DAFTAR PUSTAKA

Abrianto, F., & Jaelani, L. M. 2016. Evaluasi Pengukuran Angin dan Arus Laut Pada Data Sentinel-1, Data BMKG, dan Data In-Situ (Studi Kasus: Perairan Tenggara Sumenep). *Jurnal Teknik ITS*. Vol 5(2): 153–158.

Alaerts, G., & Santika, S.S. 1984. Metoda Penelitian Air. Usaha Nasional. Surabaya. 309 hlm.

Anasiru, T. 2015. Analisis Perubahan Kecepatan Arus Pada Muara Sungai Palu. *Jurnal SMARTek*. Vol 3(2): 101-112.

Anzari, R., Hartoni, H., dan Surbakti, H. "Pemetaan Batimetri Menggunakan Metode Akustik Di Muara Sungai Lumpur Kabupaten Ogan Komering Ilir Provinsi Sumatera Selatan." *Maspari Journal*, vol. 9, no. 2, 31 Jul. 2017, pp. 77-84.

APHA. 2005. Standard Methods of Water and Wastewater. 21st Edn., American Public Health Association, Washington, DC., ISBN: 0875530478, pp: 2-61.

Arifin, T., Yulius, Y., & Ismail, M.F.A. 2012. Kondisi arus pasang surut di perairan pesisir kota Makassar, Sulawesi Selatan. *Depik*. *1*(3).

Arvianto, S. E., Satriadi, A., & Handoyo, G. 2016. Pengaruh arus terhadap sebaran sedimen tersuspensi di muara sungai silugonggo kabupaten pati. *Journal of Oceanography*. *5*(1): 115-125.

Bahar, A. 2015. Pedoman Survei Laut. *Masagena Press*. Makassar.

Batti, D. P. S. 2021. Pemodelan Arus & Salinitas Pada Zona Estuary Sungai Tallo. Diss. Universitas Hasanuddin.

Brown, E., Colling, A., Park, D., Phillips, J., Rothery, D., & Wright, J. 2001. Ocean Circulation Second Edition. Butterworth-Heinemann.

Cahyo, T. N. 2012. Hidrodinamika dan Sebaran Materi Padatan Tersuspensi di Perairan Pelawangan Barat, Segara Anakan Cilacap. Institut Pertanian Bogor.

Chai, T., & Draxler, R. R. 2014. Root Mean Square Error (RMSE) or Mean Absolute Error (MAE)? – Arguments Against Avoiding RMSE in The Literature. *Geoscientific Model Development.* Vol 7(3): 1247-1250.

Dahuri, R., Rais, J., Ginting, P. S., M.J. Sitepu. 1996. Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan Secara Terpadu. PT. Pradya Paramita. Jakarta.

Damerianne, H. A. 2013. Analisa Laju Sedimentasi di Kanal Cooling Intake PLTGU Grati (PT. Indonesia Power Unit Bisnis Pembangkitan) UPB Perak-Grati. *Tugas Akhir*. Jurusan Teknik Kelautan. Institut Teknologi Sepuluh Nopember. Surabaya.

DHI *Water and Environment*. 2007. MIKE 21 Flow Model FM and Hydrodynamics Module. *Documentation Index.*

DHI *Water and Environment*. 2017. MIKE 21 & MIKE 3 Flow Model FM *Sand Transport Module Scientific*. *Documentation index 14.*

Diposaptono, S. 2007. Karakteristik Laut Pada Kota Pantai. Direktorat Bina Pesisir, Direktorat Jenderal Urusan Pesisir dan Pulau-pulau Kecil. Departemen Kelautan dan Perikanan. Jakarta.

Diposaptono, S., & Budiman. 2006. Tsunami. *Penerbit Buku Ilmiah Populer*. Bogor.

Duxbury, A. B., & Sverdrup, K. A. 2002. Fundamentals of Oceanography. McGraw Hill Companies, New York.

Dyer, K. R. 1986. *Coastal and Estuarine Sediment Dynamics*. New York: John Wiley and Sons Ltd.

Effendi, H. 2003.Telaah Kualitas Air Bagi Pengelolaan Sumber Daya dan Lingkungan Perairan. *Kanisius*. Yogyakarta

Gemilang, W., A., Wisha U. J., Rahmawan G. U., & Dhiauddin R. 2018. Karakterisitik Sebaran Sedimen Pantai Utara Jawa Studi Kasus: Kecamatan Brebes Jawa Tengah. Jurnal Kelautan Nasional.

Hadi, S., & Radjawane, I. M. 2011. Arus Laut. Bandung: Penerbit ITB.

Hafli, T. M., Akbar, S. J., & Al'ala, M. 2022. Pengaruh Rencana Konstruksi Pelabuhan Jetty Terhadap Perairan di Kawasan Pelabuhan Pulau Banyak. *Jurnal Teknik Sipil*. Vol 29 (1).

Handoyo, G., Subardjo, P., Kusumadewi, V., Rochaddi, B., & Widada, S. 2020. Pengaruh Pasang Surut Terhadap Sebaran Material Padatan Tersuspensi di Pantai Dasun Kabupaten Rembang. *Indonesian Journal of Oceanography*.

Hutabarat, S., & Evans, S. M. 2012. Pengantar Oseanografi. Universitas Indonesia Press Jakarta.

Ikhwan, R., Saputro, S., & Hariadi. 2015. Studi Sebaran Sedimen Dasar di Sekitar Muara Sungai Pekalongan, Kota Pekalongan. *Jurnal Oseanografi*. Vol 4(3): 617-624.

Irwan, A., Oktavia, P., & Rusdiana, D. 2021. Kajian Hidro-Oseanografi Untuk Rehabilitasi Suaka Margasatwa Muara Angke, Jakarta Utara. *Journal of Applied Science*. Vol 3(2): 57-68.

Ji, U., Julien, P. Y., Park, S. & Kim, B., 2008. Numerical Modeling for Sedimentation Characteristics of the Lower Nakong River and Sediment Dredging Effects at the Nakdong River Estuary Barrage. *KSCE Journal of Civil and Environmental Engineering Research*, *28*(4B), pp.405-411.

Kasim, M. R. S. 2020. Pemodelan Arus dan Gelombang di Muara Sungai Jeneberang Dengan Aplikasi MIKE 21. *Tugas Akhir*. Universitas Hasanuddin. Makassar.

Keith, S. 1998. A Concept of Tidal Pumping in The Estuarine and Coastal Ocean. *Estuarine, Coastal and Shelf Science*. Vol 46(1): 1-16.

Kepmen LH No 51. 2004. Baku mutu Air Laut. Mentri Negara Lingkungan Hidup.

Khatib, A.Y. Adriat., & A. E. Wahyudi. 2013. Analisis Sedimentasi dan Alternatif Penanganannya di Pelabuhan Selat Baru Bengkalis. Konfrensi Nasional Teknik Sipil, 31-37.

Kisnarti, E. A., & Prasita, V. D. 2019. Pemodelan Hidrodinamika Muara Sungai Studi Kasus: Muara Sungai Porong Sidoarjo. *Hang Tuah Press*. Surabaya.

Komar, P. D. 1976. *Beach Processes and Sedimentation.* Prentice Hall Inc. Englewood Cliffs. New Jersey. USA.

Kusuda, T., & Futawatari, T. 1992. Simulation of Suspended Sediment in a Tidal River. *Water Science Technology*. Vol 26 (5).

Lahopang, V.R., Widada, S., & Atmodjo, W. 2023. Sebaran Ukuran Butir Sedimen di Muara Sungai Sragi Baru-Wonokerto, Kabupaten Pekalongan, Jawa Tengah. *Indonesian Journal of Oceanography*. Vol 5 (1): 18-27.

Liu, L. 2003. Pipeline Engineering. *Lewis Publisher*: Florida. USA.

Long, T., Di, T., Xuefeng, W., & Lijiang, Q. 2020. The Influence of Knickpoints on The Erosion in Songlin River Basin. *IOP Conference Series: Materials Science and Engineering*. Vol 794: 1-8.

Mann, K. H., & Lazier, J. R. N. 2006. Dynamics of Marine Ecosystems: Biological-Physical Interactions in The Ocean. Bedfordi Institute of Oceanography, Canada.

Mustono. 2023. Pemodelan Arus dan Angkutan Sedimen di Muara Sungai Malili, Kabupaten Luwu Timur. *Tesis*. Universitas Hasanuddin. Makassar.

Mutiara, I., Erdiansa, A., Iqbal, M. T., Hendrawan, H., & Tawakkal, T. 2021. Pemodelan Hidrodinamika Pada Daerah Muara Sungai Saddang. In *Seminar Nasional Hasil Penelitian & Pengabdian Kepada Masyarakat (SNP2M)* (Vol. 6, No. 1, pp. 34-40).

Nichols, G. 2009. Sedimentology and Stratigraphy (2ndiedition). London: Wiley Blackwell

Nybakken, W.J. 1988. Biologi Laut. Suatu Pendekatan Ekologis. *Gramedia*. Jakarta. 459 hlm.

Ongkosongo, O. S. R. 2010. Kuala. *Muara sungai, dan Delta, LIPI, Jakarta*.

Ongkosongo, O. S. R., & Suyarso. 1989. *Pasang Surut*. LIPI, Pusat Penelitian dan Pengembangan Oseanologi, Jakarta.

Pawitra, M. D., Indrayanti, E., Yusuf, M., & Zainuri, M. 2022. Sebaran Sedimen Dasar Perairan dan Pola Arus di Muara Sungai Loji, Pekalongan. *Indonesia Journal of Oceanography* (IJOCE). Vol 4(3): 22-32.

Poerbondono., & Djunasjah, E. 2005. Survei Hidrografi. *Refika Aditama*. Bandung. 166 hlm.

Pratikto, W. A., & Armono, D. H. 1997. Perencanaan Fasilitas Pantai dan Laut. Edisi Pertama. BPFE. Yogyakarta.

Putra, D. A. P. 2016. Pemodelan Perubahan Morfologi Perairan Estuaria Sungai Wonokromo. *Tugas Akhir*. Institut Teknologi Sepuluh Nopember. Surabaya.

Rachman R. A. 2019. Kajian Karakteristik Sedimen Dasar Laut Untuk Mendukung Rencana Pembangunan Pelabuhan Patimban. Jurnal Geologi Kelautan 17(2): 99-111.

Ramli, M., Putra, R. D., Koenawan, C. J., & Pi, S. 2017. Pola Sebaran Sedimen Permukaan Berdasarkan Kedalaman Perairan di Pelabuhan Internasional Ferry Dompak Tanjungpinang. *Jurnal Umrah*.

Rifardi, 2012. Ekologi Sedimen Laut Modern Edisi Revisi. Pekanbaru. UNR Press.

Ronggodigdo, S. 2011. Kajian Sedimentasi Serta Hubungannya Terhadap Pendangkalan di Muara sungai Belawan. Tugas Akhir Departemen Teknik Sipil. Fakultas Teknik. Sumatera Utara.

Samskerta, I. P., Bachtiar, H., & Riandini, F. 2011. Perubahan Karakteristik Pola Arus Laut Pulau Bali Terkait Kejadian ENSO. *Kolokium Pusat Penelitian dan Pengembangan Sumber Daya Air*, 1-12.

Saputra, R. A. 2018. Pemodelan Sedimentasi Pasca Reklamasi dan Masterplan di Teluk Jakarta Menggunakan Perangkat Lunak Mike 21. *Skripsi*. Universitas Islam Negeri Sunan Ampel. Surabaya.

Subakti, H. 2012. Karakteristik Pasang Surut dan Pola Arus di Muara Sungai Musi, Sumatera Selatan. *Jurnal Penelitian Sains*. Vol 15 (1) : 35-39.

Sugianto, D. N. 2009. Simulasi Model Transpor Sedimen Tersuspensi Untuk Mendukung Perencanaan Pelabuhan Teluk Bayur, Sumatera Barat. *Jurnal Teknologi Lingkungan.* Universitas Trisakti. *5*(2): pp-46.

Suntoyo. 2014. Mekanika dan Teknologi Transportasi Sedimen. Institut Teknologi Sepuluh Nopember. Surabaya.

Supiyati., Suwarsono., & Asteriqa, M. 2015. Analisis Transport Sedimen di Muara Sungai Serut Kota Bengkulu. Universitas Tanjungpura Pontianak. *Prosiding Bidang Fisika*: 354-362.

Supriharyono., Handoyo., Bambang, A. N., & Sudharto. 1990. Studi Pengelolaan Pesisir di Kepulauan Riau, Selat Makassar, dan Pantai Utara Jawa Tengah. Lembaga Penelitian. Universitas Diponegoro. Semarang.

Surbakti, H., Purba, M., & Nurjaya, I. A. 2011. Pemodelan Pola Arus di Perairan Pesisir Banyuasin, Sumatera Selatan. *Maspari Journal*. Vol 3(2011): 9-14.

Triatmodjo, B. 1993. Teknik Pantai. Beta Offset. Yogyakarta.

Triatmodjo, B. 1999. Teknik Pantai. Jurusan Teknik Sipil Fakultas Teknik Universitas Gajah Mada. Yogyakarta. 397 hlm.

Tuharea, N. D. 2023. Pengaruh Pembangunan Makassar *New Port* Terhadap Pola Sedimentasi di Muara Sungai Tallo Menggunakan Simulasi Numerik. *Skripsi*. Universitas Hasanuddin. Makassar.

Usman, K. O. 2014. Analisis Sedimentasi pada Muara Sungai Komering Kota Palembang. *Jurnal Teknik Sipil dan Lingkungan*. Vol 2 (2): 209-215.

Van Rijn, L. C. 1993. Principles of Sediment Transport in Rivers, Estuaries and Coastal Seas. *Aqua Publications*. Amsterdam. ASCE. 110(12).

Vanlede, J., Smolders, S., Maximova, T., & Teles, M. J. 2015. The Unstructured Scaldis Model: A New 3D High Resolution Model for Hydrodynamics and Sediment Transport in The Tidal Scheldt. *Environmental Science*. Conference: 36th IAHR World Congress At: The Hague, the Netherlands.

Wahyuni, N. 2014. Analisa Laju Volume Sedimentasi di Alur Pelayaran Barat Surabaya (APBS). *Tugas Akhiri*. Jurusan Teknik Kelautan. Institut Teknologi Sepuluh Nopember. Surabaya.

Wati, E. K. 2020. Pengantar Akustik. *Penerbit LP UNAS*. Jakarta Selatan.

Wibowo, Y. S. A., Hariadi., & Marwoto, J. 2016. Pengaruh Arus Laut Dan Pasang Surut Terhadap Distribusi Sedimen Tersuspensi Di Perairan Muara sungai Sembilangan Kaliprau Pemalang. *Jurnal Oseanografi*. 5(4): 490-497.

Wismadi, T., & Handayani, S. 2014. Karakteristik Pasang Surut Laut di Raja Ampat, Indonesia. Jurnal Ilmiah Geomatika, 20 (1): 73-78.

Zakaria, A. 2009. Dasar Teori dan Aplikasi Program Interaktif Berbasis Web untuk Menghitung Panjang Gelombang dan Pasang Surut. *Tesis*. Universitas Negeri Lampung. Lampung.

LAMPIRAN

Lampiran 1. Data pasang surut sekunder 01-29 Juli 2023 pada lokasi penelitian

Tanggal	Tinggi Muka Air (m)																							
	Waktu																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Juli 2023	1.58	1.47	1.41	1.24	1.11	0.99	0.82	0.70	0.61	0.59	0.60	0.63	0.70	0.84	0.95	1.06	1.21	1.33	1.48	1.60	1.69	1.76	1.74	1.71
2 Juli 2023	1.69	1.61	1.52	1.37	1.25	1.09	0.92	0.79	0.61	0.52	0.52	0.49	0.54	0.68	0.78	0.94	1.11	1.27	1.44	1.58	1.73	1.80	1.85	1.86
3 Juli 2023	1.76	1.69	1.60	1.46	1.31	1.16	1.01	0.79	0.67	0.56	0.44	0.43	0.46	0.49	0.61	0.75	0.93	1.12	1.32	1.49	1.70	1.80	1.90	1.93
4 Juli 2023	1.87	1.79	1.73	1.60	1.48	1.34	1.17	1.03	0.85	0.69	0.57	0.47	0.44	0.46	0.49	0.63	0.78	0.94	1.13	1.37	1.56	1.74	1.83	1.91
5 Juli 2023	1.88	1.81	1.75	1.66	1.55	1.47	1.35	1.22	1.06	0.91	0.73	0.60	0.50	0.47	0.45	0.52	0.64	0.82	1.01	1.21	1.46	1.62	1.77	1.85
6 Juli 2023	1.83	1.79	1.72	1.66	1.58	1.51	1.45	1.35	1.23	1.14	0.98	0.84	0.69	0.61	0.52	0.54	0.58	0.73	0.87	1.10	1.30	1.52	1.66	1.75
7 Juli 2023	1.77	1.74	1.64	1.57	1.50	1.43	1.41	1.36	1.30	1.25	1.17	1.06	0.91	0.81	0.69	0.61	0.62	0.68	0.84	1.01	1.22	1.42	1.57	1.68
8 Juli 2023	1.67	1.66	1.55	1.48	1.36	1.29	1.31	1.25	1.31	1.28	1.29	1.23	1.11	1.02	0.89	0.79	0.73	0.77	0.83	0.96	1.16	1.37	1.51	1.59
9 Juli 2023	1.65	1.58	1.51	1.37	1.26	1.15	1.09	1.13	1.11	1.20	1.27	1.25	1.27	1.18	1.11	0.99	0.94	0.90	0.89	1.05	1.16	1.33	1.46	1.57
10 Juli 2023	1.60	1.54	1.46	1.32	1.17	1.07	0.97	0.94	0.98	1.04	1.17	1.25	1.28	1.35	1.26	1.21	1.13	1.09	1.07	1.10	1.18	1.32	1.45	1.53
11 Juli 2023	1.59	1.56	1.44	1.27	1.11	0.96	0.81	0.76	0.77	0.83	0.91	1.07	1.19	1.27	1.33	1.29	1.26	1.23	1.21	1.19	1.28	1.36	1.48	1.52
12 Juli 2023	1.57	1.56	1.46	1.30	1.15	0.96	0.82	0.72	0.67	0.69	0.76	0.88	1.04	1.15	1.26	1.32	1.36	1.32	1.35	1.36	1.37	1.41	1.49	1.50
13 Juli 2023	1.55	1.53	1.41	1.32	1.14	0.94	0.78	0.66	0.61	0.59	0.63	0.76	0.90	1.03	1.14	1.27	1.35	1.43	1.45	1.50	1.53	1.54	1.52	1.57
14 Juli 2023	1.51	1.48	1.42	1.29	1.13	0.97	0.80	0.68	0.56	0.55	0.54	0.63	0.75	0.88	1.01	1.12	1.24	1.35	1.43	1.50	1.59	1.62	1.61	1.59
15 Juli 2023	1.55	1.49	1.41	1.27	1.15	0.99	0.83	0.70	0.59	0.54	0.55	0.58	0.64	0.73	0.87	0.99	1.08	1.24	1.37	1.47	1.60	1.64	1.66	1.61
16 Juli 2023	1.55	1.47	1.38	1.26	1.15	0.98	0.87	0.73	0.63	0.56	0.50	0.49	0.55	0.60	0.71	0.81	0.94	1.09	1.27	1.40	1.55	1.63	1.67	1.65
17 Juli 2023	1.58	1.50	1.38	1.25	1.14	1.03	0.93	0.82	0.71	0.66	0.56	0.53	0.52	0.53	0.63	0.70	0.85	0.98	1.14	1.34	1.48	1.61	1.68	1.65

18 Juli 2023	1.64	1.54	1.40	1.29	1.16	1.06	0.97	0.90	0.78	0.74	0.66	0.59	0.54	0.53	0.54	0.63	0.72	0.86	1.02	1.19	1.39	1.54	1.63	1.68
19 Juli 2023	1.64	1.55	1.43	1.31	1.19	1.14	1.02	0.98	0.93	0.86	0.81	0.72	0.65	0.60	0.57	0.58	0.67	0.78	0.92	1.11	1.31	1.46	1.63	1.68
20 Juli 2023	1.64	1.59	1.47	1.32	1.22	1.17	1.09	1.02	0.99	0.97	0.93	0.84	0.75	0.68	0.63	0.60	0.65	0.76	0.86	1.03	1.22	1.37	1.53	1.62
21 Juli 2023	1.59	1.55	1.43	1.31	1.19	1.11	1.06	1.03	1.02	0.99	0.98	0.93	0.82	0.76	0.65	0.64	0.63	0.70	0.82	0.95	1.13	1.30	1.44	1.56
22 Juli 2023	1.54	1.48	1.39	1.27	1.13	1.08	1.02	1.00	1.06	1.08	1.07	1.06	0.97	0.88	0.79	0.74	0.70	0.74	0.84	0.96	1.12	1.26	1.39	1.49
23 Juli 2023	1.51	1.44	1.32	1.22	1.11	1.00	0.99	0.97	1.02	1.06	1.11	1.13	1.11	1.02	0.94	0.87	0.80	0.83	0.92	1.02	1.13	1.29	1.37	1.46
24 Juli 2023	1.45	1.40	1.28	1.14	1.06	0.96	0.91	0.93	0.98	1.06	1.15	1.20	1.23	1.17	1.09	0.99	0.95	0.93	0.97	1.04	1.17	1.26	1.36	1.41
25 Juli 2023	1.40	1.34	1.23	1.13	0.97	0.90	0.85	0.84	0.93	1.02	1.13	1.22	1.28	1.26	1.21	1.14	1.08	1.03	1.05	1.11	1.20	1.28	1.39	1.43
26 Juli 2023	1.41	1.34	1.23	1.10	0.94	0.85	0.78	0.77	0.82	0.94	1.04	1.15	1.25	1.28	1.26	1.20	1.19	1.12	1.11	1.14	1.19	1.29	1.36	1.42
27 Juli 2023	1.40	1.35	1.23	1.07	0.91	0.75	0.67	0.62	0.66	0.76	0.88	1.04	1.16	1.23	1.27	1.26	1.24	1.20	1.21	1.22	1.27	1.33	1.39	1.43
28 Juli 2023	1.42	1.33	1.21	1.03	0.87	0.70	0.57	0.53	0.51	0.60	0.74	0.89	1.02	1.12	1.19	1.24	1.22	1.26	1.30	1.32	1.39	1.40	1.46	1.48
29 Juli 2023	1.42	1.36	1.22	1.03	0.87	0.66	0.55	0.42	0.40	0.48	0.55	0.68	0.85	1.00	1.10	1.17	1.23	1.29	1.35	1.41	1.48	1.53	1.57	1.56

Lampiran 2. Data angin sekunder 01-29 Juli 2023 pada lokasi penelitian

- Data kecepatan angin (m/s)

Tanggal	Kecepatan Angin (m/s)																							
	Waktu																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Juli 2023	2.98	2.98	3.04	3.07	2.75	2.43	2.23	2.24	2.1	1.71	1.89	2.12	2.29	2.33	2.22	2.07	1.96	1.89	1.91	1.8	1.56	1.37	1.31	1.44
2 Juli 2023	1.85	2.33	2.84	3.24	3.38	3.08	2.7	2.57	2.49	2.32	2.34	2.47	2.63	2.85	3.02	3.09	3.05	3.05	3.16	3.35	3.57	3.97	4.44	4.66
3 Juli 2023	4.69	4.57	4.31	4.03	3.91	3.84	3.55	2.8	2.25	2.27	2.15	2.06	1.99	1.85	1.67	1.61	1.75	1.96	2.06	2.01	1.9	1.63	1.5	1.42
4 Juli 2023	1.42	1.55	1.59	1.64	1.72	1.7	1.56	1.28	0.98	0.93	0.83	1.08	1.16	1.08	0.8	0.44	0.4	0.54	0.64	0.69	0.77	0.94	1.16	1.29
5 Juli 2023	1.35	1.42	1.58	1.86	2.13	2.33	2.61	2.92	2.95	3	2.89	2.79	2.71	2.67	2.68	2.96	3.34	3.6	3.86	4.14	4.38	4.52	4.59	4.57
6 Juli 2023	4.51	4.63	4.53	4.02	3.65	3.54	3.62	3.81	4.05	4.42	4.63	4.68	4.64	4.48	4.28	4.03	3.71	3.47	3.55	3.75	3.9	3.95	3.98	3.89
7 Juli 2023	3.76	3.7	3.67	3.67	3.69	3.71	3.68	3.69	3.64	3.63	3.47	3.19	2.92	2.76	2.68	2.63	2.59	2.58	3.17	3.98	4.56	4.82	4.8	4.59
8 Juli 2023	4.05	3.49	3.24	3.16	2.89	2.76	2.75	2.84	3	3.33	3.43	3.21	2.79	2.35	2	1.78	1.69	1.7	1.96	2.35	2.84	3.27	3.61	3.67
9 Juli 2023	3.65	3.7	3.8	3.83	3.77	3.86	4.09	4.31	4.65	4.78	4.74	4.42	4	3.68	3.5	3.46	3.59	3.89	4.34	4.64	4.69	4.66	4.62	4.47
10 Juli 2023	4.29	4.12	3.96	3.81	3.71	3.79	3.98	4.21	4.5	4.65	4.6	4.38	4.09	3.83	3.64	3.6	3.53	3.57	3.92	4.2	4.29	4.23	4.13	4.14
11 Juli 2023	4.16	4.12	4.16	4.31	4.46	4.57	4.67	4.71	4.82	4.76	4.55	4.19	3.97	4.02	4.05	4.16	4.35	4.6	4.83	4.86	4.65	4.31	4.12	3.88
12 Juli 2023	3.59	3.4	3.38	3.44	3.5	3.77	4.24	4.61	4.79	5.12	4.96	4.42	3.92	3.69	3.63	3.61	3.58	3.52	3.6	3.54	3.52	3.66	3.86	3.73
13 Juli 2023	3.44	3.28	3.31	3.33	3.54	3.79	4.32	4.62	4.01	4	3.89	3.69	3.75	3.8	3.69	3.51	3.35	3.07	3.1	3.21	3.33	3.39	3.41	3.39
14 Juli 2023	3.35	3.3	3.31	3.46	3.61	3.82	4.13	4.47	4.63	4.83	4.81	4.46	3.98	3.72	3.89	4.24	4.49	4.45	4.41	4.44	4.5	4.47	4.28	4.05
15 Juli 2023	3.89	3.83	3.86	3.9	3.91	4.06	4.31	4.49	4.7	4.69	4.51	4.3	3.96	3.7	3.79	4.18	4.45	4.39	4.31	4.17	3.99	3.79	3.6	3.55
16 Juli 2023	3.63	3.67	3.67	3.63	3.65	3.76	3.9	4.07	4.21	4.25	4.19	3.95	3.72	3.74	3.99	4.41	4.77	5.04	5.43	5.67	5.65	5.41	5.1	4.79
17 Juli 2023	4.47	4.21	4.07	4.03	3.98	3.98	4.03	4.13	4.34	4.34	4.35	4.4	4.4	4.4	4.42	4.53	4.66	4.78	4.79	4.72	4.64	4.48	4.32	4.15
18 Juli 2023	3.93	3.72	3.6	3.6	3.58	3.54	3.5	3.55	3.67	3.72	3.78	3.77	3.64	3.62	3.76	3.99	4.26	4.46	4.56	4.68	4.72	4.65	4.5	4.3
19 Juli 2023	4.15	4.11	4.14	4.24	4.37	4.63	4.85	5.05	5.37	5.33	5.03	4.58	4.06	3.65	3.53	3.55	3.64	3.97	4.25	4.48	4.59	4.5	4.35	4.09
20 Juli 2023	3.88	3.76	3.69	3.65	3.64	3.68	3.86	4.13	4.41	4.41	4.33	4.2	4.1	4.07	4.17	4.31	4.44	4.71	4.87	4.94	4.82	4.67	4.47	4.31
21 Juli 2023	4.27	4.31	4.27	4.11	3.96	4.15	4.66	5.04	5.33	5.3	5.03	4.69	4.83	5.27	5.66	5.92	6.03	5.8	5.33	4.87	4.54	4.39	4.15	3.81
22 Juli 2023	3.53	3.37	3.34	3.33	3.18	3.22	3.53	3.96	4.21	4.44	4.42	4.24	4.11	4.13	4.28	4.48	4.67	4.69	4.59	4.55	4.48	4.36	4.25	4.2

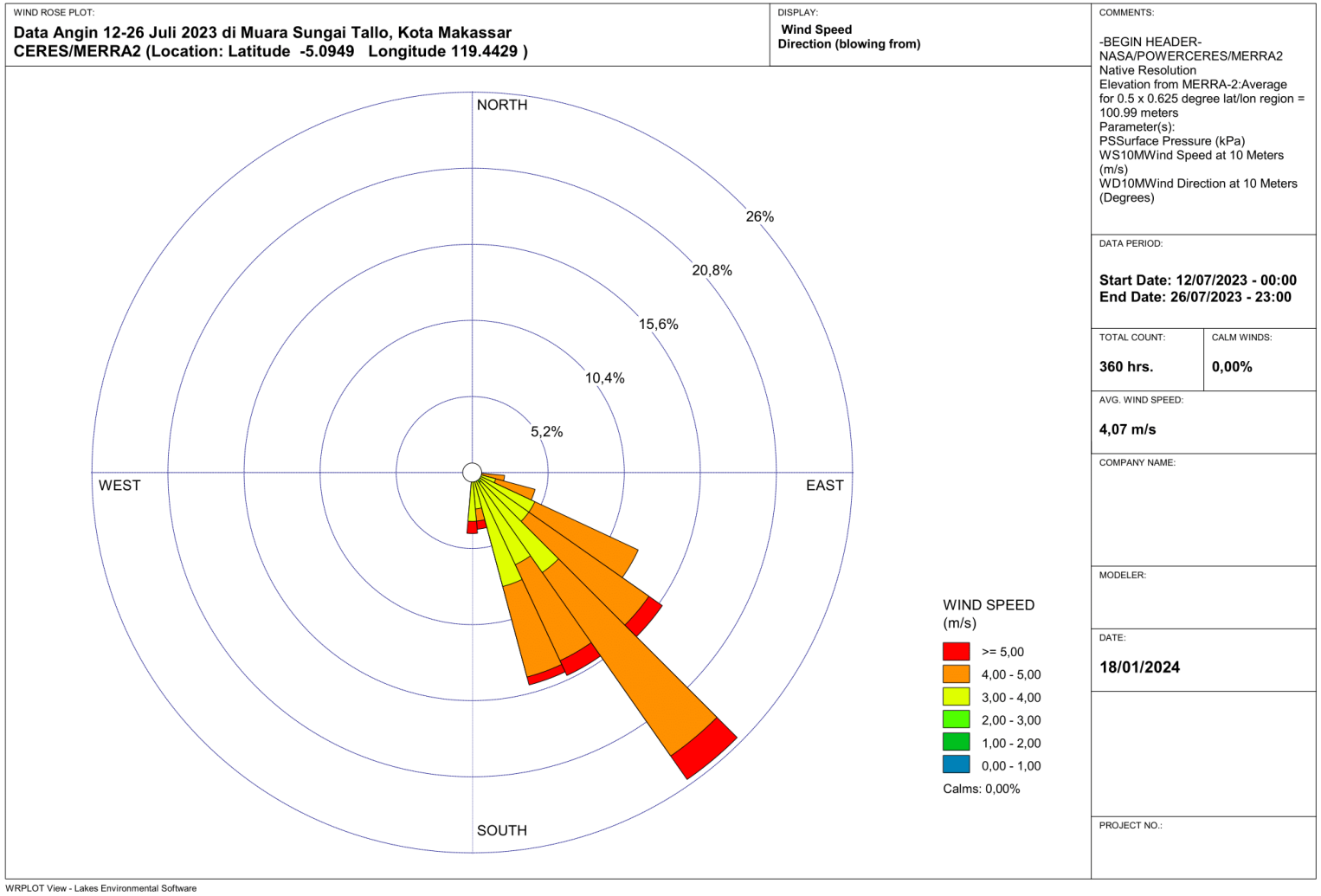
23 Juli 2023	4.12	4.12	4.15	4.26	4.36	4.48	4.47	4.25	3.69	3.36	3.31	3.54	3.68	3.74	3.79	3.78	3.94	4.12	4.27	4.47	4.49	4.43	4.39	4.36
24 Juli 2023	4.29	4.16	4.04	4.01	4.03	4.12	4.32	4.56	4.9	4.92	4.59	4.1	3.55	3.08	2.76	2.72	2.92	3.22	3.63	3.95	4.18	4.21	4.06	3.91
25 Juli 2023	3.85	3.77	3.63	3.5	3.4	3.36	3.51	3.72	3.9	3.89	3.67	3.23	2.79	2.58	2.7	2.98	3.28	3.59	3.86	4.27	4.67	4.71	4.66	4.57
26 Juli 2023	4.55	4.57	4.55	4.6	4.64	4.5	4.36	4.35	4.46	4.11	3.38	2.52	1.92	2.07	2.62	2.95	2.75	2.68	2.85	3.18	3.39	3.5	3.63	3.71
27 Juli 2023	3.69	3.66	3.64	3.6	3.54	3.49	3.51	3.57	3.57	3.43	3.34	3.52	3.8	4.05	4.33	4.66	4.87	4.97	4.89	4.82	4.78	4.73	4.59	4.4
28 Juli 2023	4.31	4.46	4.61	4.58	4.49	4.45	4.53	4.82	5.24	5.27	5.13	4.93	4.74	4.71	4.77	4.91	4.94	4.87	4.87	4.87	4.82	4.61	4.36	4.28
29 Juli 2023	4.2	4.15	4.04	3.94	3.91	4	4.19	4.53	5	5.18	5.05	4.69	4.25	3.85	3.68	3.62	3.61	3.69	3.99	4.33	4.62	4.7	4.66	4.44

- Data arah angin (degree)

Tanggal	Arah Angin (degree)																							
	Waktu																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Juli 2023	148.6	145.27	144.1	142.87	133.85	126.65	130.88	134.72	140.44	162.47	179.29	184.45	193.8	203.9	210	213.15	211.79	203.91	191.59	179.75	173.09	176.4	191.71	210.75
2 Juli 2023	227.06	233.44	239.98	243.5	244.98	239.73	226.99	212.97	202.87	197.46	197.71	203.89	212.98	220.33	225.94	228.49	230.61	232.69	232.42	228.59	222.43	216.19	208.73	203.3
3 Juli 2023	200.67	198.43	197.84	198.29	195.65	191.97	188.49	184.31	187.79	196.19	205.36	211.04	206.06	196.68	192.41	196.59	202.8	211.47	215.13	211.46	207.73	212.7	226.26	242.73
4 Juli 2023	257.64	268.26	275.65	280.13	278.9	276.34	268.56	248.59	215.59	204.4	238.85	263.8	262.64	251.04	241.43	211.14	146.93	113.96	94.94	92.6	99.37	107.84	112.59	117.81
5 Juli 2023	124.61	129.4	129.99	124.02	119.48	117.51	115.18	113.62	115.21	117.77	123.65	131.14	138.04	144.77	150.3	150.12	147.98	145.34	141.32	138.13	136.3	134.51	130.44	122.71
6 Juli 2023	118.21	121.54	122.4	118.96	115.47	112.72	109.14	106.58	106.02	106.86	106.88	105.08	102.05	99.43	97.13	96.68	97.86	99.99	101.95	104.73	106.88	108.69	110.57	111.05
7 Juli 2023	110.92	110.92	109.79	108.24	106.25	103.66	101.88	100.86	101.53	101.79	102.75	105.06	109.55	113.3	115.22	116.26	115.79	118.19	117.32	116.87	117.58	120.06	121.83	120.14
8 Juli 2023	114.29	105.06	99.71	97.95	96.36	93.74	97.02	106.79	115.1	117.23	116.68	117.56	120.3	122.53	124.31	127.52	132.75	133.51	124.26	114.35	108.14	107.79	109.85	112.25
9 Juli 2023	115.47	118.24	119.31	119.18	118.85	119.05	117.89	115.31	112.95	110.18	108.14	107.79	110.24	113.95	117.37	120.28	121.48	120.27	115.92	111.77	110.37	110.8	111.53	112.27
10 Juli 2023	113.29	114.18	115.45	117.88	120.34	120.32	119.03	117.85	116.97	116.09	115.48	116.25	118.43	122.01	125.22	127.59	129.25	129.68	126.82	122.86	121.05	123.63	129.17	131.63
11 Juli 2023	131.96	136.31	140.72	140.22	137.13	135.28	134.19	133.52	136.38	140.93	144.02	147.94	158.39	164.1	163.98	162.86	157.26	151.91	146.67	141.46	138	136.03	132.54	128.62
12 Juli 2023	127.04	129.69	136.41	142.48	143.36	138.95	134.93	133.76	133.61	135.37	137.36	142.18	148.88	156.31	163.24	168.76	172.61	176.18	177.76	176.83	176.18	177.31	179.07	179.88
13 Juli 2023	181.04	180.95	177.43	173.13	169.19	167.97	167.67	162.48	152.24	153.79	154.82	156.53	157.98	156.86	156.42	155.71	155.35	155.19	154.15	152.44	149.4	145.91	142.63	140.04
14 Juli 2023	141.15	145.52	149.2	149.61	147.99	144.49	140.53	137.41	137.26	137.43	136.58	137.42	142.25	151.39	159.16	160.2	157.59	154.52	149.94	144.46	143.55	143.53	141.14	139.93
15 Juli 2023	139.4	137.4	135.98	134.35	132.74	131.1	128.01	123.08	120.36	120.33	122.7	125.31	131.08	139.45	146.93	151.9	151.82	150.1	145.65	139.86	135.16	133.75	137.2	143.51

16 Juli 2023	149.29	153.05	155.07	157.08	159.86	161.72	161.67	159.69	156.15	151.08	147.26	148.01	153.43	158.31	161.18	161.4	158.98	156.25	152.84	148.63	144.22	140.04	136.92	133.68
17 Juli 2023	131.38	131.39	132.36	133.19	133.57	135.08	137.28	137.68	140.18	143.85	148.65	152.16	153.43	154.98	154.66	152.11	148.57	143.77	137.18	128.62	122.27	118.8	116.29	114.83
18 Juli 2023	114.93	116.73	119.62	121.52	121.71	121.83	121.21	121.14	124.67	130.05	135.42	140.89	147.37	154.43	159.3	160.18	155.64	147.68	139.73	133.71	130.17	127.56	126.45	127.18
19 Juli 2023	130.41	134.08	136.53	136.72	135.36	133.43	130.1	127.01	126.95	128.03	131.54	136.25	141.81	149.81	155.99	156.54	153.22	148.19	143.07	137.54	133.97	132.25	131.51	131.75
20 Juli 2023	132.79	134.66	137.23	139.77	141.97	142.94	141.99	140.07	140.1	141.26	144.62	149.86	155.83	161.43	165	163.7	158.31	151.65	145.52	139.23	135.46	133.17	133.09	134.78
21 Juli 2023	137.67	140.89	141.62	140.17	138.52	140.11	141.54	142.05	143.47	145.63	151.52	163.26	173.5	178.81	178.89	176.14	171.73	167.48	163.48	159.82	157.01	154.85	153.24	152.54
22 Juli 2023	153.32	154.92	155.96	155.72	152.81	148.08	142.93	138.44	137.1	138.28	141.17	146.43	153.43	158.48	160.24	157.23	150.78	143.4	135.69	128.52	124.13	122.55	123.08	124.99
23 Juli 2023	127.61	129.76	132.94	136.11	139.43	141.15	139.18	134.26	128.55	131.51	144.02	156.15	163.84	168.06	168.83	164.3	153.64	141.15	128.91	119.61	114.15	112.18	111.82	112.66
24 Juli 2023	114.05	114.98	115.92	117.21	118.45	118.41	117.26	116.04	115.59	115.3	116.35	117.83	120.4	125.71	133.17	140.95	143.71	140.21	131.24	123.06	117.38	115.95	116.17	117.13
25 Juli 2023	117.29	115.93	113.09	110.54	109.77	111.26	113.2	115.38	118.36	122.86	127.55	133.82	144.35	159.26	172.85	177	169.71	156.51	142.32	129.28	118.07	109.37	104.08	101.04
26 Juli 2023	101.39	102.94	103.82	102.67	100.78	101.82	104.73	107	107.42	108.95	114.02	125.41	152.6	186.29	203.58	205.27	191.63	175.49	160.97	148.46	138.45	128.38	120.37	119.21
27 Juli 2023	122.11	123.69	124.68	124.66	121.2	116.45	114.05	115.11	120.04	128.07	140.21	152.35	158.66	163.17	164.51	161.63	155.86	146.48	136.62	130.14	123.53	117.2	115.61	116.57
28 Juli 2023	118.56	120.29	119.21	117.22	116.34	117.24	119.66	122.22	125.78	128.98	132.04	135.26	138.88	141.8	144.54	144.46	141.93	137.02	131.23	125.07	119.85	117.35	117.62	117.97
29 Juli 2023	118.81	119.32	120.18	121.96	123.34	123.94	125.74	126.73	128.02	128.51	129.23	131.49	134.18	136.89	138.09	138.23	136.67	133.46	129.2	126.93	126.19	126.49	125.79	125.4

- Olah data angin menggunakan WRPlot



Lampiran 3. Data input pasang surut 15 hari (12-26 Juli 2023)

Timestamp	Tanggal	Waktu	Pasang Surut (m)
1	12 Juli 2023	00:00	1.57
2		01:00	1.56
3		02:00	1.46
4		03:00	1.30
5		04:00	1.15
6		05:00	0.96
7		06:00	0.82
8		07:00	0.72
9		08:00	0.67
10		09:00	0.69
11		10:00	0.76
12		11:00	0.88
13		12:00	1.04
14		13:00	1.15
15		14:00	1.26
16		15:00	1.32
17		16:00	1.36
18		17:00	1.32
19		18:00	1.35
20		19:00	1.36
21		20:00	1.37
22		21:00	1.41
23		22:00	1.49
24		23:00	1.50
25	13 Juli 2023	00:00	1.55
26		01:00	1.53
27		02:00	1.41
28		03:00	1.32
29		04:00	1.14
30		05:00	0.94
31		06:00	0.78
32		07:00	0.66
33		08:00	0.61
34		09:00	0.59
35		10:00	0.63
36		11:00	0.76
37		12:00	0.90
38		13:00	1.03
39		14:00	1.14
40		15:00	1.27
41		16:00	1.35
42		17:00	1.43
43		18:00	1.45
44		19:00	1.50

45		20:00	1.53
46		21:00	1.54
47		22:00	1.52
48		23:00	1.57
49	14 Juli 2023	00:00	1.51
50		01:00	1.48
51		02:00	1.42
52		03:00	1.29
53		04:00	1.13
54		05:00	0.97
55		06:00	0.80
56		07:00	0.68
57		08:00	0.56
58		09:00	0.55
59		10:00	0.54
60		11:00	0.63
61		12:00	0.75
62		13:00	0.88
63		14:00	1.01
64		15:00	1.12
65		16:00	1.24
66		17:00	1.35
67		18:00	1.43
68		19:00	1.50
69		20:00	1.59
70		21:00	1.62
71		22:00	1.61
72		23:00	1.59
73	15 Juli 2023	00:00	1.55
74		01:00	1.49
75		02:00	1.41
76		03:00	1.27
77		04:00	1.15
78		05:00	0.99
79		06:00	0.83
80		07:00	0.70
81		08:00	0.59
82		09:00	0.54
83		10:00	0.55
84		11:00	0.58
85		12:00	0.64
86		13:00	0.73
87		14:00	0.87
88		15:00	0.99
89		16:00	1.08
90		17:00	1.24

91		18:00	1.37
92		19:00	1.47
93		20:00	1.60
94		21:00	1.64
95		22:00	1.66
96		23:00	1.61
97	16 Juli 2023	00:00	1.55
98		01:00	1.47
99		02:00	1.38
100		03:00	1.26
101		04:00	1.15
102		05:00	0.98
103		06:00	0.87
104		07:00	0.73
105		08:00	0.63
106		09:00	0.56
107		10:00	0.50
108		11:00	0.49
109		12:00	0.55
110		13:00	0.60
111		14:00	0.71
112		15:00	0.81
113		16:00	0.94
114		17:00	1.09
115		18:00	1.27
116		19:00	1.40
117		20:00	1.55
118		21:00	1.63
119		22:00	1.67
120		23:00	1.65
121	17 Juli 2023	00:00	1.58
122		01:00	1.50
123		02:00	1.38
124		03:00	1.25
125		04:00	1.14
126		05:00	1.03
127		06:00	0.93
128		07:00	0.82
129		08:00	0.71
130		09:00	0.66
131		10:00	0.56
132		11:00	0.53
133		12:00	0.52
134		13:00	0.53
135		14:00	0.63
136		15:00	0.70

137		16:00	0.85
138		17:00	0.98
139		18:00	1.14
140		19:00	1.34
141		20:00	1.48
142		21:00	1.61
143		22:00	1.68
144		23:00	1.65
145	18 Juli 2023	00:00	1.64
146		01:00	1.54
147		02:00	1.40
148		03:00	1.29
149		04:00	1.16
150		05:00	1.06
151		06:00	0.97
152		07:00	0.90
153		08:00	0.78
154		09:00	0.74
155		10:00	0.66
156		11:00	0.59
157		12:00	0.54
158		13:00	0.53
159		14:00	0.54
160		15:00	0.63
161		16:00	0.72
162		17:00	0.86
163		18:00	1.02
164		19:00	1.19
165		20:00	1.39
166		21:00	1.54
167		22:00	1.63
168		23:00	1.68
169	19 Juli 2023	00:00	1.64
170		01:00	1.55
171		02:00	1.43
172		03:00	1.31
173		04:00	1.19
174		05:00	1.14
175		06:00	1.02
176		07:00	0.98
177		08:00	0.93
178		09:00	0.86
179		10:00	0.81
180		11:00	0.72
181		12:00	0.65
182		13:00	0.60

183		14:00	0.57
184		15:00	0.58
185		16:00	0.67
186		17:00	0.78
187		18:00	0.92
188		19:00	1.11
189		20:00	1.31
190		21:00	1.46
191		22:00	1.63
192		23:00	1.68
193	20 Juli 2023	00:00	1.64
194		01:00	1.59
195		02:00	1.47
196		03:00	1.32
197		04:00	1.22
198		05:00	1.17
199		06:00	1.09
200		07:00	1.02
201		08:00	0.99
202		09:00	0.97
203		10:00	0.93
204		11:00	0.84
205		12:00	0.75
206		13:00	0.68
207		14:00	0.63
208		15:00	0.60
209		16:00	0.65
210		17:00	0.76
211		18:00	0.86
212		19:00	1.03
213		20:00	1.22
214		21:00	1.37
215		22:00	1.53
216		23:00	1.62
217	21 Juli 2023	00:00	1.59
218		01:00	1.55
219		02:00	1.43
220		03:00	1.31
221		04:00	1.19
222		05:00	1.11
223		06:00	1.06
224		07:00	1.03
225		08:00	1.02
226		09:00	0.99
227		10:00	0.98
228		11:00	0.93

229		12:00	0.82
230		13:00	0.76
231		14:00	0.65
232		15:00	0.64
233		16:00	0.63
234		17:00	0.70
235		18:00	0.82
236		19:00	0.95
237		20:00	1.13
238		21:00	1.30
239		22:00	1.44
240		23:00	1.56
241	22 Juli 2023	00:00	1.54
242		01:00	1.48
243		02:00	1.39
244		03:00	1.27
245		04:00	1.13
246		05:00	1.08
247		06:00	1.02
248		07:00	1.00
249		08:00	1.06
250		09:00	1.08
251		10:00	1.07
252		11:00	1.06
253		12:00	0.97
254		13:00	0.88
255		14:00	0.79
256		15:00	0.74
257		16:00	0.70
258		17:00	0.74
259		18:00	0.84
260		19:00	0.96
261		20:00	1.12
262		21:00	1.26
263		22:00	1.39
264		23:00	1.49
265	23 Juli 2023	00:00	1.51
266		01:00	1.44
267		02:00	1.32
268		03:00	1.22
269		04:00	1.11
270		05:00	1.00
271		06:00	0.99
272		07:00	0.97
273		08:00	1.02
274		09:00	1.06

275		10:00	1.11
276		11:00	1.13
277		12:00	1.11
278		13:00	1.02
279		14:00	0.94
280		15:00	0.87
281		16:00	0.80
282		17:00	0.83
283		18:00	0.92
284		19:00	1.02
285		20:00	1.13
286		21:00	1.29
287		22:00	1.37
288		23:00	1.46
289	24 Juli 2023	00:00	1.45
290		01:00	1.40
291		02:00	1.28
292		03:00	1.14
293		04:00	1.06
294		05:00	0.96
295		06:00	0.91
296		07:00	0.93
297		08:00	0.98
298		09:00	1.06
299		10:00	1.15
300		11:00	1.20
301		12:00	1.23
302		13:00	1.17
303		14:00	1.09
304		15:00	0.99
305		16:00	0.95
306		17:00	0.93
307		18:00	0.97
308		19:00	1.04
309		20:00	1.17
310		21:00	1.26
311		22:00	1.36
312		23:00	1.41
313	25 Juli 2023	00:00	1.40
314		01:00	1.34
315		02:00	1.23
316		03:00	1.13
317		04:00	0.97
318		05:00	0.90
319		06:00	0.85
320		07:00	0.84

321		08:00	0.93
322		09:00	1.02
323		10:00	1.13
324		11:00	1.22
325		12:00	1.28
326		13:00	1.26
327		14:00	1.21
328		15:00	1.14
329		16:00	1.08
330		17:00	1.03
331		18:00	1.05
332		19:00	1.11
333		20:00	1.20
334		21:00	1.28
335		22:00	1.39
336		23:00	1.43
337	26 Juli 2023	00:00	1.41
338		01:00	1.34
339		02:00	1.23
340		03:00	1.10
341		04:00	0.94
342		05:00	0.85
343		06:00	0.78
344		07:00	0.77
345		08:00	0.82
346		09:00	0.94
347		10:00	1.04
348		11:00	1.15
349		12:00	1.25
350		13:00	1.28
351		14:00	1.26
352		15:00	1.20
353		16:00	1.19
354		17:00	1.12
355		18:00	1.11
356		19:00	1.14
357		20:00	1.19
358		21:00	1.29
359		22:00	1.36
360		23:00	1.42

Lampiran 4. Data laju akumulasi angkutan sedimen pada lokasi penelitian

- Hasil berat akhir sedimen pada setiap arah dan titik di lokasi penelitian

Titik	Arah	Berat Cawan (gr)	Berat Kering (gr)	Berat Akhir (gr)
1	U	285.14	286.84	1.70
	S	316.44	317.58	1.14
	B	301.66	302.73	1.07
	T	316.65	318.23	1.58
	A	324.39	327.11	2.72
2	U	246.94	250.87	3.93
	S	244.51	246.84	2.33
	B	297.27	299.64	2.37
	T	298.92	304.3	5.38
	A	255	260.22	5.22
3	U	310.05	314.13	4.08
	S	299.88	305.16	5.28
	B	310.68	312.69	2.01
	T	301.46	311.27	9.81
	A	293.17	297.38	4.21
4	U	131.21	134.37	3.16
	S	127.67	128.52	0.85
	B	129.24	129.92	0.68
	T	126.53	127.64	1.11
	A	126.17	130.04	3.87
5	U	129.42	134.01	4.59
	S	108.1	108.57	0.47
	B	129.78	131.43	1.65
	T	128.74	131.21	2.47
	A	126.18	130.61	4.43

- Hasil perhitungan transport sedimen

Koordinat		Titik	Qu - Qs	Qb - Qt	(Qu-Qs)^2/(Qb-Qt)^2	Arc tan (rad)	Arc tan(derajat)
X	Y						
119439001.00	-5,101,037	1	2.81	-2.56	1.21	0.88	50.33
119445681.00	-5,100,068	2	8.02	-15.10	0.28	0.28	15.78
119449048.00	-5,090,304	3	-6.02	-39.12	0.02	0.02	1.36
11945338.00	-5,083,451	4	11.59	-2.16	28.86	1.54	88.02
119461301.00	-5,079,166	5	20.66	-4.11	25.24	1.53	87.73

- Besar angkutan sedimen

Titik	Qu-Qs	(Qu-Qs)^2	Qb-Qt	(Qb-Qt)^2	(Qu-Qt)^2+(Qb-Qt)^2	SQRT
1	0.560	0.314	-0.510	0.260	0.574	0.757
2	1.600	2.560	-3.010	9.060	11.620	3.409
3	-1.200	1.440	-7.800	60.840	62.280	7.892
4	2.310	5.336	-0.430	0.185	5.521	2.350
5	4.120	16.974	-0.820	0.672	17.647	4.201

Lampiran 5. Hasil analisis ukuran butir d50 sedimen dasar

Titik 1

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 1** ANALYST & DATE: ,

SAMPLE TYPE: Bimodal, Moderately Sorted TEXTURAL GROUP: Slightly Gravelly Sand

SEDIMENT NAME: Slightly Very Fine Gravelly Fine Sand

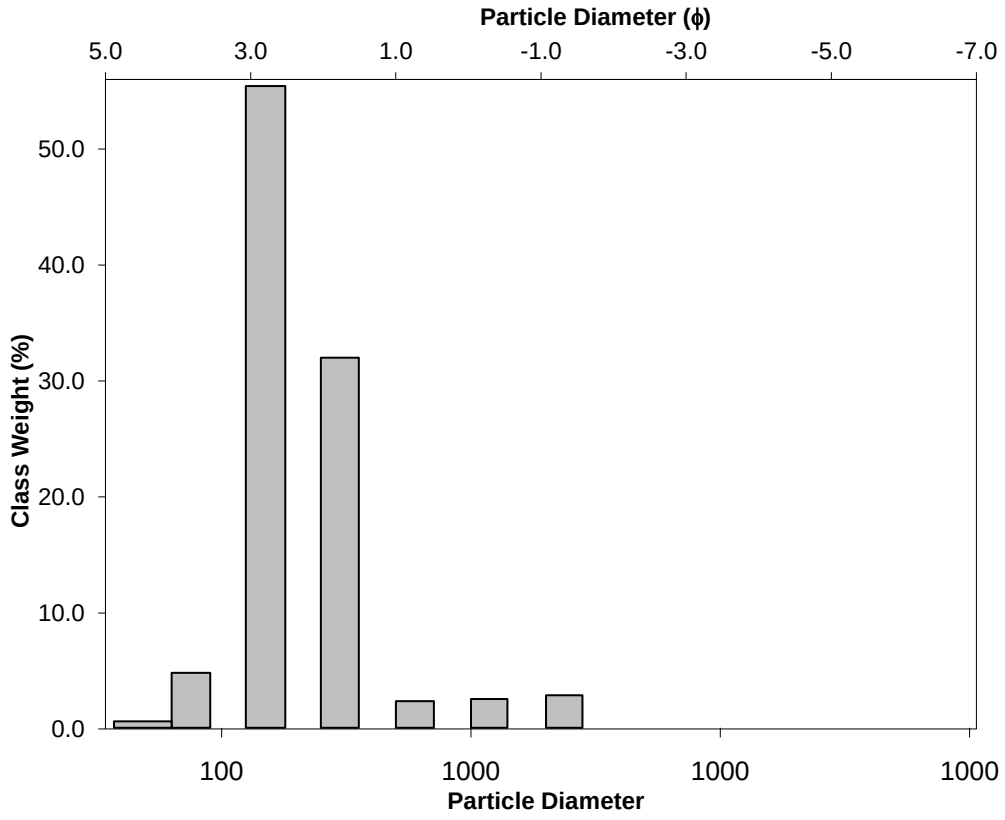
	μm	ϕ
MODE 1:	152.5	2.737
MODE 2:	302.5	1.747
MODE 3:		
D_{10}:	128.7	1.540
MEDIAN or D_{50}:	166.9	2.583
D_{90}:	343.9	2.958
(D_{90} / D_{10}):	2.673	1.921
(D_{90} - D_{10}):	215.3	1.418
(D_{75} / D_{25}):	2.048	1.580
(D_{75} - D_{25}):	148.6	1.034

GRAIN SIZE DISTRIBUTION

GRAVEL:	2.6%	COARSE SAND:	2.2%
SAND:	96.6%	MEDIUM SAND:	31.1%
MUD:	0.8%	FINE SAND:	56.1%
		V FINE SAND:	4.7%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.8%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	2.6%	V FINE SILT:	0.0%
V COARSE SAND:	2.3%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	288.3	207.2	2.271	192.9	2.374	Fine Sand
SORTING (σ):	389.4	1.907	0.931	1.711	0.775	Moderately Sorted
SKEWNESS (Sk):	4.464	1.674	-1.674	0.435	-0.435	Very Coarse Skewed
KURTOSIS (K):	23.43	7.281	7.281	1.199	1.199	Leptokurtic

GRAIN SIZE DISTRIBUTION



Titik 2

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 2** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Gravelly Sand

SEDIMENT NAME: Very Fine Gravelly Coarse Sand

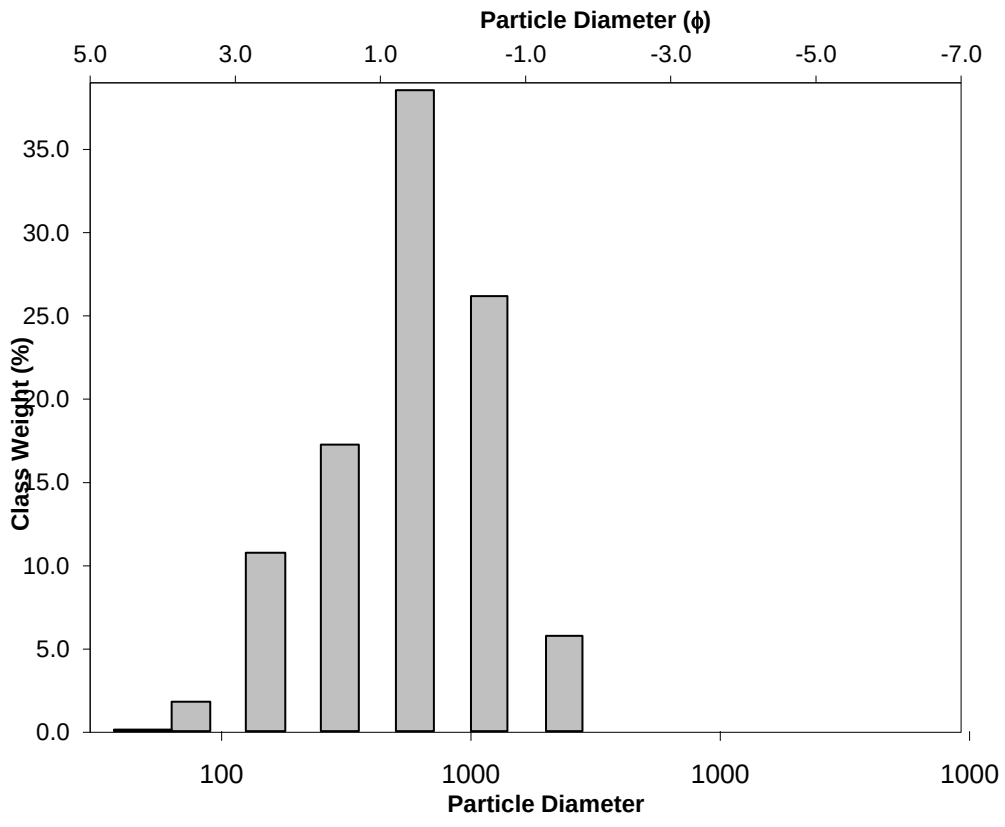
	μm	ϕ
MODE 1:	605.0	0.747
MODE 2:	1200.0	-0.243
MODE 3:	302.5	1.747
D_{10}:	162.4	-0.399
MEDIAN or D_{50}:	596.6	0.745
D_{90}:	1319.0	2.623
(D_{90} / D_{10}):	8.123	-6.566
(D_{90} - D_{10}):	1156.6	3.022
(D_{75} / D_{25}):	3.399	-14.923
(D_{75} - D_{25}):	762.2	1.765

GRAIN SIZE DISTRIBUTION

GRAVEL:	5.5%	COARSE SAND:	38.7%
SAND:	94.3%	MEDIUM SAND:	17.3%
MUD:	0.1%	FINE SAND:	11.2%
		V FINE SAND:	1.8%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.1%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	5.5%	V FINE SILT:	0.0%
V COARSE SAND:	25.2%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	740.9	557.5	0.843	577.2	0.793	Coarse Sand
SORTING (σ):	541.6	2.173	1.120	2.206	1.142	Poorly Sorted
SKEWNESS (Sk):	1.465	-0.402	0.402	-0.073	0.073	Symmetrical
KURTOSIS (K):	5.276	2.820	2.820	0.906	0.906	Mesokurtic

GRAIN SIZE DISTRIBUTION



Titik 3

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 3** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Gravelly Sand

SEDIMENT NAME: Very Fine Gravelly Coarse Sand

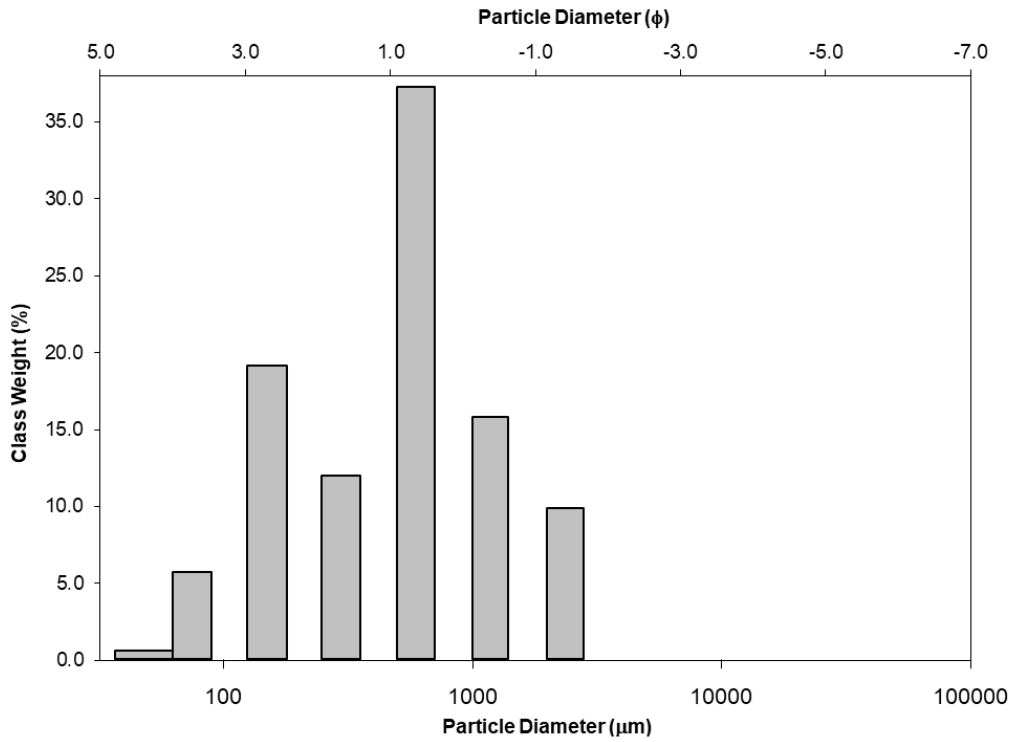
	μm	ϕ
MODE 1:	605.0	0.747
MODE 2:	152.5	2.737
MODE 3:	1200.0	-0.243
D_{10}:	132.9	-0.467
MEDIAN or D_{50}:	558.1	0.841
D_{90}:	1382.6	2.912
(D_{90} / D_{10}):	10.40	-6.230
(D_{90} - D_{10}):	1249.7	3.379
(D_{75} / D_{25}):	4.036	5.021
(D_{75} - D_{25}):	531.7	2.013

GRAIN SIZE DISTRIBUTION

GRAVEL:	9.4%	COARSE SAND:	37.1%
SAND:	89.7%	MEDIUM SAND:	11.9%
MUD:	0.9%	FINE SAND:	19.8%
		V FINE SAND:	5.8%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.9%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	9.4%	V FINE SILT:	0.0%
V COARSE SAND:	15.1%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic μm	Geometric μm	Logarithmic ϕ	Geometric μm	Logarithmic ϕ	Description
MEAN ($\bar{x}$):	703.1	457.6	1.128	464.4	1.107	Medium Sand
SORTING (σ):	646.7	2.608	1.383	2.812	1.492	Poorly Sorted
SKEWNESS (Sk):	1.560	-0.194	0.194	-0.205	0.205	Fine Skewed
KURTOSIS (K):	4.709	2.329	2.329	0.988	0.988	Mesokurtic

GRAIN SIZE DISTRIBUTION



Titik 4

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 4** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Gravelly Sand

SEDIMENT NAME: Very Fine Gravelly Medium Sand

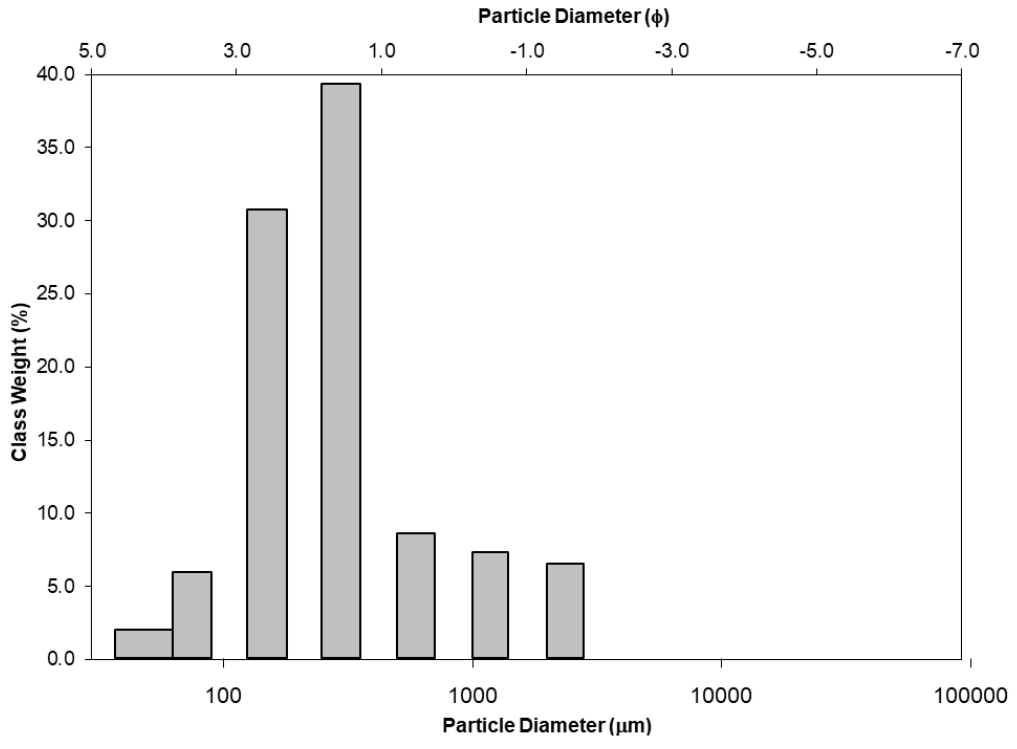
	μm	ϕ
MODE 1:	302.5	1.747
MODE 2:	152.5	2.737
MODE 3:	605.0	0.747
D_{10}:	126.8	-0.209
MEDIAN or D_{50}:	273.6	1.870
D_{90}:	1155.5	2.979
(D_{90} / D_{10}):	9.112	-14.289
(D_{90} - D_{10}):	1028.7	3.188
(D_{75} / D_{25}):	2.274	1.769
(D_{75} - D_{25}):	192.4	1.185

GRAIN SIZE DISTRIBUTION

GRAVEL:	6.1%	COARSE SAND:	8.4%
SAND:	91.1%	MEDIUM SAND:	38.6%
MUD:	2.8%	FINE SAND:	31.3%
		V FINE SAND:	5.9%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	2.8%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	6.1%	V FINE SILT:	0.0%
V COARSE SAND:	6.9%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	449.5	278.0	1.847	285.4	1.809	Medium Sand
SORTING (σ):	566.4	2.421	1.275	2.447	1.291	Poorly Sorted
SKEWNESS (Sk):	2.566	0.701	-0.701	0.146	-0.146	Coarse Skewed
KURTOSIS (K):	8.807	3.434	3.434	1.691	1.691	Very Leptokurtic

GRAIN SIZE DISTRIBUTION



Titik 5

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 5** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Slightly Gravelly Sand

SEDIMENT NAME: Slightly Very Fine Gravelly Medium Sand

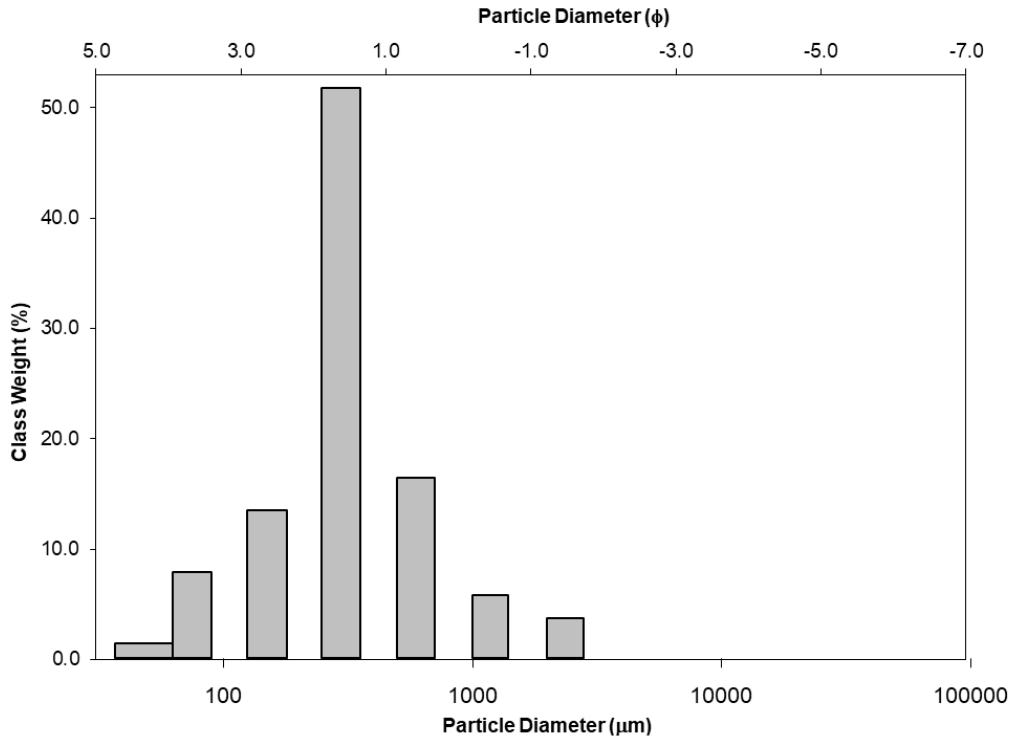
	μm	ϕ
MODE 1:	302.5	1.747
MODE 2:	605.0	0.747
MODE 3:	152.5	2.737
D_{10}:	89.95	0.530
MEDIAN or D_{50}:	299.1	1.741
D_{90}:	692.7	3.475
(D_{90} / D_{10}):	7.701	6.561
(D_{90} - D_{10}):	602.8	2.945
(D_{75} / D_{25}):	1.986	1.991
(D_{75} - D_{25}):	248.5	0.990

GRAIN SIZE DISTRIBUTION

GRAVEL:	3.5%	COARSE SAND:	16.2%
SAND:	94.5%	MEDIUM SAND:	51.1%
MUD:	2.1%	FINE SAND:	13.8%
		V FINE SAND:	7.9%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	2.1%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	3.5%	V FINE SILT:	0.0%
V COARSE SAND:	5.4%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	428.5	302.8	1.723	298.6	1.743	Medium Sand
SORTING (σ):	450.5	2.188	1.130	2.207	1.142	Poorly Sorted
SKEWNESS (Sk):	3.083	0.200	-0.200	0.002	-0.002	Symmetrical
KURTOSIS (K):	13.20	3.744	3.744	1.717	1.717	Very Leptokurtic

GRAIN SIZE DISTRIBUTION



Titik 7

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 7** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Gravelly Sand

SEDIMENT NAME: Very Fine Gravelly Coarse Sand

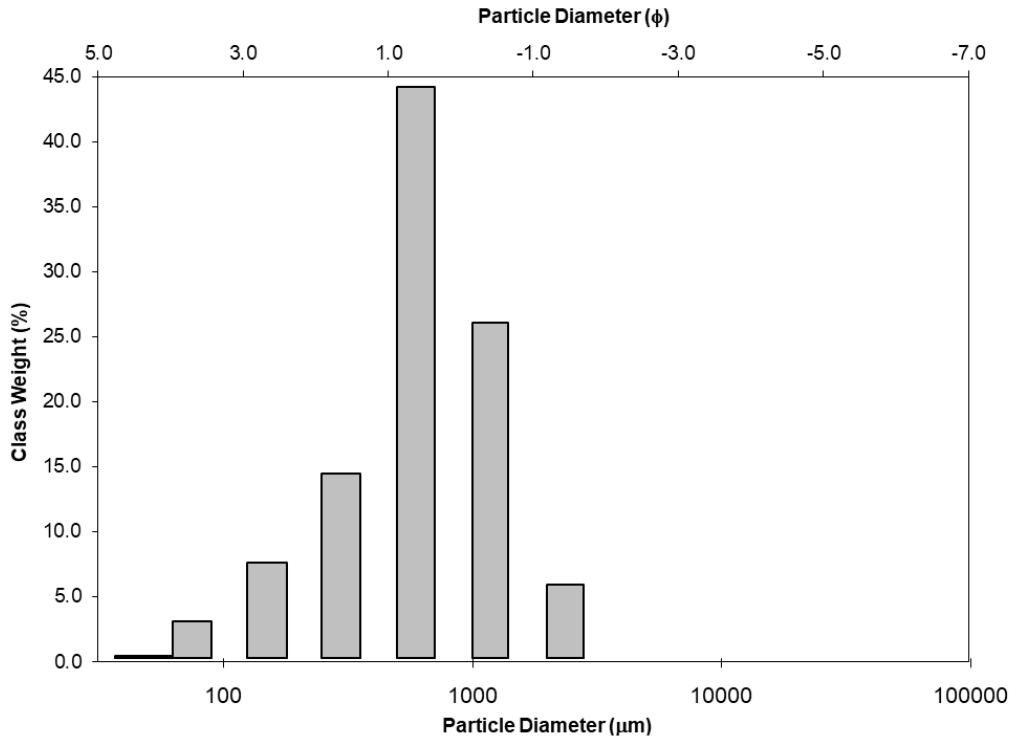
	μm	ϕ
MODE 1:	605.0	0.747
MODE 2:	1200.0	-0.243
MODE 3:	302.5	1.747
D_{10}:	172.0	-0.397
MEDIAN or D_{50}:	608.1	0.718
D_{90}:	1317.0	2.540
(D_{90} / D_{10}):	7.659	-6.393
(D_{90} - D_{10}):	1145.1	2.937
(D_{75} / D_{25}):	3.052	-14.206
(D_{75} - D_{25}):	723.6	1.610

GRAIN SIZE DISTRIBUTION

GRAVEL:	5.5%	COARSE SAND:	44.3%
SAND:	94.2%	MEDIUM SAND:	14.3%
MUD:	0.3%	FINE SAND:	7.7%
		V FINE SAND:	2.9%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.3%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	5.5%	V FINE SILT:	0.0%
V COARSE SAND:	25.0%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	756.2	579.6	0.787	593.4	0.753	Coarse Sand
SORTING (σ):	528.8	2.145	1.101	2.173	1.120	Poorly Sorted
SKEWNESS (Sk):	1.503	-0.651	0.651	-0.077	0.077	Symmetrical
KURTOSIS (K):	5.524	3.537	3.537	0.998	0.998	Mesokurtic

GRAIN SIZE DISTRIBUTION



Titik 9

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 9** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Slightly Gravelly Sand

SEDIMENT NAME: Slightly Very Fine Gravelly Medium Sand

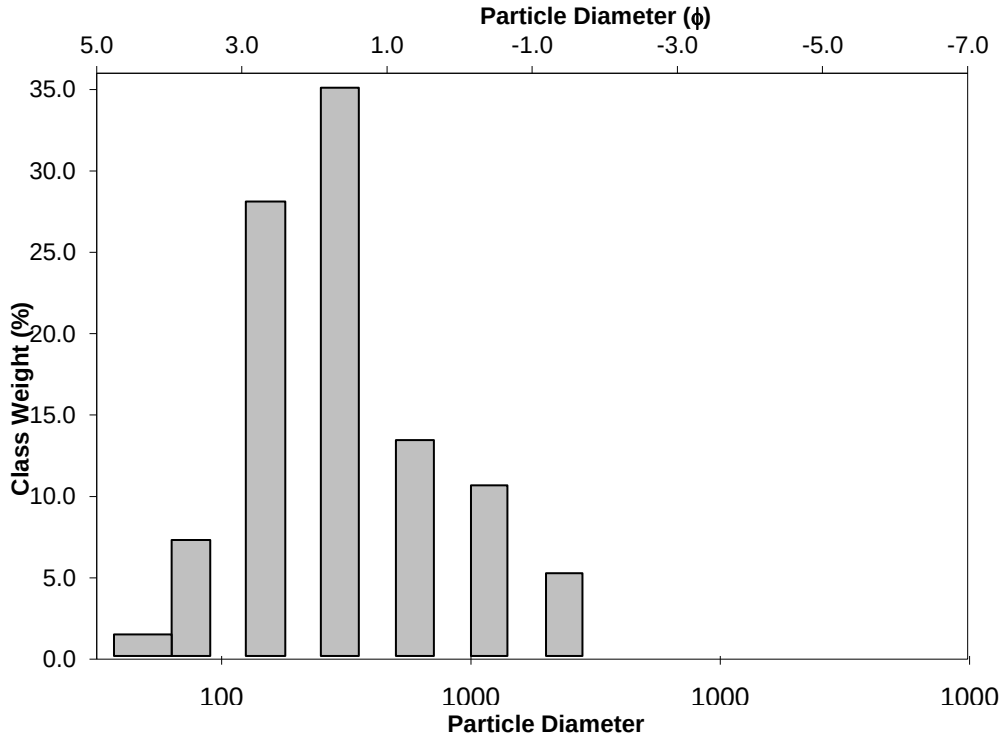
	μm	ϕ
MODE 1:	302.5	1.747
MODE 2:	152.5	2.737
MODE 3:	605.0	0.747
D_{10}:	126.4	-0.231
MEDIAN or D_{50}:	283.2	1.820
D_{90}:	1174.0	2.984
(D_{90} / D_{10}):	9.289	-12.890
(D_{90} - D_{10}):	1047.7	3.215
(D_{75} / D_{25}):	3.524	3.039
(D_{75} - D_{25}):	386.1	1.817

GRAIN SIZE DISTRIBUTION

GRAVEL:	4.8%	COARSE SAND:	13.1%
SAND:	93.2%	MEDIUM SAND:	34.4%
MUD:	2.0%	FINE SAND:	28.6%
		V FINE SAND:	7.2%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	2.0%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	4.8%	V FINE SILT:	0.0%
V COARSE SAND:	9.9%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	467.9	296.8	1.752	298.2	1.746	Medium Sand
SORTING (σ):	536.2	2.437	1.285	2.339	1.226	Poorly Sorted
SKEWNESS (Sk):	2.400	0.485	-0.485	0.089	-0.089	Symmetrical
KURTOSIS (K):	8.520	2.885	2.885	0.958	0.958	Mesokurtic

GRAIN SIZE DISTRIBUTION



Titik 10

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 10** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Slightly Gravelly Sand

SEDIMENT NAME: Slightly Very Fine Gravelly Coarse Sand

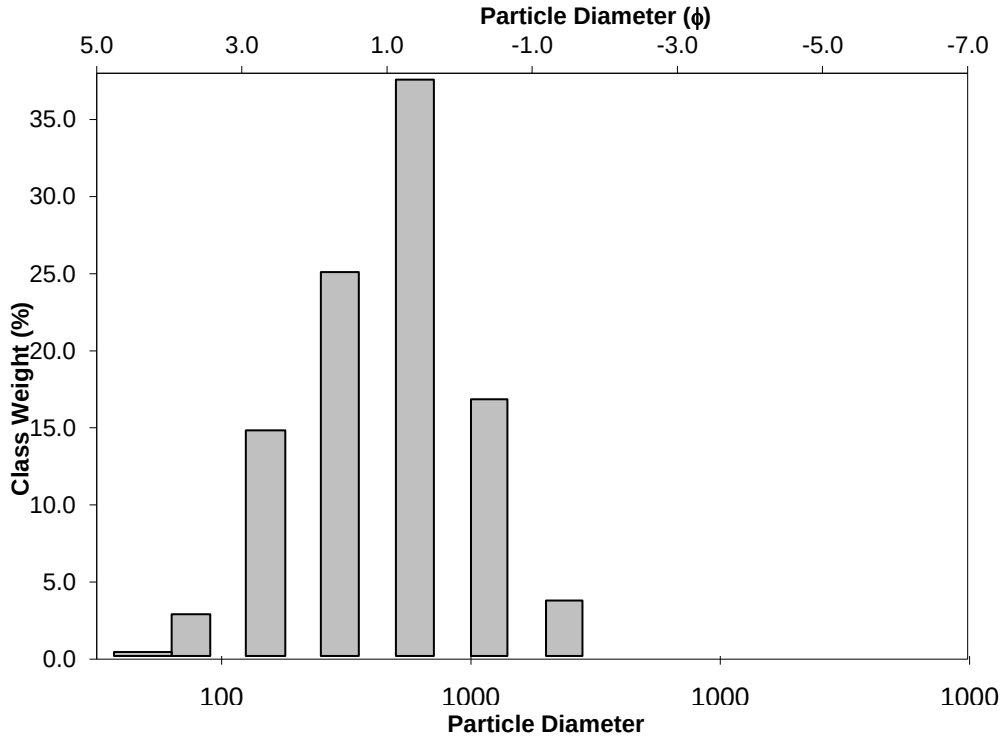
	μm	ϕ
MODE 1:	605.0	0.747
MODE 2:	302.5	1.747
MODE 3:	1200.0	-0.243
D_{10}:	147.4	-0.286
MEDIAN or D_{50}:	532.8	0.908
D_{90}:	1219.4	2.763
(D_{90} / D_{10}):	8.276	-9.652
(D_{90} - D_{10}):	1072.1	3.049
(D_{75} / D_{25}):	2.454	3.273
(D_{75} - D_{25}):	399.2	1.295

GRAIN SIZE DISTRIBUTION

GRAVEL:	3.4%	COARSE SAND:	37.4%
SAND:	96.2%	MEDIUM SAND:	24.9%
MUD:	0.4%	FINE SAND:	15.2%
		V FINE SAND:	2.8%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.4%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	3.4%	V FINE SILT:	0.0%
V COARSE SAND:	16.0%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	601.1	445.0	1.168	460.1	1.120	Medium Sand
SORTING (σ):	480.0	2.179	1.124	2.259	1.176	Poorly Sorted
SKEWNESS (Sk):	1.899	-0.188	0.188	-0.220	0.220	Fine Skewed
KURTOSIS (K):	7.389	2.731	2.731	1.068	1.068	Mesokurtic

GRAIN SIZE DISTRIBUTION



Titik 12

SAMPLE STATISTICS

SAMPLE IDENTITY: **Titik 12** ANALYST & DATE: ,

SAMPLE TYPE: Polymodal, Poorly Sorted TEXTURAL GROUP: Gravelly Sand

SEDIMENT NAME: Very Fine Gravelly Coarse Sand

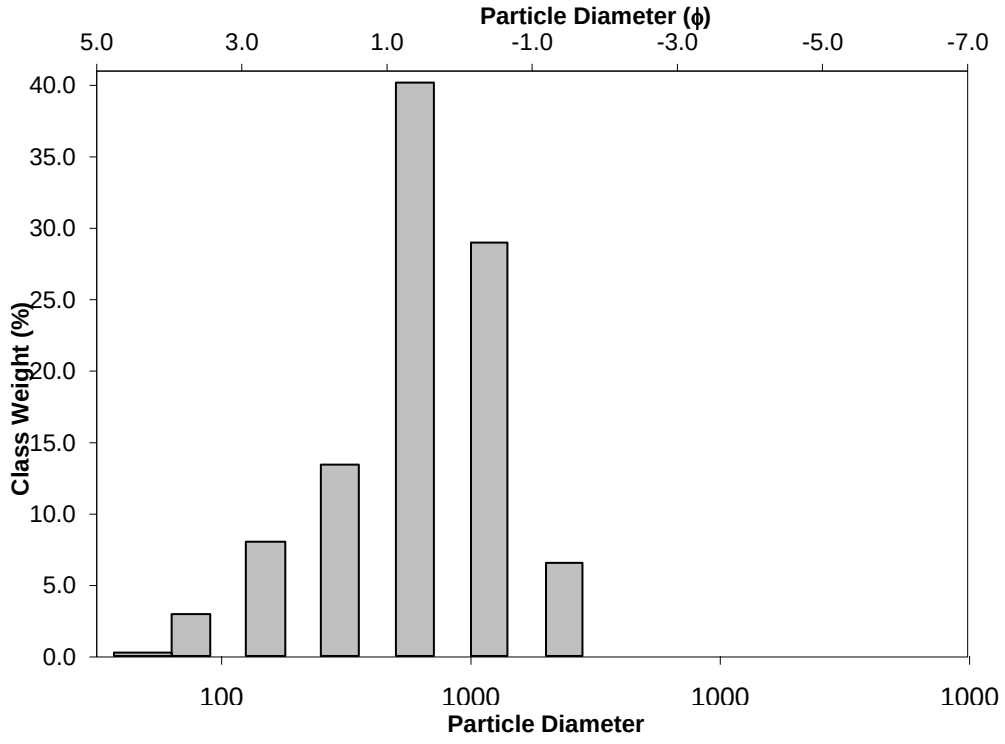
	μm	ϕ
MODE 1:	605.0	0.747
MODE 2:	1200.0	-0.243
MODE 3:	302.5	1.747
D_{10}:	166.8	-0.421
MEDIAN or D_{50}:	619.6	0.691
D_{90}:	1339.2	2.584
(D_{90} / D_{10}):	8.028	-6.132
(D_{90} - D_{10}):	1172.3	3.005
(D_{75} / D_{25}):	3.170	-9.329
(D_{75} - D_{25}):	765.5	1.665

GRAIN SIZE DISTRIBUTION

GRAVEL:	6.3%	COARSE SAND:	40.5%
SAND:	93.3%	MEDIUM SAND:	13.5%
MUD:	0.4%	FINE SAND:	8.4%
		V FINE SAND:	3.0%
V COARSE GRAVEL:	0.0%	V COARSE SILT:	0.4%
COARSE GRAVEL:	0.0%	COARSE SILT:	0.0%
MEDIUM GRAVEL:	0.0%	MEDIUM SILT:	0.0%
FINE GRAVEL:	0.0%	FINE SILT:	0.0%
V FINE GRAVEL:	6.3%	V FINE SILT:	0.0%
V COARSE SAND:	28.0%	CLAY:	0.0%

	METHOD OF MOMENTS			FOLK & WARD METHOD		
	Arithmetic	Geometric	Logarithmic	Geometric	Logarithmic	Description
	μm	μm	ϕ	μm	ϕ	
MEAN ($\bar{x}$):	788.0	594.9	0.749	599.6	0.738	Coarse Sand
SORTING (σ):	554.7	2.208	1.143	2.212	1.145	Poorly Sorted
SKEWNESS (Sk):	1.358	-0.663	0.663	-0.085	0.085	Symmetrical
KURTOSIS (K):	4.901	3.345	3.345	0.984	0.984	Mesokurtic

GRAIN SIZE DISTRIBUTION



Lampiran 6. Perhitungan Debit Aliran Sungai Tallo

$$Q = A\ x\ v$$

$$A = p\ x\ t$$

Keterangan:

Q = Debit (m^3/s)

v = Kecepatan arus (m/s

A = Luas penampang (m^2)

p = Lebar penampang basah (m)

t = Kedalaman (m)

- Menghitung luas penampang basah

  $A = p\ x\ t$

  $A = 168\ x\ 1{,}98$

  $\boldsymbol{A = 332{,}64\ m^2}$

- Menghitung debit aliran Sungai Tallo

  $Q = A\ x\ v$

  $Q = 332{,}64\ m^2 x\ 0{,}05102\ m/s$

  $\boldsymbol{Q = 16{,}98\ m^3/s}$

Lampiran 7. Hasil analisis nilai TSS menggunakan metode gravimetri

- Menuju Surut

Titik	Berat Kertas Saring (gr)	Berat Kering (gr)	Air Hasil Saringan (Liter)	Nilai TSS (mg/L)
1	0.095	0.115	0.540	37.037
2	0.094	0.129	0.510	68.627
3	0.095	0.124	0.540	53.704
4	0.095	0.128	0.540	61.111
5	0.095	0.126	0.470	65.957
6	0.096	0.119	0.540	42.593
7	0.094	0.125	0.540	57.407
8	0.094	0.127	0.550	60.000
9	0.093	0.121	0.545	51.376
10	0.092	0.122	0.510	58.824
11	0.095	0.118	0.480	47.917
12	0.095	0.124	0.550	52.727
13	0.092	0.125	0.550	60.000

- Menuju Pasang

Titik	Berat Kertas Saring (gr)	Berat Kering (gr)	Air Hasil Saringan (Liter)	Nilai TSS (mg/L)
1	0.094	0.107	0.550	23.636
2	0.093	0.114	0.540	38.889
3	0.095	0.106	0.540	20.370
4	0.095	0.116	0.550	38.182
5	0.092	0.117	0.530	47.170
6	0.094	0.111	0.540	31.481
7	0.095	0.112	0.540	31.481
8	0.093	0.119	0.530	49.057
9	0.095	0.118	0.540	42.593
10	0.095	0.113	0.550	32.727
11	0.094	0.110	0.530	30.189
12	0.094	0.104	0.550	18.182
13	0.093	0.103	0.540	18.519

Lampiran 8. Hasil validasi RMSE perhitungan arus lapangan (current meter) dan model

NO	Tanggal / Waktu	Current Meter (m/s)	Arus Model (m/s)	Xm-Xe	(Xm-Xe)^2
1	18 Juli 2023 10.00	0.0552	0.01753	-0.0377	0.0014
2	18 Juli 2023 11.00	0.0963	0.03006	-0.0662	0.0044
3	18 Juli 2023 12.00	0.1461	0.02273	-0.1234	0.0152
4	18 Juli 2023 13.00	0.0712	0.01113	-0.0601	0.0036
5	18 Juli 2023 14.00	0.0951	0.01434	-0.0808	0.0065
6	18 Juli 2023 15.00	0.0497	0.02370	-0.0260	0.0007
7	18 Juli 2023 16.00	0.0121	0.02988	0.0178	0.0003
8	18 Juli 2023 17.00	0.0442	0.02837	-0.0158	0.0003
9	18 Juli 2023 18.00	0.0918	0.02785	-0.0640	0.0041
10	18 Juli 2023 19.00	0.1401	0.02427	-0.1158	0.0134
11	18 Juli 2023 20.00	0.1077	0.01910	-0.0886	0.0079
12	18 Juli 2023 21.00	0.1739	0.01351	-0.1604	0.0257
13	18 Juli 2023 22.00	0.2575	0.00996	-0.2475	0.0613
14	18 Juli 2023 23.00	0.1408	0.00291	-0.1379	0.0190
15	19 Juli 2023 00.00	0.1666	0.00190	-0.1647	0.0271
16	19 Juli 2023 01.00	0.137	0.00624	-0.1308	0.0171
17	19 Juli 2023 02.00	0.0683	0.01077	-0.0575	0.0033
18	19 Juli 2023 03.00	0.0536	0.01240	-0.0412	0.0017
19	19 Juli 2023 04.00	0.0306	0.01809	-0.0125	0.0002
20	19 Juli 2023 05.00	0.0463	0.02831	-0.0180	0.0003
21	19 Juli 2023 06.00	0.0243	0.03531	0.0110	0.0001
22	19 Juli 2023 07.00	0.0463	0.04091	-0.0054	0.0000
23	19 Juli 2023 08.00	0.0187	0.03997	0.0213	0.0005
24	19 Juli 2023 09.00	0.0712	0.04164	-0.0296	0.0009
				Total	0.2150
				n	24
				Total/n	0.0090
				RMSE	0.0946
				%	9.4640

Lampiran 9. Dokumentasi

- Dokumentasi di lapangan

Gambar 22. Pengambilan data TSS

Gambar 23. Pengambilan data sedimen menggunakan sedimen trap

Gambar 24. Pengambilan data arus menggunakan current meter

Gambar 25. Foto bersama tim di lapangan

- Dokumentasi di laboratorium

Gambar 26. Preparasi alat dan sampel di laboratorium

Gambar 27. Analisis ukur butir sedimen

Gambar 28. Analisis sampel air untuk uji TSS