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GEOTECHNICAL AND VIBRATION MONITORING PROGRAM
PROPOSED RESIDENTIAL DEVELOPMENT
22C BURRAN AVENUE, MOSMAN, NSW

Introduction

The purpose of this document was to satisfy the requirement for the preparation of a Geotechnical and Vibration Monitoring program in accordance with the Statement of Facts and Contentions set out in the Land and Environment Court of NSW Case Number 2021/00169097.

The proposed development comprises the following:

- Demolition of the existing residence and in-ground pool.
- Construction of a new four-storey house with an automatic car parking system. The lower ground floor level has a finished floor level of RL19.48m while the automatic car parking system will have a finished floor level of approximately RL17.0m.
- To the east or rear of the house a terrace, pool, deck and spa will be constructed. The terrace will have a finished floor level of RL19.48m while the base of the pool will vary between RL18.78m and RL19.48m. The deck and coping of the spa will have a finished level of and deck, proposed as RL18.7m and RL19.90m while the base of the spa will be at about RL18.7m.
- This will require excavations to maximum depths of about 8.8m towards the front of the site and to maximum depths of about 2m towards the rear. Localised deeper excavations may be required for a lift overrun, OSD system or buried services.

Geotechnical Monitoring

The amount of geotechnical monitoring required during construction will depend on the subsurface conditions exposed following removal of the house and pool, as well as the areas of responsibility during construction divided between the builder, the structural consultant and the geotechnical consultant. The builder should submit a method statement for demolition, excavation and construction. This method statement should also nominate hold points throughout the various stages of the works and each activity





must be satisfactorily completed before the next one is commenced. In addition, the works are to be subject to on-going monitoring and review by the structural and geotechnical engineers. The purpose of the monitoring is to check initial assumptions regarding demolition, excavation, retention and footings and possible variations that may occur, and to assess if adjustments to the design are required.

The monitoring program outlined below is intended to provide an appropriate degree of assurance that the recommended geotechnical design parameters are appropriate and to check initial assumptions about subsurface conditions and possible variations that may occur between test locations.

A geotechnical monitoring program is provided in the table below.

GEOTECHNICAL MONITORING PROGRAM			
Item	Action	Action By	Date Completed
1	Prepare structural drawings in light of the recommendations outlined in the geotechnical report.	SE	
2	Geotechnical review of structural, civil and hydraulic drawings.	JKG	
3	Completion of dilapidation reports on buildings/structures that fall within the zone of influence of the excavation. As a minimum, dilapidation reports should be carried out on the properties to the north and south (Nos. 22 and 22a) and road reserve prior to the commencement of works.	PM/SE	
4	Builder to prepare a construction methodology statement (including demolition, excavation/retention sequence, excavation methods, hold points, etc).	BLD	
5	Geotechnical and structural review of builder's method statement and monitoring requirements.	JKG/SE	
6	Builder is responsible for coordinating all necessary inspections and ensuring all approvals are given before proceeding to the next stage of work.	BLD	
7	Following the demolition of the existing house, drilling of additional cored boreholes over the front of the site to confirm the extent of the poor quality bedrock identified in BH1 and the excavation of test pits along the northern and southern boundaries to both determine the depth to bedrock and the footings details of the walls located on the boundaries.	BLD/JKG/SE	
8	Site meeting between the builder, subcontractor and geotechnical engineer prior to any site works to review the excavation methodology near the cliff-line.	BLD/JKG/SC	
8	Continuous vibration monitoring during percussive demolition and percussive excavation.	AC	
9	Review of the suitability of temporary batters by the geotechnical engineer where proposed.	JKG	
10	Regular inspection of all unsupported vertical cuts formed through bedrock by a geotechnical engineer at depth intervals of no more than	JKG	



GEOTECHNICAL MONITORING PROGRAM			
Item	Action	Action By	Date Completed
	1.5m to check for the presence of adverse defects and initiate remedial measures where required.		
12	Builder, Hydraulic Engineer and Geotechnical Engineer to monitor groundwater seepage (if any) into the bulk excavation and Hydraulic Engineer to confirm wall and floor drainage requirements.	BLD/JKG/HE	
14	Geotechnical engineer to inspect all footing excavations to confirm that the exposed material is suitable for the design ABP.	JKG	

NOTES:	JKG	JK Geotechnics	SE	Structural Engineer
	BLD	Builder	PM	Project Manager
	SUR	Surveyor	AC	Acoustic Consultant
	GT	Geotechnician	HE	Hydraulic Engineer
	SC	Sub-Contractor		

VIBRATION MONITORING PROGRAM

Vibration Limits

We recommend that during percussive demolition and percussive excavation that the vibration limits along the boundaries, measured as peak particle velocity (PPV) in mm/sec, be limited to no higher than 5mm/sec. We note that this may result in vibrations significantly less than the 10mm/sec specified in AS2187, which refers to ground vibrations due to blasting and is not necessarily appropriate for ground vibration during normal construction activities. Confirmation of the vibration limit from the geotechnical and structural engineers is required after review of the dilapidation surveys and confirmation of the footing systems at the nearby buildings/structures and prior to commencement of percussive excavation.

Proposed Monitoring Locations

We recommend that vibration monitors be installed at the following locations:

- Two at the southern boundary on the fence/retaining wall,
- Two at the northern boundary on the fence/retaining wall, and,
- One near the crest of the cliff-line where it is closest to the proposed excavation.

The vibration sensors must be solidly fixed to the neighbouring/boundary structures at each location.

Vibration Monitoring Instrumentation

We recommend the use of equipment that measures transverse, vertical and longitudinal ground vibrations and their vector sum. The monitoring equipment must measure the vibration in terms of peak particle velocity as specified in AS2187. The equipment must be equipped with computer loggers which provide a graphical presentation of vibration velocity versus vibration frequency.

An alarm (or SMS text) must be raised/sent instantaneously when any of the vibration components or their vector sum approaches the preset trigger level. The alarm can take the form of a strobe light and siren which

can make the plant operator aware immediately when the vibration limit is being approached. We recommend that the trigger level be set 4.5mm/sec.

Monitoring Frequency

We recommend continuous vibration monitoring be carried out during percussive demolition and percussive excavation.

Recommended Work Procedure

The acoustic consultant must supervise installation of the vibration sensors at the monitoring points described above.

The installation must include warning lights (or SMS text) in the vicinity of the relevant vibration sensors in such a position that they can be clearly seen by the plant operators at all times throughout the excavation period. The alarm (or SMS text) can be configured in such a way that it will continue to operate for a set period of time after the vibration exceedance ceases. The acoustic consultant should set the alarm duration (or SMS text) in consultation with the manager responsible for project compliance and in control of the site (the manager) to ensure warnings are not missed.

It is the responsibility of the site supervisor on site to monitor the alarms (or SMS text) and to implement the following responses when an alarm (or SMS text) is activated:

- 1 All work shall cease immediately when any alarm (or SMS text) is activated. Details of the activities occurring at the time must be logged and the manager informed immediately.
- 2 An alternative work strategy must be devised in conjunction with the plant operator and manager or geotechnical engineer, and details added to the log before work is resumed.
- 3 In the event that the reason for the alarm (or SMS text) is not apparent, the acoustic consultant must download the relevant vibration logger data to assist in assessing the situation.
- 4 The acoustic consultant must download the data from all loggers and must be handed a copy of the site log at weekly intervals.
- 5 The acoustic consultant must correlate the relevant records and forward reports to the manager at weekly intervals.
- 6 The acoustic consultant or geotechnical engineer are required to comment on any discrepancies between the exceedances and site logs.

GENERAL COMMENTS

The monitoring program does not relieve the Contractor from his responsibility for safe operation of his equipment. His personnel shall make their own assessment of vibration effects whenever the excavator and any other equipment is in use. Only experienced, competent contractors with appropriate insurances should be considered for this project.

This program has been prepared for the particular project described and no responsibility is accepted for the use of any part of this program in any other context or for any other purpose. If there is any change in the proposed development described in this program then all recommendations should be reviewed. Copyright in this program is the property of JK Geotechnics. We have used a degree of care, skill and diligence normally



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Should you require any further information regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
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