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METIER3 PTY LTD
26 EDMONDSTONE
ROAD, BOWEN HILLS

CIVIL SITE
INVESTIGATION
REPORT



PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

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Question today *Imagine tomorrow* Create for the future

26 Edmondstone Road, Bowen Hills
Civil Site Investigation Report

Metier3 Pty Ltd

WSP
Level 12, 900 Ann Street
Fortitude Valley QLD 4006
GPO Box 2907
Brisbane QLD 4001

Tel: +61 7 3854 6200
Fax: +61 7 3854 6500
wsp.com

REV	DATE	DETAILS
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	NAME	DATE	SIGNATURE
Prepared by:	Jared Falkenhagen	20-12-2019	
Reviewed by:	Steve Novak – RPEQ 12760	20-12-2019	
Approved by:	Steve Novak – RPEQ 12760	20-12-2019	

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1 INTRODUCTION

WSP Australia Pty Ltd has been commissioned by Metier3 to investigate the civil components of the proposed development at 26 Edmondstone Road, Bowen Hills. The proposed tower is a 10-storey residential development with a roof terrace proposed for the top floor. The development falls within the interests of Economic Development Queensland, and is therefore listed as part of a Priority Development Area. The report outlines the existing available infrastructure surrounding the development, and the opportunities and constraints for the servicing of stormwater, sewer, and water infrastructure.

Preliminary connection points and service capacities have been outlined, as well as requirements to meet flood mitigation levels and comments on the proposed bulk earthworks. Vehicle access and basement level carpark swept paths have also been developed and the constraints of the layouts discussed. Availability and impact upon other inground services such as gas, telecommunications, and power have also been communicated.

Refer to Appendix A for provided documentation of the preferred site layout and building design.

2 SITE CHARACTERISTICS

The proposed site is currently a two-storey brick and render commercial building servicing multiple tenants. The existing building has vehicle access from both Edmondstone Road and Thompson Street. The existing site area is approximately 809m², however, a truncation of the lot is proposed to allow for future road widening resulting in a proposed site area of approximately 770m². Brisbane City Council has the parcel zoned as “Emerging Community” and is identified as being within a Priority Development Area declared under the Economic Development Act 2012.

A Dial Before You Dig search was conducted to provide information of the existing services surrounding the site, as well as detailed survey provided.

2.1 SITE LOCATION

The proposed development is an infill mixed use project to the north of the Brisbane CBD, located in the centre of Bowen Hills between Breakfast Creek and the Inner City Bypass. The development falls within the Brisbane City Council local government boundaries. The locality plan for the site is depicted below.

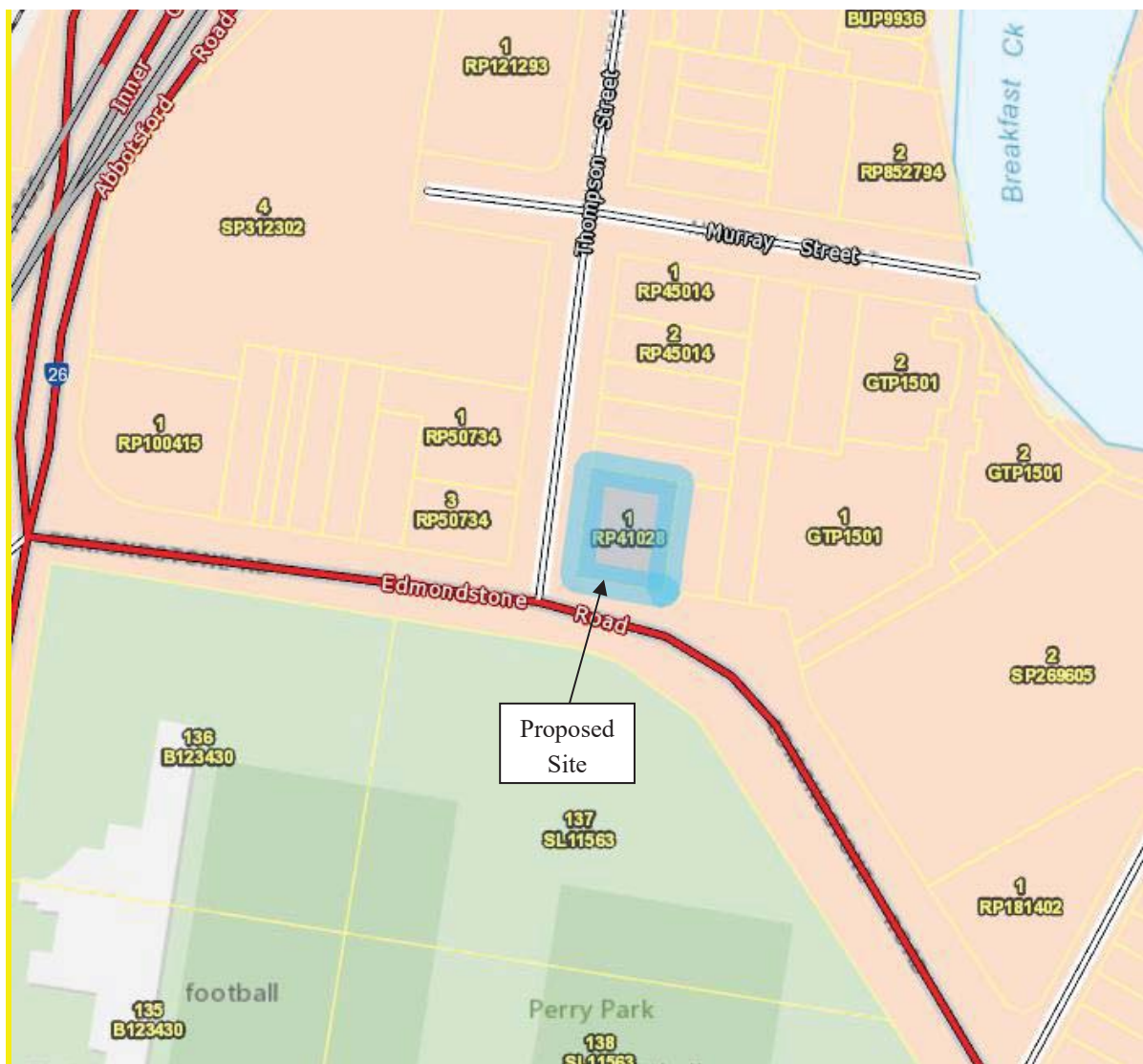


Figure 1 - Site Locality Map

2.2 PROPOSED DEVELOPMENT

The proposed development at 26 Edmondstone Road, Bowen Hills incorporates the construction of a 10-storey residential tower. At street level, the tower offers a proposed café space as well as a commercial showroom. The tower includes three basement levels serviced by a car lift and car stacking machinery to maximise available carparks. Vehicle and pedestrian access to the building is proposed to be from Thompson Street.

The proposed development includes a boundary realignment in allowance for a future road widening at the Thompson Street and Edmondstone Road intersection.

This report investigates the availability and impact to civil infrastructure and surrounding services, such as vehicle access, stormwater, sewer and water reticulation. Furthermore, the available earthworks and geotechnical information is summarised.

The proposed architectural site layout plan can be found at Appendix A.

2.3 EXISTING TOPOGRAPHY

The existing site levels range from approximately RL2.10 (AHD) on the south-east corner of the site, to RL5.40 (AHD) at the north-west corner of the site, resulting in an average site grading of approximately 7.5%. The site generally drains towards the south-eastern corner of the site. However, the proposed development is to accommodate three basement levels, and therefore will involve extensive bulk earthworks. Due to the proposed basement levels the proposed hydraulic design must incorporate a method to pump out water from the basement

3 ENGINEERING

3.1 EARTHWORKS

The bulk earthworks associated with the site will be generated by the excavation of the three basement levels. The finished floor level (FFL) of the existing building is approximately RL4.0 AHD. The proposed FFL of basement level 3 is RL-6.02 AHD. The proposed bulk earthworks level to allow for working platforms and basement slabs is assumed an additional 0.5m lower, approximately RL-6.52 AHD. This results in an excavation depth generally 10.52m below the existing floor levels.

The area of the site is 809m², however, the resultant site area will be reduced to 770m² due to the boundary realignment allowing for future road widening. An approximate bulk earthworks cut volume can be calculated as 8,500m³.

The preliminary geotechnical assessment conducted by Butler Partners Pty Ltd, dated 20 April 2018, suggest soil conditions throughout this area are highly variable, however, the site is anticipated to be underlain initially by fill material with 3-4m of stiff to soft clays beneath, followed by variable strength rock. Ground water can be expected at approximately 3-5m of depth, and will need to be managed during construction.

For basement retention during construction, the preliminary assessment suggests soldier pile wall system supported by stressed anchors, subject to rock quality and strength.

Further geotechnical investigation is required to adequately determine foundation design. At least one borehole drilled 2-3m below bulk excavation level is suggested by the Butler Partners assessment.

If any imported fill is required, it will need to be engineered fill from an approved source specified as free of contaminants or deleterious material. A detailed geotechnical investigation is recommended prior to detailed design to confirm stability of soils on site. To comply with Council standards, all filling within lots associated with bulk earthworks will be completed under Level 1 Geotechnical Supervision and AS3798:2007.

3.2 SITE GRADING AND RETAINING STRUCTURES

The site is graded with an average grade of approximately 7% towards the south-eastern corner of the site. The proposed site layout allows for at grade entries into the carpark (RL 5.125) and apartment lobby (RL 4.38), on the western site frontage. The proposed commercial showroom and café floor levels are set at RL 3.2, over a meter lower than the lobby. The floor level of the café and showroom therefore complies with the Coastal Hazard Overlay Code for flood immunity, requiring a floor level of 3.1m AHD. This floor level also allows entry from the southern street frontage with minimal grade difference, resulting in approximately two stairs. The slight retaining structure proposed on the southern frontage will likely be incorporated into the structural detailed design of the building and the basement levels.

3.3 TRAFFIC ACCESS

The access driveway must be located and constructed in accordance with the Brisbane City Council Transport, Access, Parking and Servicing Planning Scheme Policy and Brisbane City Council Standard Drawing – BSD-2021. Furthermore, access to the development must be from Thompson Street, as per the Economic Development Queensland (EDQ) directive, dated 10th December 2019. The driveway and carparking area shall be paved with a brushed concrete pavement in accordance with Brisbane City Council guidelines to cater for the design vehicle. All concrete pavements will be designed for a 40-year design life.

The basement carpark employs a car lift system to provide access to the lower car park levels.

Delivery vehicles for the proposed showroom and café are restricted to the car park entry height if using the access driveway, any vehicles exceeding the height clearance will have to park on the street.

3.3.1 BASEMENT SWEEP PATHS

Preliminary swept paths of the proposed carpark entry and basement levels have been conducted. The findings suggest the entry level is suitable for a standard car to successfully access the proposed car lift. Basement level 2 can successfully access all parks, but relies on reverse parking for carpark No. 2-8 and 11-12. However, carpark No. 1 in Basement level 2 has difficulty exiting the carpark without excessive reversing. Finally, basement level 3 incorporates a semi-automated car stacking system. The car stackers in basement level 3 can be accessed only via reverse parking, as a front first entry appears to impact the proposed stacking structure. Exiting the car stackers after reverse parking is also achievable from most car parks. However, the northern most slots of basement level 3 cannot be accessed with the current basement layout.

The carpark swept path layouts primarily detail the worst-case vehicle manoeuvre, and can be found at Appendix B.

3.4 STORMWATER DRAINAGE

3.4.1 FOUL WATER AND ROOF WATER DRAINAGE

Available infrastructure mapping from Brisbane City Council's EBIMAP2 shows a 'Foul Water and Roof Water' drainage pipe running within the eastern site boundary. This pipe appears to discharge the existing buildings roof water, as well as upstream properties to the north. The size of the pipe is unknown.

The pipe ultimately discharges to the stormwater network in Edmondstone Road. The infrastructure mapping suggests the pipe is currently in use, but further investigation is recommended as these pipes are very old infrastructure that are often left abandoned but in-situ. In the event the pipe is still live, relocation of the pipe through the basement as part of the hydraulic works will be required. The pipe must remain live during any construction works if it is servicing any upstream properties, as the available mapping suggests.

3.4.2 STORMWATER QUANTITY

Brisbane City Council City Plan 2014 Section 9.4 – Stormwater Code and the Brisbane Planning Scheme Policy – Chapter 7 – Stormwater Drainage state stormwater detention requirements can be waived where:

- (a) The development will not cause adverse impacts or actionable nuisance to surrounding properties;
- (b) for infill development, the development site has an existing actual impervious fraction greater than 60%.

Due to the existing site being infill and fully impervious, the proposed design will not be increasing the stormwater runoff, and will not cause adverse impacts or actionable nuisance to surrounding properties. The existing site drains to road drainage infrastructure within Edmondstone Road. This connection can be utilised for the proposed works.

3.4.3 STORMWATER QUALITY

Table 9.4.9.3.A of the Brisbane City Plan 2014 Stormwater Code identifies the proposed development as a low risk classification with respect to water quality, as the development does not fall within one of the defining categories for high risk development:

- (a) a material change of use for urban purposes that involves a land area greater than 2,500m² that:
 - i) will result in an impervious area greater than 25% of the net developable area, or
 - ii) will result in six or more dwellings, or
- (b) reconfiguring a lot for urban purposes that involves a land area greater than 2,500m² and will result in six or more lots, or
- (c) operational works for urban purposes that involve disturbing more than 2,500m² of land.

The water quality impacts of the development should be minimised by identifying and adopting best practice techniques at the detailed design phase to treat the pollutants typically generated during the operational phase of the development, such as litter bins and silt baskets for inlet pits. No specific bio-treatment system is warranted for the development.

3.4.1 OVERLAND FLOW

The existing site is fully impervious and grades to Edmondstone Road where any overland stormwater is discharged to the street. The proposed building footprint will extend to the property boundaries and therefore not contribute any overland flows. The verge surrounding the site will be accordance with Brisbane City Council standards and discharge directly to Thompson Street and Edmondstone Road respectively.

3.4.2 FLOOD ANALYSIS

The Brisbane City Council Floodwise Property Report states a ‘minimum habitable floor level’ of 3.2m(AHD). This floor level is the minimum floor level proposed by the development in the café and showroom areas on the ground floor. The basement levels are protected from typical design flooding by the entry being located on the north-west corner of the site, the highest point on the site at approximately 5.2m(AHD).

Access to the property may be limited by extreme flood events, such as the 0.2% and 0.05% AEP storms (1 in 500 year and 1 in 2000 year storms respectively); however, typical design flood events will allow access from the property to Edmondstone Road and Thompson Street.

Figure 2 below shows the site on the Brisbane City flood awareness map, and the full Floodwise Property Report for 26 Edmondstone Road can be found at Appendix C.

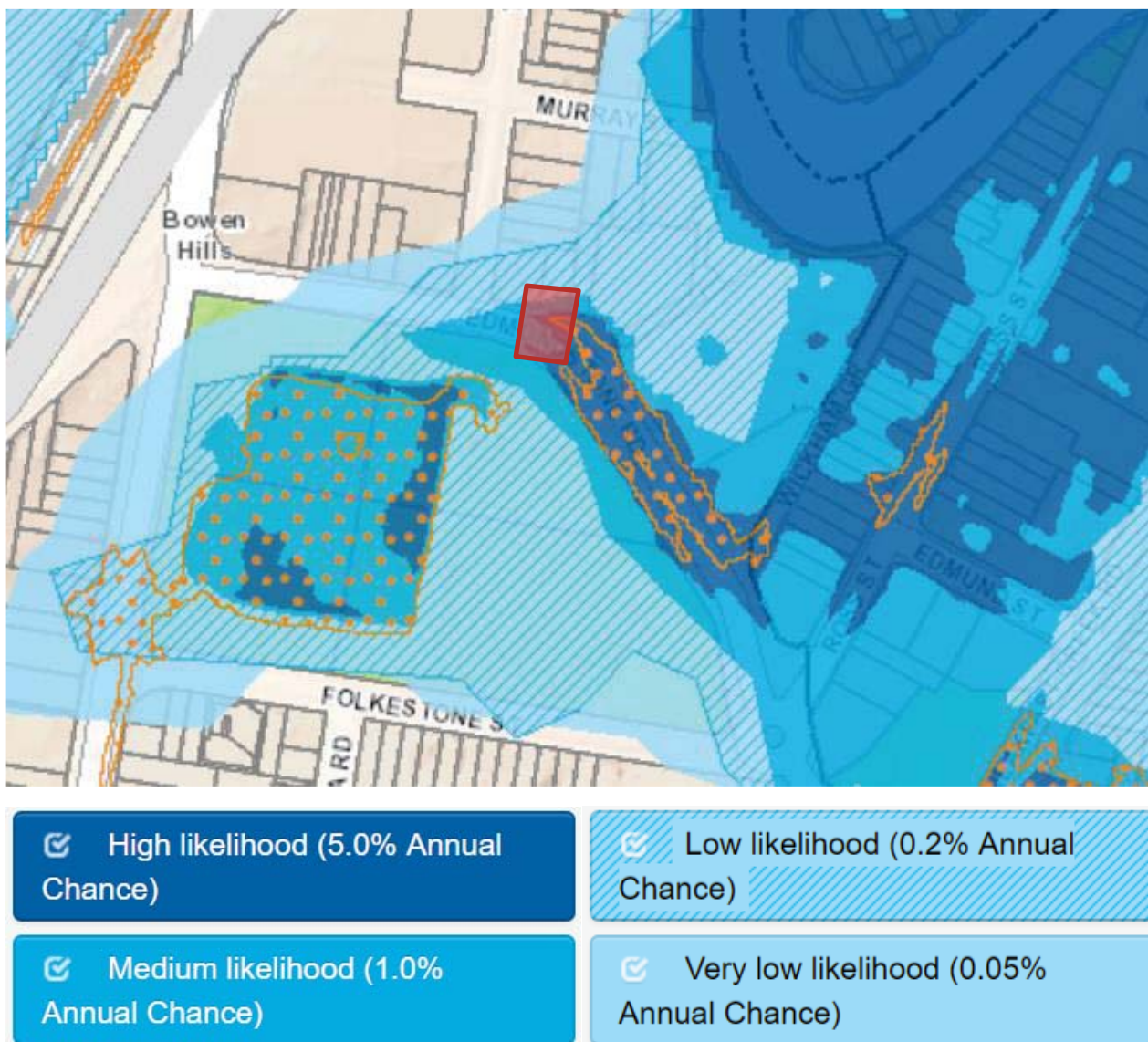


Figure 2 – BCC Flood Awareness Mapping

3.5 SEWER RETICULATION

The design of the works must be in accordance with the current version of the SEQ Water Supply and Sewerage Design and Construction Code in accordance with the local water and sewer authority, Queensland Urban Utilities. The design must be certified by a Registered Professional Engineer of Queensland (RPEQ).

26 Edmondstone Road is currently serviced by a 100mm sewer connection at the south-east corner of the site. According to Brisbane City Council infrastructure mapping tools, this connection flows to a 150mm earthenware pipe along Edmondstone Road. This service is a gravity main that heads south-east eventually connecting to a 750mm trunk sewer main near Breakfast Creek Road.

The local water and sewer authority, Queensland Urban Utilities (QUU) requires a property connection of minimum size 150mm, as per Section 4.1 of the SEQ Amendment to WSA Sewerage Code 2016. The Water Services Association of Australia (WSAA) code also suggests 600 Equivalent People (EP's) can be serviced by a 150mm pipe. The earthenware pipe within Edmondstone Road services approximately 11 lots of predominantly low-rise commercial and retail. The demand created by these lots and the proposed building at 26 Edmondstone Road is unlikely to exceed the 600 EP's available within the 150mm pipe. However, the WSAA code requires a minimum 225mm pipe to service commercial and industrial lots of greater than 300m², suggesting the existing pipe is no longer suitable for its current use.

A Services Advice Notice (SAN) produced by QUU will be required to confirm the connection and capacity of the available sewer network and inform the detailed design of the proposed building.

Dial Before You Dig information is available at Appendix D.

3.6 WATER RETICULATION

The design of the works must be in accordance with the current version of the SEQ Water Supply and Sewerage Design and Construction Code in accordance with the local water and sewer authority, Queensland Urban Utilities. The design must be certified by a Registered Professional Engineer of Queensland (RPEQ).

The site is currently serviced by an existing 25mm water connection from a 180mm PE watermain on the western side of Thompson Street. This is a residential connection and will not be suitable for the proposed use. Water main connections are determined by the proposed building demands and firefighting requirements. These demands and the subsequent watermain connection will be determined by the Hydraulic Engineer at the detailed design stage. The water supply must also be designed in accordance with AS 2118 and AS 2319, in reference to multi-storey building firefighting requirements. In the event the 180mm PE watermain is not suitable, there is further water services within Edmondstone Road, including a 225mm cast iron pipe.

A Services Advice Notice (SAN) from QUU will be required to evaluate the capacity of the 180mm watermain to verify the proposed demands can be met by the available infrastructure, which will inform the detailed design of the proposed building.

Dial Before You Dig information is available at Appendix D.

3.7 OTHER SERVICES

3.7.1 GAS

A 40mm gas service is available along the western property boundary at Thompson Street, and a 50mm service along the southern boundary at Edmondstone Road. For capacities and connection availability, coordination with the asset owner must be investigated.

Further information is available within the Dial Before You Dig documents at Appendix D.

3.7.2 TELECOMMUNICATIONS

TPG fibre infrastructure can be found in the Edmondstone Road verge adjacent the site. Furthermore, Telstra telecommunication and NBN infrastructure can be found in both street frontages. For connections and capacity availability, coordination with the asset owner must be investigated.

Further information is available within the Dial Before You Dig documents at Appendix D.

3.7.3 POWER

High voltage power (>33kV) can be found along both street frontages of the site. This includes overhead power as well as underground conduits. According to the Dial Before You Dig information, there are work orders in place for planned works in Edmondstone Road and Thompson Street. There is also a junction pillar situated at the south-west corner of the site, just outside the current property boundary. For capacities and connection availability, coordination with the asset owner must be investigated.

Further information is available within the Dial Before You Dig documents at Appendix D.

3.7.4 SURVEY MARKS

A Temporary Bench Mark (TBM) in the kerb at the north-west corner of the site may be impacted by the proposed driveway works. Proper benchmark relocation processes should be adhered to in the event of removal being necessary. The survey mark location can be found in the provided survey documentation at Appendix E.

4 EROSION AND SEDIMENT CONTROL

4.1 SITE CONTROLS

The erosion and sediment control measures will be designed during the detail design stage to include in the building contract. The building contractor will implement and maintain erosion and sediment control measures during the construction and on-maintenance period.

4.2 GENERAL REQUIREMENTS

All erosion and sediment control measures are required to be installed and functional prior to works commencing. The following implementation sequence shall be adopted where practicable with the construction program. Plans shall be updated, and measures moved and reinstated to reflect the progression of the works.

A site based Erosion and Sediment Control Management Plan will be required and implemented under the direct supervision of a Registered Professional Engineer of Queensland. Indicative ESC measures will be required on the detailed design drawings and a final Erosion and Sediment Control Management Plan (ESCMP) shall be prepared by the Contractor as part of the Construction Management Plan for the information of the relevant parties prior to the Pre-start Meeting. The ESCMP to be generally in accordance with Best Practice Erosion & Sediment Control Document published by International Erosion Control Association (Australasia) 2008.

In addition to the general environmental duty which applies to all persons, it is the contractor's responsibility to implement and maintain all erosion and sediment control measures on site, until all disturbed areas are reinstated.

The contractor is, at all times, responsible for the establishment, management and maintenance of the erosion and sediment control measures, to ensure minimal environmental harm and to comply with Council's standards.

Once the site is stripped, the contractor will need to ensure that sediment is not washed into drains and that the loose dense silty sand and clays are not eroded away and bypass the site. Sediment fencing around the area of works and to direct the flows needs to be provided.

5 CONCLUSION

This report for the proposed development at 26 Edmondstone Road, Bowen Hills has reviewed the bulk earthworks, traffic access, stormwater management, sewer reticulation, erosion and sediment control, gas, water reticulation and electrical & communications infrastructure in support of the development application.

The site constraints, such as flood level mitigation, stormwater discharge, erosion and sediment control have been addressed. This report provides details that indicate that the proposed development can be constructed in accordance with the Brisbane City Council guidelines for development and current Best Management Practices considering the proposed use, pending confirmation of council external water and sewer infrastructure capacity. The current basement carpark layout has some constraints, such as reverse only parking manoeuvres and restricted access to some car spaces pending the manoeuvring space around the car stacking system.

It should be noted that the results in this report are limited to use for preliminary assessment purposes only. During the detailed design stages, a further refinement of the engineering components of the development will be necessary.