



ENVIRONMENTAL - REMEDIATION - GEOTECHNICAL ENGINEERING - WORK HEALTH & SAFETY - LABORATORIES - DRILLING

GS8329 – 1A

20th September 2021

Peter Fryar
Director, Key Urban Planning
10/151-153 Peats Ferry Road
Hornsby, NSW 2077
P: 02 9987 4041
M: 0432 678 268

Dear Mr. Fryar,

RE: Bearing Capacity Assessment for the Container Lots at the 11 Simblist Road, Port Botany

1. Introduction

As requested, Aargus Pty Ltd (Aargus) attended the above site on 30 August 2021. The purpose of the site visit was to undertake an assessment of the bearing capacity of the shipping container base and foundation material.

2. Supplied Document/s

Prior to the site visit and the preparation of this report, the following document/s were made available to Aargus by the client:

- Drawing document entitled “Container Staking Plan, Port Botany, NSW 2036” prepared by JT Studio dated 20/05/2021, supplied by the client.

3. Supplied Information

Aargus, was supplied with information by the client in relation to the new amendments and it is understood:

- That, Key Urban Planning is assisting Tyne Container Services in gaining approval to permit an increase in container stacking height within an established container park at Lot 101 in DP 1182871 No. 11 Simblist Road, Port Botany (the “site”).
- That the subject site is an irregular shaped allotment comprising a 223.135 metre frontage to Simblist Road with a total area of 1.443ha and is accessible from the north-eastern side of the site from Simblist Road. That, the Development Consent No. DA-42-10-2007-i (MOD 1) (the “DA”) for the “Construction and operation of an empty container storage depot at Simblist Road, Port Botany, Randwick Local Government Area” on the site was granted by Minister for Planning on 27 February 2008.
- That, on 22 March 2010 the Director, infrastructure Projects approved a “Modification to allow the stacking of containers within the site to be increased by one container to a maximum height of six containers”.
- That, the subject site contains an existing empty container depot. Terminals Pty Limited operates an existing filling station and bulk liquid storage tank to the northeast of the site. The subject site is not affected by any significant site constraints and currently operates as a 24-hour empty container depot. And the site is in a container park precinct located on the edge of the Port Botany Lease area.
- That, on 6 November 2020, State Environmental Planning Policy (Three Ports) Amendment (Shipping Containers) 2020 was gazetted. The amendment inserted a new clause 29A in schedule 1 that states (in part): the shipping containers must not be stored or stacked at a height of more than 7 shipping containers if the shipping containers are empty, or in any other case 5 shipping containers.

4. Scope of Work

The scope of this report is to provide the client with the capability statement of the current ground conditions in relation to the bearing pressures considering the additional numbers of containers being staked on the above-mentioned site.

5. Site Conditions and Bearing Requirements

Aargus have referred the supplied technical information in relation to the amended plan for the staking. Aargus has also referred to the library of the works and reports issued originally as a part of the staking plan (Ref: SE08151-A, 2009) and it is understood that the required designed bearing capacity for the given number of containers can be deduced as follows:

- The proposed number of containers = 7 Containers
- Each container is approximately 40 foot long with four sitting pads each with an approximate area of minimal area of 150mm square. The bearing load in each container is distributed in the four pads.
- Each container (Empty) is assigned a bearing thrust of = 3700kg = 37000N. The total vertical thrust of seven containers (currently proposed and actively being staked) = **254,000N** = 25.9tonnes on an approximated area of 0.08-0.1 (conservatively taken as 0.08) squared meters = 3175kPa. For containers lesser than 7, it can be approximately around 2500kPa (conservative approximation).
- The operational forklift with an approximate lift capacity of 20-22 tonnes (standard) is found to exert a thrust upwards to 3300kPa.
- For a normal asphalt pavement material with a subgrade material composed of sandstone materials (22-24tonne/m³), based on the pavement construction being 1.5m thick, the expected loading transferred through the pavement to the sub-grade materials is expected to be about 20-26kPa. Treating the platform is devoid of any slip failures (due to it being not situated next to slopes, material fatigue etc), the platform is considered to bear the pressures exerted by the stack of seven empty containers.

6. Site Observation and Analysis

Aargus geotechnical engineer visited the site for general observation and tests, if any. It was observed during the site visit and the observation that the subject site, was currently actively being used to stack the empty containers.

- The site is a standard road-base layer, an asphalt surface of 200mm, of which the active platform of the site below the road-base layer is constituted of ripped sandstone compacted in a successive thickness of 200mm.
- Aargus, understands, from the available past report that the platform of this subject site is at a designed thickness of 1500mm below the existing surface.
- The site, as assessed by an assessing geotechnical engineer is characteristically categorised as a relatively strong platform in terms of the material performance, with observable mechanical intactness of the binding material and the aggregates on the surface.
- No major signs of material distress, fatigue and failures of the surface has been observed. A minor tension cracks and rutting on the asphalt is common in a high traffic area,

comparable to this container staking site. The cracks and ruts due to staking and transporting machines is deemed not to undermine on the overall performance of the platform in sufficing the required bearing reaction for the machines.

- No such subsidence in the site was observed (in the form of surface failures, cracks, ruts, fatigue or subsidised surface intactness) which would impede to impact in the performance of the site.
- As agreed, Aargus can confirm the platform area is deemed robust enough to provide working space and staking strength for the implied reaction thrust of the seven containers staked on the surface for the next six to ten months from the time of this assessment. Aargus recommends seeking further advise in the event of any change in the surface and or signs of major failures, if any.
- The interpretive analysis assuming the container boxes described in the stacks are the same as originally supplied and described.
- The conclusion drawn herein and the recommendations if any, are in alignment and with client's consent and agreement to the initial draft, incorporating their judgements on the technical details detailed in this report.

7. Limitations

It is recommended that should ground conditions, including subsurface and groundwater conditions, encountered during construction and excavation vary substantially from those presented within this report, Aargus Pty Ltd be contacted immediately for further advice and any necessary review of recommendations. Aargus does not accept any liability for site conditions not observed or accessible during the time of the inspection. This report and associated documentation and the information herein have been prepared solely for the use of the **Key Urban Planning** and any reliance assumed by third parties on this report shall be at such parties' own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to Aargus Pty Ltd, directors or employees.

The conclusions and recommendations of this report should be read in conjunction with the supplied documents and technical information.

Please do not hesitate to contact this office, should there be any further queries.

Aargus Pty Ltd



Dom Kafley

Geotechnical Engineer

MEng, BEng (Civil)(Hons), MIEAust

Reviewed By



Shyam Ghimire

Principal Engineering Geologist

B.Sc, M.Sc, MAIG

Attachments

- Some Photos from the site
- Container Staking Plan Supplied by the Client
- Important Information about this Report

Some Photos from the Site Visit



(a). Looking North from the rear of the site office at 11 Simblast Road, Port Botany.



(b): Looking east from the parking lot at the rear of the site office at 11 Simblast Road, Port Botany towards the east Simblast Road. In the vicinity is the stake of six containers being staked.



(c): Looking northeast at the site where there is actively being staked with six empty containers.

Figure 1 (a), (b) & (c): Photos from the site visit taken on 30/08/2021. As seen from the photos, no areas within the active staking site are observed to have a subsidised asphalt surface. Minor tensions stretch/tension marks and were observed, which, can have no significant impact on the overall performance of the staking site.

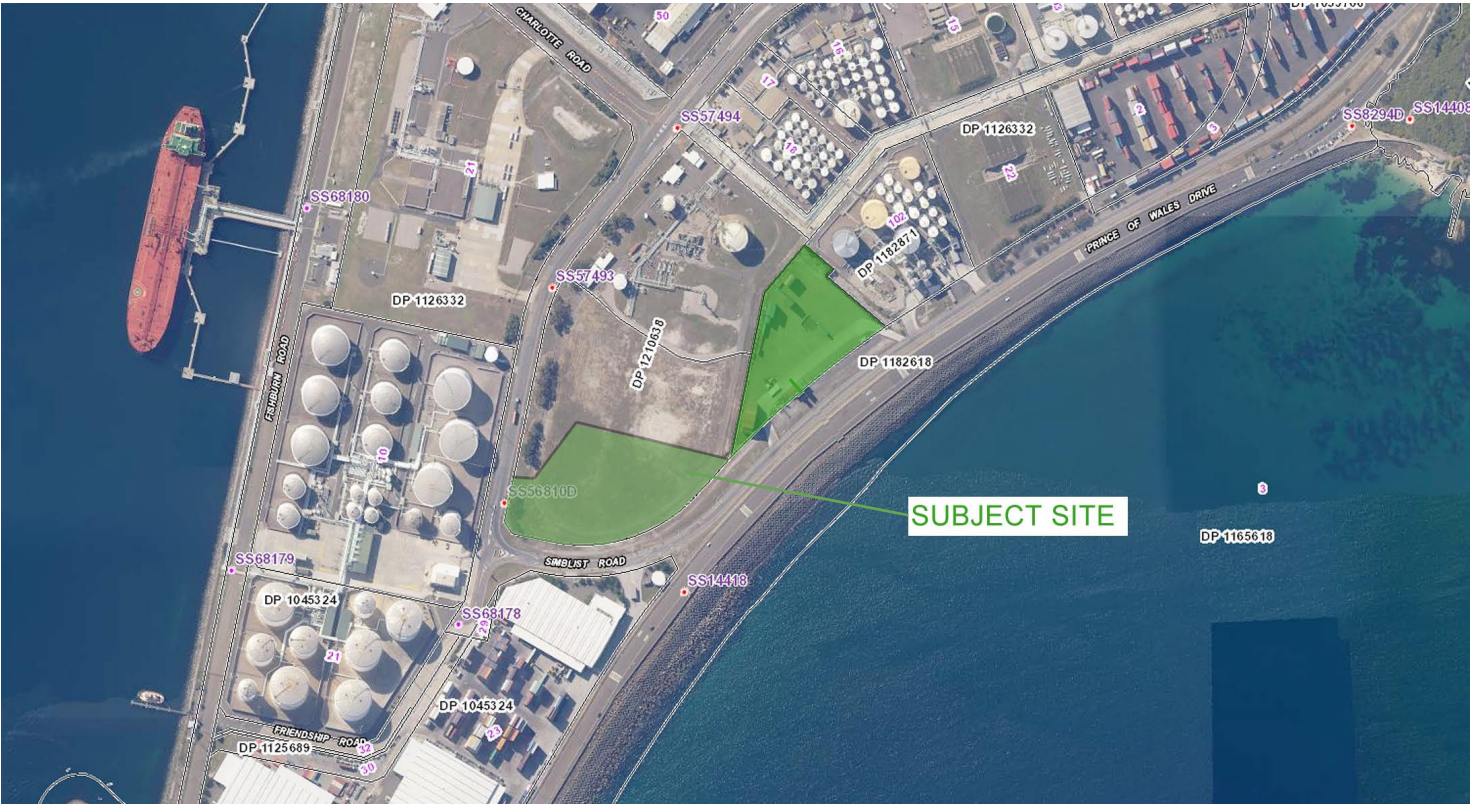
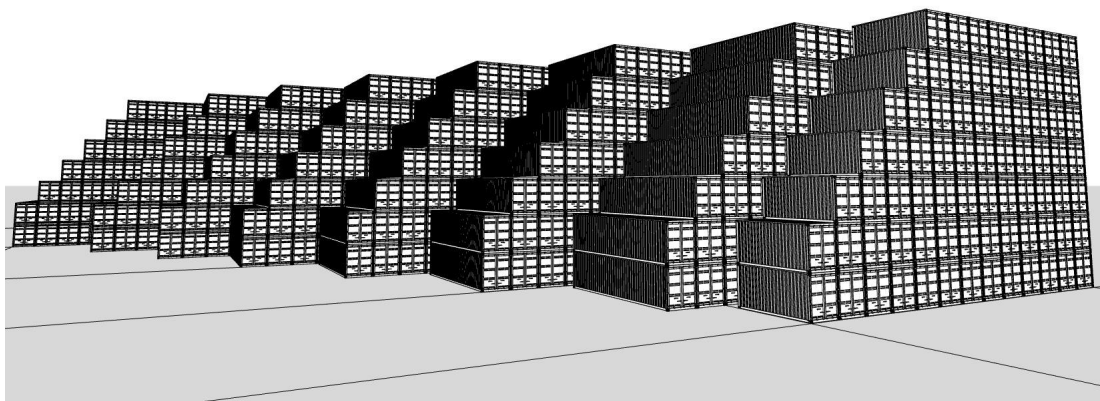
CONTAINER STACKING PLAN

PORT BOTANY, NSW, 2036

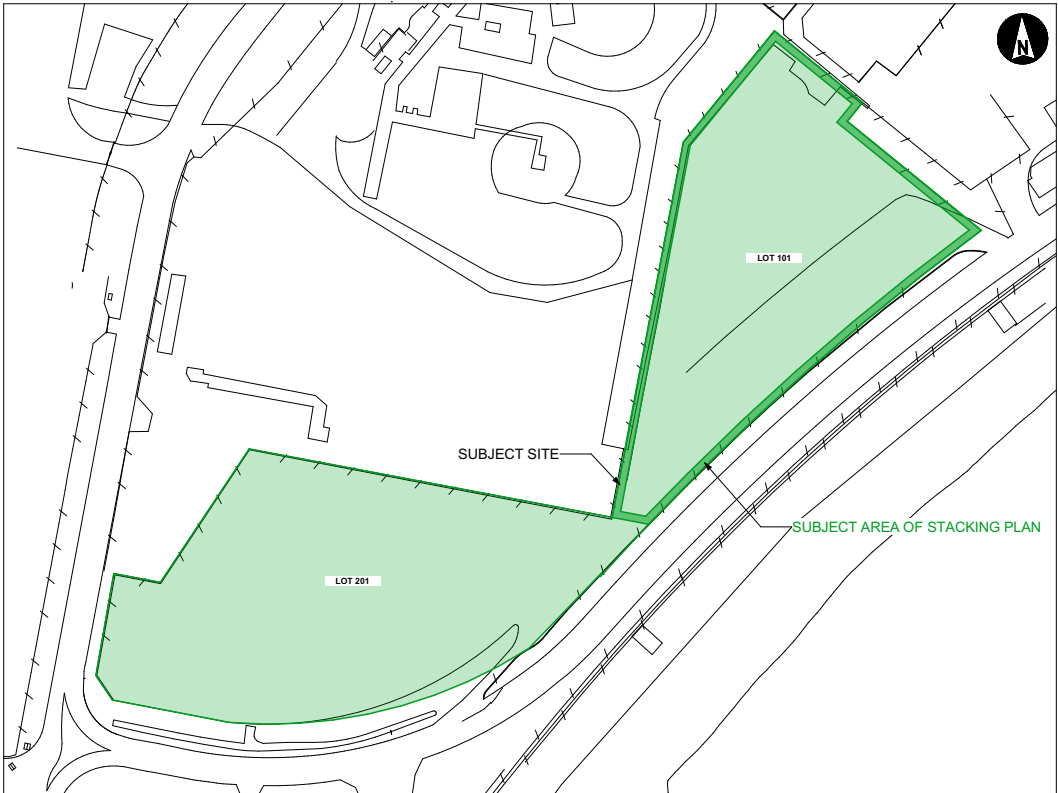
JOB REFERENCE: JTS-100
CLIENT NAME: TYNE CONTAINER SERVICES



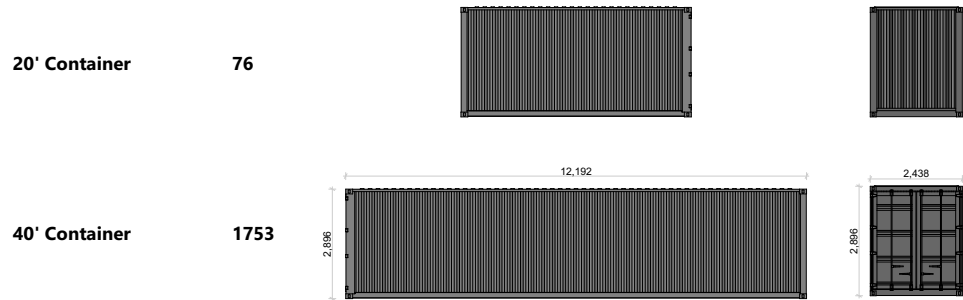
PREPARED BY:



Lot 101 & 201, DP1182871



Container Schedule			
TYPE	QTY	LONG ELEVATION	SHORT ELEVATION



CONTAINER TOTAL 1829

- DENOTES CONTAINER STACK - 7 HIGH
- DENOTES CONTAINER STACK - 6 HIGH
- DENOTES CONTAINER STACK - 5 HIGH
- DENOTES CONTAINER STACK - 4 HIGH
- DENOTES CONTAINER STACK - 3 HIGH
- DENOTES CONTAINER STACK - 2 HIGH

ACCESS TO LOT 201
VEHICULAR ACCESS TO
ADJOINING SITE

- DENOTES CONTAINER SITE BOUNDARY
- ➔ DENOTES VEHICLE EXIT
- ➔ DENOTES VEHICLE ENTRY
- ➡ DENOTES VEHICLE MOVEMENT DIRECTION

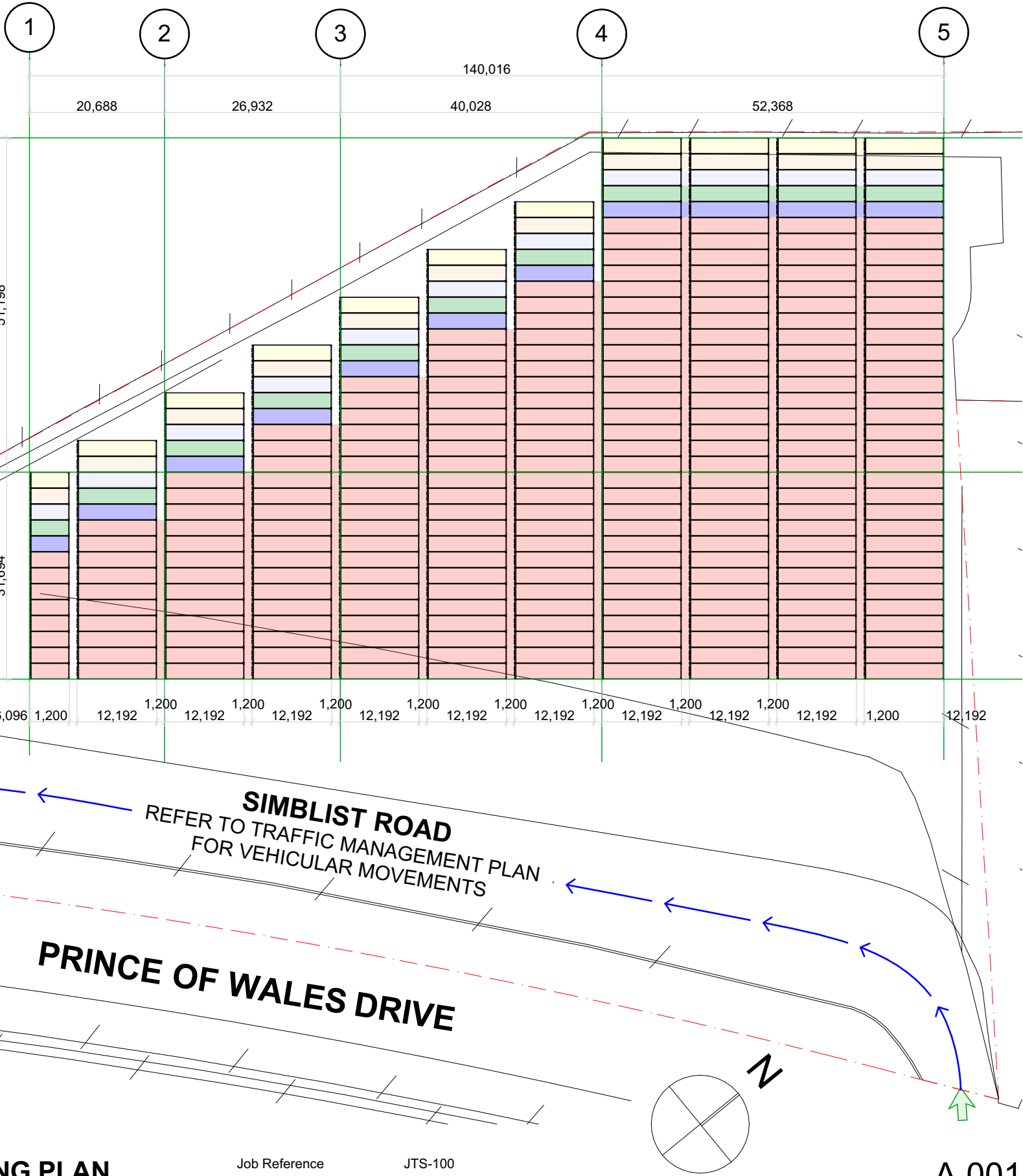
CONTAINER STACKING PLAN

LOT: 101, DP: 1182871
TYNE CONTAINER SERVICES
PORT BOTANY, NSW,2036

Job Reference
Issue Date
Revision
Drawings Status
Drawn by
Prepared for

JTS-100
20/05/2021
C
FOR APPROVAL
J.T.
TYNE CONTAINER SERVICES

CONTAINER STACKING PLAN
1:750



A.001



IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/ The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include the general nature of the structure involved, its size and configuration, the location of the structure on the site and its orientation, physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program.

To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting geotechnical engineer indicates otherwise, *your geotechnical engineering report should NOT be used:*

🌐 when the nature of the proposed structure is changed: for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an un-refrigerated one,

🌐 when the size or configuration of the proposed structure is altered,

🌐 when the location or orientation of the proposed structure is modified,

🌐 when there is a change of ownership, or for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their report's development have changed.

Geotechnical reports present the results of investigations carried out for a specific project and usually for a specific phase of the project. The report may not be relevant for other phases of the project, or where project details change.

The advice herein relates only to this project and the scope of works provided by the Client.

Soil and Rock Descriptions are based on AS1726-1993, using visual and tactile assessment except at discrete locations where field and/or laboratory tests have been carried out. Refer to the attached terms and symbols sheets for definitions.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no geotechnical engineer, no matter how

qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact. For this reason, most experienced owners retain their geotechnical consultants through the construction stage, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.*

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly changing natural forces. Because a geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a geotechnical engineering report whose adequacy may have been affected by time.* Speak with the geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations may also affect subsurface conditions, and thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

Subsurface conditions can change with time and can vary between test locations. Construction activities at or adjacent to the site and natural events such as flood, earthquake or groundwater fluctuations can also affect the subsurface conditions.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems.

No individual other than the client should apply this report for its intended purpose without first conferring with the geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

The interpretation of the discussion and recommendations contained in this report are based on extrapolation/interpretation from data obtained at discrete locations. Actual conditions in areas not sampled or investigated may differ from those predicted

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final boring logs customarily are included in geotechnical engineering reports. These logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings because drafters may commit errors or omissions in the

transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimise the likelihood of boring log misinterpretation, give contractors ready access in the complete geotechnical engineering report prepared or authorized for their use. Those who do not provide such access may proceed under mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY

CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are not exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. Your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other

techniques which can be employed to mitigate risk. In addition, ASFE has developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

FURTHER GENERAL NOTES

Groundwater levels indicated on the logs are taken at the time of measurement and may not reflect the actual groundwater levels at those specific locations. It should be noted that groundwater levels can fluctuate due to seasonal and tidal activities.

This report is subject to copyright and shall not be reproduced either totally or in part without the express permission of the Company. Where information from this report is to be included in contract documents or engineering specifications for the project, the entire report should be included in order to minimise the likelihood of misinterpretation.