Preliminary Geotechnical Assessment Report

19 Hope Street & 69-77 Hughes Ave, Melrose Park NSW 2114

Prepared for: M Projects

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ADE CONSULTING GROUP

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For and on behalf of
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1 Introduction

This report presents the results of a walkover assessment and desktop study for the potential development for residential and commercial uses at 19 Hope Street & 69-77 Hughes Avenue, Melrose Park, NSW 2114. M Projects commissioned ADE Consulting Group to carry out desktop study/preliminary geotechnical assessment of the proposed site in an email dated 11 November 2020.

Based on supplied information, ADE understand that the project is at planning stage and M Projects are preparing the site for a planning proposal for the rezoning on the properties. ADE also understand that this report will be submitted to assist with the planning proposal.

The objective of this report to carry out walkover assessment together with desktop study of the published information and provide comments on the geotechnical issues related to the site. A walkover inspection was carried out by principal from ADE. This assessment is based upon a detailed inspection of the topographic, surface drainage and geological conditions of the site and its immediate environs. These features were compared to those of other similar lots in neighbouring locations to provide a comparative basis for assessing the geotechnical issues for the site rezoning and/or development.

2 Site Description

The site is currently occupied by a large industrial unit and residential houses. The site is bounded by Hope Street to the south and Hughes Avenue to the west. The site sits within an industrial area situated between Victoria Road and the Parramatta River, which is approximately 300m to the south of Hope Street.

The topography of the site is generally flat to gently sloping down to the south. The site adjoining an industrial area mixed with residential properties comprising of single/duplex dwellings of one to two storeys. Vegetation across the site is limited to mature trees around the perimeter.

3 Available Information

The Sydney 1:100,000 Scale Geological Sheet indicates that the site is mainly underlain by Triassic age Hawkesbury Sandstone.

A review of the Sydney Soil Landscape Series Sheet indicates the site is underlain by soils of the Lucas Heights grouping. The Lucas Heights soil group is attributed to residual soil derived from the Mitta gong Formation. Quaternary age alluvial sediments are shown below the southern extent of the site, running along the course of a potential former drainage channel. This alluvial channel appears to run parallel to Cobham Avenue, to the east of the site, to the confluence with the Parramatta River.

The Prospect/Parramatta River Acid Sulfate Soil Risk Map indicates that the site is within the area of

No Known Occurrence, indicating that acid sulfate soils are not known or expected to occur in these environments.

4 Expected Geological Model

4.1 Expected Site Geology

During the site walkover a number of recent, shallow excavations were observed, with cuttings of bedrock found along both Hope Street and Hughes Avenue. These bedrock samples indicate the presence of Mitta gong Formation bedrock, sandstone, along Hughes Avenue.

Figure 1: Excerpt of geological map of Sydney.

subsurface conditions based on the results of the site walkover and nearby borehole drilling. Based on the landforms observed during the site walkover and experience at similar sites, we expect
subsurface conditions at the site will comprise the following:

Geotechnical Unit	Description	Expected thickness
Fill	Where reprofiling of the site has occurred, fill may consist of gravelly clay, with possible sandstone cobbles and boulders. The fill may also include demolition rubble from previous structures on site, such as bricks, tiles, sheeting	Fill across such a large site is difficult to assess, however, from the site walkover filling of up to 1.5m was estimated, and may be found at greater depths.
Residual Silty Clay	Silty clay and sandy clay, low to high plasticity, likely stiff to hard.	Typically found between 0.5m and

	Residual soil will be derived from sandstone bedrock.	2.5m thick.
Sandstone Bedrock	Sandstone, fine to medium grained, likely contains interbeds of shale, grading from highly weathered to fresh, typically low to high strength, increasing with depth.	below 2.5m depth

4.2 Groundwater

Groundwater may encounter at the contact between soil profile and bedrock, however, quantity could be limited to seepage.

It should be noted that fluctuations in groundwater levels may occur due to rainfall, seasonal changes, or damaged buried services.

5 Comments

5.1 Suitability for the development

Based on our site observations, preliminary geotechnical model, and experience on similar projects, the proposed development, including basements is considered feasible from a geotechnical perspective. Provided appropriate site investigation, design assessments, and construction monitoring normally associated with this type of development are carried out, the risks to adjacent structures and services should be able to be managed.

5.2 Excavation

Following demolition, it is anticipated that the site will be stripped and levelled to form the finished ground levels for service roads and parklands. The relevelling will likely include excavation into the soil profile and may extend into the sandstone bedrock.

Based on the assessment results, the bulk excavation will encounter the soil profile and extend into the underlying bedrock. The excavation of the soil and extremely to very low strength bedrock (if encountered) may be completed using conventional earthworks equipment (e.g. hydraulic excavator, bulldozer, etc.) with rock breaking/ripping equipment required for the low strength and better bedrock as well as any iron indurated bands within the extremely low/very low strength bedrock. However, we expect excavation of low to medium and higher strength sandstone would be most effectively excavated using hydraulic impact hammers. This equipment would also be required for breaking up boulders or blocks, for trimming rock excavation side slopes, and for detailed rock excavations (such as for footings or buried services).

Care be taken during rock excavation on this site and there will likely be direct transmission of ground vibrations to the buildings and structures to the south and west. The excavation procedures and the dilapidation reports should be carefully reviewed prior to excavation commencing, so that appropriate equipment is used. It is recommend that vibration monitoring be carried out during rock excavations when using rock breakers.

5.3 Excavation Support

In general, bulk excavations up to 2m depth within the soil and extremely weathered bedrock should be temporarily battered to a side slope no steeper than 1V in 1H. Steeper batters may be feasible, but site specific subsurface information would be required, together with daily monitoring of batter slopes and regular geotechnical inspections. Subject to geotechnical inspections, excavations in Class IV and better-quality bedrock are expected to be able to stand unsupported vertically in the short term, with permanent support provided by the basement structure in the long term.

Conventional retaining walls may then be constructed at the toe of the batters and subsequently backfilled.

However, where temporary batters are not preferred, or are not feasible, a retention system will be required and should be installed prior to excavation commencing. Suitable retention systems, given the subsurface conditions encountered, would include a soldier pile wall with shotcrete infill panels which is anchored progressively as excavation proceeds. Conventional bored piles would be suitable for use on this site. The piles should be installed to sufficient depth below bulk excavation level to satisfy stability and founding considerations.

5.4 Foundations

Weathered sandstone bedrock is expected to be exposed at shallow depth or at the base of any bulk excavations. We therefore recommend that the buildings be uniformly supported on footings founded within the weathered bedrock. Where the bedrock is at the bulk excavation level or at shallow depth (say less than 1m), strip or pad footings could be used and where the bedrock is at greater depth, bored piles, or possibly “bucket piers” could be adopted.

Pad and strip footings and bored piles founded within the bedrock may be designed based on an allowable bearing capacity of 600kPa. For piles, a minimum socket of 0.3m into the appropriate bedrock stratum is required to achieve these allowable end bearing pressures, provided the socket is satisfactorily cleaned and roughened.

For all footings, both shallow and piles, the lowest quality bedrock within 1.5 times the width/diameter of the footing will give the allowable bearing pressure for the design of footings. The allowable bearing pressures and shaft

adhesions are based on serviceability criteria and should result in settlements of less than 1% of the footing width/diameter.

5.5 Groundwater

Groundwater may encounter at the contact between soil profile and bedrock; however, quantity could be limited to seepage. It should be noted that fluctuations in groundwater levels may occur due to rainfall, seasonal changes, or damaged buried services.

We anticipate that some groundwater seepage flows will likely occur at the soil and rock interface as well as through joints and other defects within the completed cut faces, particularly after periods of heavy rain. However, seepage during excavation is expected to be satisfactorily controlled by conventional sump pumping.

5.6 Further Geotechnical Investigations

A detailed geotechnical investigation of the site must be carried out. The purpose of the investigation is to confirm the depth, quality and continuity of the bedrock below the site. Site specific groundwater information will also be obtained.

We recommend that a minimum of 10 to 15 boreholes be drilled to at least 2m below any bulk excavation level and evenly spaced across the site. At least half of the boreholes should be advanced into the underlying better-quality sandstone using core drilling techniques with water flush.

Following completion of the geotechnical investigation, this report should be reviewed and revised, as appropriate.

6 Limitations

This report has been prepared for use by the Client who has commissioned the works in accordance with the project brief only and has been based on information provided by the Client. The advice herein relates only to this project and all results, conclusions and recommendations made should be reviewed by a competent and experienced person with experience in geotechnical investigations, before being used for any other purpose.

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This report does not provide a complete assessment of the geotechnical status of the site and it is limited to the scope defined herein. Should information become available regarding conditions at the site (e.g., conditions exposed at the site during earthworks varying significantly with the results within this report), ADE reserves the right to review the report in the context of the additional information.

ADE's professional opinions are based upon its professional judgement, experience, training and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and/or opinions. ADE has limited investigation to the scope agreed upon with its client.

This report has been written with the intent of providing information of the site subsurface to the client for design and construction purposes. Subsurface conditions relevant to the works undertaken by the client should be assessed by a competent contractor who can make their own interpretation of the data represented within this report.

Subsurface conditions will always vary within a worksite and the extremes of these variations cannot be defined by exhaustive investigations, and as such, the measurements and values obtained within this result may not be representative of these extremes.

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