

Woollahra Council

Bellevue Gardens Rock Remediation Assessment

Domain 5

September 2019

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1. Introduction

At the request of Woollahra Council GHD has carried out a geotechnical assessment of the rock faces at Pringle Place and Bellevue Gardens, Bellevue Hill, as part of the ongoing risk management strategy for the site, periodic assessments to monitor the rock face and assess the need for further stabilisation works are carried out on a five-yearly basis..

This report presents the results of the five-yearly assessment of the area designated as Domain 5.

1.1 Scope and limitations

The scope of work for this assessment was as follows:

- Review of our previous reports prepared for the site
- Visual assessment of the rock faces within Domain 5.
- Summary of observations and assessment of observed hazards
- Discussion on observed conditions of existing rock face support measures
- The compilation of photographic records of current conditions observed
- Recommendations for further remediation if required.

This report: has been prepared by GHD for Woollahra Council and may only be used and relied on by Woollahra Council for the purpose agreed between GHD and the Woollahra Council as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Woollahra Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report.

2. Fieldwork

The fieldwork was carried out by two GHD Engineering Geologists on 26 February 2019. Access to the rear of each property along Pringle Place and Bellevue Gardens was facilitated by Council staff accompanying GHD. The fieldwork comprised the observation of accessible areas of the rock faces and comparison of the current rock face conditions with previous photographic records.

A further site visit was undertaken on 15 March 2019 along with the Council's Team Leader for Infrastructure Assets to assess vegetation removal requirements and property boundaries at Domain 5, adjacent to Cooper Park.

Following submission of our final report in May 2019, Council removed all the vegetation previously obscuring large areas of the rock face adjacent to Cooper Park (Domain 5). GHD were subsequently requested to reinspect the rock face and this site visit was undertaken on 25 June 2019.

3. Observations

Bellevue Gardens Property Nos: 10, 11, 12 and Victoria Road Property 206D

Plate Nos: 1-3 (Appendix B)

GHD observed Domain 5 on 25 June 2019, following the de-vegetation works carried out by Council. During the site visit, we compared the photomosaics of the rock faces prepared as part of our 2011 report. The geotechnical conditions appears to be broadly similar to the conditions observed in 2011, however it appears that a number of small detached rock blocks have been removed from the rock face as part of the recent de-vegetation works.

Domain 5 comprises near-vertical rock faces ranging from about 10 m to 15m high. The rock faces comprise both shear and irregular faces as a result of blast damage from previous quarrying activities. It is also apparent that residents at No.s 10, 11 and 12 Bellevue Gardens maintain the Council land at the rear of their properties directly below the cliff (i.e. maintain lawns etc.).

The main hazards in Domain 5 as summarised in our previous reports include:

- Various partially detached blocks and wedges of sandstone
- Accumulations of soil, rock debris and building refuse on rock ledges, particularly along the crest of the rock faces
- Various old and ineffectual stacked rock walls located along the crest of the rock face.

4. Comments on Survey Provided

Council provided GHD with two survey plans covering the Domain 5 area to help clarify which parts of the site are on Council land and which parts of the site are privately owned. During our previous assessments we were advised that Domain 5 was located wholly on Council Land.

We have attached these plans in Appendix C along with annotations showing our understanding of property ownership based on discussions with Council. These are for discussion purposes only and we recommend Council make their own assessment.

It would appear that a small section of the sharp return corner of the rock face in the northern part of Domain 5 may be on private land. In addition, the southern section of Domain 5 may also be on private land.

5. Recommendations

The works required in Domain 5 comprise:

- The scaling removal of selected rock masses and soil accumulations from the face and crest of the rock faces.
- The removal of a knob of deformed/ ineffectual sandstone block wall and the battering back re-profiling of soil/ fill.
- The battering back re-profiling of selected soil/ fill/ debris zones on nominated ledge and crest areas.
- The installation of 6 x 1.5m and 3 x 4m long rock bolts.
- The application of a zone of reinforced shotcrete at the base of the existing sandstone block retaining wall.
- The installation of a panel of rockfall containment mesh over a segment of the existing sandstone block retaining wall. The mesh is to be supported by fully grouted mesh support dowels.

The above works are delineated on Plates in Appendix D.

6. Closure

We have carried out the geotechnical assessment of the sandstone rock faces in Domain 5 as part of the five-yearly inspections.

We have not carried out a formal landslide risk assessment of the site to date. Regardless of this and the uncertain property boundaries, the untreated rock faces are hazardous to both people and property located in the vicinity of the toe. We recommend the stabilisation works discussed in this report be implemented as soon as practicable. Further assessment of stabilisation requirements and geotechnical advice will be required during construction, especially given the nature of the development works planned above Domain 5.

The risk mitigation options discussed in this report will require further assessment at the time of implementation to confirm the extent of works. We are happy to provide further advice and engineering support for these works when required. This report outlines our observations of geotechnical site features and assessment of rockfall hazards observable at the time of the fieldwork. Natural features will change and may deteriorate over time, which could change existing hazards or create new ones. Additional investigations may be required to further assess rockfall hazards, risk mitigation measures, ongoing monitoring and maintenance requirements.

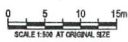
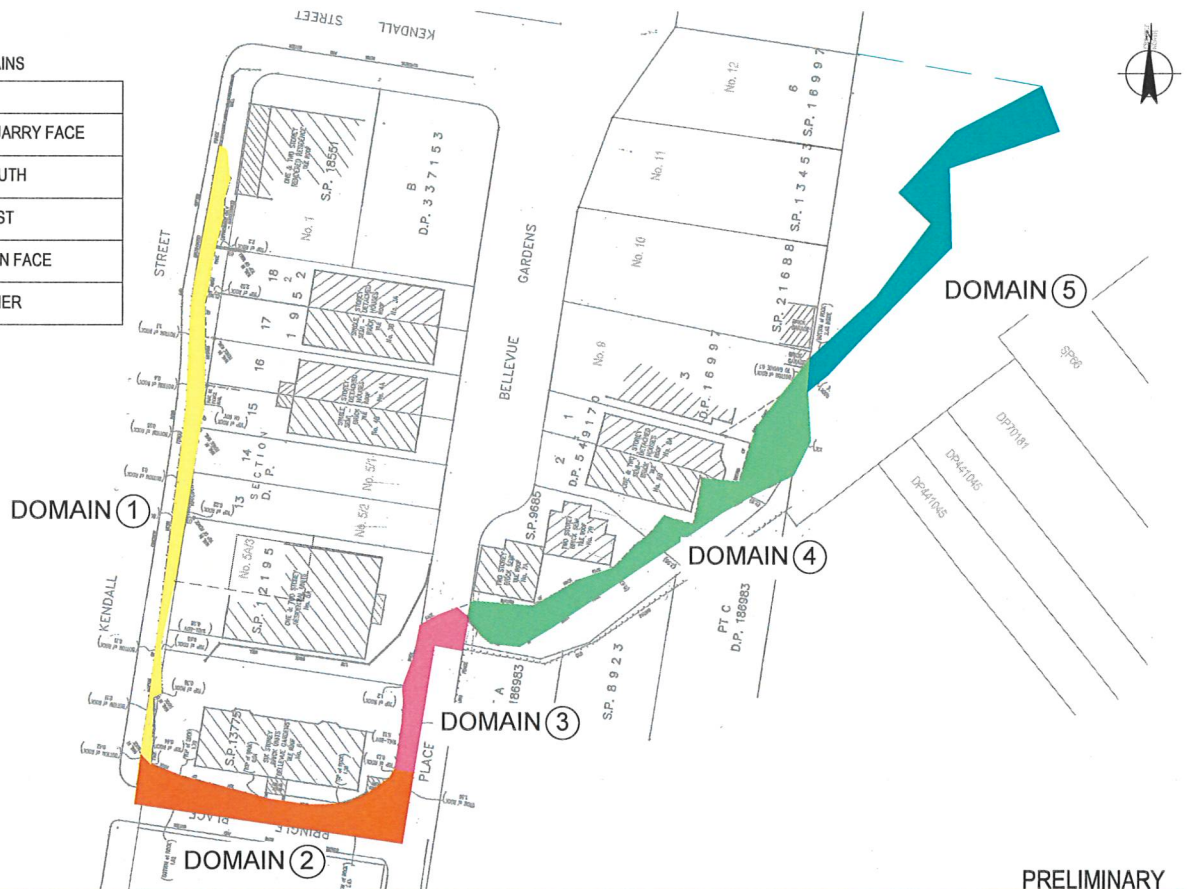
It is our understanding from Council there is uncertainty regarding property boundaries and ownership. Council commissioned surveyor, Cope and Lethbridge on 28 November 2018 to survey the rock face to determine property boundaries and person/s responsible for undertaking necessary stabilisation works. The survey submitted to Council in March 2019 was inconclusive. Council has now commissioned Degotardi Smith and Partners to complete a Laser Scan Survey of the rock face to confirm ownership.

Appendices

Appendix A – Location & Geotechnical Domain Plan (Figure 1)

GEOTECHNICAL DOMAINS

No.	NAME
1	KENDALL STREET QUARRY FACE
2	PRINGLE PLACE - SOUTH
3	PRINGLE PLACE - EAST
4	VEGETATED EASTERN FACE
5	COOPER PARK CORNER



Woolahara Municipal Council
Pringle Place, Bellevue Hill
Geotechnical Assessment of Rockfall Hazards

PRELIMINARY

Job Number 21-28043
Revision A
Date April 2019

Location & Geotechnical Domain Plan **Figure 1**

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Appendix B – Photographic Record

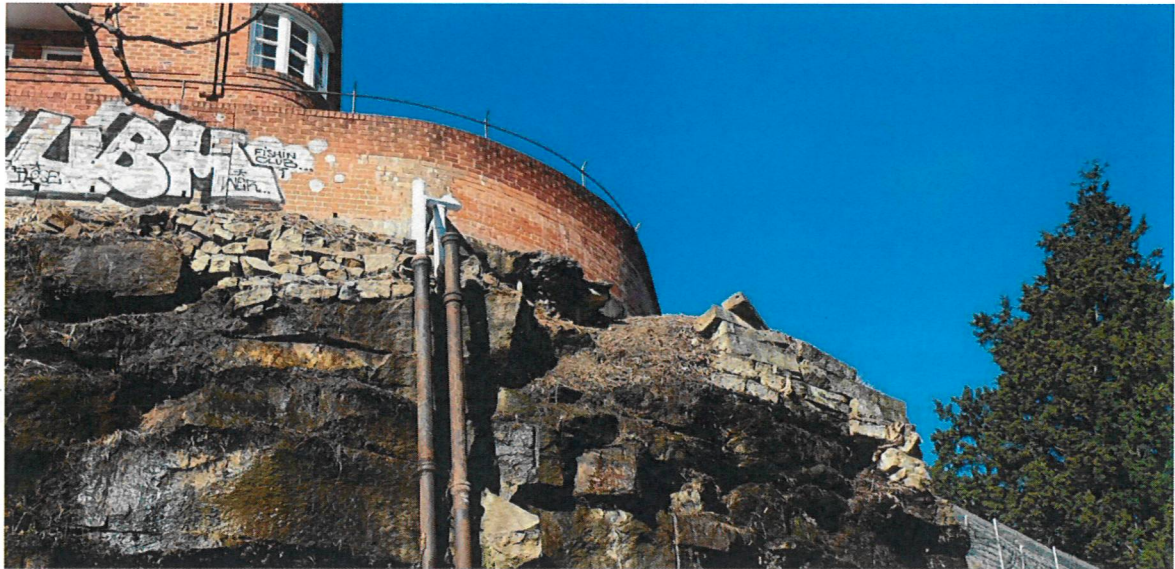


Plate 1 Domain 5, Ineffectual stacked rock walls above rock face.

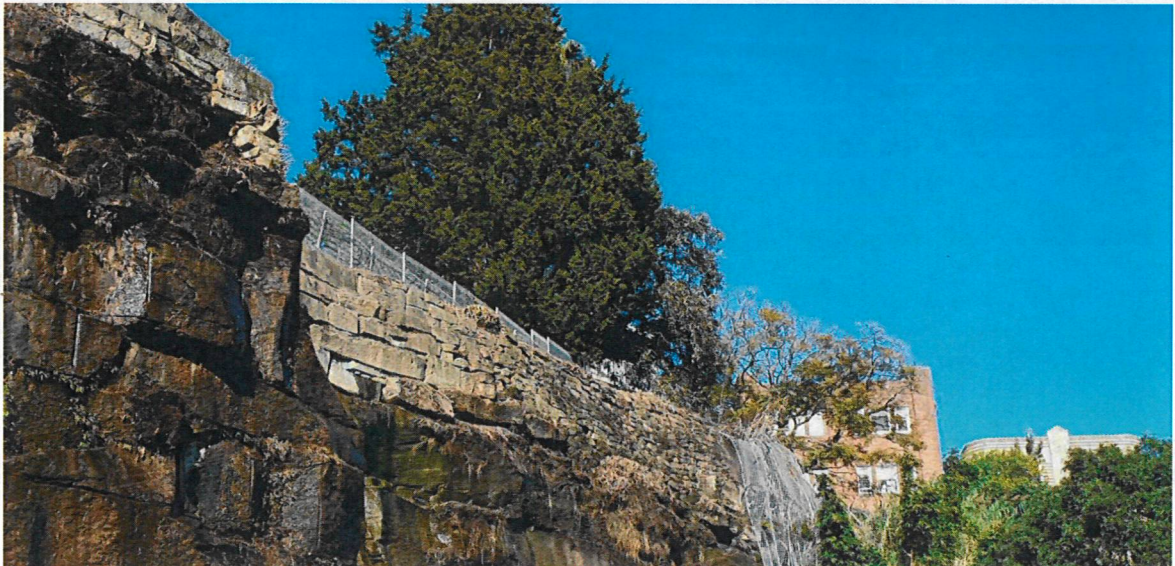


Plate 2 Domain 5, Stacked rock walls supporting car parking areas of unit complex above.

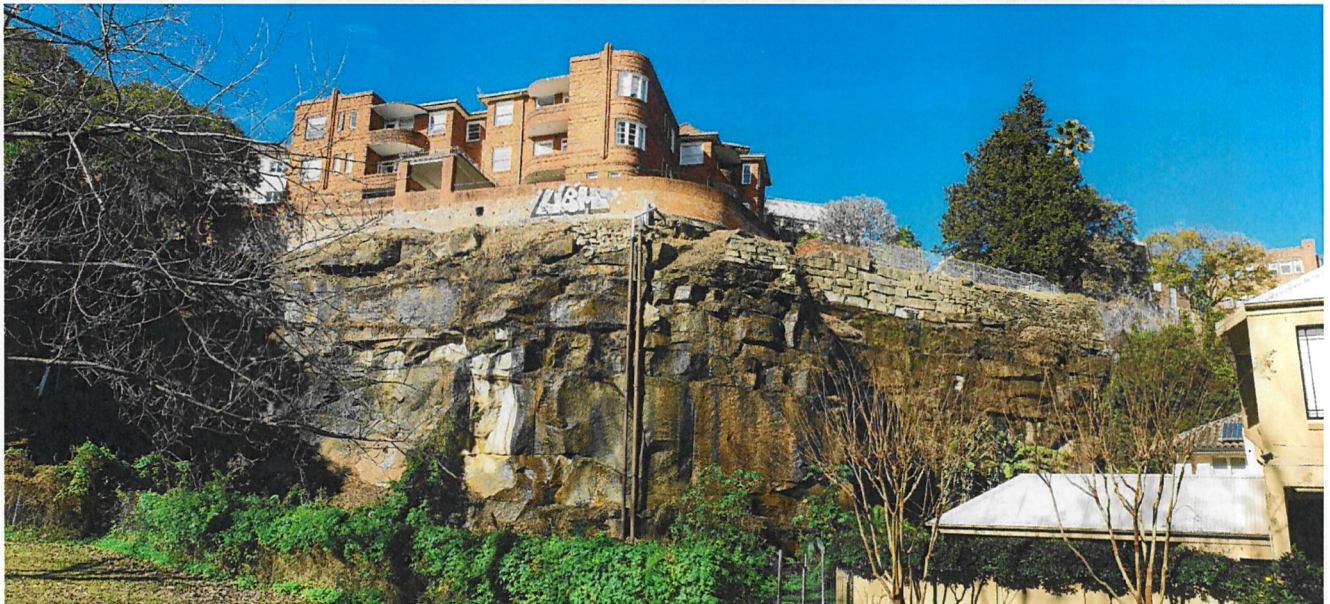
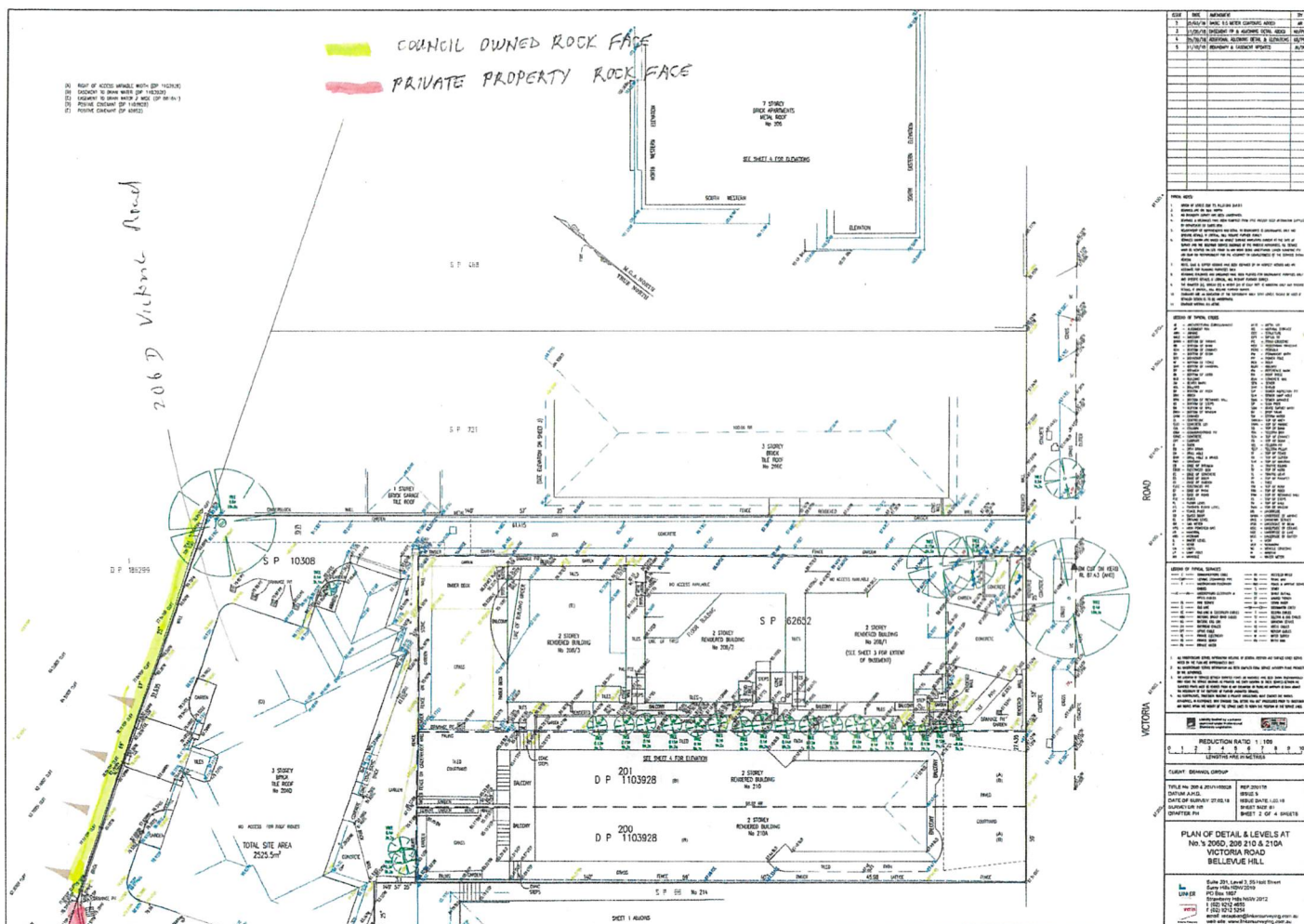
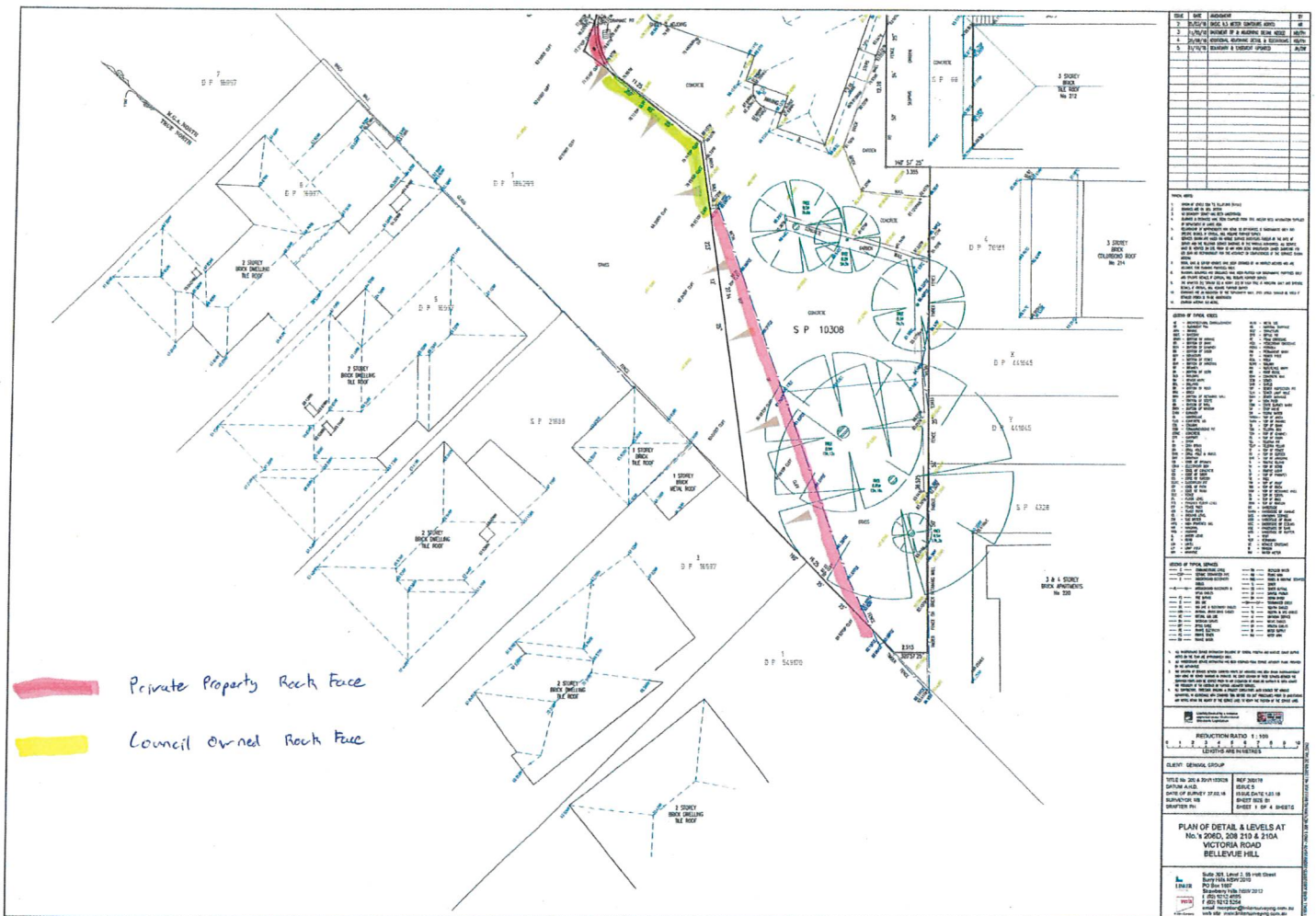


Plate 3 Domain 5, Photomosaic showing Domain 5 following recent revegetation works.

Appendix C – Survey Plans





Appendix D – Recommended Treatment Works



ROCKBOLTS INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH



SCALING & GROOMING

Areas of selective devegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.



SHOTCRETE

Locations requiring application of mesh reinforced shotcrete with drainage pipes and/or strip drain provisions, for rock support and protection purposes.



GROOMING/REPROFILING

Areas requiring extensive grooming and reprofiling of batter slope.

NOTES:

1. WARNING - Parallax distortion effects. Do not scale. Boundaries are approximate.
2. Areas delineated for shotcrete are to be trimmed, scaled and groomed prior to shotcrete installation.
3. See accompanying report for treatment details.
4. Rockbolts that are shown within areas that are delineated for scaling and grooming may be modified after scaling/grooming, subject to geological assessment.
5. All stabilisation works are to be delineated, marked up and supervised by suitably experienced geotechnical personnel.



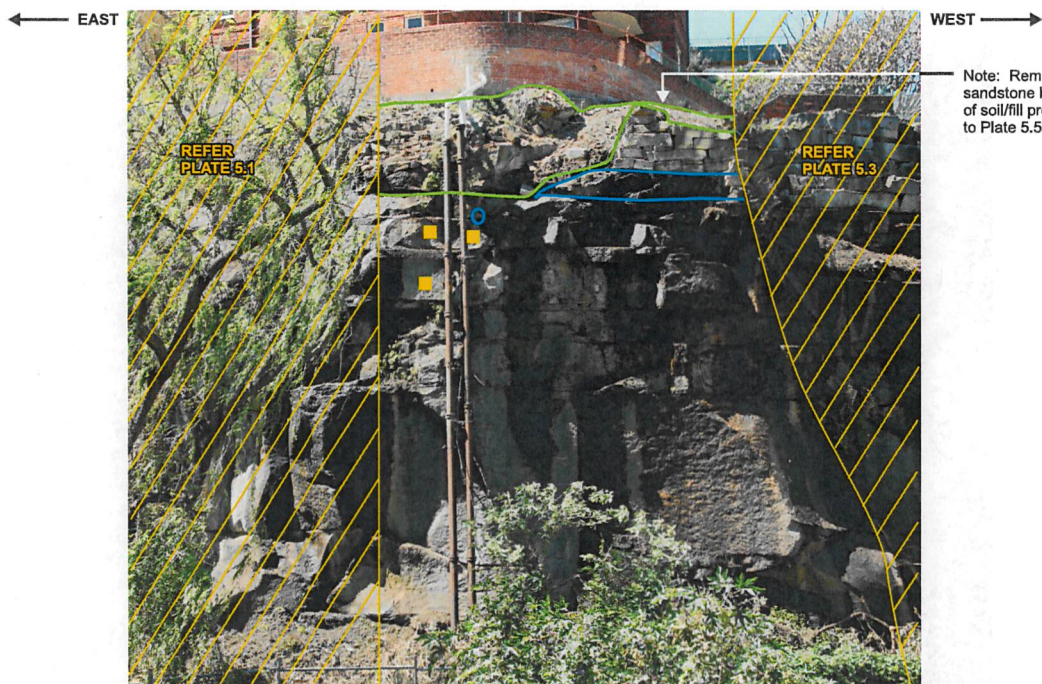
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WOOLLAHRA MUNICIPAL COUNCIL

PRINGLE PLACE, BELLEVUE HILL - DOMAIN 5 STABILISATION TREATMENT REQUIREMENTS

Job No: 21/18168/00
File Name: 2118168_LTN_10.cdr
Revision No: A
Photomosaic Date: 18 October 2010
Mark-up Date: 8 December 2010
Plate No: 5.1



ROCKBOLTS TO BE INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH

LEGEND

- INDICATIVE PROPERTY BOUNDARY
- PHOTOGRAPHIC OVERLAP

SCALING & GROOMING

Areas of selective devegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.

SCM SHOTCRETE

Locations requiring application of mesh reinforced shotcrete with drainage pipes and/or strip drain provisions, for rock support and protection purposes.

GROOMING/REPROFILING

Areas requiring grooming and reprofiling of batter slope.

NOTES:

1. For Domain and property boundary locations refer to Figure 1.
2. WARNING - Parallax distortion effects. Do not scale. Boundaries are approximate.
3. Areas delineated for shotcrete are to be trimmed, scaled and groomed prior to shotcrete installation.
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6. All stabilisation works are to be delineated, marked up and supervised by suitably experienced geotechnical personnel.



ROCKBOLTS INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH



SCALING & GROOMING

Areas of selective devegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.



SCM

SHOTCRETE

Locations requiring application of mesh reinforced shotcrete with drainage pipes and/or strip drain provisions, for rock support and protection purposes.



GROOMING/REPROFILING

Areas requiring extensive grooming and reprofiling of batter slope.

NOTES:

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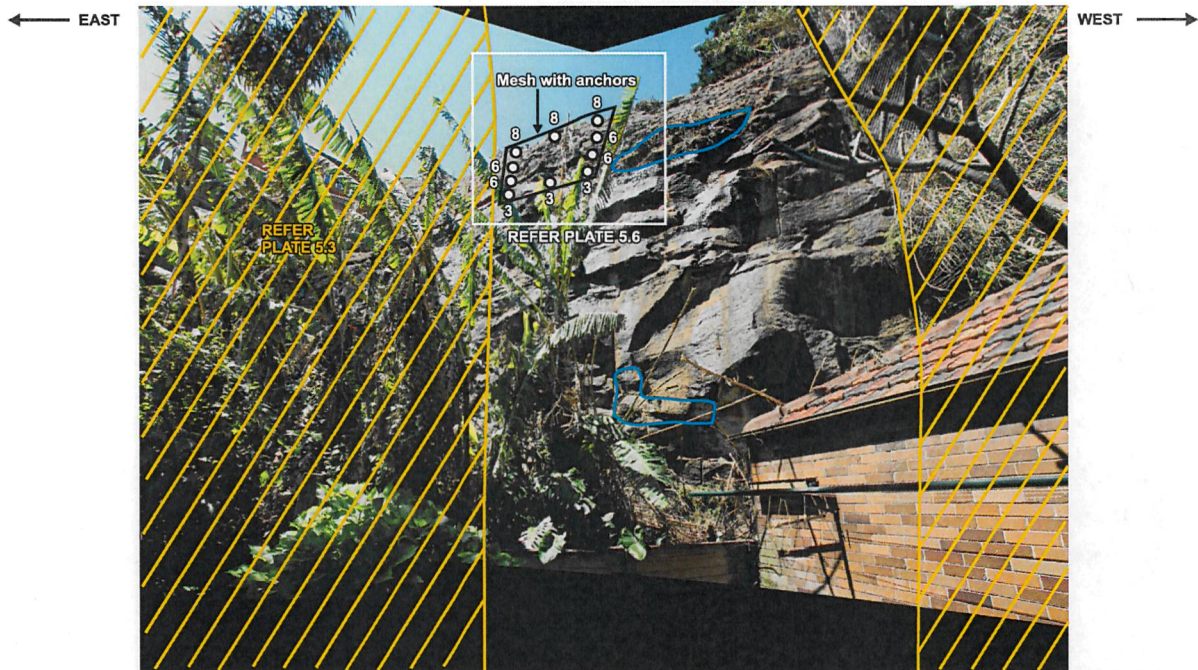
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PRINGLE PLACE, BELLEVUE HILL - DOMAIN 5 STABILISATION TREATMENT REQUIREMENTS

Job No: 21/18168/00
File Name: 2118168_LTN_12.cdr
Revision No: A
Photomosaic Date: 18 October 2010
Mark-up Date: 8 December 2010
Plate No: 5.3



ROCKBOLTS INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH



SCALING & GROOMING

Areas of selective devegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.



SHOTCRETE

Locations requiring application of mesh reinforced shotcrete with drainage pipes and/or strip drain provisions, for rock support and protection purposes.



GROOMING/REPROFILING

Areas requiring extensive grooming and reprofiling of better slope.

NOTES:

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PRINGLE PLACE, BELLEVUE HILL - DOMAIN 5 STABILISATION TREATMENT REQUIREMENTS

Job No: 21/18168/00
File Name: 2118168_LTN_13.cdr
Revision No: A
Photomosaic Date: 18 October 2010
Mark-up Date: 8 December 2010
Plate No: 5.4

NORTH

Note: Remove section of wall and reprofile soil/fill



SOUTH

ROCKBOLTS INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH



SCALING & GROOMING

Areas of selective revegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.



SHOTCRETE

Locations requiring application of mesh reinforced shotcrete with drainage pipes and/or strip drain provisions, for rock support and protection purposes.



GROOMING/REPROFILING

Areas requiring extensive grooming and reprofiling of batter slope.

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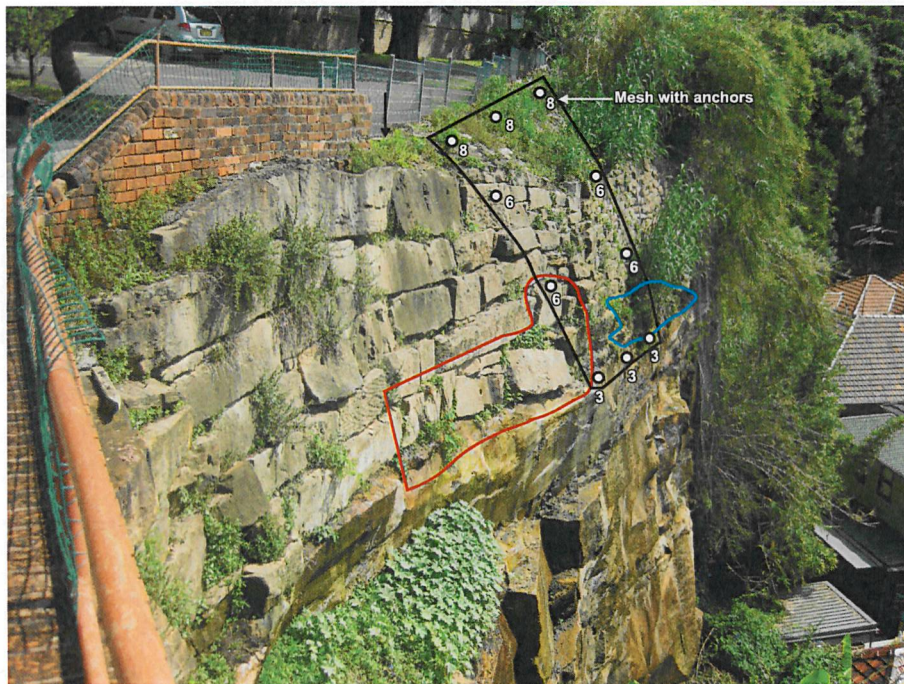
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PRINGLE PLACE, BELLEVUE HILL - DOMAIN 5 STABILISATION TREATMENT REQUIREMENTS

Job No: 21/18168/00
File Name: 21/18168_LTN_14.cdr
Revision No: A
Photomosaic Date: 18 October 2010
Mark-up Date: 8 December 2010
Plate No: 5.5

EAST

WEST



Note: Rockfall containment mesh and fully grouted mesh support dowels with lengths as shown (in metres). Refer to accompanying report text for discussion and details.

ROCKBOLTS TO BE INSTALLED

- 1.5m LENGTH
- 2.0m LENGTH
- 3.0m LENGTH
- 4.0m LENGTH

LEGEND

- INDICATIVE PROPERTY BOUNDARY
- PHOTOGRAPHIC OVERLAP



SCALING & GROOMING

Areas of selective devegetation and scaling/grooming as directed to remove loose or detached rock masses, soil accumulations and root masses.



SHOTCRETE

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GROOMING/REPROFILING

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PRINGLE PLACE, BELLEVUE HILL - DOMAIN 5 ROCK FACE STABILISATION / TREATMENT REQUIREMENTS

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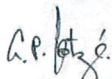

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Pringle Place Remediation Requirements_Domain 5 -Revision 1.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	Andrew Hunter	Mark George		Mark George		6/05/2019
1	Andrew Hunter	Greg Kotze		Greg Kotze		16/08/2019
2	Andrew Hunter	Greg Kotze		Greg Kotze		20/09/2019

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