportunities than their urban counterparts. Herders in remote areas have very limited opportunities for participation in markets through the sale of raw materials and the purchase of necessary goods. Access to markets, services and information is limited and compounds the problems of access to social services and economic opportunities. Over the last few years, the predicament of herders has worsened due to frequent natural disasters, such as drought and overgrazing of pastureland.

[3] Information System for Environment and Agriculture Monitoring (ISEAM), Ministry of Nature and Environment, Government of Mongolia
http://reliefweb.int/mapc/asi_east/cnt/mon/mong_drought.html

Vocational Skills

What all this socio-economic data indicates, given the growth of mining in the region, is the importance of introducing effective vocational training. Whilst training centers do exist, there is currently a poor match between the (largely theoretical and non-trade related) existing courses and the needs of the modern mining industry. Meeting this challenge, of providing training and vocational skills for rural residents, is a shared responsibility for the government (at all levels) and for companies working in the region.

2.3 Big Bend: Detailed Socio-Economic Analysis

The Big Bend placer gold deposit will be mined in one section of the Tuul River valley, on both sides of the Tuul River. Because the river serves as the border between two different aimags and soums the company needs to work with two different soum governors. These are Zaamar (in the Tov Aimag) and Buregkhangai (in the Bulgan Aimag). As the panoramas on the next page illustrate, the Big Bend site is dominated by the Tuul River – which, as a source of surface water and flood plains, is an important part of livelihoods for local herders.

To put the local situation in these two soums in perspective, this section presents an overview of the socio-economic situation in the two areas. Despite thirteen new mines commencing exploration and operation in the past ten years, the local economy remains predominately agricultural, as explained in **Section 2.2.2**.

The focus of this section is on providing some background to explain that the views of local herders and soum governors, and to better understand the likely impacts that mining operations will have on the local communities. The data presented are based on best efforts to acquire local data; however, many points are from secondary sources and are not the result of detailed socio-economic study.

2.3.1 Population and Demography

In both the Buregkhangai and Zaamar Soums, population dynamics follow the national trend: a decreasing fertility rate, increasing life expectancy, a decreasing death rate, decreasing infant mortality rate, and a high rate of rural-to-urban migration in the context of an extremely low population density. At the end of 2007, the resident population of the Buregkhangai Soum was 2,376 persons – with a total of 149,567 livestock. Zaamar Soum's population was 5,841 people with a total of 69,265 livestock. These low population figures reflect the low population density of the country and the region. Yet, it should be noted that the Tuul River valley, as a lush grazing area with access to surface water, has considerably higher levels of population density than other areas. This population density has increased with the arrival of mining in the Tuul River valley, which

has led to the development of a new township (Shijir Alt) – which, loosely translated, means “Pure Gold”.

The population figures detailed below in **Table 5** and **Table 6** reflect this changing population dynamic. It is worth noting that ca. 27 percent of the Zaamar Soum population lives in the soum center, with people in this semi-urban settlement largely relying on government subsidies and state-based employment for their welfare. However, a comparison between (and within) these soums is made more difficult by the different statistics available and by questions about the reliability and verifiability of these data.

Figure 4: Panorama of Big Bend (North facing)

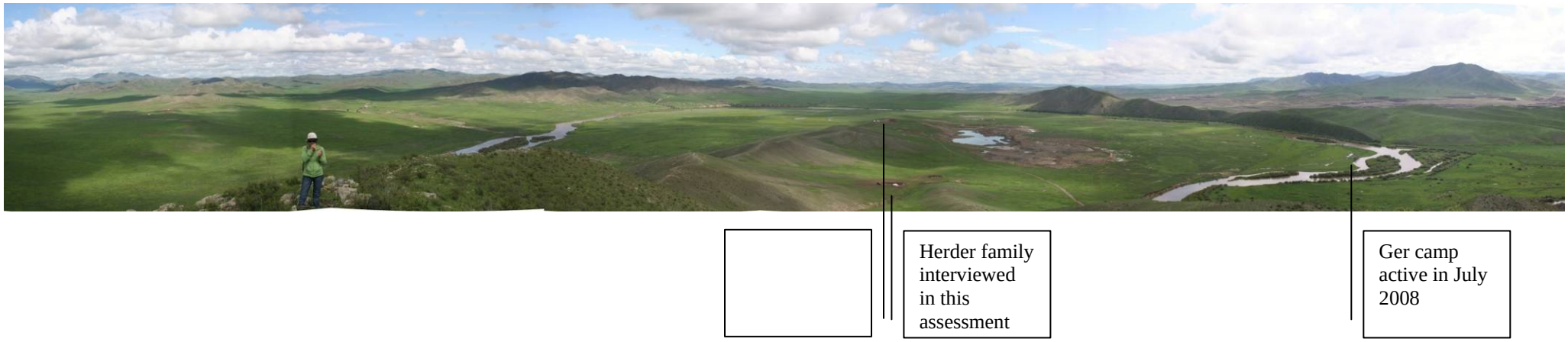


Figure 5: Panorama of Big Bend (South facing)

Table 5: Selected Indicators for the Buregkhangai Soum, 2007

Indicator	2003	2005	2007
Total area (1,000 sq km)	349.8	349.8	349.8
Total population	2,394	2,194	2,376
Population aged 0-16 years	851	851	744
Labor aged population	1309	1288	1508
Labor aged popn. (Female)	632	645	777
Total employed	1001	895	971
Total unemployed	176	226	121
Total number of families	638	559	627
Families living under the Poverty line	201	232	110
Birthrate	25	6	39
Mortality rate	19	8	15
Total livestock	84,839	96,465	149,567
Number of families without livestock	176	174	188

Source: Buregkhangai Social Welfare Officer (2008)

Table 6: Socio-Economic Indicators of the Zaamar Soum, 2007

Indicator/Bagh	Toson	Tomstii	Khailaastai	Zaamar Center	Total
Total population	522	640	3124	1555	**5841**
Total Number of families	143	173	828	420	**1564**
Number of Herder families	82	100	69	12	**263**
Poor and Very Poor families	43	29	99	170	**341**
Total Number of Livestock	16,887	28,796	13,212	10,370	**69,265**

Source: Zaamar Soum Social Welfare Officer (2008)

What these figures illustrate, despite the differences in how they are presented and what data are available, is that the economic performance of the region is linked closely with the fortunes of herders. The high levels of animals, which have grown in recent years despite fears of overgrazing, illustrate the importance placed on herding as a source of income.

There is considerable potential for the extractive industries operating in Zaamar and Buregkhangai to provide limited new job opportunities as well as infrastructure to the region. These include providing industrial employment and non-agricultural employment opportunities that have eroded since the collapse of communism. Yet, this potential remains largely untapped.

2.3.2 Economics, Employment and Income

The economies of Buregkhangai and (especially) Zaamar have been impacted by the growth of the gold mining industry in the past ten years. In some cases, these economic impacts have been positive, creating new opportunities and contributing to the development of the region. However, because of the high levels of unemployment in Mongolia – and external events such as large animal losses during the zuud (deep freeze) of 1999 to 2001 – the soums remain poor.

The working age population and economically active population are higher in the Zaamar and Buregkhangai Soums compared to the national averages. However, the official level of unemployment remains staggeringly high – as does the official number of households living in poverty.

In rural areas, unemployment is likely to be much lower, on the basis that herders are (self) employed on a full-time basis. As the dominant form of economic activity in the two soums, employment and income is closely tied to market prices for livestock products, and to the variables of weather and rainfall – all of which have been sub-optimal for the past years – creating challenges for rural livelihoods.

Rural Livelihoods

Rural livelihoods in Zaamar and Buregkhangai as well as in Mongolia have become much more diverse than they were at the start of the 1990s. The liberalization of fuel prices coupled with the vast distances and low population density of rural Mongolia led to marked differentials in the prices of consumer goods and the prices paid for producer goods such as livestock products. As a result, geographical location became an important driver of economic opportunity, and migration became the livelihood strategy of choice for those in a position to take advantage of opportunities in more central regions or larger urban centers. However, herding remains the dominant source of income for most households.

In the Tuul River valley, rural livelihoods remain characterized by an extensive livestock industry with an absolute dependence on an extremely harsh and highly variable natural environment, which has been subject to considerable over-grazing. This pressure on grasslands is evidenced in the significant number (and increase) in livestock in the region, as shown in Table 5 and **Table 6**.

This overgrazing, combined with a series of harsh winter 'zuuds' or deep freezes which killed off large numbers of livestock, contributed to the growth in ninja mining in the region. Former herders, coming from both the local soums as well as from further distances, gravitated towards the Tuul River Valley as a source of employment and livelihoods. Since 2006 most of the ninja miners have been resettled in their home soums and encouraged to return to herding. For many former ninja miners, the lack of economic opportunities has led them to move towards Ulaanbaatar and other centers, to seek employment. However, the number of ninja miners working on the Big Bend license area was always small, numbering no more than one hundred ninja miners in total.

The majority of the population remains dependent – to varying extents – on seasonal grazing of livestock. There are signs that families are, however, turning to a diversity of livelihood options – including sending family members abroad (e.g., to South Korea), engaging in small businesses, including those servicing the mining industry and, decreasingly, the ninja or illegal mining.

As previously mentioned, poverty is more prevalent in rural areas. Between 2003 and 2006, urban poverty decreased from 30.3 percent to 27.0 percent, whereas rural poverty dropped from 43.4 percent to 38.0 percent. This helps to explain why there has been so much migration from rural areas, such as the Tuul River valley, towards Ulaanbaatar. This also feeds the rising economic inequality in the country. The disparity in distribution of incomes in Mongolia (as measured by the Gini coefficient[4]) was 0.329 in 2002/2003 and 0.380 in 2006. Since 2007, the gap between rich and poor is perceived to have widened more markedly.

2.3.3 Social Services

Delivery of social services to remote herders remains a challenge in Mongolia. Herders are scattered across vast territories and move often within these territories, which causes significant logistical problems for the delivery of social services such as education and healthcare. Infrastructure remains under-developed, so herders do not have access to quality health, education and social protection services. National statistics show that the doctor/patient ratio and the

[4] The Gini coefficient is a measure of inequality of income distribution. It is defined as a ratio with values between 0 and 1: A low Gini coefficient indicates more equal income or wealth distribution, while a high Gini coefficient indicates more unequal distribution. 0 corresponds to perfect equality (everyone having exactly the same income) and 1 corresponds to perfect inequality (where one person has all the income, while everyone else has zero income). Worldwide, Gini coefficients range from approximately 0.249 in Japan to 0.707 in Namibia.

number of hospital beds per 1,000 persons are comparatively high. However, most of these doctors and beds are located in the large urban areas or in aimag centers. Therefore, soums and other smaller administrative units lack the resources to provide quality medical services in remote areas.

Each soum center in Zaamar and Buregkhangai has a secondary school and a hospital, as well as continuous electricity supply and a post office. But these services do not extend very far into the rural areas. Most children of herders live in state-run dormitories or with relatives in the soum centers during the school year. An example of a soum center school and dormitory is pictured below in a photograph of the school in Zaamar Soum center.

Figure 6: Zaamar Soum Center School

The capacity of local government officers to implement policies and deliver social services is variable. While motivated and trained staff do exist in the areas surveyed (especially in Buregkhangai), they face considerable challenges in terms of the distance involved, the costs of supplying services to such a disparate population and the lack of viable employment opportunities for their populations. This is true for environmental officers, social welfare officers and, ultimately, soum governors. For instance, while a vocational training facility exists in the Zaamar Soum center, it remains unclear which courses are taught and how this training links with job opportunities.

Hospital facilities exist in Zaamar and Buregkhangai but operating these requires funding and staffing – which is not always present. Thus the capacity of local

government officials is restrained by circumstances, some of which may be transformed through new economic activity. Big Bend has already been active in providing materials and supplies to the hospital in the Buregkhangai Soum center.

2.3.4 Water and Other Infrastructure

The soum centers of in the region do not have water or sewer systems and generally rely on pit latrines. This is especially problematic in the new settlement of Shijir Alt, where the town has grown rapidly with insufficient investment in infrastructure. Water availability in the soum centers is limited, usually coming from communal water supply wells. In rural areas, water supply is based on shallow groundwater supplies and from the Tuul River – which is undrinkable without filtration. There are some wells in the region, which use electrical or diesel pumps; however, many of these are either non-operational or poorly maintained.

No centralized electricity is available to herders and the majority of herder households in the soum use wind or solar energy to generate electricity. Dung is the primary source of heat for most herder gers. Herders depend on local public water supply and dug wells within their pasture lands for domestic and livestock water supply. There are a number of wells throughout the area which do provide clean water, but more wells are requested and would provide much needed water for both domestic and livestock use. Most herders do not have any form of sanitation, pit latrines or soak pits for proper hygiene in the vicinity of their gers.

Mobile communication services from MobiComare are available in the soum centers (Gmobile in the case of Buregkhangai) and in the Shijir Alt township.

2.3.5 Data Gaps and Uncertainties

While good data do exist at the national and aimag levels, soum level statistics are often lacking or in some cases outdated. In the research for this report, it was possible to gain most of the required statistics; however, there is no in-depth information on the economic conditions of herders and others in the mining affected areas.

No detailed socio-economic baseline study has been completed to date, nor was this possible given the time, resources and scope of this study. However, focused efforts at the project site, surrounding area, and soum centers provided a sound understanding of the key issues of the area.

3.0 Legal and Regulatory Framework

This section presents an overview of the legal and regulatory framework for the Big Bend project in Mongolia. In preparing this Social Baseline Study, the company is following international best practices, IFC Performance Standards and associated Equator Principles' requirements. Big Bend is conducting its continuing operations subject to the laws of the Republic of Mongolia. This section is not a comprehensive review of the legal requirements of the company.

To understand the Socio-Economic and Socio-Environmental perspective, it is important to recognize that the company is operating within a specific legal and regulatory context. This context is examined firstly in terms of the domestic legislation of Mongolia (especially The Minerals Law of Mongolia), and secondly in light of the international best practices and IFC Performance Standards to which the company seeks to comply.

3.1 Legal and Administrative System of Mongolia

Mongolia is a constitutional democracy. The modern political history of Mongolia is of an extended period of Soviet-style government from 1924 to 1989, with economic and legal policies heavily influenced by the Soviet Union. In 1990, democracy was established in Mongolia, following peaceful street protests and the economic decline due to the collapse of the Council for Mutual Economic Assistance (Comecon, the communist states' economic block).

The 1990s were characterized by unstable politics and economic malaise as the country struggled to adapt to the new economic realities of the post-Soviet period. This instability has created, and continues to create challenges for policy formulation – for example, the government consistently experiences difficulties in passing amendments to the Country's Mining Law (EIU, 2008).

Since the late 1990s onwards, buoyant commodity prices, large amounts of Western development assistance and a gradual realignment of the economy away from state subsidies have seen Mongolia's politics become somewhat more stable, with the development of a viable opposition and enhanced judicial checks & balances. However, recent instability shows the fragility of post-1991 politics.

A general election was conducted on June 29, 2008. Questions about the legitimacy of the victory of the ruling Mongolian People's Revolutionary Party (MPRP) party led to street violence in Ulaanbaatar on 1 July, culminating in the declaration of a four-day state of emergency and the burning of the MPRP headquarters. Four civilians were reportedly killed during the protests. Of the many complaints cited by the protesters, the most prominent was about the distribution of mineral wealth and job opportunities.

3.1.1 Constitution and Institutions

Under the constitution adopted in February 1992, the head of state is a directly elected president who serves a four-year term as head of the executive. The legislative branch of the state is constituted of 76 members of the State Great Khural (the Parliament), whose members are elected on four-year terms. The president has the power to veto legislation; however, this veto can be overruled by a two-thirds majority in the State Great Khural. According to the constitution, the judiciary is independent of both the legislature and the president; however, commentators suggest that this separation is more nominal than actual. There is a separate constitutional court which rules on the constitutionality of legislation.

The State Great Khural as the legislative branch promulgates laws and regulations. However, legislation may also be promulgated by government entities whose primary responsibilities are not legislative. For example, an executive branch may produce certain types of legislation in order to carry out its responsibility to implement the laws. These government entities include the President, the Cabinet Ministry, the various Ministries and their Agencies, and Governors at all levels.

The types of legislation promulgated include: Presidential Decrees, Conclusions of the Constitutional Council, Official Interpretations and Judicial Decisions of the Supreme Court, Cabinet Ministry Resolutions, Ministerial Orders (such as from the Ministry of Nature and Environment), and Soum/Bagh Ordinances. This multiplicity of legal authorities is due in part to the immense distances between settlements in Mongolia, necessitating relatively high levels of administrative authority and autonomy at the local level, as explained next.

3.1.2 Administration and Regional Authority

Mongolia is a very large and sparsely populated country. To ease administration, the country is divided into 21 aimags (provinces) and the capital, Ulaanbaatar. These aimags are divided into soums (districts) and the soums into baghs (sub-districts), each with Bagh Khurals (elected assemblies). All households have the constitutional right to be represented at the Bagh Khural.

Each aimag, soum and bagh has an elected governor[5] who is responsible for implementing laws and ensuring the welfare of the citizens. Because of the devolved nature of the law in Mongolia, soum and aimag assemblies can pass resolutions to implement specific measures related to the environment, which carry the full weight of the law. These resolutions may, for instance:

[5] Aimag governors are proposed by Aimag Khurals and approved by the prime minister.

Aimag Level

- Set maximum limits for the use of natural resources in the local areas;
- Make decisions on the status of local protected areas;

- Establish protected area boundaries;
- Establish protection status and procedures;

Soum Level

- Approve measures on the environment and monitoring implementation;
- Determine annual limits on the use of natural resources.

Implementation of these laws is the responsibility of the aimag and soum governors, usually assisted by a relevant officer at the soum level (for instance, an environmental inspector or social welfare officer) and with the collaboration of the Bagh Governor. What this means in practice is that aimag, soum and bagh governors (and assembly members) hold considerable legal authority and should be considered as important stakeholders in project planning.

3.1.3 Law on Minerals

In August 2006, the Mongolian government repealed the 1997 Minerals Law and replaced it with a new Minerals Law of Mongolia (Minerals Law). The new law establishes the state as having primary control of its mineral resources.

The Minerals Law allows any Mongolian legal entity to hold any number of mineral exploration licenses of up to 400,000 hectares each. An exploration license holder is afforded the right to conduct exploration for minerals within the boundaries for nine years (three years initially plus two extensions of three years each), and the exclusive right to obtain a mining license for any part of the exploration license. It also provides the right to transfer or pledge any part of the exploration license.

A pre-mining period of three years has been introduced at the expiration of the exploration license term. During this period, the Minerals Law permits a feasibility study and an Environmental Impact Assessment (EIA) (with social impact assessments forming a minor part of these assessments, if at all) to be completed, which is governed by both the Environmental Impact Assessment Law and Environmental Assessment regulations promulgated by the Ministry of Nature and the Environment. However, these requirements are generally unclear, which is why adopting international best practices is advisable.

License fees payable in years seven, eight and nine are applicable during this period. The Minerals Law now provides that the local aimag government directly benefit from the payment of license fees and royalties. They will receive 50 percent of all license fee payments and 30 percent of all royalty payments. This

arrangement is set for review in the new Minerals Law, although details of the new arrangements remain unclear.

The agreement of aimag and soum governors is required to conduct exploration and mining activities, as well as to use groundwater and other natural resources. There are no legal requirements to conduct community level consultations or disclosure.

Mining license holders have the right to engage in mining of minerals within the license area for thirty years (with the right to extend for two additional periods of twenty years), the right to sell mineral products internationally, the right to transfer or pledge all or part of the license, and the right to conduct exploration for minerals within the license area. A mining license holder must pay royalties to the government equal to five percent of the sale value of products sold (with the exception of coal and common minerals resources that are sold domestically on which the royalty is 2.5 percent).

3.1.4 Windfall Tax

In May 2006, the Government of Mongolia passed a Windfall Profit Tax Law. This Law imposes a tax rate of 68 percent when copper reaches US$2,600 a tonne and when gold reaches US$500 an ounce. The new mining law of 2006 also raised royalty rates on metals extraction, and removed some tax holidays. The government justified the changes as an attempt to allow the government to benefit more equally from the impact of surging global metals prices. The boost to revenue from the mining sector helped to keep the budget in surplus in 2007/2008. Questions remain on whether this windfall tax will be expanded to other minerals, or if a more broad approach to taxation and control will be taken, as with Russia's focus on 'strategic' resources.

It will be important for the management of Big Bend to continue to watch legislative developments as they occur to ensure continuing compliance, and applicability of new laws.

3.2 Relevant Regulations

The regulation of mining in Mongolia is focused on managing the environmental impacts of mining, with little attention paid to community and social impacts – although the government is talking about incorporating issues of social impact analysis into the new Mining Law. This section presents a brief discussion of important regulations on social impacts, especially the Law on the Protection of Cultural Heritage. This is followed by an analysis of likely movements in future legislation and regulation, based on consensus opinions from locally based sources. Finally, an overview of the relevant environmental regulations is

provided, with the caveat that this assessment did not set out to perform an in-depth assessment of environmental regulations.

3.2.1 Law on the Protection of Cultural Heritage

Protection of cultural sites is set out in the Law on Culture of Mongolia (1996), State Policy on Culture (1996) and, most importantly, the Law on the Protection of the Cultural Heritage (2001). Together, these laws provide for the protection of tangible and intangible forms of cultural heritage, placing authority at the national, aimag and soum level for protecting cultural heritage properties classified as "common", "valuable" or "unique and valuable". The emphasis of the legislation is on intangible forms of culture in need of protection, such as:

- mother language, script, and associated culture;
- oral literature;
- folk songs (*urtiin duu* and *bogino duu*) and epics, and the techniques of singing or narrating these;
- work and labor-related songs and chants;
- *khuumii* (diaphonic singing): whistling, clicking of the lips and palate, and other non-vocal musical forms created with the mouth and speech organs; etc.

Although the legislation does include physical areas of cultural heritage, the emphasis is on intangible culture. Such physical areas include burial sites, places of particular historical or cultural interest such as shamanistic sites, and places of particular natural beauty.

3.2.2 Future Trends in Regulation

The government is currently re-writing the Law on Minerals – this has been underway for some time and it is likely that there will be no action before the June 2008 parliamentary elections. It is possible that the presidential election in 2009 will delay this law further. While it is expected that Mongolia will continue to promote legislation which is generally supportive of mining, there are moves to increase government stakes in 'strategic' assets and the uncertain policy environment is leading to regulatory uncertainty.

This uncertainty is characterized by the continuing lack of clarity about the legal status of the massive Oyu Tolgoi copper gold project in the Gobi desert. Whilst the company (a Ivanhoe Mines and Rio Tinto joint venture) has agreed a draft text with government negotiators for over a year, the government has consistently delayed presenting this proposed deal to parliament. Whilst the Oyu Tolgoi project has attempted to continue with shaft development and exploration during this period of uncertainty, the project is close to a point where production will soon begin the company has announced that it will soon have to delay work until

an agreement is reached. This new agreement will also be shaped by the new mining law under review in the new parliament of 2008.

One likely, and popular, aspect of the new mining law relates to a more direct benefit sharing of tax revenues with affected soums and aimags. The currently proposed structure would see 50 percent of all tax revenue go to the central government, 25 percent go to unaffected soums and 25 percent to be distributed amongst the affected soum(s). However, it seems unlikely that the law will proceed in its current form. Firstly, there are practical questions about how well soums and aimags could absorb and transparently disburse such large sums of money.

Secondly, there are equity issues. With large sums of money involved, many suggest that a percentage calculated based on issues like population and poverty is more appropriate. However, there is a strong feeling that this sort of revenue sharing initiative will form part of the new regulatory framework in Mongolia. This should be seen as a positive outcome for the company – making it easier to evidence the contribution of the mines to the community without making direct disbursements. However, because of the low standards of government capacity and transparency at aimag/soum/bagh levels – it would be advisable for Big Bend to support local government capacity where possible.

Another aspect of future legislation is the increased focus on companies identifying their social and community impact. It is unclear how this regulation will be implemented; however, a number of sources from within development agencies and local contacts suggest that it is likely that companies will in the future be required to produce a social impact study – in much the same way as EIAs are currently conducted. The government capacity to competently review and assess these reports will need to be strengthened before this regulatory change is implemented.

In part, these social aspects reflect a growing recognition by the government that existing mechanisms for taxing and distributing mineral wealth have not had the requisite employment creation and poverty alleviation impacts. In part, recent unrest in the capital related to the elections, reflects growing discontentment with how mineral wealth is allocated and how mining projects operate. This is driving the government to try and legislate so force mining companies to manage their environmental (and now social) impacts more carefully.

These possible changes will fit into the existing framework of (predominately environmentally focused) regulations on mining, outlined below.

3.2.3 Environmental Regulations – Overview

Currently there are 32 laws relating to environmental management and the approval procedure in Mongolia as provided in the table overleaf.

Obviously not all of these laws and regulations will directly affect company operations. The extent to which they are relevant will depend on the likely and locally perceived impacts that mining will have on the local community. There are also areas, such as resettlement, compensation and consultation, where the Mongolian legislative and regulatory environment is lacking – which are where the use of international best practices and IFC Performance Standards are needed – as set out below.

Table 7: Environmental Laws in Effect in Mongolia

Resource Type	Law and Year of Passage
Land Resources	Mongolian Law on Land, 1994, renewed 2003 Mongolian Law on Land Use Fees, 1997 Mongolian Law on Land Ownership for Mongolian Citizens, 2003, amended 2008 Mongolian Law on Geodesy and Topography, 1997 Mongolian Law on Cadastral Survey and Land Registration, 1999
Minerals, Oil and Gas	Mongolian Law on Subsoil, 1989 Mongolian Law on Mineral Resources, 1997, renewed 2006 Mongolian Law on Petroleum, 1991, renewed 1999
Forest Resources	(Mongolian Law on Forests, 1995) Mongolian Law on Forestry, 2007 Mongolian Law on Fees for Timber and Firewood Harvesting, 1995 Mongolian Law on Prevention of Steppe and Forest Fires, 1996
Water Resources	Mongolian Law on Water, 1995, renewed 2004 Mongolian Law on Water and Mineral Water Use Fees, 1995
Plant Resources	Mongolian Law on Plant Protection, 1996 Mongolian Law on Natural Plants, 1995 Mongolian Law on Natural Plant Use Fees, 1995
Wildlife Resources	Mongolian Law on Hunting, 1995, 2000, 2003 Mongolian Law on Fauna, 2000 Mongolian Law on Hunting Resource Use Payments and on Hunting and Trapping Authorization Fees, 1995
National Park	Mongolian Law on Special Protected Areas, 1995 Mongolian Law on Buffer Zones, 1997
Other Conservation Legislation	Mongolian Law on Environmental Protection 1995, and renewed 2005 Mongolian Law on Environmental Impact Assessment, 1998 Mongolian Law on Air, 1995 Mongolian Law on Toxic and Hazardous Chemicals, 1995, 2006 Mongolian Law on Municipal and Industrial Waste, 2004 Mongolian Law on the Import, Export, and Cross-Border Transport of Hazardous Wastes, 2000 Mongolian Law on Foreign Trade of Endangered Fauna and Flora, 2002 Mongolian Law on Meteorology and Hydrology, 1997 Mongolian Law on Reinvestment of Natural Resource Use Fees for the Protection of the Environment and Natural Resource Restoration, 2000

Sources: http://www.pmis.gov.mn/parl_mon.htm, EcoTrade LLC, Ulaanbaatar, Mongolia.

3.3 IFC Performance Standards

Big Bend has a stated intention to comply not only with domestic Mongolian laws and regulations, but also with international best practices. The most comprehensive overview of these best practices lies in the IFC Performance Standards, which are preconditions for seeking funding from the World Bank/IFC and EPFIs.

The following two sections relate to performance according to IFC standards, assessed during the field visit and desk review conducted for this report. This assessment is based on information provided by the company and upon the locally available information that was available at the time of research.

Many of these requirements are based on having the correct information in a good practice social baseline, action plans to address gaps, and clear management systems in place to ensure that action is taken when issues are identified. **Table 8** summarizes the eight IFC Performance Standards against a list of issues which should be covered in the Stakeholder Engagement Program.

The list is based on the IFC publication "Performance Standards on Social and Environmental Sustainability" (April 30, 2006 – attached as Appendix 4), which sets out the key aspects of the performance standards:

IFC Standard 1: Social and Environmental Assessment and Management System
IFC Standard 2: Labor and Working Conditions
IFC Standard 3: Pollution Prevention and Abatement (see other sections of report)
IFC Standard 4: Community Health, Safety and Security
IFC Standard 5: Land Acquisition and Involuntary Resettlement
IFC Standard 6: Biodiversity and Sustainable Natural Resource Management (see other sections of report)
IFC Standard 7: Indigenous Peoples
IFC Standard 8: Cultural Heritage (see archeological section of report)

In addition OPIC will directly reference sector-specific EHS Guidelines as promulgated by IFC as they relate to the environmental impacts of this project. This includes aspects of PS3 on Pollution Prevention and Abatement with respect to Good International Industry Practice and will most likely include references to:

- EHS Guidelines for Mining (2007)
- Specific components of the General Env Guidelines (2007)

The color coding of the status bar is a summary of company performance against the IFC standards, as assessed in July 2008. This is a summary of the findings presented in **Section 4.0** (current and potential impacts) and **Section 5.0** (Stakeholder Engagement Program). The colors indicate:

Current Status	Color
Company is currently compliant with relevant IFC Performance Standard and domestic legislation	
Company is either in process of ensuring compliance, or existing systems have been shown to be only partially effective.	
Serious issues exist, or a lack of data means that no judgment can be made. Action is required to ensure IFC compliance.	

Table 8: IFC Performance Standards and Current Status

IFC Performance Standard	Requirements	Status	Options for Action
1. Social and Environmental Assessment and Management System **Objectives** § To identify and assess social and environment impacts, both adverse and beneficial, in the project's area of influence § To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment § To ensure that affected communities are appropriately engaged on issues that could potentially affect them § To promote improved social and environment performance of companies through the effective use of management systems	Social and Environmental Management System		As the mine moves towards production, implement a social and environmental monitoring system.
	Social and Environmental Assessment		SEIA and EIA studies completed and compliant according to Mongolian government assessment.
	Management Program		Current management is ad-hoc, but effective. Before mine begins production – introduce a formal management program.
	Community Engagement		There has been a shortage of community engagement to date. This can be rectified by following the specific recommendations made in the SEP (**Section 5.0**).
	Monitoring		Monitoring of social and environmental impacts has been compliant with Mongolian and IFC requirements. This monitoring will need to become more frequent as the mine begins production.
	Reporting		Reporting of results to regulators and government officials has been compliant. However, there has not been adequate and appropriate reporting of project information and environmental data to local herders.

IFC Performance Standard	Requirements	Status	Options for Action
2. Labor and Working Conditions **Objectives** § To establish, maintain and improve the worker-management relationship § To promote the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labor and employment laws § To protect the workforce by addressing child labor and forced labor § To promote safe and healthy working conditions, and to protect and promote the health of workers	Working Conditions and Management of Worker Relationship		Company compliant with international and Mongolian laws and standards.
	Protecting the Work Force		Company compliant with international and Mongolian laws and standards. No forced or bonded labor issues exist.
	Occupational Health and Safety		Company compliant with international and Mongolian laws and standards. Implementation of a formal management system will be required (and is already planned) for production.
	Non-Employee Workers		No formal system exists to ensure compliance of suppliers and sub-contractors with IFC standards, especially relating to child and forced labor and Occupational Health and Safety.
	Supply Chain		No formal system exists to ensure compliance of suppliers and sub-contractors with IFC standards, especially relating to child and forced labor and Occupational Health and Safety.

Please note: IFC Performance Standard 3 (Pollution and Abatement) is dealt with elsewhere in this report.

IFC Performance Standard	Requirements	Status	Options for Action
4. Community Health, Safety and Security **Objectives** § To avoid or minimize risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances § To ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security	Community Health and Safety Requirements		Company has been proactive in ensuring community health and safety compliance – as well as in improving healthcare provision in one neighboring soum. Providing access to a health clinic for all workers and neighboring herders is recommended.
	Security Personnel Requirements		Company has a plan in place for housing security personnel (off-site and separate from main mine camp). Training security staff in how to deal with local herders will be required in the future.

IFC Performance Standard	Requirements	Status	Options for Action
5. Land Acquisition and Involuntary Resettlement **Objectives** § To avoid or at least minimize involuntary resettlement wherever feasible by exploring alternative project designs § To mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of land by: (i) providing compensation for loss of assets at replacement cost; and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected § To improve or at least restore the livelihoods and standards of living of displaced persons § To improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites	Compensation and Benefits for Displaced Persons		No compensation or benefits for displaced persons has been included in mine planning to date. The SEP in **Section 5.0** sets out a range of Compensation and Benefit options for the company.
	Consultation and Grievance Mechanism		No formal consultation and grievance mechanism has been established by the company. This will be a necessary part of the SEP in **Section 5.0.**
	Resettlement Planning and Implementation		No resettlement planning has taken place to date. The numbers of likely displaced individuals is small and the company has stated its commitment to minimizing and mitigating resettlement.
	Physical Displacement		Physical displacement of herders (approximately five families) is likely at varying project stages. Because of the nomadic and seasonal nature of physical settlements, this issue can be managed.
	Economic Displacement		Economic displacement (a loss of assets or access to assets that leads to a loss of income) will occur as a result of (temporarily) closed grazing areas until these areas are reclaimed. Compensation and benefits as set out in **Section 5.0** are needed.
	Private Sector Responsibilities under Government-Managed Resettlement		The company has made a stated commitment to ensuring human rights are adhered to. Any resettlement that occurs must take place in consultation with the local government and in accordance with IFC Standards.

Please note: IFC Performance Standard 6 (Biodiversity Conservation and Sustainable Natural Resource Management) is dealt with elsewhere in this report.

IFC Performance Standard	Requirements	Status	Options for Action
7. Indigenous Peoples **Objectives** § To ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples § To avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not feasible, to minimize, mitigate, or compensate for such impacts , and to provide opportunities for development benefits, in a culturally appropriate manner § To establish and maintain an ongoing relationship with the Indigenous Peoples affected by a project throughout the life of the project § To foster good faith negotiation with and informed participation of Indigenous Peoples when projects are to be located on traditional or customary lands under use by the Indigenous Peoples § To respect and preserve the culture, knowledge and practices of Indigenous Peoples	Avoidance of Adverse Impacts		Company has been proactive in ensuring avoidance of adverse impacts – SEIA and EIAs conducted to date have identified no unique or endangered cultural issues.
	Information Disclosure, Consultation and Informed Participation		No formal Information Disclosure, Consultation and Informed Participation mechanism has been established by the company. This will be a necessary part of the SEP in **Section 5.0**.
	Development Benefits		Because of the negative impacts, especially on economic displacement, the development benefits of the mine need to be ensured. Options for delivering sustainable development are included in the SEP in **Section 5.0**.
	Impacts on Traditional or Customary Lands under Use		The grazing lands under use (excepting those with archeological sites on them) are neither unique nor do they serve additional cultural purposes. However, full reclamation needs to be ensured and compensation delivered for temporary displacement.
	Relocation of Indigenous Peoples from Traditional or Customary Lands		Physical and economic displacement of local herders will occur as a result of the mine. Full reclamation needs to be ensured and compensation delivered for temporary displacement.
	Cultural Resources		Action plan needs to be implemented – see the archeological section of this report.

Please note: IFC Performance Standard 8 (Cultural Heritage) is discussed in the Archeological section of this report.

4.0 Social Impacts and Issues Identified

Social issues and impacts were identified both from the opinions and perspectives of local people, as well as based on the expert analysis of the AATA/EcoTrade team. These are classified here as current socio-economic impacts (4.1) and potential socio-economic impacts (4.2) once the exploration site proceeds to construction and production.

4.1 Current Socio-Economic Impacts

The impacts of current activities (drilling, operating an exploration camp) are limited in scope and scale, and relate largely to direct impacts on a limited number of families (approximately five ger households, totaling 25 persons). However, the Big Bend mine site sits in the middle of approximately 13 other mines in operation along the Tuul River valley, so many of the current impacts of exploration are inseparable from the impacts of other mining operations. This makes community engagement and education an important aspect of managing these impacts.

Because all of the households close to the Big Bend project are engaged in herding for their livelihoods, the socio-economic impacts discussed here focus mainly on grazing, water and human well-being. These three types of impacts are exacerbated by a lack of information availability and consultation at the local level – which is partially off-set by an existing social program operated by Big Bend.

In reading this section, it is important to note that the impact of other mining operations in the region can in some ways not be separated from the impact of the Big Bend project. This is to say that the cumulative impacts of other neighboring projects – for instance environmental impacts, employment issues, legacy and reputational risks – all have an impact on the Big Bend project. This suggests that there might be opportunities for Big Bend, in concert with other mining companies to adopt a joint approach to solving some of these issues. This could be through a joint approach to engaging government, local procurement, community development and environmental protection.

4.1.1 Grazing and Pasture

Current exploration and drilling operations have a minor impact on grazing and pasture in the immediate area of the exploration license areas. This impact, limited to small parts of the exploration areas at both sites, has a direct effect on the livelihoods of the herding households that live in the mining affected area. Since grazing land is one of the most important issues for the locals, this impact was the most frequently mentioned local concern.

Mine operations in July 2008 were confined to confirmatory drilling (two rigs) and the operation of a small mine camp by the company. Thus the impact on grazing and pasture was small – but some concerns were raised regarding drilling sub-contractors and on future impacts (see **Section 4.2**).

Drilling

Drilling to confirm the location of the ore body was being conducted by sub-contractors during the time of research (July 2008). There were complaints from local people that the subcontractors are not as careful or conscientious as the direct employees of Big Bend, especially as relates to backfilling of drill holes.

Although all drill holes are meant to be reclaimed and backfilled (by company policy, land use agreement and contracts with drilling subcontractors), there have been complaints of isolated incidents of drill holes not being backfilled. The risk being that animals fall into these holes and die, which has apparently occurred on several occasions.

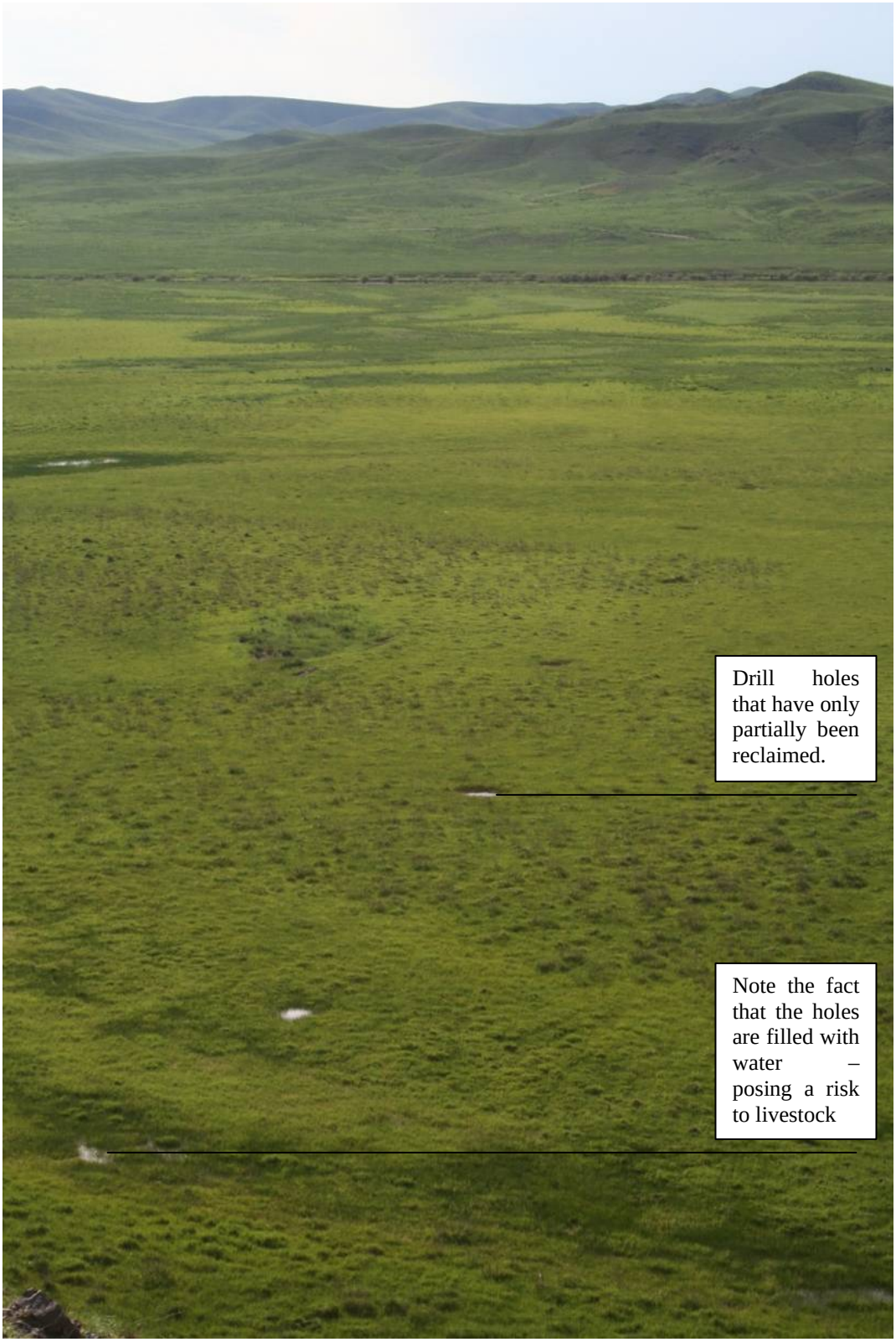
It was not possible to confirm when the most recent animal death was; however, it was possible to confirm that indeed not all drill holes are fully and properly reclaimed. Evidence of these holes can be seen in the photolog (Appendix 2) in images 5095 and 5097, at locations N 48’ 22.0217 E 104’ 27.7139 and N 48’ 22.0217 E 104’ 27.7139.

A straight line of seven partially reclaimed drill holes can also be seen from the high point of the property looking North-West, as shown in the image overleaf.

There are also drill holes on the Big Bend property that were dug by Ninja miners, which pose an on-going risk to livestock (and to mine operations). While not the direct responsibility of Big Bend – it would be advisable to refill these holes – as a way of being proactive in preventing local problems and of ensuring the safety of mine staff and operations.

A simple plan to implement this could include establishing terms in contracts to enforce backfilling. Any new sub-contracts could include financial and other instruments which would penalize non-compliance with company/IFC/OPIC standards.

Figure 7: Partially Reclaimed Drill-Holes - Posing Risk to Livestock



Overgrazing and Drought

From 1998 onwards the Tuul River valley area has experienced increased pressure on grazing areas. This is due to historically low levels of rainfall compounded by historically high grazing numbers and subsequent pressure on pasturelands. These pressures have been compounded by the growth of mining in the area at this same time – putting more pressure on grazing areas and shifting some herders into the Big Bend area that had not previously grazed there. The scale of this should not be underestimated, with the Zaamar Soum having a total of 135 mining and exploration licenses issued for 87,000 hectares, or two-thirds of the total Zaamar Soum lands.

It is thus difficult to disaggregate the locally perceived impacts of mining from the underlying problems of overgrazing and drought. While it is clear that mining does impact grazing and pasture, – through creating exclusion areas and from other impacts – these impacts are localized and contained. Yet, as a visible presence (and one which coincided with the arrival of drought conditions) the mining industry receives considerable blame for the wider problems, and this is, therefore, a potential risk to the company and needs to be addressed. This is linked to the issue of information and engagement, discussed in Section 4.1.4. It also links closely with the issue of water, discussed in Section 4.1.2.

4.1.2 Water

As with grazing, water is essential for herders – providing domestic water for human consumption and water for livestock. Exact details of the impacts of other mining operations (severe) and of the Big Bend operation to date (limited) on the Tuul River are included elsewhere in this report.

The important point to note is that the impact of mining in the Tuul River valley has been a severe reduction in the quality of surface water and that this is having a material impact on herder livelihoods. It is equally important to note that, to date, the contribution of Big Bend to this problem is limited to non-existent. The steps the project will take to monitor its impact on water quality are set out elsewhere in this report, which details the monitoring conducted and planned.

Water from the Tuul River is reportedly unfit for human consumption without filtration, with herders sourcing their water instead from distant tributaries and wells. Likewise, during periods of high sediment load, the Tuul River is seen by local herders as unfit for watering their livestock – necessitating taking the animals to watering holes or alternative surface sources.

Complaints about water quality relate both to the high turbidity as well as to allegations of chemical poisoning of the water. These complaints include:

- instances of children having rashes after swimming in the Tuul,
- sheep when slaughtered having blue mucous deposits in their lungs (blamed by herders on unfit drinking water)
- large numbers of fish dying in the winter (blamed by herders on chemical pollution, more likely caused by organic loads reducing oxygen availability under the ice) as seen in the below picture.

Figure 8: Photograph of Dead Fish under Ice: 22 February, 2008.

Source: Environmental Officer of Buregkhangai Soum (photo taken 22 Feb. 2008)

It is important to note that many, if not all, of the water issues discussed with herders were likely caused by other mining operations, upstream from Big Bend. However, because at the local level perceptions are realities, it is important for these negative impacts on herders' livelihoods to be considered as part of mine planning.

4.1.3 Social Impacts of Mining

The local employment and economic impacts of the Big Bend exploration site was limited at the time of research. This is due in part to the small size of existing operations and the need for a small number of relatively highly skilled individuals to conduct the exploration work (mostly subcontracted drillers). There were, however, positive examples of local procurement of meat, especially of sheep meat, and the company is committed to expanding this local procurement to include milk products and increased meat purchases once the site moves into production.

In 2008, at the time of this study, there was limited direct local employment creation. This was due in large part to the small scale of operations and the fact that the positions that did exist required skills and training which only Ulaanbaatar based staff typically possessed.

No evidence or complaints of adverse social impacts related to Big Bend were observed.

Beyond the Big Bend project, there are complaints from local herders as well as from domestic and international NGOs, of adverse social impacts as a result of mining in the Tuul River valley. No specific evidence was seen of these adverse impacts, nor were they mentioned in interviews conducted in and around the Big Bend site; however, they were raised in interviews conducted in Ulaanbaatar and are present in the literature on mining in Mongolia[6]. These adverse social impacts are said to include:

- Population concentration in the Shijir Alt township leading to problems of alcoholism, prostitution (including forced prostitution and people trafficking), domestic violence and sexually transmitted diseases (STDs);
- Influxes of foreign (e.g., Russian) and non-local (e.g., from Ulaanbaatar and other soums) workers depriving local workers of jobs;
- Ninja mine camps evidencing high levels of STDs, increased youth alcohol consumption (including amongst young women) and personal safety concerns for women and girls;
- Mine worker rotations leading to increased incidence of domestic violence (upon return to city home).

[6] Mongolian Business Development Agency (MBDA), Ninja Gold Miners of Mongolia: Assistance to Policy Formulation for the Informal Gold Mining Sub-sector in Mongolia (2003) 18-19;
Peter W. Uitterdijk Appel, Small-Scale Mining in Mongolia – A Survey Carried Out in 2004 (2004), http://www.geus.dk/program-areas/common/geus_rep_2005-4.pdf. ;
Asian Development Bank and World Bank, Country Gender Assessment: Mongolia (2005) www.adb.org/Documents/Reports/Country-Gender-Assessments/cga-mongolia.pdf ;
ILO, Informal Gold Mining in Mongolia: A Baseline Survey Report Covering Bornuur and Zaamar Soums, Tuv Aimag (2006) www.ilo.org/asia/library/download/pub06-12.pdf

Some of these social impacts, for example ninja mining, are being managed by the government which is active in eliminating ninja mining camps (of which there were never any large scale camps in the Big Bend license area). The company is advised to ensure that its involvement in any government activity to reduce ninja mining meets not only with Mongolian legal standards, but also with international resettlement standards and human rights criteria. However, no ninja mining activity is present at Big Bend.

Other issues, such as the increased incidence of prostitution and STDs pose a direct risk to mine operations (especially Occupational Safety and Health) for Big Bend once production begins. However, at present, the Big Bend project is not materially contributing to these problems, nor is it adversely affected by these social impacts.

Because of the ability of negative social issues to impact mine operations (including operational and safety as well as reputational risks), it is important for the Big Bend project to be aware of the current and perceived social impacts of mining on the local region. Where these negative impacts can be avoided or eliminated, action plans are included in Section 5.0 of this report. In some cases, negative impacts (or perceived impacts) are outside of the control of the company – which is where it is important to have a well managed and well publicized social campaign to benefit the local community and economy, as discussed next.

4.1.4 Existing Social Program and Budgetary Contributions

Big Bend currently has a voluntary social program in place in addition to the mandatory direct budgetary contributions made to the soums for resource use (especially land use). These two contributions are seen to be having a positive impact on the two soums (Zaamar and Buregkhangai) in which Big Bend conducts its operations. While limited in scope at present, the social program can be expanded in the future, as the mine begins production.

Voluntary Social Contribution

As part of its ambition to be seen as a 'best practice mine' in the communities in which it works, Big Bend runs a social program – focused at present in the Buregkhangai Soum. This program, led by Gerrit Bazuin (Executive Director of Big Bend), focuses on providing hospital supplies to the hospital in the Buregkhangai Soum Center. This should be seen as a positive contribution to the local community.

In making contributions such as this, it is important for the company to be acting strategically and ensuring that these donated goods and materials are matched with local effort and input, as well as working to ensure that the contribution is sustainable. Making sure that there is local 'ownership' of the initiatives is increasingly seen as an important way of making sure that company contributions

match community expectations and that contributions lead to sustainable development, not the development of charitable expectations.

This assessment was not furnished with accounts on the value of this voluntary social contribution, and it will be important for the company in the future to be transparent in how these funds are disbursed, as part of a wider effort to support good governance and transparency at the local level.

Direct Budgetary Contributions

The Big Bend project makes direct budgetary contributions to the soums in which it works (Zaamar and Buregkhangai). These payments are negotiated in advance for the use of land, in accordance with the law. These funds are transferred into the soum budgets and spent by the soum governors as they see fit. As mentioned in Section 3.0, the future trend in legislation is likely to be towards greater levels of direct contributions to soums and aimags.

This development, proposed in the draft Mining Law, should enable soums to better manage their budgets and to deal with the social issues created by mining in their regions. However, concerns remain about the capacity of local governments to absorb and transparently disburse these funds, which emphasizes the need for responsible companies like Big Bend to contribute skills and expertise in financial management, not just funds, to recipient soums.

Considering indicative examples of social contributions from other mines in the region already in production, we see that many of these contributions are of cash but not expertise, with limited oversight and a high potential for corruption.

Other Company's Social Contributions

Examples of other mining company's social contributions, provided by the Governor of Zaamar soum, include:

- 470 million MNT[7] to build a two-storey kindergarten building (with capacity for 120 children) by Altand Dornod Mongol Ltd.;
- 7,200 livestock donated to 120 herder families by Shijir Alt Ltd.;
- 150 million MNT for the renovation of school, dormitory and kitchen buildings by Monpolymet Ltd.;
- Renovation of the Cultural Center by Tod Undarga Ltd.;
- Double-glazed windows installed in a government building by Ikh Alt Ltd. and Bat Alt Ltd.;
- 42 million MNT towards a new stadium by Uyan Gan Ltd.;
- 54 million MNT to fix the main road in the Zaamar Soum center, donated by a group of small mining companies;

[7] Mongolian Tugrug: The rate as of July 22, 2008 was 1.159:US$1

- Small bakery and shop established, employing ten people, by Datsan Trade Ltd.; and
- 50 million MNT to establish a sewing factory, supplying local mining firms and employing seven to eight people, contributed by Khotu Ltd.

4.1.5 Lack of Information and Consultation

To date, most information about the project has been passed directly to the soum governors as part of the legal permitting process. There had been no proactive information campaign or provision of project information to local communities and affected herders. This is a shortcoming of the project in meeting IFC Performance Standards which needs to be addressed.

In many of the interviews conducted, local herders, community leaders and others complained of a lack of information about the Big Bend project and its activities. In many cases this had led to incorrect opinions being formed about the mining operations, including:

- that once dredging began, herders would have to vacate the land and not return (this is incorrect),
- that the Big Bend project planned to dredge the river bed directly (incorrect according to the mine plan and mining license),
- subcontractors telling locals to keep away from certain areas, apparently for their own safety.

In the absence of correct information, herders and local people are relying on gossip and hearsay to form their opinions of Big Bend and of local operations. The experiences that they do have, for instance of drill holes not being re-filled properly and of limited local employment creation are not universally positive. This is creating unnecessary concerns about the project, which could easily be dispelled through proper information sharing.

Likewise, the IFC Performance Standards call for consultation which is "free of external manipulation, interference, or coercion, and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information" – the purpose of which is to "build and maintain over time a constructive relationship with [local] communities"[8].

Big Bend has not engaged in any manipulation, interference or coercion with the local population. Equally, it has not adequately begun to build trust and constructive relationships with the local community. A plan for improving this situation and beginning consultation is set out in section five of this report, on establishing a Stakeholder Engagement Program.

[8] Appendix 4 – p.4

It is also important, given the large amount of sub-contracted work which will likely be undertaken by the project, to ensure that subcontractors adhere to the same standards of consultation, community engagement and environmental safeguarding as the Big Bend project. This is why it is important that the project establish a system of **continuous administrative oversight of subcontractor activities**, including their communications with local community members. Management systems to enforce international standards should be used to ensure performance on environmental, health, safety and social impact indicators.

4.2 Potential Socio-Economic Impacts

As the Big Bend project commences construction in late 2008 and moves towards production in 2009, there will be increased socio-economic impacts. These impacts are set out in the diagram below (**Figure 9**), charting risks and opportunities on a continuum of probability and impact. In many cases, the risks identified here can be managed. Likewise, some of the local concerns about grazing and water are set to be exacerbated once the exploration sites move towards production, but the impact of these risks can be reduced through planning and community engagement. Whether local concerns are realistic or not, they are strongly held by affected communities, and thus merit consideration.

The community expectation that is most difficult to meet is that of employment creation. Local herders have high hopes for employment but modern mining employs few, highly skilled, people. This makes it even more important for the Big Bend project to focus on local skill development and local procurement, to ensure that some of the reasonable expectations for employment are met. It also reinforces the importance of planning the mine camp in a way that minimizes its impact.

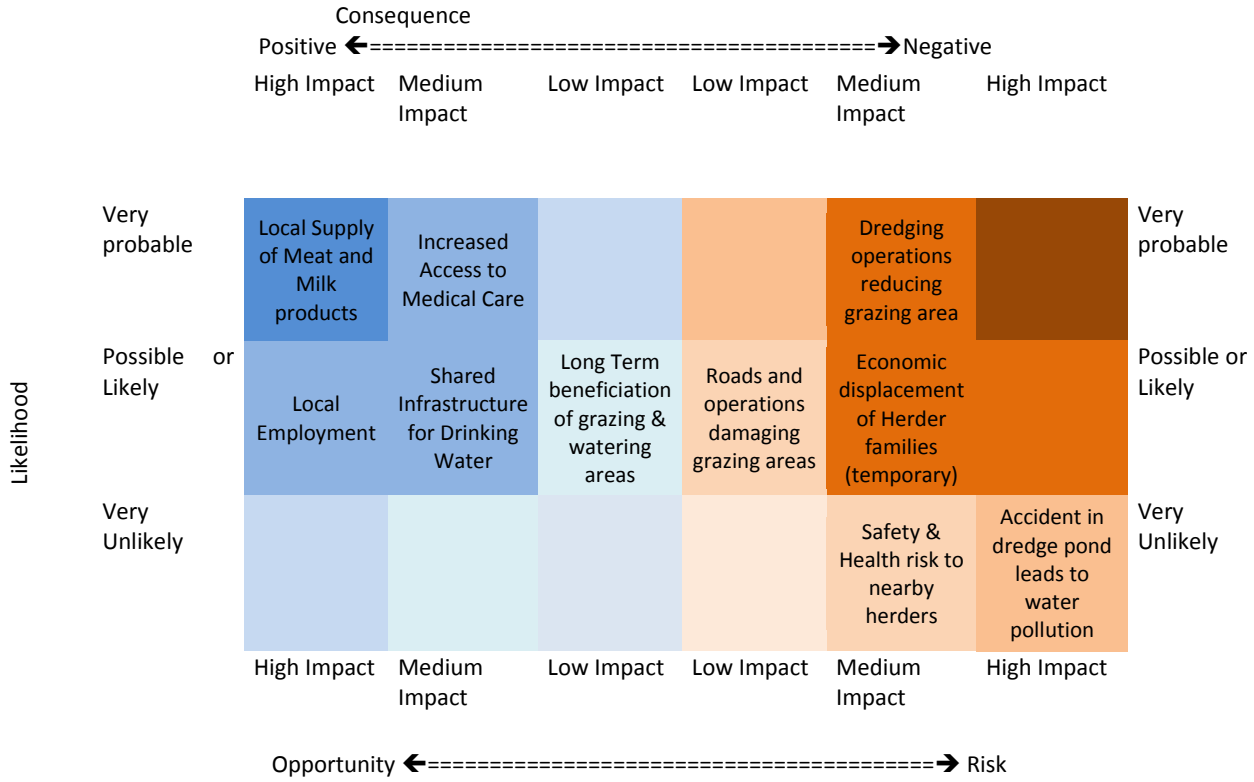
It is however important to manage these expectations properly. To the company or an outside observer, employment expectations might appear unreasonable, but these local expectations are only ‘unreasonable’ because the company has not provided the local community with adequate information. Indeed based on the information the local people have at the moment, these expectations are perhaps reasonable.

This is why providing information to local communities, and consulting with them, is so important – to minimize negative impacts and to enhance win-win solutions for both the company and the local community.

To shape this community consultation, it is important to map out the likelihood of various socio-economic impacts, and the scope and scale (positive and negative) of these effects on the local community. These impacts are discussed below, and Section 5.0 provides a set of management options for enhancing the positive outcomes (opportunities) and mitigating potential negative outcomes (risks).

It should be noted that where compensation is suggested in this document, this will need to be calculated and assessed in collaboration with the local community. The assessment and field visit for this report did not look at the specificities of calculating compensation for affected individuals and communities. However, given the small number of affected households and the contained nature of the project and its impacts, it is envisaged that any potential compensation payments will be limited.

Figure 9: Risk - Opportunity Matrix for Social Impacts



Grazing

As outlined in Section 4.1, grazing is a core concern of local herders. Because the domestic economy revolves around livestock, any impact on the amount and quality of grazing land is a sensitive issue. This is exacerbated by the large amount of displacement that has already occurred in the Tuul River valley, as well as drought/over-grazing in other areas of Mongolia that has seen internal migration towards surface water sources such as the Tuul River.

The company has stated that the intention is to focus on wetland restoration and environmental improvements, choosing to compensate herder families who move away from the region and to encourage remaining herders to reduce their stock levels. This is driven by a "serious [intention] to protect the environment and [Big Bend] reclamation from grazing pressure [to enable the company to] preserve at least 3400 hectares for wildlife similar to Nature conservancy programs." (WM Mining LLC, August 12 2008).

In implementing this, or any, resettlement plan the company should be aware that the IFC Performance Standards do not distinguish between long-term 'traditional' users of the land and more recent (i.e. within the past ten years) land users. Whilst from a perspective of the Mongolian law the company is entitled to move existing herders off the land without compensation or consultation, the IFC Performance Standards establish a higher standard.

This is why actions detailed in section five will be a necessary part of fulfilling IFC criteria on resettlement and economic displacement.

Risk: Dredging operations reducing grazing area

In the process of dredging for gold at Big Bend, it is inevitable that areas of grazing land will become unavailable for herders to graze their animals on. This will occur both while actual dredging operations are taking place, during any delay in commencing reclamation as well as during the waiting period for grass to be fully re-established.

This loss of grazing area will have a material impact on herders in the area which needs to be acknowledged, communicated and compensated through either replacement of land or monetary measures that reflect lost income (as well as through other benefits from mining, such as those detailed in this section).

Because the Big Bend project has land use rights (paid directly to soum governments) for the entire license area, the company has a right to dredge for gold and the land use tax covers the direct compensation for this activity.

In exercising this right, it is important that the company seeks to reclaim the grazing areas as quickly and as effectively as possible, to ensure that this negative impact is mitigated as much as possible.

Risk: Roads and operations damaging grazing areas

Within the Big Bend license area, it is likely that increased vehicle traffic (as well as human settlements and associated activities) will cause non-site specific degradation of existing grazing areas. This will be much less severe than dredging operations, but it will also be less contained than one specific operational area. Much of this impact is due to multi-track roads, where in the absence of a defined roadway, many alternative roads emerge side by side.

This impact is not yet visible at the Big Bend site, but examples of its impact can be seen elsewhere in the Tuul River valley, as shown in **Figure 10** (p.52).

The impact of multi-track roads can be managed, especially within the Big Bend property, by clearly marking out the roads which are to be used with flags or a similar device. This is also an important health and safety initiative, as it ensures that roadways are clearly marked and thus reduces the risk of a vehicle-vehicle, vehicle-human or vehicle-livestock collision. It is also an important part of reducing the socio-economic impact of the mine, as well as reducing long-term reclamation costs for the company.

Figure 10: Multi-Track Roads Cause Reduced Grazing Areas

Opportunity: Long-term beneficiation of grazing areas

The Big Bend project is in a position to demonstrate best practices for reclamation of grasslands, and to implement overall beneficiation (improvement) of grazing areas within the Big Bend license area. This beneficiation also extends to creating wetlands, marshlands and un-grazed rangelands to promote biodiversity, which in turn benefits grazing areas in the long-term.

Rather than seeing reclamation as a zero-sum process of returning the environment to its previous state, the Big Bend project can set about to improve the local grazing situation. This can be achieved by:

- re-seeding with native grass species and reducing the incidence of introduced weeds, such as sage brush;
- encouraging herders to graze the Big Bend area in a sustainable manner, reducing the incidence of overgrazing and improving the productivity of livestock (linked with local procurement); and
- ensuring that reclamation takes place in a timely and effective manner, demonstrating best practice in the Tuul River valley.

The environmental sections of this report deal with specific management plans on how best to implement grassland improvements. The key point from a socio-economic perspective is to recognize the opportunities for the Big Bend project to enhance – not only damage – the environment in a way that contributes to local livelihoods and community economic development. This should be done in consultation with local herders and in accordance with their requests.

4.2.1 Water

With grazing, water is essential for local herders. Existing water supplies in the area include both surface water (mostly in the Tuul River, its tributaries and in a few small lakes) and groundwater from wells (predominately in settlements, and increasingly in rural areas). These sources provide water for both domestic consumption and for livestock.

As noted previously, and in depth elsewhere in this report, the quality of surface water in the Tuul River has been adversely affected by other mining operations upstream from the Big Bend project –with high levels of sediment and discharge in the river system. This extant pollution overshadows the Big Bend project. Exact details of how mine operations, such as the creation of dredge ponds and the periodic dewatering of these ponds, will impact on the surrounding water quality is addressed in the water section of this report.

Risk: Accident in dredge pond leading to water pollution

The Big Bend project has committed to an environmental management plan that avoids further disturbance or pollution of the Tuul River. So long as this management plan is adhered to, the impact on water in the vicinity should be limited.

There is, however, in all mining operations, risks that problems develop, in which case, it is possible that pollution might occur. In the case of the Big Bend project, it is possible that an accident or error might occur in one of the dredge ponds. If this were to occur, then a large discharge of turbid water could be discharged. Such an event would have a direct impact on water quality and this would in turn impact local herders adversely.

Opportunity: Shared infrastructure for drinking water

Because of the current state of the Tuul River, it is unsuitable for human consumption without filtration and not ideal for livestock watering. In terms of drinking water, the Big Bend project has already drilled a well for drinking water (situated within the 'big bend' of the Tuul River). The quality of this water is excellent and the supply far exceeds the needs of the project.

It is thus advisable to provide local herders with access to drinking water from the existing well and to consider the feasibility of drilling a well on the 'outside' of the 'big bend' in the Tuul River to provide access to other herders impacted by the project. While not a direct responsibility of the project, providing access to this sort of 'shared infrastructure' is one of the ways the project can contribute to local livelihoods as a limited cost to the company.

Opportunity: Long-term beneficiation of watering areas

As with drinking water for human consumption, there are problems in the availability of clean water for livestock. This is a direct result of mining operations upstream from the Big Bend project, that are contributing physical pollution and sediment load to the Tuul River.

Because of the high water table in the Big Bend area, it is possible to create livestock watering areas that take advantage of the natural filtering process of the groundwater system. Such an artificial lake already exists in the Big Bend area, having been dug for open pit mining by a prior license holder. This lake provides clean water, indeed it is currently used by one herder family for domestic and livestock supply.

In the reclamation process, the company could create livestock watering areas on both sides of the river. These could then be used by herders to water their livestock without the risks of using high-turbidity river water. However, the main goal of the

Project is to reclaim the area to a higher level use as an ecological preserve and wildlife enhancement area. Grazing will be discouraged; thus an active watering program would be viewed as counter-productive. Wildlife watering will be enhanced.

4.2.2 Local Economic Impacts

The Big Bend project will have impacts on the local economy and on the livelihoods of affected herders. In managing these impacts, it is important to balance between unavoidable negative impacts (such as economic displacement) and potential positive impacts (local employment and supply), ensuring that the contribution of the mine is to *sustainable* economic development and that the impacts accrue equitably to different community members.

Risk: Economic displacement of herder families (temporary)

Because of the impact of dredging operations, and associated reduction in grazing areas, it is possible that some local herders will be economically displaced by the project. This displacement will be temporary and limited to fewer than five households. To manage this economic displacement it is important for the project to:

i) Inform local people of the mine plan and consult with them on methods of adaptive planning to minimize the displacement;
ii) Ensure that short-term displaced families also benefit from the local employment and local supply opportunities discussed below;
iii) Implement grassland and water beneficiation projects as a form of compensation for economic displacement;
iv) Use on-going community consultation to monitor and assess the impacts of economic displacement, taking action as needed;
v) Compensate affected individuals for their loss of income, although temporary.

Because of the small scale, scope and time period of any economic displacement, there is no reason to reconsider the mine plan (which was approved August 8, 2008). However, it is essential that the issue of economic displacement continues to be monitored and mitigated as part of the SEP in Section 5.0.

Opportunity: Local employment

The Big Bend Project will only employ approximately 50 individuals at the site, many of whom will require specialist skills and training. Yet one of the highest expectations of the local community is of employment opportunities. Moreover, allegations of corruption in hiring practices are frequently aired against existing mines operating in the region.

To reconcile this, it will be important for the project to try to employ local staff wherever possible. To achieve this, it is recommended that the project focus on the recruitment *process* rather than on setting quotas for employment.

The recruitment process should follow a series of steps, as set out below:

i) For all positions, investigate if the job can be filled locally. Both by approaching herder families directly as well as by working with the soum governors to ask them to suggest suitable candidates. This helps to fill positions that do not require rotations (cleaners, cooks, etc.) as well as ensuring that employees are less likely to get drunk, steal, etc. (by having the soum governor guarantee their character).
ii) In cases where no candidate can be found locally, recruitment from Ulaanbaatar should be considered – along with the costs of providing training to local candidates – and the position filled in this way.
iii) Only when local candidates cannot be found, trained, or employed from Ulaanbaatar – should expatriate staff be employed.

By following this process, and making the recruitment process transparent and accountable, the company ensures the highest quality of staffing – while also demonstrating a commitment to local employment and transparent hiring practices.

At present subcontractors, such as the drilling company, make limited or no use of local employees and local supply – and this is one area where the project could also improve its social performance.

Figure 11: Potential Supplier - Yak Milking within the Big Bend Project Area

Opportunity: Local supply of meat and milk products

The Big Bend project currently purchases meat and milk products from local people on an ad-hoc basis. This is seen, by both the company and by the local suppliers, as a mutually beneficial arrangement.

By formalizing this system of local procurement, and gradually expanding it to include local services (such as ger camp cleaning), the project can make a direct contribution to local economic development, which also contributes to the efficient operation of the project.

In setting up a formal system of local procurement, the company needs to balance between the usual indicators of best value procurement, while introducing issues such as matching procurement contracts to those households directly affected by the mine – especially those that are economically displaced. The safety and reliability of supplies remains paramount, but in cases where it is possible to source locally (even if this requires some initial support and assistance), then every effort should be made to do so. Sourcing supplies locally helps build legitimacy and local support for the project, as well as serving as one (non-charitable) way of compensating those herders directly impacted by the project.

4.2.3 Safety, Health and Medical Care

Health, safety and human well-being is an important part of modern mine management – it is also a key concern for local people. By managing risks properly, and delivering social benefits through shared infrastructure and shared access to medical facilities, the Big Bend project can help improve – rather than endanger the health of the local community.

There are some features of safety, health and emergency planning which are typically used at mine sites around the world, which are currently informal or in some cases lacking, at the Big Bend project. These include:

i) An emergency response plan for how to deal with emergencies (medical, environmental etc) and how to coordinate responses with government officials and other companies operating in the area;
ii) Driver safety training and licensing, including specialized 4WD training and rules for carriage of passengers etc;
iii) Safety induction training for all site visitors and subcontractors with risk identification and rule setting
iv) Systems to monitor and evaluate safety & health performance.

Risk: Safety and health risk to nearby herders

Mining operations are dangerous areas, and having herders and livestock living nearby to dredging operations poses inherent risks. Yet the total exclusion of all herders would lead to considerable economic displacement and local discontent. Thus in establishing a health and safety plan for the mine, these two pressures need to be balanced in a way that ensures the safety of all operations, without severely affecting local livelihoods. This is discussed in the SEP in the next section.

Opportunity: Increased access to medical care

In addition to the contributions currently made to the Buregkhangai Soum hospital, the Big Bend project will increasingly require first aid and access to emergency medical care for its staff and contractors. In implementing this system, such as having a stretcher-equipped four-wheel-drive vehicle on site at all times, the project has expressed a willingness to provide equal access to first aid and hospital transport to herders in the affected area. While not a direct responsibility of the company, this is another way in which positive community engagement can build trust, at little to no cost to the company – but of considerable benefit to the local community and to the company.

5.0 Stakeholder Engagement Program

In order to ensure compliance with IFC Performance Standards, as well as to benefit from having positive relationships with the local community and government officials, a Stakeholder Engagement Program (SEP) is recommended.

This section sets out a series of management options for responding to IFC requirements and to ensure that the Big Bend project is able to take advantage of the opportunities – and minimize the risks – described in Section 4.0. The SEP recommended for the Big Bend project focuses on the following issues:

1) **Community Consultation, Engagement and Information Sharing**: local communities and soum government officials need to be consulted with much more effort than has occurred in the past, with an emphasis on managing risks in a way that creates value for the company and the local community. This should include a Grievance Mechanism.

2) **Socio-Environmental Management and Reporting Plan:** to ensure that socio-economic and environmental impacts are identified, mitigated and managed as quickly and effectively as possible.

3) **Local Procurement and Local Hiring Process:** as a way of ensuring the positive developmental benefits of the project accrue to the local community as much as possible.

4) **Reclamation and Beneficiation of Land and Water Resources:** Compensation for economic and physical displacement needs to be delivered via improvements in local livelihoods as well as through monetary measure. This can be achieved by improving grazing areas and introducing safe water supplies for humans and livestock.

5) **Health, Safety, Supply Chain and Security Policies:** compliance with IFC standards will rely upon having well-documented policies and practices regarding Health and Safety, Procurement and Security.

6) **Planning for Mine Closure of Social and Legal Liabilities:** Mine closure will have economic impacts on communities close to the mine, especially those engaged in service and supply to the mine site. Proper planning should take place to ensure social and legal liabilities are adhered to.

It should be emphasized that this SEP only sets out a range of options and recommendations for *how* the Big Bend can ensure compliance – in some cases, other ways could also be used to ensure the project meets the legal requirements detailed in Section 3.0 of this report.

5.1 Community Consultation, Engagement and Information Sharing

To date, there has been limited interaction with soum governors and the project and almost no direct interaction between the Big Bend project and local communities. This lack of community consultation, engagement and information sharing needs to be overcome for the project to be deemed in compliance with IFC Performance Standards. This lack of communication is also not in the interests of the company.

At the core of an SEP should to be a clear process by which the project communicates and consults with the local community, and relevant stakeholders, on a regular basis.

Information Sharing and Contact Person

As a first step, to be taken as soon as possible, the mine plan (approved August 8, 2008) can to be 'translated' into a non-technical brochure for distribution to all ger households in the affected area, as well as displayed at the Zaamar and Buregkhangai Soum centers (all soum centers have information boards for this purpose), as well as given out by Big Bend staff and contractors to anyone who approaches asking questions. This brochure should include information such as:

- A map of the Big Bend license area and an over-view of the planned dredging operations;
- Basic information on the joint-stock company involved in the project;
- Detail on how long the mine is going to operate for, how many people it will employ and who to approach to ask questions and address grievances (a designated contact person);
- What distance people and animals should keep from the mining areas and how they can be sure that they are not endangering themselves or their animals;
- Information on what kind of benefits the mine is able to offer and how people can become involved, for instance as suppliers; and
- Detail on the reclamation plan for the project.

Using this brochure as a starting point, a member of staff needs to be designated as a contact person for questions and complaints – who is then responsible for consultation. This consultation should emphasize that the current mine plan can be adapted to suit the needs and concerns of local herders and government officers.

Consultation and Community Engagement

The next step is to begin listening to the concerns of local stakeholders and integrating these issues into mine planning wherever possible. This community consultation should be seen as an on-going process of information disclosure and

participatory planning. There is no strict set of guidelines on how often this consultation needs to take place – but it needs to reflect "the project's risks to and adverse impacts on the affected communities" (Appendix 4, p.4).

In cases where communities or individual stakeholders are uncomfortable with how these risks and adverse impacts are being managed by the project, it is important to have a clear *grievance mechanism* through which complaints can be brought to the attention of project management and resolved before they escalate. This should be a simple process of contacting a company representative or soum governor and asking for a specific complaint to be investigated. This investigation should be conducted, and the results publicized, within a reasonable timeframe and complaints need to be logged and tracked in an appropriate management system.

In terms of meeting IFC Performance Standards, community consultation brings up two core issues for the Big Bend project.

The first is the importance of having clear company policies and procedures to ensure that there is an individual tasked with making sure information is communicated to local people. This may require new staffing, or for the issue of community communication to be added to the terms of reference of an existing staff member. This staff member is the key contact person for all information and consultation, and is responsible for implementing the grievance mechanism.

The second issue is the requirement that the information that is communicated is locally appropriate and relevant. It must also be communicated in an appropriate manner. However, this need not be seen as an onerous task – in fact, community consultation can be an effective means by which to build trust and secure operations, which is why consultation is an important facet of a Socio-Environmental Management Plan.

To address these requirements, Wallace Mays, the General Director of Big Bend intends to review the plan personally with the local stakeholders before promulgating the plan to the general public. This consultation will consider any modifications that are required to the Mongolian mine plan, noting that this mine plan (as approved August 8, 2008) is separate from the EIA to be submitted to OPIC. This OPIC EIA will be based on agreement with local stakeholders and will serve to finalize the recommendations made in this report. (WM Mining, August 12, 2008)

5.2 Socio-Environmental Management and Reporting Plan

Having a management plan in place to monitor project impacts on the environment, society and local economy is an important way through which the project can assess – and publically defend – its impacts. The specific recommendations on environmental management are included elsewhere in this report. Discussed here is the socio-economic management plan, which includes issues of community environmental monitoring and reporting.

In terms of assessing the socio-economic impacts of the project on the local area, a management plan should be developed that utilizes:

i) Company and community monitoring as an 'early warning system';
ii) Regular reporting of results to project management and local stakeholders; and
iii) Response scenarios that are worked out in consultation with local herders and with soum environmental / social welfare officers.

The Big Bend project will collect environmental data as part of the environmental management plan, especially data on water quality. Yet because of the already degraded nature of the local environment, it is possible that complaints will be made against the project. Even with an effective information campaign (as above), the project might still find itself accused of environmental damage. To manage this risk, and to act as an early warning system should the project begin to pollute the environment, an environmental monitoring system that incorporates local herders, and soum environmental officers, could be useful.

By including local governors and local people in the monitoring of environmental impacts, and by regularly reporting results to these stakeholders, the ability for people to then complain about 'corrupt governments' or 'dishonest companies' is reduced. Simply put, who monitors – matters. When trying to assess the impact of company operations on water, grasslands, air quality and other environmental indicators, there is potential to use co-monitoring to help build trust and to improve the reach of environmental monitoring. Monitoring upstream and downstream of the Big Bend will demonstrate relative contributions from the project, which will likely be quite negligible.

In cases where issues do arise, the management plan should work with local stakeholders to develop response options. This might include discussing potential problems in advance with local herders and environmental officers, then arriving at agreed plans of action for all parties. The benefit of this is that it helps the company to ensure that any environmental problem is responded to quickly and effectively, and equally, that the local community will work with the project to minimize the impact of any event – reducing operational disruptions.

5.3 Local Procurement and Hiring Process Implementation

The opportunities to promote local procurement and local hiring are set out in Section 4.2. From a management perspective, it is important to make sure that procurement is both effective in promoting legitimacy for the project and sustainable development for the local community. If this is done properly, it can help the mine operate effectively with good quality supplies, as well as meeting many of the compensation and development expectations of the local community.

As explained in Section 4.2.3, the expectations of local herders for employment creation are high. It is, however, likely that the project will have ca. 50 jobs, many of which will require skills not extant in the local soums. This is where working through a local hiring process is a good way to recruit good quality staff, while demonstrating a commitment to local hiring wherever possible.
The recruitment process should follow a series of steps, as set out below:

i) For all positions, investigate if the job can be filled locally. Both by approaching herder families directly as well as by working with the soum governors to ask them to suggest suitable candidates. This helps to fill positions that do not require rotations (cleaners, cooks, etc.) as well as ensuring that employees are less likely to get drunk, steal, etc. (by having the soum governor guarantee their character).
ii) In cases where no candidate can be found locally, recruitment from Ulaanbaatar should be considered – along with the costs of providing training to local candidates – and the position filled in this way.
iii) Only when local candidates cannot be found, trained, or employed from Ulaanbaatar – should expatriate staff be employed.

It should be possible to identify which skills and trades are required at the potential mine sites – both during the construction and operation phases – and to try to work with the soum governors to provide training to local people to fulfill these roles. There will inevitably still be a large amount of staffing which can only be sourced from Ulaanbaatar and abroad, but the more local employment that can be created – through local training conducted by the soum centers – the greater the legitimacy of the project in the eyes of local government and local communities.

But the scope for direct employment creation is limited, which is where local service and supply can be used to enhance the company's socio-economic impact. The exploration camps currently require food, transportation and supplies for the workers engaged in drilling and exploratory activities. As the Big Bend site expands operations, the staffing for construction and operation will increase significantly. Supplying these camps with food and other services is one further area of opportunity for the company to engage with the local community.

The project is already promoting local supply of meat and milk, and these relationships can form the basis for future local procurement.

Besides milk and meat, local people can also provide direct services such as transport, cooking and ger cleaning (indeed one local herder worked for five years at a tourist camp doing exactly this). Hiring local cars and drivers, besides potentially reducing operational costs, could also make a big impact on the regulation of road use by preventing multi-tracking of roads.

Needless to say, all local supplies need to comply first and foremost with Big Bend's procurement principles of 'best value' and 'health and safety'. But where this can be assured, local supply and employment can be a win-win way of promoting local development and ensuring the effective operation of the mine.

5.4 Reclamation and Beneficiation of Land and Water Resources

Because the Big Bend project will be having temporary impacts on grazing land, which will lead to some inevitable economic displacement of herders, it is important for the project to provide adequate compensation for this. While from a strictly legal perspective this compensation is provided in the form of land use payments to the local government, IFC Performance Standards call for a high standard of responsibility, which ensures benefit to affected communities.

To achieve this without having to resort to direct cash payments or physical exclusion (which would not contribute to development or cooperative relationships with local communities), the Big Bend project should explore ways to not only reclaim (as per legal liability) but also beneficiate local land and water resources.

This beneficiation can be achieved by the following initiatives:

Land:

- re-seeding with native grass species and reducing the incidence of introduced weeds, such as sage brush;
- encouraging herders to graze the Big Bend area in a sustainable manner, reducing the incidence of overgrazing and improving the productivity of livestock (linked with local procurement);
- ensuring that reclamation takes place in a timely and effective manner, demonstrating best practice in the Tuul River valley;

Water:

- provide herders nearby access to clean well water for domestic consumption; and
- during the reclamation process, add in small lakes which are fed from groundwater sources, to provide clean watering areas for livestock.

None of these initiatives will be particularly expensive to the project, nor will they interfere in mine operations. Rather, by providing access to shared infrastructure and through planning for beneficiation (during reclamation), the project can lead to lasting improvements in the local land and water environment. This will help the project ensure it meets the higher standards of compensation to affected herders.

In implementing this reclamation and beneficiation, the ideas and concerns of local herders – for instance, on where to situate small lakes and which grass types to promote – can be accessed through the community consultation procedures outlined above.

5.5 Health, Safety, Supply Chain and Security Policies

This socio-economic assessment is not in a position to make specific recommendations on company Health and Safety, Procurement and Supply Chain or Security policies. It is, however, important to note that as the Big Bend project begins construction and production, ensuring compliance with both Mongolia laws and IFC Performance Standards (for instance, on preventing child labor in the suppliers) will become more important.

It is thus recommended that the Big Bend project ensures that it remains within both domestic law and international best practices for these issues.

5.6 Planning for Mine Closure

Mine closure will have economic impacts on communities close to the mine, especially those engaged in service and supply to the mine site. However, so long as reclamation and beneficiation work is conducted properly – then there will be few, if any, lasting adverse impacts as a result of mine operation.

The most important issue in planning for mine closure is of public consultation and disclosure. In conducting community consultation, and when entering into supply agreements, it is important that the Big Bend project be open about the likely mine lifespan and the finite nature of its social and budgetary contributions.

If the project is open and transparent in its intended lifespan and closure procedures, then few socio-economic adverse impacts will be created. For the issues that do arise, these need to be managed through the community consultation procedure, established as the first step in the SEP.

6.0 Conclusions

This Social Baseline Study has identified several areas where company operations are currently having – or will soon have – impacts. These include both adverse (negative) and positive effects on the local socio-economic situation.

Many of the concerns raised by local stakeholders (herders) relate to the environmental impact of operations and how, in particular, grazing areas and water will be affected. In many cases, the negative impacts can be mitigated through proper community consultation, reclamation and beneficiation, and through creating local employment and supply chain possibilities. However, the issue of economic displacement has not yet been well integrated into mine planning. Thus plans for local environmental improvement and economic development need to form part of the mine plan. This can be achieved by targeting local supply opportunities, beneficiating water and grasslands and by providing access to shared infrastructure such as healthcare. A summary of the key findings are provided below:

1) Community consultation has until now been lacking, and it is recommended that the Big Bend project establish information brochures as a first step towards full community consultation. This will require a contact person, complaints procedure and SEP.
2) Local expectations of employment creation and the development of service and supply industries are high and cannot all be met. But current experiences of local supply are positive and there is scope to expand, and target, these benefits in the future – for instance, by implementing a local hiring process and by increasing local procurement.
3) Environmental impacts on grazing and water are already acute due to other mines operating in the area. The Big Bend project is in a position to demonstrate best practice by improving local water supplies (small lakes for animals to water, shared infrastructure of wells for human consumption) and by executing best practice in land reclamation. These goals can be finalized in consultation with local herders and the management plan communicated to all local stakeholders.
4) Big Bend already operates a small, but effective (according to local officials), social program to help provide health supplies in the Buregkhangai Soum. As the mine expands operations, the necessity of on-site first aid and having a stretcher-equipped 4WD vehicle means that the project can help in delivering medical care to herders as it has expressed an interest in doing . Other possibilities exist and are detailed in the SEP.

In summary, the Big Bend project currently has some site-specific impacts, which are set to increase in the future. However, the adverse impacts (on grazing, water, economic displacement) can be mitigated and compensated through reclamation,

beneficiation, local employment and supply – all delivered in concert with the local community through a Stakeholder Engagement Program.

7.0 References

Asian Development Bank and World Bank. 2005. Country Gender Assessment: Mongolia. Available from: www.adb.org/Documents/Reports/Country-Gender-Assessments/cga-mongolia.pdf

Economist Intelligence Unit (EIU). 2008. Country Profile: Mongolia.

Government of Mongolia. 1999. Living Standards Measurement Survey, Ulaanbaatar.

Government of Mongolia. 2004. 2002-03 Household Income and Expenditure Survey / Living Standards Measurement Survey, Ulaanbaatar.

Government of Mongolia. 2004. Millennium Development Goals: National Report on the Status of Implementation in Mongolia, Ulaanbaatar.

International Finance Corporation (IFC). 2003. Good Practice Note: Addressing the Social Dimensions of Private Sector Projects. Washington (D.C.)

International Labour Organization (ILO). 2006. Informal Gold Mining in Mongolia: A Baseline Survey Report Covering Bornuur and Zaamar Soums, Tuv Aimag. Available from: www.ilo.org/asia/library/download/pub06-12.pdf

Mongolian Business Development Agency (MBDA). 2003. Ninja Gold Miners of Mongolia: Assistance to Policy Formulation for the Informal Gold Mining Sub-sector in Mongolia, 18-19 pp.

National Statistics Office and United Nations Development Program. 1998. Living Standards Measurement Survey, Ulaanbaatar.

National Statistics Office. 2007. Mongolian Statistical Yearbook 2007, Ulaanbaatar.

Peter, W. and Uitterdijk A. 2004. Small-Scale Mining in Mongolia – A Survey Carried Out in 2004. Available from: www.geus.dk/program-areas/common/geus_rep_2005-4.pdf

UNDP: United Nations Development Program (UNDP). 2007. Mongolia Human Development Report: Employment and Poverty in Mongolia.

World Bank and Center for Policy Research. 2002. Rural Development Strategy for Mongolia, Ulaanbaatar.

Appendix E: Attachment 2
Archaeological Report

Big Bend Placer Gold Mining Project, Mongolia

Prepared for

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Prepared by

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October 2008

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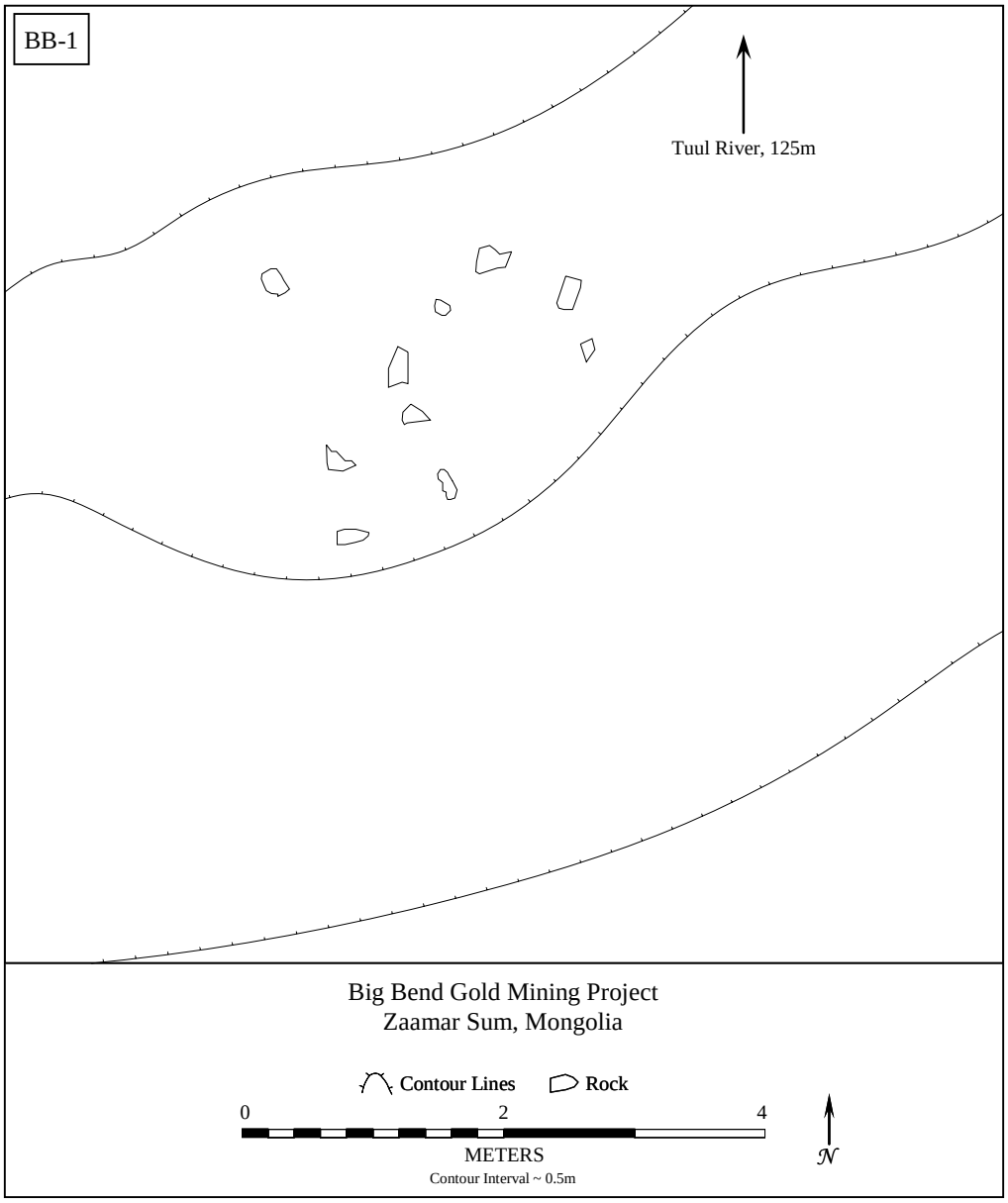
Site BB-1

Setting: This small site is exposed along the north/south-trending margin of a low, second terrace (hereafter referred to as the T2 terrace) of the Tuul River, approximately 125 meters (m) from the active stream channel. Vegetation in the area includes tall and short grasses, extremely dense in places, as well as low forbs. A narrow riparian zone along the river is dominated by low willows. The soil is a deep, medium brown alluvial silt. Elevation is 929 m.

Description: This site consists of a 3-meter-diameter, loose concentration of limestone blocks that appear to average 25-30 centimeters (cm) in length (**Error! Reference source not found.**). The blocks are angular to subangular and are not river-deposited. Site function is unknown, although it is certain that the rocks were not transported naturally to the location.

Impacts and Recommendation: Site BB-1 is located well to the outside of the nearest proposed dredge path and is not threatened by the project. The concentration of rocks, most of which are partially buried, may indicate the presence of a grave. The site should be avoided.

Figure 1 Site BB-1 Plan View



Site BB-2

Setting: This site is situated on a T2 terrace remnant on the broad floodplain of the Tuul River, approximately 400 m from the active stream channel to the west and 150 m from the base of a prominent limestone ridge to the southeast. Vegetation in the site area consists of tall and short floodplain grasses and abundant low forbs including many in bloom at the time of fieldwork. Willows line the nearby Tuul River. The soil is a medium brown alluvial silt of unknown depth. Elevation is 928 m.

Description: Site BB-2 is a grave dating to the Bronze Age or early Iron Age. Four features are present within an area measuring 45 m (NE/SW) x 30 m (NW/SE) (). The limestone blocks and slabs present in Features 1 – 4 were probably transported from the ridge to the southeast, where prominent rock outcrops occur. Feature 1 dominates the site and is manifested as a roughly rectangular, approximately 10 m x 10 m concentration of angular limestone blocks and slabs that range up to 80 cm in length but average about 15 cm (Error! Reference source not found.). Feature 1 is mounded to 1 m above the surrounding T2 terrace surface. The rocks are densely concentrated and number over 500 on the surface. An apron of rock surrounds the main rectangle and increases the overall dimensions to about 14 m x 14 m. Several very large blocks and slabs occur around the perimeter of which a few lean at odd angles, suggesting that they once stood upright.

Figure 2 Site BB-2 Plan View

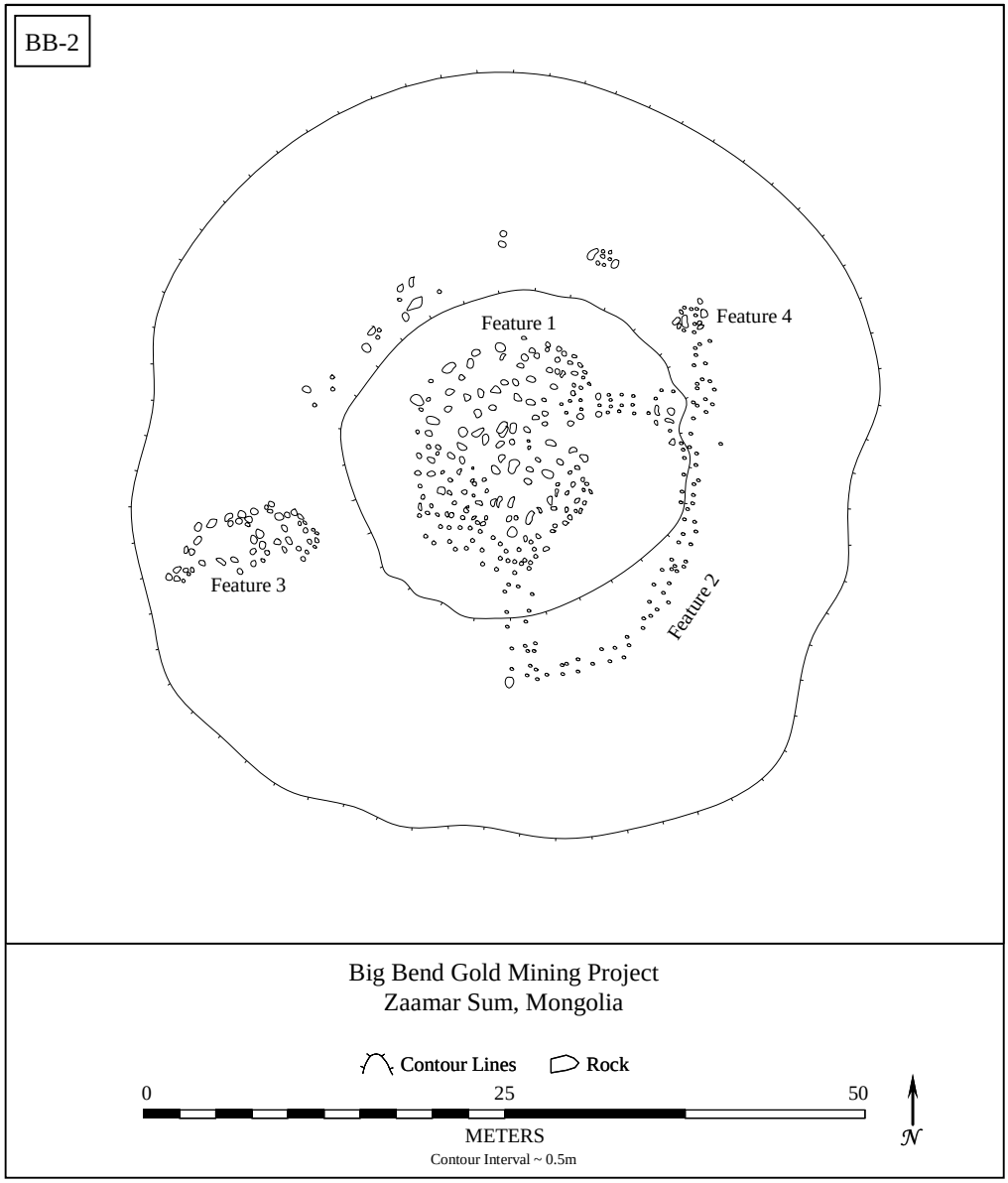


Figure 3 Site BB-2 Photograph

View east of Feature 1 (foreground)

Feature 2 is a semi-circular configuration of limestone blocks and slabs that is contiguous with Feature 1 at the south and east sides of the latter feature. Feature 3 measures approximately 15 m (NE/SW) x 9 m (NW/SE). Approximately 150 rocks, most of which are less than 20 cm long, make up the visible portion of this feature.

Feature 3 is a loose concentration of large limestone blocks and slabs centered about 20 m southwest of Feature 1. About 50 blocks and slabs are present of which the majority range between 30 cm and 40 cm in length. Unlike Feature 1, Feature 2 is not mounded above the level of the surrounding terrace surface.

Feature 4 is a dense, 3 m (NE/SW) x 1.5 m (NW/SE) concentration of large limestone blocks and slabs, centered 13 m northeast of Feature 1 in a position opposite that of Feature 3. Rocks in Feature 4 range up to 80 cm in length.

Impacts and Recommendations: The site lies within a dredge path and is threatened with destruction. At least one burial is present, and the site appears to be largely, if not entirely, intact. The site should be avoided.

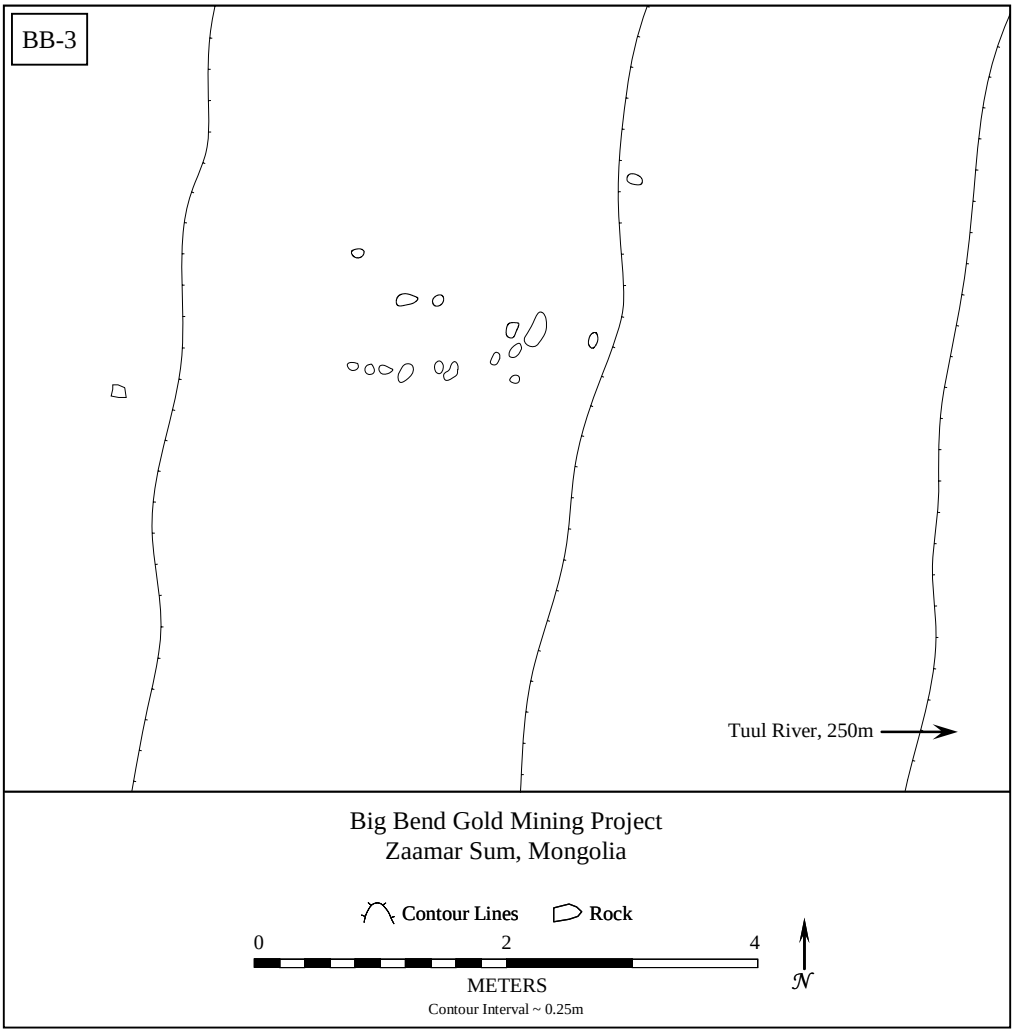
Site BB-3

Setting: This site is located along the margin of the Tuul River floodplain, approximately 200 m west of the active stream channel and close to the toe of a broad colluvial fan emanating from hills to the west. Vegetation in the site vicinity is dominated by short grasses and dense low, aromatic forbs, while willows line the Tuul River. The soil is a medium brown alluvial silt of unknown depth. Site elevation is 930 m.

Description: This small site consists of a short, roughly east/west-trending alignment of 10 angular limestone blocks, with another eight rocks scattered to all sides within a 5-m radius (Error! Reference source not found.). One large rock in the alignment is approximately 30 cm long, while the remainder are 20 cm or less. The alignment may be a structural remnant although its function is uncertain. The site appears to have been scattered as a result of livestock activity.

Impacts and Recommendations: The site lies exterior to the nearest dredge track and is not threatened by the project. The site has been disturbed and is lacking in physical integrity. As a result no further management actions are needed.

Figure 4 Site BB-3 Plan View



Site BB-4

Setting: This site occupies a setting similar in all ways to that of site BB-3. It is located along the approximate boundary between the Tuul River floodplain and the toe of a broad colluvial fan that originates in hill to the west and encroaches on the valley from that direction. Vegetation is dominated by low grasses and low, aromatic forbs, with willows along the Tuul River 200 m to the east. Soil is a medium brown silt of unknown depth, probably an alluvium-colluvium combination. Site elevation is 933 m.

Description: This site consists of a tight cluster of approximately 25 angular and subangular limestone blocks (Error! Reference source not found. and Error! Reference source not found.). Most of the rocks are partially buried, suggesting that they have been in place for a long period of time. Most are confined to a 1.5-m-diameter area although the overall dimensions of the site are 3 m (E/W) x 2 m (N/S). One large rock in the center of the cluster is about 40 cm in length while the remainder are less than 20 cm. This site could be a grave or the remains of a structure.

Impacts and Recommendations: Site BB-4 is located along the approximate boundary of a dredge path and is threatened with destruction. The site appears to be largely intact although some degree of lateral movement of individual rocks is evident, probably the result of livestock activity. While its function is uncertain, the site could represent a grave and should be avoided.

Figure 5 Site BB-4 Plan View

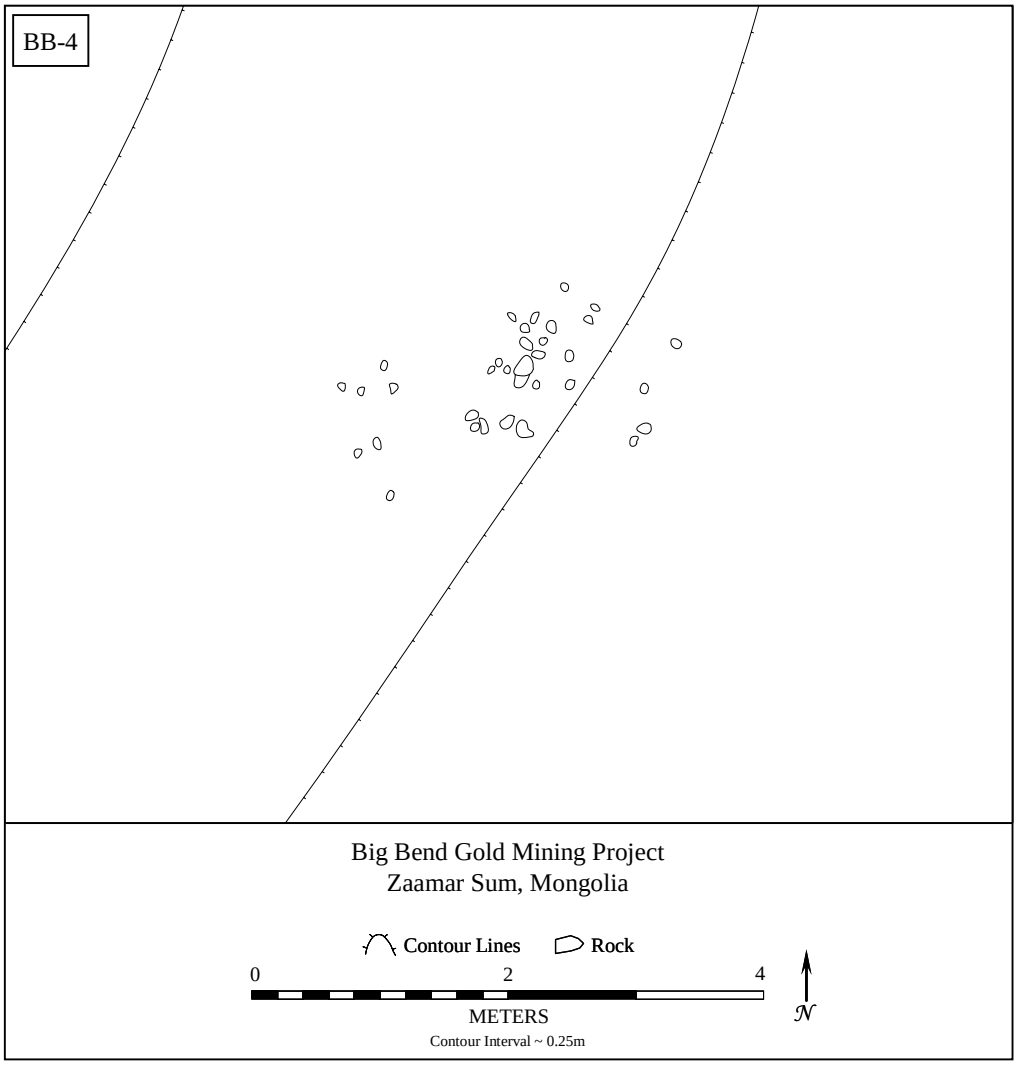


Figure 6 Site BB-4 Photograph

View northeast of rock alignment; length of north arrow in all photographs is 20 cm.

Site BB-5

Setting: Site BB-5 is located 200 m south of an ephemeral tributary of the Tuul River that enters that stream from the west. The Tuul River is 125 m east of the site. Vegetation includes dense, low aromatic forbs, scattered islands of tall grass, and stinging nettles in disturbed soils around the looted grave (below). The soil is light grayish brown, gravelly silt that probably represents a mixture of alluvium from the Tuul River and/or the tributary drainage and colluvium associated with a broad fan emanating from hills to the west. Site elevation is 932 m.

Description: This site is a single looted grave of Bronze Age or Iron Age affiliation (Error! Reference source not found. and Error! Reference source not found.). It consists of a 3-m-diameter mound of large, angular limestone blocks that average 30 cm in length. The mound rises about 40 cm above the level of the surrounding terrain. The surface manifestation of this site may have been rectangular in plan with the long axis oriented northeast/southwest; however, the original configuration is difficult to discern because of damage from looting. Approximately 120 rocks are exposed in and around the looter's pit (both *in situ* and displaced) and another 40 make up a secondary pile that rests on the surface 5 m to the south. The looter's pit is 1.5 m in diameter and at least 50 cm deep and is choked with large blocks.

Impacts and Recommendations: The location of this site places it within a dredge path and the site would therefore be destroyed by the proposed mining. The central portion of the grave has been torn out and the site is totally lacking in physical integrity. No further management actions are needed, and it is not necessary to avoid the site.

Figure 7 Site BB-5 Plan View

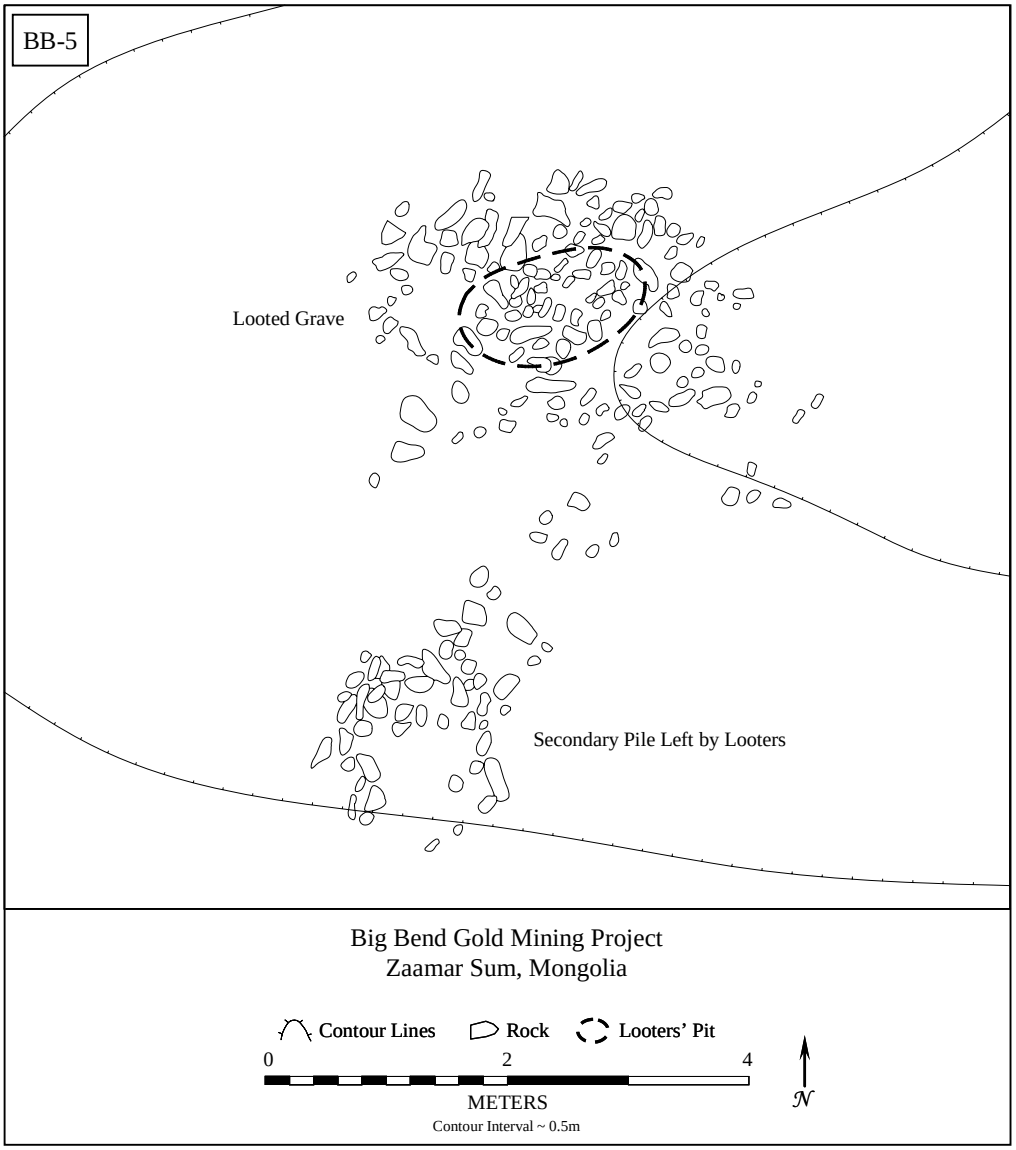


Figure 8 Site BB-5 Photograph

View northeast of rock-filled looter's pit in probable grave.

Site BB-6

Setting: This site lies along the margin of the Tuul River floodplain on the T2 terrace, near the toe of a broad colluvial fan that originates in hills to the west. Vegetation is dominated by dense, low aromatic forbs with scattered islands of tall grasses. Willows line the Tuul River, 125 m to the east. The soil is a medium brown alluvial silt of unknown depth. Site elevation is 928 m.

Description: Site BB-6 consists of a 1.5-m-diameter, very tight and mounded cluster of angular sandstone blocks and slabs (Error! Reference source not found. and Error! Reference source not found.). Some slabs lean at odd angles suggesting that they were once upright. The concentration, which probably marks a grave, is mounded 75 cm above the surrounding floodplain. Approximately 20 rocks, ranging in length up to 25 cm, are visible on the surface.

Impacts and Recommendations: This probable grave is located just exterior to a dredge path and is therefore not threatened by proposed mining. The rocks on the surface are largely unaffected by erosion or livestock activity, and the site appears to be fully intact. The site should be avoided.

Figure 9 Site BB-6 Plan View

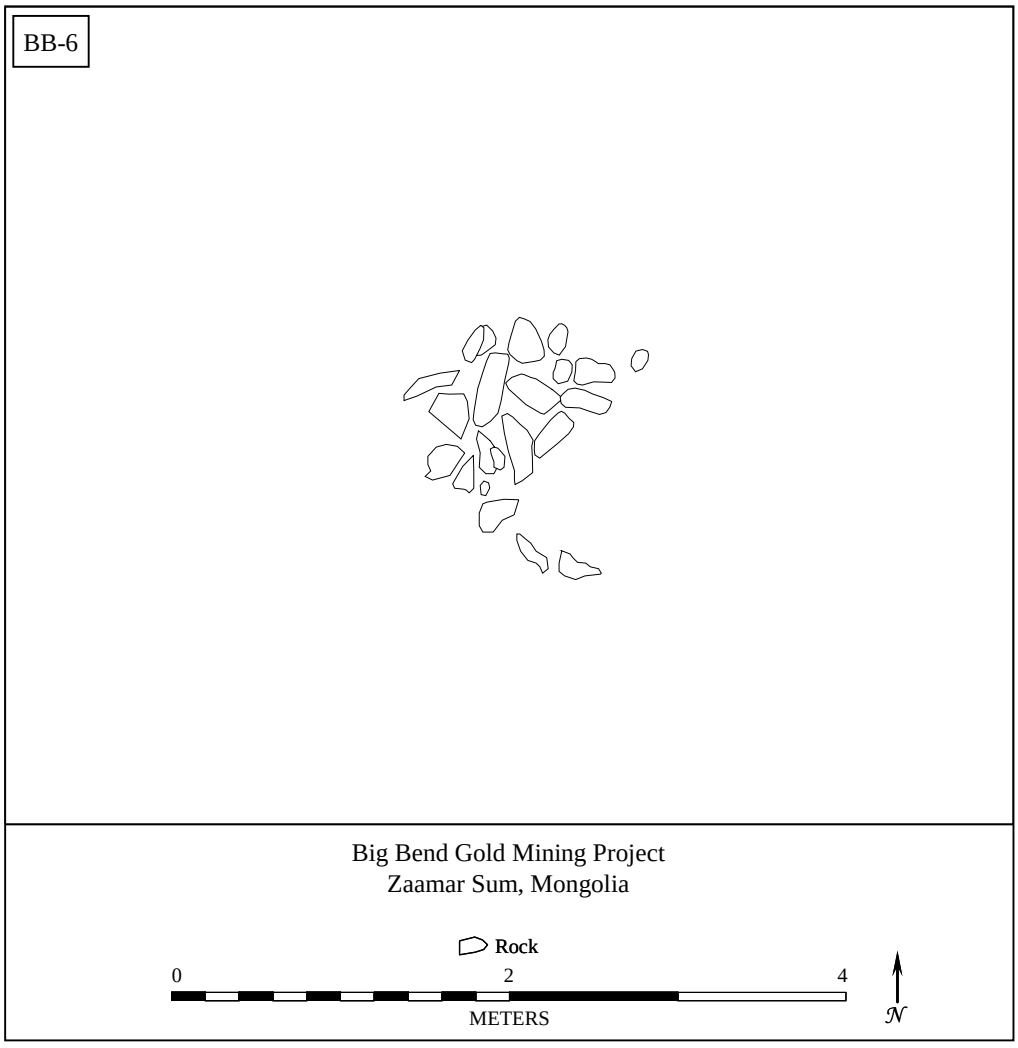


Figure 10 Site BB-6 Photograph

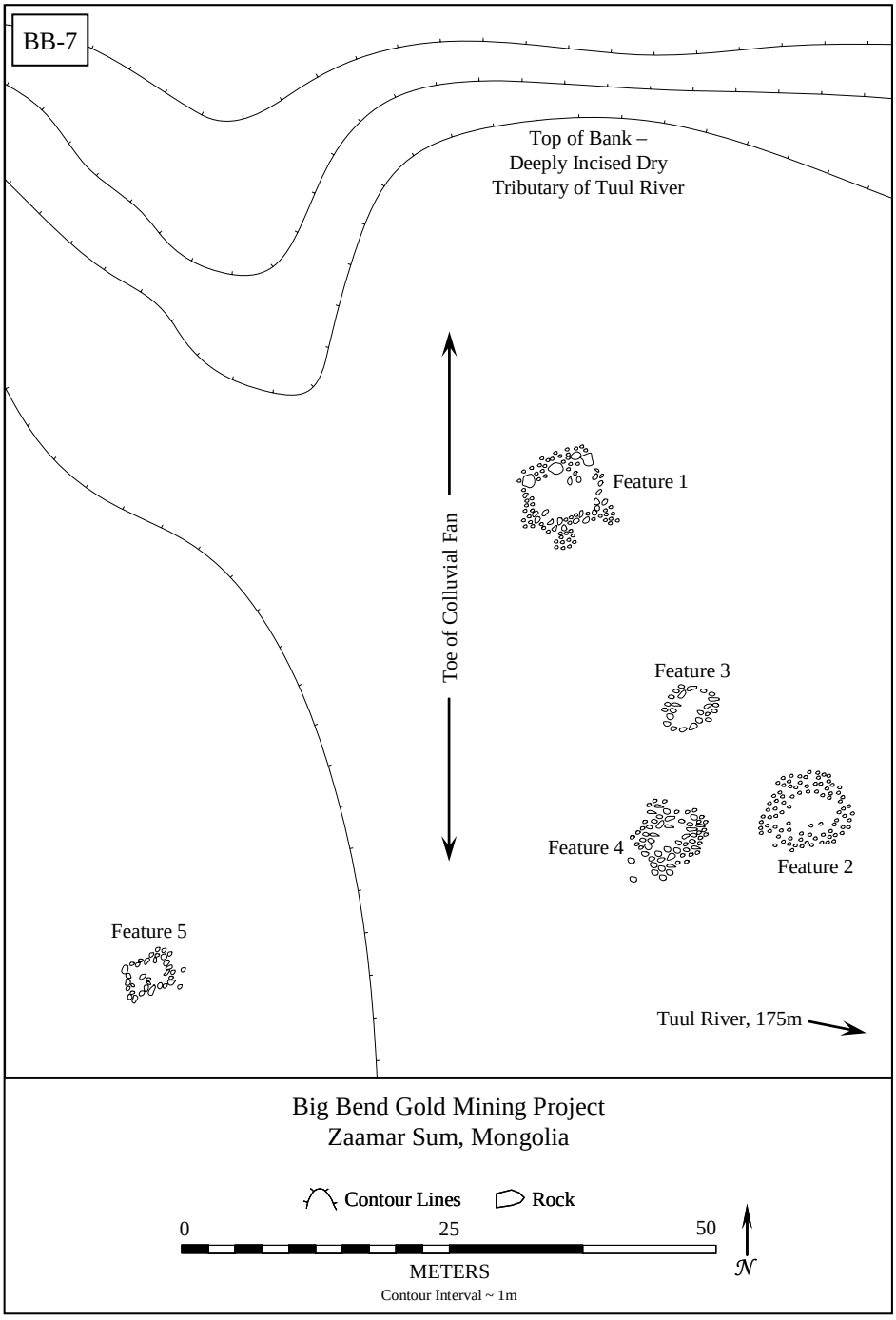
View north-northeast of rock cluster that may represent a grave.

Site BB-7

Setting: This site is situated a short distance south of an ephemeral tributary of the Tuul River that enters that stream from the west. The tributary drainage is incised several meters below the surface of a broad, otherwise featureless plain at the toe of a colluvial fan that enters the valley of the Tuul River from the west. Vegetation consists of low, aromatic forbs with scattered islands of tall grasses; occasional free-standing elm trees are found along the ephemeral drainage, and willows line the Tuul River 200 m to the southeast. The soils consists of light brown colluvial silt; alluvium from the Tuul River may also be present. Widely scattered limestone blocks occur on the surface in the site area. Elevation is 941 m.

Description: This extensive site is a complex of five rock features, at least some of which represent graves of either Bronze Age or Iron Age affiliation (). Three of the features (Features 2 – 4) occur in a cluster while the remaining two (1, 5) are somewhat removed from the others.

Figure 11 Site BB-7 Plan View



Feature 1 is a roughly circular, 10-m-diameter configuration of angular and rounded limestone blocks and cobbles. There is an irregular row of very large boulders (60 – 80 cm across) along the northwestern edge of the feature. The interior of the feature is raised 30 – 40 cm above the surrounding landscape. Approximately 200 rocks are exposed on the surface.

Feature 2 is a circular to slightly ovate ring of limestone blocks and cobbles 7 – 9 m in diameter (Error! Reference source not found.). The interior is elevated about 30 cm above the level of the surrounding plain. Approximately 150 rocks, most of which are 15 – 25 cm across, are exposed on the surface although most are partially buried. The feature lies at the margin of a former corral area with little vegetation and is well exposed.

Figure 12 Site BB-7 Photograph of Feature 2

View northeast of Feature 2.

Feature 3 is a roughly circular arrangement of blocks and cobbles ranging up to 50 cm across but averaging much smaller. The feature measures 6 m (NW/SE) x 5 m (NE/SW). About 50 rocks are exposed and many appear to be largely buried. There is no visible mounding associated with Feature 3.

Feature 4 is a circular to amorphous alignment of rocks that measures 7 m (N/S) x 6 m (E/W). This feature resembles nearby Feature 3 in terms of overall size and

in the number of rocks present on the surface. These rocks are also largely buried, and there is no visible mounding.

Feature 5 is a well-delineated rectangle of limestone blocks and cobbles, many of which are partially to almost entirely buried (Error! Reference source not found.). Several large blocks up to 50 cm across are present, particularly along the southwestern edge of the feature. Overall dimensions are 6 m x 4 m, with the long axis oriented northeast/southwest. Approximately 120 rocks are exposed on the surface. There is no visible mounding.

Figure 13 Site BB-7 Photograph of Feature 5

View west of Feature 5.

Impacts and Recommendations: Site BB-7 lies within a dredge path and is threatened with destruction. The site has not been vandalized like nearby B-6 and appears to be fully intact, although there has undoubtedly been some lateral displacement of surface rocks as a result of livestock activity. This site is assumed to harbor one or more graves and should be avoided.

Site BB-8

Setting: This site is located on a terrace overlooking the Tuul River, at the base of a broad colluvial fan that originates in hills to the west. The site lies on the opposite (north) side of the deeply incised ephemeral drainage described for site BB-7 (above). Vegetation is the dominated by low aromatic forbs but also includes very sparse low grasses. The general absence of ground cover indicates that the site area has been used recently to corral livestock. Elms are scattered along the tributary drainage, and willows line the Tuul River, 175 m to the east-southeast. Soil consists of medium to light brown alluvial silt and sand of unknown depth. Site elevation is 933 m.

Description: This extensive and complex site includes at least nine features representing a wide range of sizes and shapes. The features are arranged along a north/south axis and are numbered from south to north (Error! Reference source not found. and Error! Reference source not found.). However, there is no overall symmetry to the site configuration. All of the features exhibit limestone blocks and slabs. An unknown number of graves, of Bronze Age or Iron Age affiliation, are present.

Figure 14 Site BB-8 Plan View

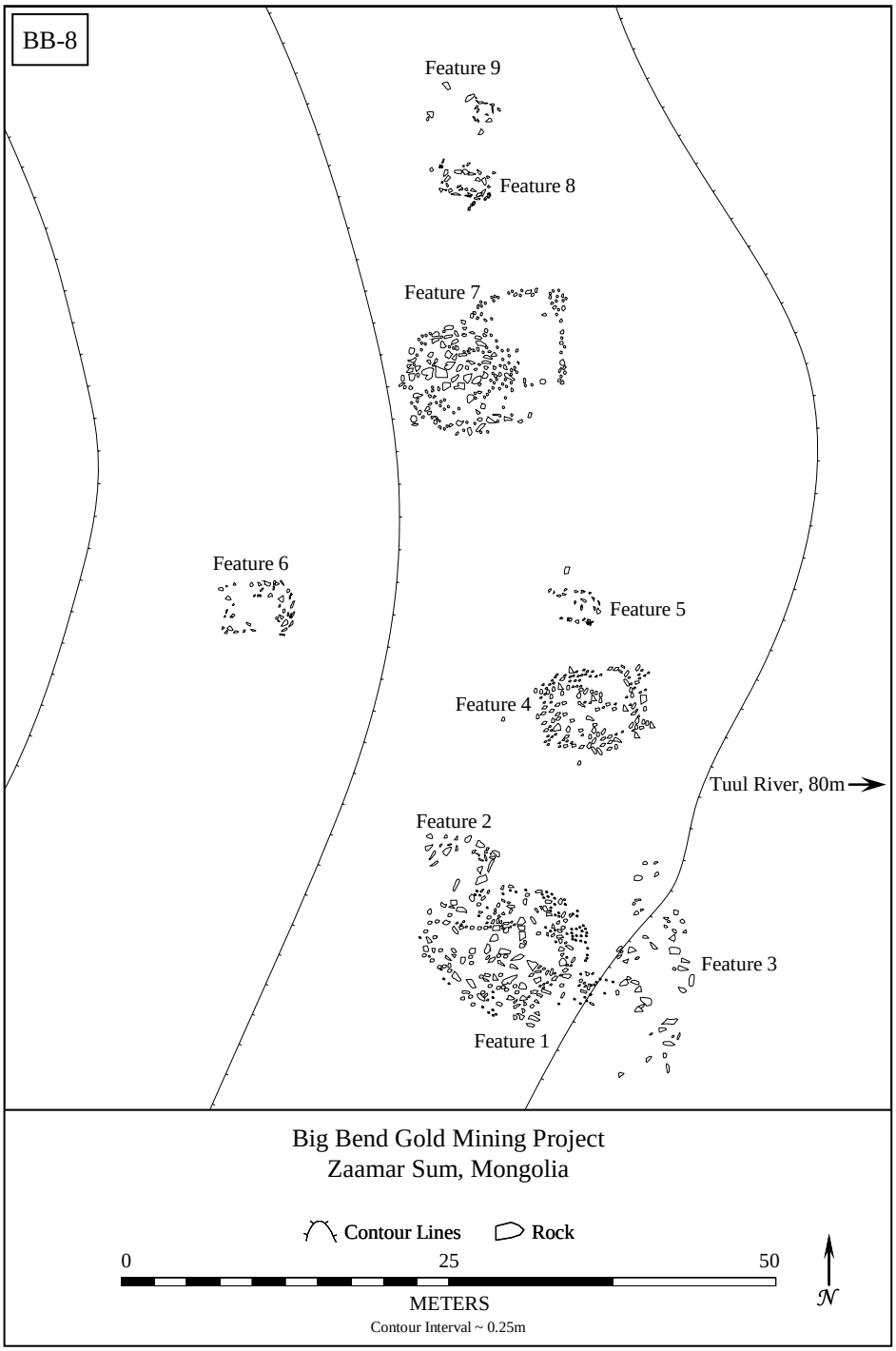


Figure 15 Site BB-8 Photograph

Overview to the south showing Features 9, 8, and 7 (listed in order from closest to furthest from photo station).

Feature 1 is a large, roughly circular arrangement of large blocks and slabs up to 80 cm long (Error! Reference source not found.). Some of the rocks are massive. The feature is 11 – 12 m in diameter. Some of the blocks and slabs are upright and others lean at various angles suggesting that they also stood upright at one time. Approximately 120 rocks are visible, most of which are partially buried. Feature 1 is mounded a maximum of 15 cm above the level of the surrounding terrain.

Figure 16 Site BB-8 Photograph of Feature 1

View southeast of Feature 1; Tuul River is visible in distance.

Feature 2 is a small, subrectangular grouping of partially buried blocks and slabs up to 80 cm long. The dimensions of the feature are 3 m (N/S) x 2 m (E/W). About 35 rocks are exposed. No mounding is evident.

Feature 3 is an elongated, north/south-trending arrangement of blocks up to 70 cm long. One upright slab occurs at the north end of the feature. The feature is very crudely rectangular in plan with overall dimensions of 17 m x 6 m. Some of the rocks may have been displaced by livestock but most are set firmly into the ground. About 45 rocks are exposed.

Feature 4 is a subrectangular configuration of both large and small blocks and slabs, and includes an upright row of rocks along the east side. Most rocks occur around the margins of the feature although some occur in the interior. Blocks up to 75 cm long are present, and most are firmly set in the ground and stable. Overall feature dimensions are 9 m (E/W) x 7 m (N/S). Very slight mounding is discernible. Approximately 120 rocks are exposed.

Feature 5 is a small, ovate alignment of mostly small blocks. The feature exhibits dimensions of 4 m (NW/SE) x 2.5 m (NE/SW) and is open to the west. Approximately 30 rocks are visible, most of which appear to be largely buried. No mounding is visible.

Feature 6 is a subrectangular arrangement of small to medium blocks and slabs (mainly the latter) including many that are upright. The feature measures 9 m (N/S) x 5 m (E/W). About 55 rocks are visible. No mounding is apparent although the area has been trampled by livestock and the surface is eroded.

Feature 7 is the most complex at the site. It consists of a roughly circular to ovate concentration of mostly massive blocks and slabs (up to 1 m across) in an area measuring 9 m (N/S) x 8 m (E/W), in addition to a contiguous, roughly D-shaped alignment of generally smaller blocks and slabs to the northeast. The main concentration (Error! Reference source not found.) is comprised of approximately 100 rocks and is mounded about 25 cm above the level of the surrounding terrain. A few upright rocks are present, and others set at odd angles were probably once upright as well. The D-shaped alignment is 7 m across and is made up of about 75 rocks, some of which are upright or leaning. No mounding is apparent in this part of the feature.

Figure 17 Site BB-8 Photograph of Feature 7

View east of Feature 7; Tuul River is visible in distance at left.

Feature 8 is a small, roughly rectangular configuration of approximately 50 blocks and slabs of all sizes, some of which are upright or leaning (Error! Reference source not found.). Most of the rocks are firmly set and largely buried. Feature dimensions are 4 m (E/W) x 2 m (N/S). No mounding is evident.

Figure 18 Site BB-8 Photograph of Feature 8

View northeast of Feature 8; Tuul River is visible in distance at right.

Feature 9 consists of a 3-sided rectangular configuration of about 20 rocks and slabs of various sizes, including several upright slabs. The feature opens to the southwest. Dimensions are 5 m (NW/SE) x 3 m (NE/SW). No mounding is evident.

Impacts and Recommendations: This site is situated just exterior to a dredge path boundary and may be threatened with destruction. It is also located close to a ger, and people have been living in the immediate area for about 10 years. Rocks in some of the features have been laterally displaced as a result of livestock activity; the general absence of vegetation indicates that the site area has been used as a corral. However, despite the heavy trampling the site appears to be largely intact, with feature configurations plainly visible and the great majority of rocks set into the ground. The site contains one or more graves, and should be avoided.

Site BB-9

Setting: The site occupies the top of a broad, high, nearly flat-topped hill overlooking the Tuul River several hundred meters to the east. The location commands an excellent view in all directions and is offset to the eastern edge of the hilltop, toward the river. Vegetation consists of dense, low aromatic forbs and small islands of tall grass. The soil is a silty and gravelly colluvial loam, light brown, of unknown total depth. The site elevation is 947 m.

Description: This Bronze Age or Iron Age grave site is comprised of four features constructed of limestone slabs and blocks (Error! Reference source not found.). One lithic artifact and one ceramic artifact were found as well, in a small clearing west of the rock features. The lithic artifact is a small, dark gray basalt interior flake. The ceramic artifact is a small plainware sherd with dark brown slipped exterior and interior surfaces, very fine temper, and shallow, parallel exterior incisions. It is unknown if the artifacts and rock features are associated.

Figure 19 Site BB-9 Plan View

Feature 1 is the most salient feature at the site, consisting of a roughly rectangular configuration of large to massive, upright and collapsed slabs and blocks that number approximately 40 (Error! Reference source not found.). Some of the blocks are over 1 m in length. Overall feature dimensions are 4 m (E/W) x 3 m (N/S).

Figure 20 Site BB-9 Photograph of Feature 1

View east of Feature 1; Tuul River is marked by line of willows at base of ridge in distance.

Feature 2 is an 11-m-diameter, almost perfectly circular concentration of over 200 blocks and slabs, none upright. A tightly compacted encircling alignment of blocks is discernible along the northeastern margin of the feature (Error! Reference source not found.). Feature 2 is mounded slightly above the level of the surrounding ground surface. This feature lies to the northeast of Feature 1 and is separated from it by only 1 – 2 m.

Figure 21 Site BB-9 Photograph of Feature 2

View south-southeast of portion of rock alignment encircling Feature 2.

Feature 3 is located to the south of Features 1 and 2 and consists of a rectangular rock configuration that measures 5.5 m (N/S) x 5 m (E/W). Several blocks lie scattered downslope to the north of the feature. Rocks here are mostly less than 30 cm across; one block remains upright.

Feature 4 is a roughly circular concentration of over 100 blocks and slabs, most of which are less than 25 cm across. This feature is similar in appearance to Feature 2 but smaller at 6 – 7 m in diameter. Feature 4 is mounded to about 30 cm above the level of the surrounding terrain.

In addition to the numbered features is an L-shaped alignment of limestone blocks that lies to the north of Feature 2. The two wings of this alignment total 24 m in length and may represent the remains of an enclosure that once encompassed one or more of the features.

Impacts and Recommendations: This site is located approximately 200 m west of the nearest dredge track and is not threatened in any way. The site appears to be largely intact although formerly upright slabs and blocks have fallen and some smaller rocks have been scattered by livestock. This site harbors one or more graves and should be avoided.

Site BB-10

Setting: This site sits at the crest of the northeast/southwest-trending limestone ridge that bisects the Big Bend project area. The location affords excellent views in all directions, particularly in a 180-degree arc from northwest to northeast to southeast. Vegetation on the ridge crest is sparse, consisting of scattered and overgrazed, low grasses and forbs. Soil is a thin regolith, medium brown in color, with abundant angular gravels and spalls of limestone. The elevation is 957 m.

Description: Site BB-10 is a single 3-m-diameter circle of small limestone blocks, most of which are less than 20 cm across (Error! Reference source not found. and Error! Reference source not found.). The rocks are firmly set in the shallow soil and most are partially buried. Despite heavy ridge top traffic, which includes livestock, people on foot, and occasional vehicles, most of the rocks appear to be in position. Approximately 40 rocks are present. The function of this feature in unknown, although it may be the remnant of a small structure.

Impacts and Recommendations: This site occupies a ridge crest location and is not directly threatened by mining. However, secondary activities such as camping or use of the ridge to view the project area could create impacts. The site is not a grave, given the lack of soil development on the ridge. However its function is unknown. The site should be avoided.

Figure 22 Site BB-10 Plan View

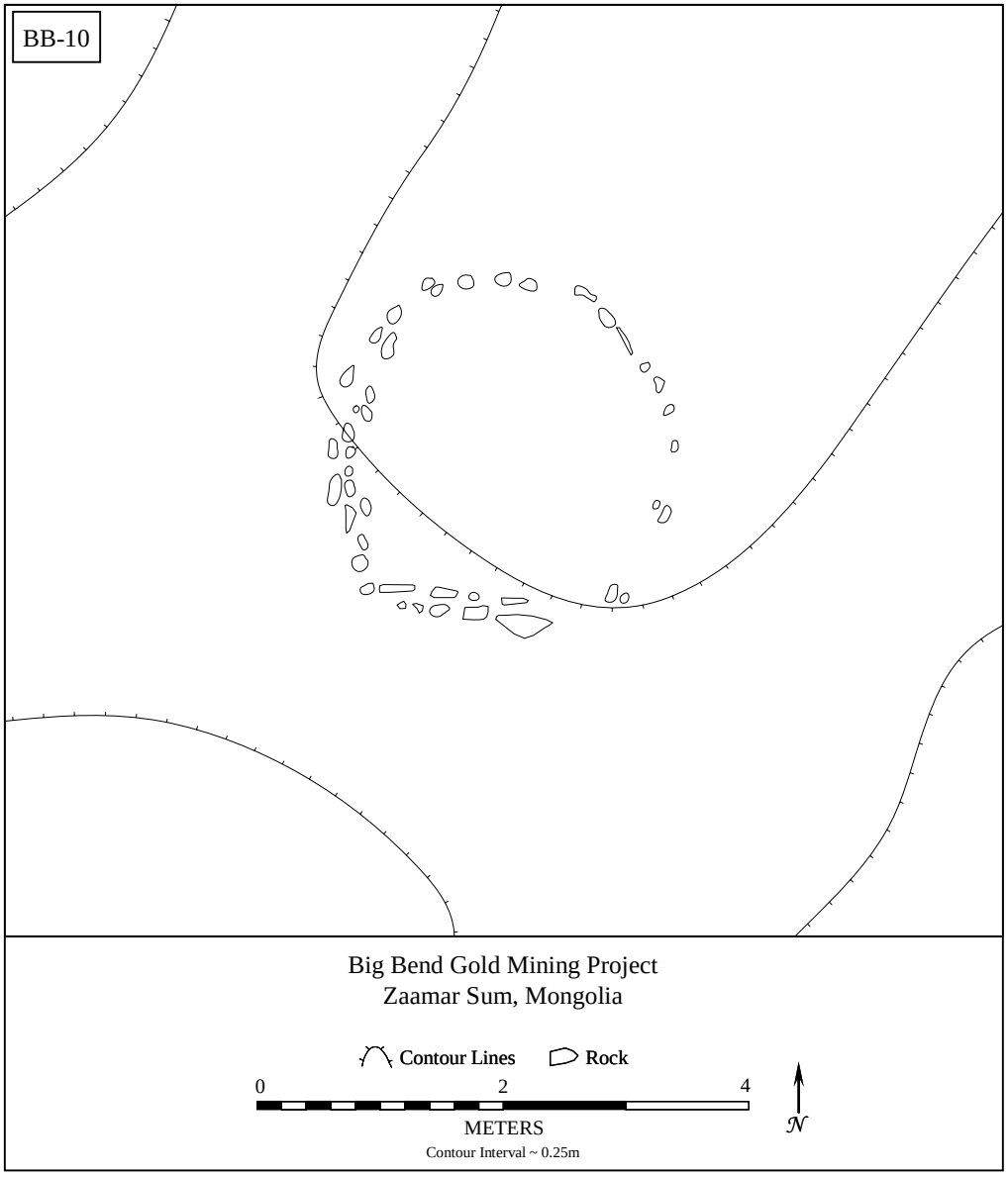


Figure 23 Site BB-10 Photograph

View north across ridge top showing stone circle (foreground). Site BB-11 is visible at right; Tuul River runs along base of bluff in distance.

Site BB-11

Setting: Site BB-11 is located a short distance north-northeast of BB-10 in a nearly identical ridge top setting. Similar panoramic views to the northwest, northeast and southeast are provided by the location. The vegetation is sparse and overgrazed, consisting of scattered low forbs and grasses. Soil is a thin regolith, medium brown in color, with abundant angular gravels and spalls of limestone. Site elevation is 957 m.

Description: This site is a single 2.5-m-diameter stone pile, or cairn, exhibiting at least 75 angular limestone blocks of limestone of which most are in the 10 cm – 20 cm range and **(** and Error! Reference source not found.). At least 75 blocks are visible on the surface although the total number present is probably several times that figure. The rocks are tightly clustered but the feature is collapsed and only slightly mounded. The cairn is overgrown and there is abundant sediment among the rocks, indicating that it has been in place for a long period of time. The function of the site is unknown, although it could have religious significance, either Buddhist or earlier (shamanistic).

Impacts and Recommendations: This site occupies a ridge crest location and is not directly threatened by mining. However, secondary activities such as camping or use of the ridge to view the project area could create impacts. The site is not a grave, given the lack of soil development on the ridge, but its precise function is unknown. It should be avoided.

Figure 24 Site BB-11 Plan View

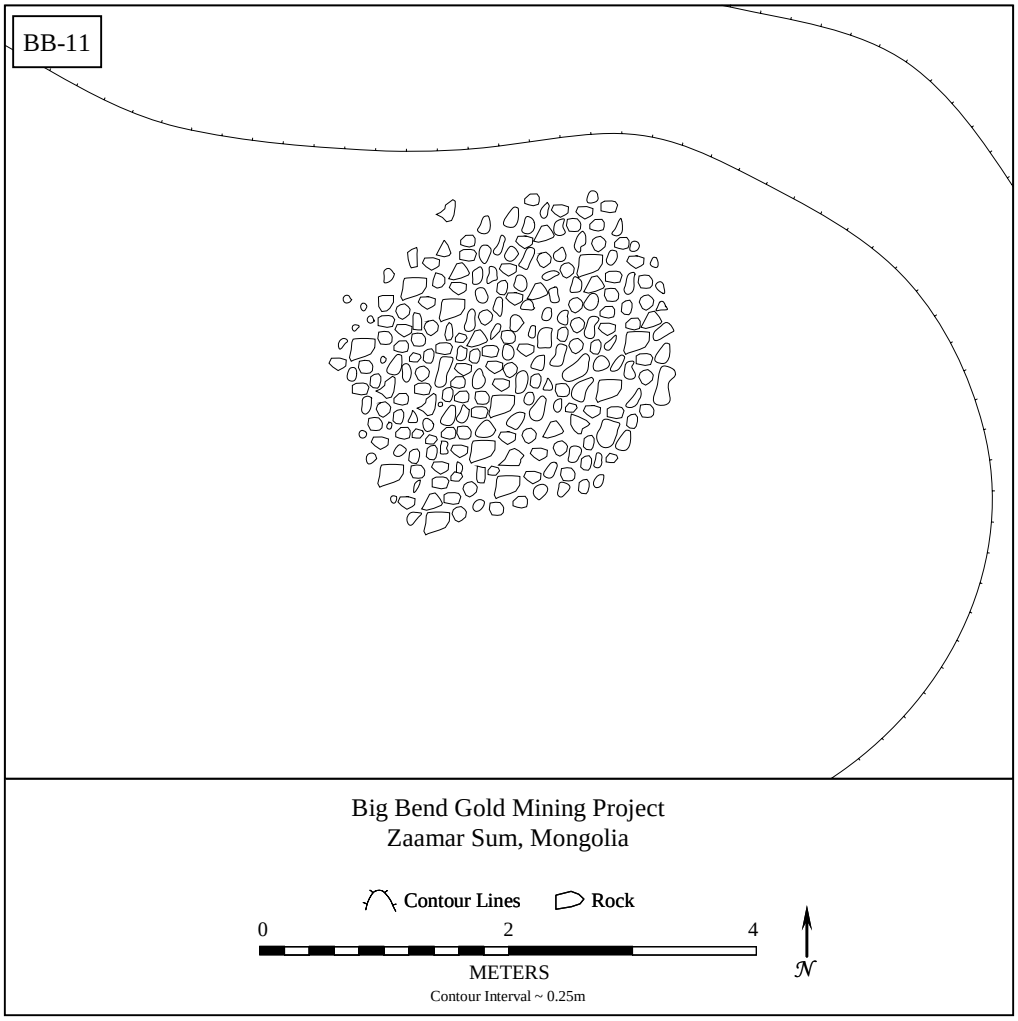


Figure 25 Site BB-11 Photograph

View east-northeast along ridge crest showing collapsed cairn in foreground; Tuul River is visible in distance.

Site BB-12

Setting: This site is situated just above the toe of the prominent limestone ridge that bisects the project area on a northeast/southwest axis and faces due east, overlooking the Tuul River floodplain. Vegetation is a moderate cover of overgrazed low grasses and very low forbs. The soil consists of a thin regolith and colluvium veneer, medium brown in color, overlying bedrock limestone. The elevation is 937 m.

Description: A single feature is present at this site, consisting of a roughly circular alignment of limestone blocks and slabs, most of which are in the 25 cm – 35 cm range (Error! Reference source not found. and Error! Reference source not found.). The feature averages 2.5 m in diameter. Approximately 35 rocks are visible on the surface. A few rocks have been displaced downslope, showing the effects of natural erosion in combination with repeated livestock trampling. However, the feature appears to be largely intact. Site function is unknown, although the site could represent the remains of a small structure.

Impacts and Recommendations: Given its ridge slope location this site is not threatened by mining, although it could incur impacts as a result of secondary activities such as camping. The lack of soils development indicates that the site is not a grave. However, the function of the site is unknown, and it should be avoided.

Figure 26 Site BB-12 Plan View

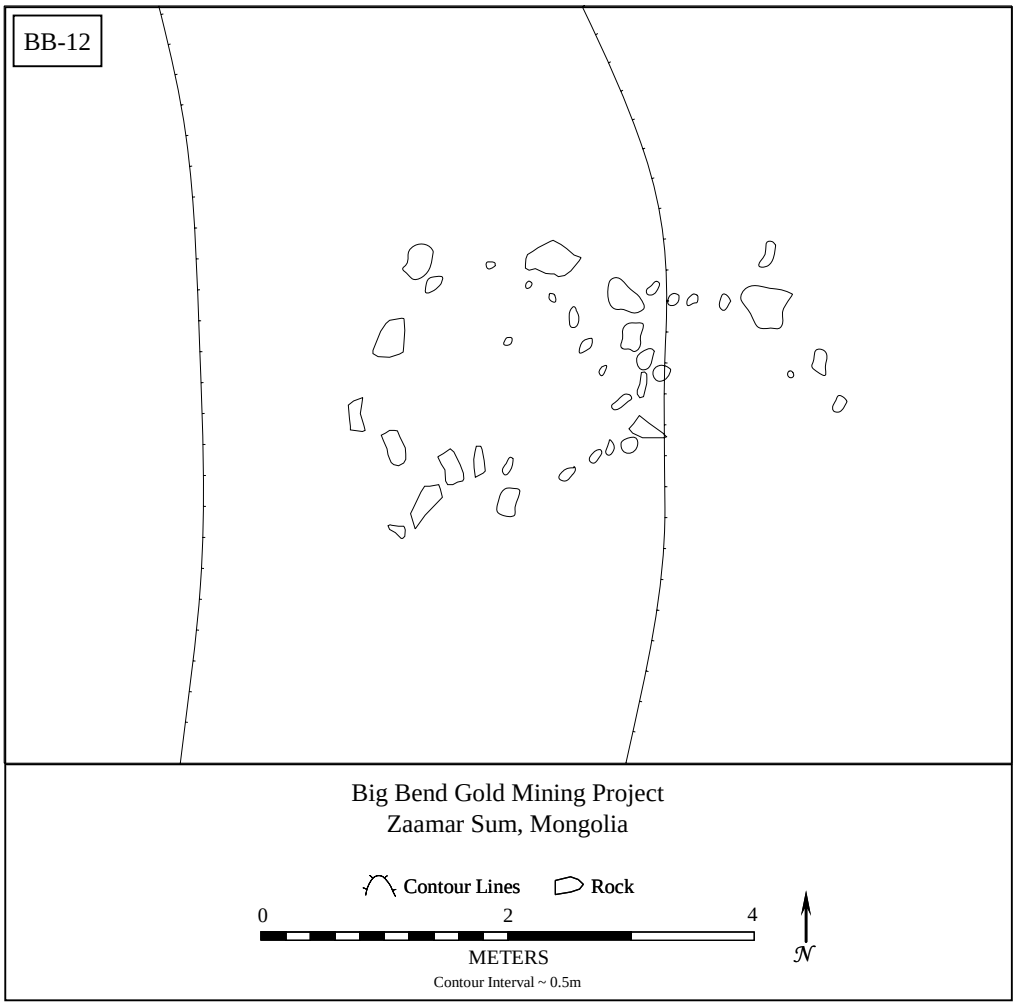


Figure 27 Site BB-12 Photograph

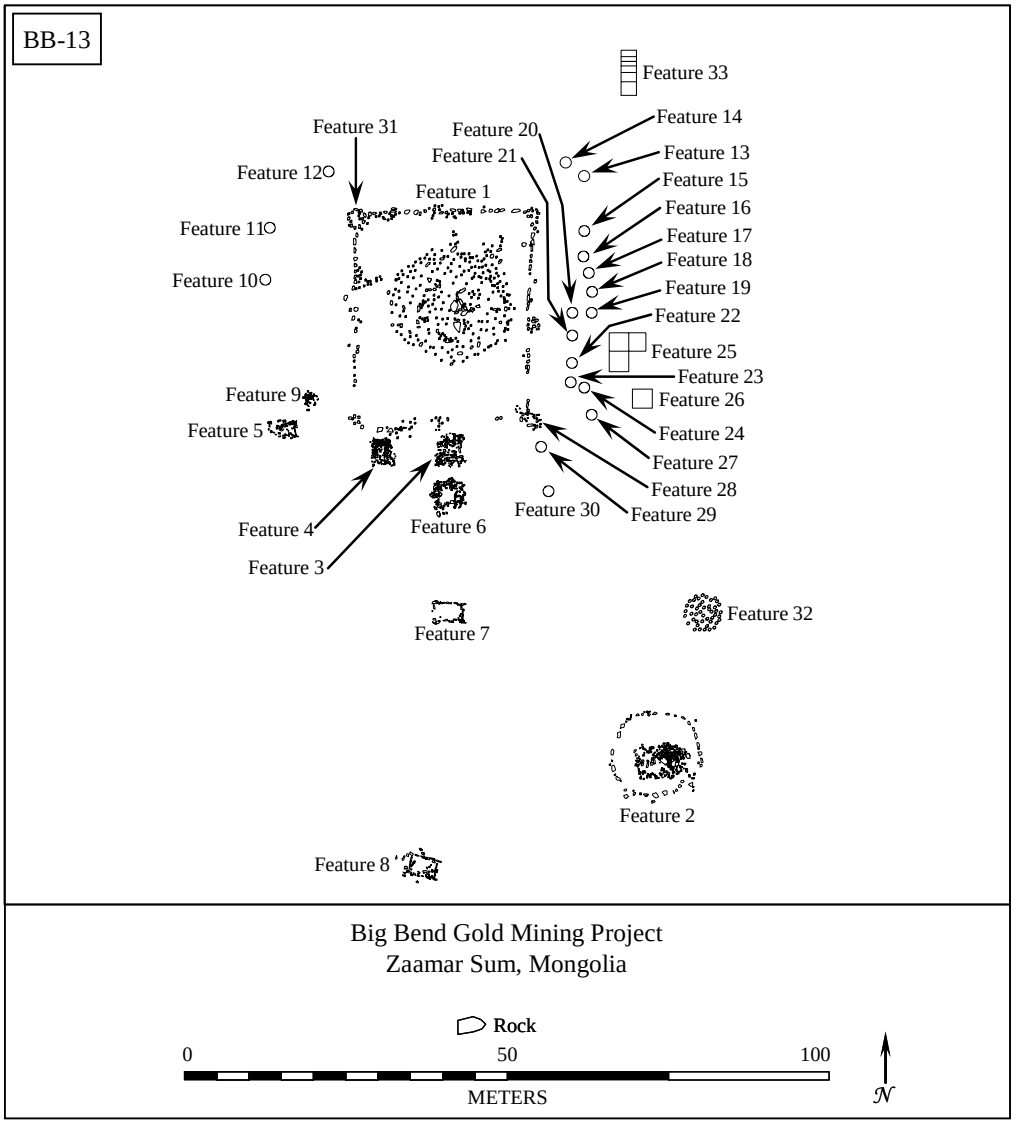
View north-northeast of stone alignment.

Site BB-13

Setting: This site, the largest recorded in the Big Bend project area, is located on T2 terrace remnants in a narrow strip of floodplain between the active channel of the Tuul River and the base of a limestone ridge to the east. The site is perched about 4 – 5 m above the bed level of the river. The ridge is a prominent landform that bisects the project area on a southwest-to-northeast axis but trends almost due north/south in the immediate site vicinity. The base of the ridge lies approximately 120 m east of the site boundary. The floodplain in the site area is poorly drained and supports a lush growth of tall and short grasses as well as scattered low forbs. A dense, narrow riparian zone dominated by willows lines the nearby Tuul River. The soil is a light brown, silty alluvium of unknown total depth. Site elevation is 932 m.

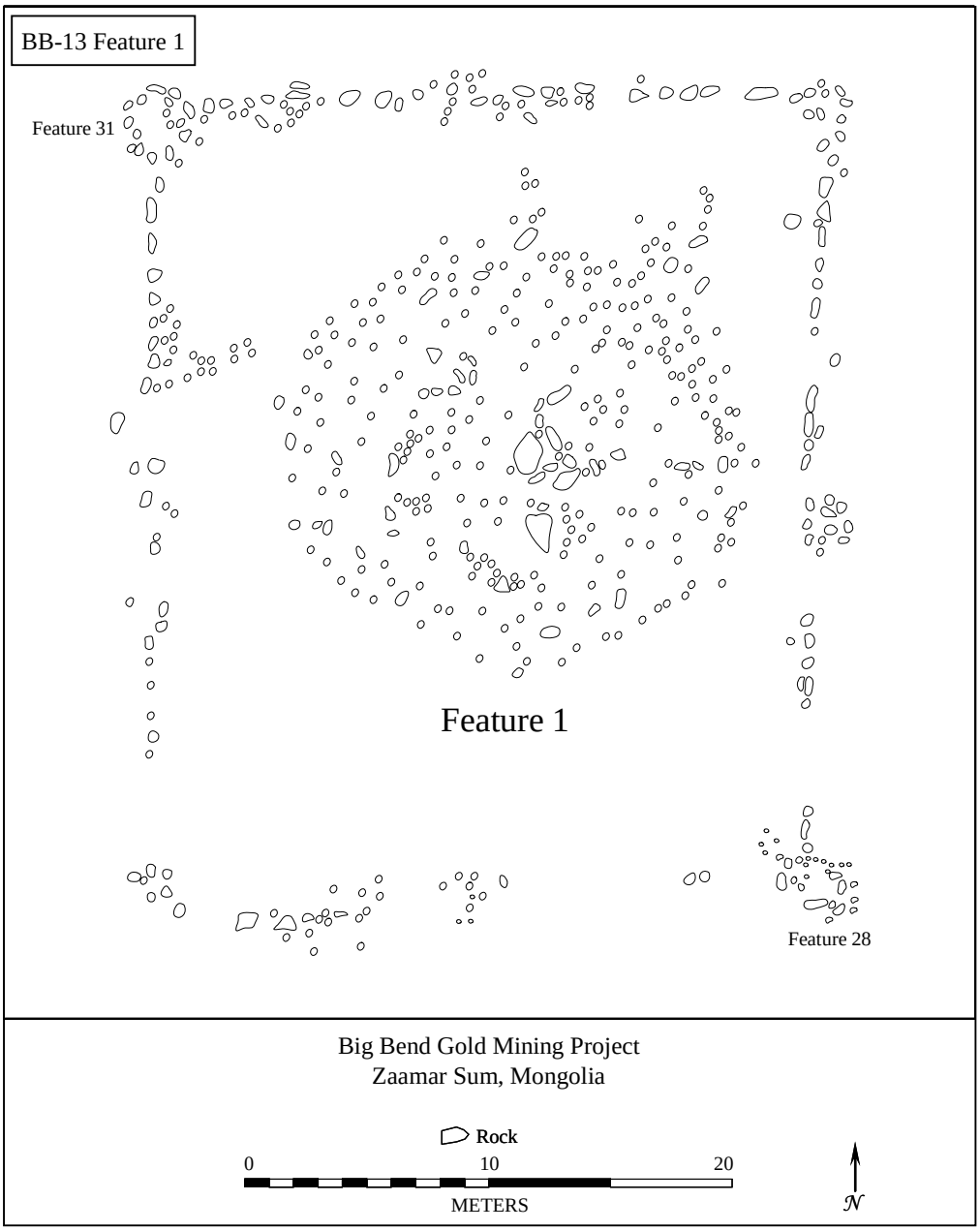
Description: This complex and areally extensive site is a complex that contains an unknown number of graves of Bronze Age or Iron Age affiliation. The site appears to have been laid out with respect to the cardinal direction, with a north/south long axis (Error! Reference source not found.). The dominant feature (Feature 1) is in the northern portion of the site while smaller features, some very formalized in appearance, are arrayed mainly to the south, west, and east. Alignments of multiple features running both north/south and east/west occur mainly to the south of Feature 1. At least 33 features are present. Given the general symmetry of the site, it seems likely that a portion of the site on the west side has been lost to erosion; the Tuul River flows just 25 m beyond the western edge of the site as recorded and mapped. Unique features are described individually below while others are grouped for descriptive purposes.

Figure 28 Site BB-13 Plan View



Feature 1 consists of a prominent circular mound surrounded by a rectilinear enclosure of rocks (and Error! Reference source not found.). The mound is 18 m in diameter and rises to 1.5 m above the level of the surrounding floodplain. Several hundred limestone blocks and slabs are visible on the surface including a few massive slabs over 1 m across in the approximate center of the mound that probably once stood upright. The enclosing limestone block alignment measures 33 m (N/S) x 28 m (E/W). At the southeastern and northwestern corners of this enclosure are small, roughly circular rock alignments designated Features 28 and 31, respectively. These alignments, which are about 2 m in diameter, are incorporated into the larger enclosure.

Figure 29 Site BB-13 Plan View of Feature 1



Plan map of Feature 1 including small stone circles (Features 28 and 31) at opposite corners of enclosing rock alignment.

Figure 30 Site BB-13 Photograph of Feature 1

Overview looking northwest taken from slope of limestone ridge overlooking site. Vehicle at left sitsbeside Feature 2; figure at right stands at north edge of Feature 1. Tuul River is visible in background.

Feature 2 is a large, roughly circular mound of limestone blocks. This feature, probably a grave, has been looted and its original configuration is uncertain. However, it exhibits an enclosing, 13-m-diameter ring of rocks in a circular configuration that makes this feature unique at the site (Error! Reference source not found.). A hole measuring 2.5 m x 1.5 m and over 1 m deep has been excavated into the center of the mound, and rocks and earth have been thrown out in all directions. The excavation is recent. This feature and nearby Feature 32 are outliers in terms of locations within the site.

Figure 31 Site BB-13 Photograph of Feature 2

View north of Feature 2 showing looter's pit in central portion of mound.

Features 3 through 8 are similar, rectangular configurations of upright slabs and blocks with average overall dimensions of 2 - 2.5 m x 3.5 - 4 m and mounding within the interiors of 25 cm to 40 cm, with the exception of Feature 7, which is not visibly mounded (Error! Reference source not found.). The long axes of all six of these features trend east/west with the exception of Feature 8 (below). Upright slabs and blocks number between 25 and 75 per feature and are generally large to massive, measuring up to 80 cm in length. Features 3, 6, and 7 occur in a perfect north/south line and are also in alignment with the center of Feature 1, while Feature 8, at the extreme southern edge of the site, is offset slightly to the west of this alignment. Feature 8 is the only member of the group that is not oriented precisely with respect to the cardinal direction, its long axis trending west-northwest/east-southeast. Features 3 and 4 are perfectly aligned east/west, while Feature 5, further to the west, is offset slightly to the north. Feature 9 may have been similar morphologically to Features 3 – 8 but has been affected by erosion owing to its location near the Tuul River. It measures approximately 4 m x 3 m with its long axis east/west. A few upright slabs and numerous fallen slabs and blocks are present on the surface. Feature 9 lies northeast of Feature 5 and does not form a part of any discernible feature alignments.

Figure 32 Site BB-13 Photograph of Features 3 to 8

View southwest of Feature 7, typical of rectangular alignments of upright slabs and blocks.

Features 10 through 24, 27, 29, and 30 are small, generally circular concentrations and scatters of rock (Error! Reference source not found.). They occur mainly around Feature 1 – particularly on the east side – and appear to be associated somehow with this dominant feature. At least three alignments of multiple features, trending generally but not precisely north/south, are apparent on the east side of Feature 1. These features are typically 1.5 m to 2.5 m in diameter and exhibit mostly small slab and block sizes, 30 – 35 cm across or less. No mounding was noted in or around these features.

Figure 33 Site BB-13 Photograph of Features 10 to 24, 27, 29, and 30

View southeast of Feature 21, typical of small concentrations of rock that occur mainly to the east of Feature 1.

Feature 25 is comprised of three contiguous, small square alignment that together form an L-shaped bloc (Error! Reference source not found.). Individual alignments measure 2 m to 2.5 m square and are made up of mostly small, upright and collapsed slabs and blocks 30 cm across or smaller. Approximately 120 rocks in total are exposed on the surface. No mounding was noted. The overall orientation of Feature 25 is north/south and east/west.

Figure 34 Site BB-13 Photograph of Feature 25

View northeast of western portion of Feature 25.

Feature 26 lies just to the south of Feature 25 and consists of a 3-m-square rock configuration that is oriented with respect to the cardinal directions. It is constructed of mostly small, upright and collapsed slabs and blocks. Approximately 100 rocks are exposed. No mounding is evident.

Feature 32 is an outlier located along the southeastern site margin near Feature 2. It is manifested as an amorphous, approximately 6.5-m-diameter mound of earth and limestone blocks and slabs. It rises to a maximum of 25 cm above the level of the surrounding terrain. About 125 rocks are visible including a few that are upright or leaning.

Feature 33 is a 7-m-long, 2-m-wide long configuration of upright slabs with an overall north/south alignment. This block is segmented into six compartments ranging in size from approximately 2 m x 2 m to 2 m x 1 m (Error! Reference source not found.). A few fallen slabs occur in the feature interior and are scattered around the perimeter. Upright slabs that are in place appear to be firmly set into the ground, and only project a few centimeters above the surface.

Figure 35 Site BB-13 Photograph of Feature 33

View southeast of upright slabs delineating one compartment within Feature 33.

Impacts and Recommendations: This highly significant, complex site is largely intact with the exception of a single looted feature and possible stream-induced erosion along the western site margin. The site lies exterior to proposed dredge paths and is not threatened with destruction. The site should be avoided.

Attachment 3

Remote Sensing Report

Data Processing Methodologies

Tuul River, Mongolia

Orthorectification of IKONOS Imagery
1 m Natural Color Imagery Composite
4 m Custom Landuse Classification
Supplemental Geographic Information

Prepared for:

AATA International

August 18th, 2008

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Table of Contents

List of Tables

1.0 Orthorectification of IKONOS Imagery

The source imagery used for this project is IKONOS 1 m panchromatic and 4 m multi-spectral imagery collected on July 15th, 2008.

1.1 Control Sources

1.1.1 Horizontal Control

The 1 m Panchromatic IKONOS imagery was horizontally controlled using the Rational Polynomial Coefficients (RPCs) provide by GeoEye. The RPCs represent a calculation of the mathematical model of the image geometry of the IKONOS sensor. i-cubed improved the fit of the rational polynomial model to the 3 m seamless orthomosaic that was produced by i-cubed in 2003 for this same project area in the Tuul River region of Mongolia.

The source images for the 3 m seamless orthophoto mosaic were 112 individual orthophotos provided by AATA. The original geographic referencing of the orthophotos was not altered.

1.1.2 Vertical Control

The IKONOS imagery was vertically controlled using 3 arc second terrain data derived from NASA's Shuttle Radar Topography Mission (SRTM).

1.2 Georeferencing

Projection:	Gauss Kruger Transverse Mercator	
	Central Meridian :	105°E
	Reference Latitude:	0°
	False Easting:	18,500,000
	False Northing:	0
Datum:	WGS84	

A total of 47 Ground Control Points (GCPs) were collected with an overall Root Mean Square (RMS) error of 1.74 pixels in the X direction and 3.01 pixels in the Y direction. The data was corrected using a first order polynomial transformation using the above reference points.

2.0 Classification Inputs and Procedures

2.1.1 Supervised Classification

Visual interpretation of the imagery was utilized to define training areas for various classes. A Maximum Likelihood Classifier Algorithm was employed to analyze the spectral and textural input information to define the following classes:

- River
- Grassland
- Forest
- Oxbow areas
- Upland Barren Steppe
- Mining Disturbances
- Mining Ponds

The supervised classification was done using PCI ImageWorks Software V.9.1

2.1.2 Manual Additions to the Classification

From the above automated classes, additional classes where manually defined:

Main Class	**Manual Division**
Water	Mining Dredge Ponds Mining Channel Diversions
Mining Disturbances	Mining Camps Mining Roads

It was possible to automatically extract the main river channel, as it exists today, and mining ponds because of their distinct differences in sediment load. Mining dredge ponds were manually extracted from the mining ponds class, based on their distinct linear physical characteristics, or the evidence of dredging equipment.

Mining channel diversions were manually distinguished as waterways that lead from the main river channel into mining ponds. One section of the Tuul River itself was classified as a mining diversion channel based on examination of pre-mining photography.

Mining roads were manually digitized from 2008 IKONOS imagery, and encoded into the classification based on a 5 meter estimated thickness.

Mining camps were manually digitized as polygons from 2008 IKONOS imagery, and encoded into the classification.

2.1.3 Semi-automated additions to the Classification

Proximity to the Tuul River helped to distinguish riparian grassland and forest from their upland counterparts. In addition to the proximity analysis, a combination of slope and elevation analysis was employed to further distinguish these features.

3.0 1 m Natural Color Imagery

3.1 Fusion Process

The 1 m natural color IKONOS imagery was produced utilizing a PCI utility called pansharp. Pansharp, produces superior sharpening results by extracting the detail of the 1 m panchromatic imagery, while preserving the spectral characteristics of the 4 m multispectral imagery (bands 1,2,3).

4.0 Supplemental Information

4.1 Vector Layers

4.1.1 Mining_Roads.shp

This is a polyline shapefile of the mining roads that were manually digitized off of the 1 m natural color imagery.

4.1.2 Mining_Buildings.shp

This is a polygon shapefile of the mining camps and other permanent structures that were visible on the 1 m natural color imagery.

4.2 Hectare Report

4.2.1 Hectares_2008.xls

This is an excel spreadsheet that calculates the total hectare amounts for each class within the 4 m classification, and gives percentages for each class See **Table 4-1**.

Table 1 Total Hectares for Each Class within the 4 m Classification (Hectare_2008.xls)

Class Value	Class Description	Counts	Sq. Meters	Hectares	Percentage
11	river	96,948	1,551,168	155.12	1.52
12	oxbows	7,500	120,000	12.00	0.12
13	riparian grassland	316,306	5,060,896	506.09	4.95
14	riparian forest	60,475	967,600	96.76	0.95
10	**Natural Riparian**	**481,229**	**7,699,664**	**769.97**	**7.54**
21	open	2,536,155	40,578,480	4,057.85	39.73
22	upland grasslands	2,473,414	39,574,624	3,957.46	38.75
23	upland forest	311,305	4,980,880	498.09	4.88
20	**Uplands/Open**	**5,320,874**	**85,133,984**	**8,513.40**	**83.35**
31	mining pond	24,043	384,688	38.47	0.38
32	mining dredge ponds	33,327	533,232	53.32	0.52
33	mining river diversion	4,970	79,520	7.95	0.08
30	**Antropogenic Water Features**	**62,340**	**997,440**	**99.74**	**0.98**
41	mining disturbance	388,214	6,211,424	621.14	6.08
42	mining camps & structures	5,033	80,528	8.05	0.08
43	mining roads	126,101	2,017,616	201.76	1.98
40	**Anthropogenic**	**519,348**	**8,309,568**	**830.96**	**8.14**
				Total Hectares = 10,214.07	