Wolverine Project

GENERAL SITE PLAN

VERSION 2008-04

Prepared by:

Yukon Zinc Corporation

February 9, 2009

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1 Introduction

Yukon Zinc Corporation's (YZC) Wolverine Project, located in the southeast Yukon (Figure 1), is a zinc-silver-copper-lead-gold underground mining project that will mine up to 1,700 t/d of diluted ore. Following construction over a one and one half year period, the mine will operate for approximately nine years. The reclamation and closure phase will occur over a three-year period as previously described in the *Wolverine Project Reclamation and Closure Plan V2008-02*.

This General Site Plan (GSP) describes the general construction plan for the Wolverine Project over a period commencing January 2009 and extending to June 2010. This report updates *General Site Plan* (*GSP 2007-03*) submitted in April 2007 by YZC and subsequently approved by Yukon Government Energy, Mines and Resources (EMR) June 8th, 2007.

The project development schedule and activities described in *GSP 2007-03* has not been completed as previously described due to delays with project financing in late 2007 and early 2008. 2007 and early 2008 construction activities were and will be supported by the existing exploration camp infrastructure located near Wolverine Lake and a temporary construction camp located near the airstrip.

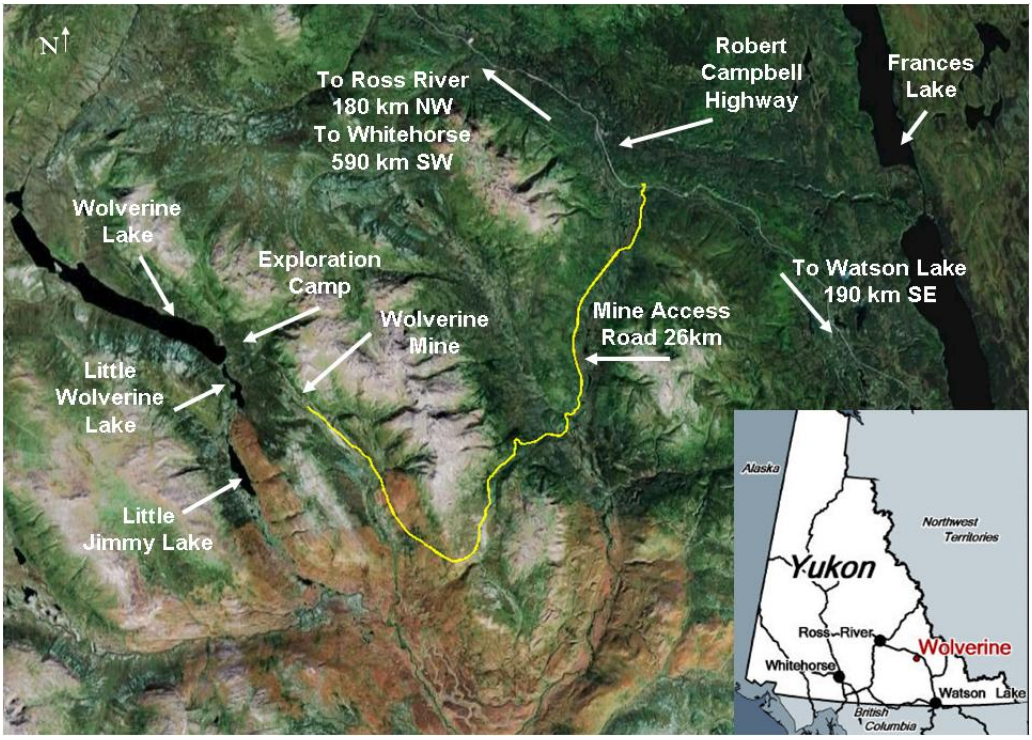


Figure 1: Location of Yukon Zinc Corporation's Wolverine Project.

1.1 Summary of 2007 and 2008 Activities

The main activities completed in 2007 and 2008 were: construction of the all-weather road access from the Robert Campbell Highway; installation of a temporary construction camp; earthworks and site utility installation to prepare for installation of the permanent camp; the installation of a diversion ditch upslope of the tailings facility and removal of organic material within the tailings facility area to allow for site drainage before the onset of bulk excavation works in spring 2009. Design and construction details pertaining to these activities were provided in previously approved General Site Plans (GSP), including:

1. *GSP Version 2006-02 (November 2006)*

- Details and drawings for the Phase 1 and Phase 2 access road completed by Yukon Engineering Services Ltd. (YES),
- Phase 1 access road closure plan
- Site infrastructure descriptions for the permanent 150 person camp, mill building and ancillary facilities, underground mine development and the tailings facility

2. *GSP Version 2007-03 (April 2007)*

- All-weather road and stream crossing details, traffic and access control measures, and borrow source design by YES, environmental and geotechnical testing protocols by AMEC, best management practices and mitigation measures for construction related activities, construction monitoring plans, and reclamation plans and cost estimates for closure of the road and borrow sites
- Bunker Creek bridge and bin-wall abutments general arrangement and detail drawings (Associated Engineering and Armtec)
- Permit #1560 for Resource Road Access (issued by Yukon Highways and Public Works in March 27, 2007)
- Site infrastructure drawings including the permanent 150 person camp, mill building and ancillary facilities, underground mine, and tailings facility including diversion ditches

A summary of road building activities and permanent camp pad preparation activities completed in 2007 have been submitted as per *Quartz Mining License* (*QML)-0006* requirements in the *Wolverine Project 2007 Annual Report.*

Documentation of the 2008 activities including the installation of Bunker Creek bridge, access road alignment and grade improvements, tailings facility site preparation (installation of diversion ditches and removal of organic material), and the permanent

camp utilities installation are briefly summarized herein and details will be provided in the *QML-0006 Wolverine Project 2008 Annual Report* (due March 31, 2009).

1.2 Corporate Update

On July 2, 2008, Jinduicheng Molybdenum Group Ltd and Northwest Nonferrous International Investment Company Ltd. (JXC) took sole ownership of Yukon Zinc Corporation. The new ownership intends to proceed with development and operation of the Wolverine Project as described herein. The YZC management team has expanded to increase internal capacity in engineering, construction, and project controls to execute the development and operation of the Wolverine Project over the 2009 and 2010 period in a timely and responsible manner.

Protection of the environment continues to be a corporate priority for YZC. Since the issuance of the last *General Site Plan* in June 2007, YZC has issued several policies, including an *Environmental Protection Policy*, a *Health and Safety Policy*, a *Heritage Resources Protection Policy*, and a *Wolverine Project Firearm Policy*.

Through the development and implementation of its policies and Environmental Protection and Mine Operating plans, YZC strives to preserve and protect the environment while providing a safe and responsible operating environment. YZC is committed to managing its business in a way that will contribute to and achieve a high level of environmental performance, and meet the goal of continuous improvement.

2 Wolverine Project Regulatory Update

2.1 Permits and Licences

Yukon Zinc Corporation was issued *Type A Water Licence QZ04-065 (A-Licence)* by the Yukon Water Board on October 4, 2007. Along with *Quartz Mining License QML-0006*, YZC currently operates according to the major and minor permits (issued to January 31, 2009) for the construction and operation phases of the project that are summarized in Table 1.

Table 1: Permits Issued for the Wolverine Project (to January 2009).

Permits Issued	Issuing Dept./Board	Purpose	Date of Receipt	Expiry
Mining Land Use Permit LQ00140	Yukon Energy, Mines and Resources (EMR)	To establish and use exploration site roads/ trails and camp, and temporary waste rock pad.	Jan. 18, 2005	Jan. 17, 2015
Type B Water Licence QZ01-051	Yukon Water Board (YWB)	To use water at the exploration camp and for drilling; deposit wastes in the waste rock pad.	April 4, 2005	Jan. 11, 2015
Quartz Mining License QML-0006	EMR	For project development, operation, and closure activities.	Dec. 5, 2006	Dec. 1, 2021
Type A Water Licence QZ04-065	YWB & Yukon Executive Council Office	To use water, deposit wastes, and modify the bed and bank of a watercourse for the purposes of mining and milling.	Oct. 4, 2007	Dec. 31, 2027
Explosives Storage Permits YT460, YT461, YT462	Yukon Workers' Compensation Health and Safety Board	Compliance with the Occupational Health and Safety Act and Regulations	Dec. 5, 2007	Dec. 5, 2012
Land Treatment Facility Permit #4202-24-022	Yukon Environment (YE)	To operate a land treatment facility for the bioremediation of hydrocarbon contaminated soil	Sept. 19, 2007	Dec. 31, 2009
Commercial Dump Permit #81-014	YE	To operate a landfill for disposal of solid wastes	June 11, 2007	Dec. 31, 2009
Air Emissions Permit #4201-60-021	YE	For use of a solid waste incinerator and burning of construction wastes	Feb. 5, 2009	Dec. 31, 2011
Special Waste Permit #43-046	YE	To generate and store waste oil, diesel, antifreeze & batteries; incineration of waste oil & diesel.	Oct. 24, 2007	Dec. 31, 2009
Sewage Disposal Permit #3337	Yukon Health and Social Services	Permit to install and operate a sewage disposal system	Sept. 24, 2008	n/a

2.2 Quartz Mining License Submissions

Since the issuance of the *General Site Plan* (*V2007-03*) in 2007, two plans submitted by YZC to EMR were approved:

- Reclamation and Closure Plan (V2008-02), approved by EMR in March 2008
- Heritage Resource Protection Plan (V2007-01), approved by EMR in November 2007.

Information included in this GSP, to satisfy *QML-0006* Condition 6.2, includes updated information on the overall project layout, project development schedule, site and underground mine development overview, and construction details for the permanent camp, site roads, and tailings facility diversion ditches. Detailed engineering design is being finalized for the tailings and seepage dams and the industrial complex buildings. This information will be submitted as it is completed (anticipated dates provided in Section 2.2.2, Table 3). This GSP supersedes versions V2006-02 and V2007-03, with the exception of Section 5.3 and Appendices A and B from version V2007-03, which are provided in Appendix F. Therefore this GSP reflects all current layout and design details.

2.2.1 Environmental Protection Plans

Under *QML-0006*, YZC is committed to the development of five Environmental Protection Plans (EPPs). Each EPP provides YZC with a practical way to demonstrate its understanding of the regulatory environment, and documents practices and procedures required to minimize or eliminate potential environmental and socio-economic impacts throughout YZC's work areas, activities and operations.

Each EPP has been or will be structured so that it can be updated, if required, as the project advances and develops. The status of each EPP required by *QML-0006* is summarized in Table 2. Appendices A, B, C and D contain the current commitments and plans for waste management, monitoring and surveillance, spill contingency and wildlife protection, respectively. The content of these Appendices will be integrated into separate plans that will be submitted for review and approval by EMR.

Each EPP is a living document to be used in the field by site management and project personnel, as well as at the corporate level to ensure that commitments are implemented and monitored. EPPs also provide YZC, government regulators, stakeholders and First Nations with a reference for monitoring compliance and a mechanism for making suggestions for improvement.

Table 2: Status of Wolverine Project Environmental Protection Plans.

Requirement	Date Submitted	Date Approved	Comments
Waste Management Plan	June 30, 2006 V2006-01	Dec. 5, 2006[1]	See Appendix A for current plan - Updated plan V2009-02 to be submitted by mid 2009
Monitoring and Surveillance Plan	June 19, 2006 V2006-01	Dec. 5, 2006[1]	See Appendix B for current plan - Updated plan V2009-02 to be submitted by early 2009
Spill Contingency Plan	May 17, 2006 V2006-01	Dec. 5, 2006[1]	See Appendix C for current information - Updated plan V2009-02 to be submitted by early 2009
Wildlife Protection Plan	n/a[2]	June 8, 2007[2]	See Appendix D for current commitments – 2009-01 Plan in development with YTG and Kaska for completion early 2009
Heritage Resource Protection Plan	Oct. 26, 2007 V2007-01	Dec. 11, 2007	Plan is current.

2.2.2 Mine Operating Plans

Under *QML-0006*, YZC is committed to the development of three Mine Operating Plans (OPs), which will be submitted for review and approval once detailed design work is completed. The status of each OP is summarized in Table 3.

Table 3: Status of Wolverine Project Mine Operating Plans.

Requirement	Date Submitted	Date Approved	Comments
Mill Operating Plan	May 24, 2006 V2006-01	Dec. 5, 2006[3]	Section 3.4 herein provides an update to *GSP 2007-03* - Plan V2010-02 will be submitted by early 2010 prior to mill operation.
Mine Development and Operation Plan	April 27, 2006 V2006-01	Dec. 5, 2006[3]	Section 3.5 herein provides an update to *GSP 2007-03*- Plan V2009-02 will be submitted by the end of 2009.
Tailings and Infrastructure Design and Construction Plan	May 11, 2006 V2006-01	Dec. 5, 2006[3]	Plan V2009-02 submitted Dec. 31, 2008 for review & approval. Final submission & approval anticipated February 2009.

[1] Version 1 Environmental Protection Plans (V2006-01) were approved with issuance of *QML-0006*, and revised plans require submission for approval as plans evolve with project advancement.

[2] Wildlife protection and mitigation practices previously committed to by YZC during the environmental assessment and 2005-07 permitting phases were documented and approved in *General Site Plan 2007-03.*

[3] Version 1 Mine Operating Plans (V2006-01) were approved with issuance of QML-0006, and require revision upon completion of detailed design and submission to EMR for approval.

3 Project Schedule and Development

3.1 Project Development Schedule

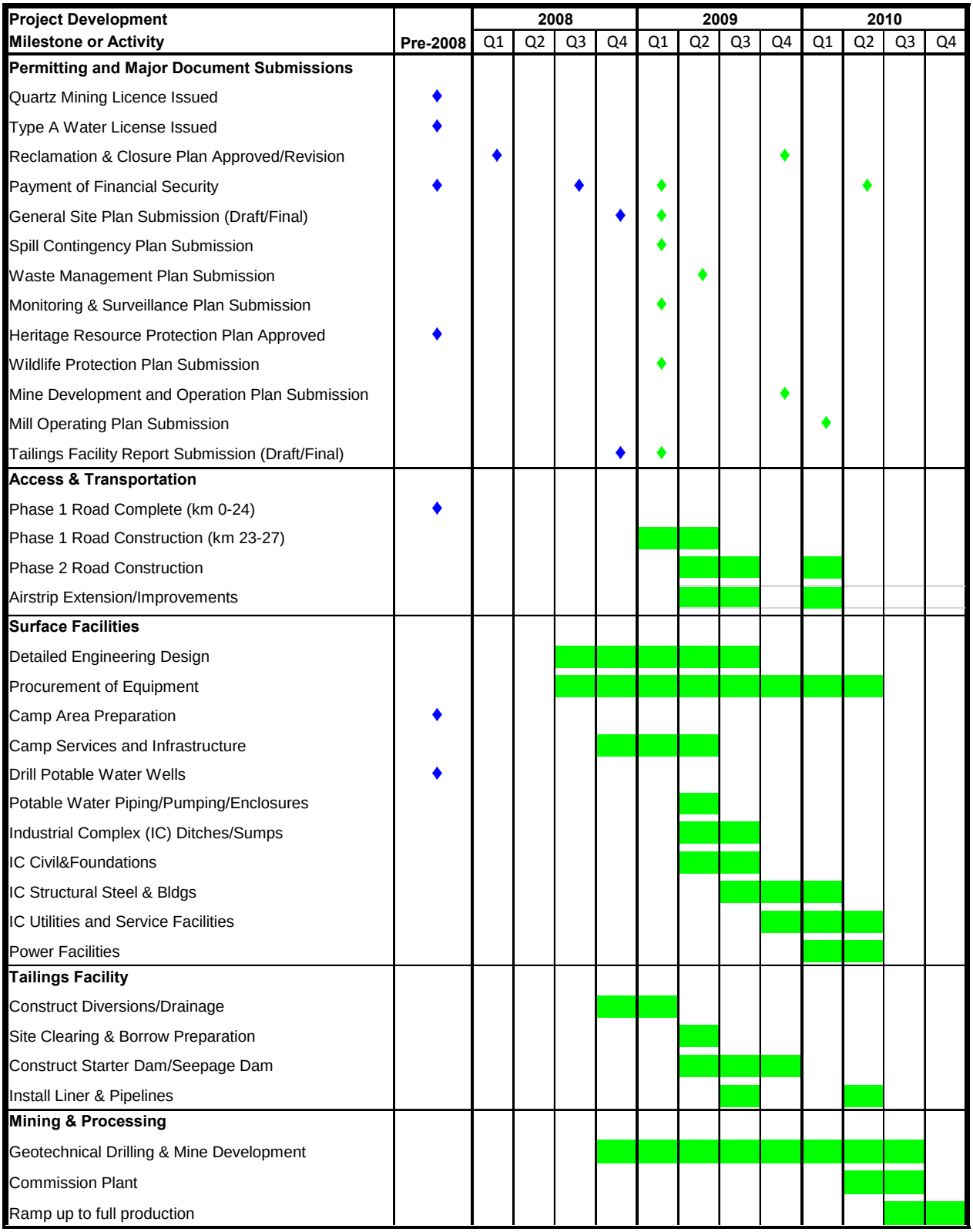
The development of the surface infrastructure and the underground is estimated to take approximately one and one half years, resulting in commissioning of the plant in June 2010 and full production by late summer 2010. The schedule for development activities at the Wolverine Project is provided in Figure 2. *QML-0006* submission requirements, including Environmental Protection Plan and Mine Operating Plan submissions described in Section 2, are also summarized in Figure 2.

3.2 Site Layout

The activities planned and the infrastructure to be constructed or in use as described herein are located on claims owned by YZC, with the exception of the Money Claims, which are subject to an Option Agreement with YGC Resources Ltd. Figure 3 provides the claim map for the project area (from the exploration camp to the Robert Campbell Highway).

Based on an optimization study conducted in late 2007, the completion of preliminary detailed engineering design work in fall 2008, and several other technical studies in 2008, several minor modifications have been made including:

- The layout of buildings and roads within the industrial complex area has been revised to capitalize on favourable ground conditions for the mill and crushing facility locations, and the addition of conveyors to decrease surface ore haulage. The fresh return air raises for mine ventilation have been relocated from the area upslope (north) of the portal, to a single incline raise west of the portal. All fuel storage and dispensing locations have been consolidated to an area east of the portal.
- The dense media separation (DMS) circuit has been removed from the plant process, thereby negating the requirement for a DMS stockpile near and a DMS haul road to the tailings facility.
- The permanent camp occupancy has increased from 150 to 205 people. Sewage treatment and potable water treatment plants have been sized within the allowable limits of *Type A Water Licence QZ04-065* and will be located adjacent to the camp. Potable water will be pumped from wells upslope of the camp and to reduce power requirements with the additional pumping distance.



Note: blue diamond = completed activity; green diamond/bar = activity to be completed.

Figure 2: Project Development and Regulatory Submission Schedule 2008-2010.

- The water treatment plant and retention pond have been relocated within the industrial complex area (as originally scoped during the EA process) to improve operational efficiencies (access to power, use of waste heat, etc.).
- The waste management area (consisting of the landfill, incinerator and recycling area, and a separate waste storage area for waste that will be hauled offsite for final disposal) location has been refined east of the waste rock pad. Due to safety setback requirements from the explosive magazines and proximity to other future infrastructure, the explosive magazines have been relocated along the old upper exploration site road northwest of the portal.
- The tailings facility diversions ditches (Ditches A and B) have been re-designed to reduce overall length and minimize disturbance while diverting the same catchment areas around the facility. The Go Creek freshwater pipeline is no longer required, as Ditch A has been designed to fulfill the purpose of initial filling of the tailings facility basin to commission the process plant.
- The access road from approximately km 23 to 25 has been relocated from the northeast to the southwest side of the tailings facility to allow for diversion Ditch B construction along the old northeast temporary access road, tailings and reclaim pipeline placement along the new southwest access road, and construction of the seepage dam at km 23.75 along the southwest access road embankment.
- The concrete batch plant has been relocated approximately 100 m southeast to the area immediately southwest of the waste rock pad, where borrow material was previously excavated for water rock pad liner cover.
- A Sprung building constructed in late 2008 within the industrial complex area, that currently contains a sump for underground dewatering storage and drill water supply, will be modified in 2009 for use as a truck and maintenance shop. Another freshwater pond will be constructed to the northwest of the shop for storage of underground mine dewatering water.

Figure 4 contains the overall site layout for the main mine site area from the industrial complex to the tailings facility, for both existing (in blue) and new (in orange) infrastructure. Figure 5 shows the general arrangement for industrial complex existing and new infrastructure. New infrastructure includes the crushing, concentrate loadout, mill and administration buildings, truckshop, fuel storage and genset areas, inclined ventilation raise, 205 person camp with sewage and potable water treatment plants, and mine and surface water management and treatment infrastructure. Details for these main areas of development are provided in the sections that follow.

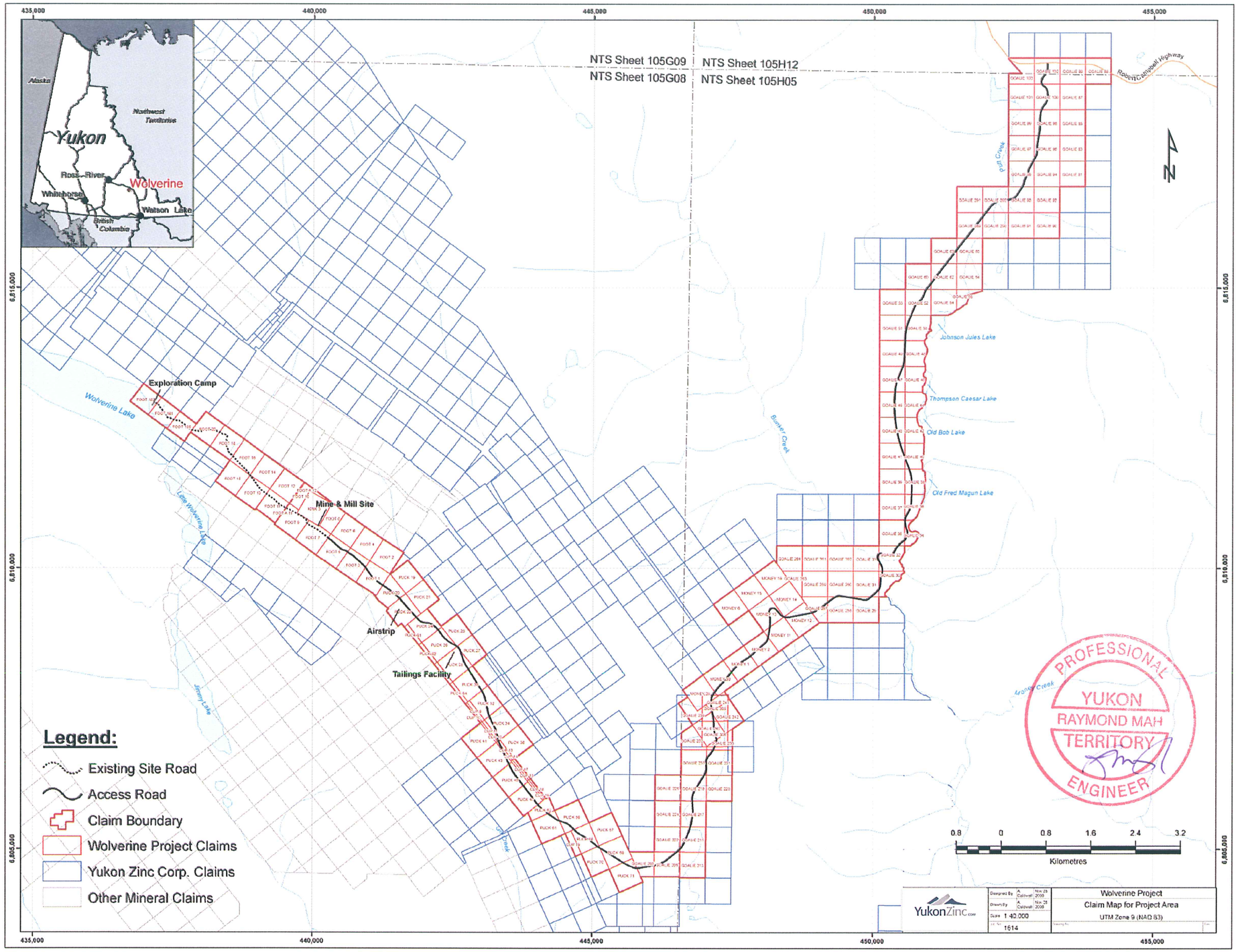


Figure 3: Map of Wolverine Project Area Claims

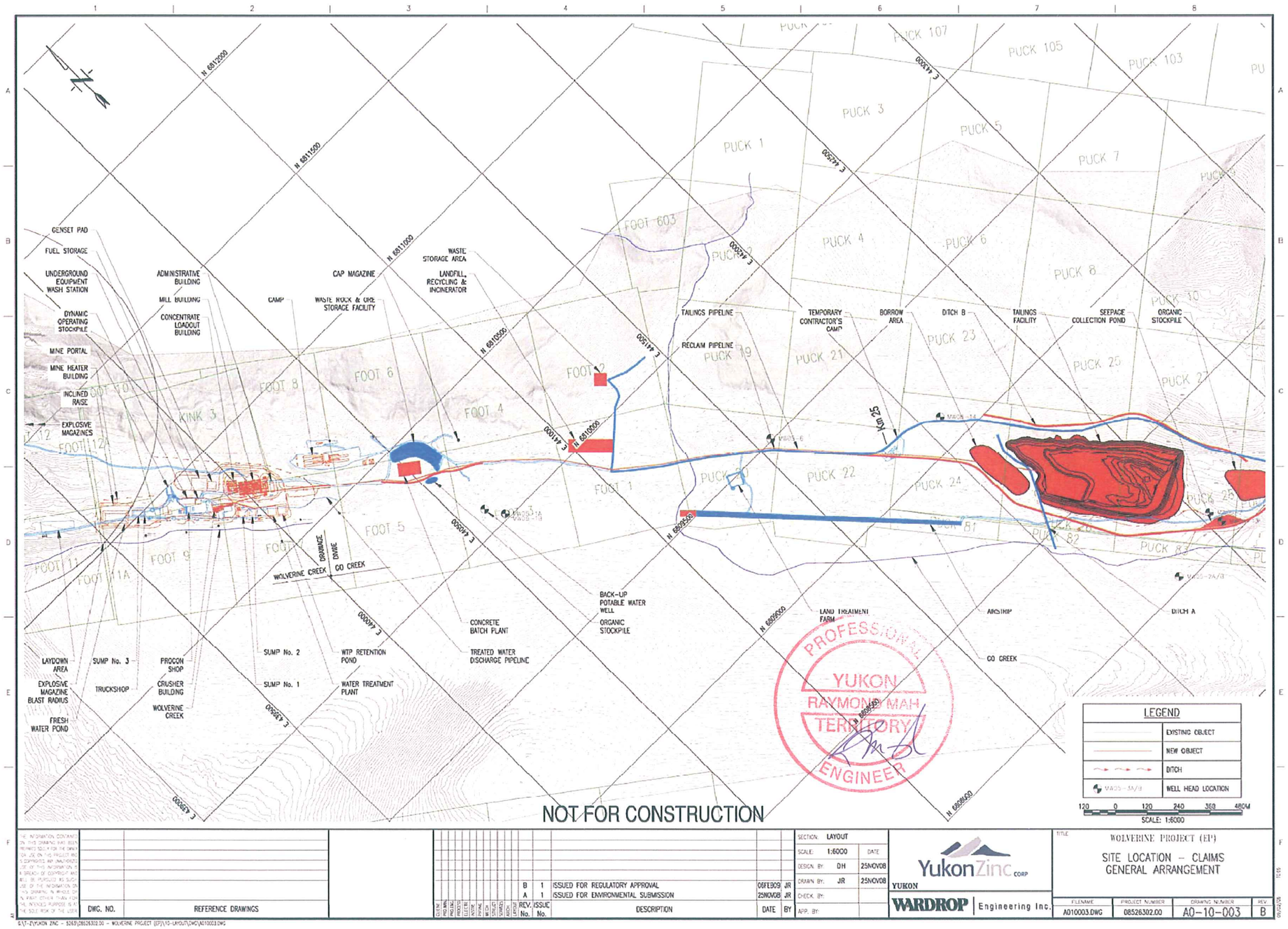


Figure 4: **Overall Site Layout with Mineral Claims.**

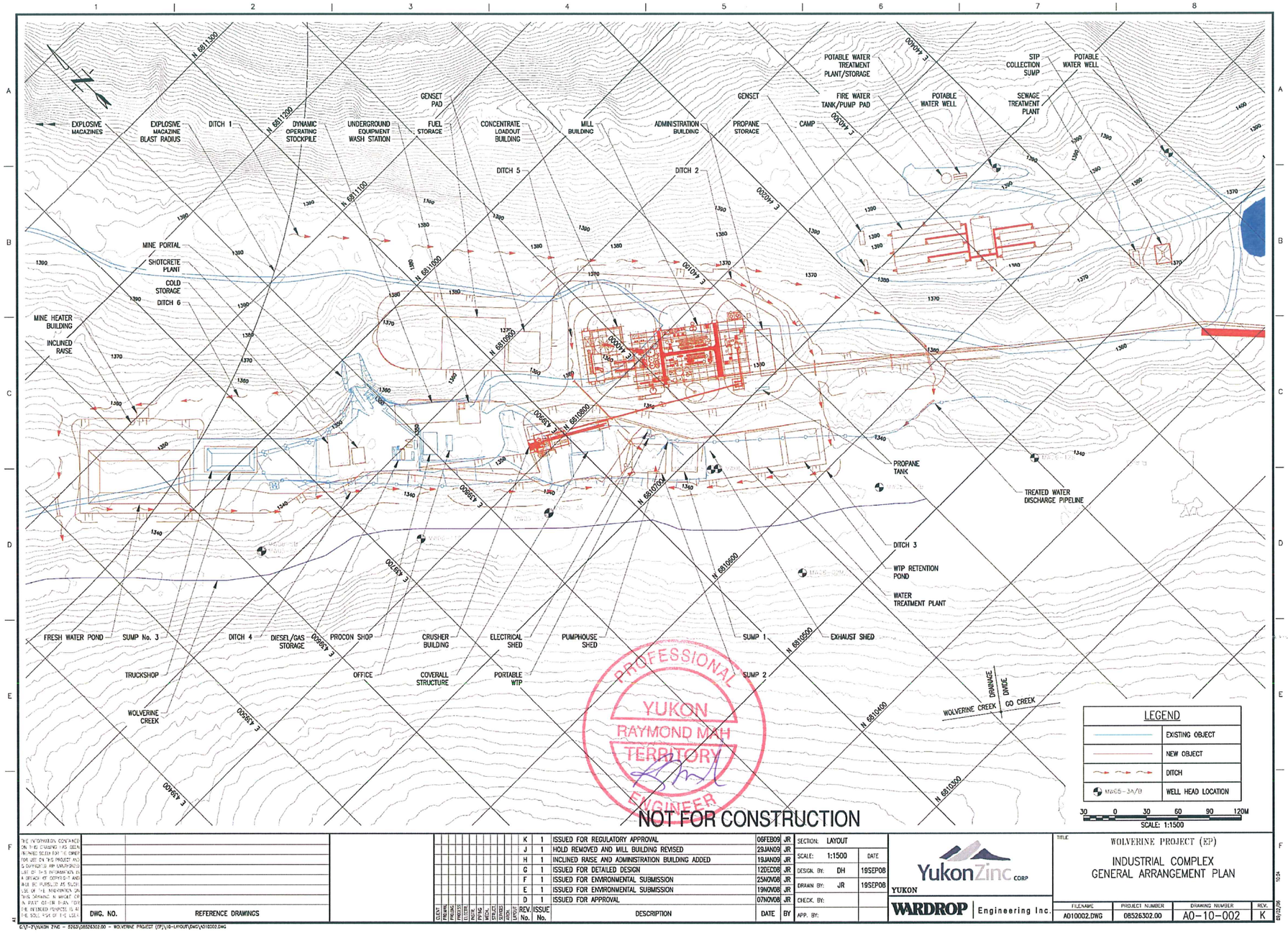


Figure 5: **Industrial Complex and Camp Layout.**

Table 4 provides a summary of the claims and the location of industrial complex buildings, transportation infrastructure, the exploration and permanent camps, organic stockpile locations, laydown and borrow areas, the tailings facility, and the ore body.

Table 4: Claims List for Wolverine Project Infrastructure.

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YB87703	CUP	9	access road, borrow site
YB87704	CUP	10	access road, borrow site
YB87705	CUP	11	access road
YB87706	CUP	12	access road
YB87707	CUP	13	access road
YB87708	CUP	14	access road
YB87709	CUP	15	access road
YB87710	CUP	16	access road
YB87711	CUP	17	access road
YB87712	CUP	18	access road, borrow site
YB87713	CUP	19	access road, borrow site
YB45954	FOOT	1	landfill and incinerator, tailings pipeline, site roads, airstrip
YB45955	FOOT	2	waste storage area, site roads
YB45956	FOOT	3	tailings pipeline, site roads, back-up potable water wells
YB45957	FOOT	4	cap magazine site, site roads
YB45958	FOOT	5	tailings pipeline, waste rock pad, site roads, organic stockpile, concrete batch plant
YB45959	FOOT	6	waste rock pad, camp, site roads, sewage treatment plant and holding pond, potable water wells and treatment plant
YB45960	FOOT	7	industrial complex, tailings pipeline, site roads
YB45961	FOOT	8	industrial complex, camp, site roads
YB45962	FOOT	9	industrial complex, ore body, site roads, ventilation raise
YB45963	FOOT	10	industrial complex, ore body, site roads
YB51608	FOOT	11	site roads, laydown area
YB71274	FOOT	11A	industrial complex, site roads
YB51609	FOOT	12	ore body, site roads
YB71275	FOOT	12A	industrial complex, ore body, site roads
YB45966	FOOT	13	site roads
YB45967	FOOT	14	site roads, explosive magazines
YB45968	FOOT	15	site roads
YB45969	FOOT	16	site roads
YB45971	FOOT	18	site roads
YB45973	FOOT	20	site roads
YB59982	FOOT	180	site roads
YB59983	FOOT	181	exploration camp, site roads
YB59984	FOOT	182	exploration camp, site roads
YC25006	GOALIE	29	access road, borrow site

Table 4: Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YC25007	GOALIE	30	access road
YC25008	GOALIE	31	access road, borrow site
YC25009	GOALIE	32	access road, borrow site
YC25010	GOALIE	33	access road, borrow site
YC25011	GOALIE	34	access road
YC25012	GOALIE	35	access road
YC25013	GOALIE	36	access road
YC25014	GOALIE	37	access road
YC25015	GOALIE	38	access road, borrow site
YC25016	GOALIE	39	borrow site
YC25017	GOALIE	40	access road
YC25018	GOALIE	41	access road
YC25019	GOALIE	42	borrow site
YC25020	GOALIE	43	access road
YC25021	GOALIE	44	borrow site
YC25022	GOALIE	45	access road, borrow site
YC25023	GOALIE	46	borrow site
YC25024	GOALIE	47	access road, borrow site
YC25025	GOALIE	48	access road
YC25026	GOALIE	49	access road
YC25027	GOALIE	50	access road
YC25028	GOALIE	51	access road
YC25029	GOALIE	52	access road, borrow site
YC25030	GOALIE	53	borrow site
YC25031	GOALIE	54	borrow site
YC25032	GOALIE	55	borrow site
YC25037	GOALIE	60	access road
YC25039	GOALIE	62	access road
YC25040	GOALIE	63	access road, borrow site
YC25041	GOALIE	64	borrow site
YC25042	GOALIE	65	access road, borrow site
YC25058	GOALIE	81	borrow site
YC25060	GOALIE	83	borrow site
YC25062	GOALIE	85	borrow site
YC25064	GOALIE	87	borrow site
YC25065	GOALIE	88	borrow site
YC25066	GOALIE	89	borrow site
YC25067	GOALIE	90	borrow site
YC25068	GOALIE	91	borrow site
YC25069	GOALIE	92	borrow site
YC25070	GOALIE	93	borrow site
YC25071	GOALIE	94	borrow site
YC25072	GOALIE	95	access road
YC25073	GOALIE	96	access road

Table 4: Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YC25074	GOALIE	97	access road
YC25075	GOALIE	98	access road
YC25076	GOALIE	99	access road, borrow site
YC25077	GOALIE	100	access road
YC25078	GOALIE	101	borrow site
YC25079	GOALIE	102	access road, staging area, borrow site
YC25080	GOALIE	103	borrow site
YC25182	GOALIE	205	access road
YC25183	GOALIE	206	access road
YC25299	GOALIE	213	borrow site
YC25301	GOALIE	215	access road
YC25303	GOALIE	217	access road, borrow site
YC25305	GOALIE	219	access road, borrow site
YC25306	GOALIE	220	borrow site
YC25308	GOALIE	222	access road
YC25310	GOALIE	224	borrow site
YC25312	GOALIE	226	borrow site
YC25316	GOALIE	230	access road
YC25317	GOALIE	231	access road
YC25318	GOALIE	232	borrow site
YC25319	GOALIE	233	access road, borrow site
YC25325	GOALIE	239	access road
YC25326	GOALIE	240	access road
YC25327	GOALIE	241	access road
YC25328	GOALIE	242	access road
YC25343	GOALIE	257	access road
YC25344	GOALIE	258	access road
YC25345	GOALIE	259	borrow site
YC25346	GOALIE	260	access road, borrow site
YC25347	GOALIE	261	borrow site
YC25348	GOALIE	262	borrow site
YC25349	GOALIE	263	borrow site
YC25350	GOALIE	264	borrow site
YC29140	GOALIE	289	access road, borrow site
YC29141	GOALIE	290	access road
YC29142	GOALIE	291	access road
YC29143	GOALIE	292	access road, borrow site
YC29439	GOALIE	305	access road, borrow site
YC29440	GOALIE	306	access road, borrow site
YA69009	KINK	3	industrial complex, ore body, pipelines
YB16726	MONEY	1	access road, borrow site
YB16727	MONEY	2	access road, borrow site
YB16731	MONEY	6	borrow site
YB16736	MONEY	11	access road

Table 4: Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YB16737	MONEY	12	access road
YB16738	MONEY	13	access road
YB16739	MONEY	14	access road
YB16740	MONEY	15	borrow site
YB16741	MONEY	16	borrow site
YB51934	MONEY	29	access road, borrow site
YB51935	MONEY	30	access road, borrow site
YB55997	PUCK	19	borrow site
YB55998	PUCK	20	airstrip, pipelines, access and site roads, land treatment facility
YB55999	PUCK	21	borrow site
YB56000	PUCK	22	airstrip, pipelines, access road, temporary construction camp
YB56002	PUCK	24	pipelines, roads, borrow site, Ditch A, temporary construction camp
YB56003	PUCK	25	diversion Ditch B
YB56004	PUCK	26	tailings facility, access and site roads, Ditch B, borrow site
YB56005	PUCK	27	diversion Ditch B, site road
YB56006	PUCK	28	tailings facility, roads, Ditch B, organic stockpile, seepage dam
YB56008	PUCK	30	site roads, seepage dam, organic stockpile, borrow site
YB56010	PUCK	32	access road
YB56012	PUCK	34	access road
YB56014	PUCK	36	borrow site
YB56019	PUCK	41	borrow site
YB56021	PUCK	43	access road, borrow site
YB56023	PUCK	45	access road
YB56025	PUCK	47	access road
YB56037	PUCK	59	access road
YB56039	PUCK	61	access road
YB56040	PUCK	62	access road
YB56045	PUCK	67	borrow site
YB56046	PUCK	68	access road
YB56047	PUCK	69	access road
YB56048	PUCK	70	access road
YB56049	PUCK	71	access road
YC31888	PUCK	81	airstrip, site roads
YC31889	PUCK	82	airstrip, site roads, Ditch A
YC31890	PUCK	83	access road
YC31891	PUCK	84	borrow site

3.3 Transportation Infrastructure

Infrastructure to support transportation requirements during site development and operation includes the airstrip and roads within to the project area and to the Robert Campbell Highway.

3.3.1 Airstrip

In 2007, access to the airstrip was relocated from the northwest to the southeast of Go Creek to avoid flooding issues associated with the road culverts during spring freshet.

In early 2009, the current airstrip will be evaluated to determine what improvements are required to accommodate larger aircraft to transport operations personnel to and from site. YES will complete detailed plans and YZC will submit these plans to EMR for approval prior to these works being initiated.

3.3.2 Roads

In 2007, YZC completed the first phase of access road construction from km ~190 of the Robert Campbell Highway to the project site (Picture 1).

Picture 1: Access Road at km 3, Looking South Towards the Mine Site.

Prior to the onset of road construction, several reports prepared by YES and YZC containing design specifications, sampling and monitoring details, and drawings were submitted to and approved by EMR, including:

- *All Weather Access Road Plan* (June 2006)
- *Phase 1 All Weather Access Road* (October 25, 2006)
- *Phase 2 All Weather Access Road* (January 16, 2007)
- *Wolverine Project General Site Plan, Version 2007-03* (April 6, 2007)

The submission of these plans satisfied requirements of *QML-0006*, including information pertaining to the location and design of the gate installed to prevent public use of the access road. As required, the gate was installed at the Robert Campbell Highway access point within 30 days of obtaining approval (Picture 2). YZC has installed an additional gate in a marshy area ~400 m from the first gate to ensure that unauthorized access is prevented. The location of the gates is illustrated in Figure 6, and additional details have been submitted in the *Wolverine Project 2007 Annual Report*.

The road was operational in late August 2007 and has been used to supply fuel and other supplies to support current operations. In September-October 2008, additional improvements were completed to permit the safe transportation of large equipment and the camp to site in 2009. Activities included the replacement of the temporary bridge with a permanent bridge at Bunker Creek (Picture 3), the removal of a bedrock outcrop at km 15, and road grade improvements near km 15 and 19.

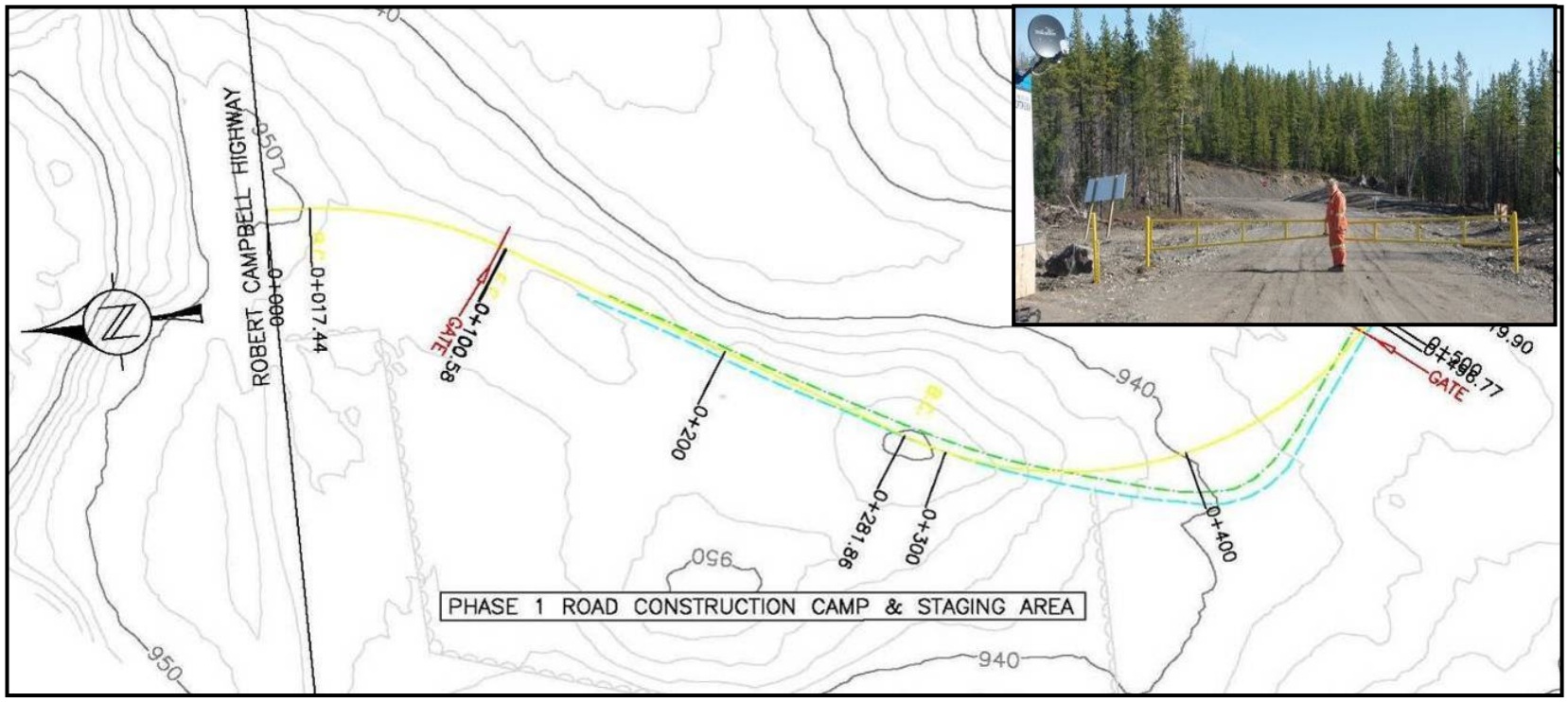


Figure 6: Wolverine Mine Access Control Gates at km 0.1 and km 0.49.

Picture 2: Access control gate at gatehouse (km 0.1), looking north.

Picture 3: Bunker Creek Permanent Bridge.

Road construction activities scheduled in 2009 will include the construction of the access road on the southwest side of the tailings facility from km 23+150 to km 27+200 (note that *GSP 2007-03* contained detailed plans for km 0 to km 24). The YES plan/profile sheets and design cross sections for this road segment are provided in Appendix E. The site road currently in use on the upslope (northeast) side of the tailings facility will be used to construct tailings facility diversion Ditch B (see Section 3.7).

Prior to the start of production in mid 2010, YZC will improve the road to the Transportation Association of Canada RLU 60 Single Lane Resource Road level (referred to as Phase 2) for concentrate haul trucks and service vehicle use during the operations phase, as previously detailed in *GSP 2007-03*. The main improvements include decreasing side slopes, widening the road or adding pull out bays in certain locations, replacing culverts at Hawkowl Creek, and adding a granular surface.

As required by *QML-0006*, within 60 days of completing construction of the Phase 2 access road, YZC will submit an as-built report containing engineered-stamped drawings and descriptions of any reclamation activities undertaken or to be undertaken in relation to any borrow sites used in construction of the access road. Current cost estimates for reclamation and closure of the access road are documented in *Wolverine Project Reclamation and Closure Plan Version 2008-02.*

3.4 Industrial Complex Area and Underground Mine

The industrial complex area is an expansion of the existing operations and laydown areas established in 2005 during the advanced exploration phase. The mill building site and

associated process and ancillary facility locations were selected to take advantage of suitable ground conditions and to minimize the excavation requirements. Ore processing facilities are housed in a pre-engineered steel structure insulated buildings covered with metal cladding.

Starting in spring 2009, surface runoff diversion ditches (Ditches 1 and 6) on the upslope side of the industrial complex area will be constructed to direct clean runoff around the site to Wolverine Creek. Site runoff collection ditches upslope (Ditches 2 and 5) and down slope (Ditches 3 and 4) of the industrial complex area will also be constructed to collect runoff from the site, and settle or treat it as necessary, prior to discharging to the Go Creek watershed. The locations of these structures are shown in Figure 5. Once the diversion and collection structures are in place, excavation work for the mill and crusher site will be a priority, followed by form work for foundations and the erection of buildings prior to fall 2009.

Laydown areas for construction supplies will be located at the airstrip and along site roads, and to the area northwest of the portal.

The crushing plant and conveyors are located to the west of the mill building, close to the portal to minimize ore haul truck travel. Areas and infrastructure associated with the mill operations include the power genset plant to the northwest, fuel station and storage area to the northwest, administration building to the southeast, truckshop to the west and water treatment facilities and lab to the southwest.

The diesel storage and dispensing tanks will be erected within a lined containment area so that containment is 110% of the largest fuel tank or 10% of the total capacity of all the tanks, whichever is greater. There will be three types of fuel storage:

- diesel storage for power plant and surface equipment use
- diesel (low sulphur) storage for underground mobile equipment
- gasoline storage for light duty vehicles

The underground intake air for the mine will be heated using specialized propane fired equipment located on the surface adjacent to the ventilation raise. Liquid propane will be stored under pressure in torpedo tanks near the heaters, and vaporized through conventional pressure relief equipment before use.

3.4.1 Mill Operations

The simplified process of ore processing including crushing, screening, grinding, floatation, and filtration is provided in Figure 7. This process has been modified in that it

no longer includes dense media separation (DMS), and hence all diluted ore from the mine will be sent through the process plant.

This has resulted in a milling rate increase from 1,400 t/day (or 1,700 t/day pre DMS) to 1,700 t/d (no DMS). Although there is an average daily increase in mill throughput, the overall amount of diluted ore milled over the Life of Mine (LOM) has not increased from earlier projections (5.15Mt). The LOM mass balance for the operation (numbers in brackets represent previous projections) is provided in Figure 8. Tailings will be pumped either to the tailings facility or to underground as paste backfill as shown in Figure 8.

3.4.2 Mill Operating Plan

As mill component design specifications and requirements are completed to a 'for construction' level of detail by Wardrop Engineering, flowsheets are also revised. Once all design work is completed, the *Mill Operating Plan* (MOP) will be prepared according to *QML-0006* Section 13.2. The submission date to EMR is anticipated to be early 2010 for review and approval by Chief, EMR. Construction details and drawings provided in the MOP will supersede all previous information submitted for the mill building and operation, power plant, and fuel storage area.

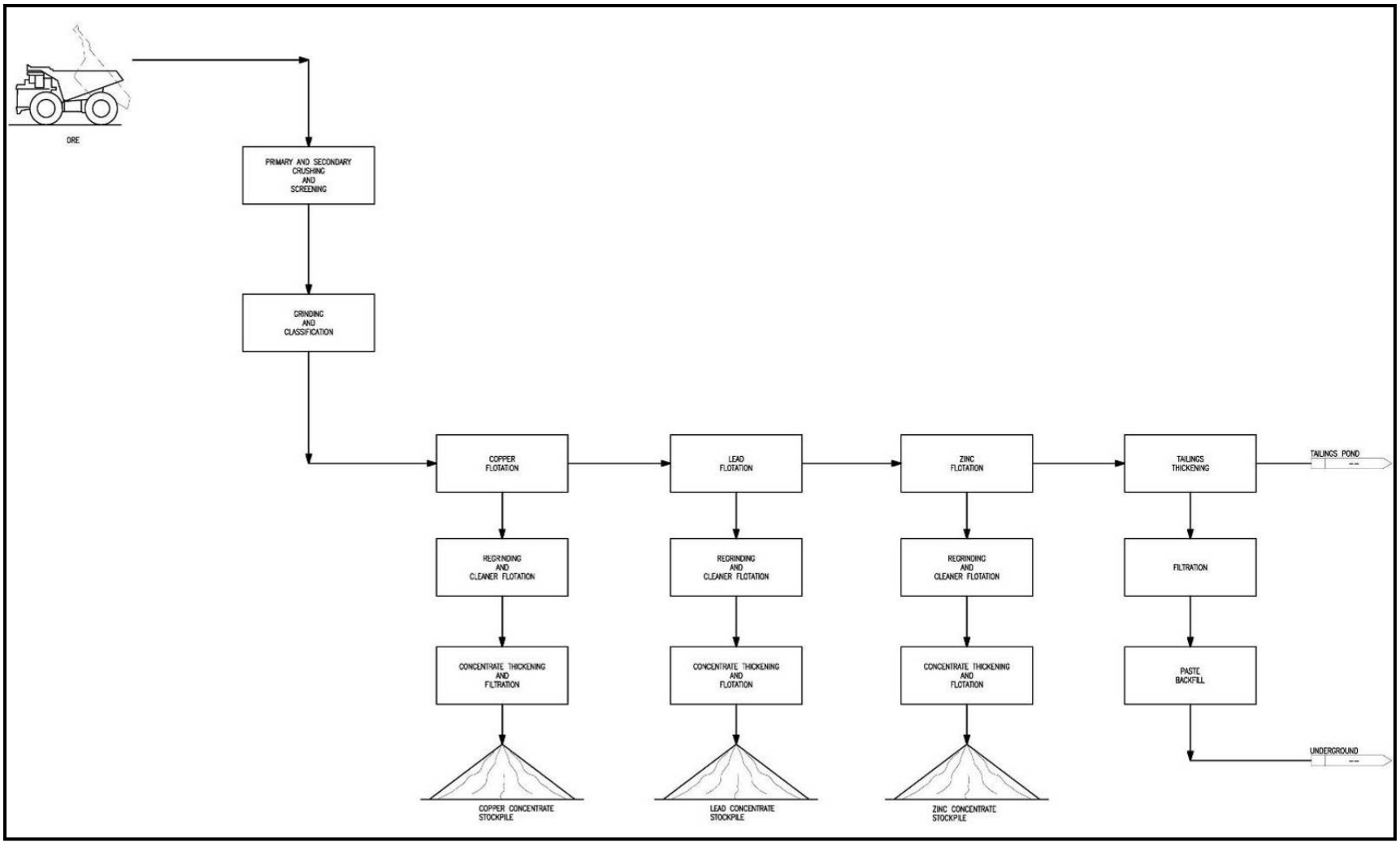
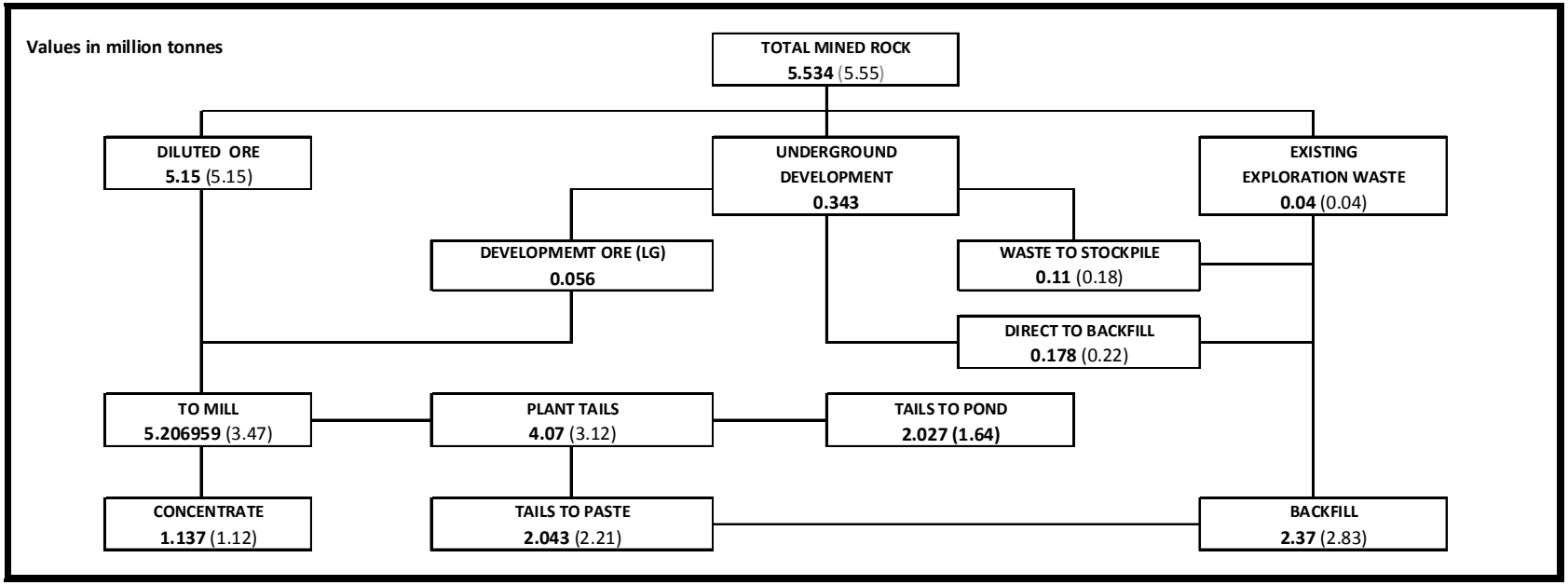


Figure 7: Simplified Process Flowsheet.



Values in ( ) are 2007 estimates provided in A Licence QZ04-065 Application; LG = Low Grade

Figure 8: **Life of Mine Mass Balance.**

3.5 Underground Mine Development

Mine pre-production development will occur from February 2009 to May 2010 to allow for full operating status in June 2010. During the pre-production period, an estimated 2,200 m of lateral development plus an estimated 600 m of raise development is planned.

In conjunction with lateral and raise development, additional activities include:

- mine rehabilitation including replacing the roadbed with segregated aggregate as needed, shotcreting the main ramp walls as needed, and encasing the existing steel sets in concrete as needed
- establish access to approximately ten active ore production faces on ten mining horizons
- provide additional development for ventilation distribution and emergency egress, including intake, exhaust, and egress raising
- install and commission several mining facilities and systems including power distribution, communications, ventilation, emergency egress, compressed air, water supply and de-watering
- install a paste-fill line into the mine.

Other infrastructure that supports the pre-production underground mine development includes the explosive and cap magazines, the temporary waste rock and ore storage facility, and water treatment infrastructure including Sumps #1, #2 and #3 (Figure 4).

The temporary waste rock and ore storage facility currently contains ~40,000 t of material generated during the 2005 underground test mine phase. In late summer 2007, the pad was extended ~150 m to the north to allow for storage of material that will be generated during the pre-production mine development program. Additional activities completed in 2008 included placing a clay liner on top of the geosynthetic liner for additional protection prior to placement of waste rock and ore on the pad in 2009. Details and as-constructed drawings are contained in the *Temporary Waste Rock and Ore Storage Facility As-Constructed Report and Drawings Advanced Exploration Phase* (December 2007). Commencing in spring 2009, approximately ~110,000 t of waste rock and low-grade ore will be added to the pad over a one year period. Closure plans for the waste rock pad are documented in *Wolverine Project Reclamation and Closure Plan Version 2008-02.*

A temporary sump (Sump #3 on Figure 5) was built near the portal (Picture 4) in fall 2008 to ensure that there is adequate surface capacity to allow for settling of water

pumped from the underground during 2009 and recycling for drill use. This water will either be recycled or pumped to Sump #1 and Sump #2 for treatment prior to discharge to Go Creek as per *B License LQ01-051* requirements. This underground dewatering/settling sump is a temporary structure and the building will be converted to a truckshop once the tailings facility is operational and the sump is no longer required.

Picture 4: Underground Dewatering/Settling Sump #3 Located Near the Portal.

3.5.1 Mine Development and Operation Plan

Once pre-production development is substantially underway, mine development and operation details will be finalized. Current development plans are provided in Figures 9 and 10 with plan and longitudinal projection views for mine pre-production development. The *Mine Development and Operation Plan* (MDOP) will be developed according to *QML-0006* Section 13.1 in late 2009. The MDOP will be submitted for review and approval by Chief, EMR. Construction details and drawings provided in the MDOP will supersede all previous information submitted to date for the mine and associated infrastructure.

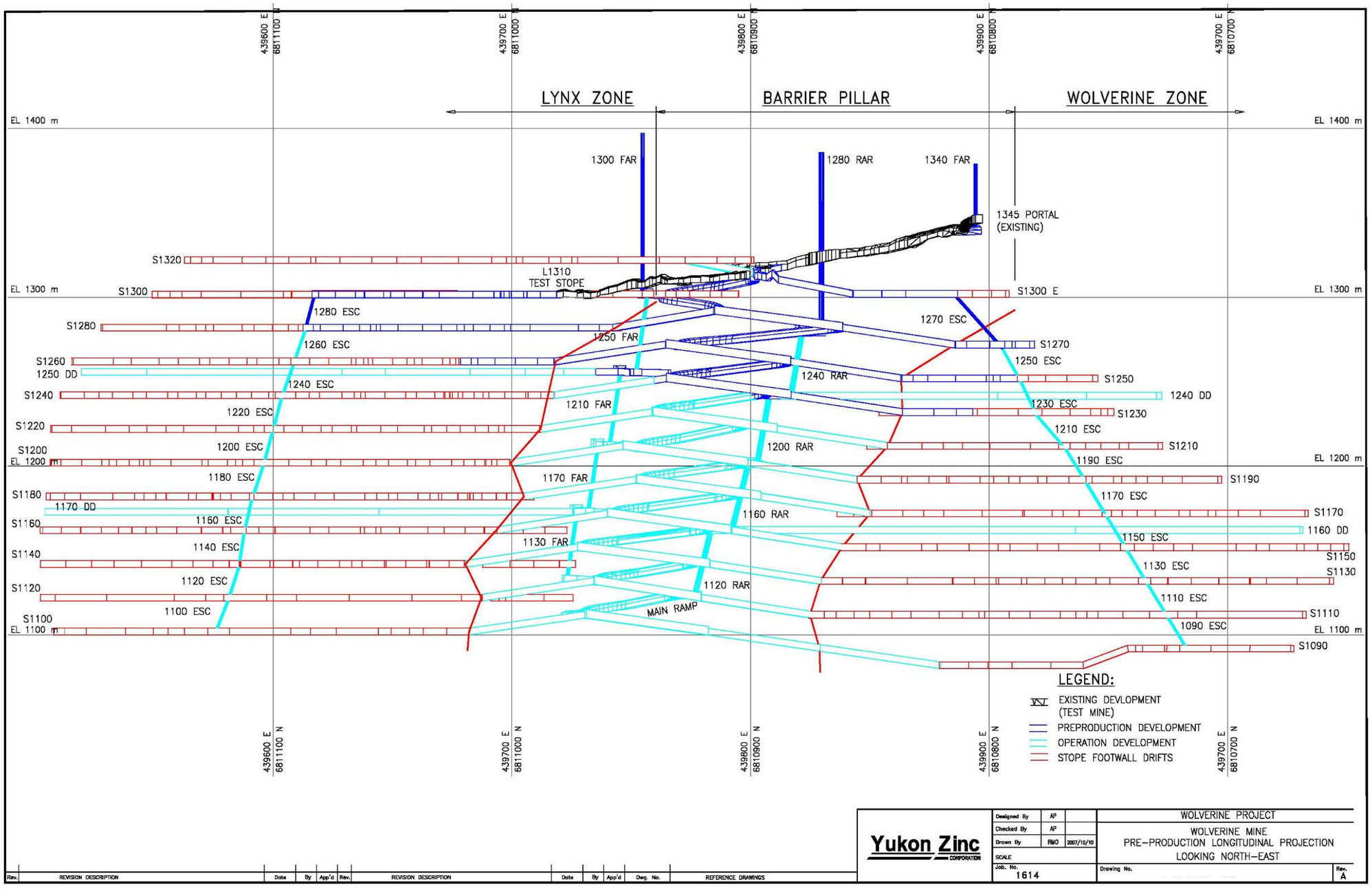


Figure 9: Wolverine Mine Development Plan

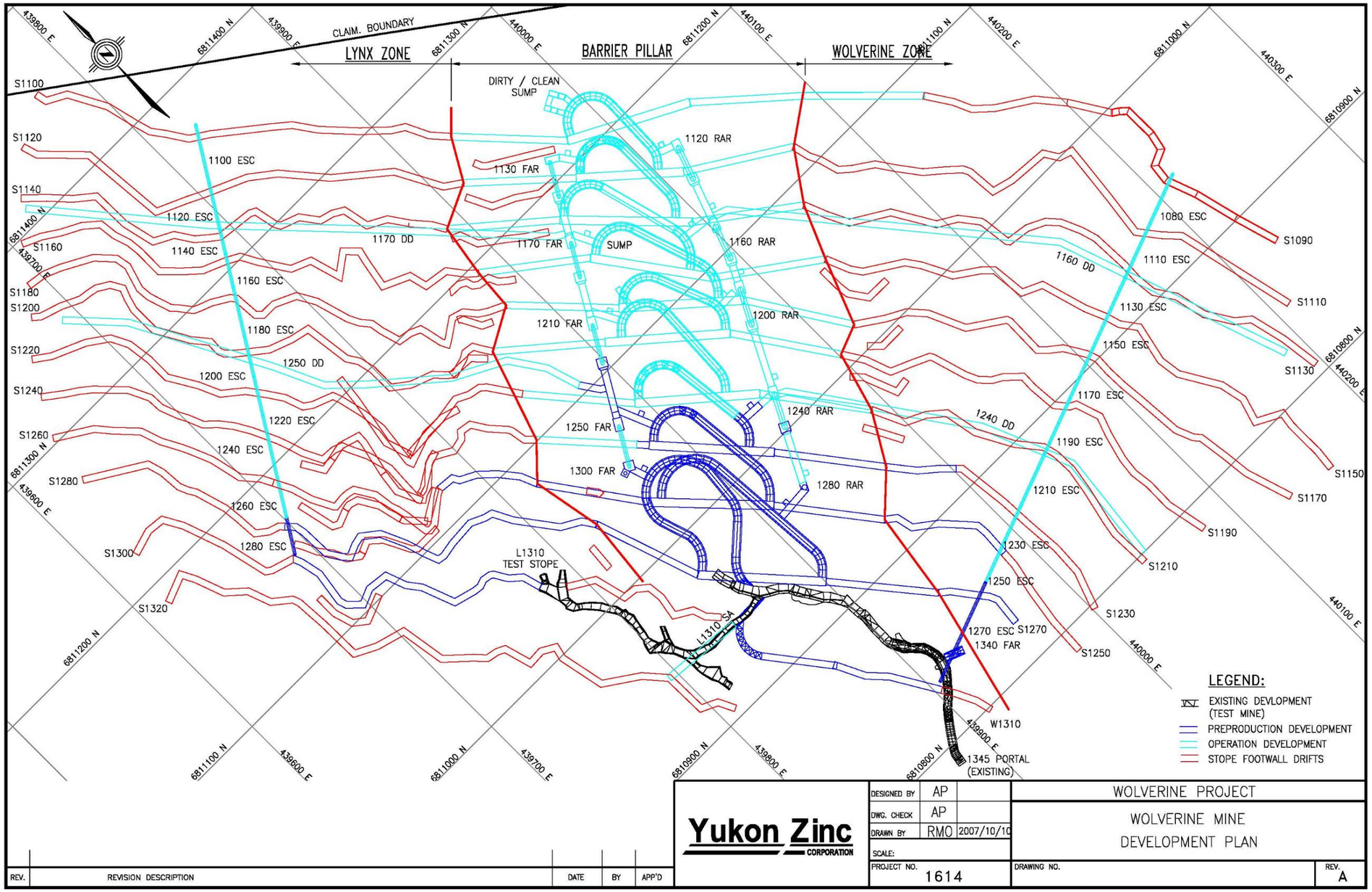


Figure 10: **Wolverine Mine Pre-production Longitudinal Projection Looking Northeast.**

3.6 Camp Infrastructure

Two small camps have been used to support construction activities over the 2007-08 periods. The YZC exploration camp located near Wolverine Lake will be used by YZC staff and underground mine contractor staff until the permanent camp is operational.

A temporary construction camp owned by Arctic Construction Ltd. has been installed to the north of the future tailings facility (Picture 5). The 50 person camp is self sufficient, with its own potable water well and sanitary system. This camp was previously located at the access road gatehouse during Phase 1 road construction activities, and will remain in its current location for the 2009 spring construction period. If additional capacity is required in early spring, a self-sufficient satellite camp (less than 50 person) may be installed in the vicinity. All camps will be operational until the permanent camp is operational, or until they are no longer required.

Picture 5: Temporary construction camp situated north of the tailings facility.

The permanent camp location is situated to the east of the mill building (Figure 5). In 2007, the 65 m x 273 m pad was levelled by cutting and filling from the northeast embankment to the southwest slope. In fall 2008, subsurface utilities including fire water, potable water and sewage pipelines, and propane lines were installed (Picture 6).

The camp has been manufactured by Northern Trailer and complies with Subsection 9.10.21 of the National Building Code of Canada (2005) and the requirements for fire protection and occupant safety of Section 4 of the Building Standards Act Order in Council 1985-147 of the Yukon Regulations.

Picture 6: Installation of the underground utilities for the permanent camp.

The camp will consist of five 41 person sleeper units, a kitchen/dining building and a recreation building arranged as separate buildings and without enclosed walkways (Figure 11). The sleeper, kitchen/dining and recreation buildings are 395 m^2, 556 m^2 and 116 m^2 in area, respectively. These modular units will be mobilized to site in January 2009 with the last units due by the end of February 2009. The camp will be operational in April 2009.

Although the occupancy of the camp has increased from 150 to 205 persons, the camp pad area is the same as previously described in *GSP 2007-03*. Potable water use and sewage treatment discharges (see Section 3.6.1 and 3.6.2, respectively) will remain within the limits permitted by the *Type A Water Licence QZ04-065*.

3.6.1 Potable Water Wells and Water Treatment

Potable water wells to supply the camp and mill were investigated and drilled in 2007, with supervision by Water Management Consultants (WMC). A test well, a production well, and a backup production well were installed in the Go Creek watershed in August and November 2007 (site locations called 'Back-up Potable Water Well' on Figure 4, south of the waste rock pad). Due to the distance of this location from the camp and mill locations, a second drilling program to test locations PW08-1 and PW08-2 in the upper Go Creek watershed was completed in October 2008 to determine if adequate water quantities and qualities could be obtained closer to the buildings (Figure 3). As 0.3 L/s is needed for potable water at the 205-man camp, both of these 2008 wells have adequate flow to supply site requirements. Water quality testing results indicate that water treatment will be required to eliminate turbidity. A potable water treatment plant will be installed on a small pad upslope of the camp, along with a fire water tank (Figure 5).

The general assembly of the potable water treatment plant (PWTP) is outlined in Figure 12. The PWTP consists of two 12 m x 2.4 m insulated containers: one containing the main treatment system and one 3,785 L storage tank, and the other containing seven 3,785 L storage tanks for peak flow and contact time requirements. The system is sized to treat a maximum of 82,000 L per day. The modular treatment system continuously pumps a raw supply of water through a manganese greensand filter, a 5 micron cartridge filter, a 1 micron absolute cartridge filter, an activated carbon filter, an ultraviolet (UV) disinfection unit, an ultra filtration membrane system, and finally through a chlorination unit before being pumped to the storage tanks prior to distribution. The PWTP will also contain the necessary peripherals to supplement the plant (e.g., sodium hypochlorite injection system, flow meters, control panel, pressure tanks, etc.) including standby parallel greensand, sediment, activated carbon and UV filters. Sample ports are also included following individual filter systems. Following treatment, water quality will meet the *Health Canada Guidelines for Canadian Drinking Water*[4].

[4] Health Canada, Guidelines for Canadian Drinking Water Summary Table prepared by the Federal-Provincial-Territorial on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment. May, 2008. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php.

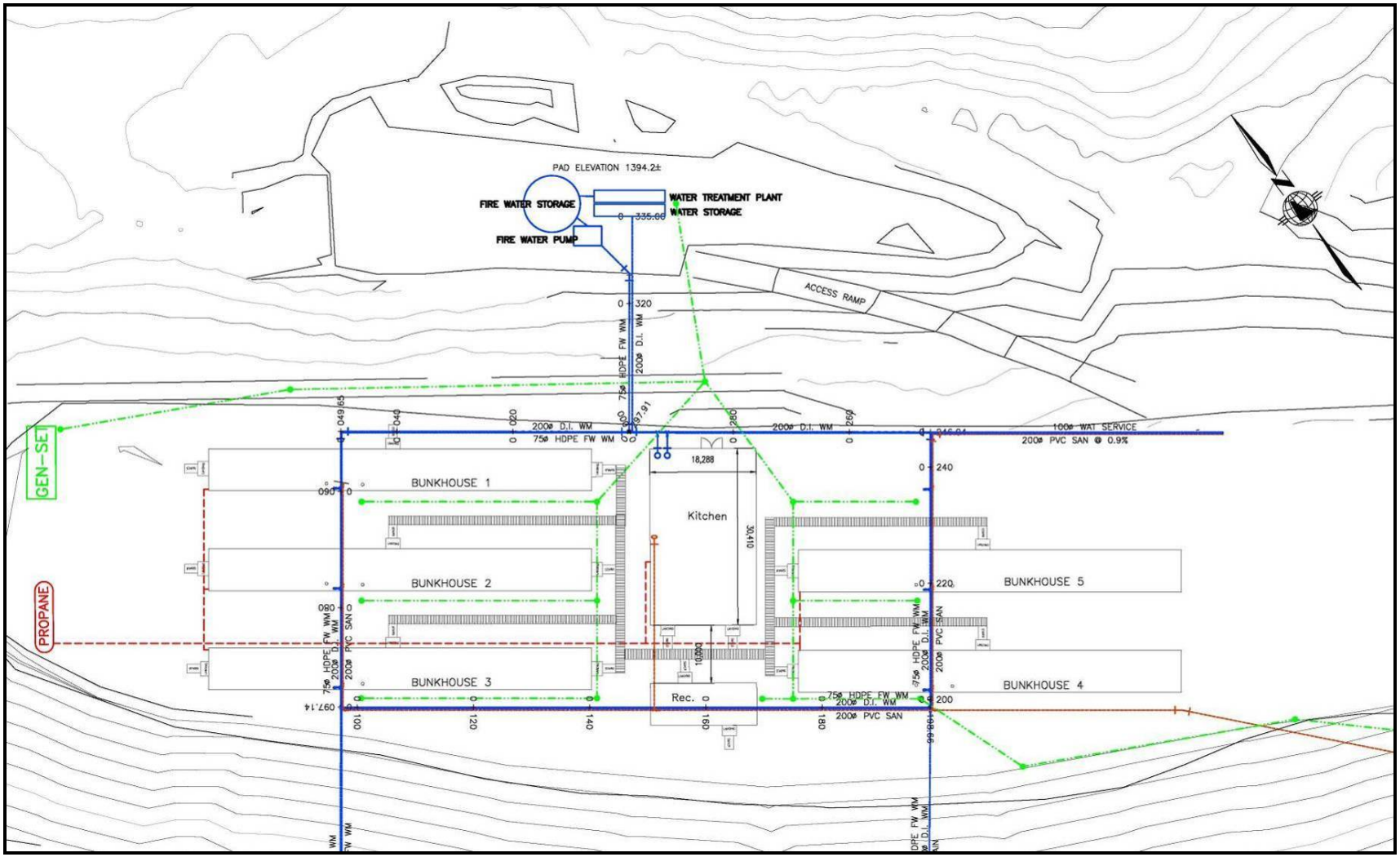


Figure 11: 205-Person Camp Bunkhouse, Kitchen and Recreation Center Layout and Utilities.

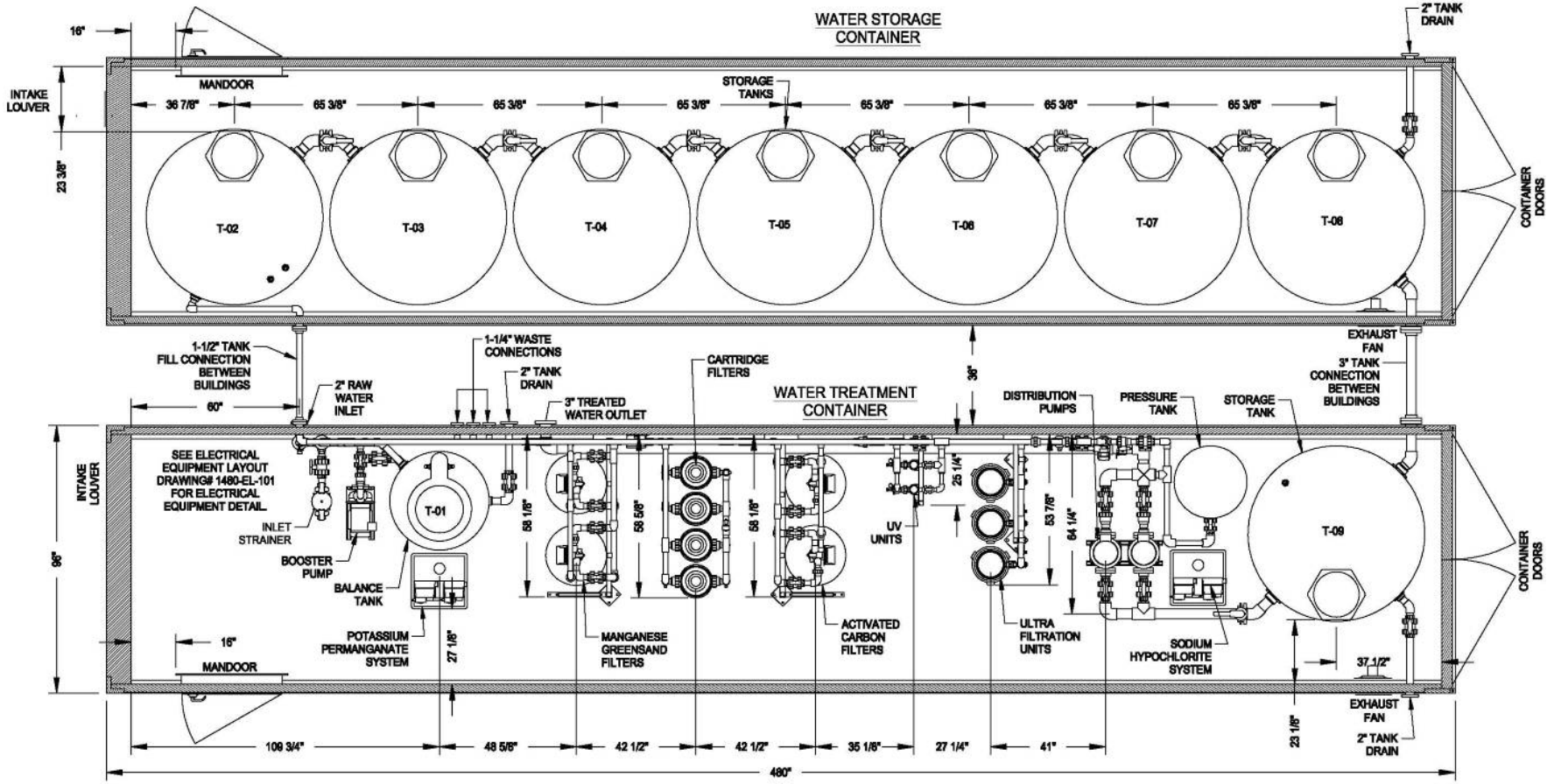


Figure 12: Potable Water Treatment Plant - General Assembly.

3.6.2 Sewage Treatment

Sewage from the permanent camp will be treated in a pre-packaged treatment plant located to the southwest of the camp (Figure 4). The modularized sewage treatment plant (STP) will be a stand-alone fully enclosed treatment plant (Figure 13). The STP is sized to treat wastes generated from the mill building, the administration building and the camp. All the components of the system will be factory assembled, inspected, tested and delivered to the site in major assemblies for final installation and commissioning on site. A sump with capacity for seven days of storage will be constructed adjacent to the plant (Figure 5) to allow for water sample collection and verification of water quality prior to discharge.

Grey and black water will be pumped into flow equalization tanks prior to digestion in anoxic tanks. The anaerobic treatment is followed by aerobic treatment and finally the water passes through a membrane reactor. The membrane reactor utilizes a fixed growth bacteria process whereby bacteria are grown on a media surface that is rotated into and out of the wastewater. The treated wastewater flows through separate zones each with a progressively higher standard of treatment. The media on which bacteria grow are engineered plastic disks made from grid extruded medium density polyethylene material with UV light inhibitors. The grid pattern promotes oxygen transfer into the wastewater. The system digests sludge efficiently as a result of the process design. The sludge remains in the primary settling tank during normal operation and will be pumped out every six to nine months depending on the influent total suspended solids level. Digested sludge from the facility will be disposed of in the tailings facility, or hauled offsite for disposal at an approved facility. The system is not prone to upsets and can be operated with varying flows.

Prior to the completion of the tailings facility (for the 2009 and early 2010 period), treated water will be discharged to the Go Creek drainage once water quality analyses verify that the waste discharge standards outlined by *A-Licence QZ04-065* have been met. When the mill and administration building are operational in mid 2010, water will be sent via the sanitary sewer system to a small in-ground concrete surge tank and subsequently pumped to the STP for treatment. Once treated, the effluent will be either recycled through the process plant or discharged to the tailings facility via the tailings pipeline.

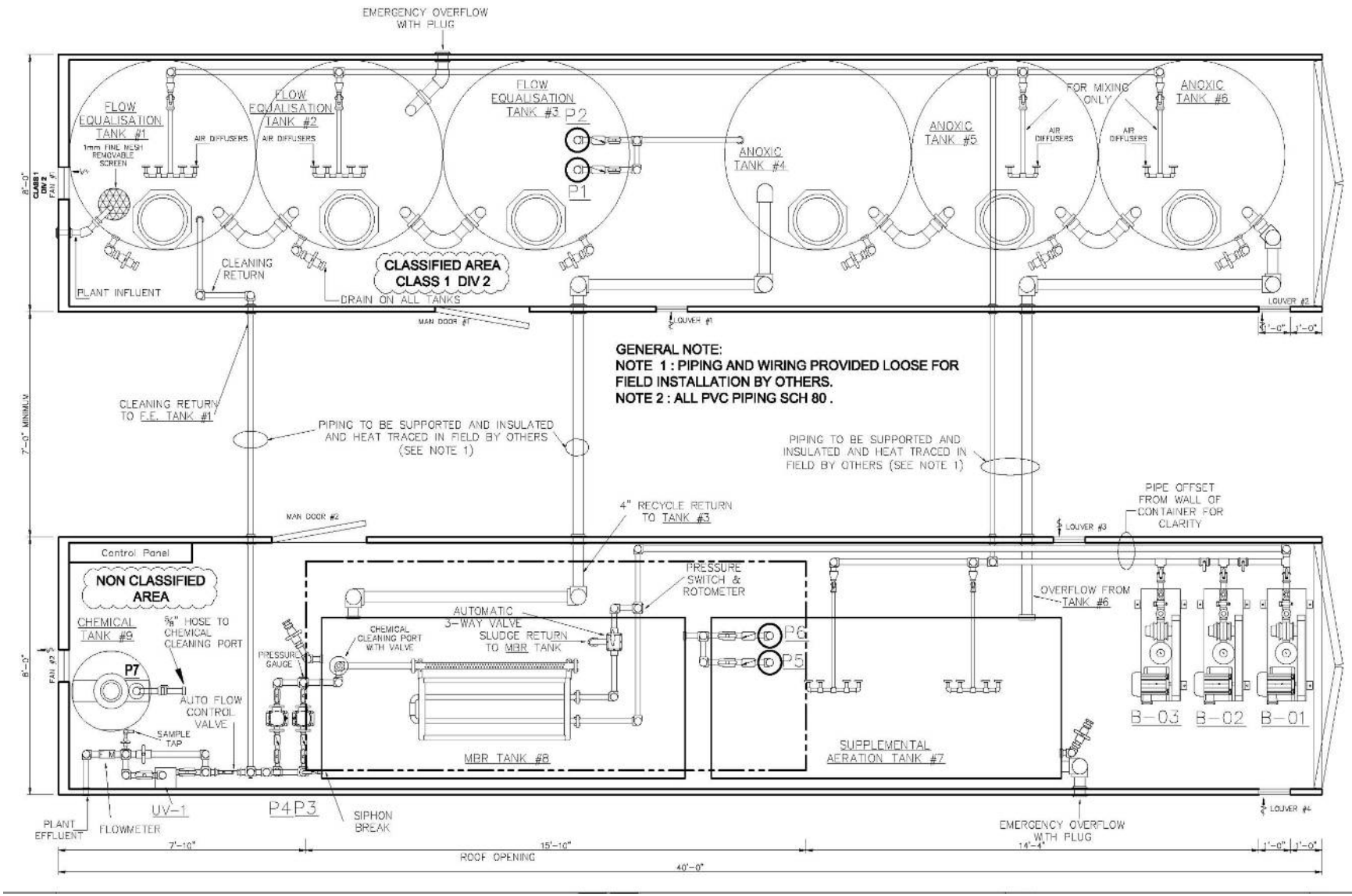


Figure 13: **Sewage Treatment Plant - General Assembly.**

3.7 Tailings and Infrastructure Design and Construction Plan

The tailings facility consists of a lined basin, the main dam, a seepage dam, spillways, seepage collection and diversion ditches, a reclaim pump barge and pipelines. The *Tailings and Infrastructure Design and Construction Plan*, prepared as per *QML-0006* Section 13.3 requirements, has been submitted for review and approval. The final document will be submitted in late February 2009. As this information is forthcoming, design and construction details are not provided herein. An *Operation, Maintenance and Surveillance Manual* will be developed in late 2009 following completion of the starter dam and the as-built report.

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Appendix A

Waste Management

A1 Waste Management Plan

The Wolverine Project *Waste Management Plan (WMP) V2006-01* was originally submitted on June 30, 2006 and approved with the issuance of *QML-0006* on December 5, 2006. Detailed design of the landfill, recycling and incinerator area is currently underway by Yukon Engineering Services (YES). The *WMP (V2009-02)* will be revised in accordance with *QML-0006* Section 12.1 and will be submitted to YTG Energy, Mines and Resources (EMR) for review and approval in Q2 2009 for implementation at the onset of major construction activities in Spring 2009. Once approved by the Chief, EMR, *WMP V2009-02* will update and supersede the requirements and measures outlined below.

A1.1 Solid Waste

Conditions outlined in *Commercial Dump Permit #81-014* issued by Yukon Environment June 12, 2007 for the operation of the landfill and *Air Emissions Permit # 4201-60-021* reissued by Yukon Environment on February 5, 2009 will be adhered to. Non-hazardous solid waste will be segregated into the two streams - putrescible and non-putrescible wastes. Regular pick-up times and designated areas will be established for all burnable materials such as kitchen waste, paper, cardboard, and untreated/ unpreserved wood waste.

A1.1.1 Putrescible Waste

Organic food wastes from the kitchen facilities will be segregated, collected in closed bear-proof bins and incinerated daily to minimize wildlife attraction.

A1.1.2 Non-Putrescible Waste

Burnable non-organic wastes will be incinerated. Non-burnable materials (such as cans, bottles, etc.), used rubber products, scrap metal, and plastic packaging will be collected in designated recycling bins and removed from site periodically.

Non-hazardous solid wastes that cannot be recycled will be buried in a landfill. The landfill will be established early in the construction phase and will remain in use for the life of the mine. Material will be periodically buried under a layer of soil to prevent the loss of garbage through wind action.

The landfill will be designed to accommodate the waste volume generated over the life of the mine and in a manner that will facilitate landfill closure. Surface water runoff will be diverted around the facility.

A sign at the entrance to the site will list conditions for use, emergency contacts and procedures, and items that may not be disposed of within the facility such as: hazardous wastes, acids, corrosives, solvents, oily wastes, explosives, or unsterilized medical waste. YZC will ensure that the site is managed in such a way as to prevent wildlife from being attracted to the facility and prevent entrance using methods such as an electric fence.

A1.1.3 Used Tires

Used tires will be collected and those not used on site during the construction and operation phase to provide vehicle protection barriers will be hauled off site and disposed of in accordance with the Yukon Used Tire Management Program. The Municipality of Watson Lake has a landfill facility that currently accepts used tires at no cost.

To minimize the potential fire hazard created by tire stockpiles, the rules provided by the 2005 National Fire Code of Canada will be followed.

A1.2 Special Waste

Special or hazardous wastes are dangerous goods that are no longer used for their original purpose as defined in the federal Transportation of Dangerous Goods Act and Regulations. *Special Waste Permit #43-046* issued October 26, 2007 by Yukon Environment will be adhered to. Special wastes generated, handled and stored during construction activities will include used waste oil, waste diesel, waste anti-freeze and waste batteries. Details pertaining to the source and management of these substances are provided below.

Hazardous waste will be segregated at the point of generation, placed into appropriate storage containers and then shipped off site to an acceptable disposal or recycling facility in either Whitehorse or Watson Lake. When convenient, YZC will also participate in Environment Yukon's annual commercial special waste collection.

Two facilities in Whitehorse that are permitted to collect and dispose of hazardous wastes such as used oil, waste oil filters, used batteries, antifreeze, waste solvents and lubricants are as follows:

- Sunset Septic - current trucking costs are $133/hr
- Corvus Industries - current trucking costs are $150/hr and 205L drums are supplied at $95 ea

Watson Lake is revising its Solid Waste Management Plan and is looking to build local businesses and facilities that have the capacity to support future industrial sites for all types of non-hazardous and hazardous wastes.

All wastes will be handled, stored and disposed of according to the appropriate regulations under the Yukon Environment Act, Contaminated Site Regulation, Special Waste Regulation, Solid Waste Regulation, and Storage Tank Regulation. In addition, unused or damaged explosives will be disposed of in a manner that complies with the Explosive Act (Canada).

As per *Special Waste Permit #43-046*, the following general storage procedures will be followed to prevent special waste from endangering public health and the environment:

- All drums and other portable containers containing the listed special wastes will be covered or stored out of the weather to prevent container degradation from the sun or contamination by water from snow or rain and will be stored off the ground to prevent container degradation by ground moisture.
- All listed special waste stored in unsuitable or leaking containers will be immediately removed or transferred to intact containers.
- Incompatible substances will be stored separately to prevent contamination, fires, explosions, gaseous emissions, leaching or other discharges, or other dangerous conditions.
- The contents of all storage containers will be clearly marked and visible on each container.
- The residue at the bottom of any container used for the storage of dangerous goods or special wastes will not be drained to the environment. Such residue shall be segregated and treated as a special waste until proven otherwise.
- Waste oil will not be mixed with other waste oil from piston engine aircraft.
- Special waste shall only be mixed or diluted where such mixing a dilution is specifically authorized by permit or by an environmental protection officer as an acceptable treatment/disposal option for the listed special waste.
- All containers or areas used for the storage of the listed special wastes will be secured to prevent access by unauthorized persons.
- A person who uses a container to store or transport the listed special wastes shall keep the container closed at all times during storage or transport; and not open, handle or store the container in a manner which may cause it to leak.
- Special waste will not be stored in storage tanks unless specifically authorized by the Special Waste Permit.

In the event of a temporary closure, all unused chemicals or reagents, with the exception of those required for the water treatment plant and other incidental uses, that are deemed to have a short shelf life will be returned to suppliers/manufacturers. Those chemicals that cannot be returned will be disposed of in a proper manner as per manufacture instructions. Fuel supplies for equipment will remain on site and diesel fuel tanks will remain in service during a temporary closure. YZC will comply with the requirements

under the Yukon Environment Act pertaining to storage and handling of petroleum products.

A1.2.1 Used Oil

The major sources of waste oil will be from mobile equipment and power plant generators. The most common types of used oil are crank case oil, gear oil, transmission fluid, and hydraulic oil. Under the Special Waste Regulations, a special waste permit is required if more than 20 L of used oil is generated per month or stored. For tanks with capacities greater than 4000 L, a permit will be required under the Storage Tank Regulations.

Waste oil shall be collected and disposed of via incineration in the waste oil burner for the purpose of space heating.

A1.2.2 Waste Oil Filters

Before disposing of waste oil filters, as much oil as possible will be eliminated from them. Steps required to ensure proper disposal include puncturing the top of the filter, setting the filter in a tray and allowing the oil to drain for approximately 24 hours, and crushing the filter to increase waste oil recovery.

Once the oil is drained, the filter will be disposed of by recycling through a company interested in the filter's metal value, or through a disposal operator, or at a landfill site.

A1.2.3 Used Batteries

Waste vehicle batteries will be collected for regular shipment to a licensed recycle or disposal facility. The steps outlined below for storing batteries will be followed to help prevent acid leaks and spills and to avoid contamination of the storage site:

- Batteries will be placed on wooden pallets in secondary containment (i.e., on a liner or berm) to prevent the escape of acid.
- Before putting waste batteries on the pallet, plastic sheeting will be placed on it to completely enclose all of the batteries in a continuous sheet of plastic. All sides will be wrapped to protect the batteries from the weather and to prevent any acid from being discharged into the environment.
- Batteries will not be stacked more than three layers thick and each layer will be separated with a sheet of plywood or other suitable material.

A1.2.4 Antifreeze

Used antifreeze will be stored in good quality containers that are leak-free and have tight closures to prevent spills, then shipped to a disposal facility.

A1.2.5 Waste Solvents and Lubricants

Miscellaneous, small quantities of waste solvents and lubricants will be generated through routine maintenance and repair of equipment. Solvents are liquid substances that can dissolve other substances and can be recycled. Paint thinners and strippers, varsols, degreasing fluids, mineral spirits and petroleum distillates are common solvents. Most of these liquids are flammable and toxic. A Special Waste Permit must be obtained from the Environmental Programs Branch if more than 5 L of solvents per month, or more than 5 kg of solvent sludge per month is handled or stored.

Solvents and lubricants will be collected and stored in appropriate drums for regular shipment to a licensed recycle or disposal facility. Containers will be covered to protect them from precipitation and will be kept apart from other waste products. When transporting solvents, the container will be labeled according to the Transportation of Dangerous Goods Act.

A1.2.6 Contaminated Sites

For wastes contaminated with petroleum hydrocarbons (with <3% hydrocarbon content), such as in the event of a spill, bioremediation will be used. A Land Treatment Facility (*Permit #24-022*) is located near the airstrip and used for this purpose. Remediated soils will be sampled to determine when hydrocarbon contamination has been reduced to acceptable standards, and subsequently stockpiled for use in reclamation projects. Water collected in the land farm will run through an oil-water separator and the water will subsequently be discharged into the tailings facility and the sludge will be disposed of according to *Special Waste Regulations*.

A1.2.7 Medical Wastes

A small amount of hazardous waste (such as syringes, bandages etc.) will be generated at the first aid room. This waste will be collected in designated purpose-built containers and disposed of appropriately at an offsite facility.

Appendix B
Monitoring and Surveillance Plan – Construction Phase

B1 Monitoring and Surveillance Plan

The Wolverine Project *Monitoring and Surveillance Plan (MSP) V2006-01* was originally submitted on June 19, 2006 and approved with issuance of *QML-0006* on December 5, 2006. This section contains monitoring details for the winter 2008-09 period, and therefore doesn't address summer period sampling requirements (i.e., sediment, benthos and periphyton). *MSP V2009-02* will revise and update the details contained herein to address all monitoring activities during the construction phase, which will extend to June 2010.

MSP V2009-02 is being prepared in accordance with *QML-0006* Section 12.2 and will be submitted to YTG Energy, Mines and Resources (EMR) in January 2009 for review and approval. Once approved by the Chief, EMR, *MSP V2009-02* will update and supersede the requirements outlined previously and below. Monitoring and surveillance requirements for the operations and closure phases will be submitted in early 2010.

The following section provides details pertaining to monitoring and reporting with respect to:

- Weather including temperature, precipitation, snowpack, and evaporation
- Surface water monitoring including water quality
- Groundwater monitoring including water quality and levels
- Water table – piezometer monitoring
- Ongoing testwork – humidity cells
- Construction monitoring including geochemical characterization

B1.1 Weather Monitoring

In October 2004, an automated HOBO® Weather Station, model H21-001 (Onset Computer Corporation) was installed immediately to the north of the airstrip. This station measured rainfall, atmospheric pressure, solar radiation, wind speed, wind direction, air temperature, and relative humidity at 30 minute increments. This station was upgraded by a new HOBO Onset weather station, installed on the south end of the airstrip on May 10th, 2006. The weather station on a 3 m tripod tower was outfitted with the following data collection features:

- Temperature
- Relative humidity
- Tripod mounted rain gauge

- Solar radiation in and out
- Wind speed and direction
- Barometric pressure

Climate station data has been logged continuously from this station 6 times per hour since May 20th, 2006, and will continue to be the main method of weather monitoring throughout the life of mine. Data is downloaded monthly by environmental department staff, and the data is examined at that time to ensure the station is working properly.

B1.2 Temperature

Temperature is recorded directly by the HOBO Onset weather station on-site, and is to be presented as monthly minimums, maximums and means. The minimum and maximum recorded temperatures, as well as seasonal trends and the data for the year will be summarized in the *QML-0006* bi-annual report.

B1.3 Precipitation

The tripod mounted rain gauge on the HOBO Onset weather station records the precipitation that falls as rain in mms on an hourly basis. This data is then compiled into monthly precipitation totals, and plotted against the date and reported in the *QML-0006* bi-annual report.

B1.4 Snowpack

The weather station does not record precipitation that falls as snow; as such, manual measurements are required to supplement the weather station data. Snowpack measurements are taken in late winter (end of March) to determine the snowpack at maximum depth and again in spring (end of May) to determine the maximum density values. The maximum snow water equivalent (SWE) occurs at some point between maximum depth and maximum density. Mean annual SWE at Wolverine is calculated by subtracting sublimation from the net SWE.

B1.5 Evaporation

Evaporation figures are estimated from the Hamon equation, based on latitude 61.43491547. The daily values are summed to provide monthly values, and monthly values are summed to give annual evaporation. The annual evaporation values (for the 1961 and 1963 Hamon equations) are then averaged to give an overall annual evaporation.

Free water evaporation for the Wolverine project is evaluated using site specific radiation, temperature, wind speed and relative humidity data. Using the hourly data for the open ice period, and synthesizing an annual record for certain parameters, an annual estimate of free water evaporation can be developed by employing the Modified Penman Equation.

B1.2 Water Monitoring

B1.2.1 Surface Water Monitoring

The surface water monitoring program for the Wolverine Project includes the monitoring of hydrologic flows and water quality at several locations in the Wolverine Lake, Go Creek and Money Creek watershed (Figure B-1) and has been designed to meet the following objectives:

- Continue to provide stream flow data specific to the mine site operations focusing on Go Creek and Wolverine Creek watersheds
- Better constrain watershed base flows, particularly in Wolverine Creek
- Document water quality in the receiving environment and to verify compliance during discharge periods from the water treatment facility
- Provide data to update predictions of water quality impacts, and to support ongoing review of mine water and waste management strategies during operations and at closure

As the project is in the development phase, monitoring frequency is dictated by requirements outlined in Appendix A of *Type B Water Licence QZ01-051* (*B-Licence*) and Schedule A of *Type A Water Licence QZ04-065 (A-Licence).*

Surface water monitoring locations, water quality sampling frequency and parameter sampling requirements are summarized in Table B-1.

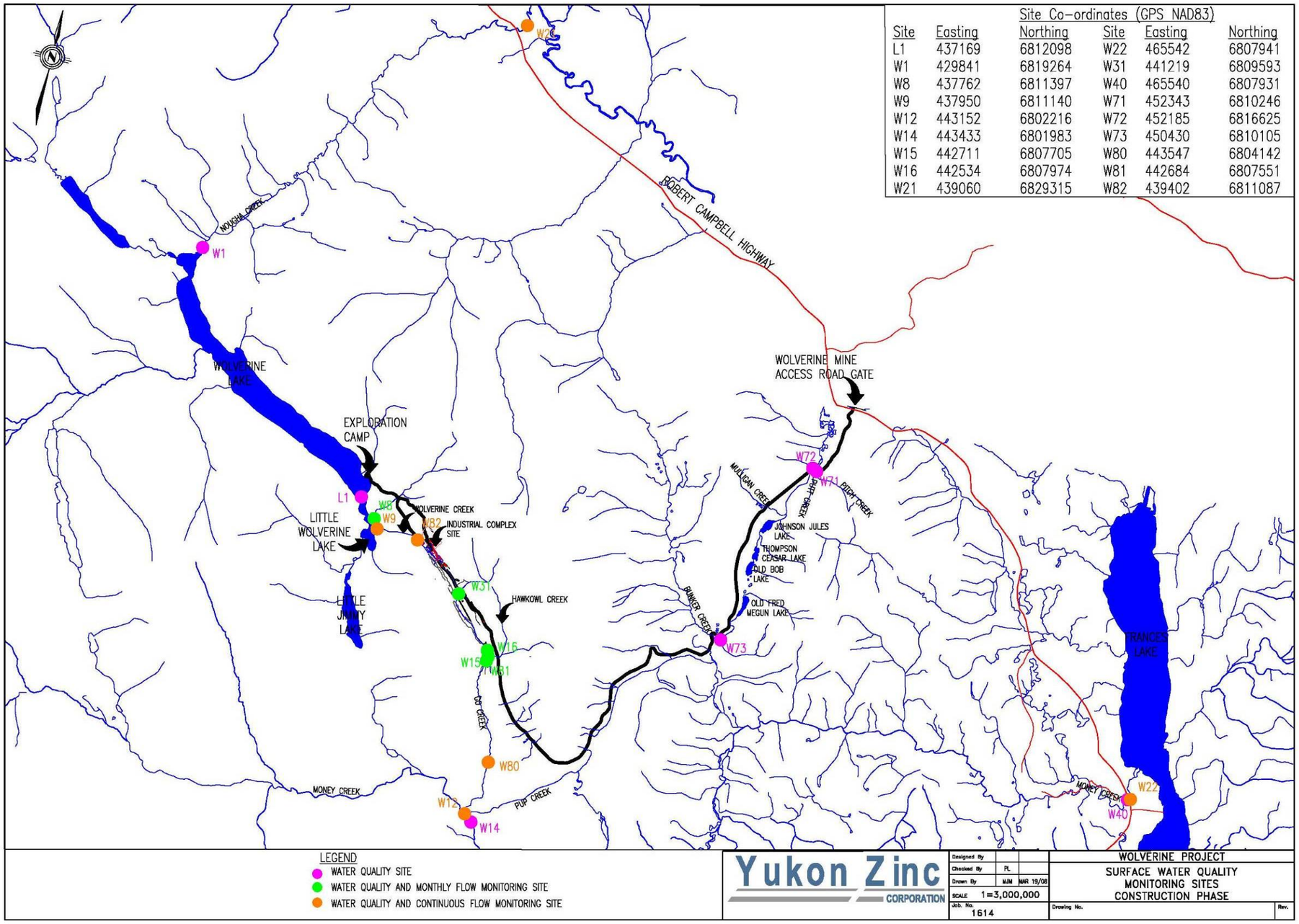


Figure B-1: Monitoring Stations – Surface Water Quality and Surface Flow

Sample parameters are as follows:

- FP – Field physical parameters (temperature, conductivity, specific conductivity, pH)
- LP – Laboratory physical parameters (temperature, conductivity[1], specific conductivity, pH)
- TSS – Total Suspended Solids
- CN – Total cyanide and WAD cyanide
- MA – Major anions (Total Alkalinity, Total Acidity, Bromide, Chloride, Fluoride, Sulphate)
- NP – Nutrient parameters (Ammonia-N, Nitrate-N, Nitrite-N, Dissolved ortho-phosphate)
- TM – ICP Trace Metals Scan (Total Metals) plus Hardness. Metals include Al, Sb, As, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, P, K, Se, Si, Ag, Na, Sr, Tl, V, Zn
- DM - ICP Trace Metals Scan (Dissolved Metals). Metals include Al, Sb, As, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Mo, Ni, P, K, Se, Si, Ag, Na, Sr, Tl, V, Zn
- DOC – Dissolved Organic Carbon
- Ra 226 – Radium 226

Detection limits for the above monitoring parameters for *B-Licence* and *A-Licence* requirements are summarized in Table B-2. Discharges during construction will be conducted under the *B Licence* as the tailings facility water treatment plant will not be operational (and is not required) until ~2011. *B-Licence* discharge criteria, for the discharge of treated water to Go Creek, are summarized in Table B-3.

[1] Accredited laboratories are only able to analyze for specific conductivity (conductivity standardized to a specific temperature), and as such, conductivity will not be measured in the laboratory.

Table B-1: Surface Water Monitoring and Surveillance Program for Construction Phase.

Component and Station No.	Licence Requirement	Sampling Frequency	Sample Parameters	Flow Monitoring Frequency
Wolverine Creek Watershed – W82, W9, W1, L1, W21, W8	A-Licence	Monthly[1]	FP, LP, TSS, MA, NP, TM, DM, DOC[2]	Continuous[3]
Go Creek Watershed – W31, W16, W15, W81, W80, W12	A-Licence	Monthly[4]	FP, LP, TSS, CN[5], MA, NP, TM, DM, DOC[5]	Monthly/Continuous[6]
Money Creek Watershed – W14, W22, W40	A-Licence	Monthly	FP, LP, TSS, MA, NP, TM, DM	Continuous[7]
Road Route – W71, W72, W73	A-Licence	Monthly	FP, LP, TSS, MA, NP, TM, DM	N/A
Underground test mine discharge (UTMD)	B-Licence	Weekly	LP, NP, TM, DM	Weekly
Waste rock stockpile seepage (WRSS)	B-Licence	Weekly	LP, NP, TM, DM	Weekly
Decant from collection/polishing sump (C-PS) [12]	B-Licence	Weekly	LP, NP, TM, DM	Weekly
Decant from water treatment plant settling pond (WTSP) [13]	B-Licence	Weekly	LP, NP, TM, DM	Weekly

Notes:
1. Sampling requirements for W82 and W9 are weekly when discharging into Wolverine Creek.
2. DOC is not required for W8 and W21.
3. Continuous flow monitoring is required at W82, W9 and W21, and monthly at W8.
4. Daily water quality sampling is required at W80 when discharging from the retention pond.
5. CN and DOC only required at W31 and W16.
6. Monthly flow monitoring is required at W31, W16, W15 and W81, and continuously at W80 and W12.
7. Continuous flow monitoring is only required at W22 in the Money Creek Watershed.
8. Monthly water quality sampling is required at T1, and daily at R1 when discharging from the retention pond.
9. DOC and Ra226 only required at R1
10. T1 - Monthly water level monitoring; R1 - Continuous water level and volume monitoring; R2 - continuous flow monitoring when discharging from the retention pond.
11. An aggregate wash plant was not constructed; hence sampling is not conducted for site AWP-SP
12. C-PS is represented by a 2000 m^3 settling pond (Sump #3) at the portal area that receives untreated underground test mine discharge
13. WTSP is represented by Sump #1 and #2 at the lower laydown area that receive treated effluent from Sump #3 prior to discharge to Go Creek

Table B-2: Monitoring Parameter Detection Limits for A-Licence QZ04-065 and B-Licence QZ01-051.

Physical Parameters	A-Licence (mg/L)	B-Licence (mg/L)	Total Metals	A-Licence (mg/L)	B-Licence (mg/L)	Dissolved Metals	A-Licence (mg/L)	B-Licence (mg/L)
Temperature	1	-	Aluminum (Al)	0.0002	0.001	Aluminum (Al)	0.0002	0.001
Conductivity	1	2	Antimony (Sb)	0.00002	0.0001	Antimony (Sb)	0.00002	0.0001
Hardness	0.5	0.5	Arsenic (As)	0.00002	0.0001	Arsenic (As)	0.00002	0.0001
Total Suspended Solids	4	3	Cadmium (Cd)	0.000005	0.000017	Cadmium (Cd)	0.000005	0.000017
Total Dissolved Solids	10	10	Calcium (Ca)	0.05	0.05	Calcium (Ca)	0.05	0.05
pH	0	0.01	Chromium (Cr)	0.0001	0.0005	Chromium (Cr)	0.0001	0.0005
Turbidity	0.1	0.1	Cobalt (Co)	0.000005	0.0001	Cobalt (Co)	0.000005	0.0001
DOC	0.5	0.5	Copper (Cu)	0.00005	0.0001	Copper (Cu)	0.00005	0.0001
			Iron (Fe)	0.001	0.03	Iron (Fe)	0.001	0.03
			Lead (Pb)	0.000005	0.00005	Lead (Pb)	0.000005	0.00005
Major Anions			Magnesium (Mg)	0.05	0.1	Magnesium (Mg)	0.05	0.1
Alkalinity-Total	0.5	2	Manganese (Mn)	0.00005	0.00005	Manganese (Mn)	0.00005	0.00005
Acidity-Total	0.5	1	Mercury (Hg)	0.00001	0.00001	Mercury (Hg)	0.00001	0.00001
Bromide	0.1	0.05	Molybdenum (Mo)	0.00005	0.00005	Molybdenum (Mo)	0.00005	0.00005
Chloride	0.5	0.5	Nickel (Ni)	0.00002	0.0005	Nickel (Ni)	0.00002	0.0005
Fluoride	0.01	0.02	Phosphorus (P)	0.002	0.3	Phosphorus (P)	0.002	0.3
Sulphate	0.5	0.5	Potassium (K)	0.05	2	Potassium (K)	0.05	2
			Selenium (Se)	0.00004	0.0005	Selenium (Se)	0.00004	0.0005
			Silicon (Si)	0.1	0.05	Silicon (Si)	0.1	0.05
Nutrient Parameters			Silver (Ag)	0.000005	0.00001	Silver (Ag)	0.000005	0.00001
Ammonia Nitrogen	0.005	0.005	Sodium (Na)	0.05	2	Sodium (Na)	0.05	2
Nitrate Nitrogen	0.002	0.005	Strontium (Sr)	0.00005	0.0001	Strontium (Sr)	0.00005	0.0001
Nitrite Nitrogen	0.002	0.001	Thallium (Tl)	0.000002	0.0001	Thallium (Tl)	0.000002	0.0001
Total Phosphate	0.005	0.002	Vanadium (V)	0.0002	0.001	Vanadium (V)	0.0002	0.001
Dissolved Ortho-Phosphate	0.001	0.001	Zinc (Zn)	0.0001	0.001	Zinc (Zn)	0.0001	0.001

Table B-3: B-Licence QZ01-051 Maximum Authorized Concentration Grab Sample Discharge Quality Limits.

Parameter	Limit (mg/L)
TSS	15
Ammonia Nitrogen	2.5
Total Arsenic	0.10
Total Cadmium	0.02
Total Copper	0.20
Total Lead	0.20
Total Nickel	0.50
Total Selenium	0.015
Total Zinc	0.50

B1.2.2 Groundwater Monitoring

Water quality monitoring is conducted as per requirements outlined in Schedule A of the *A-Licence*, as summarized in Table B-4. The wells have been designed to monitor groundwater quality at various depths and in different geological units including the shallow alluvial/colluvial aquifer and the shallow, medium and deep bedrock units.

Table B-4: Groundwater Monitoring and Surveillance Program.

Component and Station No.	Sampling Frequency	Sample Parameters*	Flow Monitoring Frequency
Groundwater Wells	Quarterly[1,2]	FP, LP, MA, NP, TM, DM[3]	Water level – Quarterly[1]

* See Section B3.1

Note:

1. Quarterly during construction, monthly during operations, quarterly during temporary closure and annually during permanent closure.
2. Wells 05-1A, -2A, -2B & -7 are not able to be sampled in the winter because the water level is close to surface and freezes; wells with deep water pumps installed (MW06-8D, 06-10M & 10D) are not sampled in the winter to prevent damage to the dedicated pumps installed in them.
3. Since total sediment is a relic of well installation, groundwater wells are not analyzed for TM.

Monitoring of groundwater conditions around the Wolverine Mine facilities focuses on groundwater conditions in the upper Wolverine Creek and Go Creek basins. More specifically, monitoring of groundwater occurs in those areas downgradient of the underground and process plant operations, immediately adjacent to Wolverine Creek, as well as downgradient of the tailings facility in the upper reaches of Go Creek. Well locations are provided in Figure B-2.

The objectives of the groundwater monitoring program for the underground and process plant areas within the upper Wolverine Creek basin are as follows:

- Provide information to delineate the direction of groundwater flow.
- Provide information to estimate the velocity and quantitative rate of groundwater flow.
- Monitor and delineate potential effects of mine dewatering on Wolverine Creek.
- Provide sampling locations to continue to document baseline groundwater quality prior to operations and to monitor for any impacts to groundwater quality that result from mining or mining related activities during operations and at closure.

Monitoring of groundwater conditions in the upper Go Creek basin focuses on monitoring the performance of the tailings facility, in particular the integrity of the Enviroliner system installed to prevent tailings water seepage. The objectives of the groundwater monitoring of the upper Go Creek basin are therefore to:

- Provide information to delineate the direction of groundwater flow
- Provide information to estimate the velocity and quantitative rate of groundwater flow
- Continue to document baseline groundwater quality prior to operations and to monitor for any impacts to groundwater quality that result from operation of the tailings facility during operations and at closure

Monitoring will consist of physical (e.g., piezometric water levels) and water quality determinations at all locations. Installed wells and their locations and depths are summarized in Table B-5. Groundwater levels will be monitored quarterly during construction, with static levels recorded prior to sampling. Data will be summarized and reported bi-annually as per *QML-0006* requirements. Reports will include elevation versus time graphs, interpreted equipotentials and updated assessments of the groundwater flow.

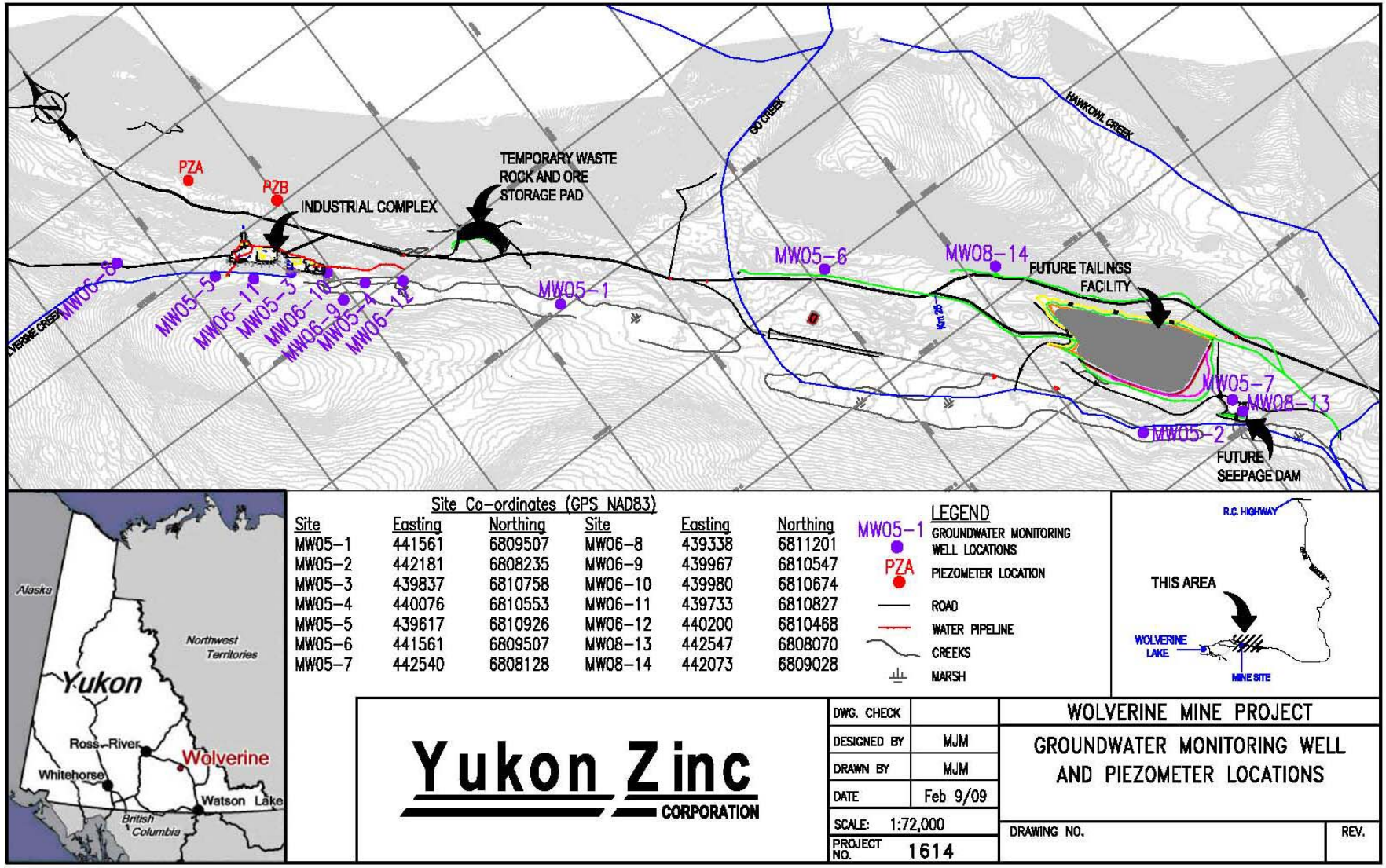


Figure B-2: Monitoring Stations – Groundwater Wells & Piezometers

Table B-5: Groundwater Well Locations, Depths and Purpose.

Well	Depth (m)	UTM Northing	UTM Easting	Purpose
MW05-1A	22.9	440643	6810020	Monitor upper reaches of Go Creek groundwater basin
MW05-1B	5.0	440642	6810021	
MW05-2A	22.9	442285	6808037	To monitor impact of tailings facility
MW05-2B	5.0	442285	6808037	
MW05-3A	19.98	439837	6810758	To monitor impact of underground and industrial complex
MW05-3B	4.52	439836	6810758	
MW05-4A	17.56	440076	6810553	
MW05-4B	3.89	440076	6810553	
MW05-5A	26.50	439617	6810926	
MW05-5B	4.39	439618	6810926	
MW05-06	12	441561	6809507	To monitor upstream of tailings facility
MW05-7	4.6	442540	6808128	To monitor impact of tailings facility
MW06-08S	21.92	439349	6811193	To monitor impact of underground
MW06-08M	82.81	439343	6811197	
MW06-08D	184.71	439338	6811201	
MW06-09S	21.30	439967	6810547	To monitor groundwater quality on west side of Wolverine Creek (not affected by operations)
MW06-09M	80.38	439967	6810547	
MW06-10S	21.33	439975	6810678	To monitor impact of underground and industrial complex
MW06-10M	104.30	439980	6810674	
MW06-10D	185.00	439980	6810674	
MW06-11S	21.30	439733	6810827	
MW06-12S	21.65	440200	6810468	
MW08-13	2.4	442547	6808070	To monitor impact of tailings facility downstream of seepage dam
MW08-14	10.36	442073	6809028	To monitor upstream of tailings facility

B1.3 Piezometer Monitoring

Four vibrating wire (VW) piezometers capable of measuring porewater pressure and temperature were installed two locations: PZA and PZB (Figure B-2) both have one shallow and one deep piezometer that began collecting data in April 2005. Details of the four VW piezometers are summarized in B-6. The piezometers are downloaded monthly (weather permitting) and the data compiled into summary water level graphs that are presented in *QML-0006* reports (annual and bi-annual).

Table B-6: Summary of Piezometer Installations.

Borehole	Ground Surface Elevation (m asl)	Borehole length	VW Piezometer Installation Elevation (m asl)	
		(m)	Shallow	Deep
PZA	1393	194.2	1362.5	1243.0
PZB	1389	198.4	1329.2	1280.7

B1.4 *Ongoing Testwork*

Testwork continues in order to support underground water quality model updates and includes waste rock, paste backfill and dense media separation (DMS) float humidity cells. Other ongoing testwork includes tailings humidity cells (started in 2005) and biological treatment for selenium reduction lab work.

B1.4.1 Humidity Cells

Waste rock, paste backfill, ore, DMS, and tailings humidity cells have been operating since 2005/06. Table B-7 summarizes the composition, the start date of operation and the weeks in operation as of November 30th, 2008. Flushing of the cells is conducted weekly, with analysis of the leachate performed at the same time. Analytical frequency for cells OA and OD were reduced to once every 4 weeks in late September 2008, with flushing continuing weekly. Analytical frequency for all other cells will be reduced to monthly upon authorization. Results from the humidity cell testwork is summarized and presented in *QML-0006* reports (annual and bi-annual).

Table B-7: Waste Rock, Paste Backfill, Ore and Tailings Humidity Cell Composition and Duration of Operation.

Humidity Cell	Composition	Date Started	Operational/ Decommissioned	Weeks in operation as of 11/30/08
HC1	Rhyolite/rhyolite fragmental	22-Dec-05	Operational[1]	154
HC2	Iron formation	22-Dec-05	Operational[1]	154
HC3	Rhyolite/rhyolite fragmental	22-Dec-05	Operational[1]	154
HC4	Rhyolite/rhyolite fragmental	22-Dec-05	Operational-	154
HC5	Calcite-pyrite exhalite	22-Dec-05	Operational[1]	154
HC6	Calcite-pyrite exhalite	22-Dec-05	Operational	154
HC7	Carbonaceous argillite	22-Dec-05	Operational	154
HC8	Carbonaceous argillite	22-Dec-05	Operational[1]	154
HC9	Non-carbonaceous argillite	12-Jan-06	Operational[1]	151
HC10	Non-carbonaceous argillite	12-Jan-06	Operational	151
HC11	Iron formation	12-Jan-06	Operational[1]	151
HC12	Rhyolite/argillite	12-Jan-06	Operational[1]	151
HC13	Rhyolite/argillite	12-Jan-06	Operational[1]	151
HC14	Ore	16-Feb-06	Operational[1]	146
HC15	Ore	16-Feb-06	Operational[1]	146
HC16	Ore	16-Feb-06	Operational[1]	146
HC17	DMS float	21-Feb-06	Operational[1]	145
HC18	DMS float	21-Feb-06	Operational[1]	145
HC19	DMS float	21-Feb-06	Operational[1]	145
HC20	NP[2] depleted ore	23-May-06	Operational[1]	132
HC21	NP depleted ore	23-May-06	Operational	132
HC22	NP depleted ore	23-May-06	Operational[1]	132
T1	Paste backfill	23-May-06	Operational	132
T2	Paste backfill	23-May-06	Operational	132
LD	Tailings - Lynx zone diluted ore composite	22-Jul-05	Decommissioned (3-Oct-06)	175 - Complete
WD	Tailings - Wolverine zone diluted ore composite	22-Jul-05	Decommissioned (3-Oct-06)	175 - Complete
OA	Tailings - Overall ore composite	6-Jun-05	Operational	182
OD	Tailings - Overall diluted ore composite	22-Jul-05	Operational	175

1. Under review and awaiting authorization for decommissioning; 2. NP = Neutralization potential

B1.4.2 Biological Selenium Reduction

Starting in 2005, testwork has been ongoing to determine water treatment requirements necessary to treat the tailings facility waste water prior to discharge into Go Creek. The main element of concern in the tailings water (produced by lock-cycle metallurgical testwork) was selenium, with influent concentrations of ~9 mg/L. The *A-Licence* discharge limit is 0.02 mg/L. Testwork has focused on 2-stage treatment using first a high density sludge process with iron salt addition followed by a polishing stage utilizing biological reduction. Testwork conducted in 2007 focused on additional bioreactor process lab testwork. Bioreactor testwork was conducted by Inotec at the University of Utah, and the work was supervised by Lorax Environmental Services. Work is ongoing to evaluate the results to date and establish pre- and post-treatment requirements.

B1.5 *Construction Monitoring*

The aim of all monitoring for construction activities is to minimize liability and environmental risk, while minimizing the footprint of the mine site development. Tantamount is the protection of health and safety of the public and area wildlife by the elimination of unacceptable health hazards and prevention of significant exposure to, or release of, substances that could damage the receiving environment.

Construction monitoring for all on-site works will be conducted as required (daily or weekly) when works are on-going, and less frequently when works are not continuous or after unusual events (e.g., rain events, earthquakes, etc.) to ensure no change has occurred to the mitigation measures (e.g., integrity of silt fence).

Environmental monitoring requires the submission of Environmental Inspection Forms, which include pictures of the works being performed and any areas of concern, a description of the site, a site assessment with a record of samples taken, mitigation requirements and further monitoring requirements.

General construction requirements are as follows:

- Fill material must be non acid generating (see Section B1.5.3)
- Organic materials must be stockpiled for future site reclamation
- Borrow operations shall avoid waste of suitable materials
- Borrow area development will provide drainage to prevent standing water in the pit and prevent erosion of adjacent slopes
- Waste piles will be brought to stable profiles with slope intersections rounded and shaped to regular lines to prevent ponding or concentrations of surface runoff and to provide a natural appearance

- Rubbish is to be removed from the area at all times
- Surface water runoff should be directed to sediment ponds or other contained areas prior to discharge to the environment
- Slope stability – demonstrated by the absence of slides, cave-ins, slumping, gullies, potholes and overhangs
- Reclaimed slope angles must be less than the angle of repose, and if greater than the angle of repose, shown to be stable
- Access to borrow pits must be restricted where such access may pose a threat to human or wildlife safety
- Access to areas of unsafe drop-offs must be blocked and, as required, posted appropriately

B1.5.1 Sediment and Erosion Control

The key to controlling erosion and sedimentation caused by work-related activities is to manage off and onsite runoff. In general, to minimize erosion and sedimentation, work-related activities will be managed to:

- Minimize disturbance to vegetation and limit area of clearing
- Minimize length of time that unstable erodible soils are exposed
- Stabilize erodible soils as soon as practical by seeding or installing erosion control blankets
- Ensure effective installation of sediment control measures (e.g., silt fences, sediment traps, etc.) before starting work

Effective ways to control erosion and trap sediment are summarized in Table B-8. Sediment traps and barriers (e.g., silt fences, straw bales, etc.) will be inspected regularly while they are in place, and cleaned when required to maintain effectiveness. Sediment-laden or turbid runoff will be directed into vegetated areas and temporary fills or stockpiles will be covered with impermeable covers (e.g., plastic) during heavy rainfall.

Table B-8: Description of Sediment and Erosion Techniques.

Technique	Description	Application
Vegetation: preservation and replanting	Maintain vegetation, minimize grubbing and maintain root mat, reseed/ replant	On slopes, stream banks, floodplains to permit infiltration and minimize surface disturbance
Silt fences	Geotextile vertical barrier that causes sediment deposition	On slopes with erodible soils – surface applications only (not to be used instream [i.e., flowing water])
Straw bales	Barrier that causes sediment deposition	On slopes with erodible soils and in low surface or low flows only
Sediment traps or basins	Excavate minor depressions to allow sediment to settle	In areas where high volumes of sediment-laden water occurs; may be used with silt fencing or bales
Flumes/ spillways	A chute or pipe of non-erodible material to convey runoff down a slope	In areas with concentrated high velocity surface runoff
Check dams	Small dams to reduce the velocity of storm water flows in swales/ditches	In small open channels
Erosion control blankets	Natural fibre matting used to minimize surface erosion	In areas with surface runoff or channels
Plastic covers	Tarp to cover erosive soils	In non-vegetated areas where a temporary measure is required to control runoff until the site is stabilized

B1.5.2 Site Isolation

Isolation techniques are required for instream work where sensitive habitat is potentially affected, or in areas where site activities have the potential to adversely affect downstream habitat. The isolation of a site reduces erosion and the release of contaminants offsite. Methods of isolating a work site so that works may proceed in isolation of flowing water or surface runoff include instream diversions, surface diversion berms or dikes, and swales, by-pass pipes, and coffer dams. A brief description of these mitigation techniques is provided in Table B-9.

Table B-9: Description of Site Isolation Techniques.

Technique	Description	Application
Instream diversion	Divert streams using dams, alternate channel, berms, pumps, etc.	To isolate an area to work in the dry; may be used with other techniques to minimize erosion and sedimentation
Diversion berms/dikes	Low berm used to divert surface water	Near slopes or around a work site; good for containing an area or preventing runoff into an area
Swales	Ditch to intercept storm runoff and divert to acceptable area	Along uphill side of exposed slopes to minimize runoff flowing across slope; may be used with other techniques to minimize erosion and sedimentation
By-pass pipes	Flexible hoses, pipes, or flumes used to carry/ pump water through or around a site	To isolate an area to work in the dry; limits sediment release, maintains streamflow
Coffer dams	sandbags, sheet piling, geotextiles used as a dam, pumps used to remove water	To isolate or contain a work area on larger streams

B1.5.3 Geochemical Characterization

Geochemical characterization via acid base accounting (ABA) is conducted on native material to establish metal leaching potential. Material that is deemed non-acid generating (NAG) based on the criterion described in the Draft BC ARD Guidelines by Price (1997[2]) in Table B-10 was used in construction activities; material that is deemed potentially acid generating (PAG) is sent for shake flask testing. The results of shake flask tests are compared to the Canadian Metal Mining Effluent Regulations (MMER) guideline values (Table B-11) to identify any parameters that could potentially leach from in-place road construction materials at concentrations that may affect receiving water quality. MMER monthly mean concentrations are used as a guideline, as they are the most stringent.

[2] Price, W.A. (1997), DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, British Columbia Ministry of Employment and Investment, Energy and Minerals Division, Smithers, BC, (April), 143p.

Table B-10: Acid base accounting screening criteria

Parameter	Acid generating potential
Net Potential Ratios (NPR or NP/AP)	
NPR < 1	Likely acid generating
1 < NPR < 2	Potentially acid generating
2 < NPR < 4	Not likely acid generating
NPR > 4	Non-acid generating
Sulphide sulphur (S_S) content	
S_S > 0.3 %	Potentially acid generating
S_S < 0.3 %	Non-acid generating
Paste pH	
pH < 5.5	Potentially acid generating
pH > 5.5	Non-acid generating
Neutralization potential (NP)	
NP < 10 kg $CaCO_3$/tonne	Potentially acid generating
NP > 10 kg $CaCO_3$/tonne	Non-acid generating

Table B-11: MMER guideline values for potential metal leaching from soils

Deleterious substance	Maximum authorized monthly mean concentration
Arsenic (mg/L)	0.5
Copper (mg/L)	0.3
Cyanide (mg/L)	1.00
Lead (mg/L)	0.20
Nickel (mg/L)	0.5
Zinc (mg/L)	0.50

Appendix C

Spill Contingency Plan

C1 Spill Contingency Plan

The Wolverine Project *Spill Contingency Plan (SCP) V2006-01* was originally submitted on May 17, 2006 and approved with the issuance of the *QML-0006* on December 5, 2006. *SCP (V2009-02)* will be revised in accordance with *QML-0006* Section 12.5 and will be submitted for review and approval in Q1 2009 for implementation with the onset of major construction activities in Spring 2009. Once approved by the Chief, EMR , *SCP V2009-02* will update and supersede the requirements and measures outlined below.

The measures outlined in the following sections intend to minimize the potential impact to the environment following a fuel and/or chemical spill. The immediate priority is to ensure human safety and limit environmental damage, followed by the action plans to effectively implement the procedures/methods for spill containment and clean up and site remediation measures. The priority sequence is as follows:

- ensure safety, protect life and prevent injury
- protect the environment
- protect infrastructure
- minimize business activity disruption

The following subsections provide details pertaining to spill response equipment, action plans, and training, and specific information on spill containment.

C1.1 Equipment

Spill kits will be located at the portal, camp, airstrip, and gatehouse as well as in heavy equipment and light vehicles. Kit contents generally contain oil sorbent pads, pillows and socks, granular sorbent, plug patties for instant leak stop, shovels, and protective equipment including gloves, goggles, and protective suits. At a minimum, all heavy equipment will be equipped with sorbent pads, granular sorbent and gloves and light vehicles will be equipped with sorbent pads.

Dry chemical fire extinguishers will be located near the fueling stations. The water truck can also be used in fire suppression activities and pumps are onsite at the upper portal for spill pumping and fire suppression activities.

The general steps required to be taken in the event of a spill are as follows:

- first responder/observer must ensure their safety and the safety of others
- shut off ignition sources (including electrical sources) and ensure no smoking
- identify and assess the spilled material
- report all spills immediately to site supervisor

- if safe, stop the source of the spill, contain the spill, and proceed with clean-up activities
- Environmental Coordinator will notify senior management immediately and contact the Yukon 24-hour Spill Report Hotline and Client Services and Inspections shortly thereafter once details are determined
- Environmental Coordinator will complete the Spill Report Form
- responsibilities for spill response are summarized in Table C-1

Table C-1: Roles and Responsibilities for Spill Response.

Position	Responsibilities
All Employees (First Observer)	• Assess the initial severity of the spill and safety concerns • Identify the source of the spill • Report all spills to Supervisor and Environmental Coordinator as soon as possible • Determine the size of the spill and stop or contain it, if possible • Participate in spill response as member of cleanup crew
Work Supervisors	• Contact the Mine Manager • Gather facts of the spill • Assist as required in spill response measures
Emergency Response Team	• Conduct cleanup of spills under direction of Mine Manager or Environmental Coordinator • Take appropriate response measures- deploy booms, absorbents and other equipment and materials as required • Continue cleanup as directed by Mine Manager or Environmental Coordinator
Mine Manager	• Assist in initial and ongoing response efforts • Supervise Spill Response Team • Ensure source of the spill has stopped and contain spill • Record spill information • Ensure co-ordination of equipment and manpower as needed • Oversee the cleanup operation until it is satisfactorily completed • Continue actions until relieved or supplemented by other supervisors • Decide with Environmental Coordinator if mobilization of additional equipment or a contractor is warranted
Environmental Coordinator	• Ensure expeditious response and clean up of spill site and impacted areas • Report the spill to the Yukon 24-Hour Spill Report Line and Client Services and Inspections • Together with the Mine Manager, decide if additional equipment is required for containment and remedial activities • Notify senior management • Oversee completion and distribution of Spill Report • Ensure investigation identifies measures to prevent similar spills
VP Environment and Community Affairs	• Is responsible for all communication with the media. Ensures that all press releases are accurate and in accordance with company policy • Makes financial decisions on major expenses during large spill response
YZC Board of Directors	• Establishes corporate environmental policy based on the recommendations of the Environmental Management Committee

C1.2 Spill Response Training

Training and preparedness will be conducted in accordance with both Occupational Health and Safety Regulations and regional legislation. At a minimum, a first responder awareness level training program will be implemented with all key staff and contractors.

All personnel will receive training that includes instruction in spill recognition and assessment, spill hazards, spill reporting, communication procedures, clean-up measures and general emergency response.

Where contract fuel suppliers will be shipping fuels as outlined under the *Transportation of Dangerous Goods Act* and be received by an employee of YZC, these personnel must hold a valid Canadian Certificate of Training in the form of a wallet card. This person will be responsible for ensuring that the appropriate records are maintained and any incidents involving the shipper and or receiver are reported to the appropriate authorities.

C1.3 Spill Containment, Clean-up and Disposal

The potential exists for spills of petroleum products and or various chemicals used at the Wolverine Mine. A spill will typically be in the form of a liquid. Various proven practical methods of containment and recovery are well documented for use in northern climates and are summarized below for each of the following areas: on land, snow, ice or in water. For additional technical information, consult the *Environment Canada Report EPS 9/SP/2* (December 1986).

C1.3.1 Containment

For spills that occur on land, three methods of containment are summarized in Table C-2. Containment on snow is readily achieved and is very effective due to its absorbent quality. Liquid spills (petroleum) will become immobile within the snow pack and are easily removed for transport for recovery or disposal. The snow can be used to its advantage in construction of snow dykes/dams. Whenever possible, the snow pack should be left in place to avoid contaminating the underlying substrate.

Spills that occur on ice, from either direct spillage or migration to the ice, are greatly affected by the strength of the ice. If the spill does not penetrate the ice, and the ice is safe to work on, then the methods of containment are similar to that on land. Where the spill has penetrated the ice, the situation should be handled similar to that on open water.

A spill occurring on or into open water is very difficult to contain and every effort should be made to prevent the material from entering the water. If in the case of petroleum

products, the material floats, then immediate deployment of surface booms should take place to control the spread of material.

Table C-2: Spill Containment Option for Land-based Spills.

Containment Method	Details Pertaining to Method Application
Snow Dykes	Petroleum products spilling onto frozen snow covered ground may be contained by the construction of snow dykes. For smaller spills the dykes can be built with shovels while larger dykes will typically require the use of heavy equipment. In freezing temperatures, water may be sprayed or poured over the dykes to further enhance the barrier. Synthetically lined dykes are more effective than just snow or snow and ice-lined dykes. The impermeability of dykes may be ensured by lining with a polyethylene plastic liner, plastic tarpaulin or similar synthetic material.
Sand or Gravel Dykes	During warmer months, containment dykes may be constructed from sand or gravel if these materials are available. For smaller spills, the dykes can be fashioned manually with shovels where as for larger spills, trucks or other heavy equipment (front-end loaders) will normally be required to handle sand and gravel.
Trenching or ditching	Used for containing and/or intercepting the flow of liquid spills on land. Ice, snow, loose sand, gravel and surface layers of organic material can usually be scraped or dug away until the underlying frozen substrate is reached. Effective in re-directing flow or simple containment prior to pumping or absorbing the spilled material. Trenching in solid frozen ground or rocky substrate is normally neither practical nor possible.

Action plans for the clean up of fuels, oils and antifreeze in various environments are provided in Table C-3.

C1.3.2 Recovery

Spilled petroleum products contained within a dyked, trenched or boomed area should be recovered by pumping into a portable storage tank or drum. Pump and suction hoses should be screened to prevent snow, ice or debris from clogging the line or pump. Any remaining material may be absorbed by use of a variety of products, such as 3M brand Conweb and Phase III brand Oil Sponge.

The availability of shovels, rakes and pitchforks are invaluable in any spill clean-up and recovery operation. The use of heavy equipment for larger spill situations such as front-end loaders and haul trucks, make the removal of material easier.

Table C-3: Action Plan for Fuels, Oils and Antifreeze.

	Spill Substance Type		
Location of Spill	**Diesel, Hydraulic, Lube and Waste Oil**	**Gasoline and Jet B Aviation Fuel**	**Ethylene Glycol (Antifreeze)**
On Land	Do not flush into ditches or drainage systems. Prevent entry into waterways and contain with berm or other barrier. Remove small spills with sorbent pads.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Do not contain spill if there is any chance of igniting vapours. On shop floors and in work yards, apply particulate sorbents.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Contain spill by dyking with earth or other barrier. Remove minor spills with universal sorbent. Remove large spills with pumps or vacuum equipment.
On Snow and Ice	Block entry into waterways and contain with berm or other barrier. Remove minor spills with sorbent pads or snow. Use ice augers and pump when feasible to recover diesel under ice. Burn using Tiger Torches if unrecoverable by other methods, feasible and safe to do so.	Block entry into waterways with snow or other barrier. Do not contain spill if there is any chance of igniting vapours. In work yards, apply particulate sorbents.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Contain spill by dyking with snow or other barrier. Remove minor spills with universal sorbent. Remove contaminated snow with shovels and mechanical equipment.
On Muskeg	Do not deploy personnel and equipment on marsh or vegetation. Remove pooled oil with sorbent pads and/or skimmer. Flush with low-pressure water to herd oil to collection point. Burn only in localized areas, e.g., trenches, piles or windrows. Do not burn if root systems can be damaged (low water table). Minimize damage caused by equipment and excavation.	Do not deploy personnel and equipment on marsh or vegetation. Remove pooled gasoline or Jet B with pumps. Low pressure flushing can be tried to disperse small spills. Burn carefully only in localized areas, e.g., trenches, piles or windrows. Do not burn if root systems can be damaged (low water table). Minimize damage caused by equipment and excavation.	Do not deploy personnel and equipment on marsh or vegetation. Burning is not feasible. Minimize damage caused by equipment and excavation.
On Water	Contain spill as close to release point as possible. Use spill containment boom to concentrate slicks for recovery. On small spills, use sorbent pads to pick up contained oil. On larger spills, obtain and use skimmer on contained slicks. Do not use sorbent booms/pads in fast currents and turbulent water. Intercept moving slicks in quiet areas using sorbent booms.	Do not attempt to contain or remove spills. Use booms to protect water intakes and sensitive areas.	Ethylene glycol sinks and mixes with water. Isolate/confine spill by damming or diversion.

C1.3.3 Disposal

Petroleum products such as oil that have been recovered by pumping into a tank or drum, can often be reused. Currently, hydrocarbon contaminated materials are removed to the Land Treatment Facility (*Permit #24-022*).

The licensed land treatment farm is located adjacent to the airstrip. Soil is reclaimed through the process of bioremediation through tilling and the breakdown of hydrocarbons by naturally occurring bacteria. The process is most effective when soil temperatures range from 5 to 45ºC. Bioremediation in soil will work so long as the ground is not frozen.

C1.3.4 Other Concerns

In the event that the accident/incident is in combination with a fire, extinguishing the fire may be required prior to initiating efforts to stop the spillage. In order to control the resulting runoff (in cases where water is used), and the subsequent spread of the spilled material, the spill site should be contained.

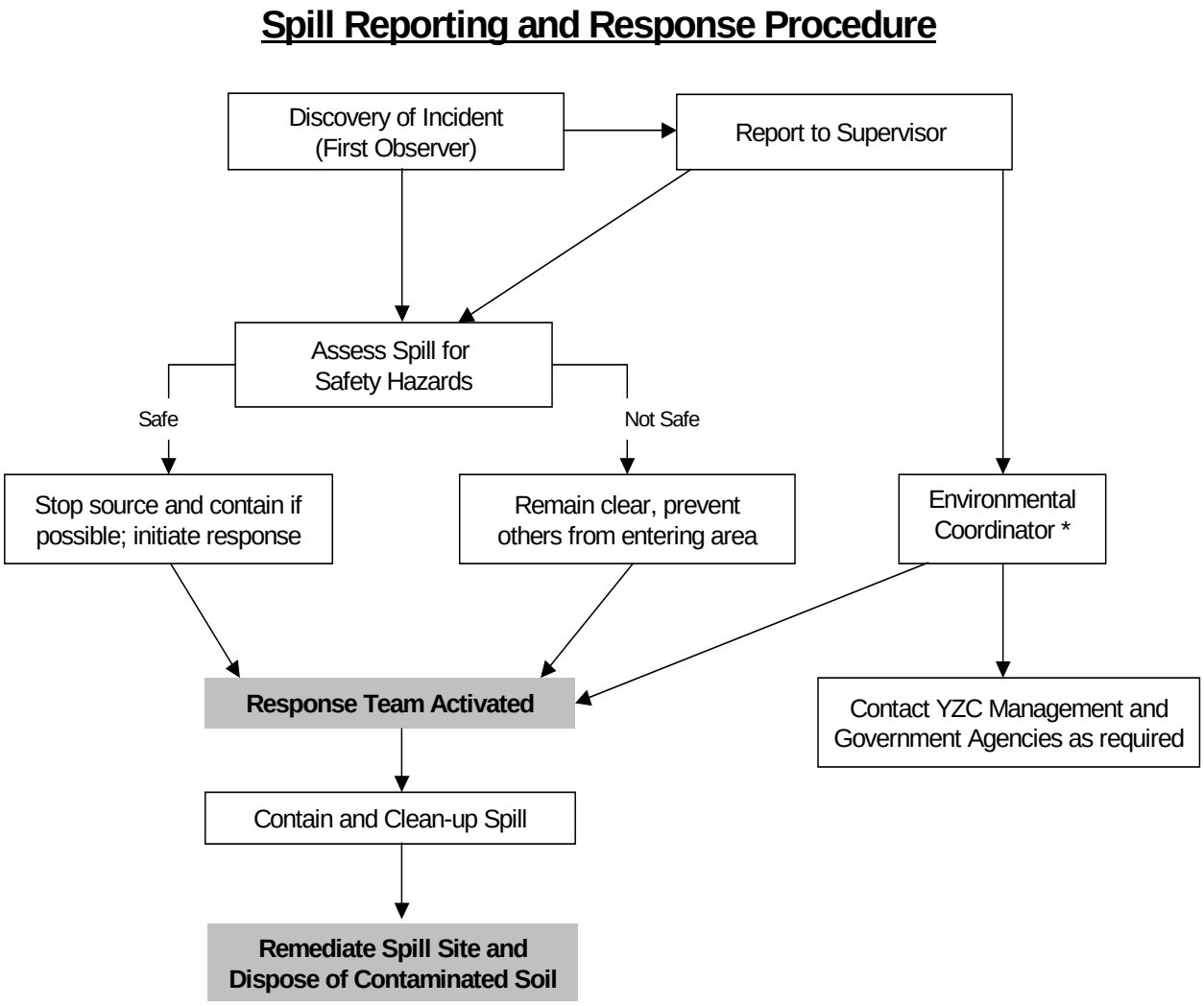
Petroleum and chemical fires have the potential to generate toxic fumes under poor combustion conditions. Approaching and dealing with any fire from upwind is recommended as well as caution with regard to breathing the vapours generated from the fire. A Self-Contained Breathing Apparatus (SCBA) should be used when situations warrant.

C1.4 Reporting

The sequence of reporting that must be strictly followed to ensure that an efficient and effective response occurs, an accurate spill report is completed, and notifications to both YZC management and government agencies are done in a timely fashion is provided Figure C-1.

Most major suppliers in the Yukon are members of the Transportation Emergency Assistance Plan (TEAP). One of the responsibilities of this organization is the sharing of resources, consumables, equipment and personnel in the event of a spill. The transporter of the fuel is responsible for contacting TEAP in the event of a spill.

Figure C-1: Spill Reporting and Response Procedure



*Or designate (i.e. Environmental Technician).

The person who discovers the spill is considered the First Observer. That person identifies the source of the spill and reports to his or her direct supervisor who gathers the facts of the spill and contacts the Site Manager. The Site Manager records the spill information and passes it onto the Environmental Coordinator who will oversee its completion and distribution. Table C-4 provides a list of substances and quantities that currently constitutes a spill with the Yukon Government.

Table C-4: What constitutes a spill according to the Yukon Government.

Substance Spilled	Specified Amount
1. Explosives of Class 1 as defined in section 3.9 of the Federal Regulations	Any amount
2. Flammable gases, of Division 1 of Class 2 as defined in section 3.11(a) of the Federal Regulations	Any amount of gas from a container larger than 100L, or where the spill results from equipment failure, error or deliberate action or inaction
3. Non-flammable gases of Division 2 of Class 2 as defined in section 3.11(d) of the Federal Regulations	Any amount of gas from a container larger than 100L, or where the spill results from equipment failure, error or deliberate action or inaction
4. Poisonous gases of Division 3 of Class 2 as defined in section 3.11(b) of the Federal Regulations	Any amount
5. Corrosive gases of Division 4 of Class 2 as defined in section 3.11(c) of the Federal Regulations	Any amount
6. Flammable liquids of Class 3 as defined in section 3.12 of the Federal Regulations	200L
7. Flammable solids of Class 4 as defined in section 3.15 of the Federal Regulations	25 kg
8. Products or substances that are oxidizing substances of Division 1 of Class 5 as defined in sections 3.17(a) and 3.18(a) of the Federal Regulations	50 kg or 50 L
9. Products or substances that are organic compounds that contain the bivalent "-0-0-" structure of Division 2 of Class 5 as defined in sections 3.17(b) and 3.18(b) of the Federal Regulations	1 kg or 1L
10. Products or substances that are poisons of Division 1 of Class 6 as defined in sections 3.19(a) to (e) and 3.20(a) of the Federal Regulations	5 kg or 5 L
11. Organisms that are infectious or that are reasonable believed to be infectious and the toxins of these organisms as defined in sections 3.19(f) and 3.20(b) of the Federal Regulations	Any amount
12. Radioactive materials of Class 7 as defined by section 3.24 of the Federal Regulations	Any discharge or a radiation level exceeding 10mSv/h at the package surface and 200 mSv/h at 1 m from the package surface
13. Products or substances of Class 8 as defined by section 3.24 of the Federal Regulations	5 kg or 5 L
14. Miscellaneous products or substances of Division 1 of Class 9 as defined by sections 3.27(1) and 2(a) of the Federal Regulations	50 kg or 50 L
15. Miscellaneous products or substances of Division 2 of Class 9 as defined in section 3.27(1) and 2(b) of the Federal Regulations	1 kg or 1 L
16. Miscellaneous products or substances of Division 3 of Class 9 as defined in section 3.27(1) and 2(c) of the Federal Regulations	5 kg or 5 L
17. Special waste as defined in section 1 of the Special Waste Regulations of the Special Waste Regulations	Amounts specified in s. 3(1)(b) of the Special Waste Regulations
18. A pesticide as defined in section 2 of the Environment Act, but not including those pesticides and fertilizers listed in Schedule 4 of the Pesticide Regulations	5 kg or 5 L
19. Pesticides and fertilizers listed in Schedule 4 of the Pesticide Regulations	Any amount

Any spill matching these criteria must be reported to the *24-hour Spill Report Line and Client Services and Inspections*. However, if in doubt as to whether the reporting criteria were met, the call should be placed as a precautionary measure.

The Environmental Coordinator reports the spill to YZC senior management and the *24-hour Spill Report Line and Client Services and Inspections*. A verbal notification is to be made by telephone as soon as possible given the circumstances. A list of contact numbers will be readily available and kept up-to-date (Figure C-2).

The following information shall be conveyed to the affected agencies through the *24-hour emergency Yukon Spill Response Line and Client Services and Inspections*. This information will constitute verbal notification of the spill and should be documented on the Spill Reporting Form. The verbal report should include as much of the following information as is known at the time of the report (excerpt from the Implementation Guidelines for Part 8 of the *Canadian Environmental Protection Act, 1999* – Environmental Emergency Plans: Appendix 6: Notification and Reporting of Environmental Emergencies):

- the reporting person's name and telephone number at which the person can be immediately contacted
- the name of the person who owns or has the charge, management or control of the substance immediately before the environmental emergency
- the date, time and location of the release
- the name/UN number of the substance released
- the estimated quantity of the substance released
- the means of containment (from which the substance was released) and a description of its condition
- the number of deaths and injuries resulting from the environmental emergency
- the surrounding area/environment affected and potential impact of the release (mobility of release and weather or geographic conditions at the site)
- a brief description of the circumstances leading to the release
- the cause of the release (if known)
- details of the actions taken or further actions contemplated (to contain, recover, clean up and dispose of the substance involved)
- the names of agencies notified or on-scene; and other pertinent information

Figure C-2: Wolverine Project Emergency Contact Numbers

Wolverine Project
Emergency Telephone Contacts

Yukon Zinc Corporation Contacts:	
VP Environment & Community Affairs, Pamela Ladyman	(604) 682-5474 ext 246 (604) 644-7655 (cell)
Chief Operating Officer, Ray Mah	(604) 682-5474 ext 313 (604) 790-4462 (cell)
First Nation Contacts:	
Ross River Dena Council, John Etzel	(867) 969-2832
Liard First Nation, Alex Morrison	(867) 668-6850 (867) 332-7848 (cell)
Spill Reporting Yukon Government Contacts:	
24-hour Yukon Spill Line	(867) 667-7244
Client Services and Inspections	(867) 456-3882
Watson Lake District Conservation Officer	(867) 536-7363
Whitehorse District Conservation Officer	(867) 667-5221
Environmental Inspections Branch	(867) 667-3436
Mine Rescue Station	(867) 667-5450
Federal Government Contacts:	
Department of Fisheries and Oceans	(867) 393-6722
Environment Canada (Whitehorse)	(867) 667-3400
Transport Canada (CANUTEC 24-hour Service)	(613) 996-6666
Regional Emergency Numbers:	
Hospital	
Watson Lake	(867) 536-4444
Whitehorse	(867) 393-8700
Watson Lake Health Unit	(867) 536-7834
Ambulance	
Watson Lake	(867) 536-4444
Fire Department	
Watson Lake	(867) 536-2222
Whitehorse	(867) 668-8699 or 668-2462
Police	
Watson Lake	(867) 536-5555
Whitehorse	(867) 667-5555
Laboratories (Vancouver)	
Maxxam Analytics Inc	(604) 444-4808

Figure C-3: Wolverine Project Spill Reporting Form

Wolverine Project Spill Reporting Form

1) Date of Incident: _____ Time: _____

2) Spill Type: (check) Oil ____Gasoline ____Diesel _____Other (name) _____

3) Source and Cause: _____

_____

4) Volume: _____(Liters/gallons)

5) Spill Location: _____

6) GPS Coordinates: _____(N) _____(E)

7) Cause of Incident (e.g.: broken hose): _____

8) Weather Conditions: Temperature _____ Wind Direction/Speed _____ Conditions _____

9) Hazards to Human Life or Health: _____

10) Known or Anticipated Environmental Effects: _____

11) Nearest Waterbody and Distance: _____

12) Fire Hazard: Yes ___ No ___

13) Supervisor Onsite: _____

14) Contractor Involved: Yes ___ No ___ Name(s): _____

15) Action taken to date: Containment: _____

Clean up: _____

16) Volume Recovered: _____(Liters/gallons)

17) Subsequent Actions Required: _____

18) Future Preventative Measures: _____

19) Additional Comments:_____

_____

20) Reported by:
Name: _____ Title: _____ Company_____

21) Reported to:
Name: _____ Organization: _____ Phone:_____

Reported to:
Name: _____ Organization: _____ Phone:_____

The Canadian Transport Emergency Center (CANUTEC), a branch of Transport Canada, can also be contacted for 24 hr technical advice on Dangerous Goods. Other stakeholders such as the Ross River Dena Council and Liard First Nation will be notified.

A written report should be made to the Director, Environmental Protection, Pacific and Yukon Region, Environment Canada within 30 days of the spill occurrence. The following information should be included in the written report (excerpt from the Implementation Guidelines for Part 8 of the *Canadian Environmental Protection Act, 1999* – Environmental Emergency Plans: Appendix 6: Notification and Reporting of Environmental Emergencies):

- the name and address of the person who owns or has the charge, management or control of the substance involved in the environmental emergency and the telephone number, including the area code, at which the person may be contacted
- the date, time and exact location of the release
- the name/UN number of the substance released
- the composition of the substance released showing, with respect to each substance involved, its concentration and total weight
- the estimated quantity of the substance released and the total quantity of substance in the means of containment before the release
- the duration of the release of the substance and its release rate
- the means of containment (from which the substance was released) and a description of its condition
- the number of deaths and injuries resulting from the environmental emergency
- the surrounding area/environment affected and potential impact of release (mobility of release, weather or geographic conditions at the site, long-term environmental impacts)
- a complete sequence of events before and after the environmental emergency (including the cause of the release, if known)
- the names of agencies notified or on-scene at the time of the release
- all measures taken pursuant to CEPA 1999 paragraph 201(1)(b) and (c) (regarding protection of the environment and public safety and notification to any member of the public adversely affected by the environmental emergency)
- all measures to be taken to prevent similar releases

Appendix D

Wolverine Project Wildlife Protection

D1 Background Information

The project area lies at the outer edges of the range of the Finlayson Caribou herd. Moose abound, as do small furbearers, in the project area. Grizzly bears and to a lesser degree Thinhorn sheep are occasionally seen in the project area.

The project results in disturbance of a relatively small area within a region that is rich in wildlife habitat and very little existing disturbance, apart from the Robert Campbell Highway. Using conservative assumptions about the size of the project disturbance footprint, effects on habitat availability for all valued species are expected to be low and barrier effects to wildlife movement are also predicted to be low. The project is on the perimeter of the Finlayson Caribou Herd Range. Concentrate haul south to Watson Lake will avoid potential effects on intensely utilized caribou range to the north. The relatively narrow right-of-way for the access road and low level of traffic will allow wildlife to cross with little impediment. Accordingly effects on wildlife movement patterns are expected to not be significant.

D2 Wildlife Protection Plan

The *Wolverine Project Wildlife Protection Plan (WPP*) is currently being prepared in accordance with *QML-0006* in collaboration with the Ross River Dena Council, Liard First Nation and Yukon Department of Environment. The *WPP* is anticipated to be completed by early 2009 for implementation at the onset of major construction activities in Spring 2009. Once approved by the Chief, EMR, the detailed *WPP* will update and supersede the requirements, measures and policies outlined below.

D2.1 Wildlife Protection Mitigation Measures

Specific mitigation measures or practices pertaining to wildlife attractants, vehicle use, habitat management and wildlife harassment, and wildlife health are provided below. General mitigation measures to avoid wildlife conflicts or mortalities include:

- Access to the mine road will be restricted by a locked gate during the construction, operations, and decommissioning and closure phases of the project.
- Firearms will not be permitted.
- Hunting and fishing will be prohibited at all times on or in the vicinity of the project site. This restriction will apply to all mine employees, managers and contractors and it will be in effect throughout the life of the project from construction through to closure and reclamation. This hunting and fishing prohibition has been in place successfully during the latter part of the exploration phase of the project.

- Incidental traffic will be kept minimal with air access to the mine predominating for personnel. No private vehicles (including ATVs, snowmobiles, motorized boats or other types of off-road vehicles) will be permitted.
- Any observed wildlife corridors will be signed to alert drivers to potential wildlife crossings.

D2.1.1 Wildlife Attractants

Food wastes are the typical wildlife attractant that is implicated in the development of problem wildlife, especially with respect to problem bears. There are, however, other wildlife attractants that may create problems: chemicals (e.g., road salt), wildlife carcasses (e.g., road kills), and roadside vegetation (e.g., clover). Policy and practice directed at minimizing wildlife concerns related to attractants are presented in Table D-1.

Management related to the control of wildlife attractants are intended to minimize and even eliminate the development of problem wildlife. However; in the event a problem wildlife situation arises, the Environmental Coordinator, Mine Manager or designate(s) will initiate the appropriate response actions. Any direct intervention with respect to problem wildlife will be conducted by authorized personnel in consultation with, and as approved and/or directed by Environment Yukon officials.

Bear management practices for this project will have two closely linked components: a Bear Aware program and Bear Safety training. The goal is to reduce human-bear interactions and to reduce and even eliminate black bear and grizzly bear mortalities associated with the project (Table D-1). The components will be presented to employees and consultants together unless specialized training in bear safety is required for field survey crews and personnel designated for problem bear responses. In those cases, a professional will provide the appropriate bear safety training course. Note that any direct intervention with respect to problem bears will be conducted in consultation with, and as approved and/or directed by government officials.

Table D-1: Mitigation Practices for Issues of Problem Wildlife.

Preventing Problem Wildlife	• Littering is prohibited on and in the vicinity of the project site and along access roads. All garbage (e.g., lunch bags) must be returned to temporary storage containers. Note that this includes organic wastes (e.g., orange peels, apple cores). • Food wastes will be disposed of as per the Waste Management Plan. • Wastes associated with mechanical maintenance and repairs (e.g., motor oil) will be disposed of as per the Waste Management Plan. • All temporary (small) storage containers (e.g., garbage cans) for garbage and recycling will be located indoors in bear-proof buildings. • The area around disposal stations will be kept free of garbage and spills will be cleaned up appropriately. • Crews working in the field may carry commercially available personal deterrent devices (i.e., bear spray, bear 'bangers') but will require an orientation on the use of these devices. General restrictions on the use and transport of these devices must be followed. • Employees are not permitted to have firearms on or in the vicinity of the Project site. • Feeding wildlife is prohibited at all times on or in the vicinity of the project site. • Report wildlife incidents related to garbage or human food attractants to Environmental Coordinator, Mine Manager or designate(s) as soon as possible. • Report improperly disposed of garbage, particularly food wastes, to Environmental Coordinator, Mine Manager or designate(s) as soon as possible. • Be 'Bear Aware'. All Project workers will receive a Bear Aware Program orientation. Report all bear observations from in and around the Project site and along access roads.
Dealing with Problem Wildlife	• Immediately notify the Environmental Coordinator, Mine Manager or designate(s) of any problem wildlife issue. Note that reporting wildlife incidents as they occur will ensure that the proactive rather than reactive measures can be taken to prevent a serious outcome (e.g., human injury, destruction of the problem animal). • The Environmental Coordinator, Mine Manager or designate(s) will initiate the appropriate actions in response to a problem wildlife issue. • Only authorized personnel are permitted to use non-lethal (e.g., rubber bullets) and lethal problem wildlife interventions. • Do not attempt to deal with a problem wildlife issue on your own. Problem wildlife can be dangerous. • Conform to recommendations regarding bear safety.

D2.1.2 Wildlife and Vehicles

Management procedures and policies are intended to reduce the incidence of wildlife-vehicle collisions and near misses Table D-2 presents management practices for traffic and wildlife/vehicle incidences.

Table D-2: Mitigation Practices for Issues of Wildlife and Vehicles

Vehicles and Wildlife	• Wildlife has the right-of-way on all roads, except where it is judged to be unsafe to do so. • Maximum speed limit on all access roads is 60 km/h. • Incorporate traffic signs for sensitive wildlife areas. • Verbally report ungulate and other large animal carcasses observed on and in the vicinity of the Project site, and along access roads to the Environmental Coordinator, Mine Manager or designate(s) as soon as possible. • Conform to road snow clearing requirements, such as exit corridors in areas of high snow, as per the discretion of the Environmental Coordinator, YG Conservation Officer and/or Regional Biologist. • Project-related traffic (including ATVs and snowmobiles) is restricted to designated access roads and trails (with certain exceptions). • A vehicle collision that results in the death or injury of an ungulate or other large animal must be reported as soon as possible. • A near miss between a vehicle and an ungulate or other large animal must be reported as a wildlife 'incident'.

D2.1.3 Habitat Management and Wildlife Harassment

Wildlife species are known to be subject to stress in association with human-caused disturbances. Human-caused disturbances that could have potentially adverse effects on wildlife include off-road vehicles, humans on foot, the presence of domestic pets, research activities, wildlife viewing, and aircraft overflights.

Management will be directed at minimizing potential project-related effects on wildlife habitat that may either occur directly (habitat loss, nest destruction) or indirectly (habitat avoidance due to sensory disturbance, disruption of daily movements).

The restrictions presented in Table D-3 will be essential in the minimizing harassment and effects of wildlife habitat.

Table D-3: Mitigation Practices for Issues of Wildlife Habitat and Harassment

Wildlife Habitat	• Conform to general restrictions for wildlife protection. • Conform to restrictions and seasonal restrictions on vegetation clearing as per the direction of the Environmental Coordinator, Mine Manager or designate(s). • Vegetated buffers will be maintained adjacent to facilities and access roads. • Conform to road snow clearing requirements at the discretion of the Environmental Coordinator. • Seeding along road corridors cannot be conducted without approval of the Environmental Coordinator, Mine Manager or designate(s), and will follow seed mix recommendation outlined in the Reclamation Plan. • Report wildlife observations from the project site and along access roads.
Wildlife Harassment	• Any harassment of wildlife will be prohibited on site and by all mine staff, guests and contractors. • Adopt and follow the Yukon guidelines for dealing with aerial impacts from helicopters and fixed-wing flights. Aircraft will, to the extent possible, avoid airspace over and in proximity to the Wolverine, Little Wolverine, Little Jimmy and Frances Lakes. • All staff, pilots, guests and contractors will receive orientation and training with respect to wildlife harassment policies.

D2.1.4 Wildlife Health

Management policy and practices are intended to reduce potential project-related effects on wildlife health. For example, company procedures on the safe and prompt clean up of any chemical spills will be followed, with the recognition that special considerations for wildlife may be necessary in some cases. Table D-4 provides mitigation practices for issues pertaining to wildlife health.

Table D-4: Mitigation Practices for Issues of Wildlife Health

Wildlife Health	• Feeding wildlife is prohibited at all times on or in the vicinity of the project site, including during travel to and from the site. • Company procedures on the safe and prompt clean up of any spills will be followed. • Engineering requirements for all ditches and engineered embankments/dams/settling ponds as per the direction of the Environmental Coordinator, Mine Manager or designate(s) will be adhered to. • Herbicides will not be used in vegetation management activities. Instead, manual clearing will be conducted when and where required, in adherence to the migratory bird vegetation clearing windows. • Report any observations of wildlife in and around potential sources of contaminants (e.g., settling ponds, fuelling sites). • Temporary fencing in areas to prevent wildlife access.

D2.2 Wildlife Reporting

A wildlife records program that includes wildlife observations, location of wildlife features (e.g., active nests or dens), traffic incidents, and wildlife incidents (e.g., aggressive encounters) will be implemented. This information will be regularly reviewed to identify issues of concern (e.g., road segments with a high incidence of roadkills,

active dens, etc.). If an issue of concern is identified, a strategy to address the concern will be developed in consultation with the appropriate agencies. The wildlife records program is an important tool in monitoring the effectiveness of the wildlife protection plan recommendations. Two different wildlife records will be recognized:

- Wildlife observations: Observation of sign (e.g., tracks, scat, nests, burrows, etc.) or observations of the animals themselves, behaving in a 'normal' way. Wildlife observations provide information on wildlife habitat use and behavior patterns in relation to the project. Project workers and contractors will be encouraged to record wildlife observations (including notes on habitat use).
- Wildlife incidents: Reports of close or aggressive encounters, unusual behavior in and around site facilities, traffic accidents or near misses, and observations of dead or injured animals. Project workers and contractors will be required to verbally notify the Environmental Coordinator, Mine Manager or designate(s) of wildlife incidents as soon as possible.

While the distinction between wildlife observations and wildlife incidents will be communicated to employees and consultants, there is the potential for overlap, especially regarding observations of certain wildlife (i.e., bears) in the immediate vicinity of project facilities. Thus, all wildlife observation reports should be reviewed for evidence of a potential problem (e.g., habituation).

A written log of wildlife observations and incidents for the mine property and access road will be maintained for the life of the mine (until there are no longer employees on site). The log will include time and date, species, location of observation and other relevant information such as mortality of wildlife and birds. A review of the log will occur periodically with the YTG Regional Biologist for the area. Wildlife collisions and mortalities will be reported immediately to the local Environment Yukon conservation office.

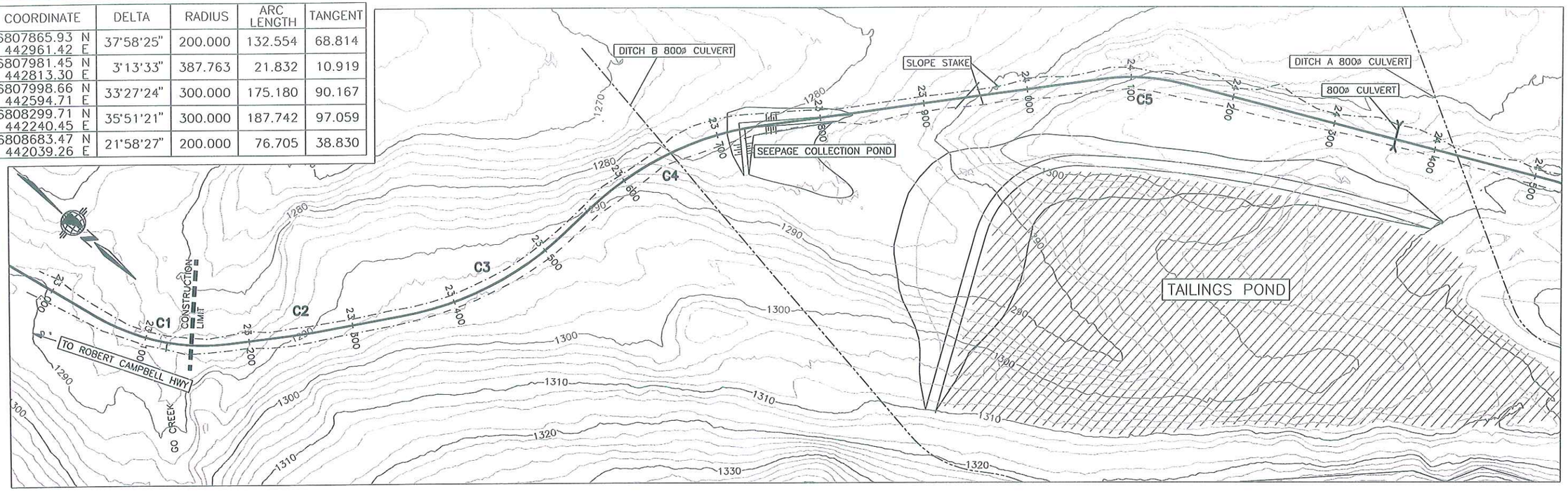
Wildlife observations, monitoring programs, and incidents may require additional mitigation as determined in consultation with the Yukon Environment officials, the Ross River Dena Council, and local stakeholders.

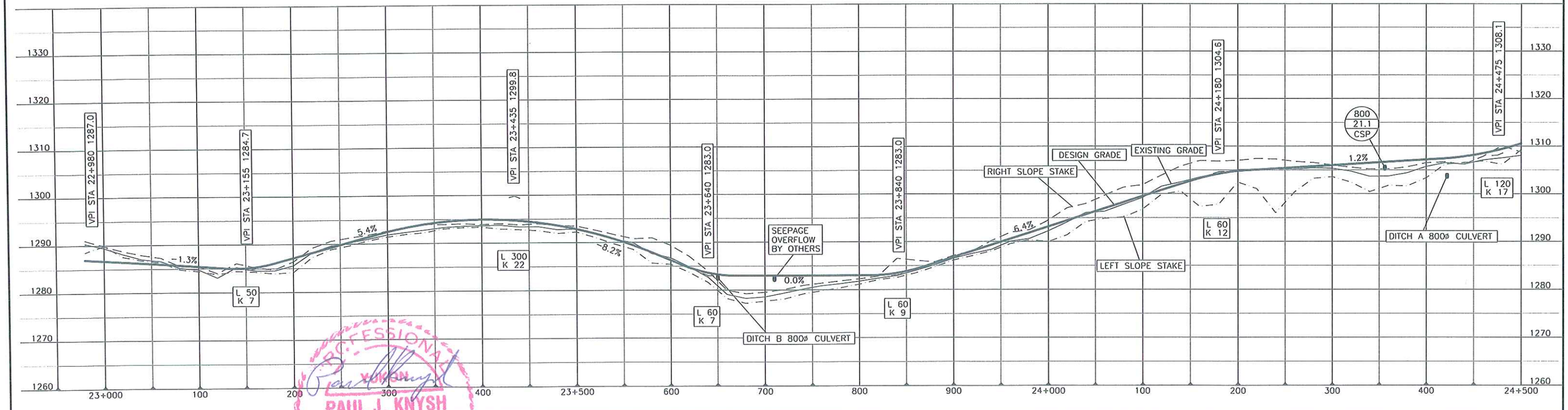
Appendix E

All Weather Access Road

Issued for Construction Plan/Profile Sheets Km 23.0 to 27.2

CURVE	COORDINATE	DELTA	RADIUS	ARC LENGTH	TANGENT
C1	6807865.93 N 442961.42 E	37°58'25"	200.000	132.554	68.814
C2	6807981.45 N 442813.30 E	3°13'33"	387.763	21.832	10.919
C3	6807998.66 N 442594.71 E	33°27'24"	300.000	175.180	90.167
C4	6808299.71 N 442240.45 E	35°51'21"	300.000	187.742	97.059
C5	6808683.47 N 442039.26 E	21°58'27"	200.000	76.705	38.830





NOTES:

1. REFERENCED FROM KLOHN CRIPPEN BERGER, PROJECT M09234A02, DRAWING J1-C-017
2. EXACT CULVERT PLACEMENT TO BE DETERMINED ONSITE

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 2008/11/24

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2	REVISIONS	RSC	24/10/08
1	ISSUED FOR REVIEW	RSC	10/10/08

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CHECKED BY: JTQ	10/10/08
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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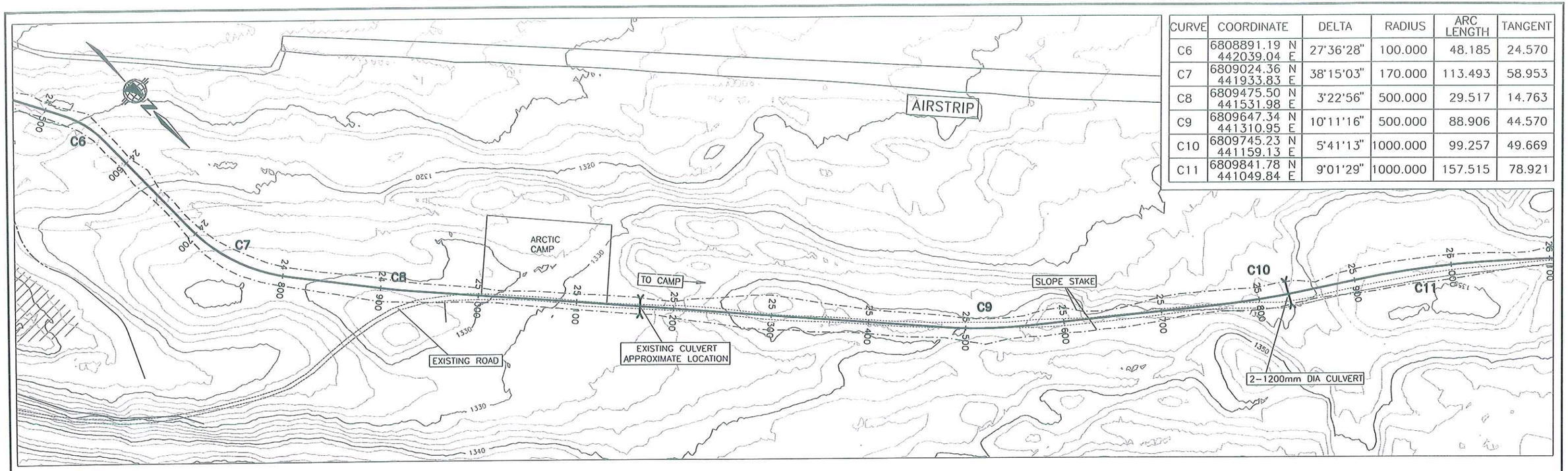
YES Yukon Zinc CORPORATION

MILL SITE TO TAILINGS POND ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 23.0 TO KM 24.5



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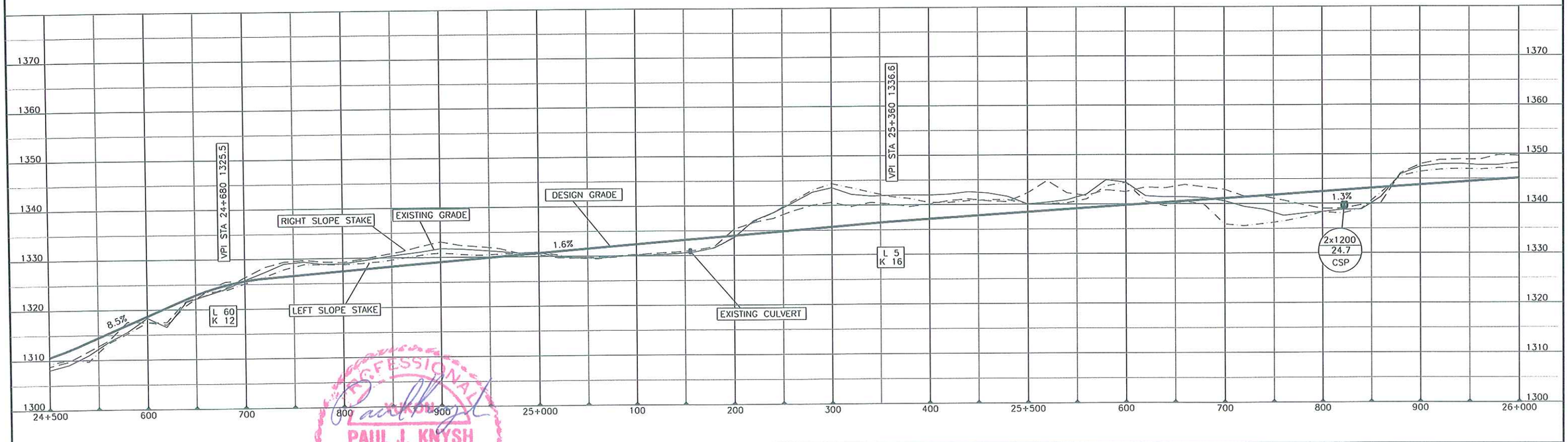
C7	6809024.36 N 441933.83 E	38°15'03"	170.000	113.493	58.953
C8	6809475.50 N 441531.98 E	3°22'56"	500.000	29.517	14.763
C9	6809647.34 N 441310.95 E	10°11'16"	500.000	88.906	44.570
C10	6809745.23 N 441159.13 E	5°41'13"	1000.000	99.257	49.669
C11	6809841.78 N 441049.84 E	9°01'29"	1000.000	157.515	78.921



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PROFESSIONAL ENGINEER YUKON PAUL J. KNYSH TERRITORY 2008/11/24

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1	ISSUED FOR REVIEW	RSC	10/10/08

SECTION:	
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CHECKED BY: JTQ	10/10/08
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
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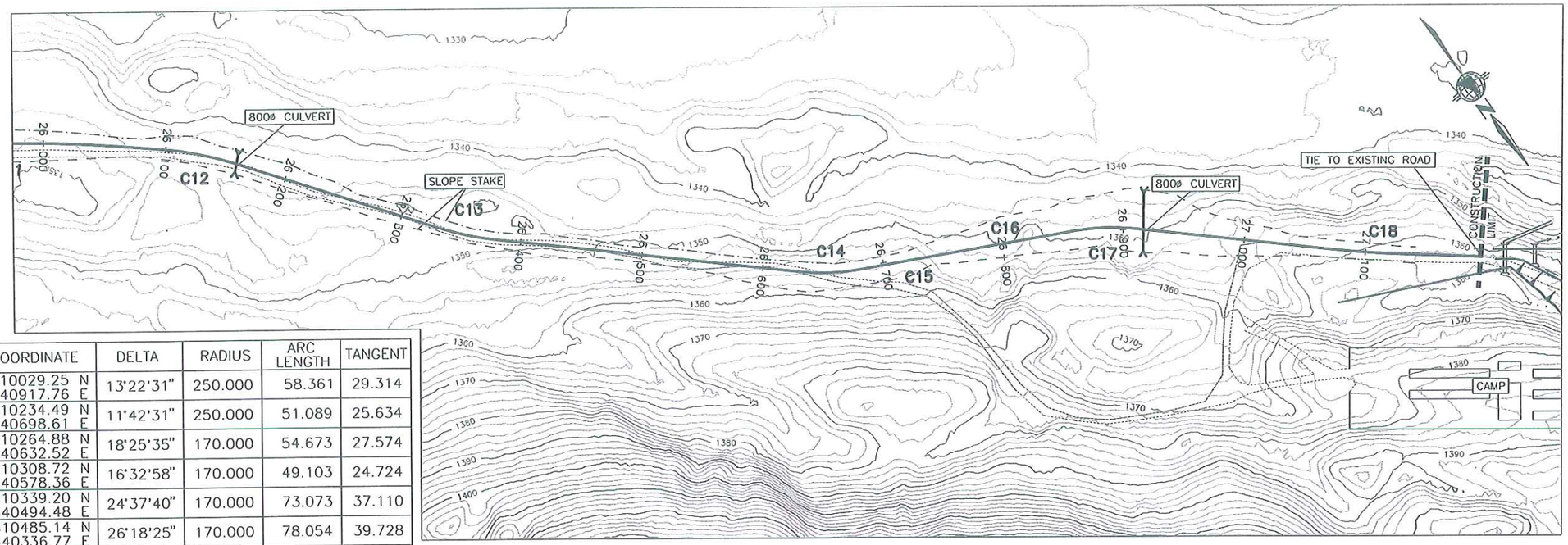
YES Yukon Zinc CORPORATION

MILL SITE TO TAILINGS POND ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 24.5 TO KM 26.0



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C13	6810234.49 N 440698.61 E	11°42'31"	250.000	51.089	25.634
C14	6810264.88 N 440632.52 E	18°25'35"	170.000	54.673	27.574
C15	6810308.72 N 440578.36 E	16°32'58"	170.000	49.103	24.724
C16	6810339.20 N 440494.48 E	24°37'40"	170.000	73.073	37.110
C17	6810485.14 N 440336.77 E	26°18'25"	170.000	78.054	39.728
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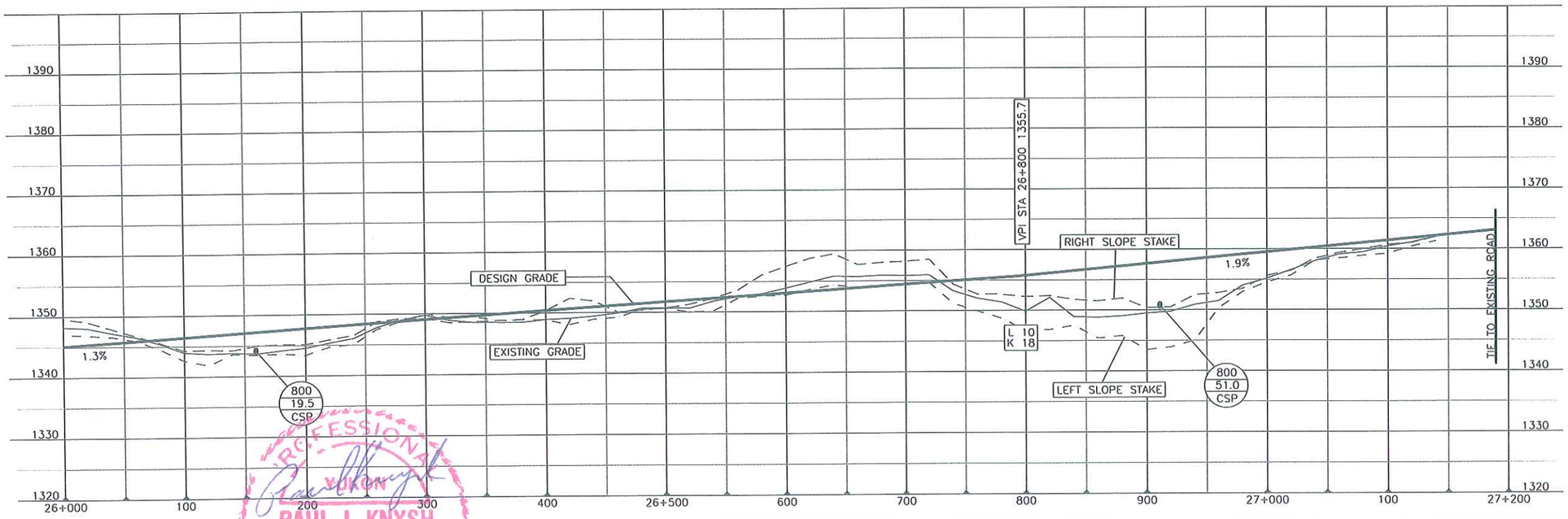

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PROFESSIONAL ENGINEER YUKON PAUL J. KNYSH TERRITORY 2008/11/24

NO	DESCRIPTION	BY	DATE
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2	REVISIONS	RSC	24/10/08
1	ISSUED FOR REVIEW	RSC	10/10/08

SECTION:	
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DRAWN BY: RSC	10/10/08
CHECKED BY: JTO	10/10/08
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015RE.DWG	E06015	km 26.0	4

YES Yukon Zinc CORPORATION

MILL SITE TO TAILINGS POND ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET KM 26.0 TO KM 27.2

PLAN PROFILE AND DESIGN CROSS SECTIONS WOLVERINE MINE ACCESS ROAD YUKON ZINC CORPORATION NOVEMBER, 2008

YUKON ENGINEERING SERVICES

E06015RE

Cover Nov 26, 2008

DESIGN CROSS SECTIONS
WOLVERINE MINE ACCESS ROAD
YUKON ZINC CORP.
NOVEMBER, 2008

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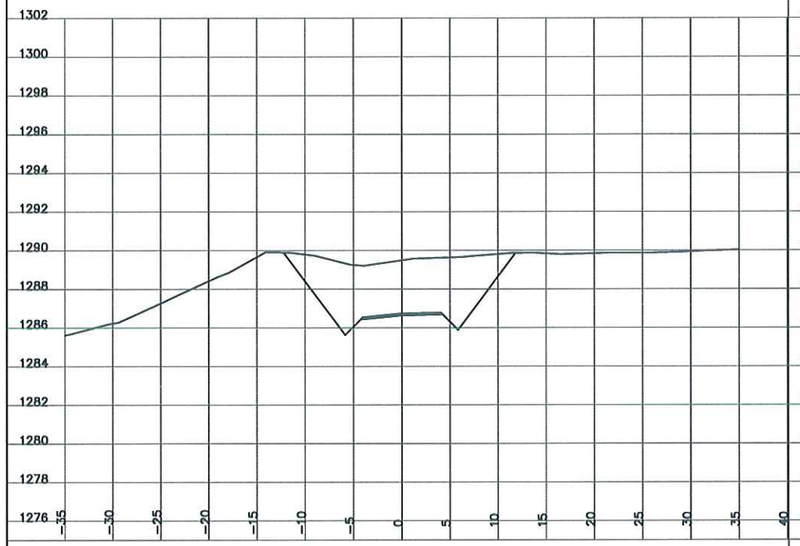

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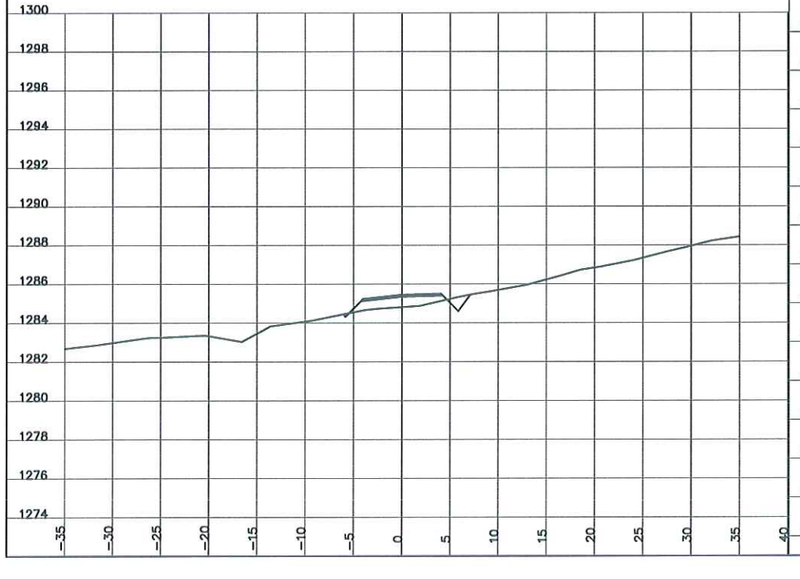

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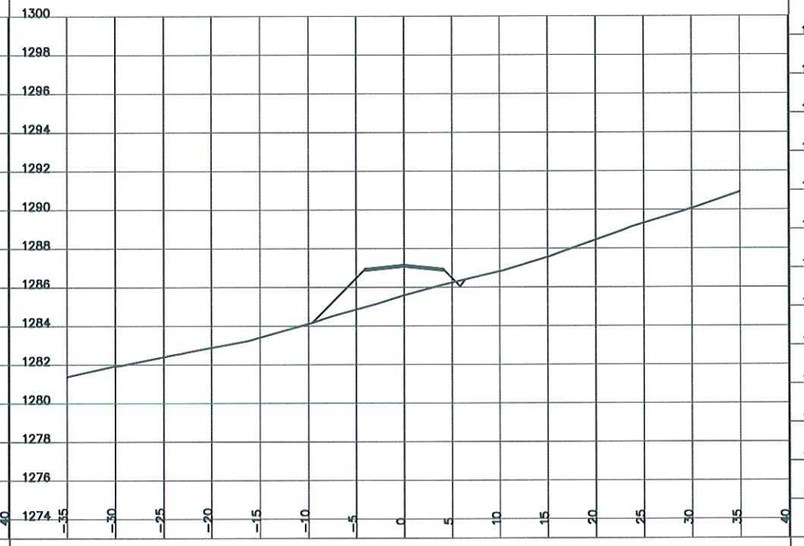

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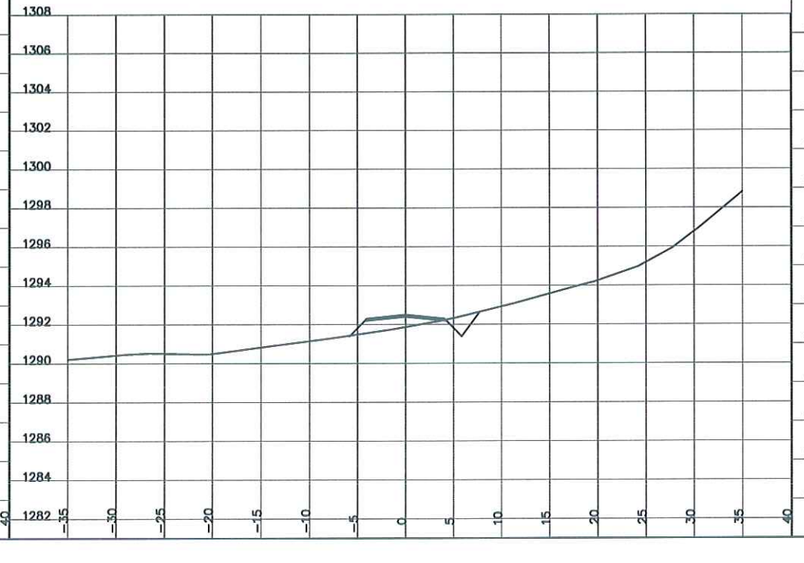

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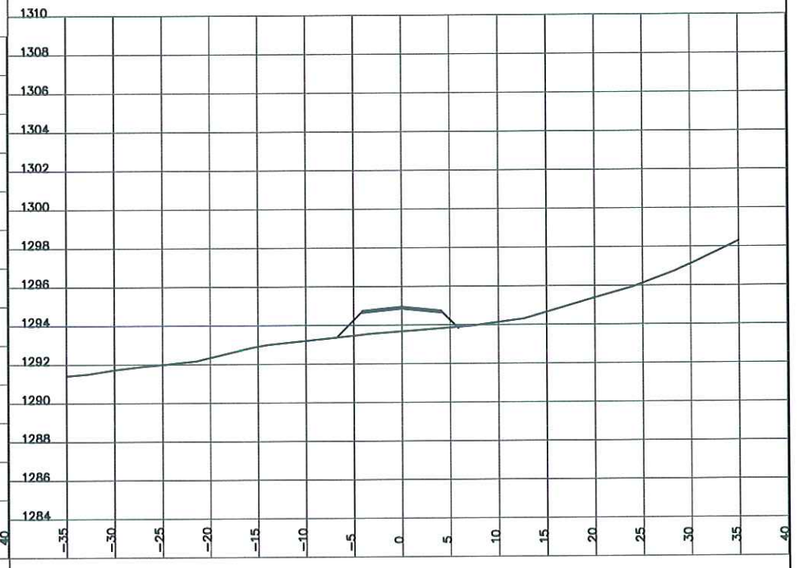

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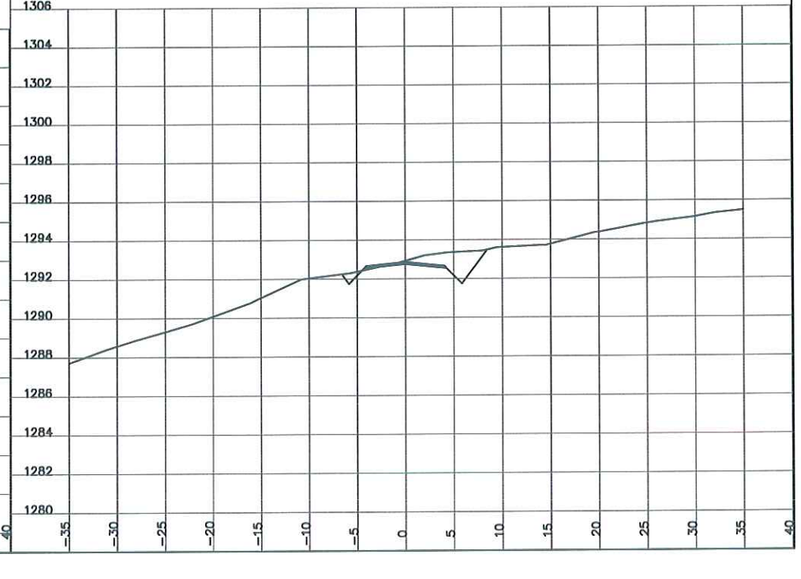

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YUKON ZINC CORP.
NOVEMBER, 2008

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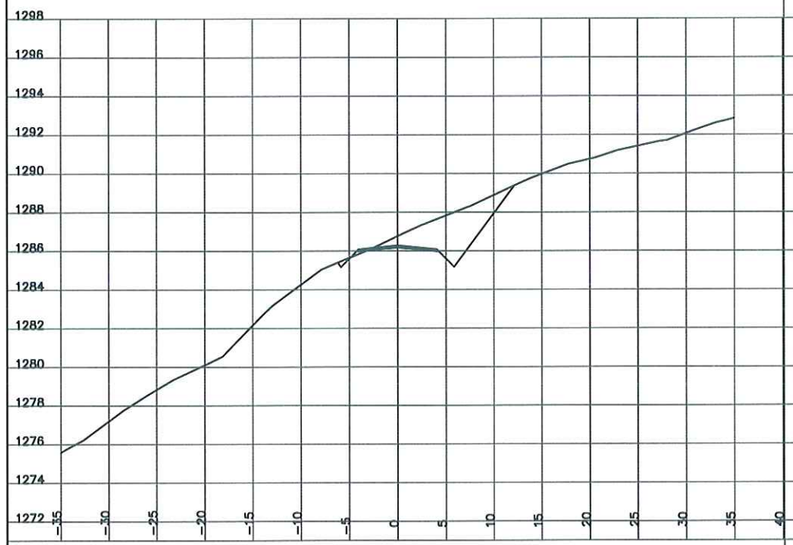

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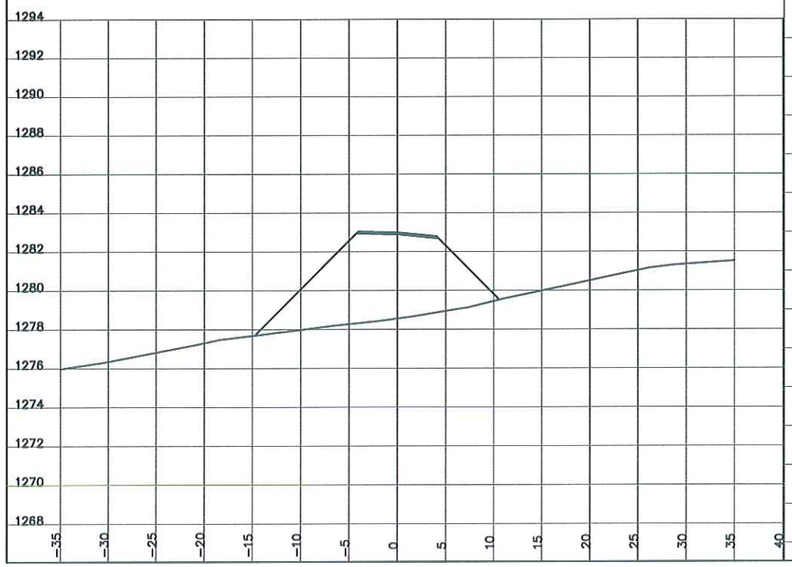

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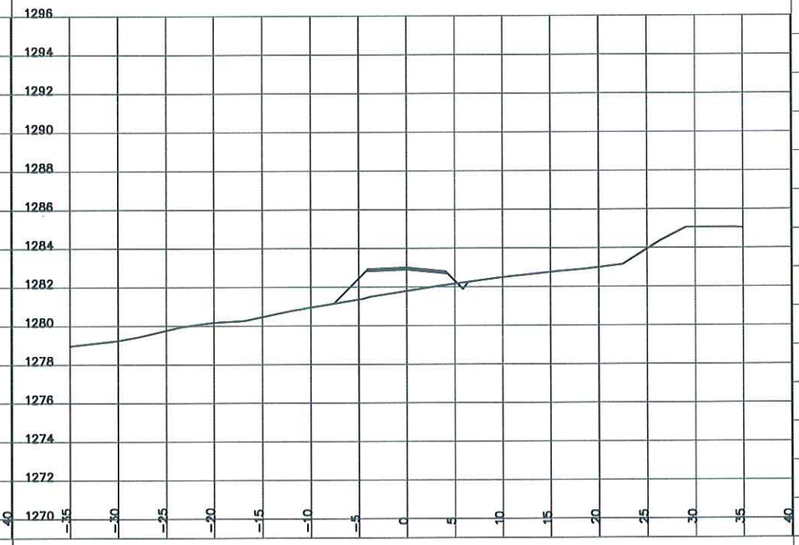

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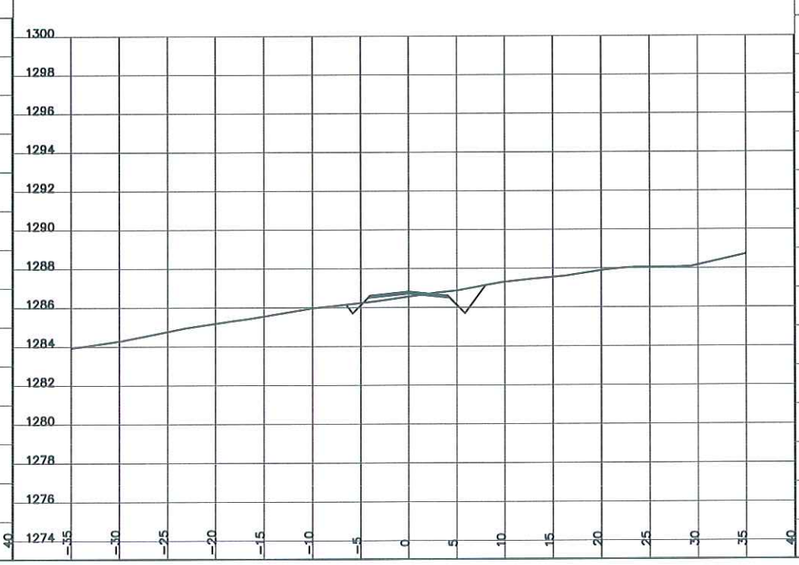

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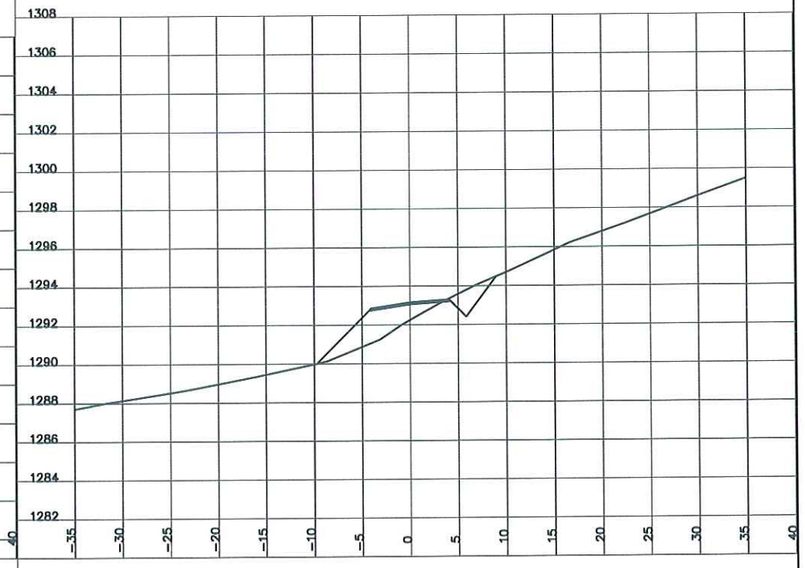

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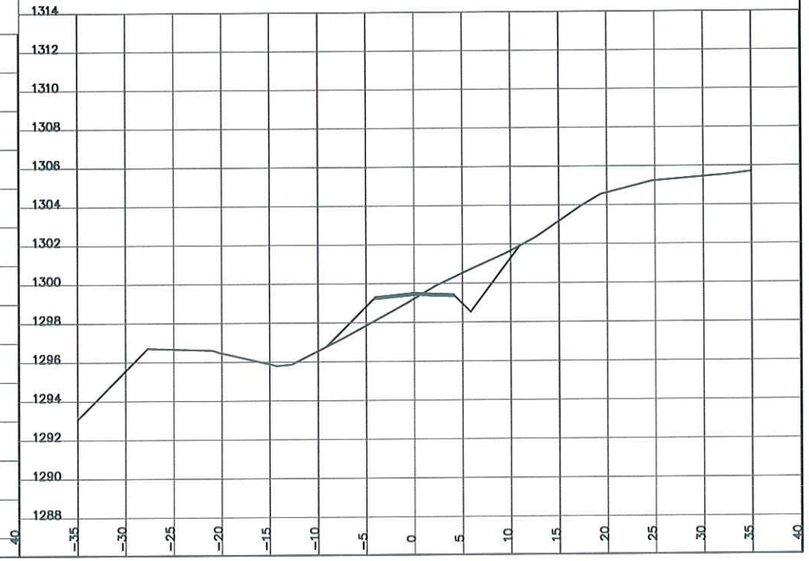

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YUKON ZINC CORP.
NOVEMBER, 2008

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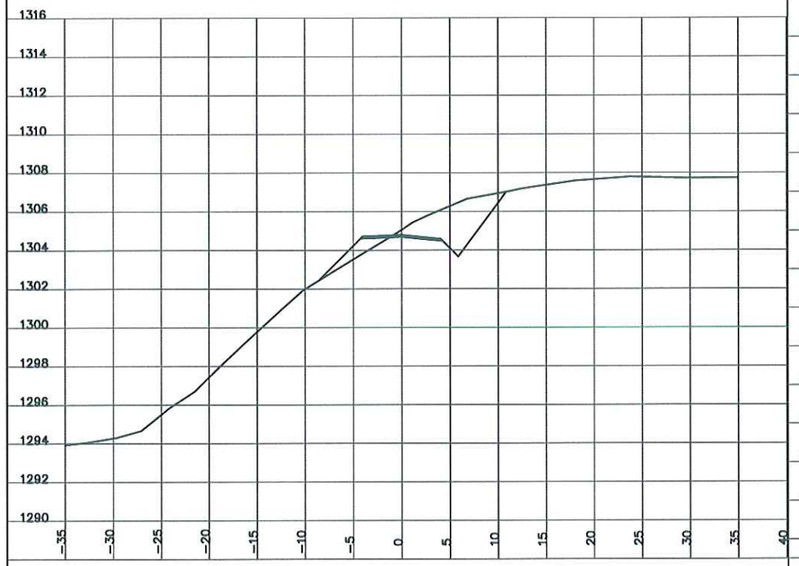

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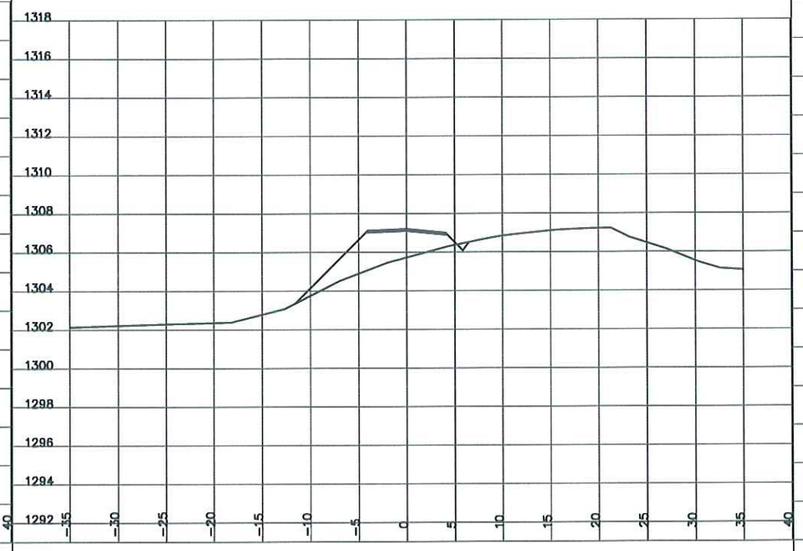

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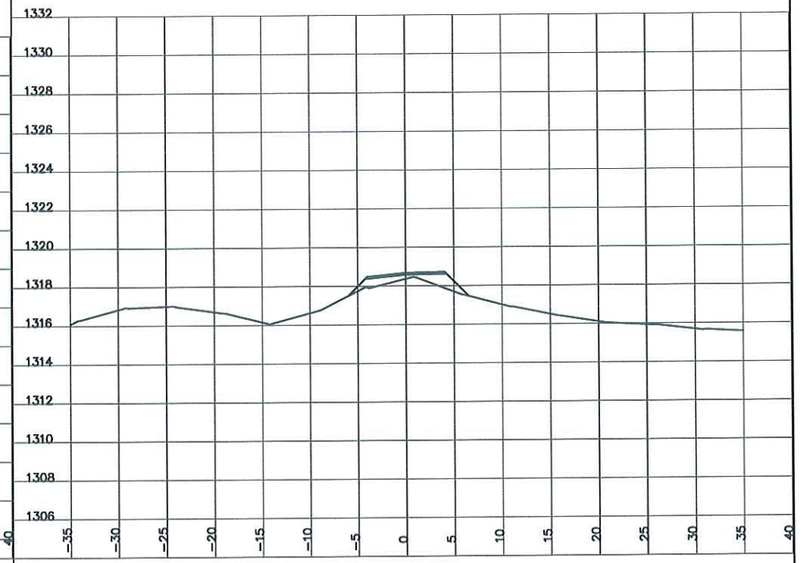
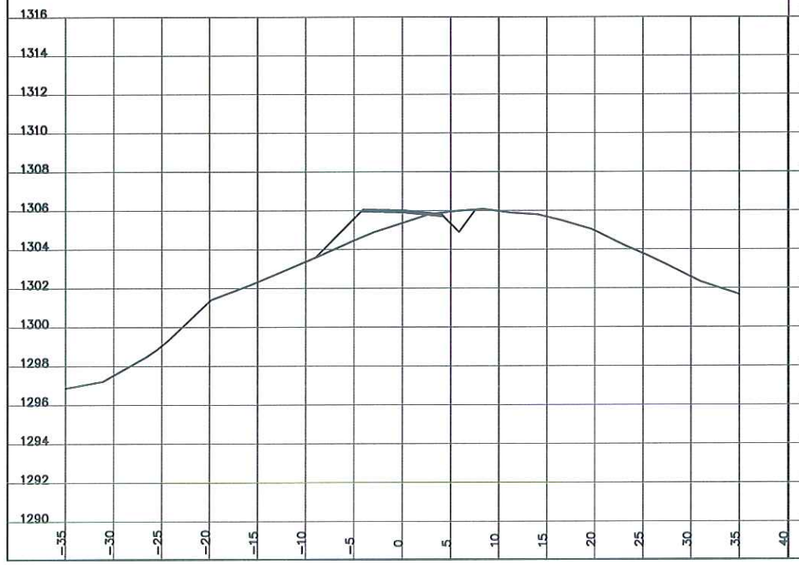


STATION 24+300.00

H= 1:600 V= 1:300

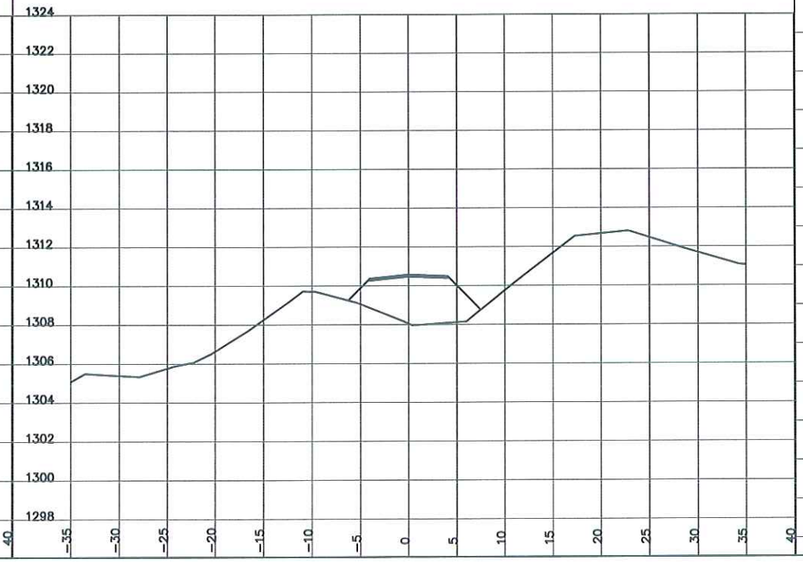
CUT= 2.15 FILL= 7.81



STATION 24+500.00

H= 1:600 V= 1:300

FILL= 23.78



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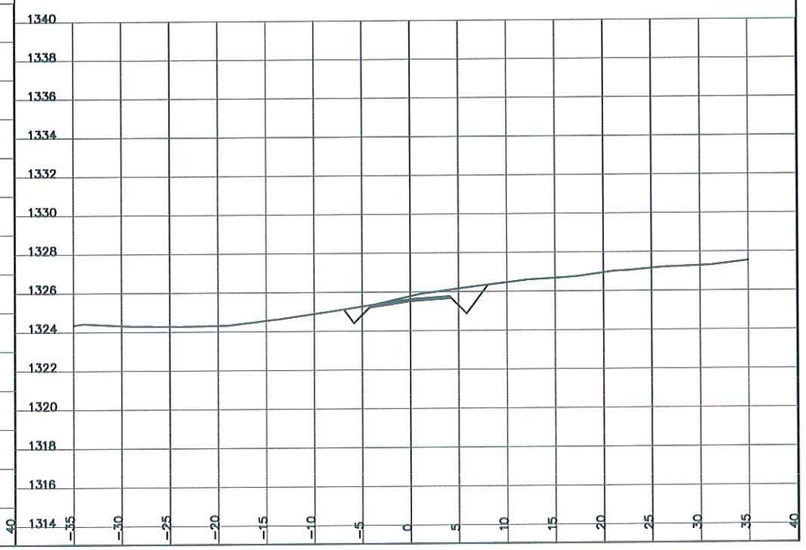
CUT= 6.36



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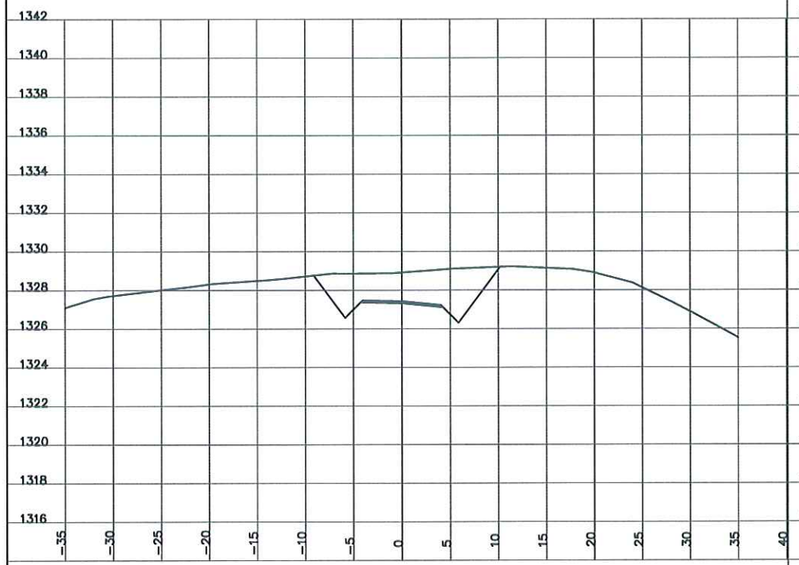
STATION 24+800.00
H= 1:600 V= 1:300

CUT= 30.73



STATION 25+000.00
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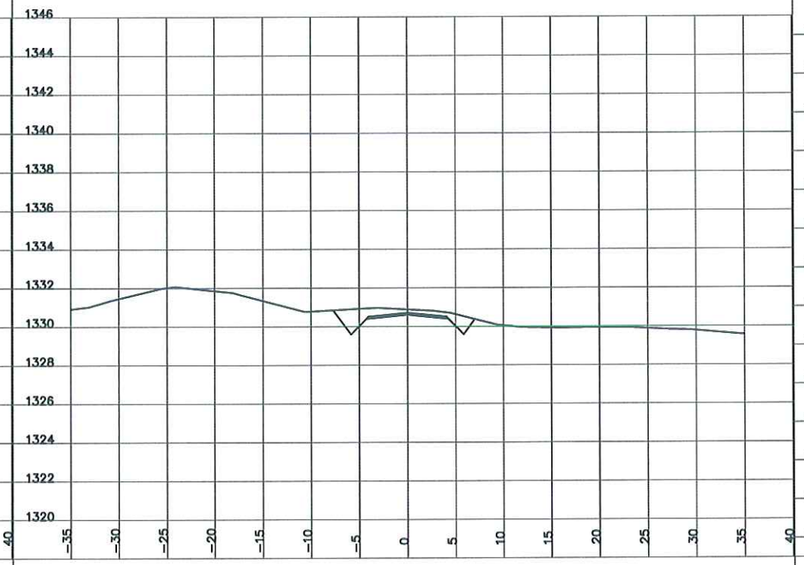
CUT= 7.41



STATION 25+200.00
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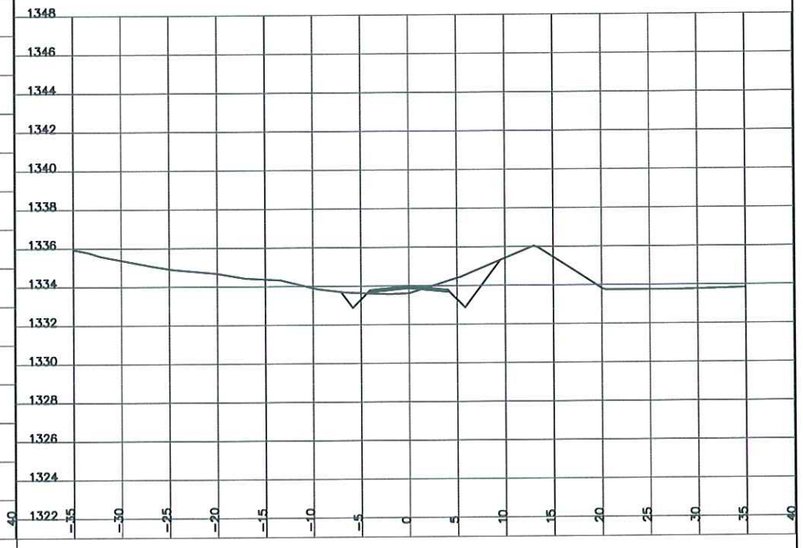
CUT= 6.85 FILL= 0.94



STATION 24+900.00
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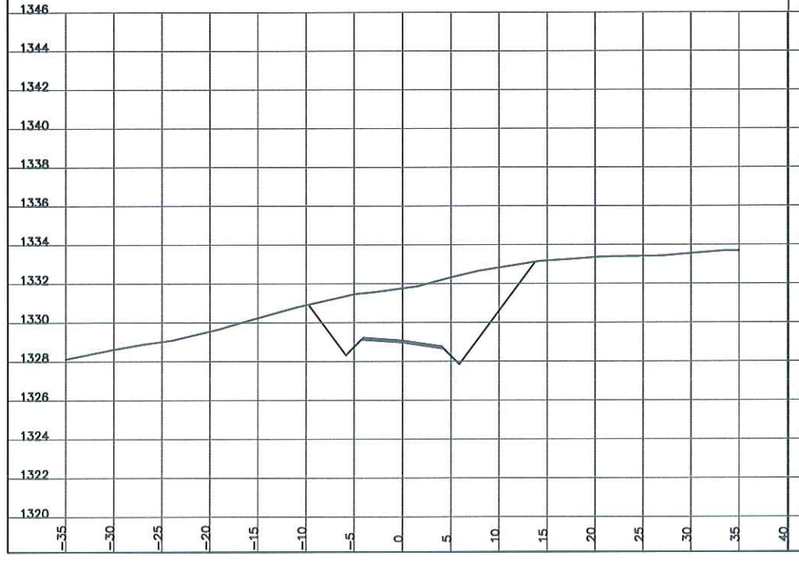
CUT= 59.39



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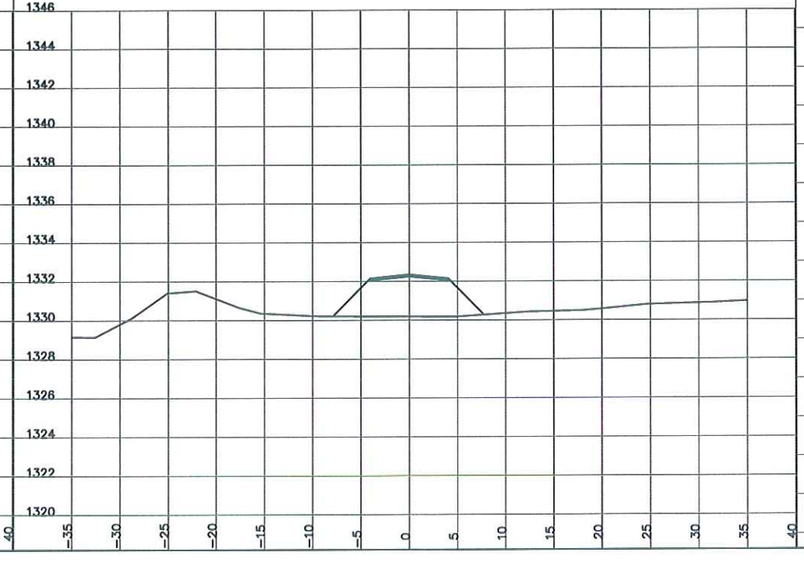
FILL= 23.26



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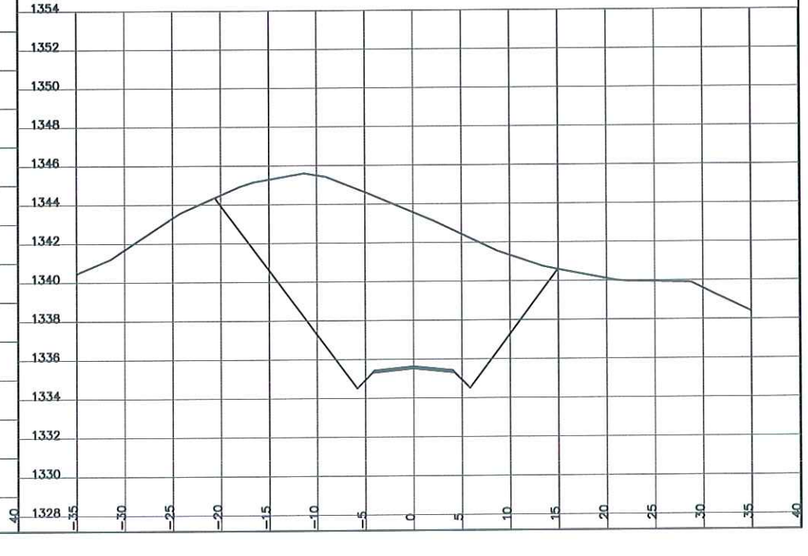
CUT= 215.70



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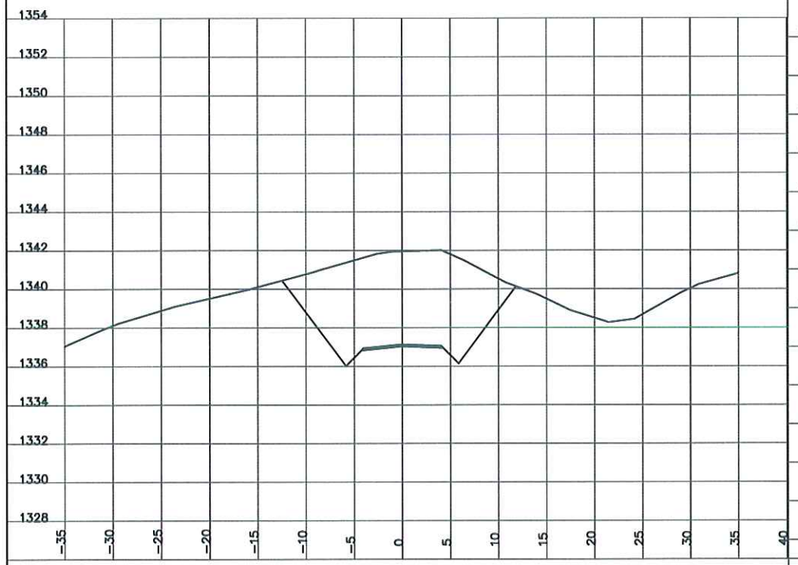
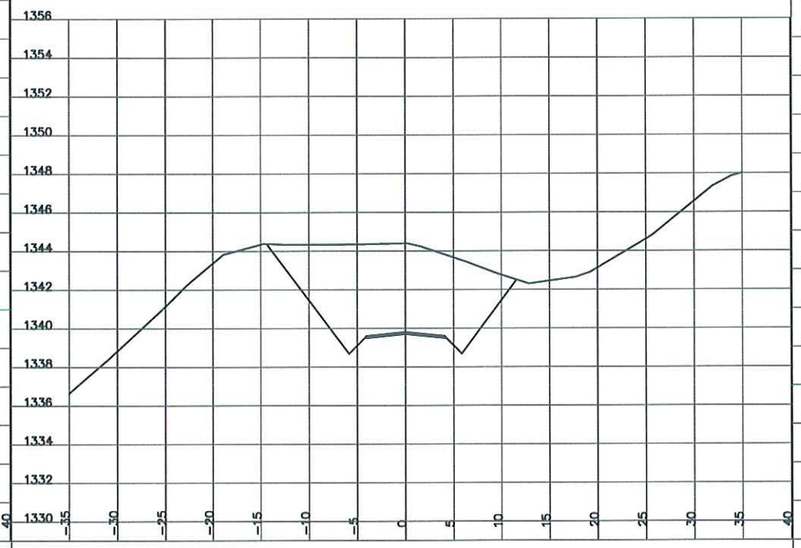
STATION 25+400.00
H= 1:600 V= 1:300

CUT= 92.34



STATION 25+600.00
H= 1:600 V= 1:300

CUT= 93.14



STATION 25+800.00
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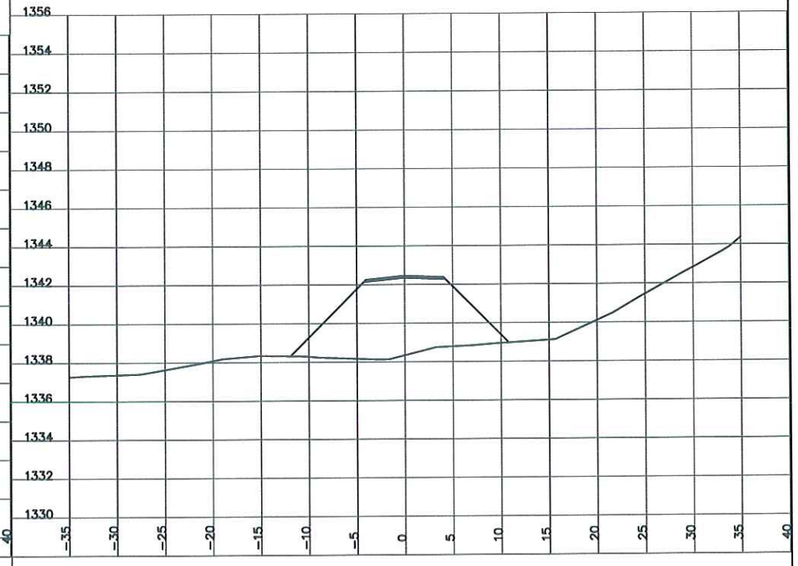
FILL= 59.92



STATION 25+500.00
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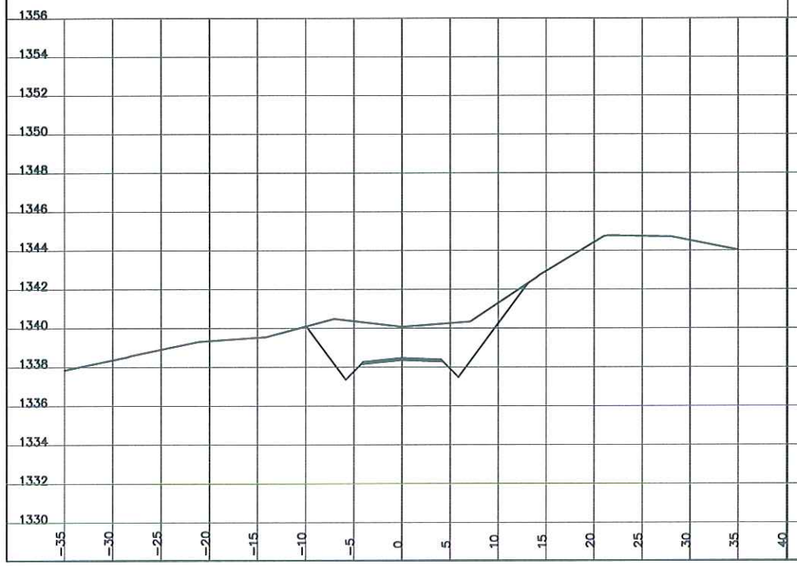
CUT= 39.69



STATION 25+700.00
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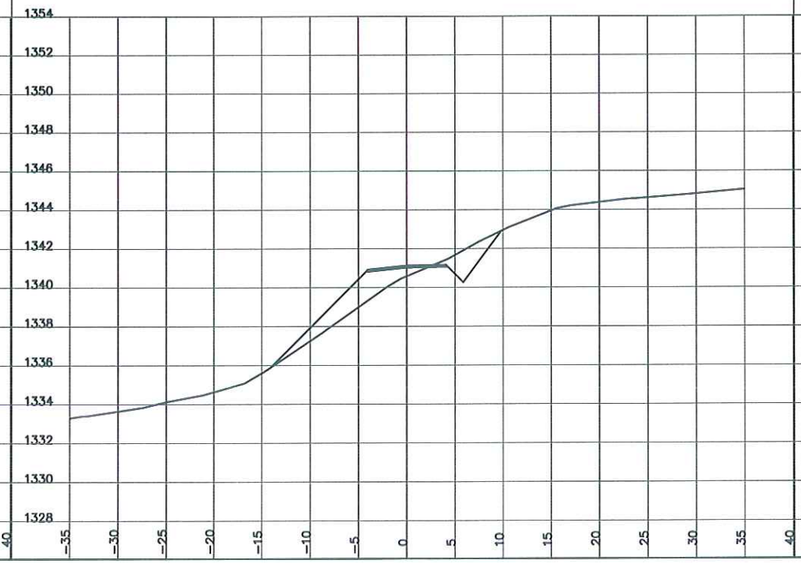
CUT= 5.34 FILL= 12.44



STATION 25+900.00
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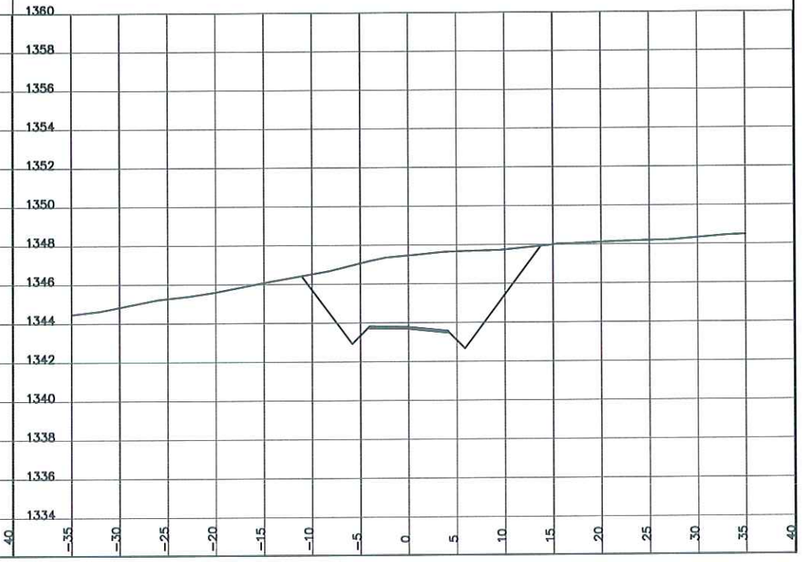
CUT= 75.65



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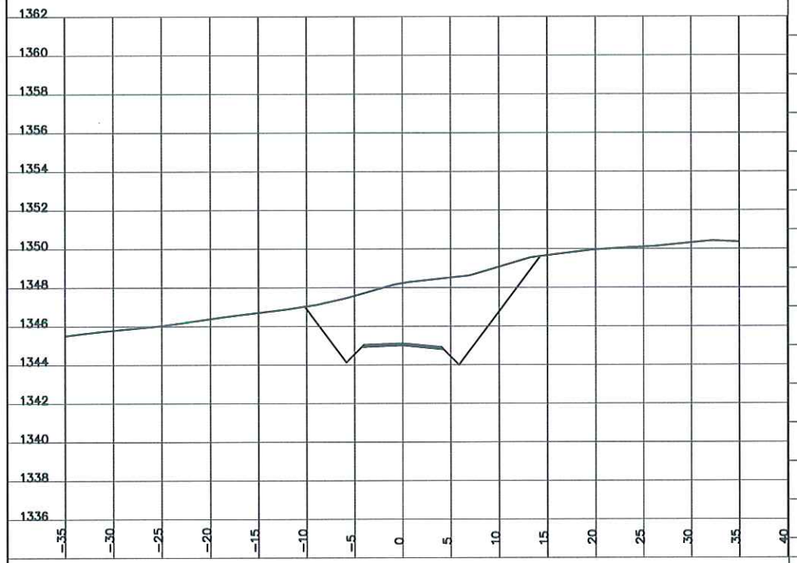
YES YUKON ENGINEERING SERVICES

STATION 26+000.00
H= 1:600 V= 1:300

CUT= 65.29



STATION 26+100.00
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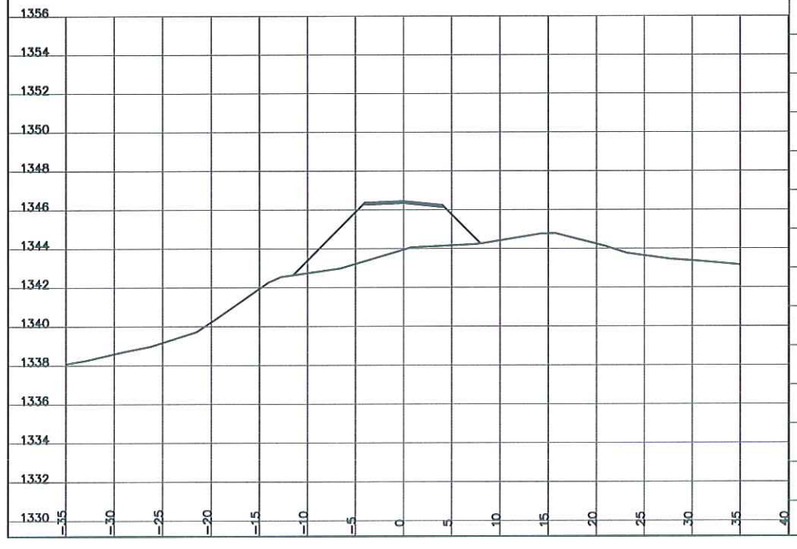
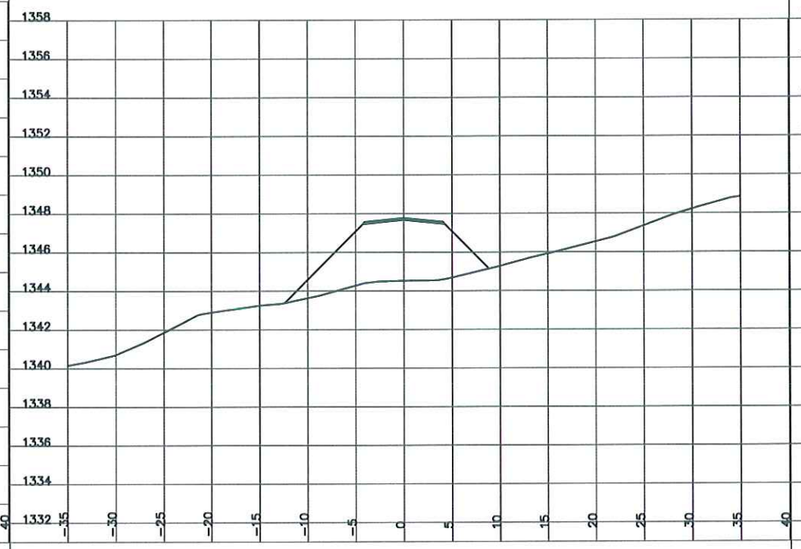
FILL= 35.35



STATION 26+200.00
H= 1:600 V= 1:300

FILL= 45.39



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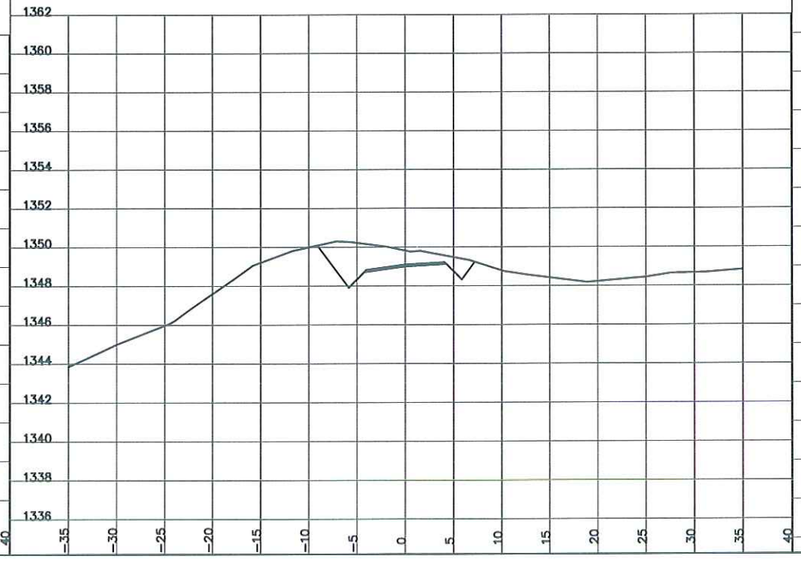
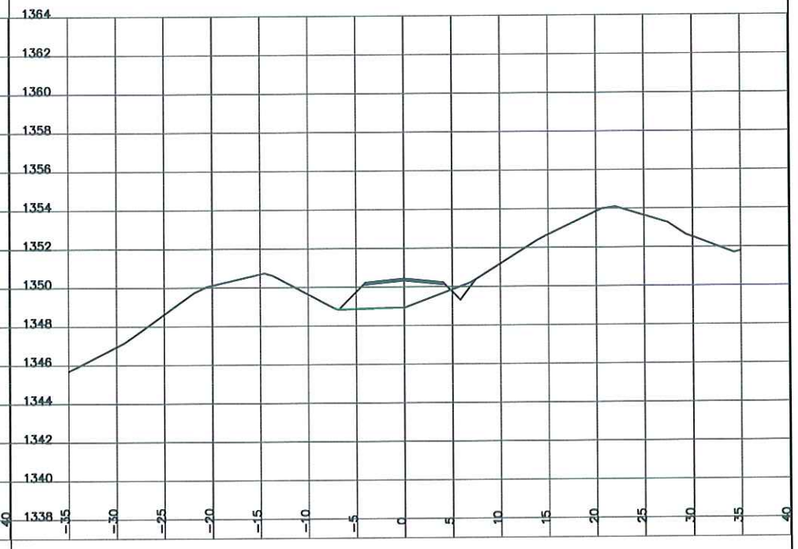
CUT= 16.74



STATION 26+400.00
H= 1:600 V= 1:300

CUT= 0.87 FILL= 11.15



STATION 26+500.00
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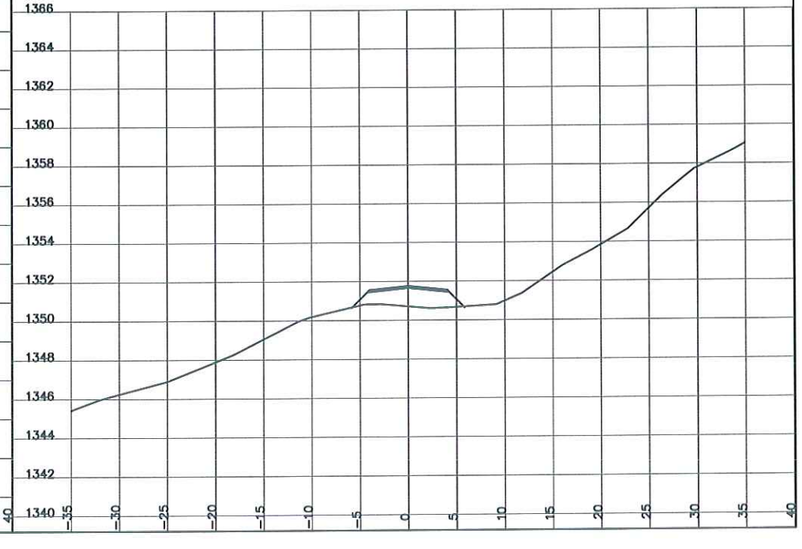
FILL= 8.14



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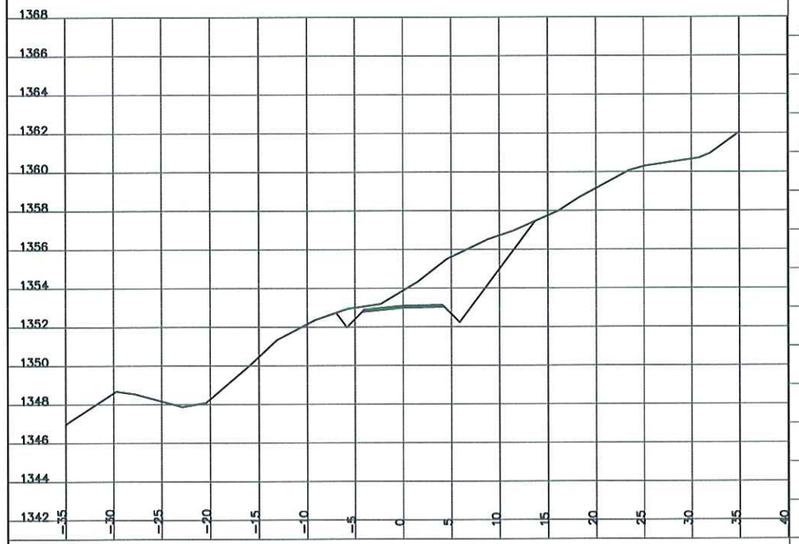
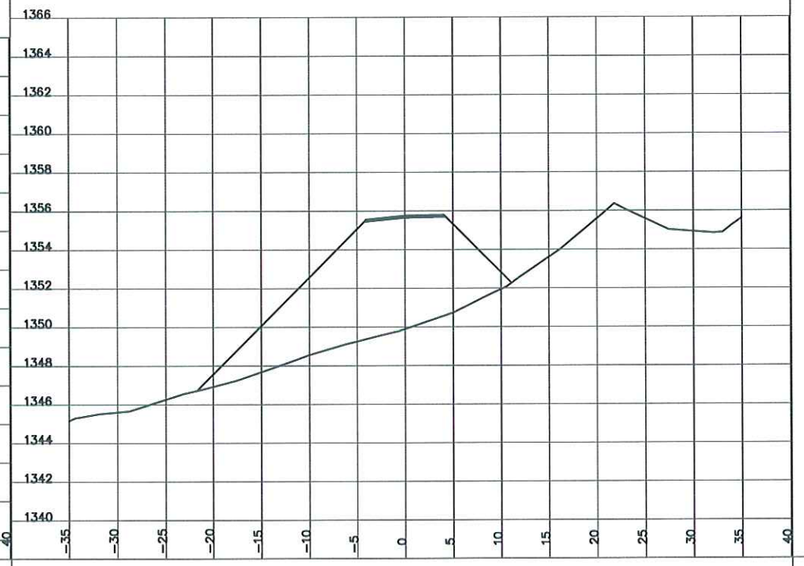
STATION 26+600.00
H= 1:600 V= 1:300

CUT= 29.16



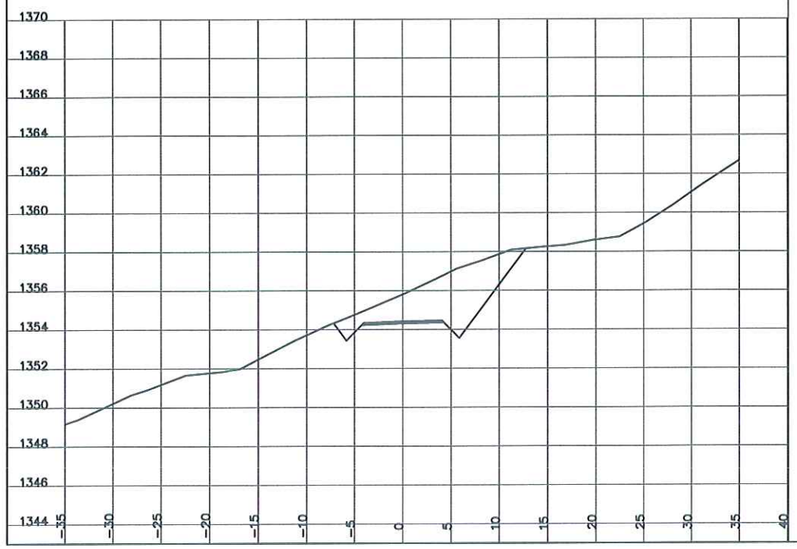
STATION 26+800.00
H= 1:600 V= 1:300

FILL= 119.34



STATION 26+700.00
H= 1:600 V= 1:300

CUT= 32.95



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Appendix F

Content from GSP V2007-03

- **Section 5.3**
- **Appendix A**
- **Appendix B**

F5 Transportation Infrastructure

Infrastructure to support transportation requirements during site development and operation includes existing and new site roads, the mine access road from the Robert Campbell Highway and the airstrip.

F5.3 Access Road

YZC will construct access to the site from kilometer 189+965 of the Robert Campbell Highway to the project site in two phases with construction of a limited-use access road (Phase 1) in late May 2007 to mobilize equipment to site, and construction of the Phase 2 access road in fall 2007.

YZC retained Yukon Engineering Services Inc (YES) to complete the route selection, preliminary design, geotechnical assessment, detailed design, tendering, construction management and quality assurance. YES retained the services of EBA Engineering Consultants Ltd. (EBA) to provide professional geotechnical evaluations of the route and sources, undertake a roadway geotechnical testing program, complete laboratory testing of samples taken along the route and from granular sources, and to provide construction recommendations resulting from their investigations and laboratory results. AMEC Earth & Environmental developed the environmental (ARD/ML) testing protocol provided in Section 5.3.6.

Details pertaining to road design, stream crossing details, borrow sources, environmental and geotechnical testing protocols and outcomes, traffic and access control measures, best management practices and mitigation measures for construction related activities, construction monitoring plans, and reclamation plans and cost estimates for closure of the road and borrow sites are provided below.

F5.3.1 Phase 1 Access Road

The first phase of the access road development is the construction of a ~24 km long limited-use access road from km 189+965 of the Robert Campbell Highway to the mine site for the purpose of hauling in equipment and supplies required to set up the construction camp and for the onset of construction activities scheduled to commence in summer 2007. From the highway, the access road corridor follows Putt Creek and crosses small Money Creek tributaries before transitioning into the Go Creek drainage and the mine.

In order to minimize impact, and to better control access in the long term, YZC has chosen to construct its access road along the alignment of the cleared geotechnical investigation trail, which itself is within the footprint of the ultimate Phase 2 access road clearing, and in the steeper side-hill areas, will fall within the ultimate roadway prism. Details and drawings for the Phase 1 access road are contained within *General Site Plan Version 2006-02*. Although construction of the Phase 1 road has been delayed, it will be constructed within the same footprint proposed for winter construction. A part of the project monitoring by the onsite geotechnical manager will be to assess the conditions of the original ground prior to placement of sub-base materials. If sufficient ground ice contents

are observed, the fill thicknesses will be correspondingly increased to preserve the permafrost.

F5.3.2 Phase 2 Access Road

The second phase entails construction of an all weather access road for use by concentrate haul trucks and service vehicles during the operations phase. The road will be a private, single lane road with passing bays, will have restricted access and will be operated under radio control. The road will be used year round with minimal load restrictions. Design and construction details for this phase are detailed within the following sections.

The design of the Phase 2 road meets Transportation Association of Canada (TAC) RLU 60 Single Lane Resource Road, (with inter-visible two lane sections) employing the standards summarized in Table 2.

Table F-2. Adapted Transportation Association of Canada Single Lane Resource Road Standards

- Desirable Minimum Curve Radii - Minimum Curve Radii - Minimum Switch-back Radii[3]	- 170m (Level of Service and Safety) - 120m (TAC: LVR = 130, RLU = 120) - 55m
- Maximum Gradient[4] - Actual Maximum Gradient - Minimum "k" Factor Crest - Minimum "k" Factor Sag	- 13% (TAC) - 11.6% (8% max. achieved in most cases) - 15 (TAC: LVR = 18, RLU = 15) - 10 (TAC: LVR = 18, RLU = 10)
- Single Lane Width - Two Lane Width - Super-elevation	- 6m crowned @ 3% (TAC: LVR = 4m) - 8.5m crowned @ 3% - Emax 6%
- Minimum Culvert Diameter - Culvert Installations	- 600mm or Q^{100} whichever is greater - as per *YG 06010-1, -2, -3, -4, -5, -6, -7 (Appendix A)* - Machine and Hand Clearing as per: *YG Sections 03010, 03011 (Appendix A)*
- Clearing	- to 15m either side minimum, or 3m beyond cuts (tree root protection), 6m beyond fills (access to reclaim stripping), whichever is greater.
- Surfacing Aggregate	- 300mm as per *YG Section 04060 (Appendix A)*
- Sideslopes (fill)	- 2H:1V ratio (except as noted below) - 1.5H:1V ratio, where safety berms are employed. (Rock embankment)
- Backslopes (earth cut) - Backslopes (rock cut)	- 1.5H:1V ratio - 0.5H:1V ratio
- Ditch Depth - Ditch Type	- 1m - "V" Ditch, with widenings for side-borrow.
- Safety Berms	- 0.75m Ht. where Fills > 10m, or where downhill side hazard requires. Roadbed widened 1.5m to accommodate.
Compactive Density	- 95% Standard Proctor (Embankment) - 98% Standard Proctor Density (Surfacing Aggregate and culvert bedding/backfill)

[3] Utilized in two situations: Bunker Ck. at km 10.25, to avoid a beaver dam, and at km 13.0, to avoid two stream crossings and for economic considerations.
[4] TAC LVR recommends maximum gradients of 13% in mountainous terrain, and 10% in semi-mountainous terrain. 8% was selected for safety, erosion control and reduced operating costs.

The Phase 2 access road design has been revised subsequent to the completion of the geotechnical field investigation (July 2006) and granular investigation (October 2006) programs executed by EBA Engineering Consultants Ltd, and following the Lidar Bare Earth topography provided by Woolpert on behalf of YZC. The EBA investigation reports were previously provided in *General Site Plan Version 2006-02*.

The road design drawings are provided in Appendix A and have been sealed by Paul J. Knysh, Yukon P.Eng. This road design is Issued for Construction, and is complete in terms of impact and construction requirements. All assessments to date have been completed using techniques suiting the level of investigation required using systematic development planning.

Route selection and design were based on hydrology studies, stream data collection, terrain analyses and air photo interpretation of soils conditions, by hand sample truthing of the mapped interpretations, then by a two phase geotechnical investigation. Contributing information to the design included a review of assessments by:

- *Surface Geology, Soils and Associated Interpretations. Wolverine Biophysical Surveys* (Mougeot Geoanalysis 1996)
- AXYS Environmental Consulting Ltd. (satellite imagery interpretation of *Surficial Materials Distribution*)
- Jack Dennett, P.Geol., EBA Engineering Consultants Ltd., YES Geotechnical Sub-consultant (air photo interpretation)
- Paul J. Knysh, P.Eng., and Rob Harvey of Yukon Engineering Services Inc. (air photo interpretation)
- EBA Engineering Consultants Ltd. (Geotechnical Investigation)
- Bare Earth LiDAR topography (Woolpert)

The Phase 2 route is “final”, within acceptable uses of the term. The alignment is fixed within a defined corridor of 50m in width, except at controlling stream crossings, where the alignment is considered final at its present location to within +/-10m. The controlling stream crossings are provided in Table 3.

Table F-3. Controlling Stream Crossings along the Road Alignment

Stream Crossing	Figure 1 Dwg #	km Location	Latitude	Longitude	Nominal Crossing Width at Centreline ****	Structure Type
Pitch	"km 1.5"	2.74	61° 28' 50.1"	129° 53' 32.1"	0.5m	1600mm Dia. CSP*
Putt	"km 3"	2.89	61° 28' 46.8"	129° 53' 33.5"	1.6m	2400mm Dia. CSP*
Bunker	"km 9"	10.25	61° 25' 21.6"	129° 56' 01.6"	4.5m	21.336m Single Lane Resource Bridge**
Bogie	"km 15"	15.59	61° 24' 00.3"	129° 59' 25.2"	0.9m	1000mm Dia. CSP***
Hawkowl	"km 22.5"	23.11	61° 24' 00.4"	130° 03' 49.8"	1.2m 0.9m	1600mm Dia. CSP at km 23+113, 1000mm Dia. CSP at km 23+085 overflow stream
*	CSP = Corrugated Steel Pipe Helical Culvert.					
**	Contractor supplied pre-Engineered Structure as per Fig. 1: AE Shop Dwg. No. *3751-SK-601 , 602 , 603* . Armtec Bin Wall Abutment Dwg. No. *BW 02-07 001 , 002 , BW-40001E , BW-40002W , km 9* - Plan/Profile, *Bunker* - General Layout.					
***	Fluming required. Refer to Figure 1.					
****	YES completed topographic surveys of all stream crossings in July 2006, including edge of water, top of bank, OHWM and thalweg.					

Phase 2 design elements have not changed significantly since the initial road design submission (June 2006). The following exceptions apply as shown in Appendix A:

- **0 to 0.7 km** – The intersection with the Campbell Highway has been relocated, to 189+965 km of the Campbell Highway as per Access Permit #1560 (Appendix B). This was done in order to accomplish the following:
  - improve the intersection visibility for public safety
  - avoid permafrost over shallow bedrock 0 to 0.7 km
  - reduce impact by including the first section of roadway within the footprint of the planned Borrow Pit, Staging and Camp Area
- **0.7 to 2.9 km** – Grade-lines were lowered, as ice contents within the discontinuous permafrost in this section were found to be generally less than 10% in granular soils. Should site-specific observations during construction so dictate, road grades will be raised to preserve the permafrost.
- **7.5 to 9.0 km** – Revised grade-lines ensure adequate embankment over ice-rich permafrost in this section. Non-woven geotextile will be applied over undisturbed organic materials prior to backfilling.
- **10.1 to 10.7 km** – Grade-lines have been improved from 10% to 8% for the section as a result of the more accurate surface topography. The design of the road through the Bunker Creek section has been optimized to the required standards. TAC RLU/LVR 60 provides for a maximum gradient of 13%, while the grade through the Bunker Creek section is at 10.29%. To flatten the hill would result in a huge change to the mass haul balance and higher construction costs. To adjust the alignment so that the road would follow the hill around would result in changes to the bridge design to allow for the long trucks to enter onto the bridge while still negotiating the corner. The cost of installing the modified bridge is high and the current road design fits within the proposed standards. Although it appears that the grades lines have been

steepened to keep the span of the crossing as short as possible, in actuality the bridge was made as short as possible to allow the grades to be flattened. The approaches to the bridge were made as flat as possible to minimize impact to the bridge structure with heavy loads crossings. Vertical impacts to the bridge structure could result in higher maintenance and shorter life span of the entire bridge unit. It is the opinion of YES, that the design as proposed is satisfactory through this section.

- **10.7 to 16.4 km** – Grade-lines have been modified from the consistent 8%, to varying grade-lines of 6% to short "pitches" of 10%, due to the improved topography.
- **16.5 to 17.4 km** – The road alignment was changed in order to avoid wet swampy ground on the glacio fluvial terrace area.
- **Throughout:**
  - accurate surface topography accommodated a complete grade-line revision throughout the entire alignment
  - test pit information provided representative bedrock profile information, as well as reliable stripping, waste-cut and grubbing thickness

Phase 2 borrow pit, granular sources and side-borrow areas have been identified for the entire Phase 2 roadway and are shown in Appendix A. Table describes the conditions, Phase 2 Construction Method, and resultant plan for each segment along the ~24 km route.

During road construction the geotechnical engineer will assess the conditions of the original ground prior to placement of sub base materials. If, in the opinion of the geotechnical manager the original ground does not provide a stable base for the sub grade as designed, he will have the responsibility to recommend a course of action. This course of action could take the form of "benching in" the new materials, insulating to prevent degradation, or design modifications to the road alignment or profile. The subsurface soil and permafrost conditions in the sliver fill areas will be assessed to ensure that slope instability is minimized. If sufficient ground ice contents are observed, the fill thicknesses will be correspondingly increased to preserve the permafrost. Table 5 lists the guidelines for the geotechnical monitoring protocols during road construction.

Table F-4. Phase 2 Methods of Clearing and Construction

KM RANGE		CLEARING METHOD	CONSTRUCTION METHOD	COMMENT
FROM	TO			
0+000	0+385	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	STAGING, CAMP, BORROW
0+375	0+535	HAND CLEARING	>1.5M FILL TYPICAL	BOG / SWAMP CROSSING
0+535	2+700	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
2+700	2+765	HAND CLEARING	EMBANKMENT CLEAN GRANULAR	PITCH CREEK CROSSING
2+765	2+855	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	GRANULAR DEPOSIT BETWEEN CREEKS.
2+855	2+915	HAND CLEARING	EMBANKMENT CLEAN GRANULAR	PUTT CREEK CROSSING
2+915	4+035	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
4+035	4+095	HAND CLEARING	OPTIMAL CUT TO FILL METHODS	UNNAMED STREAM CROSSING
4+095	4+935	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
4+935	4+995	HAND CLEARING	OPTIMAL CUT TO FILL METHODS	UNNAMED STREAM CROSSING
4+995	5+425	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
5+425	5+485	HAND CLEARING	OPTIMAL CUT TO FILL METHODS	UNNAMED STREAM CROSSING
5+485	6+300	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE esp. km 5+700 to 5+725, km 5+850 to 5+925 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
6+300	6+360	HAND CLEARING	OPTIMAL CUT TO FILL METHODS	UNNAMED STREAM CROSSING
6+360	6+600	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
6+600	6+660	HAND CLEARING	OPTIMAL CUT TO FILL METHODS	UNNAMED STREAM CROSSING
6+660	6+948	MACHINE CLEARING W/ STRATEGIC HAND CLEARING	NORMAL W/ STRATEGIC GEOTEXTILE, 1.5m FILL TYPICAL	SPORADIC PERMAFROST, ICE CONTENT <10% TYPE, SOME ICE CONTENT >10%.
6+948	7+500	HAND CLEARING	GEOTEXTILE, 1.5m FILL TYPICAL	DISCONTINUOUS ICE RICH PERMAFROST
7+500	7+575	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	
7+575	9+100	HAND CLEARING	GEOTEXTILE, 1.5m FILL TYPICAL	
9+100	10+035	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	
10+035	10+285	HAND CLEARING	OPTIMAL CUT TO FILL, PRE-ENGINEERED L100 SINGLE LANE RESOURCE BRIDGE	BUNKER CREEK CROSSING, BEAVER DAM
10+285	14+940	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL ASCENT
14+940	15+000	HAND CLEARING	HAND CLEARING	CHIP CREEK TRIBUTARY #1
15+000	15+070	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL ASCENT
15+070	15+130	HAND CLEARING	HAND CLEARING	CHIP CREEK TRIBUTARY #2
15+130	15+530	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL ASCENT, ROCK PREVALENT
15+530	15+590	HAND CLEARING	HAND CLEARING	BOGIE CREEK CROSSING
15+590	16+550	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL ASCENT, ROCK PREVALENT
16+550	18+650	MACHINE CLEARING	SMALL CUT TO FILLS	GLACIO FLUVIAL PLATEAU
18+650	20+155	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL DESCENT, ROCK PREVALENT
20+155	20+215	HAND CLEARING	HAND CLEARING	UNNAMED STREAM CROSSING
20+215	20+670	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL DESCENT
20+670	20+740	HAND CLEARING	HAND CLEARING	UNNAMED STREAM CROSSING
20+740	21+430	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL
21+430	21+490	HAND CLEARING	HAND CLEARING	UNNAMED STREAM CROSSING
21+490	23+030	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL
23+030	23+115	HAND CLEARING	HAND CLEARING	HAWKOWL CREEK CROSSING, TWIN CULVERT INSTALLATION
23+115	24+000	MACHINE CLEARING	OPTIMAL CUT TO FILL METHODS	SIDEHILL

Table F-5. Guidelines for Geotechnical Monitoring Protocols

Location	Structure Type	Guideline
Pitch Creek - km 2.74 Putt Creek - km 2.89	1600 mm dia. CSP 2400 mm dia. CSP	Monitor the installation of the culvert. The base must be properly prepared, and all culvert bedding and backfill materials must be compacted in maximum lift thicknesses of 300mm, with each lift compacted to at lest 98% of SPMDD (ASTM D698)
Bunker Creek - km 10.25	21.336 Single Lane Resource Bridge	Monitor the installation of the Bin-Wall foundation and test all required geotechnical components of abutment construction such as footing or pile installations, concrete pours and backfill compaction.
Bogie Creek - km 15.59 Hawkowl Creek - km 23.11 Hawkowl Creek overflow	1000 mm dia. CSP 1600 mm dia. CSP 1000 mm dia. CSP	Monitor the installation of the culvert. The base must be properly prepared, and all culvert bedding and backfill materials must be compacted in maximum lift thicknesses of 300mm, with each lift compacted to at lest 98% of Standard Proctor Maximum Dry Density (SPMDD) (ASTM D698)
General Embankment	Throughout the entire length of the access road	Periodically monitor and complete compaction testing on embankment fills while on site during culvert installations and bridge construction. Embankment fills must be compacted to 98% SPMDD. Assist the project engineer with determination of suitable fill materials being sourced from road cuts and borrow sites.

Once the Bunker Creek Phase 1 temporary bridge is installed and a more detailed geotechnical investigation of subsoil conditions completed in the area, excavation and abutment foundation details of the Bin-Wall will be finalized.

F5.3.3 Access Tie-In and Staging Areas

Yukon Engineering Services and Yukon Highways and Public Works Transportation Maintenance Branc has completed its assessment of the proposed intersection of the access road with the Campbell Highway. This has been done by way of confirming required sight distances based on the Rural Arterial 80 km/hr posting (TAC RAU 80) and designation of the Campbell Highway at present, and the intended RAU 90 designation of the Campbell Highway upgrades over the coming years.

The intersection with the Campbell Highway has been relocated from 189.4 to kilometer post 189+965, at the proposed staging area as shown in Appendix A. Access Permit #1560 is provided in Appendix B. A road construction camp and staging area will be constructed near the Campbell Highway for both Phase 1 and Phase 2. The staging area will be used throughout the construction of the mine and road. It is proposed to combine the access intersection, the construction camp and staging area into one development area.

Construction needs for the staging area will include:

- access road construction camp, engineering office
- temporary storage of materials, camp and equipment awaiting availability of access to the mine site
- storage of culverts and other associated road construction materials
- temporary parking and maintenance of construction equipment
- temporary fuel, parts and lubricant storage and distribution

Operational needs for the staging area include:

- chaining of trucks during the winter months
- holding area for vehicles awaiting authorization to proceed onto the access road
- access control gate

F5.3.4 Access Control

Access control is required for three scenarios:

1. Access control during mine operation, including the construction phase.
2. Access control during temporary closure.
3. Access control following permanent closure.

Operational Access Control

Access control during mine construction and operation will be by way of a manned gate situated at the south end of the construction camp / staging area, near km 0+350 (Appendix A).

Prior to operation of the access road, and prior to completion of the road construction, YZC will develop a *Manual of Rules for the Operation of the Wolverine All Weather Access Road.* This manual will provide final procedures for access road control, traffic control plans, and rules for use. In general terms, the Manual will formalize the following:

- All travelers will be advised that respecting the posted speed limit of 60 km/hr is mandatory for single vehicle traveling safety and so that all authorized vehicle drivers can anticipate the progress of other vehicles on the road, between Kilometer announcements.
- As all authorized vehicles and maintenance equipment will be radio-equipped, the following policy will be respected by all operators of authorized vehicles and maintenance equipment:

  - After authorizing a vehicle to proceed, and upon the vehicle passing the gate, the Gate Operator will announce "*Authorized Vehicle*" (or "Authorized Visitor" to suggest lesser familiarity on the part of the driver) "*Kilometer 0.5 Empty*"[5], "*Unit 17, Service Truck*". This provides an aural outline or reminder of the announcement protocols for all drivers.

  - "Loaded" traffic already on the road will announce their updated locations in a similar manner ("*Kilometer 17 Loaded, Concentrate Hauler*", or "*Kilometer 6, Grader on the Road*").

  - Empty vehicles must yield to loaded vehicles. Empty vehicles will pull over in designated two lane areas when a loaded vehicle is within 2 km, and will announce: "*Kilometer 7.6 Pullout, Empty Waiting, Unit 17, Service Truck*".

[5] "Loaded" refers to the direction of haul for loaded concentrate haulers (ie: from the mine site to shipping port)

Traffic control plans will be executed and enforced through the gate house and the Wolverine Mine site.

The gate house will be staffed by a trained operator, with current Advanced First Aid, during all hours and on all days that the road is to be used. The facility will be equipped with the following:

- heated facility with electrical generation, telephone, facsimile and VHF radio communications
- instructions for Authorized Use of Access Road
- current manifest of Authorized Users. Authorized Users will be limited to company vehicles and authorized company personnel, contract suppliers, transporters (supplies, concentrate haul), company agents of specialists, and YG personnel
- access road VHF radios and visitor unit numbers for authorized visitors and emergency vehicles

The gate house operator's duties will include:

- confirming authorization for access
- ensuring that all vehicles are equipped with operable access road VHF radios (radios will be checked at the gate by the operator) and visitor unit numbers. VUN's will be highly visible magnetic unique decals attached high on the driver's door of all visiting vehicles
- maintaining a manifest of authorized visitor access road VHF radios and VUN's
- retrieving all radios and VUN's from authorized visitors
- providing written instructions for access road rules, and access road radio use
- providing a verbal review of the instructions to first time visitors
- logging all access road radio communications, and locations of all vehicles along the road
- monitoring access road radio communications, to eliminate "chatter" and non-safety communications
- dispatching emergency equipment and personnel
- advising all traffic, including road maintenance traffic of unnoticed or unacknowledged traffic activity on the road
- advising all traffic of road conditions or hazards, including wildlife
- providing a daily access road report of all activities and traffic

Figures 8 and 9 provide details of the Operational Access Control Gate, adopted from YG HPW Single Swing Gate details (GateSSI.dwg and GateSSE.dwg)

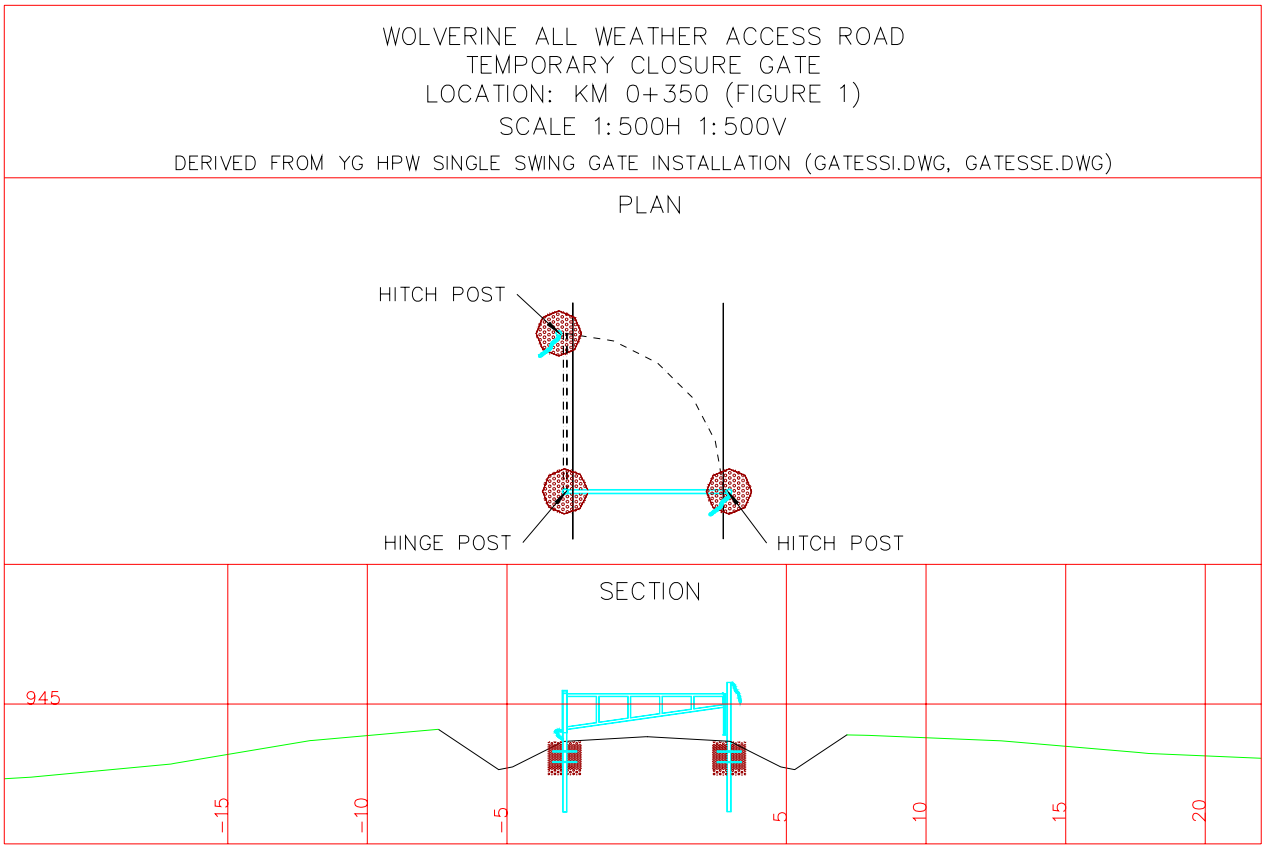


Figure F-8. Operational Access Control Gate

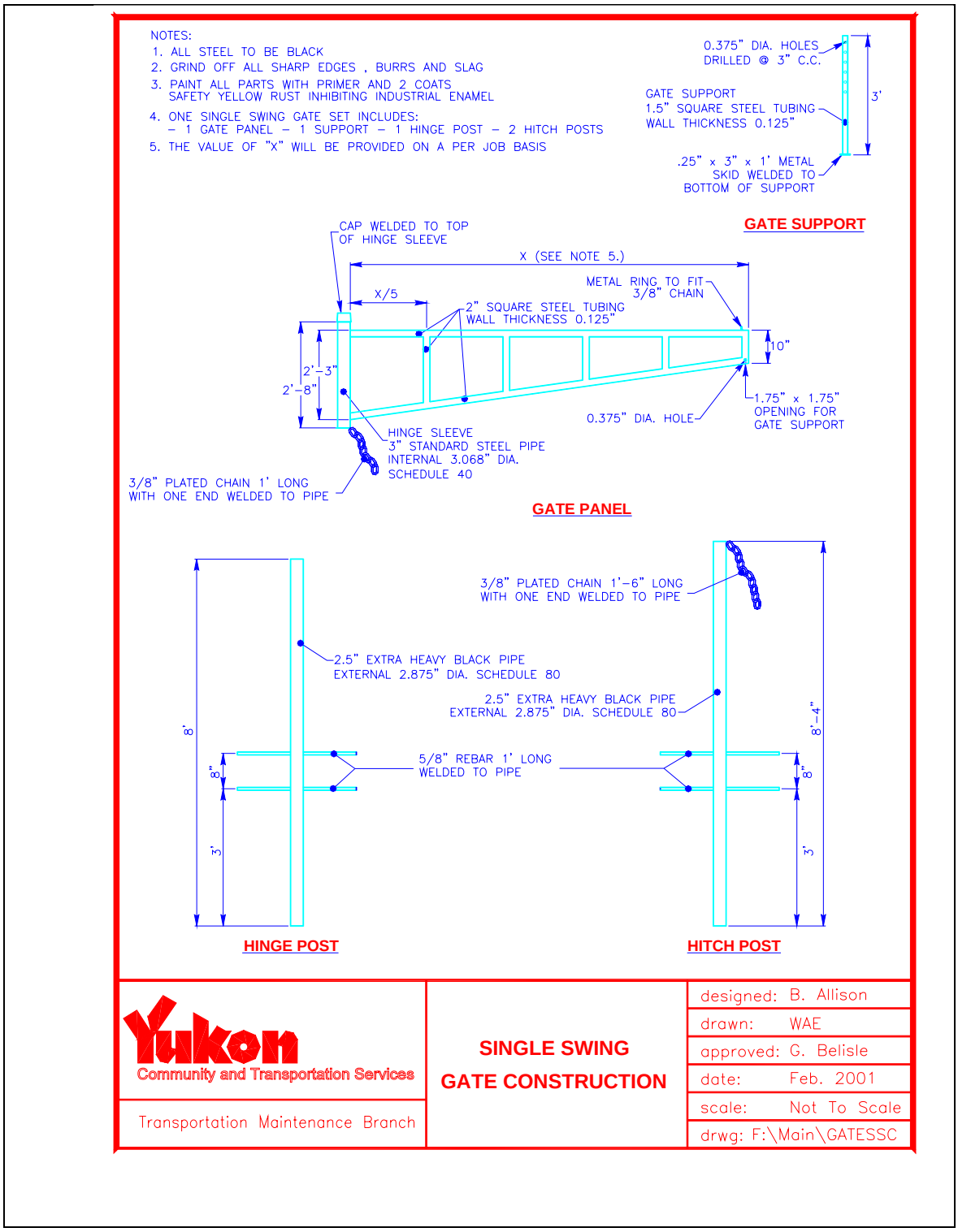


Figure F-9. YG HPW Single Swing Gate

F5.3.4.1 Temporary Closure Access Control

Access control will be required in the event of a temporary closure of the mine and the temporary suspension of hauling operations. Temporary closure access control will be employed immediately following both of the above conditions. The Operational Access Control Gate will also be locked closed, but will not be manned, unless deemed necessary from periodic inspections.

The selection of the Temporary Closure Access Control gate location was critical to deny access to highway vehicles, all terrain vehicles and snow mobiles, and to deter hunting and recreational access to the Go Creek drainage system.

YG Environment (M. George et al) provided input to the selected location, near km 13+025 (Appendix A). This location is on a 10% ascending gradient, some 3 km north of the glacio fluvial plateau that separates the upper Money Creek and Go Creek drainages. The precise location is also in a rock cut, where the rock back-slopes will be 0.5H :1V or vertical.

Figure 10 provides details of the Temporary Closure Access Control Gate.

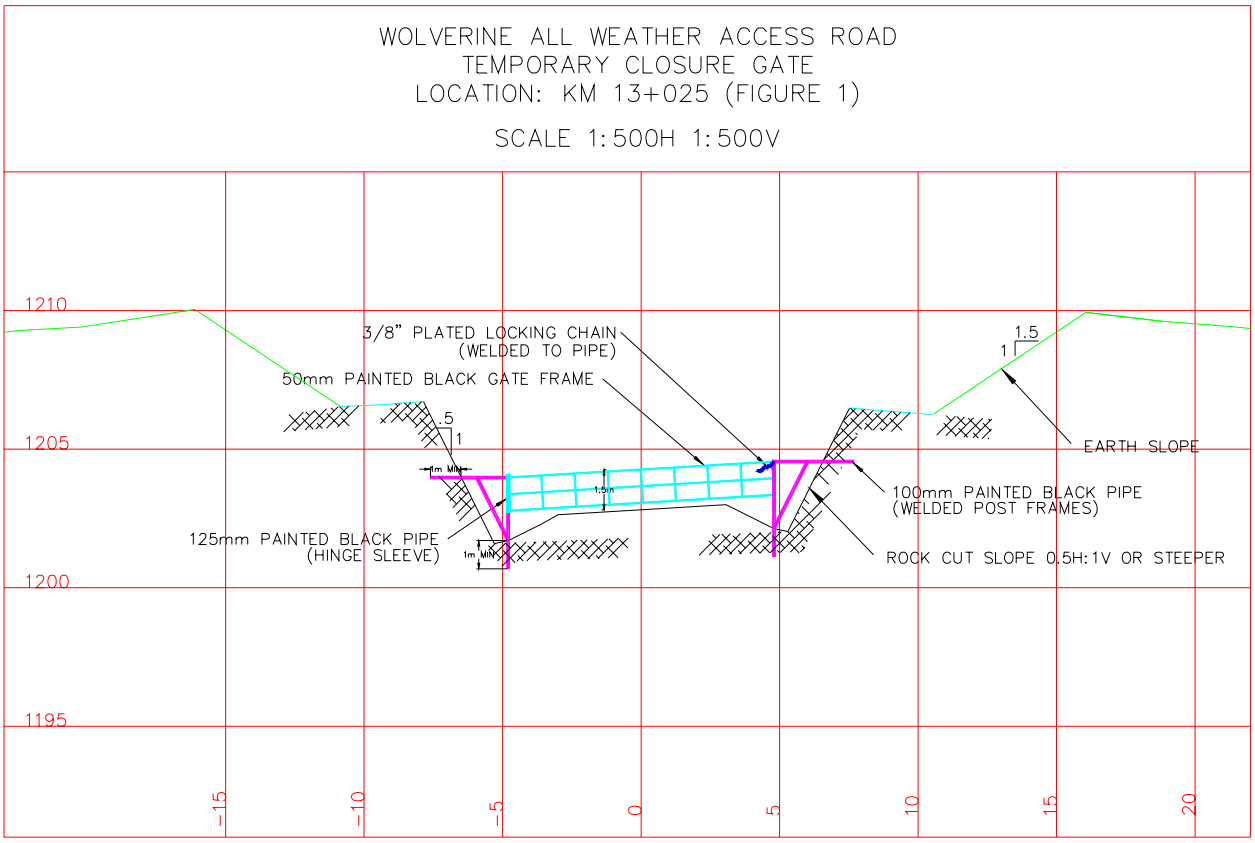


Figure F-10. Temporary Closure Access Control Gate

F5.3.4.2 Permanent Closure Access Control

Access control will ultimately be required upon the completion of mining and hauling operations.

Permanent Closure Access Control will be the final step in mine closure and reclamation, (including the removal of all road culverts, and the reshaping of roadway embankments) as access is required for these activities.

Permanent road closure activities will entail the removal (and hauling offsite) of the bridge at Bunker Creek (km 10.25 Figure 1 in Appendix A) and the removal of the culvert at Bogie Creek (km 15.59 Figure 1 in Appendix A), as well as the construction of blast rock obstacles within the rock cuts on the km 10.4 to km 16.5 ascending gradient.

F5.3.5 Borrow Sources

Originally it was planned to utilize side-borrows for all roadway embankment rather than specific borrow sources. Subsequent geotechnical investigations by EBA however, have indicated ice rich permafrost in portions. This has resulted in the need to extract common excavation as well as granular surfacing material from designated sources in some areas.

Information used to develop the Borrow Source Plan was derived from EBA's two-phase geotechnical investigation (details provided in *YZC General Site Plan Version 2006-02*).

Of the nine possible borrow targets investigated, five will be developed during Phase 2 road construction, as summarized in Table 6 and shown in Appendix A. Haul roads are also shown in Appendix A.

Table F-6. Phase 2 Designated Borrow Sources along the Road Alignment

PIT	STA	O/S	GROSS AREA (Ha.)	NET AREA (Ha.)	AVG DEPTH (m)	COMMON (m^3)	GRANULAR SURFACING (m^3)	CONCRETE AGGREGATE (m^3)	TOTAL (m^3)
P1	210	0	5.3	2.7	2	3,000	3,000	-	6,000
S3A	2560	70	1.6	0.8	2	9,000	3,000	-	12,000
S3B	2810	70	1.1	0.6	2	-	9,000	-	9,000
P2A	11060	60	1.0	0.5	2	-	8,000	-	8,000
P2B	10960	130	0.6	0.5	2	-	5,000	5,000	5,000
P4A	16560	-100	2.9	1.5	2	22,000	7,000	-	29,000
P4B	17310	110	3.0	1.5	2	23,000	7,000	-	30,000
P3	23460	-150	1.0	0.5	2	-	8,000	-	8,000
TOTALS			**16.5**	**8.5**	**2.0**	**57,000**	**50,000**	**5,000**	**107,000**

Phase 2 borrow source areas will be developed according to acceptable construction practices, and to standards currently employed by the Yukon Government in its execution of highway construction contracts. Specifically:

- Prior to clearing, additional construction test pit information will be used to confirm the optimum depth of planned excavation. These depths will be used to confirm the extents of each source, with appropriate consideration to setbacks from streams and escarpments.
- A **Borrow Source Development Plan** drawing will be provided on a case-by-case basis to the Contractor. This Development Plan will include instructions for the development stage: storage of overburden soils and organic stripping materials, stockpiling of granular screened or crushed product for construction and maintenance, designated area for setting up of a screening plant, limits of clearing, any required drainage remedies, and buffer areas; and for the reclamation stage: sloping of borrow walls (2H:1V maximum steepness recommended), re-contouring of pit area and haul road, creation of enhancements as may be directed, contouring of organic overburden over the surface area, and seeding.
- Limits of clearing for the borrow source and the haul road will be flagged in the field as per the Development Plan.
- Clearing, disposal and salvage will be completed by the Contractor, according to standards provided in *YG Sections 03010, 03011*.
- Once cleared, the extents of the planned borrow excavation will be laid out in the field, leaving the required overburden storage and buffer zones.
- Grubbing and stripping operations will be by way of bulldozing materials to the perimeter of the cleared area, leaving adequate space to re-access the materials for reclamation.
- Excavation will be limited to the development area as shown on each specific Borrow Source Development Plan.
- Where granular deposits are underlain by colluvium, till or other materials suitable for common embankment, these materials will be used for roadway sub-grade construction purposes.
- "Oversize" boulders rejected by crushing or screening operations will be employed as riprap where feasible, or stockpiled for future use as rock pile barricades at the entrances to the borrow source haul roads.

Once construction and maintenance requirements are met, the borrow source sites will be reclaimed as identified in each specific Borrow Source Development Plan.

F5.3.6 Geochemical Protocol for Evaluation

YZC retained the services of AMEC Earth & Environmental to develop a protocol for environmental testing of construction materials and cut slopes along the access road from the Robert Campbell Highway to the Wolverine mine property. Construction materials used as borrow material along the road route may consist of unconsolidated sediments (soils, till, gravel, etc.) and bedrock. The protocols outlined below have and will be used for sampling and analysis along the access road to determine acid rock drainage and metal leaching

(ARD/ML) potential. At sites of interest, the following actions will be carried out:

1. Visual inspection

   An inspection of the borrow source site or road cut will be completed by a qualified geoscientist or engineer. The inspection will be used to assess the areas for potential ARD/ML conditions. The visual inspection will include a geologic assessment of the following parameters:

   - rock type(s)
   - sulphide content
   - carbonate content
   - presence or absence of other ARD/ML indicators (iron-staining, etc.)

   The inspection will be focused on the potential for the site to produce ARD/ML if disturbed. This assessment will include a visual characterization of the mineralogy of the borrow material. Detailed descriptions of the type and amount of sulphide mineralization will include the size and shape of grains, any visible weathering, and a visual estimate of the proportion of sulphides to host rock. Careful attention will also be paid to features such as quartz and carbonate veins in the host rock, as well as the presence of iron staining and secondary precipitates that may have formed on the host rock during in situ weathering.

2. Sampling

   Following the completion of visual inspections, sites will be sampled to provide sufficient material for environmental testing. Sampling will be conducted to collect a representative sample from each geologically distinct unit within an area. Samples will weigh a minimum of 2 kg. Depending upon their volume, large homogenous borrow sources may require multiple samples. After sampling, each sample will be bagged and carefully labelled with a unique identifier.

3. Analysis

   Samples will be submitted to a certified environmental laboratory for testing. This will include the following analyses: paste pH, total sulphur, sulphate sulphur, sulphide sulphur (by difference), neutralization potential and metals by aqua regia-ICP. Analytical methods will follow current industry standards and/or those described in the Draft BC ARD Guidelines (Guidelines) by Price (1997[6]).

4. Assessment Analysis

   The resulting field inspection and testing data will be assessed by a qualified geoscientist or engineer. The data will be assessed according to criteria described in the Guidelines. This will include an assessment of the

[6] Price, W.A. (1997), DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, British Columbia Ministry of Employment and Investment, Energy and Minerals Division, Smithers, BC, (April), 143p.

neutralization potential, acid generation potential and metal leaching potential of the borrow sources. Additional testing or assessment may be required as a result of the initial assessment.

Samples will be screened according to the following criteria as per the Guidelines:

a. Net Potential Ratios (NPR, or NP/AP), where

NPR <1	Likely acid generating
NPR >1 and NPR<2	Potentially acid generating
NPR >2 and NPR<4	Not likely acid generating
NPR >4	Non-acid generating

b. Sulphide sulphur content, where

S_S >0.3%	Potentially acid generating
S_S <0.3%	Non-acid generating

c. Paste pH, where

pH<5.5	Potentially acid generating
pH>5.5	Non-acid generating

d. Neutralization Potential, where

NP<10 kg $CaCO_3$/tonne	Potentially acid generating
NP>10 kg $CaCO_3$/tonne	Non-acid generating

Materials with NP values below 10 kg $CaCO_3$/tonne should undergo additional testing consisting of the shake flask extraction test (as per the Guidelines) to determine the presence of leachable acidity or metals.

Materials that are likely or potentially acid generating, and/or with leachate chemistries in exceedance of the Guidelines, would be excluded from use as road or construction material. Alternatively, additional study could be conducted on these materials to establish their suitability, or to determine what mitigative steps would need to be taken to ensure the material's safe use.

F5.3.7 2006 Geochemical Evaluation

The access road from the Robert Campbell Highway to the Wolverine mine property was assessed and sampled for geochemical testing at any significant road cuts, and significant lithology changes by YZC Project Geologist Gilles Dessereau and EBA in October 2006. Sampling was conducted as per the protocol requirements developed by AMEC. A summary of the onsite sampling by YZC and EBA and acid-base accounting test results are provided below.

A thick organic cover over the first 9 km (from the Robert Campbell Highway) of the road route prevented any bedrock or overburden sampling by YZC in this area. The last ~4 kms were also covered with thick organic layers and the bedrock and/or overburden were not sampled. EBA collected samples for geotechnical purposes and upon further examination, submitted geochemical samples for areas over the first 3 km and at two other locations where the organic

mat or permafrost did not limit sampling. A summary of the onsite inspections and sample locations are provided in Table 7 and shown in Appendix A.

Table 8 summarizes the geochemical test results for the fourteen samples collected and submitted for analyses.

Table F-7. Summary of Geochemical Sampling Field Observations

Sample ID	Location (km)	Description	Fizz Rating (1-10*)	Sulfide Content (%)	ARD Potential Estimate
JD10-4-2-G1	0+100	Borrow Pit Primary 1, Staging Area, Construction Camp - 3.0 m testpit depth	-	-	-
JD-10-3-4	1+600	1.6 m testpit depth	-	-	-
JD-10-6-4G	2+800	Borrow Pit Secondary 3, 3.0 m testpit depth	-	-	-
WVR06-01	9+400	Small cut on west side of road, poorly sorted, well rounded glacial-fluvial overburden	5	<1	nil
WVR06-03	10+000	Road cut immediately north of Bunker Creek. Poorly sorted, well rounded glacial-fluvial overburden	1	<1	nil
JD10-5-1G	10+300	Road cut immediately south of Bunker Creek, Borrow Site Primary 2, 3.0-5.0m testpit depth	-	-	-
WVR06-02	10+400	Road cut on west side of road, poorly sorted, well rounded glacial-fluvial overburden	0	<1	nil
WVR06-04	14+100	Road cut on west side of road, poorly sorted sub-rounded to sub-angular glacial overburden	1	<1	nil
WVR06-05	15+100	Large outcrop on west side of road greenstone with abundant greenstone cobbles in creek bed	1	<1	nil
WVR06-06	15+400	Large outcrop on east side of road well foliated greenstone	1	<1	nil
WVR06-07	15+800	Large outcrop on west side of road near creek greenstone	1	<1	nil
JD10-06-10G	17+200	Borrow Pit Primary 4 on fluvial terrace, 3.0 m testpit depth, Money/Go Drainage Divide	-	-	-
WVR06-08	18+700	Large outcrop on west side of road greenstone	1	<1	nil
WVR06-09	20+000	Colluvium on west side of road consisting of cobbles and boulders of greenstone	1	<1	nil

Note: Fizz rating 1= no visible CO_2 production with the addition of 10% HCl; Fizz rating 10= abundant CO_2 production with the addition of 10% HCl. ; Visual assessment information was not collected by EBA during their geotechnical program (samples beginning with JD)

Table F-8. 2006 ABA Test Results for the Access Road

Sample ID	Location (km)	Paste pH	Fizz Rating	NP kg CaCO3/t rock	AP kg CaCO3/t rock	NNP kg CaCO3/t rock	NPR -	Total S %	Sulphate S %	Sulphide S %	Acid Potential*
JD10-4-2-G1	0+100	8.2	2	55	0.9	54	58.67	0.03	<0.01	0.03	NAG
JD-10-3-4	1+600	8.7	3	217	1.9	215	115.75	0.06	<0.01	0.06	NAG
JD-10-6-4G	2+800	8.4	3	52	0.9	51	55.47	0.03	<0.01	0.03	NAG
WVR06-01	9+400	8.4	2	55	1.9	53	29	0.06	<0.01	0.06	NAG
WVR06-03	10+000	7.6	1	11	0.9	10	12	0.03	<0.01	0.03	NAG
JD10-5-1G	10+300	7.7	1	6	<0.3	6	38.4	<0.01	<0.01	<0.01	Uncertain
WVR06-02	10+400	7.4	1	4	1.3	3	3	0.04	<0.01	0.04	Uncertain
WVR06-04	14+100	7.5	1	9	0.3	9	29	0.01	<0.01	0.01	Uncertain
WVR06-05	15+100	8.4	2	19	<0.3	19	122	<0.01	<0.01	<0.01	NAG
WVR06-06	15+400	8.4	2	24	0.3	24	77	0.01	<0.01	0.01	NAG
WVR06-07	15+800	8.7	2	13	0.3	13	42	0.01	0.02	<0.01	NAG
JD10-6-10G	17+200	7	1	7	0.6	6	11.2	0.02	<0.01	0.02	Uncertain
WVR06-08	18+700	8.2	1	13	<0.3	13	83	<0.01	<0.01	<0.01	NAG
WVR06-09	20+000	8.6	1	12	0.3	12	38	0.01	<0.01	0.01	NAG

Notes: AP = Acid potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material; NP = Neutralization potential in tonnes $CaCO_3$ equivalent per 1000 tonnes of material.
NNP = NP – AP; NPR = NP/AP; NAG = Non-acid Generating ;S = Sulphur
*Acid Potential based on paste pH, sulphide sulphur, NPR and NP; < = Less than analytical detection limit

AMEC has reviewed the ABA results for the access road samples according to the protocol described above, and concluded the following:

- All samples with paste pH>5.5 and a sulphide sulphur content significantly less than 0.3% are considered non-acid generating
- Samples WVR06-02, WVR06-04, JD10-6-10G and JF10-5-1G have NP values less than 10 kg $CaCO_3$//tonne. Sulphide sulphur contents of these materials range from <0.01 to 0.02%, and sulphate sulphur contents are less than the detection limit of 0.01%. Based on this assessment, these four samples underwent shake flask extraction (SFE) testing to further assess the presence of leachable acidity and/or leachable metals.

Shake flask testing was conducted at ALS Laboratory Group (ALS) in North Vancouver, BC using a 24 hour 3:1 deionized water to rock extraction procedure as outlined in the Guidelines (Price, 1997). The resulting leachate was analyzed for mercury via cold vapour atomic fluorescence spectrophotometry and other metals via inductively coupled plasma-optical emission spectrophotometry. The results of these analyses are presented in Table 9 and compared to the Canadian Metal Mining Effluent Regulations (MMER) guideline values to identify any parameters that could potentially leach form in-place road construction materials at concentration that may affect receiving water quality.

Leachate pH values ranged between 6.7 and 7.9 and are well within the acceptable range in pH as regulated by MMER. Regulated metals arsenic, lead and nickel were less than detection and less than the maximum monthly mean concentration for all samples. Concentrations of copper ranged from 0.015 to 0.029 mg/L and were at least ten times less than MMER value of 0.3 mg/L. Zinc was detectable only in sample JD10-5-1G, although the concentration of zinc in this sample was more than twenty times less than the maximum monthly mean allowed under MMER guidelines. Based on the results for the 14 samples, there appear to be no concerns for acid drainage or metal leaching from the materials under consideration for road construction.

Table F-9. Access Road Shake Flask Extraction (SFE) Analysis Results

Physical Tests		MMER*	WVR06-02	WVR06-04	VD10-6-10G	VD10-5-1G
pH		6.0 - 9.5	7.0	7.9	6.7	7.7
Leachable Metals	**Units**					
Aluminum (Al)	mg/L	-	3.08	2.43	4.19	2.04
Antimony (Sb)	mg/L	-	<0.050	<0.050	<0.050	<0.050
Arsenic (As)	mg/L	0.5	<0.050	<0.050	<0.050	<0.050
Barium (Ba)	mg/L	-	0.632	0.131	0.062	0.290
Beryllium (Be)	mg/L	-	<0.0050	<0.0050	<0.0050	<0.0050
Bismuth (Bi)	mg/L	-	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)	mg/L	-	<0.010	<0.010	<0.010	<0.010
Calcium (Ca)	mg/L	-	1.49	13.5	0.504	8.38
Chromium (Cr)	mg/L	-	0.013	<0.010	0.011	0.012
Cobalt (Co)	mg/L	-	<0.010	<0.010	<0.010	<0.010
Copper (Cu)	mg/L	0.3	0.029	0.015	0.022	0.023
Iron (Fe)	mg/L	-	4.66	3.14	3.80	3.27
Lead (Pb)	mg/L	0.2	<0.050	<0.050	<0.050	<0.050
Magnesium (Mg)	mg/L	-	1.98	6.74	1.56	4.89
Manganese (Mn)	mg/L	-	0.438	0.326	0.211	0.246
Mercury (Hg)	mg/L	-	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum (Mo)	mg/L	-	<0.030	<0.030	<0.030	<0.030
Nickel (Ni)	mg/L	0.5	<0.050	<0.050	<0.050	<0.050
Phosphorus (P)	mg/L	-	<0.30	<0.30	<0.30	<0.30
Potassium (K)	mg/L	-	9.0	6.2	<2.0	2.1
Selenium (Se)	mg/L	-	<0.050	<0.050	<0.050	<0.050
Silicon (Si)	mg/L	-	9.37	8.33	9.25	8.03
Silver (Ag)	mg/L	-	<0.010	<0.010	<0.010	<0.010
Sodium (Na)	mg/L	-	<2.0	5.1	2.2	<2.0
Strontium (Sr)	mg/L	-	0.0242	0.0366	<0.0050	0.0355
Thallium (Tl)	mg/L	-	<0.20	<0.20	<0.20	<0.20
Tin (Sn)	mg/L	-	<0.030	<0.030	<0.030	<0.030
Titanium (Ti)	mg/L	-	0.076	0.201	0.322	0.044
Uranium (U)	mg/L	-	<0.50	<0.50	<0.50	<0.50
Vanadium (V)	mg/L	-	<0.030	<0.030	<0.030	<0.030
Zinc (Zn)	mg/L	0.5	<0.020	<0.020	<0.020	0.023

Note VD10-6010G = JD10-6-10G and VD10-5-1G = JD10-5-1G

Appendix F-A

Figure 1

Wolverine All-Weather Access Road km 0 to km 24.0

Yukon Engineering Services

January 2007 (revised April 5, 2007)

FIGURE 1

Drawings For

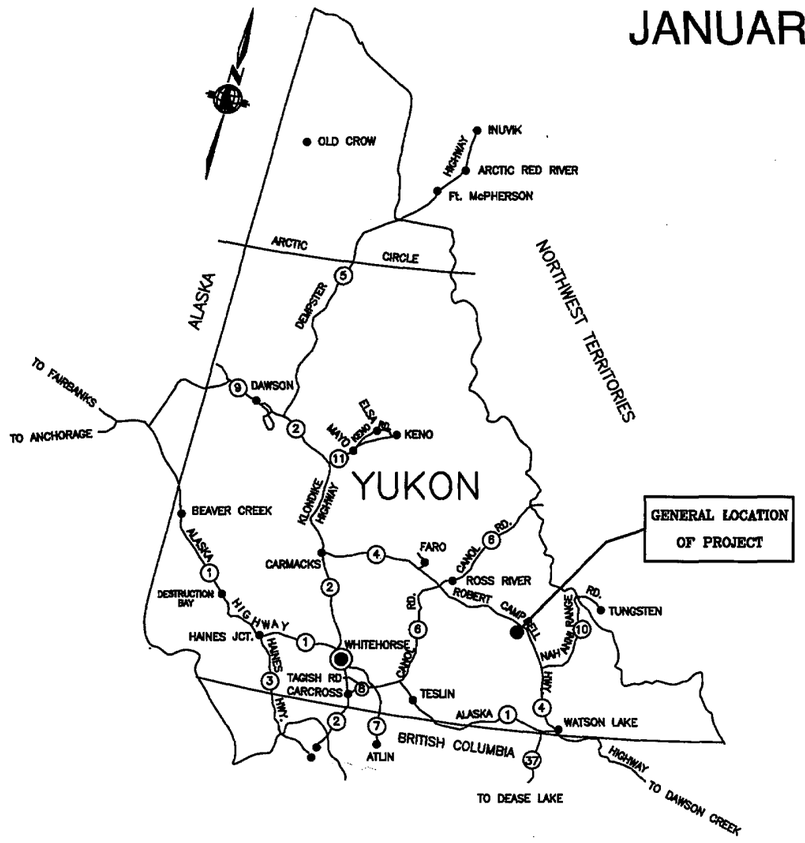
WOLVERINE ALL WEATHER ACCESS ROAD

km 0.0 to km 24.0

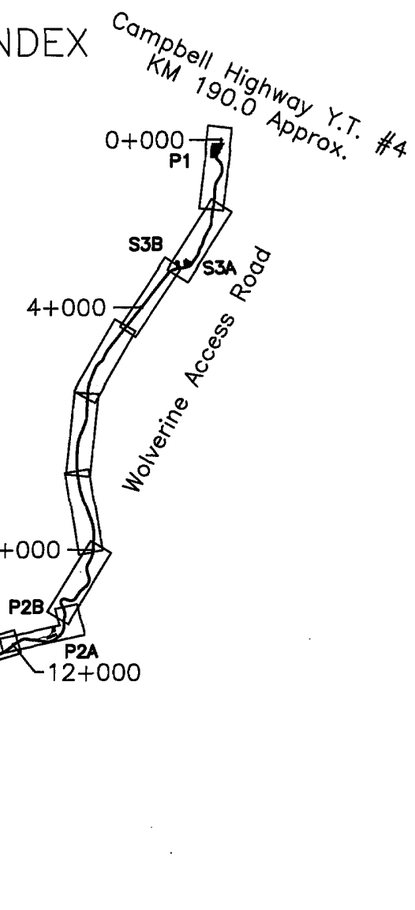
ISSUED FOR CONSTRUCTION

JANUARY 2007

PIT	STA	O/S	GROSS AREA (Ha.)	NET AREA (Ha.)	AVG DEPTH (m)	COMMON (m^3)	GRANULAR SURFACING (m^3)	CONCRETE AGGREGATE (m^3)	TOTAL (m^3)
P1	210	0	5.3	2.7	2	3,000	3,000	-	6,000
S3A	2560	70	1.6	0.8	2	9,000	3,000	-	12,000
S3B	2810	70	1.1	0.6	2	-	9,000	-	9,000
P2A	11060	60	1.0	0.5	2	-	8,000	-	8,000
P2B	10960	130	0.6	0.5	2	-	5,000	5,000	5,000
P4A	16560	-100	2.9	1.5	2	22,000	7,000	-	29,000
P4B	17310	110	3.0	1.5	2	23,000	7,000	-	30,000
P3	23460	-150	1.0	0.5	2	-	8,000	-	8,000
TOTALS			**16.5**	**8.5**	**2.0**	**57,000**	**50,000**	**5,000**	**107,000**



SHEET INDEX



LIST OF DRAWINGS:

PLAN/PROFILE SHEETS:

KM 0 - PLAN/PROFILE KM 0+000 TO KM 1+500
KM 1.5 - PLAN/PROFILE KM 1+500 TO KM 3+000
KM 3 - PLAN/PROFILE KM 3+000 TO KM 4+500
KM 4.5 - PLAN/PROFILE KM 4+500 TO KM 6+000
KM 6 - PLAN/PROFILE KM 6+000 TO KM 7+500
KM 7.5 - PLAN/PROFILE KM 7+500 TO KM 9+000
KM 9 - PLAN/PROFILE KM 9+000 TO KM 10+500
KM 10.5 - PLAN/PROFILE KM 10+500 TO KM 12+000
KM 12 - PLAN/PROFILE KM 12+000 TO KM KM 13+500
KM 13.5 - PLAN/PROFILE KM 13+500 TO KM 15+000
KM 15 - PLAN/PROFILE KM 15+000 TO KM 16+500
KM 16.5 - PLAN/PROFILE KM 16+500 TO KM 18+000
KM 18 - PLAN/PROFILE KM 18+000 TO KM 19+500
KM 19.5 - PLAN/PROFILE KM 19+500 TO KM 21+000
KM 21 - PLAN/PROFILE KM 21+000 TO KM 22+500
KM 22.5 - PLAN/PROFILE KM 22+500 TO KM 24+000

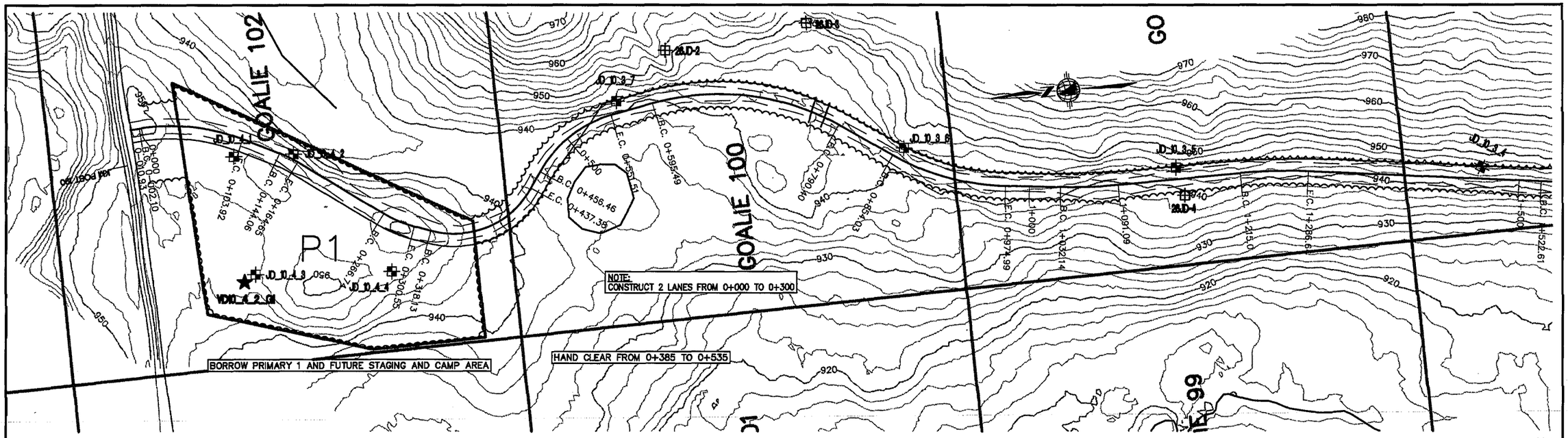
BUNKER CREEK CROSSING:

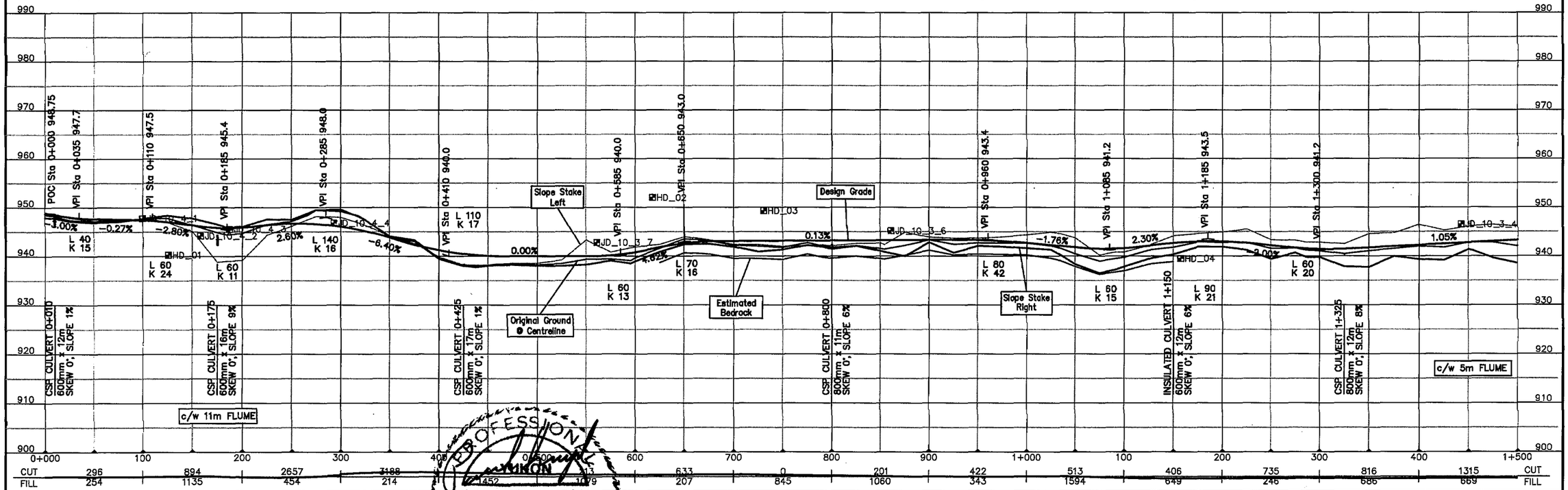
BUNKER - GENERAL LAYOUT - PLAN/PROFILE SHEET - BUNKER CK BRIDGE
3751-SK-601 - GENERAL ARRANGEMENT (AE)
3751-SK-602 - STEEL GIRDER DETAILS SHEET 1 (AE)
3751-SK-603 - STEEL GIRDER DETAILS SHEET 2 (AE)
BW 02-07001 - BIN WALL BRIDGE ABUTMENT DESIGN (ARMTEC)
BW 02-07002 - BIN TYPE RETAINING WALL BACKFILL INSTRUCTIONS AND DESIGN NOTES (ARMTEC)
BW-40001E - BIN TYPE RETAINING WALL STANDARD DETAILS AND COMPONENTS (ARMTEC)
BW-40002E - BIN TYPE RETAINING WALL STANDARD DEPTH AND HEIGHT COMBINATIONS (ARMTEC)

Yukon Zinc CORPORATION

YES
YUKON ENGINEERING SERVICES

E06015_4_PP.dwg Jan.12/07





LEGEND:
- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26.D-9 HAND DUG TESTPITS
- 120697-TP01 TESTPITS
- WR08-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
	ISSUE/REVISIONS		

NO	DESCRIPTION	BY	DATE
5	REVISED HWY ACCESS PK	PK	04/06/01
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06
	ISSUE/REVISIONS		

PROFESSIONAL ENGINEER
YUKON
PAUL J. KNYSH
TERRITORY
07/04/06

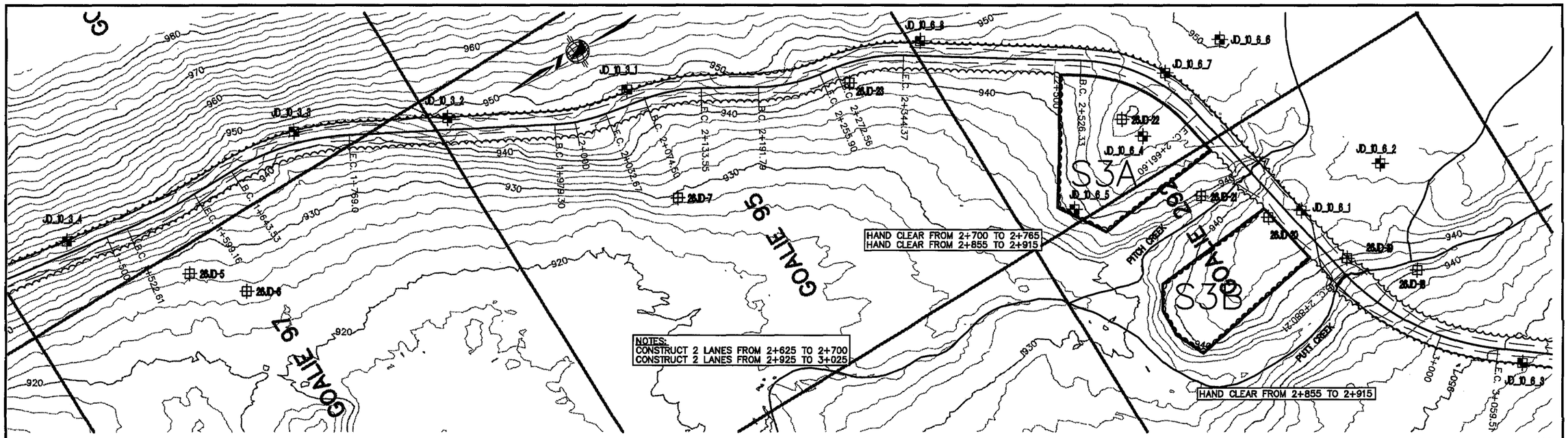
SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
ED6015_4_PP.DWG	ED6015	km 0	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 0 TO KM 1.5
FIGURE 1



LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE 1 ROAD
- 26JD-9 HAND DUG TESTPITS
- 120097-TP01 TESTPITS
- WR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — PAUL J. KNYSH — TERRITORY — 27/04/06

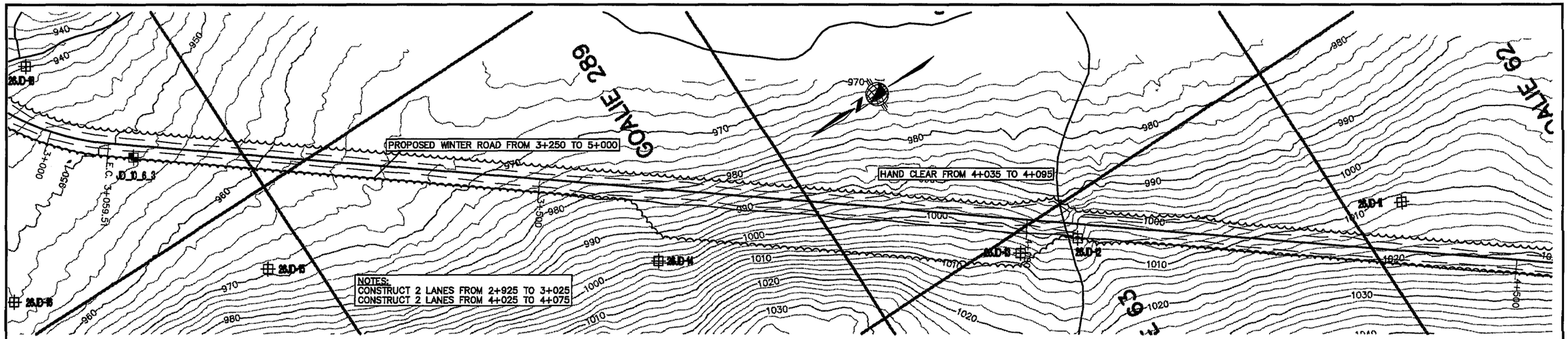
SECTION:	DATE
SCALE: 1:4000–H 1:800–V	
DESIGNED BY: RH	12/01/07
DRAWN BY: GDC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

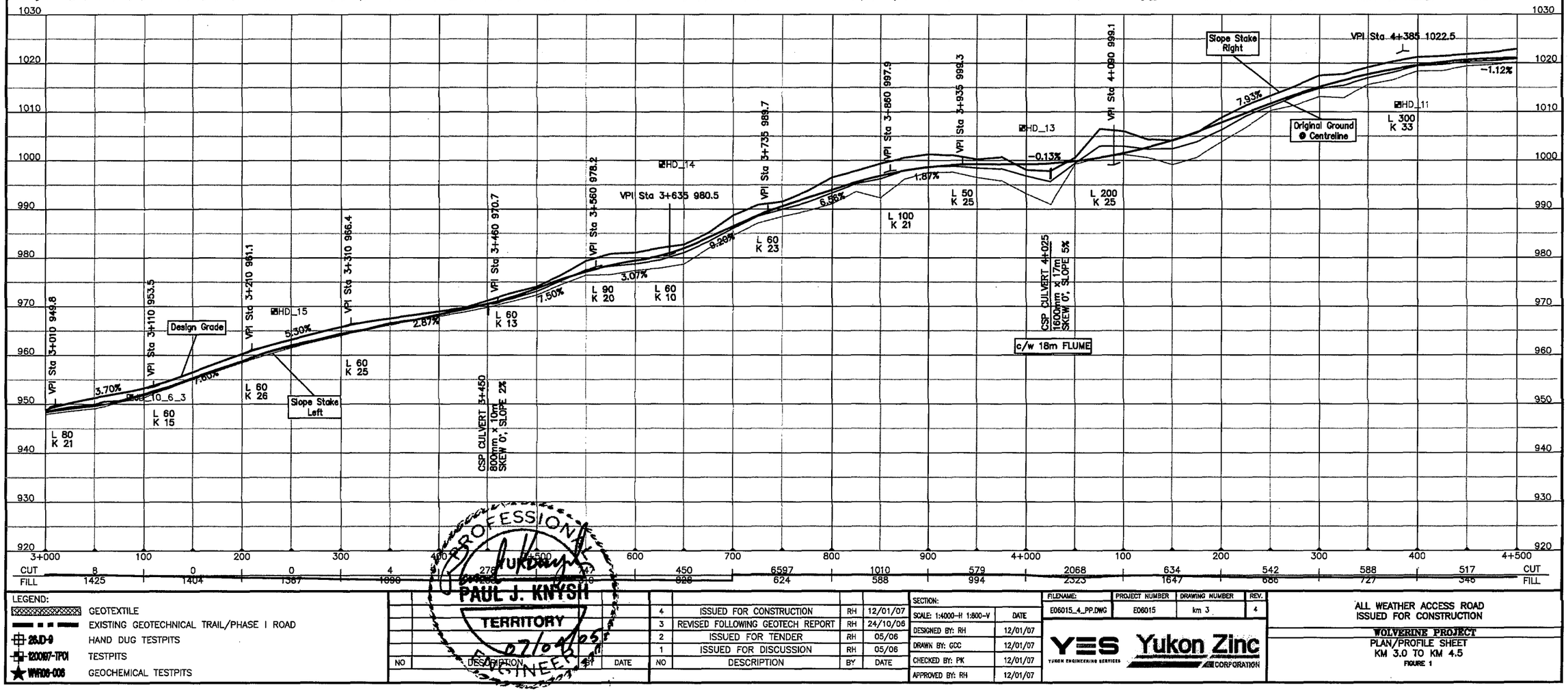
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 1.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 1.5 TO KM 3.0
FIGURE 1





LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 25JD-9 HAND DUG TESTPITS
- 12DD07-TPDI TESTPITS
- WWR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
PAUL J. KNYSH
TERRITORY
07/09/05

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

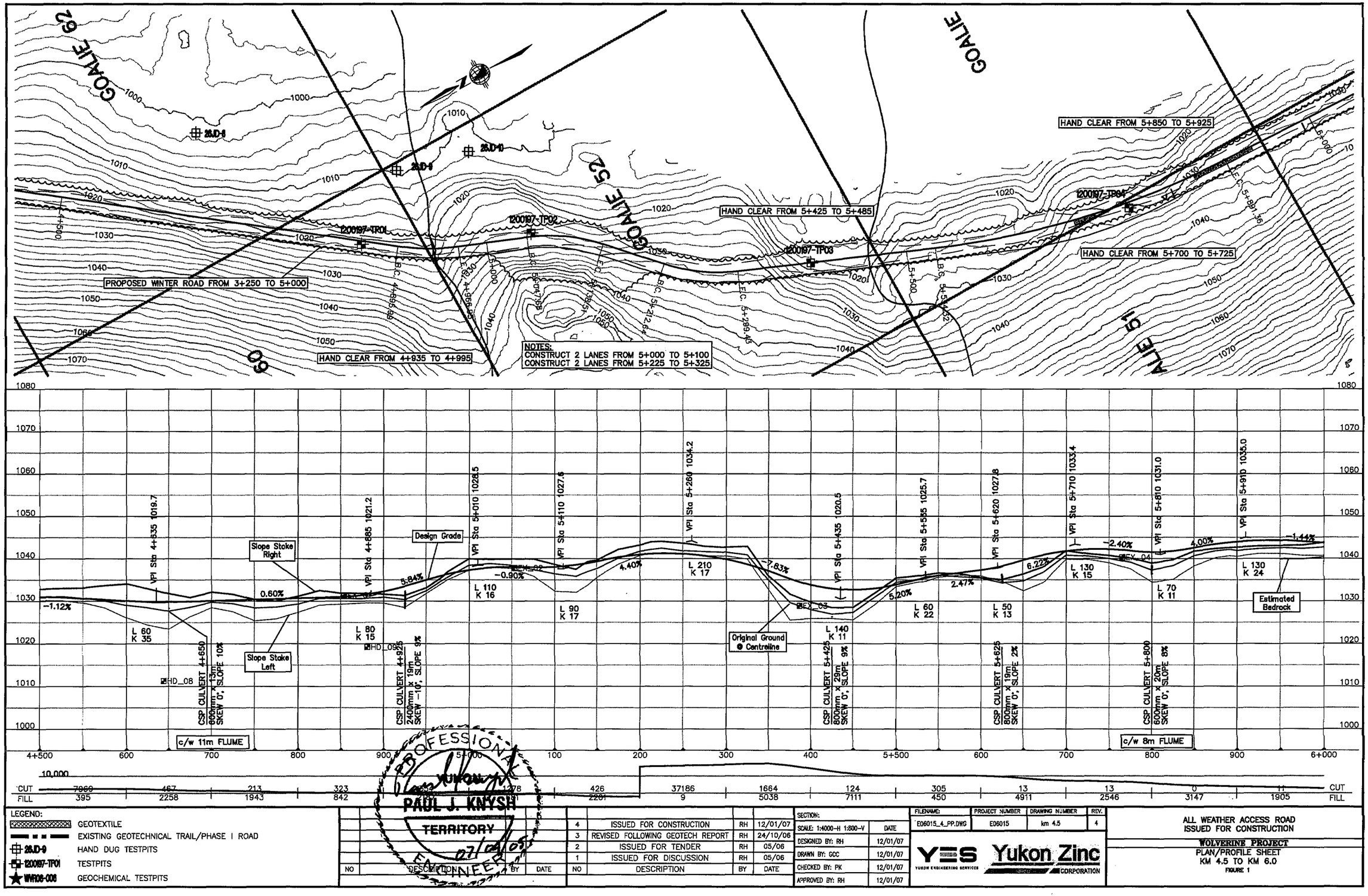
SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 3	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 3.0 TO KM 4.5
FIGURE 1



LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 200197-TP01 TESTPITS
- WWR06-008 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 07/12/05

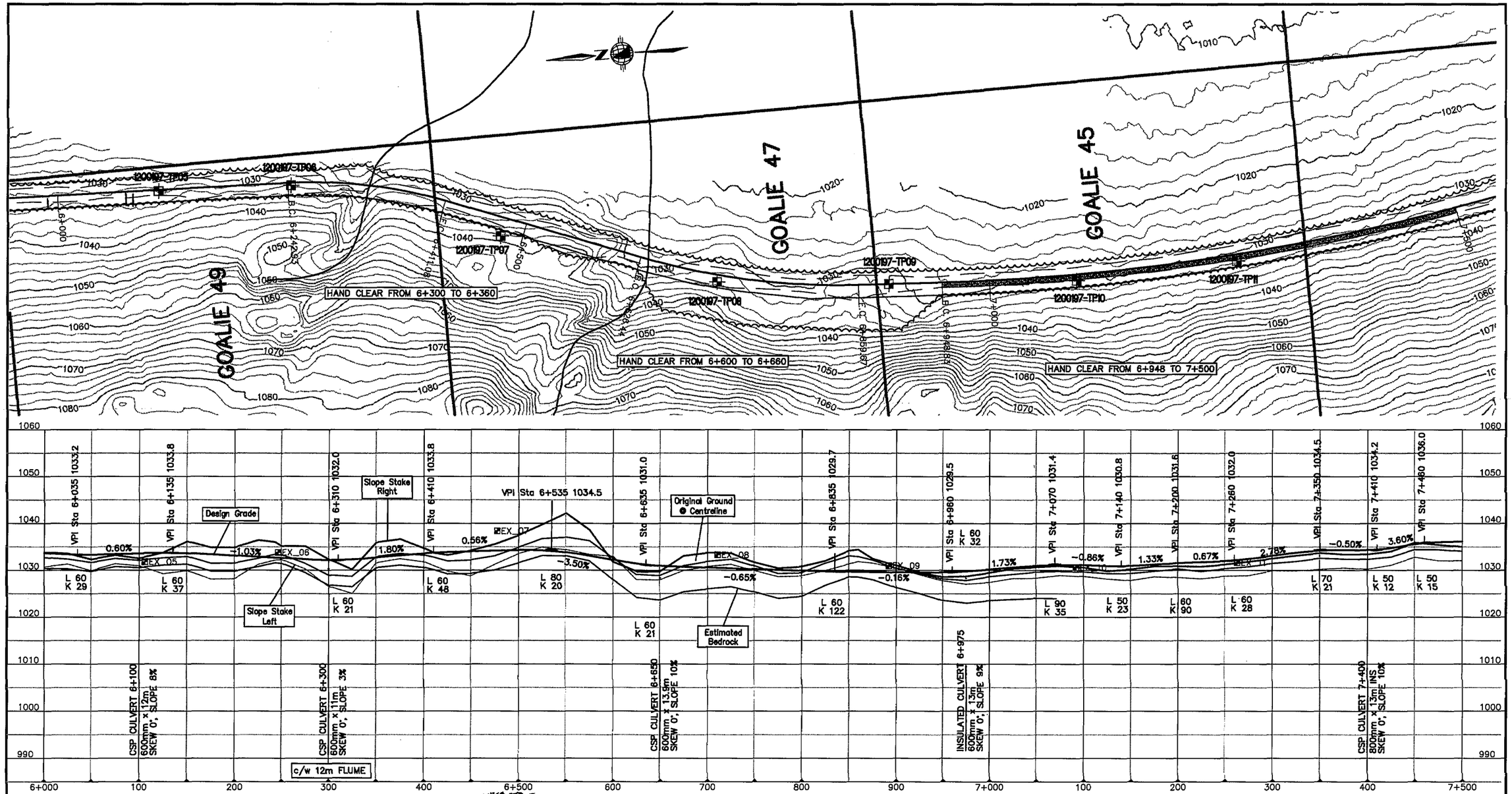
SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 4.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 4.5 TO KM 6.0
FIGURE 1



CUT	10,000	55	357	983	1014	668	1614	1857	49671	39	10	4	7	39	CUT
FILL		1393	1866	1276	2393	1256	221	55	979	1408	1468	1684	2029	1988	FILL

LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 28JD-9 HAND DUG TESTPITS
- 200197-TP01 TESTPITS
- WWR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 07/01/05

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

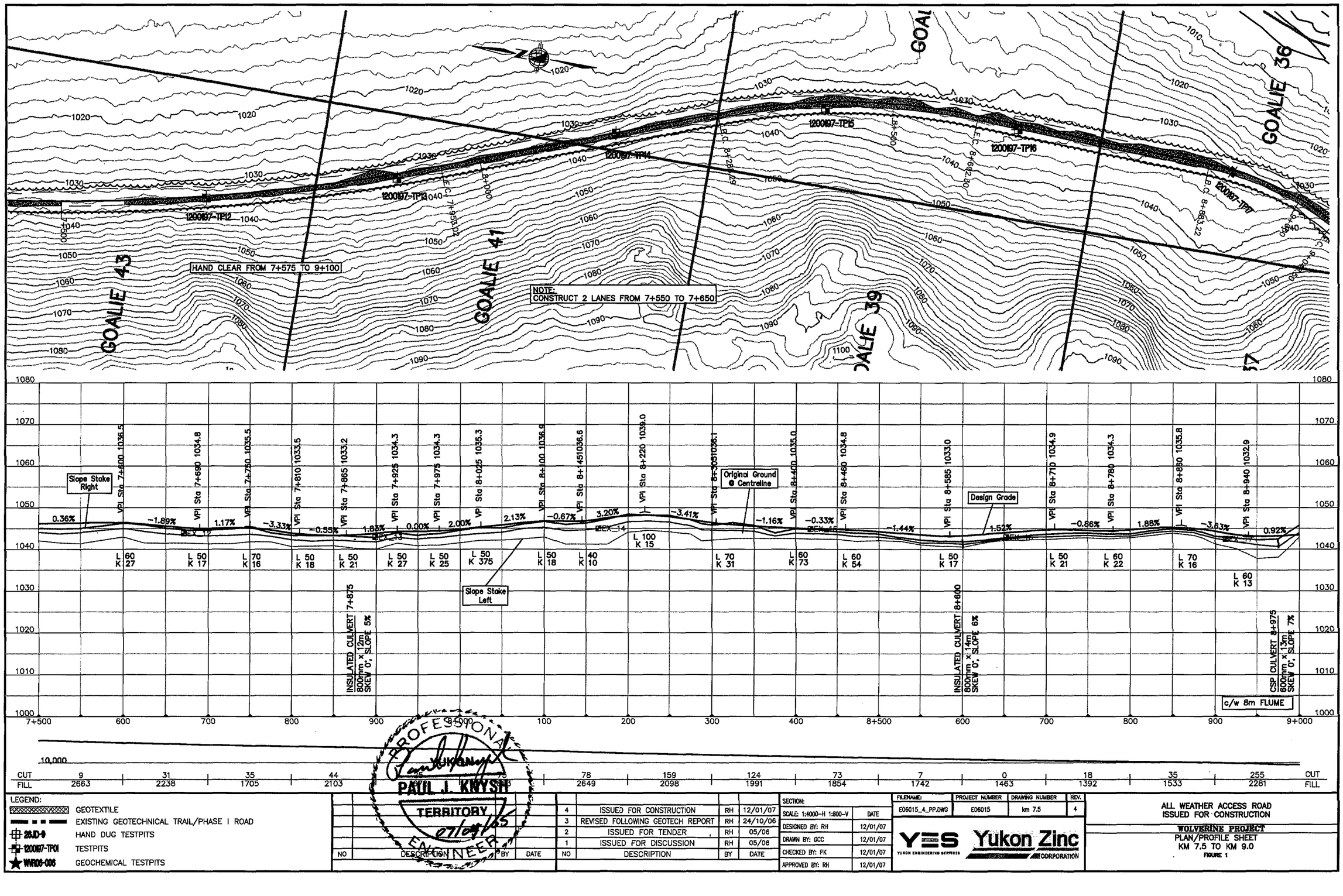
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 6	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 6.0 TO KM 7.5
FIGURE 1



CUT	9	31	35	44		78	159	124	73	7	0	18	35	255	CUT
FILL	2663	2238	1705	2103		2649	2098	1991	1854	1742	1463	1392	1533	2281	FILL

LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200697-TP01 TESTPITS
- WWD6-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER
PAUL J. KWYSH
TERRITORY
07/09/05

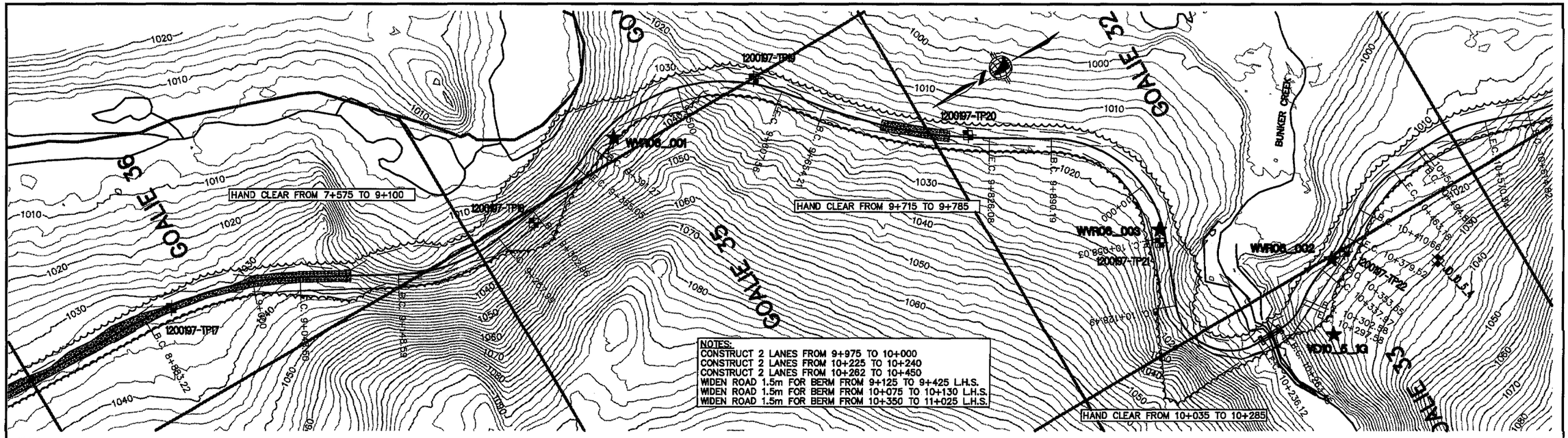
SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

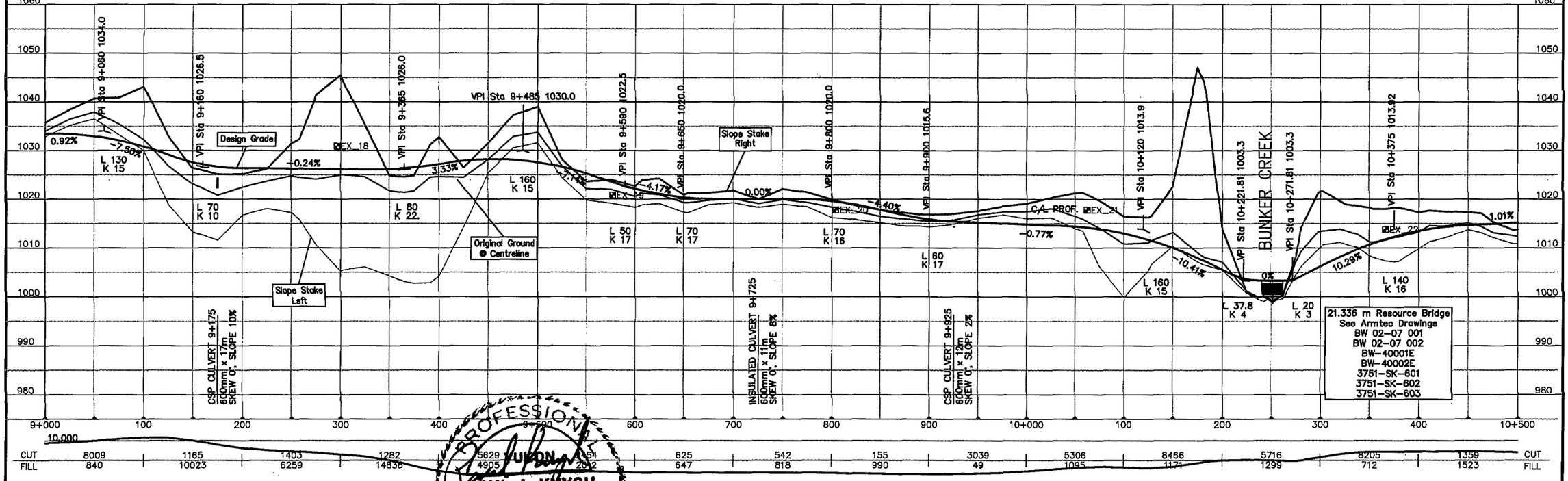
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 7.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 7.5 TO KM 9.0
FIGURE 1





LEGEND:
- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 25JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WWR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — PAUL J. KNYSH — TERRITORY — 07/04/05

SECTION:	DATE
SCALE: 1:4000–H 1:800–V	
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

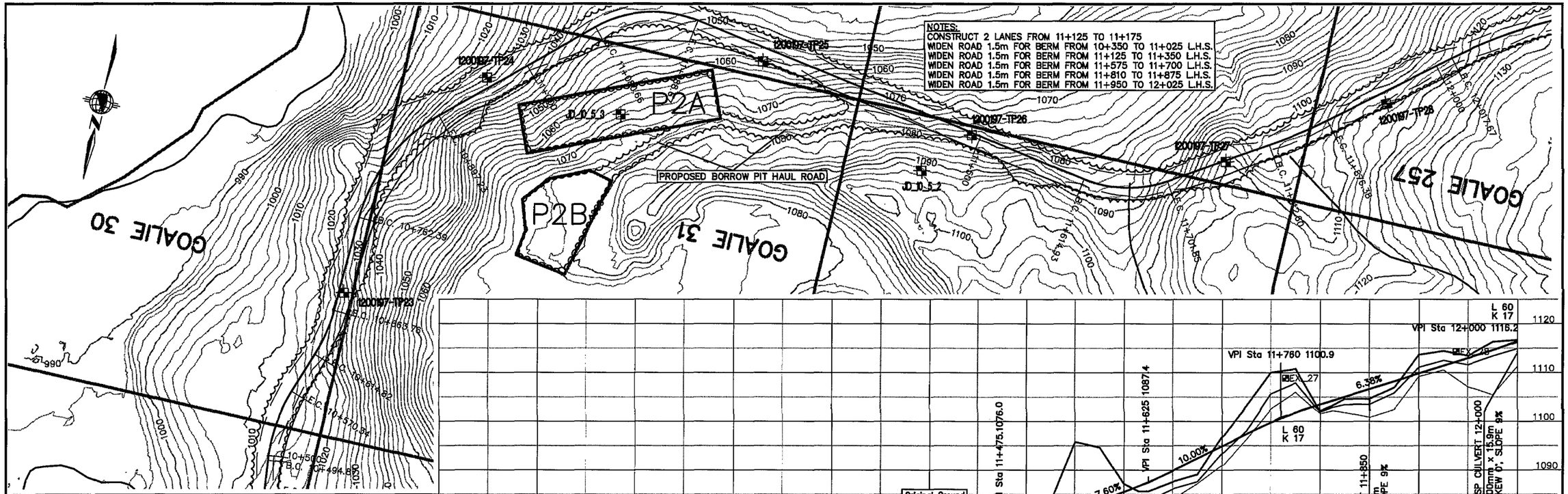
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 9	4

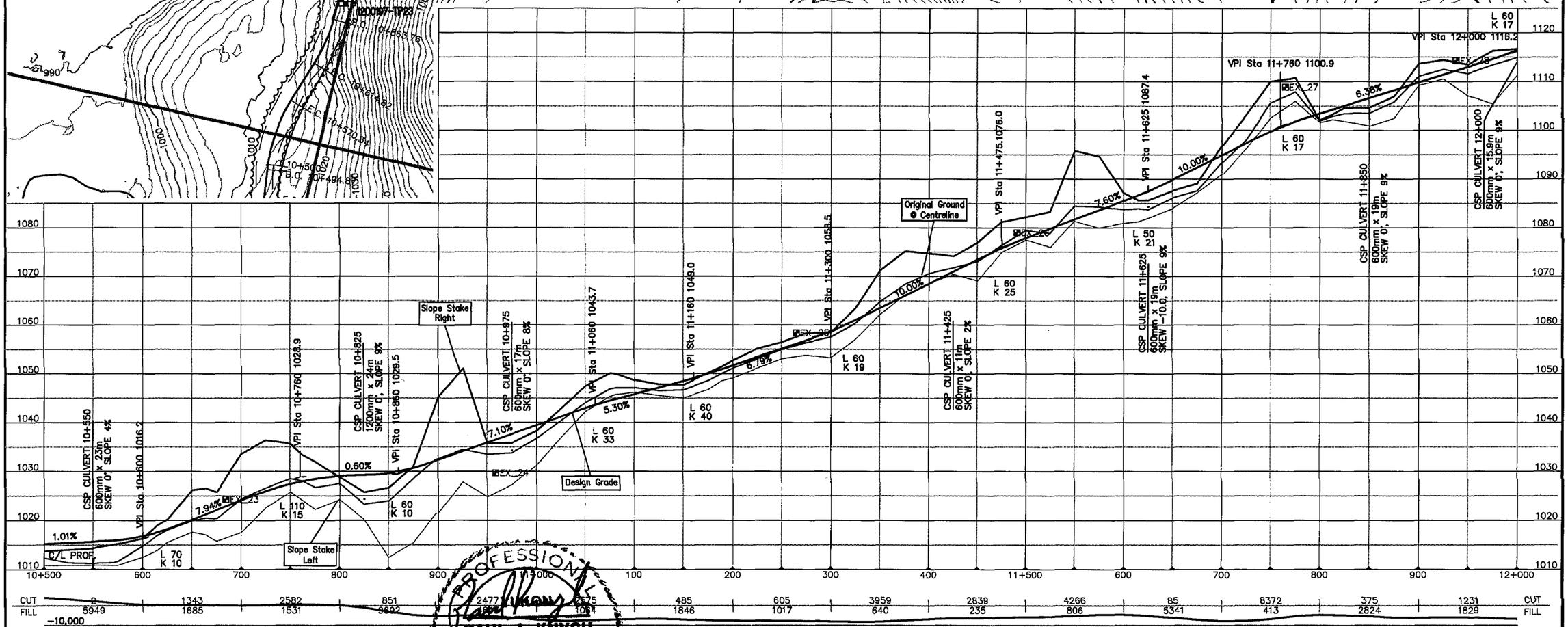
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 9.0 TO KM 10.5
FIGURE 1

NOTES:
CONSTRUCT 2 LANES FROM 11+125 TO 11+175
WIDEN ROAD 1.5m FOR BERM FROM 10+350 TO 11+025 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 11+125 TO 11+350 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 11+575 TO 11+700 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 11+810 TO 11+875 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 11+950 TO 12+025 L.H.S.





LEGEND:
- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 2MJD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
PAUL J. KNYSH
TERRITORY
07/dec/05

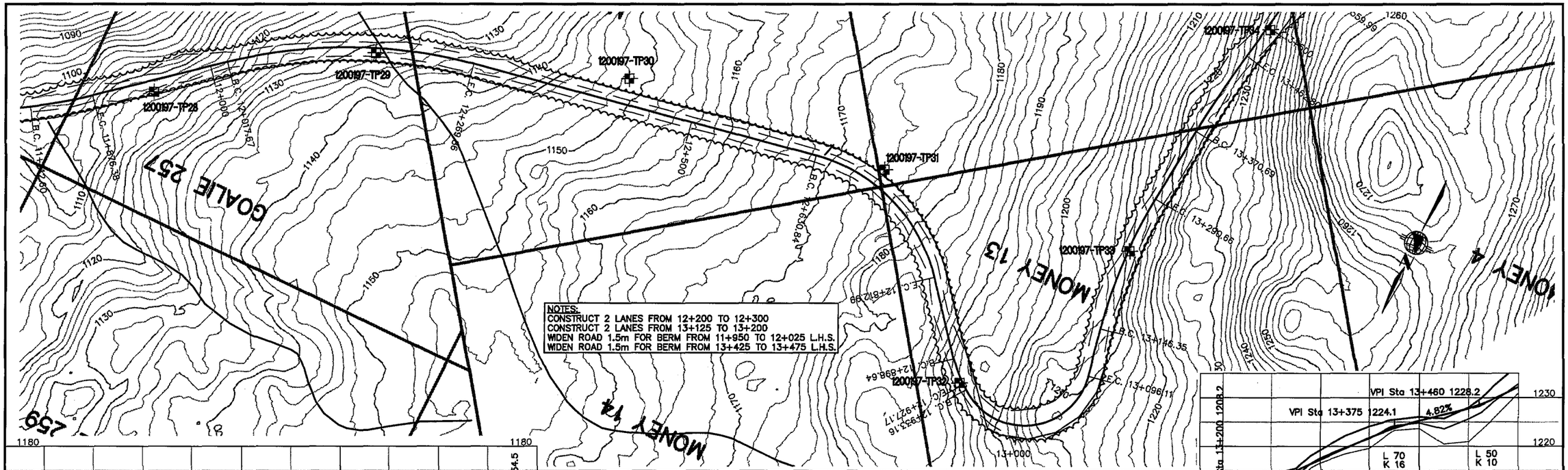
NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 10.5	4

YES YUKON ENGINEERING SERVICES
Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION
WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 10.5 TO KM 12.0
FIGURE 1



LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER YUKON PAUL J. KNYSH TERRITORY 27/04/05

SECTION:	DATE
SCALE: 1:4000-H 1:800-V	
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 12	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 12.0 TO KM 13.5
FIGURE 1

NOTES:
CONSTRUCT 2 LANES FROM 14+225 TO 14+275
CONSTRUCT 2 LANES FROM 14+975 TO 15+050
WIDEN ROAD 1.5m FOR BERM FROM 13+650 TO 13+800 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 13+90 TO 14+075 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 14+150 TO 14+825 L.H.S.

HAND CLEAR 14+940 TO 15+000
HAND CLEAR 15+070 TO 15+130

MONEY 2
MONEY 1
MONEY 30
CHIP CREEK

200197-TP04
200197-TP35
200197-TP36
WWR06_004
200197-TP37
200197-TP38
200197-TP39
200197-TP40

VPI Sta 13+560 1238.2
VPI Sta 13+700 1245.2
VPI Sta 13+920 1265.5
VPI Sta 14+040 1273.6
VPI Sta 14+150 1284.6
VPI Sta 14+250 1289.2
VPI Sta 14+375 1298.5
VPI Sta 14+530 1312.2
VPI Sta 14+675 1326.7
VPI Sta 14+775 1331.2
VPI Sta 14+920 1345.7

Original Ground @ Centreline
Slope Stake Right
Slope Stake Left
Design Grade
Estimated Bedrock

5.00%
10%
9.23%
6.75%
4.60%
8.24%
10.00%
8.18%
4.50%
3.33%

L 80 K 16
L 60 K 14
L 70 K 28
L 80 K 15
L 60 K 16
L 60 K 18
L 60
L 60 K 33
L 90 K 16
L 50 K 10
L 110 K 17

EX_34
EX_35
EX_36
EX_37
EX_38
EX_39
EX_40

CSP CULVERT 13+700
1000mm x 32m
SKEW 0°, SLOPE 13%

CSP CULVERT 14+200
800mm x 17m
SKEW 0°, SLOPE 9%

CSP CULVERT 14+475
800mm x 16m
SKEW 0°, SLOPE 10%

CSP CULVERT 15+000
800mm x 15m
SKEW 0°, SLOPE 9%

	13+500	600	700	800	900	100	200	300	400	14+500	600	700	800	900	15+000
CUT	5209	1450	70	11516	3025	573	1277	2796	104	1884	1509	9651	4775		
FILL	4	4269	11548	85	1814	1411	1508	2486	4436	2547	1023	268	274		

−10,000

LEGEND:
- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 200197-TP01 TESTPITS
- WWR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
PAUL J. KNYSH
TERRITORY
31/01/08

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

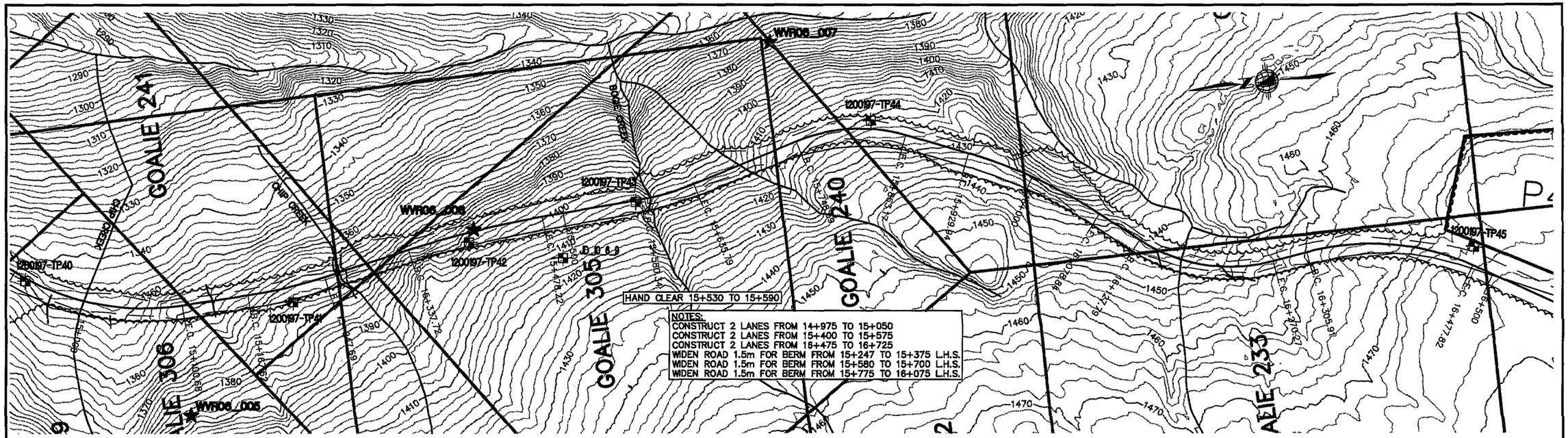
SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

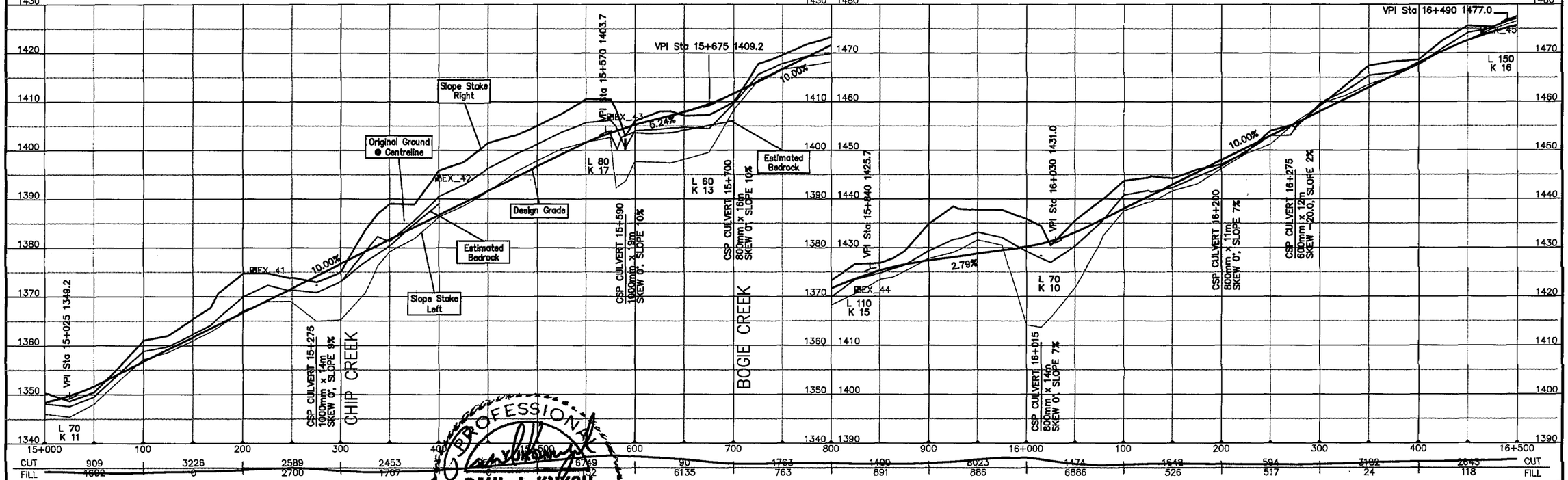
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 13.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 13.5 TO KM 15
FIGURE 1





LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 2ALD-9 HAND DUG TESTPITS
- 120197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

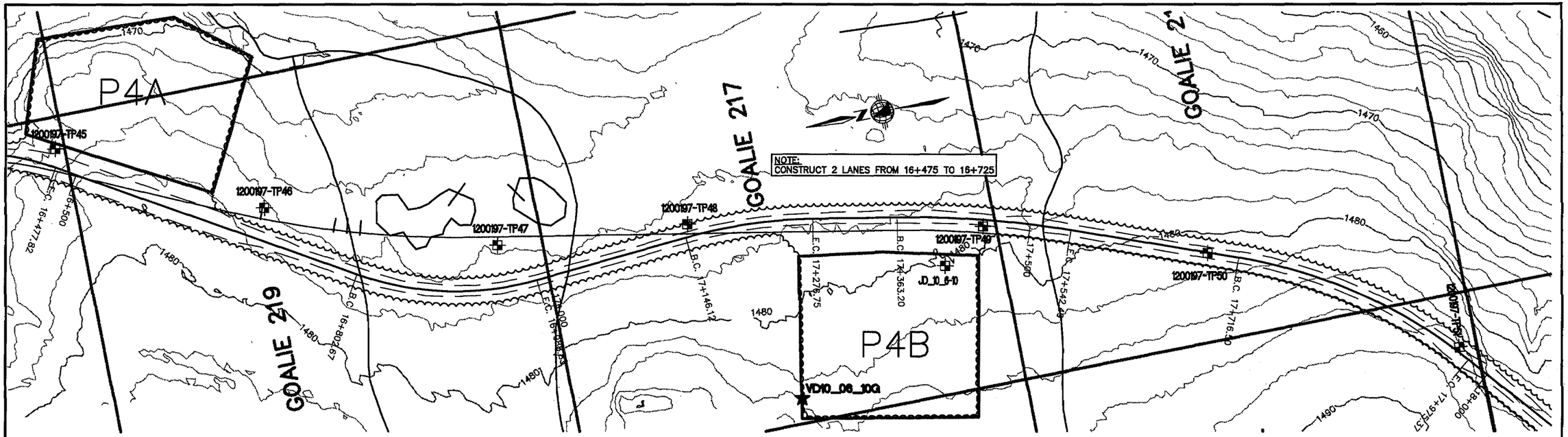
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 15	4

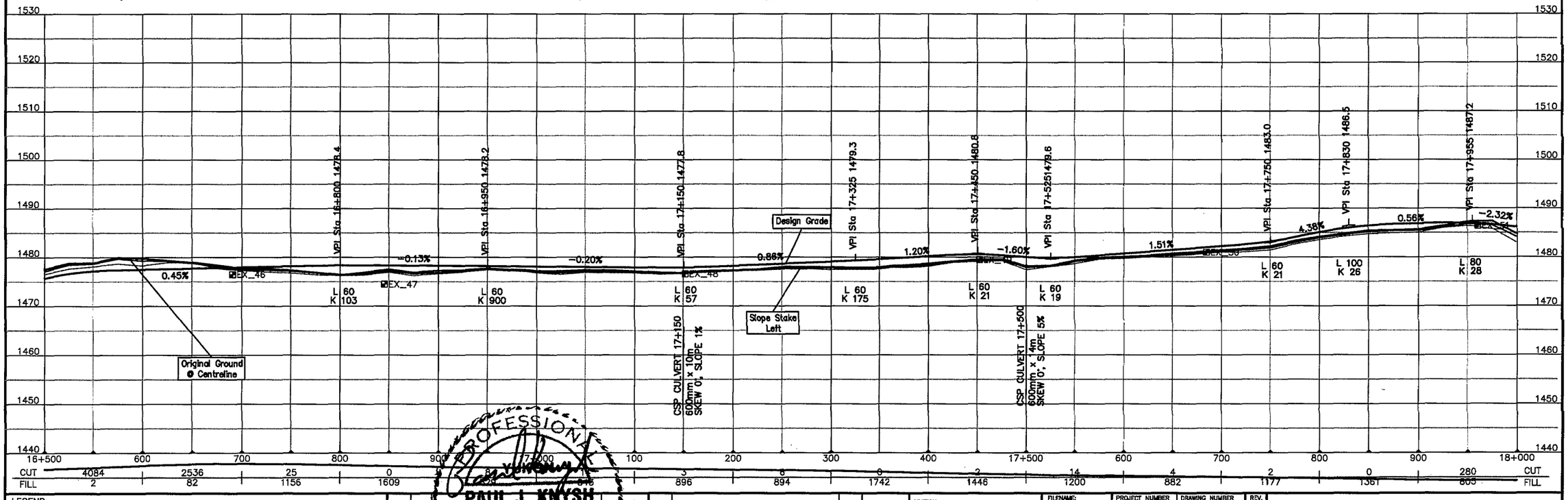
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 15 TO KM 16.5
FIGURE 1

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 07/04/05





LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WRR08-008 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER
PAUL J. KNYSH
TERRITORY
07694 95

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 16.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 16.5 TO KM 18.0
FIGURE 1

LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 07/04/04

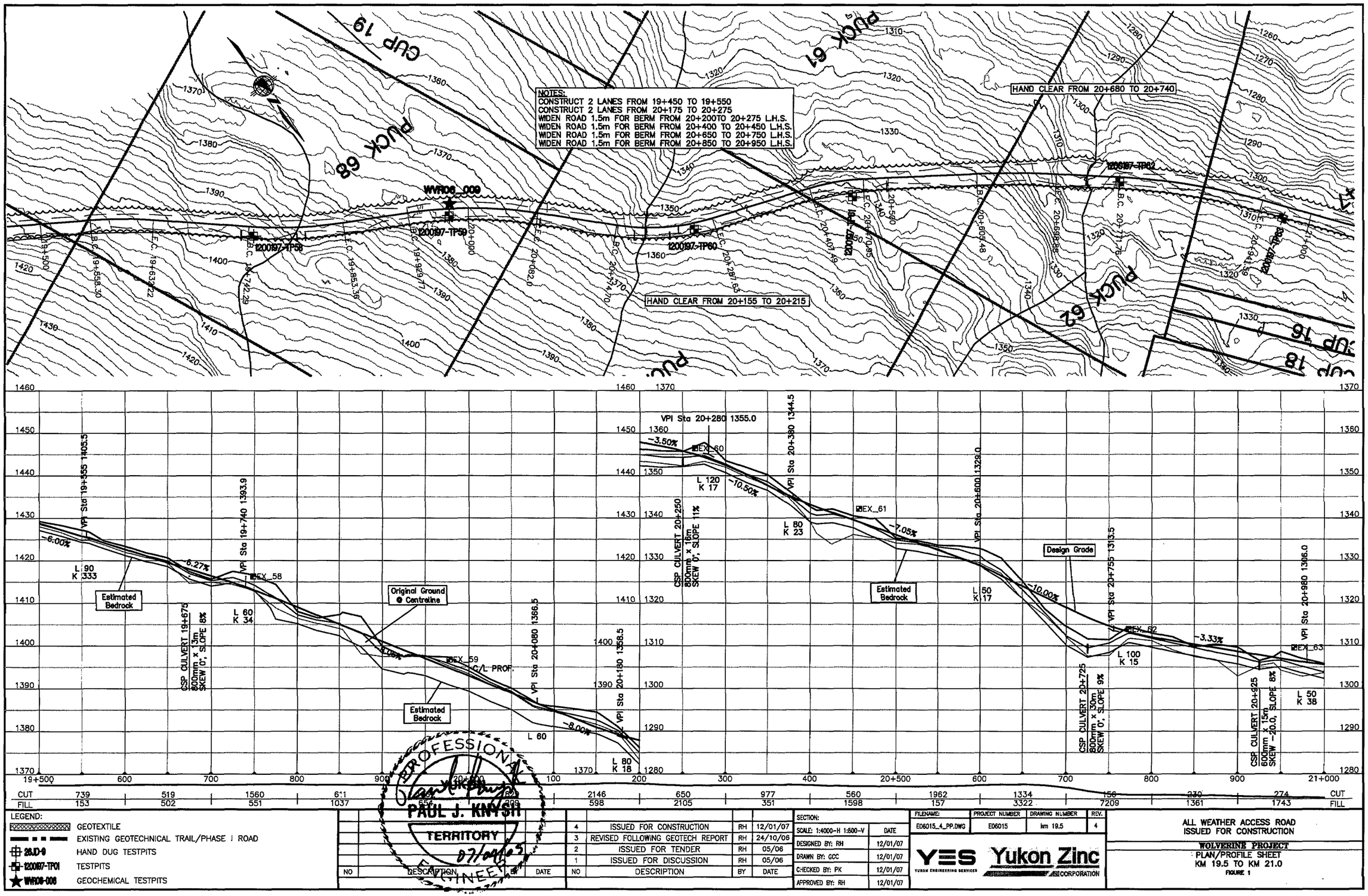
SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 18	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 18.0 TO KM 19.5
FIGURE 1



LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26.D-9 HAND DUG TESTPITS
- 120097-TP01 TESTPITS
- WVR06-008 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	DATE

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER
PAUL J. KNYSH
TERRITORY
07/oct/05

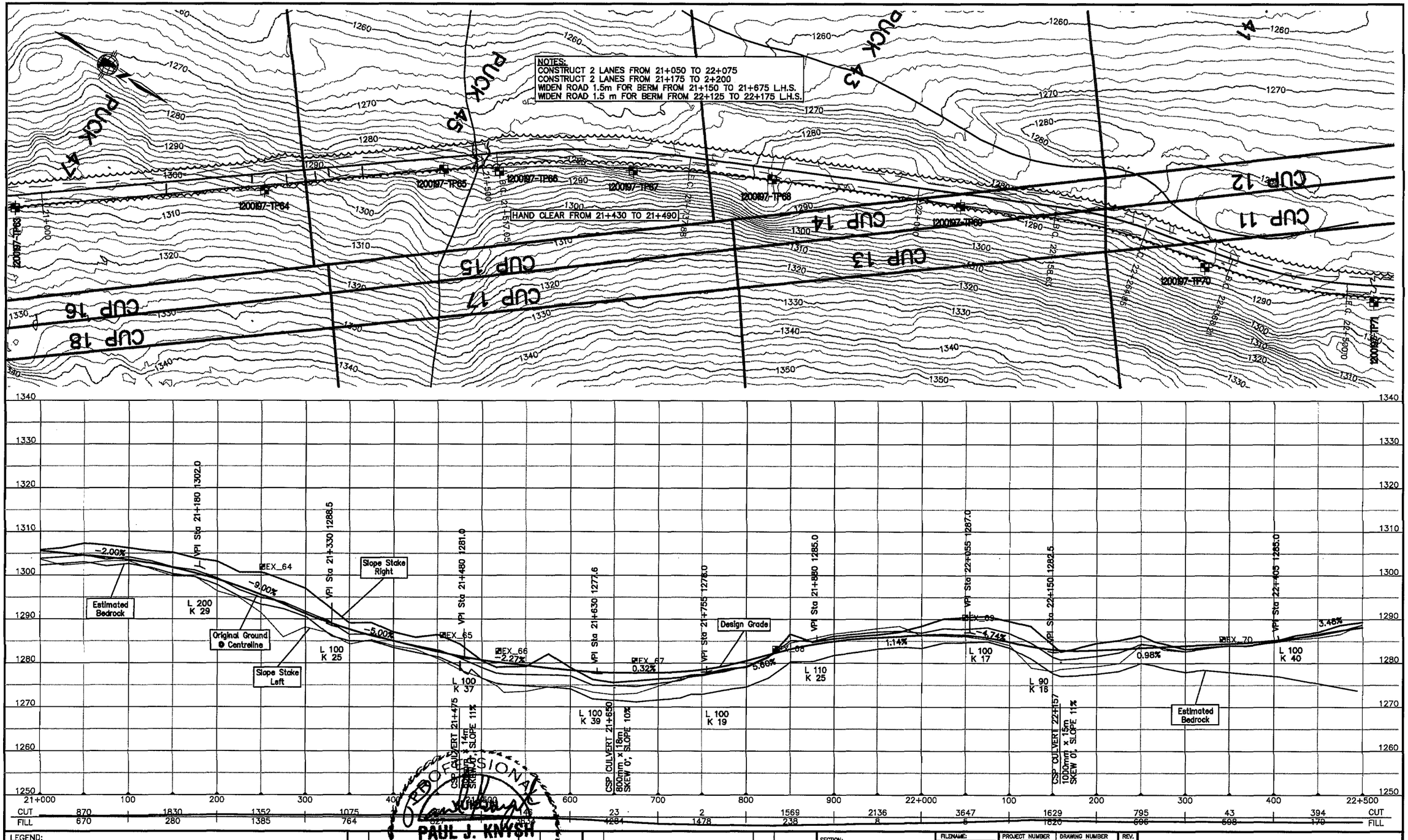
SECTION:	
SCALE: 1:4000-H 1:600-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 19.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 19.5 TO KM 21.0
FIGURE 1



LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 26JD-9 HAND DUG TESTPITS
- 200197-TP01 TESTPITS
- WWR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — PAUL J. KNYSH — TERRITORY — 07/04/05

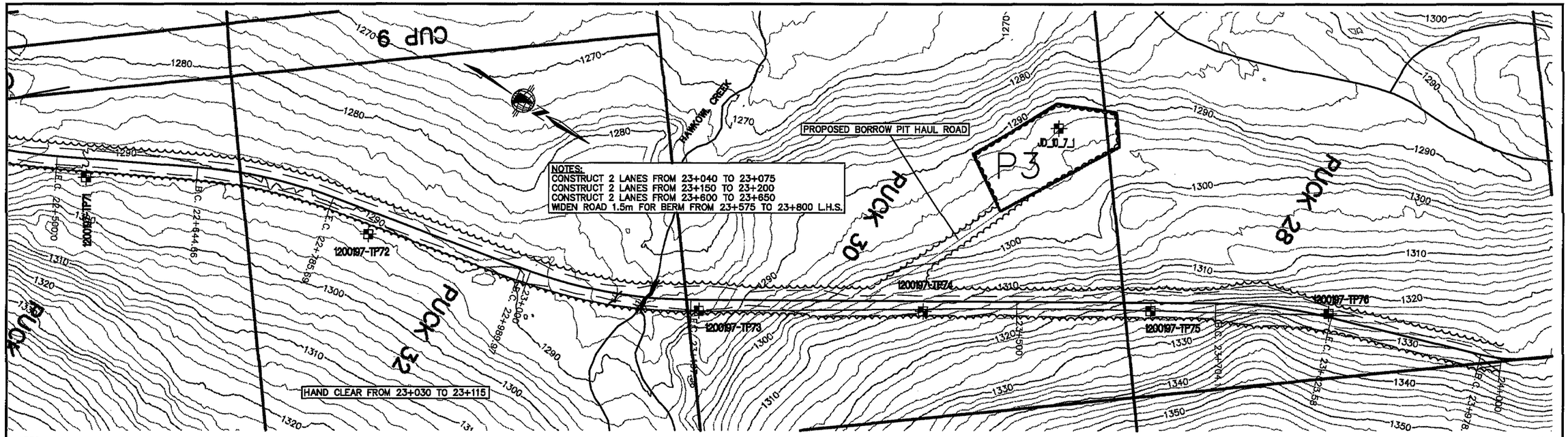
SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

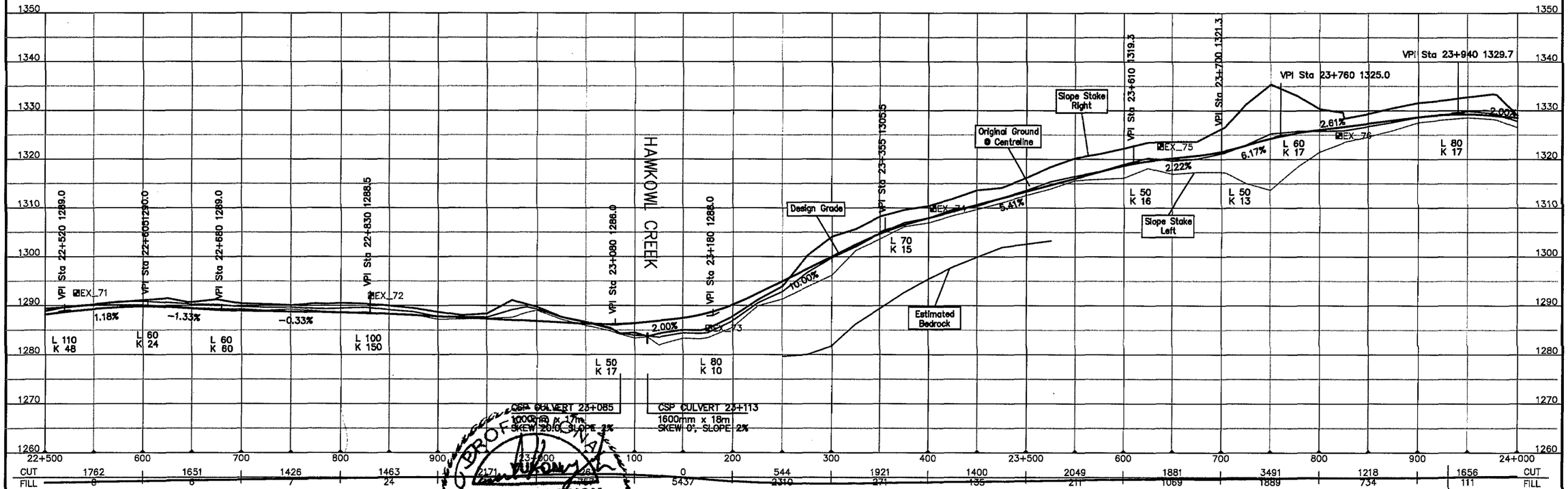
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 21	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 21.0 TO KM 22.5
FIGURE 1





LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PHASE I ROAD
- 25.D-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
4	ISSUED FOR CONSTRUCTION	RH	12/01/07
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER
YUKON TERRITORY
PAUL J. KNYSH
27/04/05

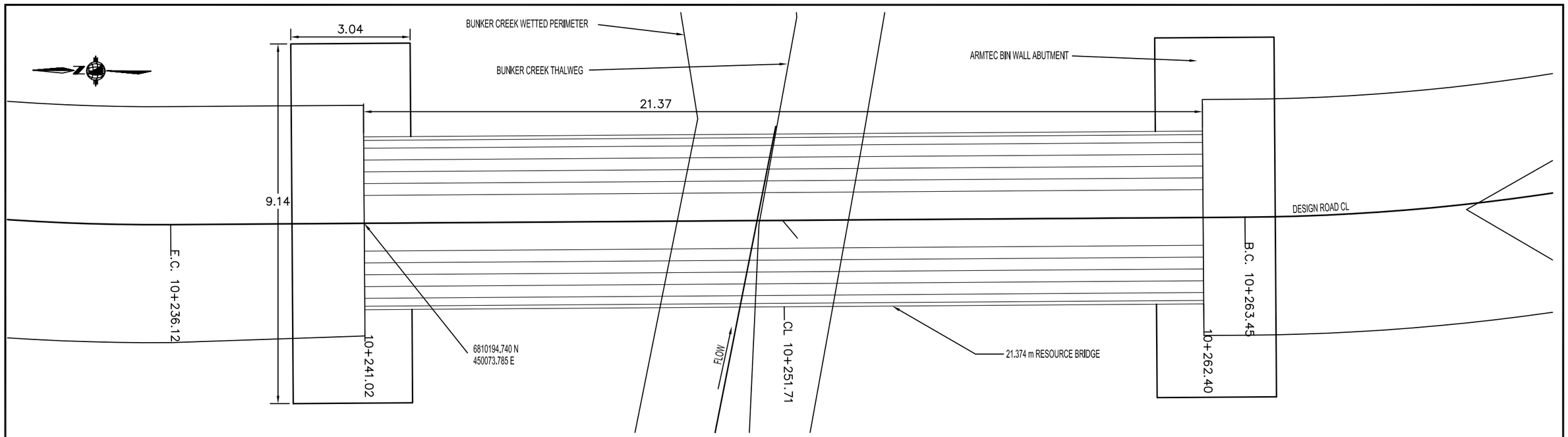
SECTION:	DATE
SCALE: 1:4000–H 1:800–V	
DESIGNED BY: RH	12/01/07
DRAWN BY: GCC	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: RH	12/01/07

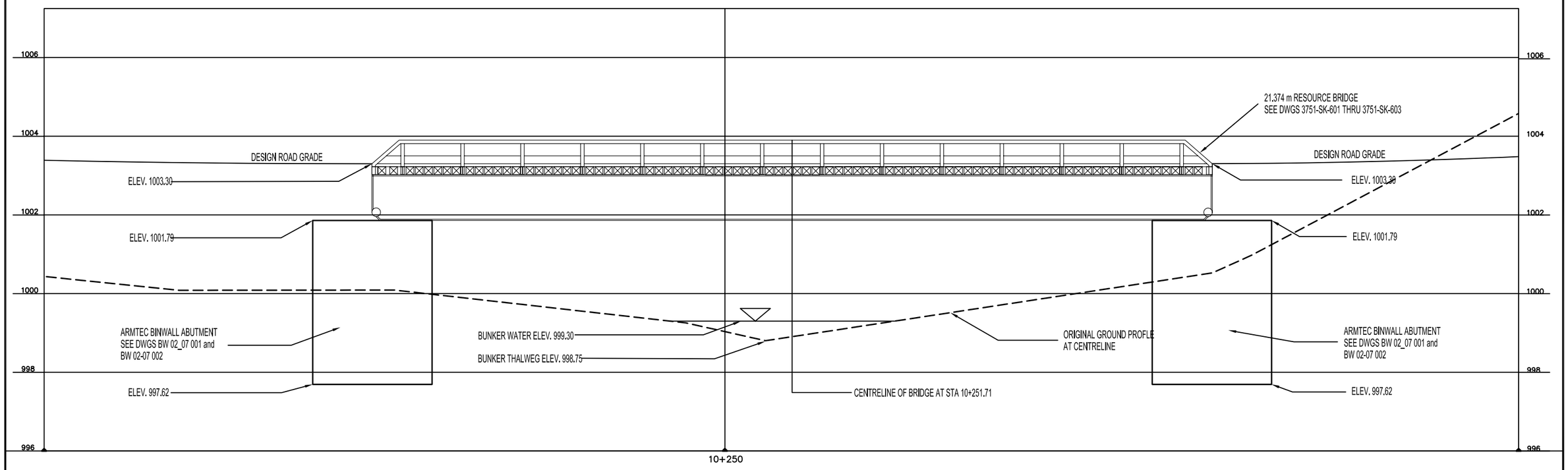
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_4_PP.DWG	E06015	km 22.5	4

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 22.5 TO KM 24.0
FIGURE 1





LEGEND:

- GEOTEXTILE
- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
1	ISSUED FOR DISCUSSION	EWN	01/07

SECTION:	
SCALE: 1:100	DATE
DESIGNED BY: EWN	12/01/07
DRAWN BY: EWN	12/01/07
CHECKED BY: PK	12/01/07
APPROVED BY: EG	12/01/07

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
BUNKER.DWG	E06015	BRIDGE PP	1

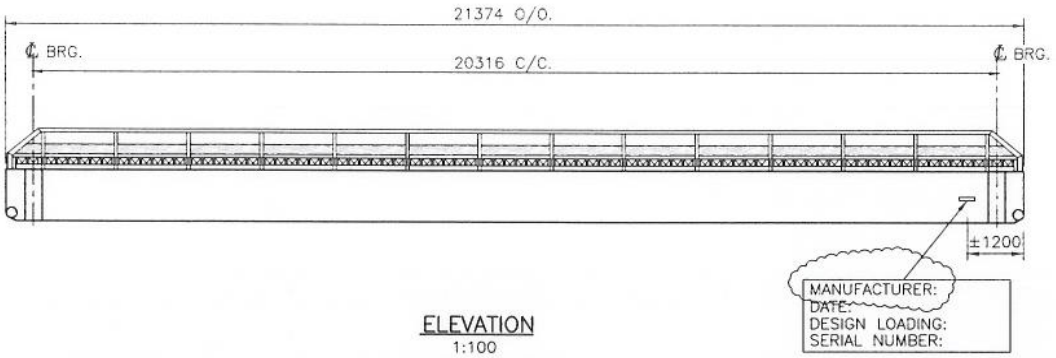
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

ALL WEATHER ACCESS ROAD
ISSUED FOR CONSTRUCTION

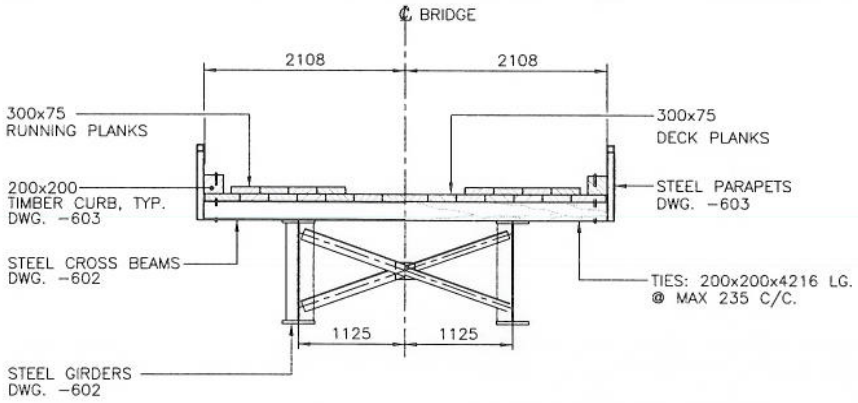
WOLVERINE PROJECT

PLAN/PROFILE SHEET
BUNKER CK BRIDGE

AUTOCADD DRAWING No. 3751-601



ELEVATION
1:100

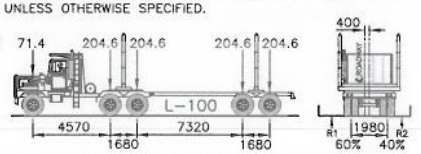


1/2 DIAPHRAGM SECTION
1:50

1/2 TYPICAL SECTION
1:50

NOTES

1. FOR INSTALLATION BY OTHERS, ONTO SUBSTRUCTURE BY OTHERS, NO RESPONSIBILITY CAN BE ACCEPTED FOR WORK BY OTHERS.
2. DESIGN: CAN/CSA-S6-88 (MODIFIED).
   LOADING: L100 (90,680kg. G.V.W.) e=400, DIST.=60/40.
3. DESIGN LIFE: 50 YEARS (EXCEPT DECK).
4. FATIGUE: 500,000 CYCLES.
5. STEEL: CSA G40.21M GRADE 350AT CAT. 3 (PLATE)
   GRADE 350A (ANGLES)
   GRADE 350W (HSS & W-SECTIONS)
   FABRICATE GIRDERS AS FRACTURE CRITICAL MEMBERS.
   NON-WEATHERING STEEL SECTIONS TO BE PAINTED USING APPROVED PAINT SYSTEM
6. WELDING: CSA W59, WELDS TO BE 6mm FILLET WELDS U/N., X-RAY TENSION FLANGE BUTT WELDS, STEEL FABRICATORS SHALL BE QUALIFIED TO CSA W47.1, DIV. 1 OR DIV. 2
7. PIPE: ASTM A252 GRADE 2.
8. BOLTS: ASTM A325 TYPE 3 M22 U/N. JOB INSPECTION TORQUE 810 Nm
9. DECK HARDWARE: HOT DIP GALVANIZED OR GRADE 350A, BOLTS ASTM A307 GALVANIZED.
10. DECK CONSTRUCTION: TO MOF DWG. NOS. ENG-94-1-01,02,04 EXCEPT AS NOTED.
11. TIMBER: SPF NO. 2 GRADE OR BETTER, ROUGH SAWN. TIES AND DECK PLANKS TO BE CCA TREATED; CURBS & RUNNING PLANKS, UNTREATED.
12. BRIDGE IDENTIFICATION: THE BRIDGE SHALL HAVE ITS LOAD RATING, DATE OF MANUFACTURE, MANUFACTURER'S NAME, AND THE SERIAL NUMBER CLEARLY STAMPED ON. PLATE FIXED TO ONE SIDE OF THE STRUCTURE. THE HEIGHT OF LETTERING USED SHALL BE A MINIMUM OF 60mm UNLESS OTHERWISE SPECIFIED.
13. DESIGN TRUCK:



PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
Signature
Date
PERMIT NUMBER: P 3979
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV	DATE Y	M	D	REVISION DESCRIPTION	ENG	DWN
1	00	10	31	PARAPET END & DECK LENGTH REV'D	TA	FZ
2	04	01	05	UPDATED TITLE & DIM REV'D	M.S.	P.L.
3	04	09	27	GENERAL REVISION	AY	CKL

21.336m OILFIELD PORTABLE
GENERAL ARRANGEMENT

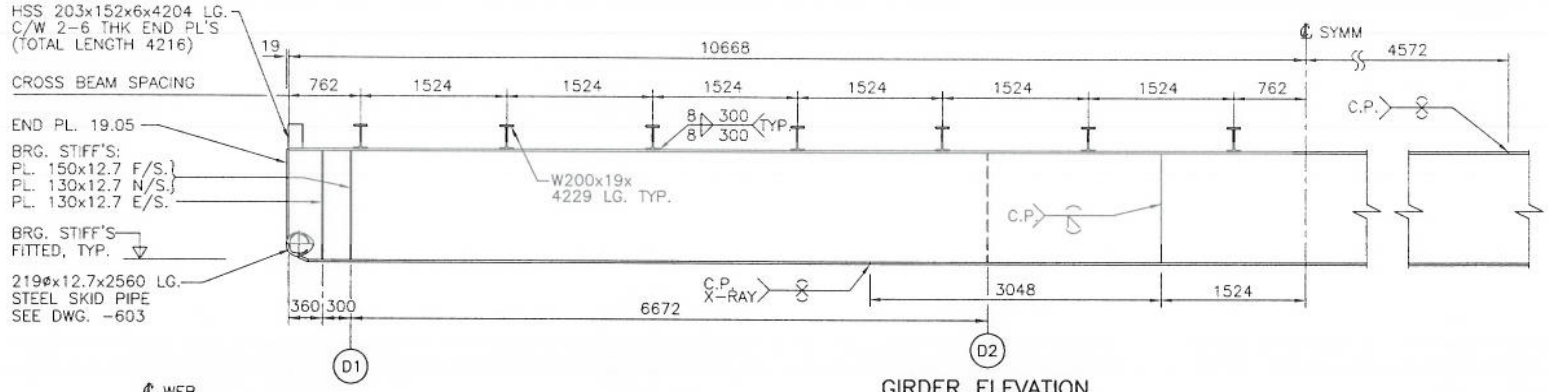
ASSOCIATED ENGINEERING

DESIGN:	M.R.S.
CHECK:	M.G.J.
DRAWN:	M.D-J
DATE:	JANUARY 2004
SCALE:	AS SHOWN
JOB No.	993751
DWG. No.	3751-SK-601
	3

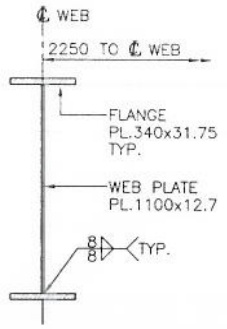
ALL DRAWINGS SUPERSEDED PRIOR TO REVISION

X-REF. ATTACHMENTS:

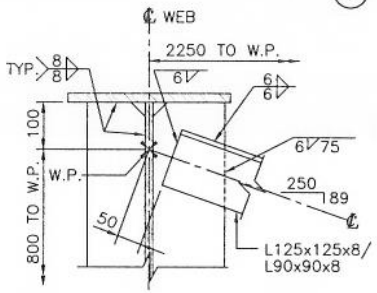
AUTOCADD DRAWING No. 3751SK602.dwg



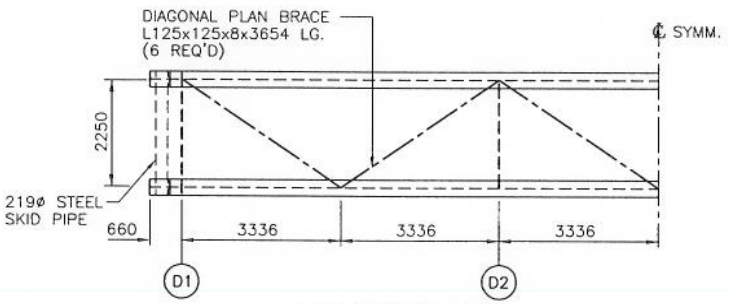
GIRDER ELEVATION
1:50



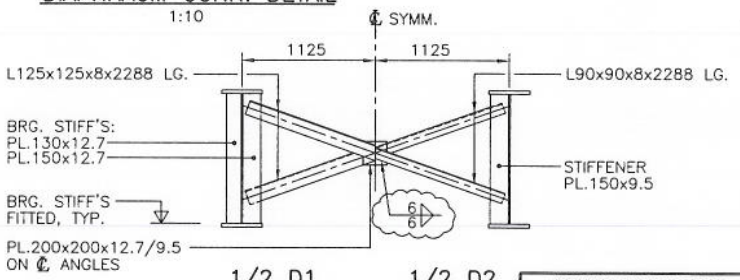
TYP. GIRDER SECTION
1:25



DIAPHRAGM CONN. DETAIL
1:10

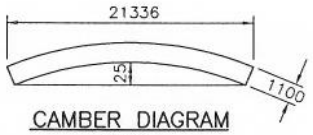


1/2 GIRDER PLAN
NTS

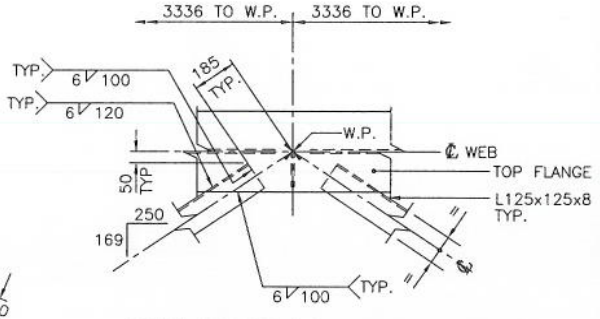


1/2 D1 (2 REQ'D) 1/2 D2 (2 REQ'D)

DIAPHRAGM DETAILS
1:40



CAMBER DIAGRAM
N.T.S.



PLAN BRACE CONNECTION DETAILS
1:20

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
Signature _____
Date _____
PERMIT NUMBER: P 3979
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV	DATE Y	M	D	REVISION DESCRIPTION	ENG	DWN
1	00	06	20	END PL'S ADDED	SR	FZ
2	00	10	19	END CROSS BEAM REV'D	TA	FZ
3	04	01	05	UPDATED TITLE	M.S.	P.L.
4	04	09	27	GENERAL REVISION	AY	CKL
5	04	12	14	FILLER PLATE WELD	AY	AY

21.336m OILFIELD PORTABLE
STEEL GIRDER DETAILS – SHT.1

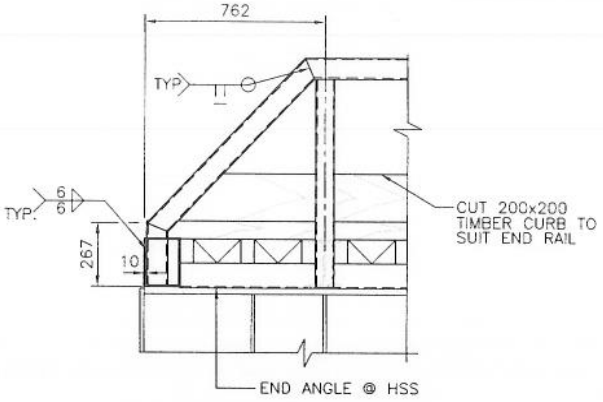
ASSOCIATED ENGINEERING

DESIGN:	M.R.S.
CHECK:	SC
DRAWN:	M.D-J
DATE:	JANUARY 2004
SCALE:	AS SHOWN
JOB No.	993751
DWG. No.	3751-SK-602
	5

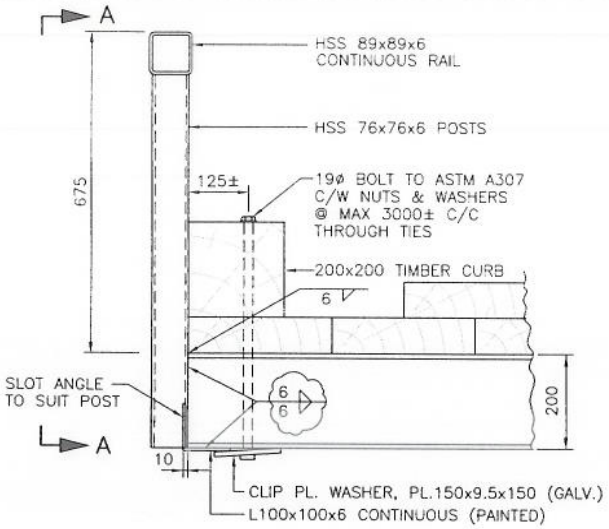
ALL DRAWINGS SUPERCEEDED PRIOR TO REVISION 5

X-REF. ATTACHMENTS:

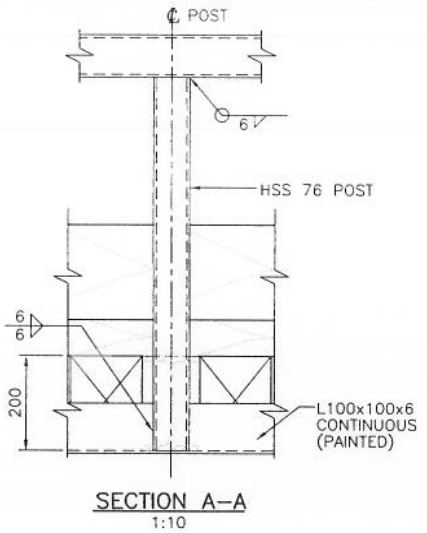
AUTOCADD DRAWING No. 3751SK603.dwg



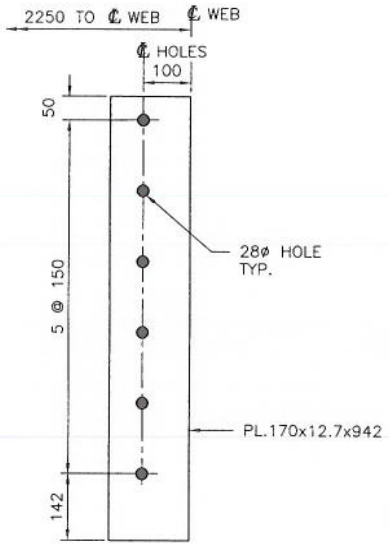
PARAPET DETAIL AT ENDS
1:20



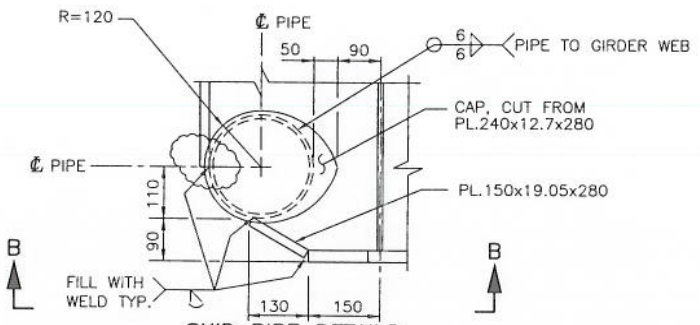
PARAPET DETAIL
1:10



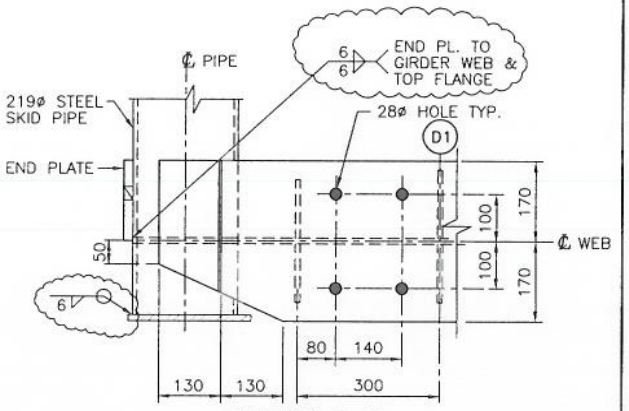
SECTION A–A
1:10



END PLATE DETAIL
1:10 (4 REQ'D)



SKID PIPE DETAILS
1:10



SECTION B–B
1:10

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
Signature _____
Date _____
PERMIT NUMBER: P 3979
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

REV	DATE Y	M	D	REVISION DESCRIPTION	ENG	DWN
1	00	06	16	PARAPET DETAIL	TA	MD
2	00	06	22	PARAPET END REV'D	SR	FZ
3	00	10	19	PARAPET END REV'D	TA	FZ
4	04	01	05	UPDATED TITLE	M.S.	P.L.
5	04	09	27	GENERAL REVISION	AY	CKL

21.336m OILFIELD PORTABLE
STEEL GRIDER DETAILS – SHT.2

ASSOCIATED ENGINEERING

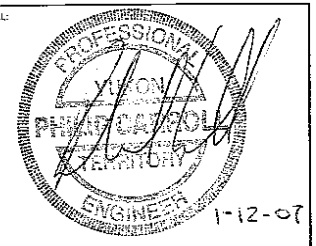
ALL DRAWINGS SUPERSEDED PRIOR TO REVISION 5

DESIGN:	M.R.S.
CHECK:	SC
DRAWN:	M.D–J
DATE:	JANUARY 2004
SCALE:	AS SHOWN
JOB No.	993751
DWG. No.	3751–SK–603
	5

X–REF. ATTACHMENTS:

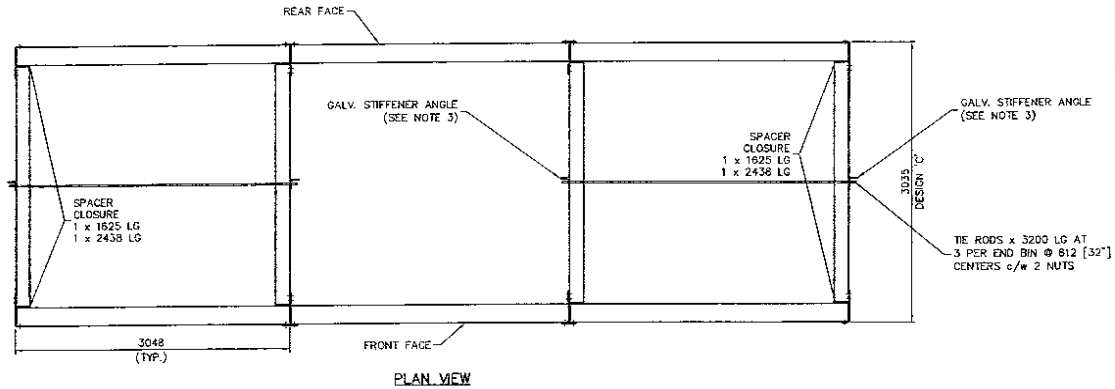
PRELIMINARY
NOT FOR FINAL DESIGN OR CONSTRUCTION PURPOSES

ENGINEER'S SEAL:

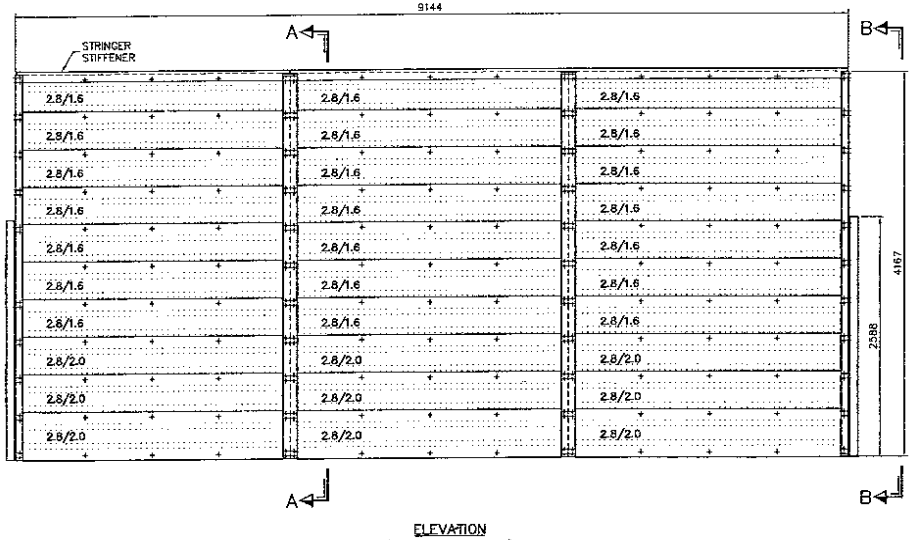


THE ENGINEER'S SEAL CERTIFIES THE ARMTEC BIN-TYPE RETAINING WALL TO BE ADEQUATE AS A GRAVITY RETAINING WALL. THIS SEAL DOES NOT CERTIFY THE BINS AGAINST FAILURE DUE TO EXCESS DIFFERENTIAL SETTLEMENT, FAULTY INSTALLATION OR GLOBAL INSTABILITY.

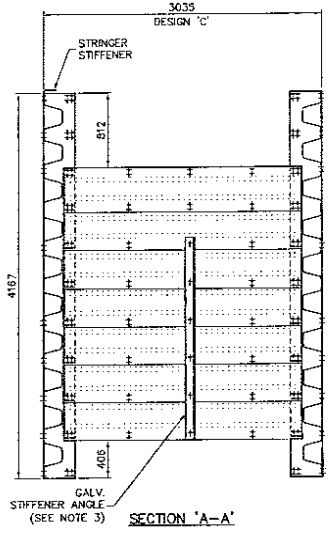
PLEASE NOTE THIS DRAWING IS PRELIMINARY IN NATURE AND ADDITIONAL STRUCTURAL DETAILS WILL BE ADDED UPON PREPARATION OF APPROVAL DRAWINGS AFTER RECEIPT OF ORDER.



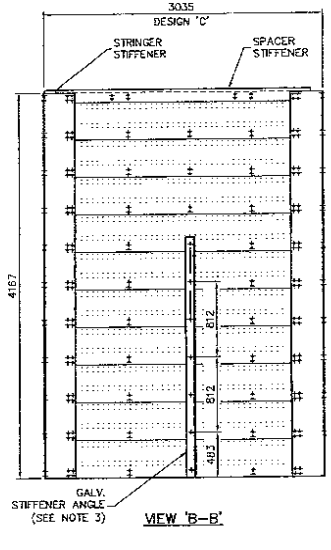
PLAN VIEW



ELEVATION
(FRONT FACE OF WALL)



SECTION 'A-A'



VIEW 'B-B'

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED.
2. ALL STRINGER THICKNESSES ARE AS NOTED ON ELEVATION VIEW
   ie 2.8/1.6
   - 1.6 — REAR STRINGER
   - 2.8 — FRONT STRINGER
3. FIELD ENLARGE HOLES IN END SPACERS FOR TIE RODS USING STIFFENER ANGLE AS TEMPLATE.

REFERENCE DWGS:

BW-40001 STANDARD DETAILS & COMPONENTS
BW-40002 STANDARD DEPTH & HEIGHT COMBINATIONS

NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
0	07/01/11	ISSUED FOR COMMENTS	DL	KA

BUNKER CREEK

BIN-WALL BRIDGE ABUTMENT
DESIGN 'C' (3035 DEEP)
4167 HIGH x 9144 WIDE

DATE 07/01/09
DRAWN D. LOWE
CHECKED K. AIRD
REVIEWED
SCALE N.T.S.
INQUIRY NO. BW-02-07
DRAWING NO. BW 02-07 001
REV 0
SHEET 1 OF 2

TAG NO.
QUANTITY 2
WT

armtec
ARMTEC LIMITED PARTNERSHIP

INSTALLATION INSTRUCTIONS

THESE INSTALLATION INSTRUCTIONS ARE INTENDED TO BE USED IN CONJUNCTION WITH THE ENGINEER'S SPECIFICATIONS AND DRAWINGS.

BACKFILL INSTRUCTIONS

1) BACKFILL MATERIAL TO BE WELL-GRADED FREE-DRAINING GRANULAR 'B' MATERIAL.

2) BACKFILL SHOULD BE PLACED IN 200 mm LAYERS (MAX) AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY.

3) THE HEIGHT OF BACKFILL INSIDE THE BINS SHOULD BE AT LEAST 400 mm GREATER THAN THE BACKFILL BEHIND THE BINS DURING THE BACKFILLING OPERATION.

4) FILL ALL CORRUGATIONS IN SPACERS AND STRINGERS, BUT CARE MUST BE EXERCISED TO AVOID DAMAGING THE STRINGERS WITH DUMPING OR COMPACTING EQUIPMENT, WHICH SHOULD BE KEPT AT LEAST 300 mm FROM THE FRONT STRINGERS.

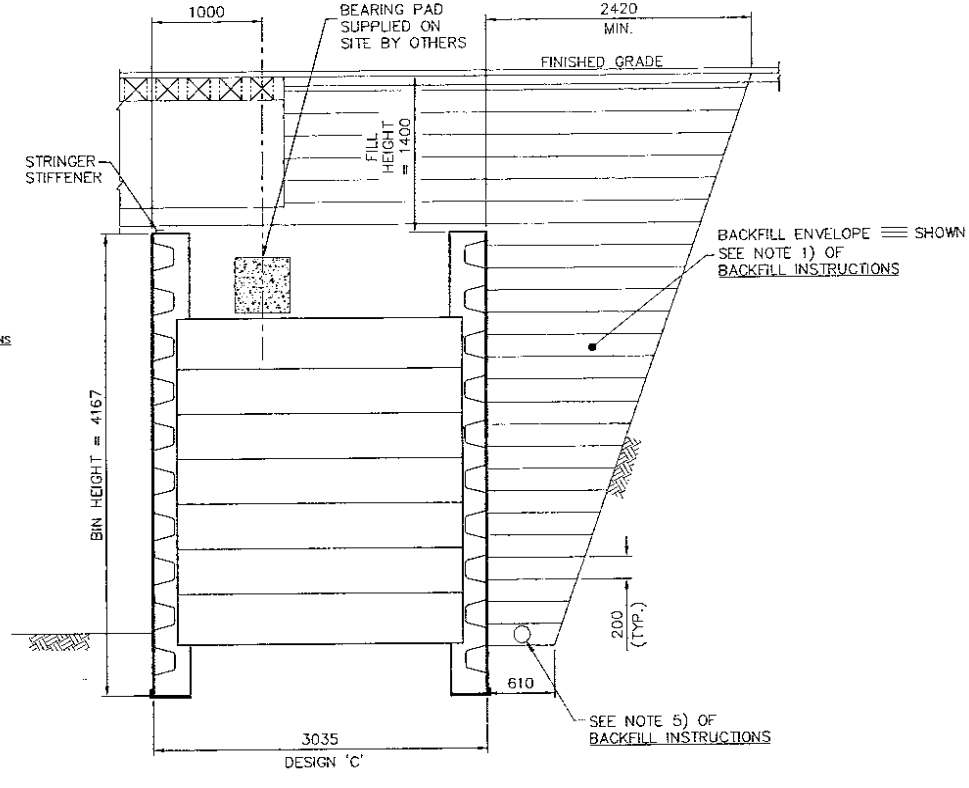
5) IT IS RECOMMENDED TO INSTALL A CONTINUOUS 250 mm DIA. x 1.6 mm PERFORATED CSP c/w FILTER SOCK BEHIND ALL WALLS.

6) A MINIMUM CUSHION ARCH OF 200 mm THICK NON-COMPACTED GRANULAR MATERIAL MUST BE PLACED UNDER THE GRADE PLATES.

7) REFER TO BIN-TYPE RETAINING WALLS TYPE 2 INSTALLATION INSTRUCTIONS BOOKLET FOR ADDITIONAL ASSEMBLY AND BACKFILL PROCEDURES.

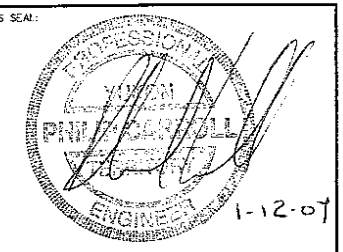
DESIGN NOTES

1) THE DESIGN PROCEDURE TO DETERMINE THE STABILITY OF THE BINS FOLLOWS THE COULOMB WEDGE ANALYSIS. LATERAL EARTH PRESSURES ON THE WALL ARE BASED ON THE EQUILIBRIUM OF A FAILURE WEDGE OF SOIL BEHIND THE BIN. THE PRINCIPAL ASSUMPTIONS OF THIS METHOD ARE:
   - i. THE BACKFILL TO BE A GOOD QUALITY, FREE DRAINING, EVENLY GRADED GRANULAR MATERIAL POSSESSING A MINIMUM INTERNAL FRICTION ANGLE = 33°. BACKFILL DENSITY = 19 kN/m³ AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
   - ii. FAILURE PLANE IS ALONG A STRAIGHT LINE ORIGINATING FROM THE HEEL OF THE BIN.
   - iii. FRICTION FORCES ARE ASSUMED TO BE DISTRIBUTED UNIFORMLY ALONG THE FAILURE PLANE AND SIMILARLY ALONG THE REAR WALL OF THE BIN.
   - iv. THE FAILURE WEDGE IS ASSUMED TO BE A RIGID BODY.
   - v. FAILURE IS A 2-DIMENSIONAL PROBLEM BUT A UNIT LENGTH OF WALL AND BACKFILL IS CONSIDERED FOR ANALYSIS.
   - vi. THE PROVIDED DESIGN IS FOR THE BIN-WALL ONLY AND ASSUMES THAT THE GLOBAL SLOPE STABILITY IS CERTIFIED BY A GEOTECHNICAL CONSULTANT.
2) MINIMUM FACTORS OF SAFETY AGAINST OVERTURNING AND SLIDING ARE 2.0 AND 1.5 RESPECTIVELY.
3) DESIGN PARAMETERS
   - LIVE LOAD CL-625 (OR EQUIVALENT)
   - DEAD LOAD REACTION IS 334 kN
   - BRIDGE SPAN IS 21.336 m
   - FILL HEIGHT IS 1.4m
4) GRADE PLATES FOR VERTICAL CONNECTORS MUST BE FOUNDED ON A YIELDING FOUNDATION. ROCK OR UNYIELDING SOIL MUST BE REMOVED FOR AN AREA OF 600 mm x 600 mm x 200 mm DEPTH AND REPLACED WITH A 200 mm THICK LAYER OF UNCOMPACTED FILL.
5) BINS ARE VERTICAL.
6) MAXIMUM ANTICIPATED BEARING PRESSURE REQUIRED TO SUPPORT BIN-WALL = 210 kPa
7) FOR WALLS CONSTRUCTED ALONG WATERWAYS, EMBEDMENT DEPTHS (FOUNDATION DEPTH) MUST BE ESTABLISHED BELOW POTENTIAL SCOUR DEPTHS TO PREVENT ANY LOSS OF MATERIALS RETAINED BY OR SUPPORTING THE BIN. SELECTION OF AN APPROPRIATE EMBEDMENT DEPTH AND DESIGN OF SCOUR PROTECTION FOR THIS APPLICATION IS BY OTHERS.
8) THE OWNER OR THEIR GEOTECHNICAL CONSULTANT MUST QUALIFY SITE CONDITIONS TO MEET OR EXCEED THE ABOVE REQUIREMENTS.



TYPICAL BIN-WALL ABUTMENT SECTION
4167 HIGH

ENGINEER'S SEAL:



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PRELIMINARY
NOT FOR FINAL DESIGN OR CONSTRUCTION PURPOSES

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED.

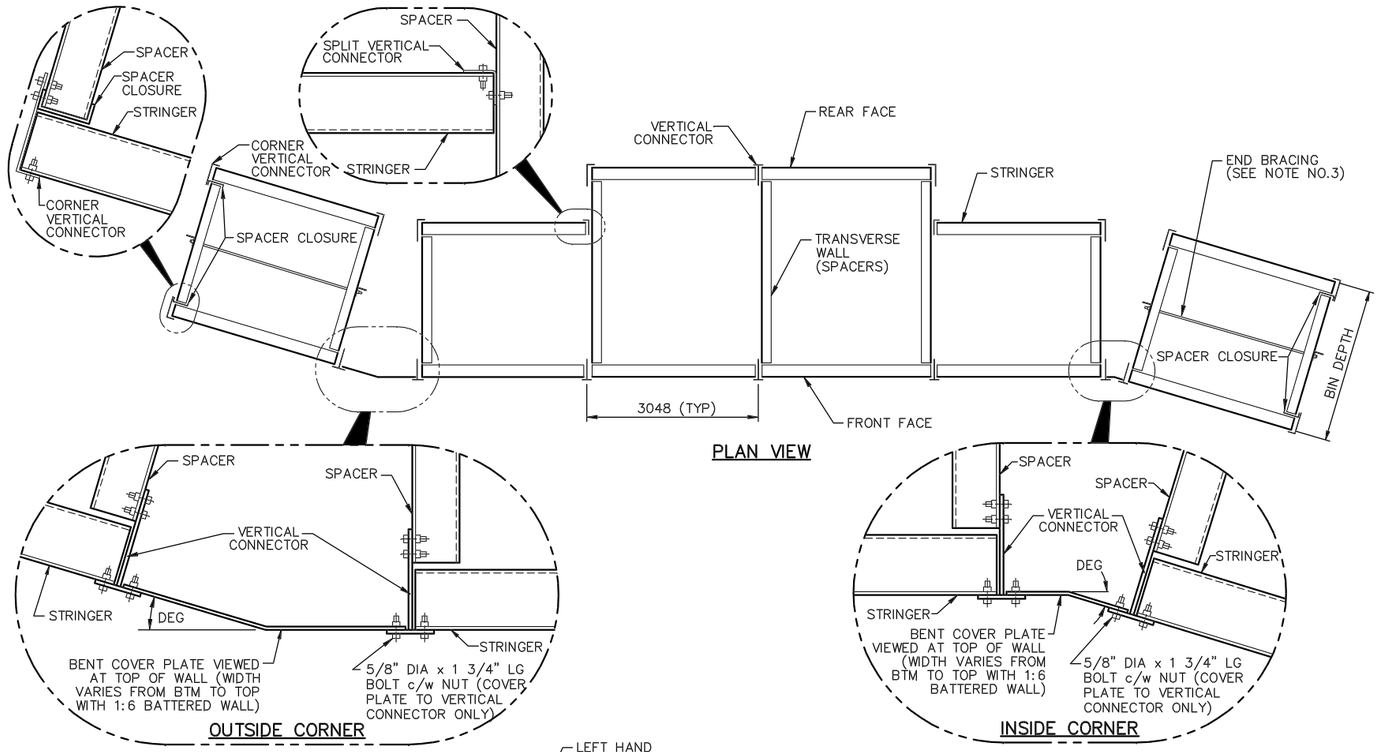
NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
0	07/01/11	ISSUED FOR COMMENTS	DL	KA

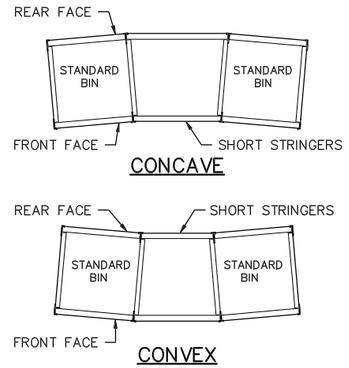
BUNKER CREEK

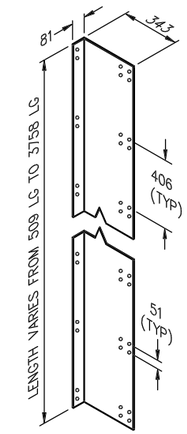
BIN-TYPE RETAINING WALL BACKFILL INSTRUCTIONS & DESIGN NOTES FOR DESIGN 'C' BIN-WALL ABUTMENTS

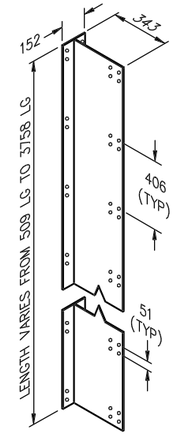
DATE 07/01/09
DRAWN D. LOWE
CHECKED K. AIRD
REVIEWED
SCALE N.T.S.
ENQUIRY NO. BW-02-07
TAG NO.
QUANTITY
DRAWING NO. BW 02-07 002 REV 0
WT
SHEET 2 OF 2

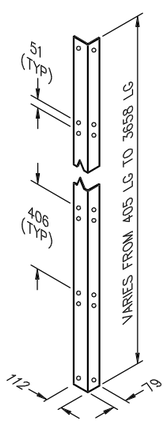
armtec
ARMTEC LIMITED PARTNERSHIP

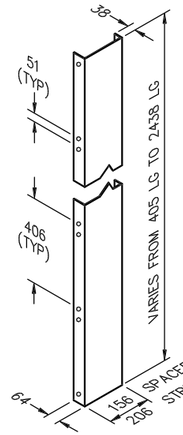


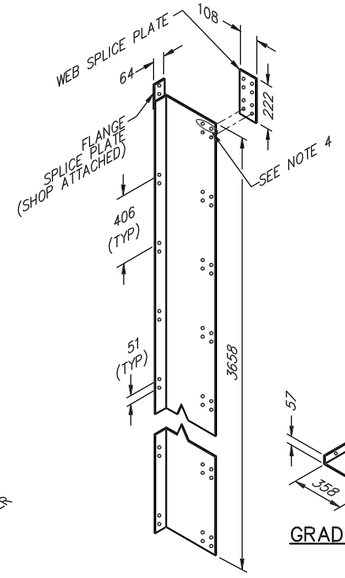


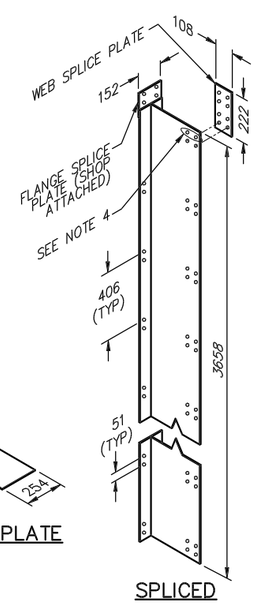


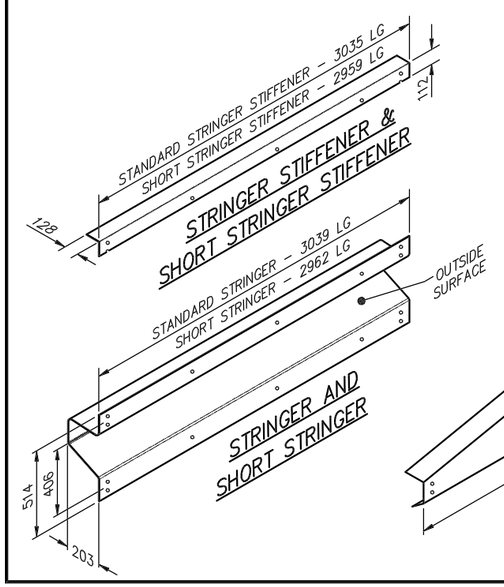


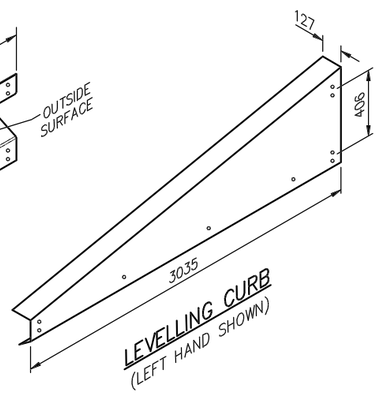


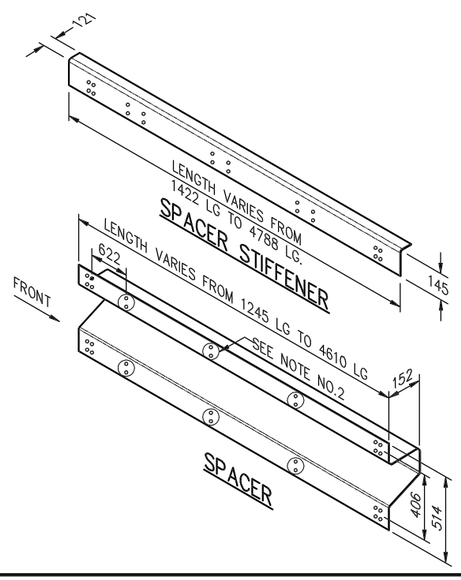












NOTES

1. SPECIAL VERTICAL CONNECTORS ARE USED ON WALLS HIGHER THAN 3758. FOR THESE WALLS THE VERTICAL CONNECTORS WILL CONTAIN TWO OR MORE PIECES. THE 3658 LG SPECIAL VERTICAL CONNECTOR SHOULD BE USED FIRST, WITH THE ATTACHED SPLICE PLATE AT THE TOP. SPECIAL CORNER VERTICAL CONNECTORS ARE USED EITHER THE SAME OR WITH THE SPLICE PLATE AT THE BOTTOM, DEPENDING ON WHETHER IT IS ON A LEFT OR RIGHT HAND CORNER. SEE DWG BW–40002E FOR MAKE–UP.
2. ONLY ONE OF THE TWO HOLES SHOWN THUS ⊙ IN THE SPACERS IS USED FOR BOLTING THE SPACERS TOGETHER EXCEPT FOR THE END WALLS WHERE BOTH HOLES ARE USED.
3. IN CERTAIN CONDITIONS THE END BIN(S) WILL REQUIRE BRACING SEE CHART ON DWG NO. BW–40002E
4. BOLT WEB SPLICE WITH 6 – 5/8" DIA. x 1 1/4" LG BIN–WALL BOLT AND NUT. (TOP TWO HOLES ARE NOT FILLED ON SPLICED CORNER VERTICAL AND VERTICAL CONNECTOR WEBS)
5. ALL BOLTS & NUTS ARE 5/8" DIA x 1 1/4" LG UNLESS NOTED
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED.

NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
4	01/11/08	UPDATED DRAWING	TCB	
3	AUG 29/96	ADDED NOTE 4	D.L.	K.A.
2	DEC 7/87	NEW DWG NO, REV CO NAME & ADDED LEVELLING CURB DTL	K.A.	

BIN TYPE RETAINING WALL TYPE 2 STANDARD DETAILS AND COMPONENTS

DATE	
DRAWN	
CHECKED	
REVIEWED	
APPROVED	
SCALE	N.T.S.
DRAWING NO.	BW–40001E
REV.	4

CORNER VERTICAL & VERTICAL CONNECTORS GREATER THAN 3758 LG ARE BUILT UP AS FOLLOWS (UNLESS NOTED)

4167 LG –1x3658
1x509
1 WEB SPLICE PLATE

4572 LG –1x3658
1x914
1 WEB SPLICE PLATE

4977 LG –1x3658
1x1320
1 WEB SPLICE PLATE

5386 LG –1x3658
1x1728
1 WEB SPLICE PLATE

5791 LG –1x3658
1x2134
1 WEB SPLICE PLATE

6197 LG –1x3658
1x2539
1 WEB SPLICE PLATE

6605 LG –1x3658
1x2947
1 WEB SPLICE PLATE

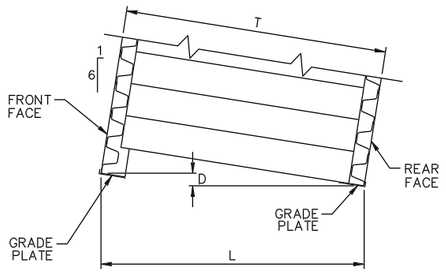
7010 LG –1x3658
1x3353
1 WEB SPLICE PLATE

7416 LG –1x3658
1x3758
1 WEB SPLICE PLATE

7824 LG –2x3658
1x509
2 WEB SPLICE PLATES

8320 LG –2x3658
1x914
2 WEB SPLICE PLATES

8635 LG –2x3658
1x1320
2 WEB SPLICE PLATES



GRADE PLATE PLACEMENT

WALL DESIGN	DIMENSIONS		
	T	D	L
A	1689	–124 *	1734
B	2362	–13 *	2397
C	3035	98	3064
D	3708	210	3724
E	4382	318	4391
F	5055	429	5055

* FRONT GRADE PLATE LOWER THAN REAR PLATE

MAXIMUM HEIGHTS AND LOADS FOR UNBRACED SPACER WALLS

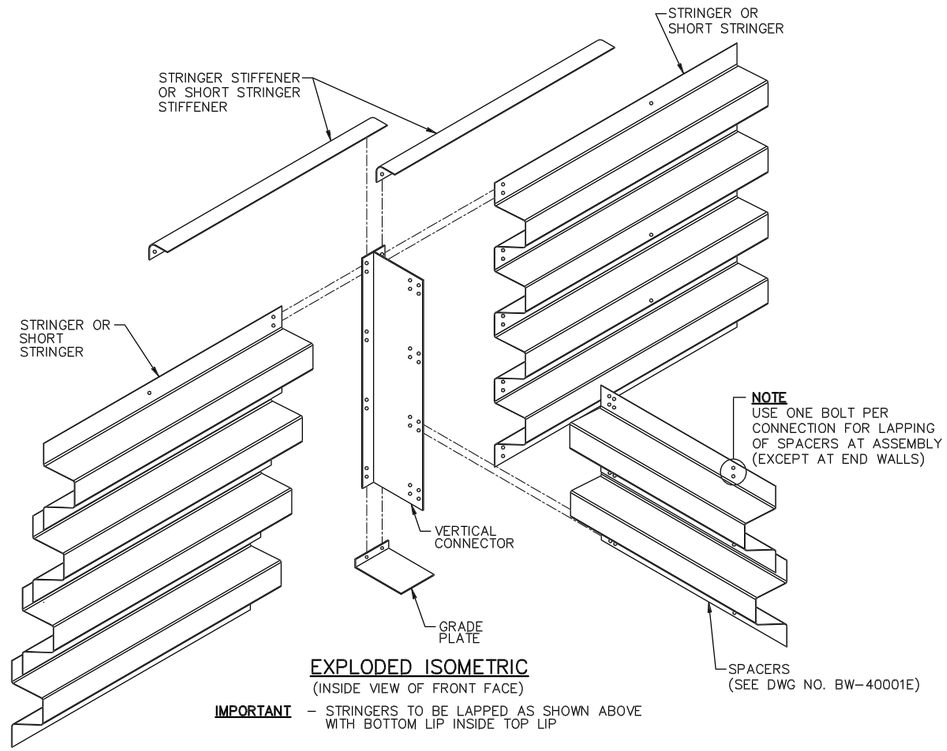
BIN DESIGN	(p max) ALLOWABLE		MAXIMUM HEIGHT WITHOUT BRACING	
	psf	k Pa	ft	mm
A	1728	83	48.0	14630
B	728	35	20.2	6160
C	498	24	13.8	4215
D	438	21	12.2	3715
E	301	14	8.4	2550
F	220	11	6.1	1860

MAXIMUM ALLOWABLE PRESSURE ON EXPOSED SPACER WALLS (p max) BASED ON LENGTH OF SPACER AND SECTION MODULUS.

MAXIMUM HEIGHT WITHOUT BRACING BASED ON SOIL DENSITY = 19 kN/m³ (120pcf) AND Φ=33° AND NO LIVE LOAD SURCHARGES.

STRINGER LOCATION & PART NO.

FRONT WALL STRINGER LOCATION	REAR WALL STRINGER LOCATION	THK mm	PART NO. STANDARD STRINGER 3039 LG	PART NO. SHORT STRINGER 2962 LG
1 THROUGH 8	1 THROUGH 6	1.6	WSA1601	WSB1601
9 THROUGH 12	7 THROUGH 10	2.0	WSA2001	WSB2001
13 THROUGH 19	11 THROUGH 17	2.8	WSA2801	WSB2801
20 AND 21	18 AND 19	3.5	WSA3501	WSB3501

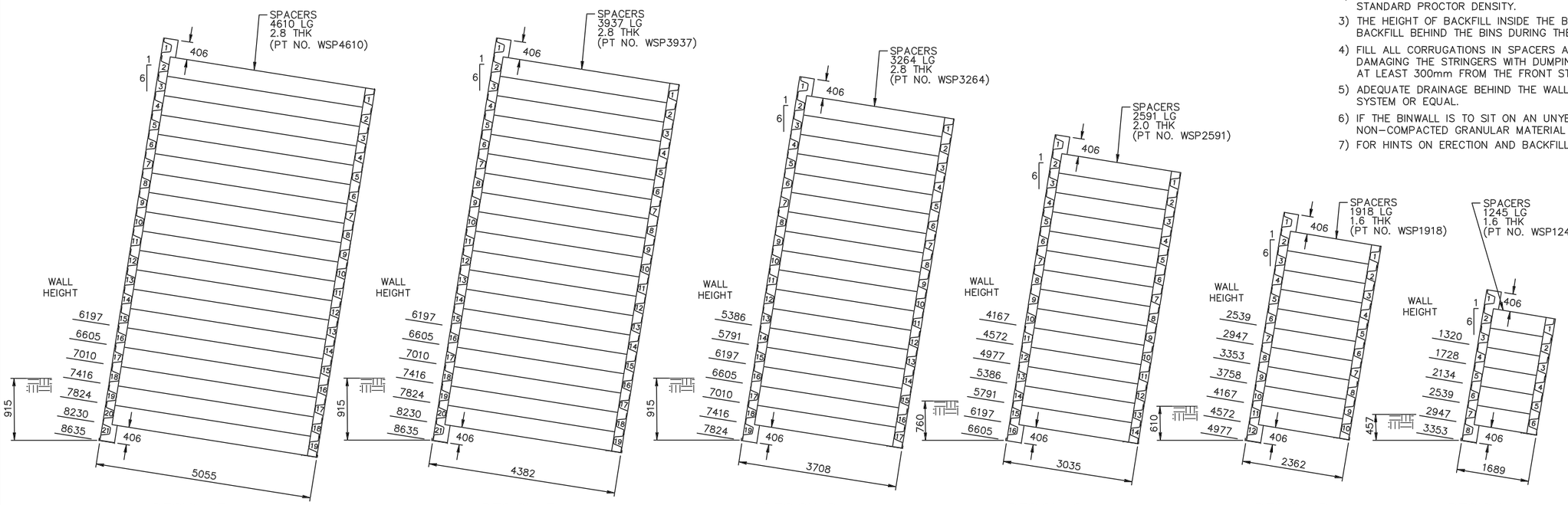


EXPLODED ISOMETRIC
(INSIDE VIEW OF FRONT FACE)

IMPORTANT – STRINGERS TO BE LAPPED AS SHOWN ABOVE WITH BOTTOM LIP INSIDE TOP LIP

NOTES

1) BACKFILL MATERIAL TO BE WELL–GRADED FREE–DRAINING GRANULAR MATERIAL, WITH LARGEST PARTICLES IN THE 75mm (MAX) RANGE AND NOT MORE THAN 10 PERCENT FINES PASSING THE NO.200 SIEVE (0.075mm).
2) BACKFILL SHOULD BE PLACED IN 200mm LAYERS (MAX) AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY.
3) THE HEIGHT OF BACKFILL INSIDE THE BINS SHOULD BE AT LEAST 400mm GREATER THAN THE BACKFILL BEHIND THE BINS DURING THE BACKFILLING OPERATIONS.
4) FILL ALL CORRUGATIONS IN SPACERS AND STRINGERS, BUT CARE MUST BE EXERCISED TO AVOID DAMAGING THE STRINGERS WITH DUMPING OR COMPACTING EQUIPMENT, WHICH SHOULD BE KEPT AT LEAST 300mm FROM THE FRONT STRINGERS.
5) ADEQUATE DRAINAGE BEHIND THE WALL MUST BE ENSURED BY USING A PERFORATED CSP DRAINAGE SYSTEM OR EQUAL.
6) IF THE BINWALL IS TO SIT ON AN UNYEILDING FOUNDATION, A MINIMUM CUSHION OF 200mm THICK NON–COMPACTED GRANULAR MATERIAL MUST BE PLACED UNDER THE GRADE PLATES.
7) FOR HINTS ON ERECTION AND BACKFILL SEQUENCE SEE THE SUPPLIED ARMTEC INSTALLATION MANUAL.



NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
2	DEC 7/87	NEW DRAWING NO. & REVISED COMPANY NAME	K.A.	

BIN–TYPE RETAINING WALL
TYPE 2
STANDARD DEPTH & HEIGHT COMBINATIONS

DATE
DRAWN
CHECKED
REVIEWED
APPROVED
SCALE

armtec LIMITED

DRAWING NO. BW–40002E
REV. 2

Appendix F-B

Permit #1560 for Resource Access

From Robert Campbell Highway km 189+965

$100.00 Fee - ☒ Paid
Receipt No : 633819
Policy Number 3.2
Original To File: 3550-20

COPY

Permit # 1560
Date: January 15, 2007
(If rejected or withdrawn, note it here)
Revise: November 2002

PERMIT FOR CONSTRUCTION OR MODIFICATION OF ACCESS

1. *Applicant: Name, Address, Phone, Fax and/or Email:*

Yukon Zinc Corporation	Att: Pamela Ladyman
701-475 Howe Street	Phone: (604) 682-5474 Ext: 246
Vancouver, B.C. V6C 2B3	Fax: (604) 682-5404

2. *Type of Access Requested:*

Resource Access

3. *Location of Access:*

Campbell Highway Km 189+965 LHS ***(Tuchitua Section)***

Note: Notwithstanding proposed plans access shall be constructed at location noted above in order maximize sight distance.

4. This permit is granted subject to the list of attached Standard Conditions, Special Conditions and Standard Drawing # 03030-8 and 03030-9 (Table C)

This form is to be attached to the application form, along with the standard drawings.

		DATE
A/Superintendent Maintenance. & Planning		07/03/12 Date
Director, Transportation Engineering		07/03/06 Date

A/Director, Transportation Maintenance	C Hawood Signature	May. 17-07 Approval Date

Distribution List:
1 copy - Applicant / 1 copy - Road Foreman / 1 copy – Area Superintendent

ACCESS TO A HIGHWAY
STANDARD CONDITIONS

Permission is subject to the following conditions:

1. The access shall be located and built in accordance with the attached Departmental standards with strong consideration given to the appearance of the highway corridor. Every attempt must be made to limit disturbance to the natural environment.

2. An access permit does not imply that direct access to the highway shall be available at all times. Realignment of the highway or the provision of alternate access by way of a frontage or service road in the future may necessitate cutting off the direct access to the highway, and the permittee shall have no claim against the Government of Yukon arising out of such change.

3. Maintenance of the access is the responsibility of the applicant. This encompasses an access as beginning from the shoulder of the road being accessed.

4. It may be necessary to relocate the access to enable improvements to be made to the highway.

5. The cost of relocation or adjustment of electrical or communication utilities or a pipeline of any sort shall be borne by the applicant.

6. Any crossing beneath an overhead utility line shall have, at a minimum; the clearance required in the Canadian Electrical code and shall be approved by the appropriate utility authority.

7. Permission to have an access to the highway does not in any way give the applicant any right, interest, estate, or easement over the land on which the access is to be built. The permission is a privilege and not a right and the Government of Yukon reserves the right to withhold or remove the permission at any time without any compensation to the applicant.

8. An access permit does not excuse violation of any regulation, bylaw, or act, which may affect this project.

9. An access permit approves only the development contained herein; a further application is required for any changes or additions.

10. The applicant may have Government of Yukon Maintenance forces construct the access under third party charges or the applicant may elect to construct the access using his own forces. If the applicant decides to construct the access using his own forces, he must construct the access as per the standard conditions and standard design.

11. The design standard for the requested type of access is attached to this permit.

12. All costs involved with construction of any access will be borne by the developer, including the supply and installation of culverts. The Developer shall ensure that:

    a) the safety, economy, and convenience of the traveling public is recognized at all times and all traffic control is undertaken by the permittee to the satisfaction of the Director, Transportation Maintenance Branch;

    b) where the said works are in the proximity of any bridge, culvert, ditch, or other existing work, such work shall be properly maintained and supported in such a manner as to not interfere with its proper function. Upon the completion of the said works, any bridge, culvert, ditch, or other existing work interfered with shall be completely restored to its original condition;

    c) the permittee shall, at all times, accept full responsibility for any accident that may occur, or damage that may be done to any person or property whatsoever, caused directly or indirectly by the said works, and shall save harmless and keep indemnified the Department from all claims and demands whatsoever in respect of the works;

    d) prior to proceeding with any excavation, the permittee will be responsible for notifying any utility company whose installation may be close to or affected by the work;

    e) during construction, any mud, soil, debris, or other foreign material tracked onto the highway from the access (or accesses) shall be removed by the permittee at his expense, at least daily, or at any time the material unduly inconveniences traffic;

    f) the access is built in accordance with the attached standard. Any change without prior consent in writing from the Director, Transportation Maintenance Branch, shall render the permit void and will result in immediate removal or alterations at the applicant's expense;

    g) the access (or accesses) shall be graveled to an extent satisfactory to the Director, Transportation Maintenance Branch;

    h) the applicant is to conform to all Territorial and Federal regulations.

    i) the applicant is to obtain all associated permits, land use, burning, and any other permits required.

13. An access road constructed by the applicant must pass a final inspection by the Road Foreman to ensure the standard conditions and design standard have been met. The applicant must inform the Road Foreman when the access is completed.

    (a) If the constructed access is rejected the applicant will then be informed in writing of the work necessary to correct the access road deficiencies. The applicant will have 60 calendar days to correct the deficiencies or Highway Maintenance will proceed as in section 13(b).

    (b) If the applicant does not comply with section 13 or 13(a), Maintenance forces may remove any material deposited on the right-of-way by the applicant. The

applicant will be charged all associated costs with the removal of this material. If the applicant fails to comply, after notification, the Foreman also has the option to correct the accesses deficiencies and charge the applicant third party rates for work performed.

(c) If the applicant replies with a plan of action, which does not meet with the approval of the Road Foreman, he will be informed in writing that the access will be dealt with as per item 13(b).

14. If the permit is for a temporary access, the access shall be removed and the area restored to its original condition by the expiry date shown on the permit at the applicant's expense.

15. The permit will become null and void if the access has not been constructed within 12 months of the permit issue, or if the constructed access has not passed inspection by Transportation Maintenance and the necessary corrections have not been completed.

16. Access Road is subject to future relocation if necessary due to development of gravel/borrow pit.

17. The applicant shall be aware that buried utility lines may exist in the right of way. It is the applicant's responsibility to have these lines located and marked The Yukon Government will not be held responsible for any damage done to any utility caused by work done under this permit.

Special Conditions:

1. Applicant is required to remove the brush and trees within the Right-of-way, 200m north and south LHS of proposed access to improve sight distance.

2. The applicant must maintain the site distance by regular upkeep of brushing, failure to do so will result in maintenance forces removing the brush and the applicant will be charged all associated costs.

3. The applicant will require approval for the brushing and site distance from Road Foreman prior to constructing the access.

Materials

1. Where there is a benefit to increase site distance, the applicant or his contractor will be permitted to utilize material from the right-of-way ditch to construct the access.
2. If material from the right-of way ditch is utilized the applicant is responsible to insure that the terrain is leveled and drainage is not compromised.

I have read and understood the above conditions for this permit and will perform the work according to the conditions. (Please sign and return this page by fax or mail to the address below.)

Applicant's Name: Pamela Ladyman

Applicant's Signature: [signature]

Date: March 27, 2007

Transportation Maintenance Branch (W-12)
9029 Quartz Road, Building 275, Whitehorse, Yukon Y1A 4P9
Phone: (867) 667-5159 Fax: (867) 667-3648

ROAD USE TABLE

USUAL VEHICLE TYPE USING ACCESS	SURFACE WIDTH		STORAGE LENGTH	FILLET RADIUS
	ONE LANE TRAFFIC	TWO LANE TRAFFIC		
(A) PICKUP TRUCK	5.5	8.5	6.0	8.0
(B) SINGLE UNIT DELIVERY	6.0	9.5	9.0	15.0
(C) LARGE TRUCK	6.0	10.5	20.0	17.0

Yukon
Highways and Public Works

Transportation Engineering Branch

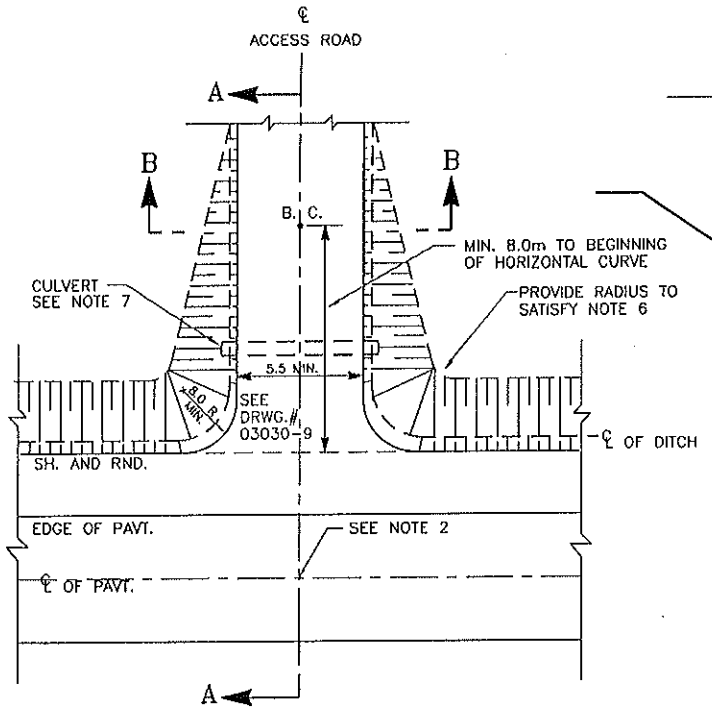
DRAWING TITLE

RESOURCE ROAD

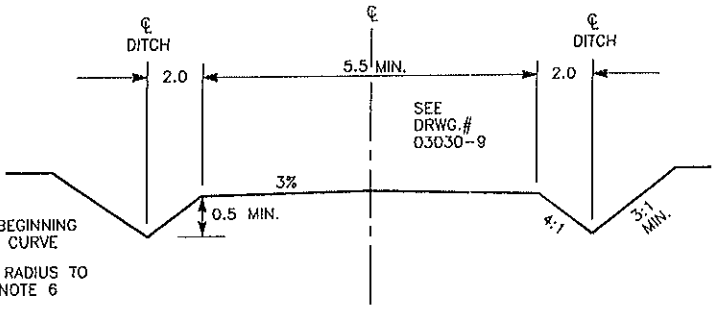
DESIGN GUIDELINES

designed:	G.B.
drawn:	ysd
app'd:	
date:	Mar. 2003
scale:	N/A
drwg:	03030–9

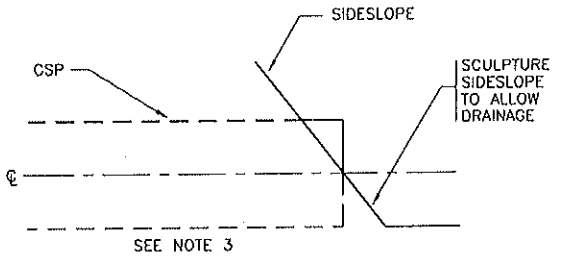
#1560



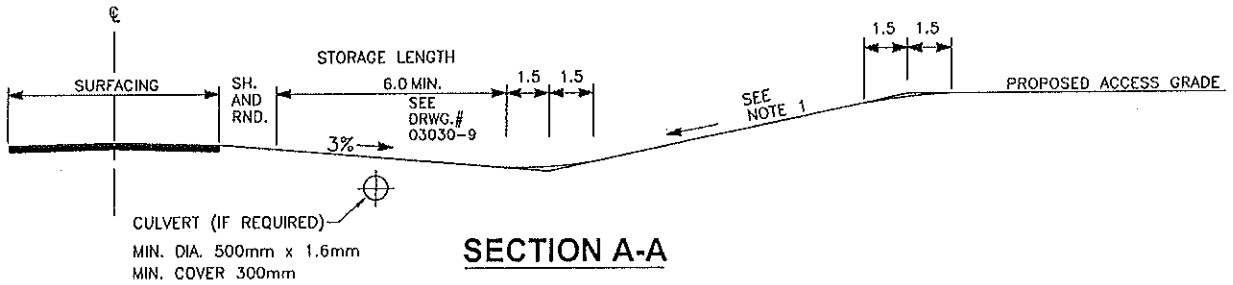
PLAN



SECTION B-B



CULVERT END DETAIL



SECTION A-A

NOTES

1. MAXIMUM GRADIENT IS 10% FOR ACCESS ROAD.
2. ACCESS ROAD TO BE BUILT AT 90° TO THE CENTRE OF THE HIGHWAY. ANGLES BETWEEN 70° TO 110° MAY BE ALLOWED IN EXCEPTIONAL CIRCUMSTANCES AND ONLY WITH THE PERMISSION OF GOVERNMENT OF THE YUKON.
3. CULVERT ENDS TO EXTEND TO A POINT WHERE SIDESLOPE INTERSECTS CENTRELINE OF CSP. SEE CULVERT END DETAIL.
4. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
5. ANY ACCESS WHICH IS PROPOSED TO CONNECT TO THE HIGHWAY ON A HORIZONTAL CURVE SHALL BE EVALUATED, BUT WILL NOT NORMALLY BE ALLOWED WHERE THE SUPERELEVATION RATE EXCEEDS 0.040m/m.
6. ADDITIONAL CUTTING OF THE HIGHWAY BACKSLOPE MAY BE REQUIRED TO PROVIDE ADEQUATE VISIBILITY.
7. CULVERT SHALL BE LOCATED SO THAT DRAINAGE IS NOT BLOCKED.

Yukon
Highways and Public Works

Transportation Engineering Branch

DRAWING TITLE

RESOURCE ACCESS

IN EARTH CUT

designed:	YTG
drawn:	ysd
app'd:	
date:	Mar. 2003
scale:	N.T.S.
drwg:	03030-8