DAFTAR PUSTAKA

Agus, F., dan Widianto. 2004. Petunjuk Praktis Konservasi Pertanian Lahan Kering. *World Agoforestry Centre*, 100.

Ansori, M. B., Edijatno, dan Soesanto, S. R. 2018. *Irigasi dan Bangunan Air*. Surabaya: FAKULTAS TEKNIK SIPIL, LINGKUNGAN, DAN KEBUMIAN INSTITUT TEKNOLOGI SEPULUH NOPEMBER.

Apriadi, D., Kurniawan, M., Sumarjono, dan Tanzilullah. 2017. *Technical Mining Operation Division Handbook*. Sangatta: PT. Kaltim Prima Coal.

Ariyanto, A. 2009. Analisis Bentuk Pilar Jembatan Terhadap Potensi Gerusan Lokal Studi kasus Model Pilar Penampang Persegi Panjang dan Ellips. *Jurnal APTEK*, 1.

Arsyad, S. 2010. *Konservasi Tanah dan Air*. Bogor: IPB Press.

Asdak, C. 2010. *Hidrologi dan Pengelolaan Daerah Aliran Air Sungai: Edisi Revisi Kelima*. Yogyakarta: Gadjah Mada University Press Yogyakarta.

Chow, V. 1989. *Hidrolika Saluran Terbuka*. Jakarta: Erlangga.

Dariah, A., Haryati, U., dan Budhyastoro, T. 2004. Teknolologi Konservasi Tanah pada Lahan Kering Berlereng. *Teknologi Konservasi Tanah Mekanik*, 103-126.

El-Swaify, E. A. 1997. Factors affecting soil erosion hazards and conservation needs for tropical steeplands. *Soil Technology*, 3-16.

Fadda, S., Fiori, M., and Matzuzzi, C. 2010. Developing rehabilitation design for the abandoned mine excavations in Central Sardinia, Italy. *International Journal of Mining, Reclamation and Environment*, 286-206.

Ganasri, B. P., and Ramesh, H. 2016. Assessment of soil erosion by RUSLE model using remote sensing and GIS - A case study of Nethravathi Basin. *Geoscience Frontiers*, 953-961.

Hancock, G. R., Duque, J. M., dan Willgoose, G. R. 2020. Mining rehabilitation Using geomorphology to engineer ecologically sustainable landscapes for highly disturbed lands. *Ecological Engineering*, 155.

Hardjowigeno, S. 1995. *Imu Tanah*. Jakarta: Akademika Presindo.

Haridjaja. 1990. *Pengembangan Pola Usahatani Campuran pada Lahan Kering yang Berwawasan Lingkungan di Desa Datarnangka, Kecamatan Saraganten Kabupaten Sukabumi*. Bogor: Jurusan Tanah Fakultas Pertanian IPB.

Harjadi, B., dan Farida. 1996. *Kaitan Perbedaan Kelas Lereng Lahan Terhadap Faktor Erodibilitas Tanah Dan Batas Toleransi Erosi*. Surakarta: Buletin Pengelolaan DAS No. : III.

Hussein , E. S., and Hashim, A. S. 2018. Numerical simulation of two-phase flow with hydraulic jump. *International journal of mechanical engineering and technology*, 470-486.

Junaidi, F. F. 2014. Analisis Distribusi Kecepatan Aliran Sungai Musi Ruas Jembatan Ampera Sampai Dengan Pulau Kemaro. *Jurnal Teknik Sipil dan Lingkungan*, 543-547.

Kartasapoetra. 2005. *Teknologi Konservasi Tanah dan Air*. Jakarta: Rineka Cipta.

Kironoto, B. A., dan Yulistiyanto, B. 2000. *Diktat Kuliah Hidraulika Transpor Sedimen*. Yogyakarta: PPS-Teknik Sipil UGM.

Lowry, J. C., Hancock, G. R., and Coulthard, T. J. 2015. Catchment reconstruction erosional stability at millennial time scales using landscape evolution models. *Geomorphology*, 15-27.

Miller, W. 2003. *Model For The Time Rate Of Local Sediment Scour At A Cylb indrical Structure*. Florida: PPS Universitas Florida.

Molla, T., and Shiseber, M. 2016. Estimating Soil Erosion Risk and Evaluating Erosion Control Measures for Soil Conservation Planning at Koga Watershed, Highlands of Ethiopia. *Solid Earth*, 120.

Nabi, G., Hussain, F., Wu, R.-S., Nangia, V., Bibi, R., and Majid, A. 2017. Optimizing micro watershed management for soil erosion control under various slope gradient and vegetation cover conditions using SWAT modeling. *Hydrology and System Sciences*, 532.

Pacetti, T., Lompi, M., Petri, C., and Caporali, E. 2020. Mining activity impacts on soil erodibility and reservoirs silting: Evaluation of mining decommissioning strategies. *Journal of Hydrology*, 589.

Putra, A. S. 2014. Analisis Distribusi Kecepatan Aliran Sungai Musi Ruas Sungai: Pulau Kemaro Sampai Dengan Muara Sungai Komering. *Jurnal Teknik Sipil dan Lingkungan*, 603-608.

Ramli, M., Purwanto, Thamrin, M., Maemuna, and M., A. 2020. Analysis of Soil Erosion on Mine Area. *Materials Science and Engineering*, 875.

Reynard, K., Foster, G., Essies, G., McCool, D., and Yoder, D. 1997. Predicting soil erosion by water: a guide to conservation planning with the Revised Universal Soil Loss Equation RUSLE. *Agricultural Research Service*, 703.

Senanayake, S., Pradhan, B., Huete, A., and Brennan, J. 2020. A Review on Assessing and Mapping Soil Erosion Hazard Using Geo-Informatics Technology for Farming System Management. *Remote sensing*, 1-25.

Seyhan, E. 1990. *Dasar-dasar Hidrologi*. Yogyakarta: Gajah Mada University Press.

Shojae, S., Kalantari, Z., and Comino, J. R. 2020. Prediction of factors affectiong activation of soil erosion by mathematical modelling at pedon scale under laboratory condition. *Nature Research*, 50-62.

Sigalos, G., Loukaidi, V., Dasaklis, S., and Alexouli-Livaditi, A. 2010. Assessment of the quantity of the material transported downstream of the sperchios river, Central Greece. *Bulletin of the Geological Society of Greece*, 737-745.

Singh, G., Babu, R., Narain, P., Bhusan, L. S., and Abrol, I. P. 1992. Soil erosion rates in India. *Journal of Soil and Water Conservation*, 97-99.

Sukardi, N., Sikumbang, I., Umar, dan Sunaryo, R. 1995. *Peta Geologi Lembar Sangatta*. Bandung: Pusat Penelitian dan Pengembangan Teknologi.

Sukmana, S., dan Soewardjo. 1978. Penelitian untuk Mempelajari Penggunaan umus Erosi USLE dalam Usaha Pengawetan Tanah . *LPT.*, 78.

Suripin. 2002. *Pelestarian Sumber Daya Tanah dan Air*. Yogyakarta: Penerbit.

Syukur, S. 2009. Laju infiltrasi dan peranannya terhadap pengelolaan daerah aliran sungai Allu-Bangkala. *Journal Agroland*, 231-236.

Tjasyono, B., Gernowo, R., Woro, S., and Ina, J. 2008. The character of rainfall in the Indonesian monsoon. *International symposium on equatorial monsoon system*, 16-23.

Triadmodjo, B. 2008. *Hidrologi Terapan*. Yogyakarta: UGM Press.

Triwanto, J. 2012. *Konservasi Lahan Hutan dan Pengelolaan Daerah Aliran Sungai*. Malang: UMM Press. Malang.

USDA. 2007. *Stream Restoration Design National Engineering Handbook*. Washington D.C: Natural Resouces Conservation Service.

Utomo, W. 1989. *Koservasi Tanah di Indonesia*. Jakarta: Rajawali Press.

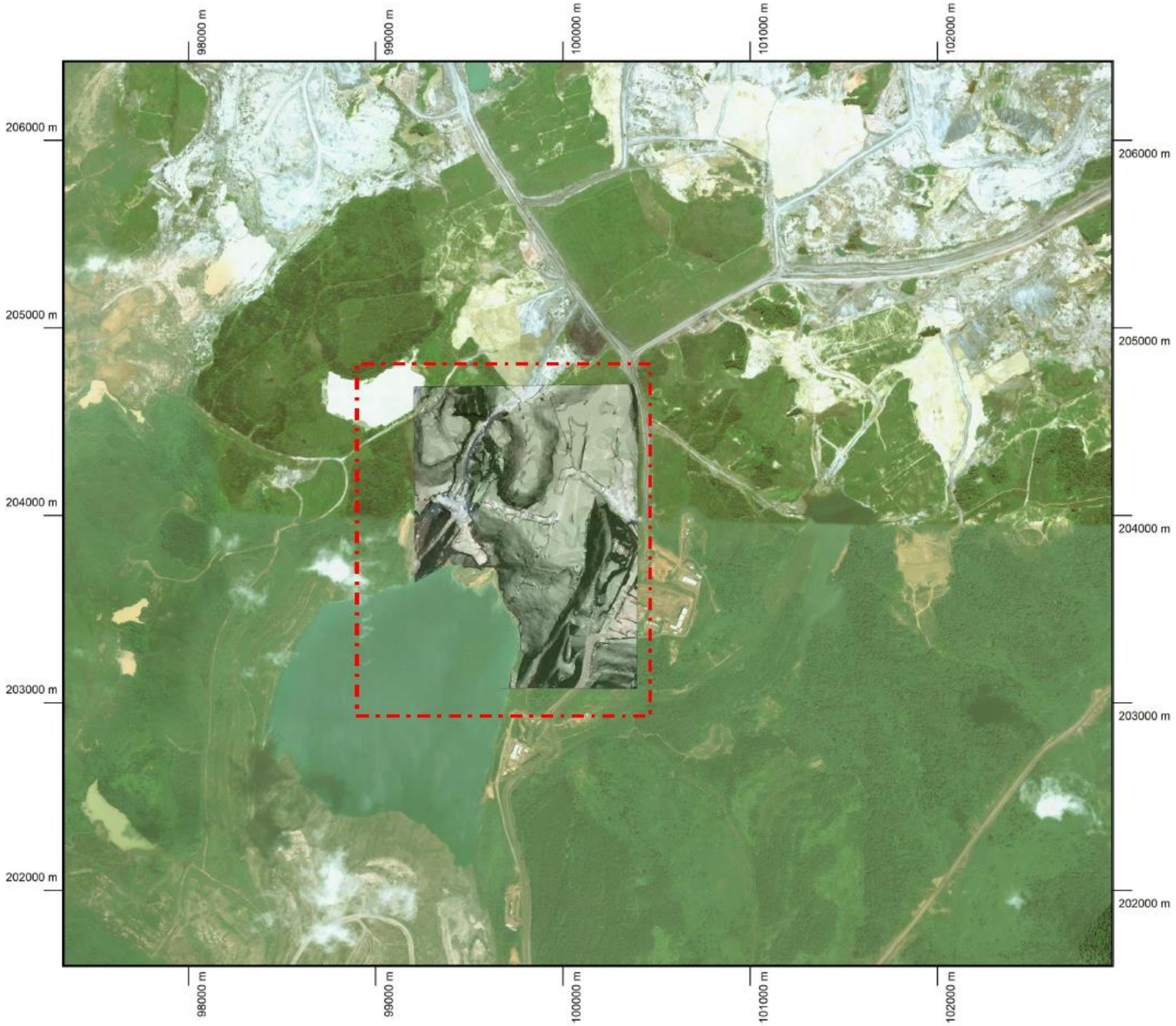
Wang, S., Wang, G., Zhang, Y., and Wang, R. 2020. Quantification of the effect of soil erosion factors on soil nutrients at a small watershed in the Loess Plateau, Northwest China. *Journal of Soils and Sediments*, 745-755.

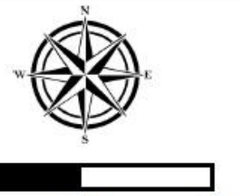
Wantzen, K. M., and Mol, J. H. 2013. Soil Erosion from Agriculture and Mining: A Threat to Tropical Stream Ecosystems. *agriculture*, 660-683.

Wischmeier, W. H., and Smith, D. D. 1978. *Predicting rainfall erosion losses - a guide to conservation planning*. Washington DC: United States Department of Agriculture.

Yellishetty, M., Mudd, G. M., and Shukla, R. 2012. Prediction of soil erosion from waste dumps of opencast mines and evaluation of their impacts on the environment. *International Journal of Mining, Reclamation and Environment*, 88-102.

LAMPIRAN





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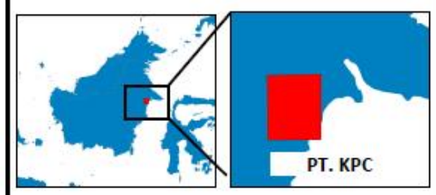
Area Penelitian

Void Pit AB

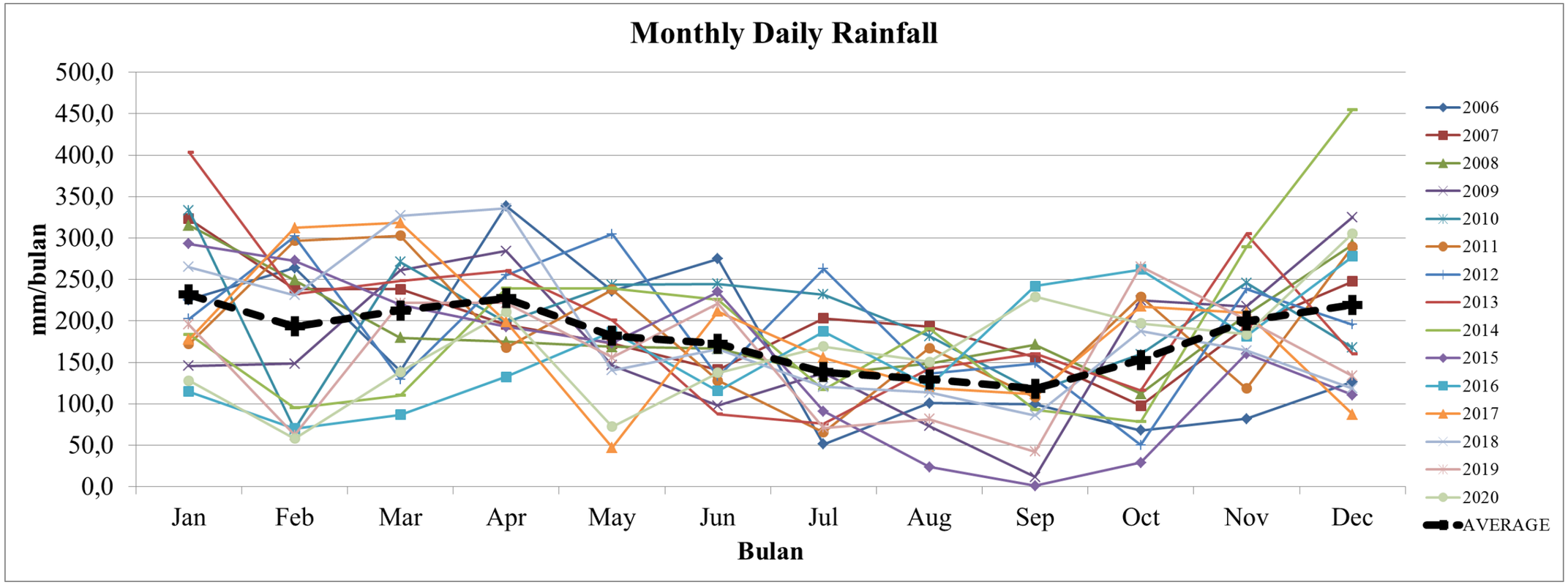
Topografi

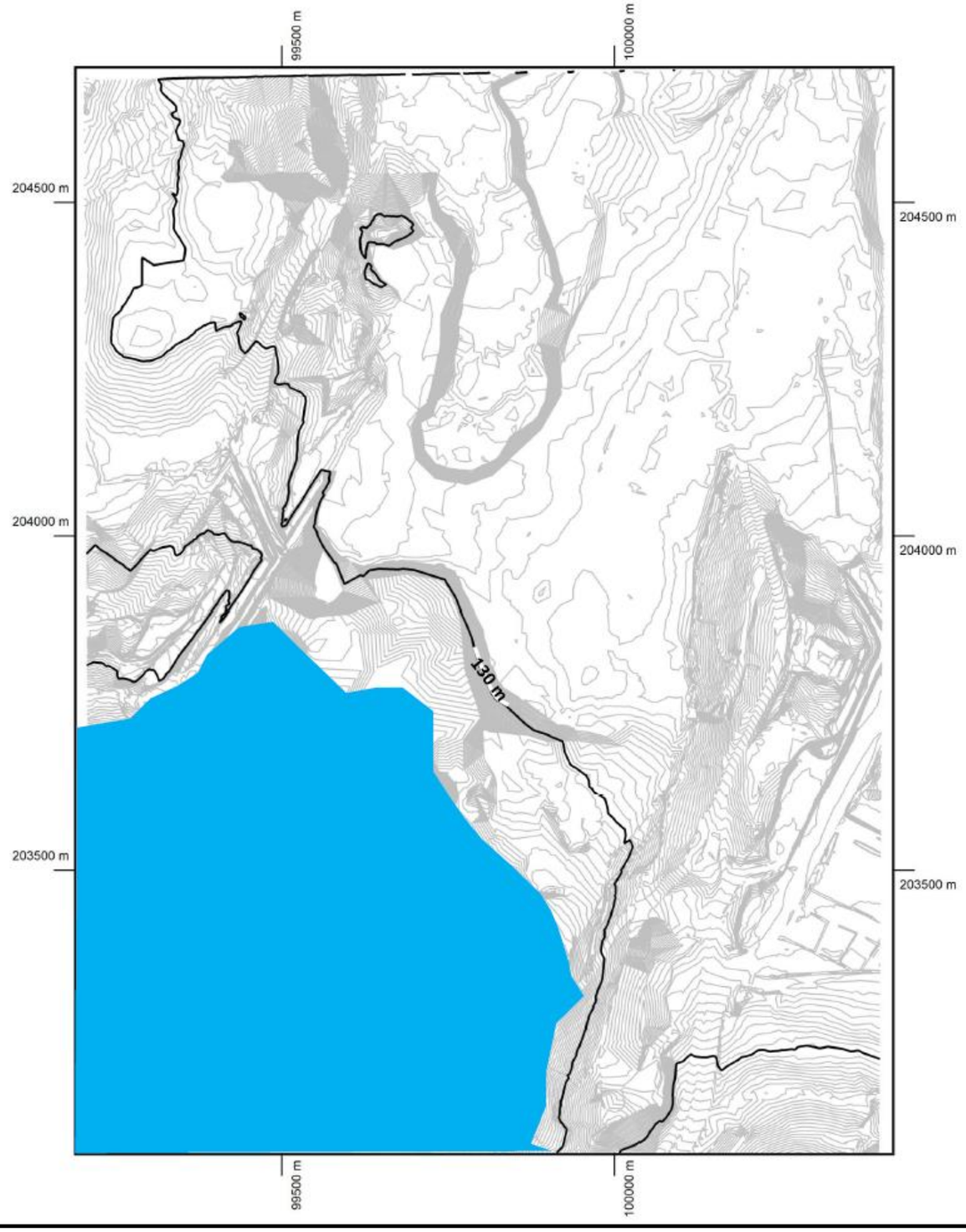


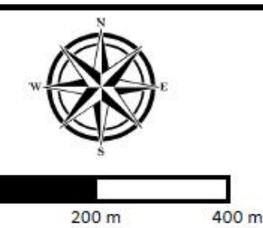
PETA CITRA SATELIT

AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL

Lampiran B Grafik curah hujan 15 tahun terakhir





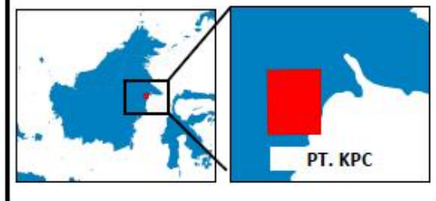


Legenda

Kontur

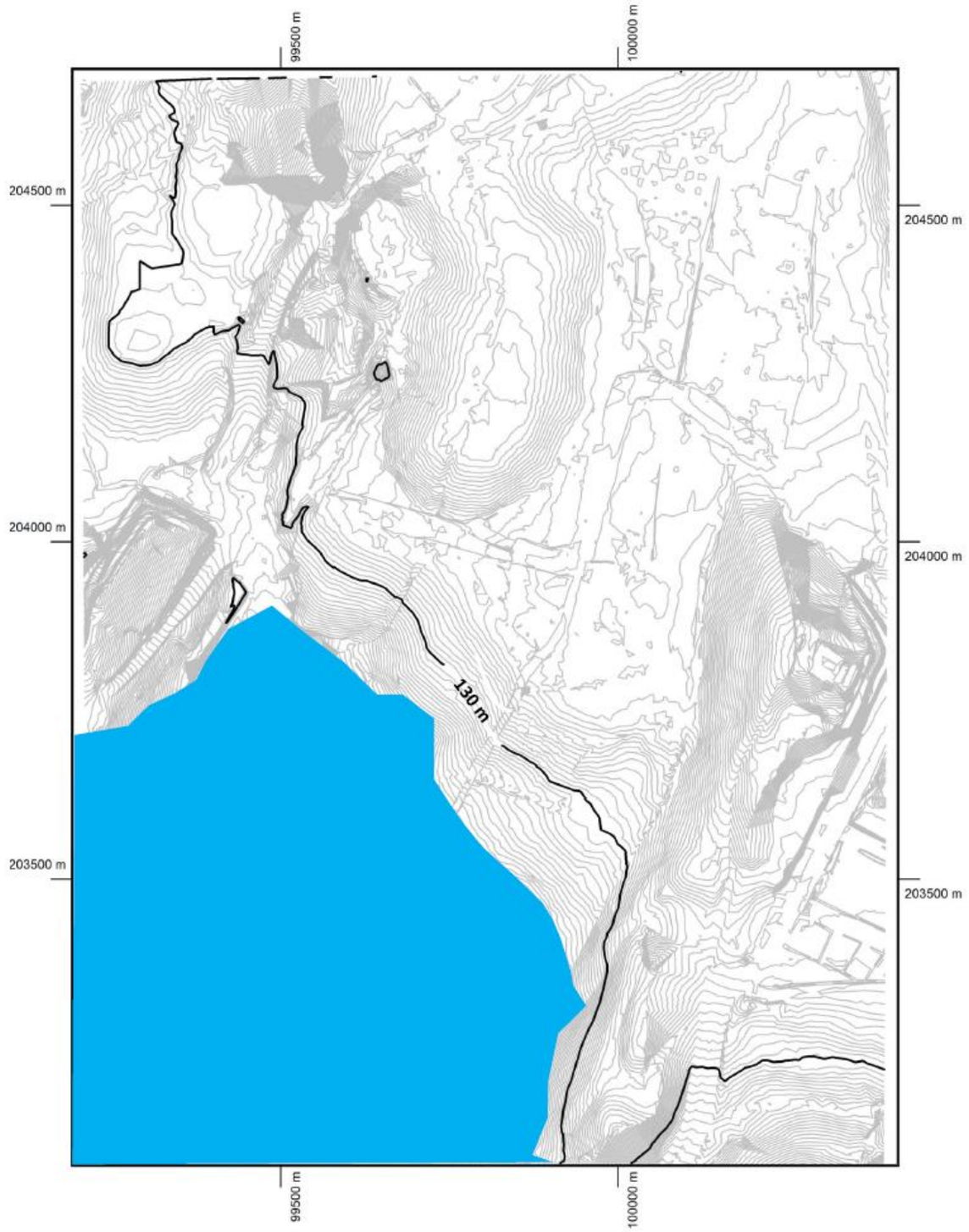
Indeks Kontur

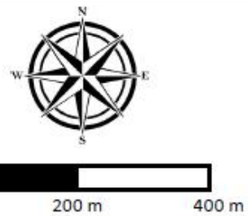
Void Pit AB



PETA TOPOGRAFI

AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL



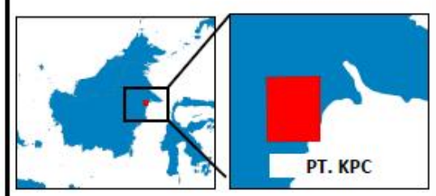


Legenda

Kontur

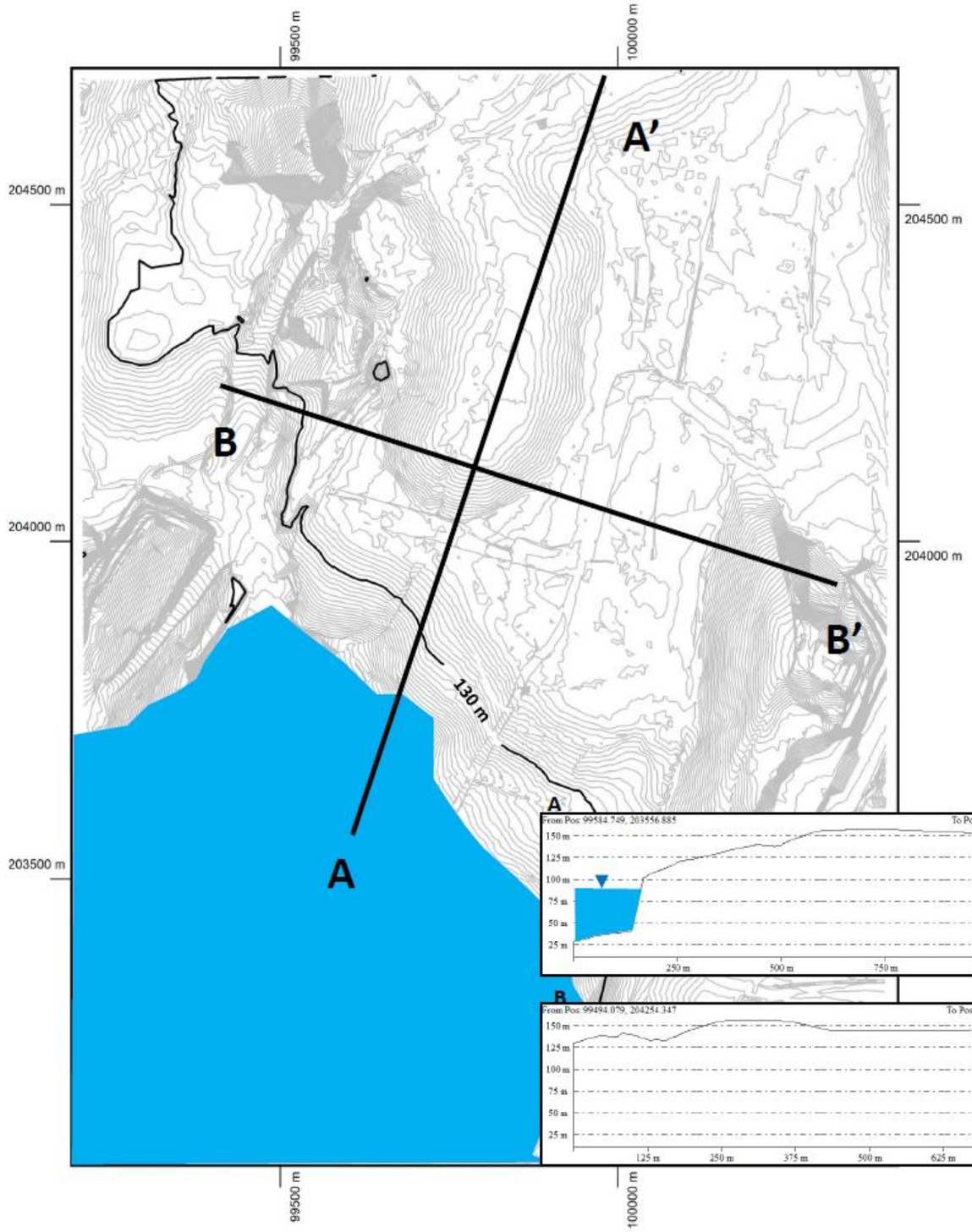
Indeks Kontur

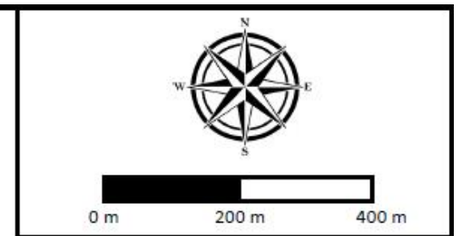
Void Pit AB



PETA KONTURING

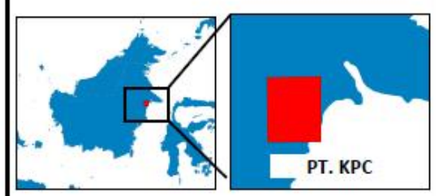
AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL





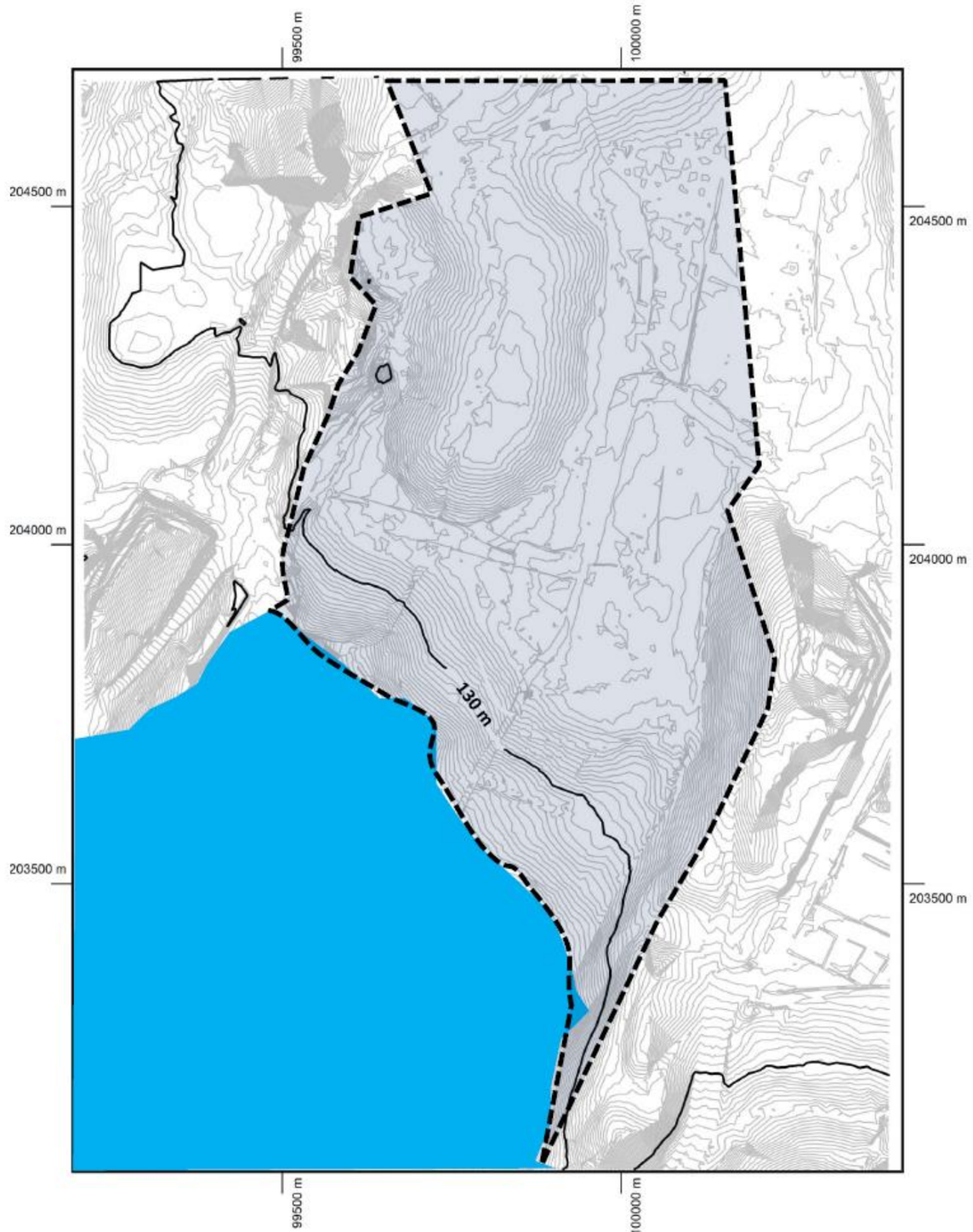
Legenda

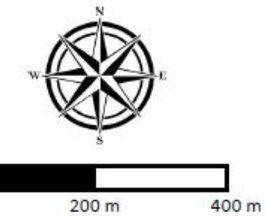
- Kontur
- Indeks Kontur
- Void Pit AB
- Garis Sayatan



PETA SAYATAN

AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL





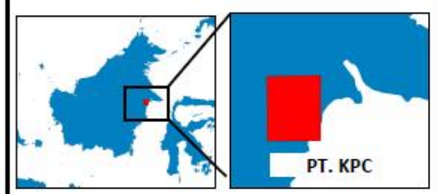
Legenda

Kontur

Indeks Kontur

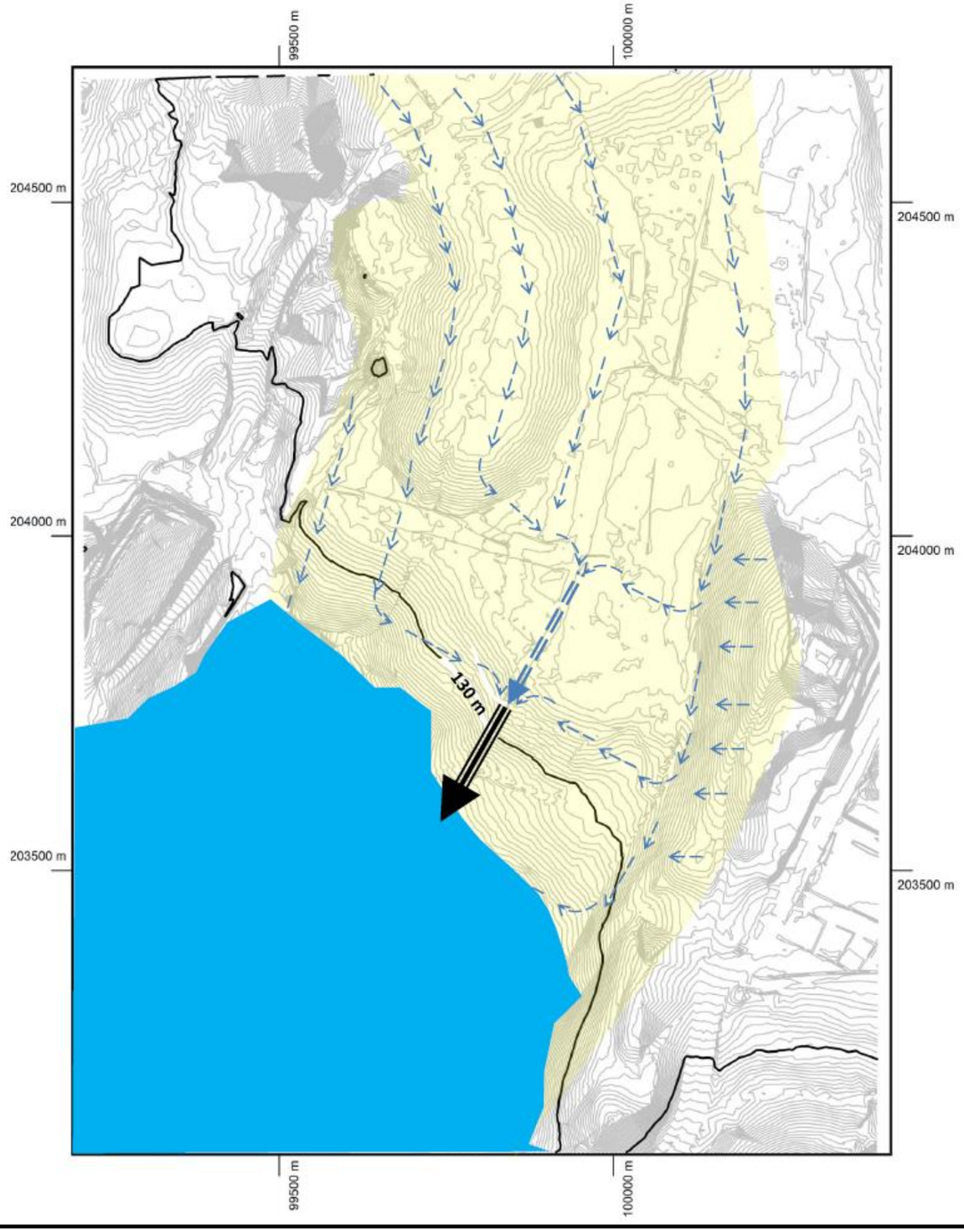
Void Pit AB

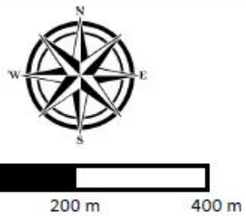
Daerah Tangkapan Air



PETA CATCHMENT AREA

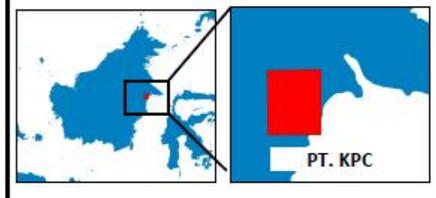
AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL





Legenda

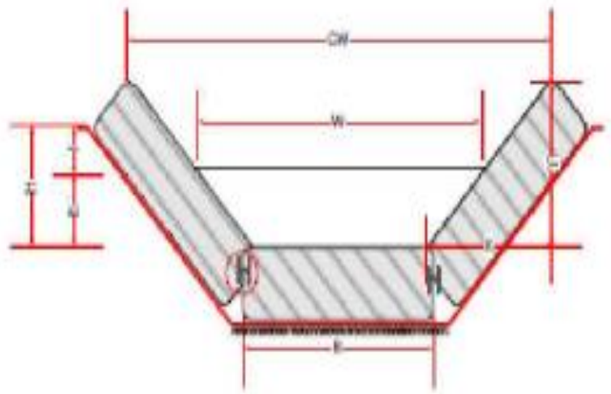
- Kontur
- Indeks Kontur
- Void Pit AB
- Limpasan air



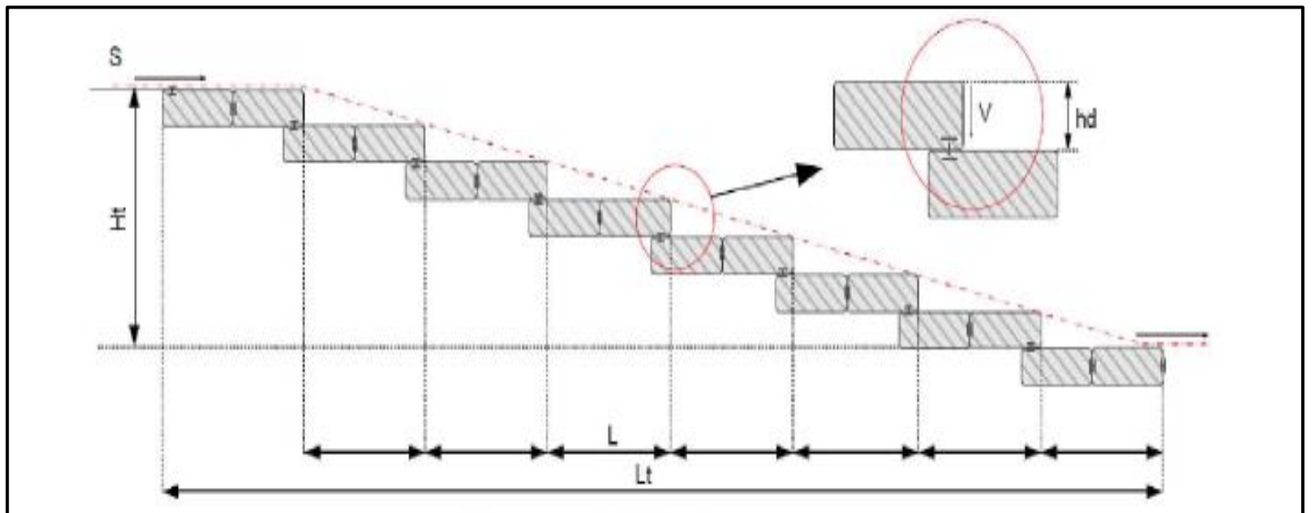
PETA LIMPASAN

AREA TIUNG AB – DUMP
DEPARTEMEN HATARI
PT. KALTIM PRIMA COAL

Lampiran H Geometri saluran terbuka bentuk trapesium



DROP STRUCTURE CONCEPTUAL



TYPICAL LONGITUDINAL SECTION

Lampiran I Tabel angka Manning

Type of Channel and Description			Minimum	Normal	Maximum
A. Natural Streams					
1	**Main Channels**				
	a.	Clean, straight, full, no rifts or deep pools	0.025	0.03	0.033
	b.	Same as above, but more stones and weeds	0.03	0.035	0.04
	c.	Clean, winding, some pools and shoals	0.033	0.04	0.045
	d.	same as above, but some weeds and stones	0.035	0.045	0.05
	e.	Same as above, lower stages, more ineffective slopes and sections	0.04	0.048	0.055
	f.	same as "d" but more stones	0.045	0.05	0.06
	g.	Sluggish reaches, weedy, deep pools	0.05	0.07	0.08
	h.	Very weedy reaches, deep pools, or floodways with heavy stands of timber and brush	0.07	0.1	0.15
2	**Flood Plains**				
	a.	Pasture no brush			
		1. Short grass	0.025	0.03	0.035
		2. High grass	0.03	0.035	0.05
	b.	Cultivated areas			
		1. No Crop	0.02	0.03	0.04
		2. Mature row crops	0.025	0.035	0.045
		3. Mature fields crops	0.03	0.04	0.05
	c.	Brush			
		1. Scattered brush, heavy weeds	0.035	0.05	0.07
		2. Light brush and tress, in winter	0.035	0.05	0.06
		3. Light brush and tress, in summer	0.04	0.06	0.08
		4. Medium to dense brush, in winter	0.045	0.07	0.11
		5. Medium to dense brush, in summer	0.07	0.1	0.16
	d.	Trees			
		1. Cleared land with tree stumps, no sprouts	0.03	0.04	0.05
		2. Same as above, but heavy sprouts	0.05	0.06	0.08
		3. Heavy stand of timber, few down tress, little undergrouwth, flow below branches	0.08	0.1	0.12
		4. same as above, but with flow into branches	0.1	0.12	0.16
		5. Denser willows, summer, straight	0.11	0.15	0.2
3	**Mountain streams, no vegetation in channel, banks usually steep, with tress & brush on banks submerged**				
	a.	Bottom : gravels, cobbles and few boulders	0.03	0.04	0.05
	b.	Bottom : cobbles with large boulders	0.04	0.05	0.07

B. Lined or Built-Up Channels					
1	**Concrete**				
	a.	Trowel finish	0.011	0.013	0.015
	b.	Float finish	0.013	0.015	0.016
	c.	Finished, with gravel bottom	0.015	0.017	0.02
	d.	Unfinished	0.014	0.017	0.02
	e.	Gunite, good section	0.016	0.019	0.023
	f.	Gunite, wavy section	0.018	0.022	0.025
	g.	On good excavated rock	0.017	0.02	
	h.	On irregular excavated rock	0.022	0.027	
2	**Concrete bottom float finished with sides of :**				
	a.	Dressed stone in mortar	0.015	0.017	0.02
	b.	Random stone in mortar	0.017	0.02	0.024
	c.	Cement rubble masonry, plastered	0.016	0.02	0.024
	d.	Cement rubble masonry	0.02	0.025	0.03
	e.	Dry rubble on riprap	0.02	0.03	0.035
3	**Gravel bottom with sides of :**				
	a.	Formed concrete	0.017	0.02	0.025
	b.	Random stone in mortar	0.02	0.023	0.026
	c.	Dry rubble or riprap	0.023	0.033	0.036
4	**Brick**				
	a.	Glazed	0.011	0.013	0.015
	b.	In Cement mortar	0.012	0.015	0.018
5	**Metal**				
	a.	Smooth steel surfaces	0.011	0.012	0.014
	b.	Corrugated metal	0.021	0.025	0.03
6	**Asphalt**				
	a.	Smooth	0.013	0.013	
	b.	Rough	0.016	0.016	
7	**Vegetal Lining**		0.03		0.5

C. Excavated or Dredged Channels					
1	**Earth, straight and uniform**				
	a.	Clean, recently completed	0.016	0.018	0.02
	b.	Clean, after weathering	0.018	0.022	0.025
	c.	Gravel, uniform section, clean	0.022	0.025	0.03
	d.	With short grass, few weeds	0.022	0.027	0.033
2	**Earth, winding and sluggish**				
	a.	No vegetation	0.023	0.025	0.03
	b.	Grass, some weeds	0.025	0.03	0.033
	c.	Dense weeds or aquatic plants in deep channels	0.03	0.035	0.04
	d.	earth bottom and rubble side	0.028	0.03	0.035
	e.	stony bottom and weedy banks	0.025	0.035	0.04
	f.	cobble bottom and clean sides	0.03	0.04	0.05
3	**Dragline-excavated or dredged**				
	a.	No vegetation	0.025	0.028	0.033
	b.	Light brush on banks	0.035	0.05	0.06
4	**Rock cuts**				
	a.	Smooth and uniform	0.025	0.035	0.04
	b.	Jagged and irregular.	0.035	0.04	0.05
5	**Channels not maintained, weeds and brush**				
	a.	Clean bottom, brush on sides	0.04	0.05	0.08
	b.	Same as above, highest stage of flow	0.045	0.07	0.11
	c.	Dense weeds, high as flow depth	0.05	0.08	0.12
	d.	Dense brush, high stage	0.08	0.1	0.14

Lampiran J Daftar Istilah, Singkatan dan Lambang

Istilah	Arti dan Penjelasan
Void	Lubang bekas penambangan
Miosen	suatu kala pada skala waktu geologi yang berlangsung antara 23,03 hingga 5,332 juta tahun yang lalu
pit	Lubang bukaan hasil penambangan dengan metode open pit
erosivitas	kemampuan potensial hujan yang menyebabkan erosi
erodibilitas	kepekaan tanah untuk tererosi, semakin tinggi nilai erodibilitas suatu tanah semakin mudah tanah tersebut tererosi
drainase	pembuangan massa air baik secara alami maupun buatan dari permukaan atau bawah permukaan dari suatu tempat
koefisien runoff	rasio/nisbah antara aliran permukaan dan curah hujan yang jatuh dalam suatu sistem DAS daerah aliran sungai
possibility	Peluang terjadinya hujan
standar deviasi	nilai akar kuadrat dari suatu varians, di mana teknik ini digunakan untuk menilai rata-rata atau yang diharapkan
topsoil	tanah yang berada di lapisan paling atas tanah dengan kedalaman sekitar 5 sentimeter hingga 30 sentimeter dari permukaan Bumi
infiltrasi	suatu proses masuknya air hujan ke dalam tanah sebagai akibat dari adanya gaya kapiler sekaligus gaya gravitasi supaya air dapat masuk ke tanah yang lebih dalam
disposal	daerah pada lokasi tambang terbuka yang dijadikan tempat untuk menimbun material yang tidak berharga
low wall	Dinding pada tambang yang merupakan sisi paling dangkal atau singkapan
overtopping	peristiwa meluapnya air waduk melalui puncak bendungan yang terjadi karena banjir besar melebihi kapasitas waduk
safety factor	faktor yang menunjukkan tingkat kemampuan suatu bahan teknik menerima beban dari luar, yaitu beban tekan maupun tarik
drop structure	bangunan yang dibuat di tempat tertentu memotong saluran, dimana aliran air setelah melewati bangunan tersebut akan merupa terjunan
allowable velocity	Kecepatan air yang di perbolehkan sesuai dengan material yang dilalui oleh air

Lambang dan Singkatan	Arti dan Penjelasan
USLE	Universal Soil Loss Equation
MUSLE	Modified Universal Soil Loss Equation
R	Faktor erosivitas hujan
K	Faktor erodibilitas tanah
LS	Panjang lereng dan faktor kemiringan
C	Faktor pengelolaan tanaman penutup
P	Faktor konservasi
USDA	United States Department of Agriculture
n	Koefisien Manning
Kom HD 785	Komatsu Highway Dumptruck 785 Type
TDS	Tyre Drop Structure