MINERAL RESOURCES TASMANIA

Laboratory Report

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MRT Sand Project Lot 4

Clay and Fine Sediment Analysis – East and Southeast Coast Sands

An unpublished Mineral Resources Report for:
Travis Holmes & Mineral Resources Tasmania

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SUMMARY

As part of the Mineral Resources Tasmania Sand Sampling Program, 30 siliceous sands were submitted for testing. The testing regimen was determined by T. Holmes based on industry requirements, with the samples assessed for clay and fine silt proportions by settling method (AS 1141.33:2015). There was variability in colour, with samples ranging from off-white to pale cream-yellow, tan, to grey brown. The samples were predominantly medium to fine grained sands, with a majority of samples containing at least trace organic matter and a minority having coarse sand to gravel/cobbles present.

Of the samples tested, the vast majority (26) had a C value <10%. Of those, 2 (C113855 & C113861) had a C value rounded to 0%, with 5 (C113847, C113852, C113864, C113870 & C113873) having a value of 1% and 14 more samples having a C value between 2 – 5% and 3 samples 6 – 10%. While dry sieving Particle Size Distribution results are not available for comparative discussion, the results of the AS 1141.33 testing indicate a low proportion of clay and fine silt for most of the samples tested.

1. INTRODUCTION

Clay and fine silt determination by the settling method AS 1141.33:2015 was requested on 30 samples of predominantly fine to medium grained, silica rich sands by Travis Holmes as part of the Mineral Resources Tasmania (MRT) Sands Resource Program. While being reasonably visually consistent, there were variations across the samples. These variations were predominantly in colour (indicative of clay and/or iron oxides), grain angularity and organic content.

2. SAMPLE PREPARATION

Samples were dried to a constant mass, photographed and broken into sub-samples for the testing. The testing regimen was determined by T. Holmes based on industry requirements and building on existing datasets. A ~100g riffle split subsample of each fine aggregate was used for AS 1141.33 testing.

3. SAMPLE DESCRIPTIONS

The samples tested were visually predominantly fine to medium grained, silica rich sands, with some variability across the samples. The variations were predominantly in colour (white to off-white, pale cream-yellow, tan and grey brown), grain size and angularity, indicative of variable amounts of clays, oxidation state and organic matter, while some samples exhibited a gap-graded gravel and cobble component. See Table 1 and Figures 1 to 30 for full sample details.

Table 1. *Southeast Coast MRT Sand Project Sample Lot 3*

Sample No.	Site	Description	mE, gda94	mN, gda94	Process
C113847	South Arm	Fine to medium grained light brown polylithic sand.	541319	5236809	Clay/Silt Settling
C113848	South Arm	Very fine to fine grained quartz rich sand.	541298	5236850	Clay/Silt Settling
C113849	South Arm	Well sorted quartz rich fine grained sand.	541281	5236847	Clay/Silt Settling
C113850	South Arm	Light grey well sorted fine grained sand with abundant root fragments.	541292	5236874	Clay/Silt Settling
C113851	South Arm	Cream well sorted very fine to fine grained quartz rich sand.	541010	5237143	Clay/Silt Settling
C113852	Rheeban Beach	Tan well sorted quartz rich sand.	577051	5278859	Clay/Silt Settling
C113855	Rheeban Beach	Well sorted light brown fine grained quartz rich sand.	576749	5270951	Clay/Silt Settling
C113856	Spring Beach	Tan well sorted quartz rich fine grained sand.	574767	5285227	Clay/Silt Settling
C113857	Copping Tip	Light grey well sorted fine grained sand with minor bracken root fragments.	561327	5256516	Clay/Silt Settling
C113858	Copping Tip	Light grey well sorted fine grained sand.	561165	5257005	Clay/Silt Settling
C113859	Copping Tip	Light grey well sorted very fine to fine grained sand.	561528	5256229	Clay/Silt Settling
C113860	Copping Tip	Light Brown very fine to fine grained sand with minor clay fraction.	562242	5256004	Clay/Silt Settling
C113861	Marion Bay	Light brown well sorted fine grained sand.	571041	5258848	Clay/Silt Settling
C113862	Bucklands	Light brown well sorted fine grained sand.	553355	5291720	Clay/Silt Settling
C113863	Bucklands	Light brown well sorted fine grained sand.	554304	5291571	Clay/Silt Settling
C113864	Bucklands	Light brown well sorted fine grained sand.	553462	5292025	Clay/Silt Settling
C113865	Bucklands	Light brown fine grained sand and minor clay.	553961	5292130	Clay/Silt Settling
C113866	Bucklands	light brown to O2 deficient grey-black fine grained sand.	554316	5292274	Clay/Silt Settling
C113867	Bucklands	Light brown well sorted fine grained sand.	553223	5292598	Clay/Silt Settling
C113868	Tyenna	Saprolite. Fine to medium grained sand and minor clay.	470191	5269192	Clay/Silt Settling

Sample No.	Site	Description	mE, gda94	mN, gda94	Process
C113869	Sloping main	Light brown fine grained sand with minor root fragments.	555476	5239858	Clay/Silt Settling
C113870	Sloping main	Light brown fine to medium grained sand.	554988	5239290	Clay/Silt Settling
C113871	Roaring Beach	Saprolite. Cream to light grey fine grained quartz rich sand.	558089	5229157	Clay/Silt Settling
C113872	Roaring Beach Dunes	Light brown fine grained sand with minor root fragments.	554896	5229565	Clay/Silt Settling
C113873	Murdunna	Light brown fine grained sand with minor bracken root fragments.	569558	5243257	Clay/Silt Settling
C113874	Murdunna	Light brown fine grained quartz rich sand.	569629	5243558	Clay/Silt Settling
C113875	Murdunna	Light Brown fine grained sand.	569553	5243090	Clay/Silt Settling
C113876	Murdunna	Cream well sorted quartz rich fine grained sand.	568455	5243270	Clay/Silt Settling
C113877	Somers Bay	Light brown fine grained sand.	567853	5242370	Clay/Silt Settling
C113878	Tahune	Till stockpile. Clay rich, ranging from clay to rounded 30-cm qz rich boulders.	476021	5227620	Clay/Silt Settling

***Figure 1**. C113847. Fine to medium grained light brown polylithic sand.*

***Figure 2.** C113848. Very fine to fine grained quartz rich sand.*

Figure 3. *C113849. Well sorted quartz rich fine-grained sand.*

Figure 4. *C113850. Light grey well sorted fine grained sand with abundant root fragments.*

Figure 5. *C113851. Cream well sorted very fine to fine grained quartz rich sand.*

Figure 6. *C113852. Tan well sorted quartz rich sand.*

Figure 7. *C113855. Well sorted light brown fine grained quartz rich sand.*

Figure 8. *C113856. Tan well sorted quartz rich fine grained sand.*

Figure 9. *C113857. Light grey well sorted fine grained sand with minor bracken root fragments.*

Figure 10. *C113858. Light grey well sorted fine grained sand.*

Figure 11. *C113859. Light grey well sorted very fine to fine grained sand.*

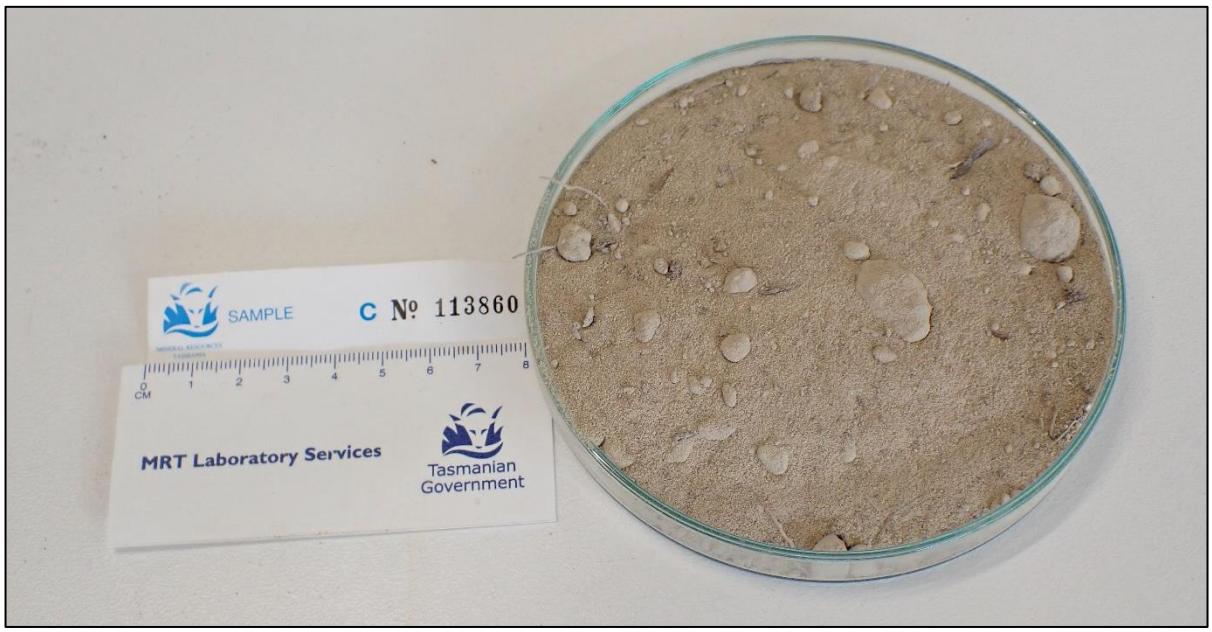

Figure 12. *C113860. Light Brown very fine to fine grained sand with minor clay fraction.*

Figure 13. *C113861. Light brown well sorted fine grained sand.*

Figure 14. *C113862. Light brown well sorted fine grained sand.*

Figure 15. *C113863. Light brown well sorted fine grained sand.*

Figure 16. *C113864. Light brown well sorted fine grained sand.*

Figure 17. *C113865. Light brown fine-grained sand and minor clay.*

Figure 18*. C113866. light brown to O2 deficient grey-black fine-grained sand.*

Figure 19. *C113867. Light brown well sorted fine grained sand.*

Figure 20. *C113868. Saprolite. Fine to medium grained sand and minor clay.*

Figure 21. *C113869. Light brown fine grained sand with minor root fragments.*

Figure 22. *C113870. Light brown fine to medium grained sand.*

Figure 23. *C113871. Saprolite. Cream to light grey fine grained quartz rich sand.*

Figure 24. *C113872. Light brown fine-grained sand with minor root fragments*

Figure 25. *C113873. Light brown fine grained sand with minor bracken root fragments.*

Figure 26. *C113874. Light brown fine grained quartz rich sand.*

Figure 27. *C113875. Light Brown fine grained sand.*

Figure 28. *C113876. Cream well sorted quartz rich fine grained sand.*

Figure 29. *C113877. Light brown fine-grained sand.*

Figure 30. *C113878. Till stockpile. Clay rich, ranging from clay to rounded 30-cm quartz rich boulders.*

4. CLAY & FINE SILT SETTLING ANALYSIS

Clay and fine silt settling analysis was undertaken in accordance with AS 1141.33:2015 with results summarised below in Table 2. The standard specifies where the separation of sediments is unclear, results should be specified “indeterminate”, however, where possible, estimated C (Ratio by volume of Clay & Fine silt to Sand) has been indicated. Almost all samples had at least a minor proportion of organic matter (predominantly fern roots) present.

Of the samples tested, the majority (26) had a C value <10%. Of those, 2 (C113855 & C113861) had a C value rounded to 0%, with 5 (C113847, C113852, C113864, C113870 & C113873) having a value of 1% and 14 more samples having a C value between 2 – 5% and 3 samples 6 – 10%. While dry sieving Particle Size Distribution (PSD) results are not available for these samples, the results of the AS 1141.33 testing indicate a low proportion of clay and fine silt for the majority of the samples tested. See the Appendix for a full discussion.

Table 2. *Sand and Fine Silt & Clay Settling Data*

Sample Registration Number	Sand Volume - S (mL)	Clay & Fine Silt Volume - F (mL)	Ratio by volume of Clay & Fine silt to Sand - C (%)	Comments
C113847	95	1	1%	** F (mL) Rounded up to 1*
C113848	102	2	2%	
C113849	105	2	2%	
C113850	89	7	8%	
C113851	95	3	3%	
C113852	90	1	1%	** F (mL) Rounded up to 1*
C113855	98	0	0%	** F (mL) <0.5*
C113856	101	2	2%	
C113857	99	6	6%	
C113858	105	5	5%	
C113859	98	0	0%	** F (mL) <0.5*
C113860	86	12	14%	
C113861	100	0	0%	** F (mL) <0.5*
C113862	108	2	2%	
C113863	107	3	3%	
C113864	108	1	1%	
C113865	88	10	11%	
C113866	96	4	4%	
C113867	102	2	2%	
C113868	100	12	12%	
C113869	97	6	6%	
C113870	96	1	1%	
C113871	98	4	4%	
C113872	96	4	4%	
C113873	99	1	1%	
C113874	98	2	2%	
C113875	100	6	6%	
C113876	94	2	2%	
C113877	100	2	2%	
C113878	95	12	13%	

* Estimated clay and fine silt volumes, and ratios of clay and fine silt to sand

5. DISCUSSION AND CONCLUSIONS

Of the 30 samples tested, the vast majority (26) had a C value <10% indicating a low proportion of clay and fine silt for most of the samples tested. Of those, 2 (C113855 & C113861) had a C value rounded to 0%, with 5 (C113847, C113852, C113864, C113870 & C113873) having a value of 1%, 14 more samples having a C value between 2 – 5% and 3 samples 6 – 10%. Dry sieving Particle Size Distribution results were not available for this report for comparative discussion.

As per the Standard, there is no consistent relationship between the test result and the silt and clay fraction obtained by sieving. In general, however, the magnitude of the result of this test will be greater than the result passing the 75 µm sieve. Where the clay is more active or there is a higher proportion of it, the clay and fine silt is likely to remain trapped within the sediment column, reflected in the indeterminate separation. For the samples tested for this report, this did not appear to be an issue, with no unclear separation of sediments recorded.

Likewise, the standard also recommends not using this analysis for fine aggregates with >10% of material passing the 75 µm sieve. PSD data was not available for this report. Without that, as a guide, samples with a higher C Value (>10%) should be treated with caution (though it should be noted, no unclear separation of the sand from fine silt and clay was recorded for these analyses).

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LABORATORY DETAILS

MRT operates a laboratory facility at Mornington, Tasmania. In the interests of full disclosure, these laboratories do not have NATA accreditation. However, all tests are performed according to relevant Australian Standards cited in the report and subject to internal peer review processes. The analytical facilities at MRT are periodically compared against other similar laboratories in other jurisdictions with favourable results.