



Flood Assessment of Masterplan Development 176-184 George Street, Concord

for George Concord Pty Ltd

24 February 2016

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1.0 INTRODUCTION

This flood study has been prepared by TTW to determine the flood planning level and flood impact at the proposed development at 176-184 George Street, Concord.

1.1 The Site

The site is located in Concord, approximately 11.5km west of Sydney's CBD. It is located between the northern railway line and Powell's Creek. The site is within the City of Canada Bay Council local government area.

The area is a mix of warehouses in the immediate vicinity, free standing houses to the north, a school to the northwest, and low rise apartments as well as free standing houses to the south.

The existing site consists of a warehouse building. There is a low point in George Street near the subject site.

Figure 1 shows an aerial photo of the existing site and surrounds. Figure 2 shows the site survey. Figure 3 gives the ground floor plans of the proposed development.



Figure 1 Aerial Photo (source: NearMap)





Figure 3 Site master plan (source: Concord West Precinct Master Plan, JBA, 2 May 2014)

2.0 AVAILABLE INFORMATION

2.1 Existing Documents

The following documents have been reviewed as part of this flood study

- Concord West Precinct Master Plan Urban Design Study (JBA, 2 May 2014);
- Survey by Project Surveyors dated November 2013;
- Concord West Precinct Master Plan Flood Study (Jacobs, draft 1 16/03/2015)
 - Tuflow flood model files for the above study.
- Specification for the Management of Stormwater (City of Canada Bay, February 2009)
- ARR revision Book 9 Chapter 6: Safety Design Criteria (Grantley Smith, Ron Cox, draft 9/12/2013)

2.2 Council Requirements

Council's Specification for the Management of Stormwater sets out the following flood controls for the developments relevant to the subject site:

The minimum freeboard shall be as follows:

- 150mm for roadways between the 100-year ARI overland flow route and warehouse, factory, and garage floor levels and entrances to underground carparks.
- 300mm for roadways between the 100-year ARI overland flow route and office, living rooms, retail space, storeroom, and show room floor levels.
- 300mm for surcharge paths e.g. easements between the 100-year ARI overland flow route and all internal building floor levels, garages and basement carparks.
- 500mm for channels, creeks and rivers between the 100-year flood water level and all internal building floor levels, garages, and basement carparks.

2.3 Concord West Precinct Mater Plan Flood Study

City of Canada Bay Council engaged Jacobs to prepare a flood assessment for the Concord West Precinct Master Plan. The report determined existing flood levels, as well as the impact of proposed mitigation works.



Figure 4 Jacobs Flood Study Extract - 100-year Baseline Model

The report identifies the George Street sag point as a flood prone area, and proposes a mitigation strategy to reduce the flood risk in the area as well as a safe vehicular passage for stroms up to and inlufding the 100-year ARI event. The strategy includes:

- regrading of George Street to reduce the depth of the sag point;
- high capacity pits to capture
- construction of an overland flow path from the sag point through to Powells Creek Reserve;
- construction of a floodway through the playing fields to drain flows to Powells Creek; and,
- a low profile kerb (approx. 50mm) on the western side of George Street to minimise ponding on the road before overflow to the overland flow route.



Figure 5 Jacobs Flood Study Extract - Flood Mitigation Option



Figure 6 Jacobs Flood Study Extract - 100-year with mitigation works

3.0 FLOOD MODELLING

3.1 TUFLOW

The flood model built by Jacobs was used under a licence agreement through Council by TTW for the purpose of establishing flood levels in this report.

The baseline model was run to verify the results were equivalent to those produced by Jacobs. The difference in flood levels between the two models was generally no more than 2mm. We attribute the small difference in flood levels to the use of a later version of TUFLOW in this assessment (build 2013-12-AD in this study, 2013-12-AA in Jacobs' study).

3.2 Ground Surface

The ground surface model used in the TUFLOW model was compared to the field survey obtained for George Street. The levels in the survey data used in the TUFLOW model (from AAM Hatch LiDAR) are typically within 150mm of the field survey. As a result, we consider the flood levels may be conservative. The TUFLOW existing ground survey model files were used to ensure consistency across models.

3.3 Mitigation Works

The mitigation works, including road raising, and the overland flow route between the buildings and between the ovals was designed using civil design software 12d.

The existing buildings in the model were removed and replaced with the three buildings from masterplan.

In addition to the mitigation measures recommended in Jacobs' report, the following changes have been made:

- Relocate 900mm diameter pipe under George Street to suit proposed building layout
- Culvert provided in south-east corner of playing fields to avoid the existing change rooms, extending to a pit to the west of the fields
- Twin 900mm diameter pipes discharge stormwater from the proposed culvert to Powells Creek.

4.0 100-year ARI Flood Results

4.1 Existing conditions



Figure 7 Existing 100-year ARI Flood

4.2 Proposed Development

The proposed development and mitigation measures were added to the model to determine the flood impact of the development. The mitigation measures are shown on the civil siteworks **concept plan** in **Appendix A**. This concept plan is subject to detailed design and Council formal approval through Section 138 of the Roads Act 1993.

Figure 8 shows the flood depth with the mitigation measures in place.



Figure 8 100-year Flood with mitigation

Figure 9 shows the flood hazard plan in accordance with the NSW government's "Floodplain Development Manual" April 2005 to enable Canada Bay Council assess the risk on their assets. High Hazard exists within the proposed open channel to the west of the proposed site. A safety protection treatment is recommended in the form of signage and/or fencing to eliminate or reduce the hazard. The appropriate safety protection treatment is subject to detailed design and coordination with landscaping works.





Figure 9: Flood Hazard Map

5.0 FLOOD PLANNING LEVELS

FPLs across the building have been determined based on the requirements of the DCP, the flood modelling and the masterplan layouts. The FPLs are presented in Figure 10.



Figure 10 Flood Planning Levels

5.1 Basement Entrance

It is understood that the development of the site will likely consider basement car parking. Under the DCP, the basement must be above the 100-year flood level with some freeboard, 300mm for this site. Basement entrances must be elevated to the flood planning levels in Figure 10 before ramping down to the basement.

It is recommended that TTW is contacted to provide advice on FPLs regarding the design of entries and openings to the basement.

5.2 **Overland Flow Route**

The overland flow route from the sag point on George Street through to the playing fields is a critical part of the flood mitigation design. Consideration should be given during the detailed design phase of the project including the basement underneath.

The masterplan has an allowance for shown as a connection between George Street and Powell's Creek Reserve. The finished levels are to be in accordance with the levels used in the flood modelling. As such it is recommend that TTW be contacted to advise on the overland flow route design during detailed design stage of the building structure.

6.0 EVACUCATION, GEORGE STREET AND VEHICLE STABILITY

George Street is an evacuation route for more than 100 residences and a school. Regrading George Street has the benefit of making the evacuation route trafficable during flood events. Under the current conditions, the flood depth at the say point is greater than 2m. This is clearly not passable, and dangerous for all vehicles.

6.1 Vehicle Stability

The Australian Rainfall and Runoff (ARR) revision project gives guidance on vehicle stability in Book 9 Chapter 6 Safety Design Criteria (draft 9/12/2013). The following figure is an extract from the above.



Figure 9.6.6. Interim Safety Criteria for Vehicles in Variable Flow Conditions (After Shand et al, 2011)

Figure 9Vehicle Stability in Flood Waters

With velocities less than 1 m/s at the George Street sag point with the proposed regarding, the draft recommended stability criteria for small cars is a flood depth of 300mm.

Under the design condition, during a 100-year ARI flood event, there is a width of

approximately 9m along the crown at the sag point where the flood depth is less than 300mm and small vehicles can safely pass. Refer to Figure 10.



Figure 10 Safe width for cars in a 100-year flood event under proposed conditions

TTW recommends that appropriate flood signage and depth markers are installed as part of the regrading works. It is also recommended that the road does not have any median islands through the sag point to allow vehicles to navigate flood waters through the area with the smallest flood depth.

7.0 CONCLUSIONS AND RECCOMENDATIONS

The proposed development at 176-184 George Street can be designed to reduce the flood impact on neighbouring properties and improve conditions for existing residents north of the site. The finished floor levels provide adequate freeboard to the 100-year ARI flood in accordance with Council's DCP.

This report has been prepared based on the masterplan documents. We recommend:

- That the flood information presented in this report is reviewed when detailed designs are prepared including but not limited to
 - pits and headwall design taking into account hydraulic efficiency
 - detailed design of pit 7 functioning as intended to be a surcharge pit.
 - safety protection system of the open channel and culvert in conjunction with proposed landscaping works

- minimising potential blockages of the proposed open channel and box culverts (eg, self cleansing if achievable) considering the site's levels constransts.
- That the proposed discharge outlet to Powell's creek be detailed and submitted to Department of Lands/ NSW's Ofiice of Water and Fisheries for their approval and acceptance during detailed design stage
- That the civil siteworks concept plan as shown in **Appendix A** be adopted subject to detailed design and formal approval by City of Cananda Bay Council through the Section 138 of the Roads Act 1993

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Tim Henderson Engineer

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APPENDIX A

CIVIL SITEWORKS CONCEPT PLANS

176-184 GEORGE STREET CONCORD WEST

GENERAL NOTES

- 1. Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the Enginee
- 2. Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
- 3. Make smooth connection with all existing works. 4. Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
- 5. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the
- requirements of the Authority shall be applicable. 6. For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

. These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	R	ev Date
PROJECT	SURVEY	B1060	1	NOV 2011
SURVEYORS				

SURVEY AND SERVICES INFORMATION SURVEY

Origin of levels : SSM 114416 Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM Coordinate system : ISG OR MGA OR LOCAL Survey prepared by : PROJECT SURVEYORS : CONTACT THE SURVEYOR Setout Points

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.

Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from : CONTACT THE SURVEYOR

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct. Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

JOINTING NOTES

Vehicular Pavement Jointing

- . All vehicular pavements to be jointed as shown on drawings. . Keyed construction joints should generally be located at a
- maximum of 6m centres. . Sawn joints should generally be located at a maximum of 6m
- centres or 1.5 x the spacing of keyed joints, where key joint spacing is less than 4m, with dowelled expansion joints at maximum of 30m centres.
- 4. Provide 10mm wide full depth expansion joints between buildings and all concrete or unit pavers. 5. The timing of the saw cut is to be confirmed by the contractor
- on site. Site conditions will determine how many hours after the concrete pour before the saw cuts are commenced. Refer to the specification for weather conditions and temperatures required. 5. Vehicular pavement jointing as follows.

=			FACE	0 F	KERB	l	
SJ	KJ JJ		S		SJ	i _	SJ
		6m MAX			6m MAX		
	KJ				θm		
				30m MAX			
	KJ						
_	EJ	FA	CE O	F B U	ILDI	NG	

Pedestrian Footpath Jointing

- 1. Expansion joints are to be located where possible at tangent points **FORMWORK** of curves and elsewhere at max 6.0m centres.
- 2. Weakened plane joints are to be located at a max 1.5 x width of the pavement.
- 3. Where possible joints should be located to match kerbing and / or adjacent pavement joints.
- I. All pedestrian footpath jointings as follows (uno).

	F	ACE	0 F	ΚE	RВ		_
WPJ	WPJ	EJ		MPJ	WPJ	EJ	>
	·			·		(1.5m MA	X)
				6.0	m MAX		

KERBING NOTES

Includes all kerbs, gutters, dish drains, crossings and edges.

- 1. All kerbs, gutters, dish drains and crossings to be constructed on minimum 75mm granular basecourse compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
- 2. Expansion joints (EJ) to be formed from 10mm compressible cork filler board for the full depth of the section and cut to profile. Expansion joints to be located at drainage pits, on tangent points of curves and elsewhere at 12m centres except for integral kerbs where the expansion joints are to match the joint locations in slabs.
- . Weakened plane joints to be min 3mm wide and located at 3m centres except for integral kerbs where weakened plane joints are to match the joint locations in slabs.
- 4. Broomed finished to all ramped and vehicular crossings, all other kerbing or dish drains to be steel float finished.
- 5. In the replacement of kerbs -Existing road pavement is to be sawcut 900mm from lip of
- autter. Upon completion of new kerbs, new basecourse and surface is to be laid 900mm wide to match existing materials and thicknesses. Existing allotment drainage pipes are to be built into the new
- kerb with a 100mm dia hole. Existing kerbs are to be completely removed where new kerbs are shown.

CONCRETE FINISHING NOTES

- . All exposed concrete pavements are to be broomed finished. 2. All edges of the concrete pavement including keyed and dowelled joints are to be finished with an edging tool.
- 3. Concrete pavements with grades greater than 10 % shall be heavily broomed finished.
- 4. Carborundum to be added to all stair treads and ramped crossings U.N.O.

A1	0	1	2	3	4	5	6	7	8	9	10
P6	ISSUE FOR	APPROVA	NL.			Ν	B N	IB	24.02.16		

P6 ISSUE FOR APPROVAL	NB	NB	24.02.16				
P5 ISSUE FOR COMMENT	NB	TB	30.11.15				
P4 ISSUE FOR COMMENT	NB	TB	12.11.15				
P3 ISSUE FOR COMMENT	NB	TB	28.10.15				
P2 ISSUE FOR COMMENT	NB	TB	22.09.15				
P1 ISSUE FOR INFORMATION	NB	JW	24.06.15				
Rev Description	Eng	Draft	Date	Rev Description	Eng Draft Date	Rev Description	Eng Draft Date

CONCRETE NOTES

EXPOSURE CLASSIFICATION : External : A2 Internal : A1

CONCRETE

Place concrete of the following characteristic compressive strength f'c as defined in AS 1379.							
Location	AS 1379 f'c MPa at 28 days	Specified Slump	Nominal Agg. Size				
KERBS, FOOTPATHS	S25	80	20				
FOOTINGS, PAVEMENTS	S32 at 90 days	80	20				

Use Type 'GP' cement, unless otherwise specified.

- All concrete shall be subject to project assessment and testing to AS 1379. Consolidate by mechanical vibration. Cure all concrete surfaces as
- directed in the Specification. For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
- Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review. No holes or chases shall be made in the slab without the approval
- of the Engineer Conduits and pipes are to be fixed to the underside of the top
- reinforcement layer. . Slurry used to lubricate concrete pump lines is not to be used in any structural members.
- All slabs cast on ground require sand blinding with a Concrete Underlay

The design, certification, construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. Proposed method of installation and removal of formwork is to be submitted to the superintendent for comment prior to work being carried out.

EROSION AND SEDIMENT CONTROL NOTES

- 1. All work shall be generally carried out in accordance with (A) Local authority requirements, (B) EPA — Pollution control manual for urban stormwater,
- (C) LANDCOM NSW Managing Urban Stormwater: Soils and Construction ("Blue Book").
- 2. Erosion and sediment control <u>drawings and notes are</u> provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities. The erosion and sediment control <u>plan</u> shall be implemented and adopted to meet the varying situations as work on site progresses.
- . Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
- When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
- 5. Minimise the area of site being disturbed at any one time. 6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in
- watercourses. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site
- conditions. Control water from upstream of the site such that it does not enter the disturbed site.
- 9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
- 10. All vehicles leaving the site shall be cleaned and inspected before leavina.
- 1. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
- 2. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

- . Prior to commencement of excavation the following soil
- management devices must be installed. 1.1. Construct silt fences below the site and across all potential runoff sites.
- 1.2. Construct temporary construction entry/exit and divert runoff to
- suitable control systems. 1.3. Construct measures to divert upstream flows into existing
- stormwater system.
- 1.4. Construct sedimentation traps/basin including outlet control and overflow.
- 1.5. Construct turf lined swales. 1.6. Provide sandbag sediment traps upstream of existing pits. 2. Construct geotextile filter pit surround around all proposed pits
- as they are constructed. 3. On completion of pavement provide sand bag kerb inlet sediment
- traps around pits. 4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

SITEWORKS	LEGEND
•••••••	

Finished surface level

Finished contour

Kerb and gutter

Mountable kerb

Thickened edge

and line with

Pipe grade

Grated drain

Invert level upstream

Pipe size and class

Flow (Litres per second)

Intermediate riser with subsoil

Concrete encased stormwater line

Invert level downstream

drainage line (100 dia)

edae

Mountable integral kerb

Mountable integral kerb

Integral kerb with thickened

Intearal kerb with edae downturn

Stormwater pit. flow direction

with thickened edge

• F22.20 <u>F22.00</u> K&G KO Kerb only FK _____ Elush kerb DD ——— Dish drain MK _____ MIK _____ MIK+TE IK+TE Integral kerb IK+FD K&T _____ Kerb and toe



•••••••)

• FP	Flushing point with subsoil drainage line (100 dia)
DP	Down pipe





SITEWORKS NOTES

- . All basecourse material to comply with RTA specification No 3051 and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.
- . All trench backfill material shall be compacted to the same density as the adjacent material.
- 3. All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1

RETAINING WALLS

- Drainage shall be provided as shown on the drainage drawings. . Backfilling shall be carried out after grout or concrete has reached a minimum strength of 0.85 f'c. Backfilling shall be approved granular material compacted in layers not exceeding
- 200mm to 95% Standard compaction unless noted otherwise. 3. Provide waterproofing to back of walls as specified or noted. Where retaining walls rely on connecting structural elements for stability, do not backfill against the wall unless it is adequately propped or the elements have been constructed
- and have sufficient strength to withstand the loads. 5. For all temporary batters obtain geotechnical engineers recommendations.

STORMWATER DRAINAGE NOTES 1 Stormwater Design Criteria (A) Average recurrence interval -1:100 years for roof drainage to first external pit 1:20 years for paved and landscaped areas

- (B) Rainfall intensities -Time of concentration: 6 minutes 1:100 years = 25 mm/hr 1:20 years = 52 mm/hr (C) Runoff coefficients - $C_{100} = 1.0$ Roof areas: Roads and paved areas: $C_{20} = 1.0$ Landscaped areas: $C_{20} = 0.3$
- 2. Pipes 300 dia and larger to be reinforced concrete Class "2" approved spigot and socket with rubber ring joints U.N.O.
- 3. Pipes up to 300 dia shall be sewer grade uPVC with solvent welded ioints.
- 4. Equivalent strength VCP or FRP pipes may be used subject to approval. 5. Precast pits may be used external to the building subject
- to approval by Engineer
- 6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
- 7. Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
- 8. Grates and covers shall conform with AS 3996-2006. and AS 1428.1 for access requirements. 9. Pipes are to be installed in accordance with AS 3725. All
- bedding to be type H2 U.N.O. 10. Care is to be taken with levels of stormwater lines. Grades
- shown are not to be reduced without approval. 1. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O. 12. Subsoil drains to be slotted flexible uPVC U.N.O.
- 13. Adopt invert levels for pipe installation (grades shown are only nominal).

PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets - C??? manly with ACZEOD

	Final internal p	oit dimensions are to comply with AS350	00
Туре	Description	Cover (Clear Opening)	Number
A	Kerb inlet pit 2400 lintel	450 x 900 Class D galvanised mild steel grate hinged to frame	2,3,4,5,6
В	Surface inlet pit	900 x 900 Class D galvanised mild steel grate hinged to frame	7,11,12
	Surface inlet pit	2400 x 1200 Class D galvanised mild steel grate hinged to frame	9,10
С	Junction pit	900 x 900 Class D cast iron cover with concrete infill	7,11,12

BULK EARTHWORKS NOTES

1. All bulk earthworks setout from grid lines U.N.O.

- 2. All batters at a slope of 2 (H) : 1 (V) U.N.O. 3. Excavated material may be used as structural fill provided, (i) it complies with the specification requirements for fill material.
- (ii) the placement moisture content complies with the Geotechnical Consultants requirements, and allows filling to be placed and proofrolled in accordance with the specification. Where necessary the Contractor must moisture condition the excavated material to meet these requirements.

4. Compact fill areas and subgrade to not less than:

Location	Standard dry density (AS 1289 5.1.1.)	Moisture (OMC)
Under building slabs on ground:	98%	±2%
Under roads and carparks:	98%	±2%
Landscaped areas:	95%	±2%

- 5. Before placing fill, proof roll exposed subgrade with a 10 tonne minimum roller to test subgrade and then remove soft spots (areas with more than 3mm movement under roller). Soft spots to be replaced with select fill U.N.O.
- Contractor shall place safety barriers around excavations in accordance with relevant safety regulations. . For interpretation of bulk earthworks foot print line shown on the
- bulk earthworks drawings refer to the bulk earthworks construction
- 8. Bulk earthwork drawings are not to be used for detailed excavation. 9. Refer to Geotechnical Report prepared by -Enviro West

R11035g 21/03/2011

176-184 GEORGE STREET CONCORD WEST

ARCHITECTS NAME ARCHITECTS ADDRESS

Architect

TaylorThomsonWhitting

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(Enviro West) for details. CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

works.

surrounding environment.

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshall to supervise vehicle movements where necessary.

D Headwall Keyed construction joint _____ Guard Rail

Stormwater line with pipe taper and flow direction Taper kerb to zero height over 500 mm Wheelstop RW# Blockwork retaining wall Brickwork retaining wall ----- Dowelled expansion joint -—— Sawn joint Weakened plane joint Expansion joint — — — Tied keved ioint

This drawing is copyright and is the property of TAYLOR THOMSON WHITTING (NSW) Pty Ltd and must not be used without authorisation. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING S0001

SAFETY IN DESIGN

Contractor to refer to Appendix B of the Civil Specification for the Civil Risk and Solutions Register

EXISTING SERVICES

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicably possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicably possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions. Refer to geotechnical report by (Enviro West) for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practises as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to geotechnical/environmental report by

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the

SITE ACCESS/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT



Sheet Subject NOTES & LEGENDS SHEET







GEORGE STREET LONG SECTION SCALE 1:500 HORIZONTAL 1:100 VERTICAL



Eng Draft Date Rev Description

P3 ISSUE FOR COMMENT

Rev Description

P2 ISSUE FOR INFORMATION

P1 ISSUE FOR INFORMATION

A1 0 1 2 3 4 5 6 7 8 9 10

NB TB 28.10.15

NB TB 22.09.15

NB JW 24.06.15

Eng Draft Date Rev Description







SECTION 2



Architect ARCHITECTS NAME ARCHITECTS ADDRESS

Eng Draft Date

PROPOSED TO MATCH

EXISTING SURFACE -----



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TING SURFACE — PROPOSED OPEN CHANNEL —8.62%	INDICATIVE FUTURE BUILDING ENVELOPE
, c c c	
100 E	



Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Rev Description

Eng Draft Date Rev Description

Eng Draft Date Rev Description

Eng Draft Date

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NOTE
FOR VEHICULAR CROSSINGS IN PUBLIC ROADS, BUILDER TO CONFIRM LOCAL
GOVERNMENT OR ROAD AUTHORITIES REQUIREMENTS BEFORE CONSTRUCTION

