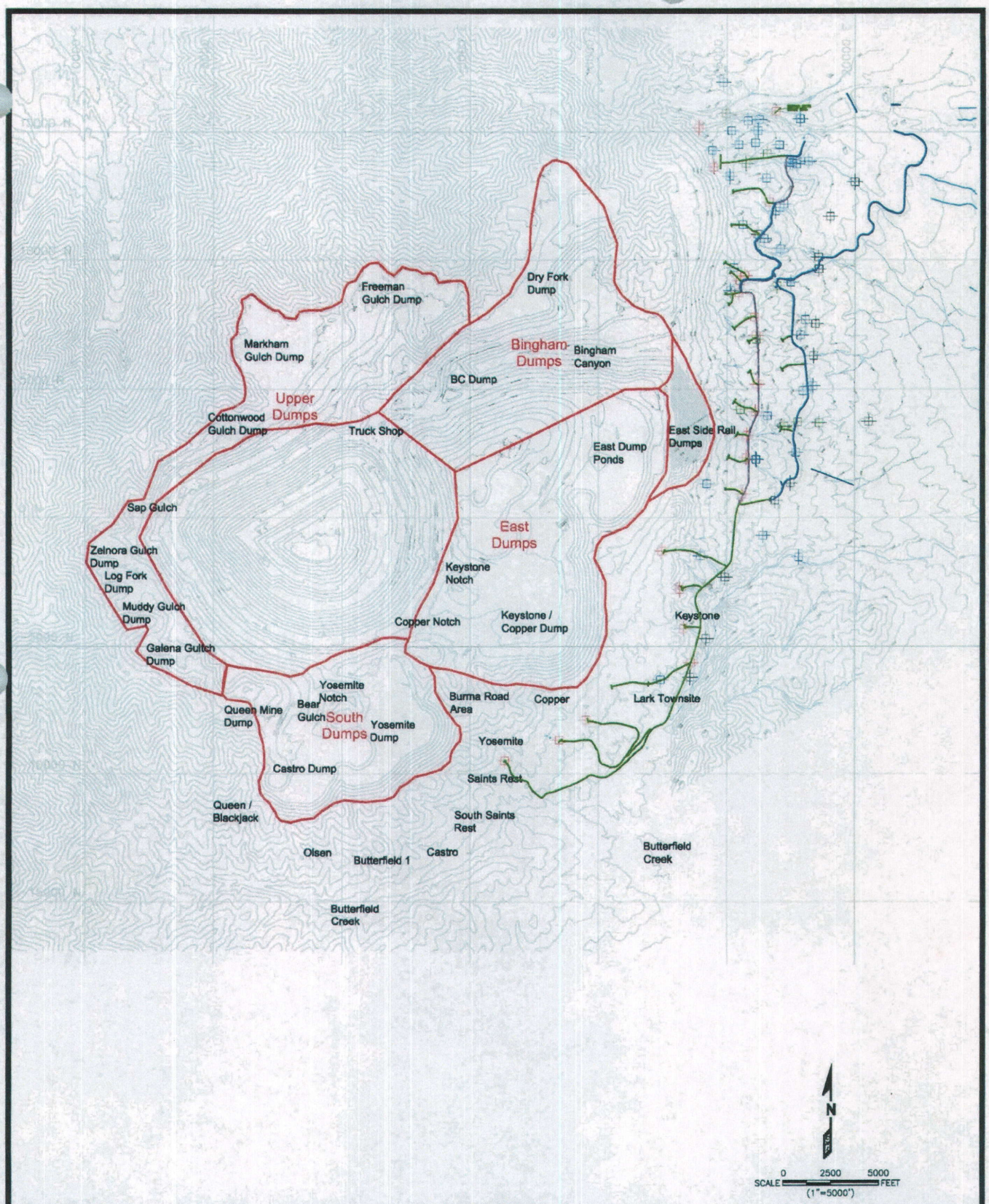

LEGEND

- LEACH WATER COLLECTION SYSTEM
- STORM WATER COLLECTION SYSTEM CANAL
- SYSTEM UNDERGROUND
- CUTOFF WALLS AND COLLECTION PIPES
- COMPLIANCE MONITORING WELLS
- OPERATIONAL MONITORING WELLS
- LEACH WATER AND METEORIC LEACH COLLECTION SITES
- TUNNELS, SURFACE SEEPS, AND REPOSITORY LEACHATE COLLECTION SUMPS
- DRAINAGE PATTERNS

CALL & NICHOLAS, INC.

TUCSON, ARIZONA USA

DRAWN LMC 4/04 APPROVED

FILE BING\2003\DUMPSTUDY\DUMP_LOC.DWG

BINGHAM CANYON DUMP LOCATIONS MAP

KENNCOTT / BINGHAM

SCALE 1"=5000' FIGURE 1

2003

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Table 1. Bingham Waste Dump Hazard Evaluation

No.	Hazard Description	Likelihood Rating	Consequences		Risk Level	Existing Controls	Possible Mitigation Measures
			Description	Rating			
1	**South dumps**						
1a	Shallow surface slumps and debris flows	Likely	Mud flow into Butterfield Creek and Herriman	Moderate	5	Water cutoffs and check dams	Additional check dams Control of surface water to minimize flow over crest Resloping and vegetation
1b	Deep seated large-scale failure	Very unlikely	Slide debris into Butterfield Canyon	Moderate	3		Control of surface water to minimize pore pressure in dumps Monitoring displacement to confirm stability
1c	Acid rock drainage passing cutoffs	Unlikely	Contamination of Butterfield Creek and Herriman water supply	Moderate	4	Water cutoffs and check dams	Control of surface water
2	**East dumps**						
2a	Shallow surface slumps and debris flows retained above cutoff	Likely	Debris in cutoff structures	Very low	3	Minor check dams	Additional check dams Control of water on dump to minimize dump saturation and flow over crest
2b	Shallow surface slumps and debris flows extending beyond cutoff structures	Unlikely	Contamination beyond cutoff	Moderate	4	Minor check dams	Additional check dams Control of water on dump to minimize dump saturation and flow over crest
2c	Deep seated large-scale failure	Very unlikely	Contamination beyond cutoff	Moderate	3	Dump leaching discontinued	Control of water on dump to minimize dump saturation and flow over crest Monitoring displacement to confirm stability
2d	Acid rock drainage passing cutoffs	Unlikely	Contamination requiring major remediation	Moderate	4	Cutoffs and monitoring wells	Control of water on dump to minimize infiltration of surface water
2e	New environmental requirement to reslope and revegetate dumps	???	Major haulage of dump material increased ARD and erosion	High	Crit C.		

Table 1. Bingham Waste Dump Hazard Evaluation

No.	Hazard Description	Likelihood Rating	Consequences		Risk Level	Existing Controls	Possible Mitigation Measures
			Description	Rating			
3	**Upper dumps**						
3a	Shallow surface slumps and debris flows	Unlikely	Accumulation of debris at toe of dump and possible transgression into upper pit	Very low	2	Some revegetation	Control of surface water to minimize flow over crest Revegetation
3b	Deep seated large-scale failure	Very unlikely	Slide material in pit	Low	2		Control of surface water to minimize pore pressure in dump
3c	Acid rock drainage	Likley	Contaminated water flowing into upper pit	Very low	3		Control of surface flow and cutofs above dump
4	**Bingham dump**						
4a	Shallow surface slumps and debris flows	Likley	Accumulation of debris at toe of dump Loss of truck and or dozer	Moderate	5	Operational dumping pratice	Control of dumping rate, dump shape and material distribution Geotechnical monitoring and design
4b	Deep seated large-scale failure	Very unlikely	Slide material extending beyond dump toe Loss of truck and or dozer	Moderate	3	Operational dumping pratice	Control of dumping rate, dump shape and material distribution Geotechnical monitoring and design
4c	Acid rock drainage passing cutoff	Unlikley	Contamination beyond cutoff	Moderate	4	Cutoffs and lower Bingham Canyon remediation	Control of dumping rate, dump shape and material distribution Geotechnical monitoring