



ASX RELEASE

14 September 2020

**TITANIUM SANDS LIMITED**  
ACN 009 131 533

Level 11, London House  
216 St. Georges Terrace  
Perth Western Australia 6000  
Tel: +61 (08) 9481 0389  
Facsimile: +61 (08) 94636103  
website:  
<http://titaniumsands.com.au>

**Contact:**

Dr James Searle  
Managing Director  
[james.searle@titaniumsands.com.au](mailto:james.searle@titaniumsands.com.au)

**Directors**

Lee Christensen  
Dr James Searle  
Jason Ferris

**Ticket**

ASX: TSL

## Project update and garnet added to resource estimate

- COVID-19 restrictions eased, exploration to recommence.
- Sri Lankan government elections have been completed providing strong and stable leadership in-country.
- Sri Lankan PR and legal firms have been appointed to assist TSL outline its future project to local communities.
- Laboratory results have enabled garnet to be added to the mineral resource estimate for the project.
- Immediate exploration focus is on conversion of more inferred resources to indicated.
- Further more detailed scoping study results expected to be released to the market once resource upgrade finalised.
- Further exploration will address resource expansion laterally and at depth.
- Offtake and strategic partner discussions continuing.

The Board of Titanium Sands Limited ("TSL") would like to provide the following market update on its Sri Lankan heavy mineral sands project. These results provide a significant boost in the mineral suite of TSL.

Sri Lanka has had a very effective and co-ordinated approach to the Covid—19 pandemic resulting in low rates of infection and mortality. Consequently COVID-19 restrictions have been eased within Sri Lanka and will allow TSL exploration work to recommence with the local workforce returning to site. TSL wish the people of Sri Lanka well during these difficult times and sincerely wish the best for the community during the pandemic.

Sri Lankan federal elections were held on August 5<sup>th</sup> and TSL congratulate the Sri Lankan Podujana Peramuna ("SLPP") and Prime Minister Mahinda Rajapaksa on their significant win with an almost 2/3rds majority. Under the guidance of the Prime Minister, Sri Lanka will continue to operate under strong democratic leadership and TSL will work closely with the government to continue to invest into the Sri Lankan community via foreign investment and to create employment and wealth generation for the people of Sri Lanka for generations to come.

Sri Lankan PR company SAPA has been appointed to assist TSL with its local public relations requirements and community messaging. Similarly, Sri Lankan legal firm Varner's has also been appointed to

assist with procedures and processes within Sri Lanka as the project begins to build. Messaging to local communities includes understanding of employment opportunities, processes involved in exploration and further as the project develops, and rehabilitation of zones post project and how that will benefit local communities. As mentioned in the announcement (ASX:TSL 30 June 2020) TSL intend to create further employment opportunities during the project and also create income producing plantations that are sustainable in nature and that will provide income and employment for generations to come.

The scoping study (**ASX announcement 16<sup>th</sup> June 2020<sup>1</sup>**) demonstrated the potential for an economically robust long life dredging project. With further resource drilling to convert more inferred resources to indicated it is anticipated that the scoping study will be updated with more detailed information on production rates, capital costs and operating costs.

Further to the proposed high-grade zone exploration, TSL will then follow with exploration on previously identified zones. The proposed exploration program will include the use of the company's owned RC Aircore rig and it is anticipated the results of this program will be available by Q1 of calendar year 2021. Further mineralogical studies have enabled the inclusion of garnet into the mineral resource estimate for the Mannar Island Heavy Mineral Sand Project as a subsidiary but valuable addition to the mineral suite for the project with selling price estimates of AUD\$357/t. The garnet inclusive resource restatement is included below.

TSL continues to discuss offtake and strategic partner opportunities with various partners. Strategic partnership opportunities are being sought in United Arab Emirates, Europe and China under mandate with local corporate advisory firms and offtake discussions are continuing with groups from Japan and India.

## **MANNAR ISLAND PROJECT MINERAL RESOURCE ESTIMATE**

### **Overview**

This Mineral Resource Estimate has been prepared by GeoActiv Pty Ltd a geological consulting and contracting company based in Johannesburg, South Africa by Bernhard Siebrits (Pr.Sci.Nat. MGSSA MAusIMM) and Kobus Badenhorst (Pr.Sci.Nat. MGSSA) in compliance with the JORC 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. The mineral resource estimate has been summarised in this ASX announcement by James Searle BSc (Hons), PhD, MAIMM) Managing Director of Titanium Sands Ltd. All three qualify as "Competent Persons" as defined under the JORC 2012 code (see competent persons statement below).

The mineral resource estimate is tabulated in tables 1, 2 and 3 below correspond to lower grade cut offs of 0% (no lower grade cut off), 2% and 3%. A 2% lower cut off is considered most appropriate for this Mineral Resource Estimation in that it maintains satisfactory continuity of the resource zone and as far as can be determined at this project stage is not likely to be inconsistent with the economics of mining and treatment unconsolidated surface exposed low silt content mineral sand deposits in general. Appendix 1 contains Sections 1 and

2 information on the Mineral Resource Estimate and the project in full compliance with the JORC 2012 requirements.

This mineral resource estimate while it supersedes the previous mineral resource estimate (*ASX Announcement 6<sup>th</sup> of May 2020*<sup>2</sup>), the only difference is the inclusion of the garnet component, all other mineral components, tonnage, total heavy minerals, and allocations to resource categories remain the same.

Resource Category	Volume (Mm <sup>3</sup> )	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	50.48	88.39	4.46	0.76	13.8	1.98	0.37	0.08	0.08	0.41
Inferred	175.96	307.86	3.03	0.99	19.86	1.32	0.23	0.06	0.07	0.23
Total	226.44	396.26	3.35	0.94	18.51	1.47	0.26	0.07	0.07	0.27

Table 1 Mineral Resource Estimate based on a 0% lower cut off\*.

Resource Category	Volume (Mm <sup>3</sup> )	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	37.78	66.14	5.54	0.83	11.63	2.48	0.46	0.1	0.1	0.51
Inferred	113.62	198.79	3.99	1.06	17.56	1.77	0.3	0.08	0.1	0.3
Total	151.4	264.93	4.38	1.00	16.08	1.95	0.34	0.08	0.10	0.35

Table 2 Mineral Resource Estimate based on a 2% lower cut off\*.

Resource Category	Volume (Mm <sup>3</sup> )	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	29.84	52.22	6.36	0.83	11.14	2.89	0.53	0.11	0.12	0.59
Inferred	63.91	111.8	5.15	1.08	15.96	2.33	0.39	0.1	0.12	0.4
Total	93.75	164.02	5.54	1.00	14.43	2.51	0.43	0.10	0.12	0.46

Table 3 Mineral Resource Estimate based on a 3% lower cut off\*.

A continuous higher grade zone measuring 10km by 2km and down to depth of 8-12m ( the zone remains largely open at depth) was identified within the above mineral resource. Using the 2% lower cut off the higher grade resource contains 92.56Mt at 5.24% THM Table 4. This zone was used as the basis for the scoping study previously reported to the ASX (*ASX Announcement 16/06/2020*<sup>1</sup>).

Resource Category	Volume (Mm <sup>3</sup> )	Tonnes (M)	Thm %	Silt %	Ovz %	Ilm %	Leu %	Rut %	Zir %	Gar %
Indicated	16.96	29.51	7.25	0.75	20.39	3.25	0.62	0.1	0.12	0.9
Inferred	36.07	63.05	4.29	0.99	25.10	1.80	0.33	0.07	0.08	0.47
Total	53.03	92.56	5.24	0.92	23.60	2.27	0.42	0.08	0.09	0.61

Table 4 Mineral resource estimate for a higher grade zone contained within the resources Tabulated above for a 2% lower cut off\*.

\*Notes to tables:

- Mineral assemblage is reported as in situ weight percentage of the resource.
- Appropriate rounding of the numbers has been applied.

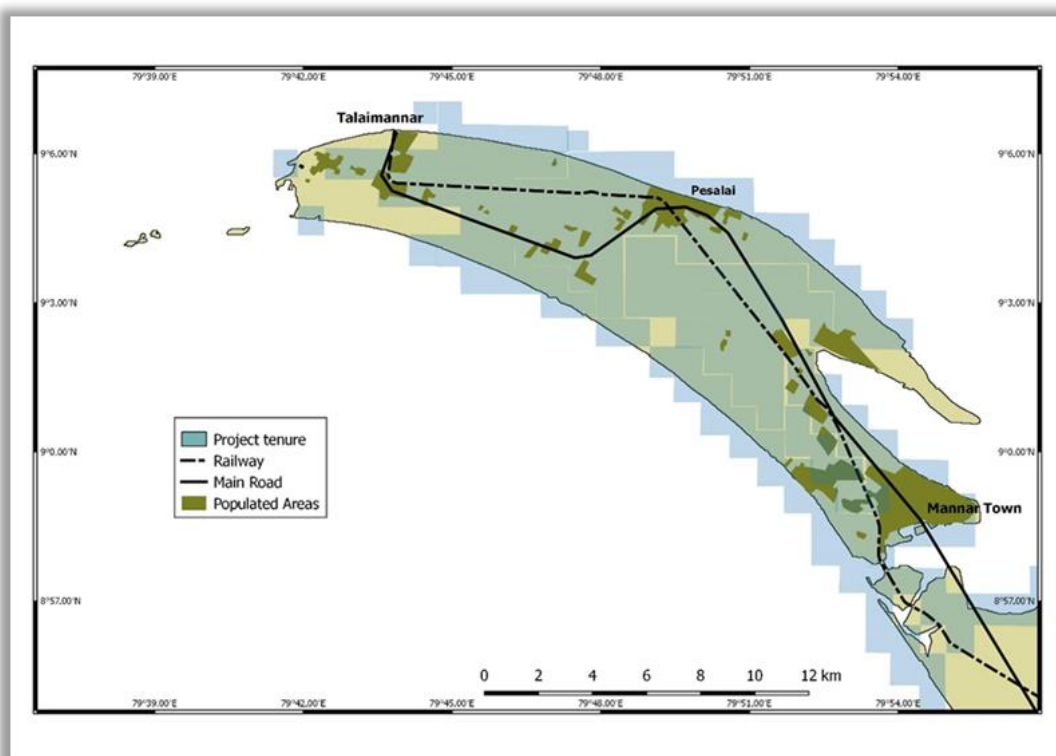
## Mineral Tenure

The tenure within which this Mineral Resource Estimate lies is held 100% by Titanium Sands Ltd under 9 exploration licenses covering 204km<sup>2</sup> (Table 5), which covers almost all of Mannar Island (Figure 1). The exploration licences are either current or in the process of being renewed with all necessary applications and submissions lodged with the Geological Survey and Mines Bureau, and the Company expects that they will be renewed in due course.

Exploration licence	EL validity		Area	Renewal date
EL 370	14.12.2017	13.12.2019	40km <sup>2</sup>	13.10.2019
EL 180/R/3	05.03.2019	04.03.2021	45km <sup>2</sup>	04.01.2021
EL 182/R/3	05.03.2019	04.03.2021	26km <sup>2</sup>	04.01.2021
EL 372	26.02.2018	25.02.2020	51km <sup>2</sup>	25.12.2019
EL 371	26.02.2018	25.02.2020	4km <sup>2</sup>	25.12.2019
EL 351	13.12.2019	12.12.2021	15km <sup>2</sup>	12.10.2021
EL 352	13.12.2019	12.12.2021	10km <sup>2</sup>	12.10.2021
EL327/R/1	14.12.2018	13.12.2020	5km <sup>2</sup>	13.10.2020
EL328/R/1	14.12.2018	13.12.2020	8km <sup>2</sup>	13.10.2020
		Total	204km <sup>2</sup>	

**Table 5 Mannar Island Project tenure\*.**

*\*All necessary applications and submissions for the renewal of EL370 and 372 have been lodged and are expected to be renewed in due course.*



**Figure 1 Titanium Sands Ltd exploration licence tenure on Mannar Island.**

## Geological Model

The geological model for the formation of the heavy mineral sands is for the supply of heavy mineral bearing sands from around 8,000 to 6,000 years ago to the present to form Mannar Island. As the sediment was supplied initially directly from a river source and later by coastal transport Mannar Island grew by progradation west across Palk Strait across an unconformity surface of Miocene to Pleistocene limestones, clays and marine sands.

As the sands were transported and deposited lighter sediment grains were winnowed out and heavy minerals concentrated. Winnowing and concentration occurred in the shallow nearshore, along the beach and by wind deflation along the back beach areas. The balance between sediment supply and heavy mineral concentration across the shoreface from the nearshore, the beach and back beach areas tended to form extensive zones of heavy mineral concentration rather than just narrow shoreline strands. Consequently continuous zones of heavy mineral concentration up to 3km wide, 8km long and up to 12m thick have been formed. This exceptional continuity of heavy mineral concentration means little or no zones of barren material within the interpreted resource block model.



**Figure 2 Wind sorting and concentration of heavy minerals (dark grey) in beach ridges on the modern coast of Mannar island.**



## Resource Drilling and Sampling

To date 3,920 hand shell auger drill holes have been completed down to the water table at 1 to 3m below surface. Initially the areas of heavy mineral concentration over Mannar Island were out lined by drill lines 800m apart with hole separations of 50m. Line spacings in areas of heavy mineral concentration were then infilled firstly down to line spacings of 400m, then 200m and in some areas 100m. Auger holes were samples at 0.5m intervals and the entire sample sent to the preparation laboratory.

During 2019 RC aircore drilling was used to test below the water table under the mineral resources defined by the auger drilling. In total 473 holes drilled to a target depth of 12m below surface. Only 19 holes failed to reach the 12m target depth. The RC aircore drill line were nominally drilled at 400m line spacings and 100m hole separations, however this was adjusted to provide infill and twin hole data with some of the auger drilling.

Above the water table the drill holes were sampled at 0.5 m intervals and below the water table at 1m intervals. The entire sample was collected and sent to the preparation laboratory. Samples were only collected when water volume recovered with the sample was sufficiently low to indicate the sample was not compromised. Water recovery increased with depth and the maximum depth of reliable sampling ranged from 8 to 11m below surface. All holes were logged to full depth.

## Laboratory and Mineralogical Analysis

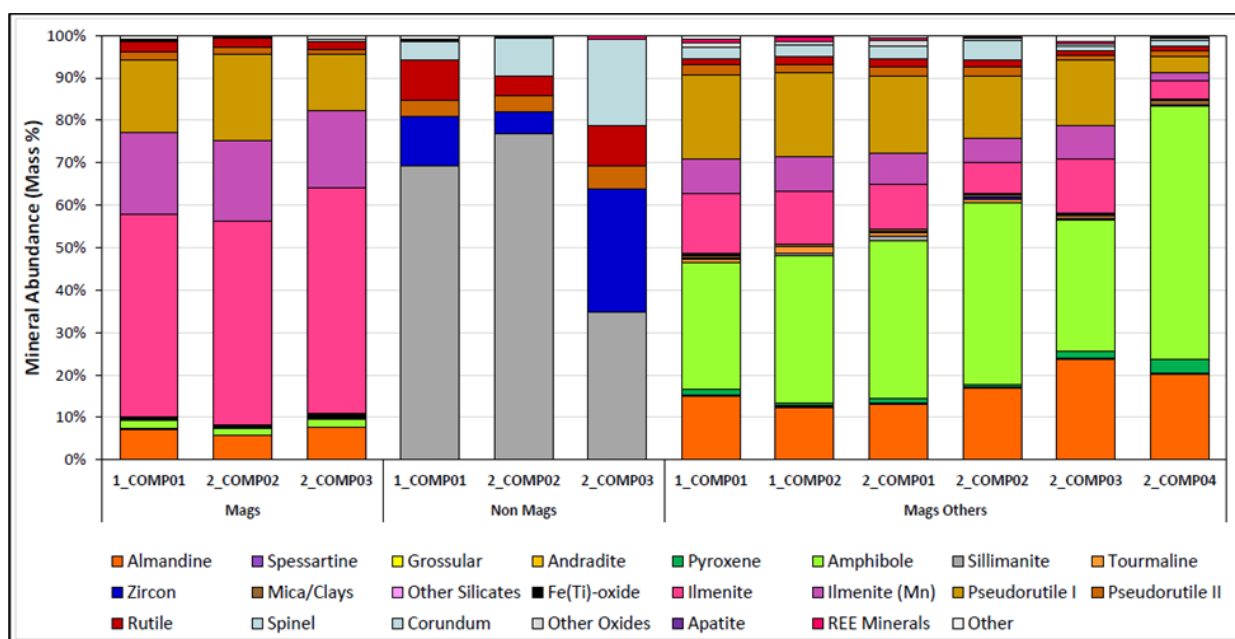
The mineralogical analysis found the dominant heavy mineral was ilmenite, with lesser amounts of pseudorutile-leucoxene, rutile, zircon and almandine garnet. A summary of the mineralogical compositions is shown in Figure 3.

Desliming (-45micron) and oversize(>1mm) removal was done with % silt and % oversize recorded in a project laboratory on Mannar Island. GeoActiv examined the facilities and procedures and reported them as satisfactory. The samples were then sent for THM analysis by heavy media separation (TBE) to a laboratory in Cape Town South Africa, Scientific Services Ltd a DEKRA certified geological laboratory (Deutscher Kraftfahrzeug-Überwachungs-Verein e.V.).

Scientific Services also prepared composite samples from 2.2% of the sample population for CARPCO (magnetic mineral separation) and XRF (x-ray fluorescence) analysis (Figure 3) . A series of 12 composites of the magnetic separations consisting of magnetic (M), magnetic-others (MO) and non-magnetic (NM) fractions from selected samples were used for mineralogical examination by XRD (X-ray diffraction), automated SEM/MLA (scanning electron microscopy) and EDX (X-ray dispersive) analysis and optical microscopy

The almandine garnet, a valuable mineral in the heavy mineral sands, was not possible to

determine from the XRF analyses, as the gangue minerals in the fractions also had Al<sub>2</sub>O<sub>3</sub> and SiO<sub>4</sub> in their compositions. A more qualitative method was needed to determine the amount of the garnets in the fractions. SJT MetMin Services (Pty) Ltd of Krugersdorp, South Africa, were provided with heavy mineral sand fraction composites for qualitative X-Ray Diffraction (XRD) and automated-SEM (QEMSCAN) analyses to determine the bulk modal mineralogical composition, mineralogical calculated chemical composition, particle characteristics and associated particle size distribution.



**Figure 3. Results of the SEM/MLA analyses of the 12 composites. Note pseudorutile and weathered ilmenite are reported as leucoxene.**

### Resource Estimation Methodology

SURPAC software was used to develop a block model with block sizes of 100m (X) x 100m (Y) x 2m (Z) and minimum sub blocking of 25m x 25m x 0.5m. The block model was constrained by the DTM (Digital Terrain Model) of the land surface and the domain areas defined by THM content. Grade interpolation for all the variables (THM, silt, oversize) and the XRF data of composite data of the CARPCO magnetic separations (CI\_yield, MO\_yield, NM\_yield, CI\_TiO<sub>2</sub>, MO\_TiO<sub>2</sub>, NM\_TiO<sub>2</sub> and NM\_ZrO<sub>2</sub>) was by inverse distance to the power of 3. The minerals (ilmenite, leucoxene, rutile and zircon) were converted from the chemistry to mineralogy with calculated attributes with the ratios determined by the mineralogical analysis. Garnet analyses were used to separately assign garnet values to the blocks in the block model. Relative densities determined by field measurements were applied to the mineralised zones. Conversion of resource volumes from the block models to tonnes was converted using 114 relative density measurements from 69 sites.

Block model validations included visual validations on section of input drill hole data and the block model (Figures 4 and 5), average grade conformance of global averages between composite input data (drill holes) with the block model output. Composite and estimated grade distributions were also compared.

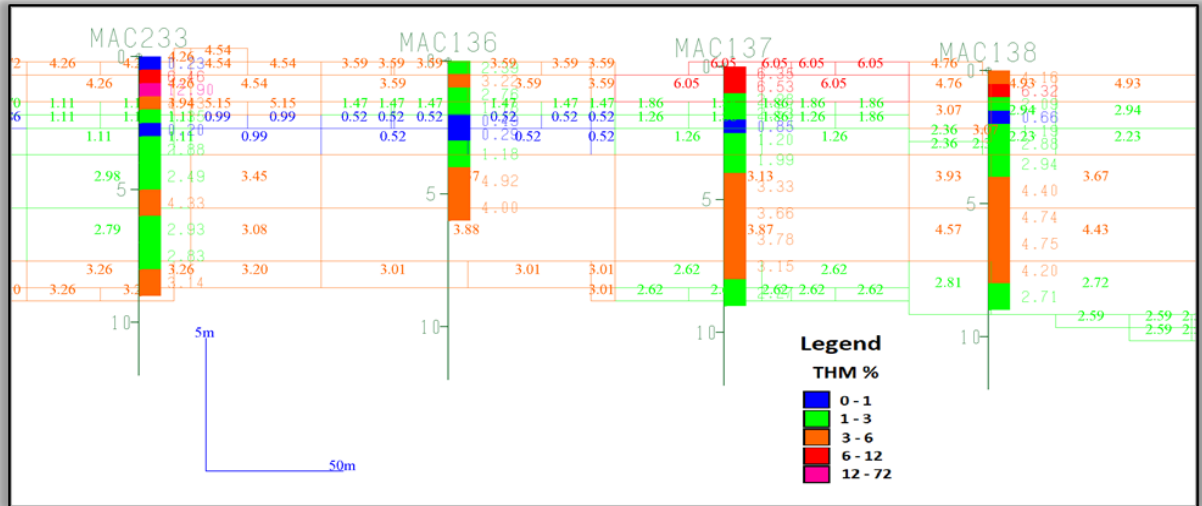


Figure 4 Section on Domain 1 and 7 on Mannar showing the input drill hole values of the THM% correlate well with the block model estimates. Vertical exaggerations 10X.

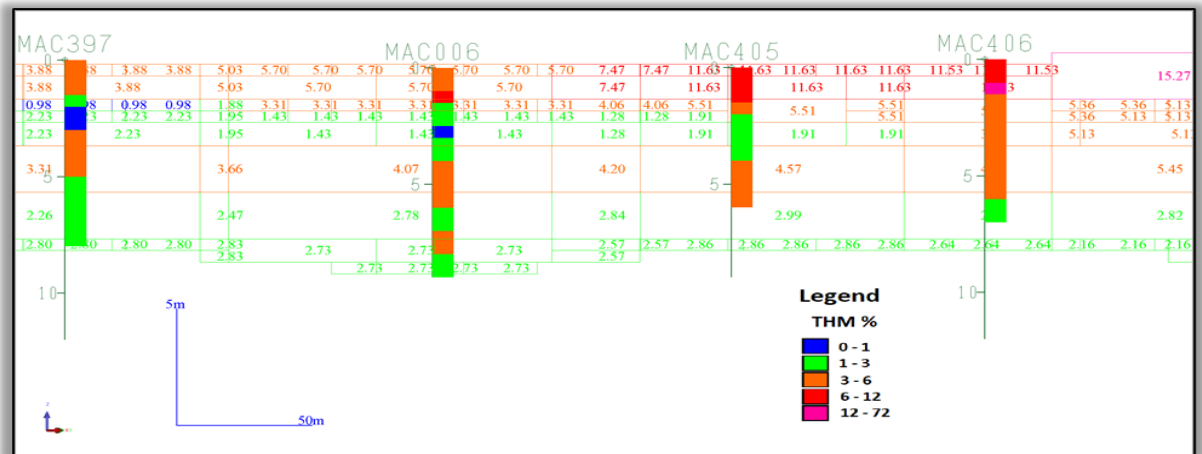


Figure 5 Section on Domain 2 and 8 on Mannar showing the input drill hole values of the THM% correlate well with the block model estimates. Vertical exaggerations 10X.

### Resource Reporting and Selection of Resource Lower Cut Off for reporting

The Mineral Resource statement tables above (Tables 1, 2, and 3) are for no lower cut-off grade of THM %, a 2% lower cut-off grade and a 3% lower cut-off grade. A 2% lower cut off is considered appropriate for this Inferred and Indicated Mineral Resource Estimation in that it maintains satisfactory continuity of the resource zone and as far as can be determined at this



early project stage is not likely to be inconsistent with the economics of mining and treatment of shallow, surface exposed high grade, low silt mineral sand deposits in general.

However as the project progresses further studies of mining and treatment options will provide better analysis of mining and treatment economics. While the 2% lower cut off is considered conservative for a Inferred and Indicated mineral resource estimation more precise and potentially variable lower and higher cut offs may have to be applied in different parts of the resource to ensure optimal economic optimisation of the resource and access to some areas where there may be localised costs for movement of infrastructure. At this stage of the project definition the use of a lower cut off of 2% is considered consistent in material respects with the requirement of the JORC code sec20 that requires mineral resources to have reasonable prospects for eventual economic exploitation.

### **Resource Classification**

The resource classification was primarily based on the drill hole density and the variability of the data. The drill hole lines 400m apart and the drill holes 50m apart were infilled in some areas to 200m by 50m. The areas with infilled drilling were able to be defined as indicated mineral resources. The areas with drill hole spacing of 400m by 50m at this time justify classification as inferred mineral resources.

### **ONGOING EXPLORATION AND RESOURCE POTENTIAL FOR THE MANNAR ISLAND PROJECT**

The Mannar Island Project has substantial resource extension and exploration potential.

- Further infill drilling is planned to convert more of the current mineral resources from inferred to indicated resources.
- Drilling has yet to establish the base of the mineralisation below the currently defined mineral resource.
- The modelled mineral resource remains partially open laterally.

The board will continue to update the market as further developments are received.

#### **Ends-**

The Board of Directors of Titanium Sands Ltd authorised this announcement to be given to ASX.

Further information contact:

James Searle

Managing Director

T: +61 8 9481 0389

E: [james.searle@titaniumsands.com.au](mailto:james.searle@titaniumsands.com.au)

## COMPLIANCE STATEMENTS

### Competent Persons Statements

Except where indicated, exploration results above have been reviewed and compiled by James Searle BSc (hons), PhD, a Competent Person who is a Member of the Australian Institute of Mining and Metallurgy, with over 37 years of experience in metallic and energy minerals exploration and development, and as such has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Dr Searle is the Managing Director of Titanium Sands Limited and consents to the inclusion of this technical information in the format and context in which it appears.

The Mineral Resources estimation reported above has been summarised by Dr James Searle. The Mineral Resources Estimate and related QA/QC investigations have been undertaken by Mr Kobus Badenhorst and Mr Bernhard Siebrits. Mr Kobus Badenhorst is a director of GeoActiv (Pty) Ltd. and is registered with the South African Council for Natural Scientific Professionals (SACNASP). Mr Siebrits is a consultant, registered with SACNASP and a Member of the Australasian Institute of Mining and Metallurgy. Mr Badenhorst and Mr Siebrits has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Persons as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Mr Badenhorst and Mr Siebrits consent to the inclusion in this report of the matters based on his information in the form and context in which it appears.

Appendix 1 contains tables of detailing compliance with the JORC 2012 requirements for reporting of Mineral Resources. This information has been compiled in relation to the Mineral Resource Estimation summarised above by Mr Badenhorst and Mr Siebrits and reviewed by Dr Searle.

### References to ASX Announcements included in this report:

- 1 Released to the ASX 16<sup>th</sup> of June 2020 "Scoping study confirms potential for major dredging project"*
- 2 Released to the ASX 6<sup>th</sup> of May 2020 "TSL Mannar island Project Resource Tonnage Tripled"*

These announcements are available to be view on the Company's website [www.titaniumsands.com.au](http://www.titaniumsands.com.au)

### Forward Looking Statements

This document may include forward-looking statements. Forward-looking statements include, but are not limited to, statements concerning the Company's planned exploration program and other statements that are not historical facts. When used in this document, the words such as "could," "plan," "expect," "intend," "may", "potential," "should", "further" and similar expressions are forward-looking statements. Although the Company believes that its expectations reflected in these forward- looking statements are reasonable, such statements involve risks and uncertainties and no assurance can be given that further exploration will result in additional Mineral Resources.

## Appendix 1

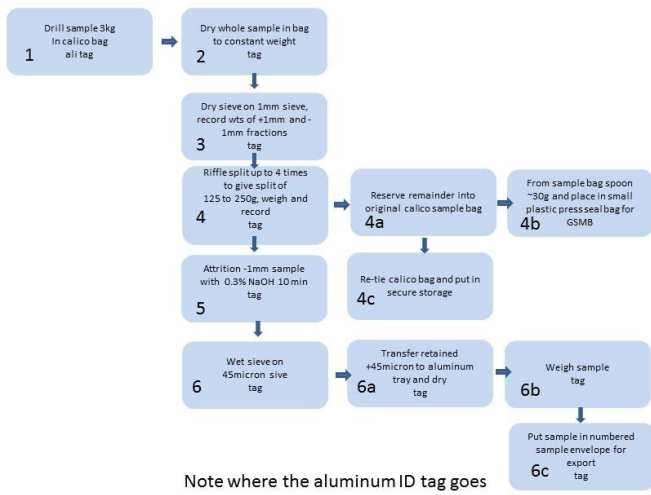
### COMPLIANCE WITH THE JORC CODE ASSESSMENT CRITERIA

The compliance information contained below is in specific reference to the Mineral Resource Estimation (MRE) for the Mannar Island Project presented here was undertaken by Kobus Badenhorst of Geo Activ Pty Ltd a geological consultant registered with the South African Council for Natural Scientific Professions ('SACNASP') and Bernhard Siebrits a geological consultant also registered with SACNASP and a Member of the Australian Institute of Mining and Metallurgy MAusIMM). Dr James Searle of Titanium Sands Ltd has also reviewed this information (see Competent Persons Statement).

The JORC Code (2012) describes a number of criteria, which must be addressed in the Public Report of Mineral Resource estimates for significant projects. These criteria provide a means of assessing whether or not parts of or the entire data inventory used in the estimate are adequate for that purpose. The resource estimate stated in this document was based on the criteria set out in Table 1 of that Code. These criteria are discussed in the table below.

JORC Code Assessment Criteria	Comments
<b>Section 1</b>	<b>Sampling techniques and data</b>
<p><b>Sampling Techniques</b></p> <p><i>Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</i></p> <p><i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></p> <p><i>Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.</i></p>	<p>A Dormer hand-auger was used for auger drilling. The bucket was designed to be able to do 0.5 m samples per drill run.</p> <p>Sampling was therefore done on 0.5 m intervals, unless penetration problems caused incomplete samples at the end of holes. Where some minor penetration problems were experienced, smaller sample runs were done.</p> <p>The full sample from the auger bucket was collected in a calico sample bag and assigned an Alpha numerical sample number.</p> <p>For the RC aircore drilling samples were collected at 0.5m intervals above the water table and 1m intervals below the water table. All material discharged from the rig cyclone was collected and bagged. No samples were taken when RC drilling went beyond a depth where water influx was considered a risk to sample integrity.</p> <p>All samples were transported to the site office / Prep Lab sample prep facility in Pesalai on Mannar Island. The Prep Lab will receive samples up to c 2.4kg in weight / sample.</p> <p>All samples from the drilling program were prepped, even samples perceived to be low grade. Reference / residual samples for samples sent to the analytical laboratory are safely stored at the site office. Permits for the export of the samples were sourced in Sri Lanka, on receipt of the permits the samples were couriered via air freight to Johannesburg where clearance took place for the samples. They were then air freighted to Cape Town where a representative from the laboratory, Scientific Services CC, collected the samples.</p>
<b>Drilling Techniques</b>	A Dormer hand-auger was used for auger drilling.

JORC Code Assessment Criteria	Comments
<p><i>Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.), and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).</i></p>	<p>The bucket has a diameter of 75mm.</p> <p>The auger bucket was designed to drill 0.5 m samples per drill run. Larger samples would have become too heavy and would have resulted in sample falling out of the bucket.</p> <p>One-meter drill rod extensions were used, with sufficient extensions on site to drill to 9m. The deepest auger holes drilled were MA176 and MA302, both drilled to 6.00m.</p> <p>Reverse circulation aircore drilling utilises HQ gauge (96mm OD, 63.5mmID) drilling rods with inner tubes was used.</p>
<p><b>Drill Sample Recovery</b></p> <p><i>Method of recording and assessing core and chip sample recoveries and results assessed.</i></p> <p><i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i></p> <p><i>Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.</i></p>	<p>Detailed measurements were done during drilling prior to and after the removal of the drill bucket during drilling. This was to ensure that there was no collapse of the sidewalls. Re-drilling took place where this was not the case, or the hole and sampling stopped where sample recovery or hole collapse became a problem. Recoveries were estimated and recorded for each 0.5m drill interval.</p> <p>The sample recovery or penetration problems were purely linked to the shallow water table.</p> <p>Sample recovery from the RC aircore drilling rig was from the rig cyclone. Recovery was logged from the sample volume collected and the volumes displaced by the drill string over the sample interval.</p>
<p><b>Logging</b></p> <p><i>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</i></p> <p><i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc), photography.</i></p> <p><i>The total length and percentage of the relevant intersections logged.</i></p>	<p>Each sample was geologically logged for mineral composition, grain size, sorting, visual Silt%, induration, and a rough visual estimate of the dark heavy mineral % component.</p> <p>Paper log information was transferred every night to an excel spread sheet.</p>
<p><b>Sub-Sampling Techniques and Sample Preparation</b></p> <p><i>If core, whether cut or sawn and whether quarter, half or all core taken.</i></p> <p><i>If non-core, whether riffled, tube sampled, rotary split, etc, and whether sampled wet or dry.</i></p> <p><i>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</i></p> <p><i>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</i></p> <p><i>Measures taken to ensure that the sampling is representative of the in situ material collected, including for</i></p>	<p>The Prep Lab will receives samples up to c 2.4kg in weight / sample that have to be dried, sieved on a 1mm aperture vibrating sieve, the +1mm and -1mm fractions weighed, then the -1mm fraction riffle split to a sub-sample of c 125-250g and the remaining material retained in storage. The 125-250g sample is weighed then undergoes rotary light attritioning in a 0.3-0.5% NaOH solution. The subsample will then be wet sieved on a 45-micron vibrating sieve with retained +45 micron material being dried then weighed and packaged for export.</p> <p>A duplicate sample was riffled from every 20th sample, i.e. 5% of the total.</p> <p>The riffler was thoroughly cleaned after each sample.</p>

JORC Code Assessment Criteria	Comments
<p>instance results for field duplicate/second-half sampling.</p> <p>Whether sample sizes are appropriate to the grain size of the material being sampled.</p>	
<p><b>Quality of Assay Data and Laboratory Tests</b></p>	<p>The initial drying (at between 80 to 105 degrees C via gas oven), de-sliming and oversize removal was conducted at the site Prep Facility on Mannar Island. The procedures are shown below.</p>  <pre> graph TD     1[1 Drill sample 3kg in calico bag all tag] --&gt; 2[2 Dry whole sample in bag to constant weight tag]     2 --&gt; 3[3 Dry sieve on 1mm sieve, record wts of +1mm and -1mm fractions tag]     3 --&gt; 4[4 Riffle split up to 4 times to give split of 125 to 250g, weigh and record tag]     4 --&gt; 4a[4a Reserve remainder into original calico sample bag]     4 --&gt; 4b[4b From sample bag spoon ~30g and place in small plastic pressseal bag for GSMB]     4 --&gt; 5[5 Attrition -1mm sample with 0.3% NaOH 10 min tag]     4a --&gt; 4c[4c Re-tie calico bag and put in secure storage]     5 --&gt; 6[6 Wet sieve on 45micron sieve tag]     6 --&gt; 6a[6a Transfer retained +45micron to aluminum tray and dry tag]     6a --&gt; 6b[6b Weigh sample tag]     6b --&gt; 6c[6c Put sample in numbered sample envelope for export tag] </pre> <p>Note where the aluminum ID tag goes</p> <p>Analytical work on the tetrabromoethane (TBE) based THM determination and subsequent magnetic separation work was done by Scientific Services C.C., Cape Town. XRF work was done on the fractions of the magnetic separation samples</p> <ul style="list-style-type: none"> <li>• The determination of THM% sample concentrate using TBE at a specific gravity (SG) of 2.95, are as follows:</li> <li>• TBE is placed into the glass flask up to the indicated mark.</li> <li>• Place approximate 1 scoop of sample into the flask.</li> <li>• Wash down the sides of the flask and impeller with TBE to ensure all material is in the TBE.</li> <li>• Run the mixer for about 10 seconds.</li> <li>• Wash down again to ensure no material is 'hung'.</li> <li>• Run the impeller mixer repeatable in 10 second bursts until sure that all heavies have been liberated.</li> <li>• Allow to stand for 5-10 minutes or until no more material cascades to bottom.</li> <li>• Once the discharge pipe is clear of suspended material release the tube to allow the concentrate to be captured in the filter paper. Store this labeled filter paper.</li> <li>• Process any remaining sample as above ensuring no concentrate is lost.</li> </ul> <p>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</p> <p>For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</p> <p>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</p>

JORC Code Assessment Criteria	Comments
	<ul style="list-style-type: none"> <li>Finally flush out the floats by opening the tube and allowing the floats to fall into filter paper – allow this to stand capturing all the TBE which will be reused at a later stage.</li> <li>Wash all concentrates and floats thoroughly with acetone to reclaim as much TBE as possible.</li> <li>After the concentrate filter is acetone rinsed and dried, transfer the concentrate very carefully into a bag by opening the filter paper ensuring nothing is lost.</li> <li>Place the floats into the waste drums unless specified by the client to do otherwise.</li> <li>Check the SG of the TBE with the density tracers provided and re-use as appropriate.</li> </ul>
<b>Verification of Sampling and Assaying</b>	
<p><i>The verification of significant intersections by either independent or alternative company personnel.</i></p> <p><i>The use of twinned holes.</i></p> <p><i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i></p> <p><i>Discuss any adjustment to assay data.</i></p>	<p>Kobus Badenhorst did twin and test holes on c 5% of the drilling done during the program.</p> <p>QA/QC of all the work done was performed by Bernhard Siebrits for GeoActiv.</p>
<b>Location of Data Points</b>	Data and work were done in UTM, WGS84.
<p><i>Accuracy and quality of surveys used to locate drill holes (collar and downhole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</i></p> <p><i>Specification of the grid system used.</i></p> <p><i>Quality and adequacy of topographic control.</i></p>	<p>A handheld Garmin GPS was used for the positioning and final position of the auger holes.</p> <p>The X and Y coordinates were collected and entered into the project spreadsheet.</p> <p>The handheld GPS Z data were found to be very inaccurate. Consequently, a GeoEye satellite based Digital Terrain Model (DTM) study that covers the entire Mannar Island was done in 2015, the data interpretation and manipulation for the areas covered by the resource update was done by a highly qualified land surveyor during 20117. The X and Y coordinates of the drill holes was used to elevate the drill holes to the DTM surface prior to resource modelling taking place. This will supply significantly more accurate Z data as the DTM is based on 13 Differential GPS derived points.</p>
<b>Data Spacing and Distribution</b>	
<p><i>Data spacing for reporting of Exploration Results.</i></p> <p><i>Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.</i></p> <p><i>Whether sample compositing has been applied.</i></p>	<p>The auger drilling program for the updated resource was conducted at 400m inter-drill line spacing, with 50m inter-drill hole spacing on the lines and further reduced to 200m by 50m. The infill drilling with the aircore holes in Domains 1 and 2 were on a drilling pattern of about 400m by 100m between the auger drilled lines and some on the auger lines to twin the auger holes. The previous drilling pattern of about 800m by 50m has been further reduced to about 200m by 50m in domain 4 with shallow auger holes</p> <p>RC aircore drilling was undertaken on nominal 400m line spacings and 100m hole spacing, although this was varied in places to enable RC aircore holes to twin previous auger holes.</p>
<b>Orientation of Data in Relation to Geological Structure</b>	Drilling took place in fences perpendicular to the interpreted strike of the mineralized ore bodies; this was confirmed during modelling.



JORC Code Assessment Criteria	Comments
<p><i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i></p> <p><i>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.</i></p>	
<b>Sample Security</b>	All sampling, prep and packing work took place under supervision of a site geologist.
<i>The measures taken to ensure sample security.</i>	A representative from the Analytical laboratory, Scientific Services CC, collected the samples from the airport in Cape Town, South Africa.
<b>Audits and Reviews</b>	Statistical analyses of the QA/QC samples were conducted by GeoActiv.
<i>The results of any audits or reviews of sampling techniques and data.</i>	A Prep Facility (on Mannar Island) and lab audit at Scientific Services was conducted by Kobus Badenhorst and Bernhard Siebrits of GeoActiv.
<b>Section 2</b>	<b>Reporting of exploration results</b>
<b>Mineral Tenement and Land Tenure Status</b>	<p>The acquisition of the Mannar Island Project and all the exploration licences from Srinel Holdings Ltd by Titanium Sands Ltd (acquired 100% of the Srinel shares) was formally concluded and the Company re-instated to trading on the Australian Stock Exchange on the 18th of December 2018.</p> <p>Subsequent acquisition of additional tenure by Titanium Sands Ltd occurred on the 10 March 2020 when the acquisition of Bright Angel Ltd was completed, which holds 38km<sup>2</sup> of exploration licences adjacent and adjoining the Mannar Island tenure already held by TSL.</p> <p>Tenure status, see Table 5 in text.</p> <p>Tenure subject to vendor gross royalty of 5% and Government royalties of 5% on sales exported , 4% if not exported.</p>
<b>Exploration Done by Other Parties</b>	
<i>Acknowledgment and appraisal of exploration by other parties.</i>	Work post 2015 was all conducted by Srinel staff, supervised by TSL (James Searle).
<b>Geology</b>	<p>There is general consensus that the heavy minerals in Sri Lanka were derived from Precambrian (Proterozoic) high-grade metamorphic rocks that account for more than ninety percent of the island. These crystalline basement units are subdivided into 3 major litho-tectonic subdivisions, namely the Highland, Wannai and Vijayan Complexes.</p> <p>The heavy minerals ilmenite, rutile, zircon, sillimanite and garnet commonly occur in the coastal sands.</p> <p>Mineralization is high in the tidal, beach and berm areas, with significant inland mineralization proven on Mannar Island.</p>
<i>Deposit type, geological setting and style of mineralisation.</i>	
<i>Drill hole information</i>	<p>Drill hole information used in this resource update has previously been reported in full to the ASX including:</p> <ul style="list-style-type: none"> <li>• Drill hole identification,</li> </ul>

JORC Code Assessment Criteria	Comments
	<ul style="list-style-type: none"> <li>• Collar locations.</li> <li>• Dip, all holes vertical.</li> <li>• Down hole length and intercept depth</li> <li>• Hole length</li> </ul>
<i>Data Aggregation Methods</i>	<ul style="list-style-type: none"> <li>• Weighted averages of intercept length and grade were used.</li> <li>• No cut off grades were applied to drill hole data.</li> <li>• Cut off grades were only applied to the block model of the mineralised zone.</li> </ul>
<i>Relationship between mineralisation widths and intercept lengths</i>	Mineralisation a horizontal blanket, drill holes all vertical.
<i>Diagrams</i>	Drill hole diagrams, and sections included with scale and locations.
<i>Balanced reporting</i>	All drill hole results reported
<i>Other substantive exploration data</i>	None
<i>Further work</i>	As stated, further drilling will target depth and lateral extensions to the modelled mineralisation.
<b>Section 3</b>	<b>Estimation and reporting of mineral resources</b>
<b>Database Integrity</b>	The data was captured in Excel spread sheets. GeoActiv performed validation checks on all the data and analyses before it was used in modelling.
<i>Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.</i>	
<i>Data validation procedures used.</i>	
<b>Site Visits</b>	One of the Competent Persons, Kobus Badenhorst, visited the exploration sites during the auger drilling phase in 2019.
<i>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</i>  <i>If no site visits have been undertaken indicate why this is the case.</i>	
<b>Geological Interpretation</b>	All the drill hole intersections with the THM above 1% were considered as the mineralization envelope from surface to the end of the auger holes. The domain boundaries of the mineral sand resource were extended to half the drill line spacings. The aircore floor wireframes were created at the bottom of the last sampled interval, section by section in Domains 1 and 2 to create Domains 7 and 8 respectively below the auger floor wireframe. The current drill spacing provides sufficient degree of confidence in the interpretation and continuity of grade for a Mineral Resource.
<i>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</i>	
<i>Nature of the data used and of any assumptions made.</i>  <i>The effect, if any, of alternative interpretations on Mineral Resource estimation. The use of geology in guiding and controlling Mineral Resource estimation.</i>  <i>The factors affecting continuity both of grade and geology.</i>	
<b>Dimensions</b>	

JORC Code Assessment Criteria	Comments
<i>The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.</i>	The Mineral Resource was divided into 8 Domains, due to different locations. The extents of the mineralization were within <b>Domain 1:</b> 8,300m x 2,400m x 2m, <b>Domain 2:</b> 9,500m x 1,400m x 2m, <b>Domain 3:</b> 4,300m x 500m x 2m, <b>Domain 4:</b> 4,700m x 1,000m x 2m, <b>Domain 5:</b> 16,300m x 120m x 1m, <b>Domain 6:</b> 33,500m x 120m x 1m, <b>Domain 7:</b> 6,700m x 2,000m x 9m and within <b>Domain 8:</b> 7,700m x 1,400m x 9m.
<b>Estimation and Modelling Techniques</b>	
<p><i>The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters, and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.</i></p> <p><i>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</i></p> <p><i>The assumptions made regarding recovery of by-products.</i></p> <p><i>Estimation of deleterious elements or other non-grade variables of economic significance (e.g.sulphur for acid mine drainage characterisation).</i></p> <p><i>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</i></p> <p><i>Any assumptions behind modelling of selective mining units.</i></p> <p><i>Any assumptions about correlation between variables.</i></p> <p><i>Description of how the geological interpretation was used to control the resource estimates.</i></p> <p><i>Discussion of basis for using or not using grade cutting or capping.</i></p> <p><i>The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.</i></p>	<p>The block sizes that were created were 100m X 100m X 2m and with minimum sub blocking of 25m X 25m X 0.5m.</p> <p>Inverse distance to the power of 3 was used for <i>in situ</i> grade interpolation for all the variables.</p> <p>The general aspects of the estimation were as follows:</p> <ul style="list-style-type: none"> <li>The variogram ranges of the THM% were used in their respective Domains 1, 2, 4, 5, 6, 7 and 8 and for Domain 3 the ranges of Domain 1 were used.</li> <li>The variogram ranges of the Silt% and Oversize% were used in their respective Domains 1, 2, 4, 7 and 8 and for Domain 3 and 5 the ranges of Domain 1 were used and for Domain 6 the ranges of Domain 2 were used.</li> <li>For the magnetic separation (Yield%) and XRF data, the variogram ranges of the THM% from Pass 2 were used in their respective domains.</li> <li>A minimum of 3 samples and a maximum of 15 samples were used for all inverse distance runs, except for the third pass when a minimum of 2 samples and a maximum of 15 samples were used.</li> <li>Pass 1: search radii set to the ranges in <b>Error! Reference source not found.</b> for the major and 2m for the vertical for all the domains;</li> <li>Pass 2: search radii set to the ranges in <b>Error! Reference source not found.</b> for the major and 3m for the vertical for all the domains;</li> <li>Pass 3: search radii set to 1000 m for the major and 10m for the vertical for all the domains.</li> <li>Block discretisation was set to 4(X) by 4(Y) by 4(Z).</li> <li>An octant search estimation method was used with the maximum of 3 adjacent empty octants in pass 1, a maximum of 5 adjacent empty octants in pass 2 and a maximum of 7 adjacent empty octants in pass 3; and</li> <li>No sample limits per drill hole were applied.</li> </ul> <p>The mineral associations for ilmenite (ilm), leucoxene (leu), rutile (rut) and zircon (zir) were calculated with an expression as a calculated attribute in the block model. The model was validated visually, statistically and with swath plots. The result of the validations shows that the interpolation has performed as expected and the model was a reasonable representation of the data used and the estimation method applied.</p> <p>The garnet estimation was done by nearest neighbour estimations with the determined garnet percentages of a composites and their positions per domain.</p>
<b>Moisture</b>	
<i>Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.</i>	All tonnages were based on dry basis, volume measurements converted to tonnes using a dry bulk density of 1.76 for Domain 1, 1.74 for Domain 2 and 1.75 for Domain 3, 4, 5, 6, 7 and 8.

JORC Code Assessment Criteria	Comments
<b>Cut-off Parameters</b>	The tabulated resources are based on a no cut-off basis, but also using lower cut-off grades of 2% and 3% THM.
<i>The basis of the adopted cut-off grade(s) or quality parameters applied.</i>	
<b>Mining Factors or Assumptions</b>	No assumptions were made regarding possible mining methods.
<p><i>Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution.</i></p> <p><i>It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.</i></p>	
<b>Metallurgical Factors or Assumptions</b>	The analytical results and mineralogical analyses could be the basis for the metallurgical extraction methods.
<i>The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.</i>	
<b>Environmental Factors or Assumptions</b>	<p>GeoActiv has not investigated and was not aware of any environmental issues that would affect the eventual economic extraction of the deposit.</p> <p>Titanium Sands Ltd is not aware at this time of any environmental impact and management issues that could prevent the development of the Mannar Island Project.</p>
<p><i>Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation</i></p>	

JORC Code Assessment Criteria	Comments
<i>of the environmental assumptions made.</i>	
<b>Bulk Density</b>	<p>The Relative Density (RD) or specific gravity was determined by digging pits of roughly 0.8m by 0.8m by 0.5m deep at 55 locations throughout the drilling area, then accurately weighing the sand and determining the volume of the holes by inserting and accurately measuring the volume of water inserted in the pits (after using a very thin lining in the pits). RD measurements of between 1.74 of 1.76 were calculated and used in different domain areas for the Mannar deposit.</p>
<p><i>Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.</i></p> <p><i>The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.</i></p> <p><i>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</i></p>	
<b>Classification</b>	
<p><i>The basis for the classification of the Mineral Resources into varying confidence categories.</i></p> <p><i>Whether appropriate account has been taken of all relevant factors, i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data.</i></p> <p><i>Whether the result appropriately reflects the Competent Person(s)' view of the deposit.</i></p>	<p>Resources were classified in accordance with the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC, 2012). The classification of Mineral Resources was completed by GeoActiv based on the geological confidence criteria, drill spacing, quality of drilling, sampling information, grade continuity and confidence in estimation of heavy mineral content and mineral assemblage. The resource classification was primarily based on the drill hole density and the variability of the data. The drill hole lines were previously generally 400m apart and the drill holes 50m apart on the drilling lines and with the infill drilling in Domains 1 and 2 the drill holes are now generally 200m by 50m. This gave a good coverage of the areas to be able to upgrade the classification in Domain 1, 2 and 4. The flagged blocks with the estimation passes 1 to 3 for the THM% and magnetic separation data (CI Yield%) were used together to classify the Mineral Resources to Indicated where the blocks were estimated with the 1<sup>st</sup> pass.</p>
<b>Audits or Reviews</b>	<p>No independent reviews of the Mineral Resource estimate have been conducted to date. An in-company review by James Searle has taken place.</p>
<i>The results of any audits or reviews of Mineral Resource estimates.</i>	
<b>Discussion of Relative Accuracy/Confidence</b>	<p>This is a global resource with no production data.</p>
<p><i>Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.</i></p>	

JORC Code Assessment Criteria	Comments
<p><i>The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</i></p> <p><i>These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</i></p>	