STEVENSGROUP

PLANNING PROPOSAL

Lot 1 DP 1135801 & Lot A DP 389480
Pacific Highway, Belmont North

Prepared By: **Lin Armstrong**
Date: **August 2015**

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1.0 INTRODUCTION

This report has been prepared by Stevens Group in support of an application to rezone Lot A DP 389480 from B4 "Mixed Use" zone under Lake Macquarie Local Environmental Plan 2014 (LMLEP 2014) to B7 "Business Park" zone under (LMLEP2014). The application also seeks to enable shops over Lot A in DP389480 and Lot 1 in DP 1135801 to permit the establishment of a pharmacy on the subject land.

The proposal has been discussed with Councils' Integrated Planning Section and is considered the most appropriate course of action to address the zoning anomaly that currently exists over the two properties. In this regard an existing motor vehicle repair shop is located across both Lot A and Lot 1, with Lot A currently zoned B4 and Lot 1 currently zoned B7. Re-development of the site to permit a pharmacy over both parcels is considered desirable, however it is considered that the subject land is not suitable for future residential development and accordingly the B7 zoning is preferred as this zone prohibits residential forms of development. It is also relevant that the land immediately adjoining to the North is currently zoned B7 and this approach means that no change is required to the zoning of that land.

This report has been prepared in accordance with the NSW Department of Planning's *"Guide to Preparing Planning Proposals".*

The report should be read in conjunction with the following plans and documentation:

- Site Location Plan, attached at **Appendix 1**
- Site Survey prepared by ADW Johnson attached at **Appendix 2**
- Proposed Development Plans prepared by W A Brown attached at **Appendix 3**
- Storm Water Management Plan and Sedimentation and Erosion Control Plan prepared by Northrop Engineers attached at **Appendix 4**.
- Landscape Design Plan prepared by Site Image attached at **Appendix 5**
- Traffic and Parking Impact Assessment prepared by BJ Bradley & Associates attached at **Appendix 6**
- Remediation Action Plan prepared by EP Risk Management attached at **Appendix 7**
- Detailed Site Investigation Report prepared by EP Risk Management submitted under separate cover

Two separate Development Applications will be lodged concurrently with this rezoning request. The first Development Application seeks approval for the demolition of all existing improvements on the subject land and remediation of the site in accordance with the Remediation Action Plan attached as **(Appendix 7)**. This work is permitted under the current zonings and the Development Application can be considered ahead of the Planning Proposal being notified.

The second Development Application seeks approval for the establishment of the Pharmacy, including construction of the main Pharmacy building, carpark, landscaping, signage and future operation of the Pharmacy. This Application can be considered concurrently with the Planning Proposal however cannot be determined until such time as the rezoning is notified.

It is considered having regard to the assessments undertaken that the site is suitably located for the form of development proposed. The site is also physically and environmentally capable of supporting the Development as proposed.

2.0 THE SITE

This section of the report identifies the proposed site of the development, describes its physical and social setting, thus placing the rezoning and future development proposal in context.

2.1 Site Location

The site is located on the north eastern side of the Pacific Highway at Belmont North, approximately 15 kilometres to the south of the Newcastle Central Business District (CBD).

A signalised intersection provides access to the site for both north and south bound traffic.

The main site access also provides access to the neighbouring Bunnings Development to the south.

A separate left in only driveway provides access from the Pacific Highway to the existing mechanical repair workshop operating from the site. This access driveway is to be closed when the pharmacy proceeds, see the Site Location Plan attached as **Appendix 1** and the proposed development plans attached at **Appendix 3.**

2.2 Physical Description

The site has an area of 1536m², is near level and comprises two allotments being Lot 1 in DP 1135801 and Lot A in DP 389480. An existing mechanical repair workshop is constructed over the two properties. An outbuilding at the rear of the site provides a second office for the workshop and a lunchroom for employees.

The site has been previously sealed and is known to have had a history of underground petrol storage which has been decommissioned in the past. Recent site investigations indicate that minor surface spills have resulted in some hydrocarbon impacted soils in hot spots over the site. Accordingly, a Remediation Action Plan (RAP) has been prepared for these areas and is attached at **Appendix 7** of this report. A copy of the Detailed Site Investigation Report has been submitted under separate cover.

A survey of the site has been prepared by ADW Johnson and is attached at **Appendix 2** of this report.

The site location plan provides an aerial view of the site and is attached at **Appendix 1** of this report.

2.3 Surrounding Development

The site is located within a mixed use zone. Land uses to the north include commercial businesses and a mix of residential and commercial properties beyond. Developments to the south include fast food retailers with associated car parking, a Caltex service station, smash repairs, and residential properties. Lake Macquarie lies approximately 1.4 kilometres to the south west.

A stormwater drainage channel lies adjacent to the site's eastern boundary and adjoins a Bunnings Warehouse and associated car parking. The Pacific Highway forms the site's western boundary.

2.4 Real Property Description

The Real Property description for the site is;

- Lot 1 in Deposited Plan 1135801 and;
- Lot A in Deposited Plan 389480.

3.0 FUTURE DEVELOPMENT

This section of the report describes the proposed development in order to provide Council with sufficient information to assess the rezoning application. In this regard, the site is currently split zoned. Lot A in DP 389480 is currently zoned B4 "Mixed Use", whilst Lot 1 in DP 1135801 is currently zoned B7 "Business Park" under Lake Macquarie Local Environmental Plan (2014). Whilst shops are permissible in the B4 Mixed Use Zone, they are prohibited in the B7 Business Park Zone.

As noted previously in this submission it is proposed to rezone Lot A from B4 to B7, and to retain the B7 zoning over Lot 1. It is also proposed to enable shops over both parcels. The reason for selecting this course of action is to preclude future residential development on the subject land given the site's location at an intersection and past history of contamination. This approach will also retain consistency with the zoning of the land immediately adjoining to the North.

3.1 Description of the Proposed Development

The overall development proposal can be broken down into the following phases:

Phase 1 - Demolition of all existing structures on site.

Phase 2 - Implementation of the Remedial Action Plan – (Decontamination).

Phase 3 - Filling of the Site.

Phase 4 - Construction of the pharmacy including;

- The main pharmacy building.
- Carpark.
- Landscaping.
- Signage.

Phase 5 – Operation of the Pharmacy.

Each aspect is discussed below.

Phases 1 & 2 will be the subject of a development application that is not dependent upon the proposed rezoning. **Phases 3-5** will be the subject of a second development application which is dependent upon the Planning Proposal being finalised.

3.1.1 Phase 1 – Demolition

The existing mechanical workshop, outbuildings and pavements will be removed from the site. All waste will be sorted for re-use where possible. Where re-use is not possible materials will be disposed of to an approved waste management facility.

3.1.2 Phase 2 – Decontamination

EP Risk Management (EP Risk) was engaged by Stevens Holdings Pty Limited on behalf of the trustee for Mayfield Superfund to prepare a Remediation Action Plan (RAP) for the remediation of petroleum hydrocarbon impacted soil and groundwater at 389-391 Pacific Highway, Belmont NSW (the site).

Previous investigations undertaken at the site identified petroleum hydrocarbon impacted soil and groundwater in isolated hot spots. The RAP was commissioned to detail the preferred methodology to remediate the impacted soil and groundwater.

The specific objectives for the RAP are to;

1. Review potential remedial options with respect to regulatory requirements and site constraints for the shallow petroleum hydrocarbon impacted soil.
2. Develop an appropriate remedial strategy for remediation of the contamination previously identified at the site.
3. Document the procedures to be followed.

The RAP has been prepared in accordance with State Environmental Planning Policy No 55. -Remediation of Land.

Three remedial options were considered;

Option 1 being the disposal of contaminated fill to landfill. The second option was to excavate, stockpile and biopile. The third option was insitu chemical oxidisation.

Option 1 was considered to be the least environmentally sustainable option and Option 2 was selected given the limited extent of impact and the available site area.

Prior to commencing the remedial works, a Construction Management Plan will be prepared for the site. Work areas will be delineated with temporary fencing and adequate warning signage including the adoption of appropriate induction procedures.

Decommissioning of two underground storage tanks located at the site has been previously undertaken and these two underground storage tanks will be removed as part of the remediation.

Hydrocarbon impacted soil will then be biopiled and it is expected that groundwater that has been affected will naturally attenuate.

The Remediation Action Plan is attached at **Appendix 7** of this report.

3.1.3 Phase 3 - Filling of the Site

The site is affected by flooding. The 1 in 100 year flood level is 9.8m AHD. Levels over the site range from approximately 9m AHD to 9.5m AHD. The floor level of the existing mechanical workshop is set at 9.28m AHD. The minimum floor level of the proposed

pharmacy building is to be set at 10.3m AHD, and allows for a 500mm freeboard above the 1:100 year flood level.

The main carpark is set at approximately 9.3m AHD and graded to ensure all carparking and access ways comply with Australian Standards. Access for people with disabilities has been provided, with a ramp and stairs providing access to the main entry at the front of the development.

The proposed development is demonstrated on the Development Plans attached at **Appendices 3, 4 and 5** of this report.

3.1.4 Phase 4 - Construction of the Pharmacy

The proposed building will have a total floor area of 511m² and as noted above will be accessible by stairs and a ramp for people with disabilities. A unisex disabled water closet and unisex water closet are provided within the main building.

The building will have a maximum height of 5.5m to the top of the parapet above the main entry doors.

The building will be constructed from precast concrete panels with a selected paint finish and Zincalume roof sheeting. As noted above a parapet screens the roof. An awning is also provided over the main entry as required by Council's Development Control Plan.

Anodised aluminium shop front windows and a steel hand rail with glass balustrade to the access ramp present to the main highway frontage.

The carpark is located adjacent to the Pacific Highway and provides parking for 22 vehicles including 2 spaces for people with disabilities and 2 motorbike carparking spaces, a landscape buffer to the Pacific Highway 1.106m wide and up to 5.547m wide is proposed.

A 6m high business identification sign is proposed adjacent to the site entry.

The proposed development plans are attached at **Appendix 3** of this report.

A landscape plan has been prepared by Site Image in support of the proposal. A copy of this plan is attached at **Appendix 5** of this report.

3.1.5 Phase 5 - Operation of the Pharmacy

The proposed pharmacy will operate Seven (7) days per week and will employ Ten (10) people on a full time, part time and casual basis.

4.0 THE PLANNING PROPOSAL

This Report has been prepared in accordance with the NSW Department of Planning's 'Guide to Preparing Planning Proposals".

PART 1

Objectives or Intended Outcomes of the proposed LEP.

To enable the development of Lot 1 DP 1135801 and Lot A in DP 389480 for the purposes of a pharmacy.

PART 2

An explanation of the provisions that are to be included in the proposed LEP.

It is requested that Council endorse rezoning Lot A DP 389480 from B4 "Mixed Use" to B7 "Business Park" under Lake Macquarie LEP 2014 and to enable shops over both Lot A DP389480 and Lot 1 DP 1135801 to permit the establishment of a pharmacy on the subject land.

PART 3

The Justification for the objectives, outcomes and provisions and the process for their implementation.

Section A – Need For The Planning Proposal

1. Is the planning proposal a result of any strategic study or report?

No. The need for the planning proposal is the result of an existing zoning anomaly. In this regard the two lots are held in the same ownership. An existing building straddles both lots. A pharmacy (shop) is permissible on one lot but not on the other. The rezoning will permit the pharmacy on both lots whilst ensuring that residential development is precluded in this location due to contamination and amenity issues.

2. Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. The proposed rezoning is the only mechanism that will permit the establishment of the facility on the subject land in a timely fashion.

3. Is there a net community benefit?

Yes, the Net Community Benefit Test is set out in the Draft Centres Strategy and has been adapted here. The assessment is set out in the following table:-

Table 1: Net Community Benefit Test

Net Community Benefit Test	Comment
Will the LEP be compatible with agreed State and regional strategic direction for development in the area (eg land release, strategic corridors, development within 800 metres of a transit node)?	Yes. It will be compatible with the objectives of the Lower Hunter Regional Strategy as it will encourage the provision of health and other infrastructure and facilities for the growing population of the area.
Is the LEP located in a global/regional city, strategic centre or corridor nominated within the Metropolitan Strategy or other regional/subregional strategy?	The LEP affects land covered by the Lower Hunter Regional Strategy. The land however is not within a strategic centre or corridor.
Is the LEP likely to create a precedent or create or change the expectations of the landowner or other landholders?	No. No similar situations exist.
Have the cumulative effects of other spot rezoning proposals in the locality been considered? What was the outcome of these considerations?	N/A. There are no similar circumstances in the City.
Will the LEP facilitate a permanent employment generating activity or result in a loss of employment lands?	Yes. The rezoning will allow retention of 10 jobs in the local area.
Will the LEP impact upon the supply of residential land and therefore housing supply and affordability?	No the land is not considered suitable for residential development as it is affected by traffic noise, heavy vehicular movements to adjacent bulky goods development and has a history of contamination.
Is the existing public infrastructure (roads, rail, and utilities) capable of servicing the proposed site? Is there good pedestrian and cycling access?	The proposal is not reliant on any extension of infrastructure. The site is accessible to pedestrians and cyclists.
Is public transport currently available or is there infrastructure capacity to support future public transport?	Yes. Public transport is available at the site frontage.

Net Community Benefit Test	Comment
Will the proposal result in changes to the car distances travelled by customers, employees and suppliers? If so, what are the likely impacts in terms of greenhouse gas emissions, operating costs and road safety?	No. There will be no change to travel patterns.
Are there significant Government investments in infrastructure or services in the area whose patronage will be affected by the proposal? If so, what is the expected impact?	No.
Will the proposal impact on land that the Government has identified a need to protect (eg land with high biodiversity values) or have other environmental impacts? Is the land constrained by environmental factors such as flooding?	No. Yes. The land is subject to flooding. The proposed floor level will be above the 1:100 year event.
Will the LEP be compatible / complementary with surrounding land uses? What is the impact on amenity in the location and wider community?	Yes. The rezoning will result in the establishment of a large pharmacy within a mixed use area.
Will the public domain improve?	Yes. The new pharmacy will replace a dilapidated mechanical workshop.
Will the proposal increase choice and competition by increasing the number of retail and commercial premises operating in the area?	The proposal will make the pharmacy more accessible, being located at a signalised intersection that permits access from north and south travelling vehicles.
If a stand-alone proposal and not a centre, does the proposal have the potential to develop into a centre in the future?	No. The site is a small land holding adjacent to large scale development.
What are the public interest reasons for preparing the draft plan? What are the implications of not proceeding at that time?	The existing pharmacy is within a leased building with poor accessibility. This new pharmacy will be owner occupied and more accessible to the public. Further, decontamination of the land will result in a broad public benefit.

Section B – Relationship To Strategic Planning Framework

4. Is the planning proposal consistent with the objectives and actions contained within the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies?

The proposal is consistent with the objectives of the Lower Hunter Regional Strategy. The strategy identifies the need for health services to meet the needs of a growing ageing population and also the need to create and retain employment opportunities.

5. Is the planning proposal consistent with the local Council's Community Strategic Plan, or other local strategic plan?

The proposal is not inconsistent with any Strategic Plan.

6. Is the planning proposal consistent with applicable State Environmental Planning Policies? (SEPPs)

Yes the proposal is consistent with both SEPP 55 – Remediation of Land and SEPP (Infrastructure) 2007. In this regard the land is to be decontaminated as required by SEPP 55 and will be suitable for the form of development proposed. Further, the existing access to the site from the Pacific Highway will be closed and all access to the site will be via the existing service road. This arrangement meets the requirements of SEPP (Infrastructure) 2007.

7. Is the planning proposal consistent with applicable Ministerial Directions made under s.117?

The Minister has issued Directions under Section 117(2) of the Environmental Planning and Assessment Act. These Directions are to be taken into consideration in the determination of a rezoning application. The following section of this report addresses those directions that are of relevance to the current proposal:-

Table 2: 117 Directions

Summary of Relevant s117 Directions	Comment
1.1 Business & Industrial Zones Objective; This Direction aims to encourage employment growth in suitable locations and to protect employment land in business zones and also to support the viability of identified strategic centres.	The proposal is consistent with these objectives. The LEP will allow the establishment of a pharmacy in an appropriate location whilst correcting a zoning anomaly.
3.1 Residential Zones Objective; This Direction seeks to encourage a variety and choice of housing types, to make an efficient use of infrastructure and to minimise the impact of residential development on the environment.	The proposal will in part remove the potential for future residential development on the land. Whilst inconsistent with the direction, the proposal reflects the fact that the land is not environmentally suited to residential development due to its location and contaminated land status.
3.4 Integrating Land Use and Transport Objective; The Direction aims to integrate Land Use with Transport Infrastructure.	The proposal achieves the objectives of this Direction being located at an intersection on a public transport route. It is accessible via all forms of private transport and buses.
4.2 Mine Subsidence and Unstable land. Objective; This Direction requires proposals in a MSD to be referred to the MSB.	The proposal will be referred to the MSB.
4.3 Flood prone land Objective; To ensure that development of flood prone land is consistent with the NSW Governments Flood Prone Land Policy and the principles of the Flood Plain Development Manual 2005. Also to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of potential flood impacts both on and off the subject land.	The proposal is consistent with this Direction. Whilst the land is flood affected any flood risk can be mitigated by complying with Councils' minimum floor level requirements.

Summary of Relevant s117 Directions	Comment
5.1 Implementation of Regional Strategies Objective; To give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.	The proposal is consistent with the Lower Hunter Regional Strategy. The development will create employment and meet health needs.
6.1 Approval and Referral Requirements Objective: The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	Noted.
6.3 Site specific Provisions Objective; To discourage unnecessary restrictive site specific planning controls.	Site specific provisions are required in this instance to meet the requirements of SEPP 55 and the amenity concerns of Council in relation to appropriate locations for residential development.

Table 3 Spot Rezoning Criteria

Category 1 Spot Rezoning Criteria

	Criteria	**Yes/No**
1	Will the LEP be compatible with agreed State and Regional strategic direction for development in the area (e.g. land release, strategic corridors, development within 800m of a transit node)?	Yes. The LEP is consistent with the objectives of the Lower Hunter Regional Strategy. In particular the LEP will create employment and provide health facilities.
2	Will the LEP implement studies and strategic work consistent with State and regional policies and Ministerial (S.117) directions?	N/A. However see above.
3	Is the LEP located in a global/regional city, strategic centre or corridor nominated within the Metropolitan Strategy or other regional/sub-regional strategy?	Yes. As Above. The LEP is in an area covered by the Lower Hunter Regional Strategy.
4	Will the LEP facilitate a permanent employment generating activity or result in a loss of employment lands?	The LEP will facilitate a permanent job generating activity.
5	Will the LEP be compatible/complementary with surrounding land uses?	Yes. The site is within a mixed use precinct.
6	Is the LEP likely to create a precedent; or create or change the expectations of the landowner or other landholders?	No. The LEP will address an existing zoning anomaly.
7	Will the LEP deal with a deferred matter in an existing LEP?	No. N/A
8	Have the cumulative effects of other spot rezoning proposals in the locality been considered? What was the outcome of these considerations?	Yes. The proposal will not create a precedent.

Section C – Environmental, Social And Economic Impact

8. Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

No. The site has been previously developed with a mechanical workshop.

9. Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

The land is to be remediated in accordance with the RAP attached at **Appendix 7.**

Section D – State And Commonwealth Interests

10. Is there adequate public infrastructure for the planning proposal?

Adequate infrastructure exists.

11. What are the views of State and Commonwealth public authorities consulted in accordance with the gateway determination?

To be advised following consultation.

Part 4 – Community Consultation

Details of the Community Consultation that is to be undertaken will be determined at the Gateway.

5.0 CONCLUSION

Favourable consideration of the planning proposal to rezone Lot A in DP 389480 from B4 “Mixed Use” zone under LMLEP 2014 to B7 “Business Park” zone under the same LEP is requested. Approval to enable shops over Lot A DP 389480 & Lot 1 in DP 1135801 is also requested to allow the construction of a pharmacy on the subject lands.

APPENDIX 1 -
SITE LOCATION PLAN

Google earth

feet 1000
meters 300

APPENDIX 2 - SITE SURVEY

Pacific Highway, Belmont

Detail Survey Plan | 1 of 1

239317-DET-001-A


PHOTO #1


PHOTO #2

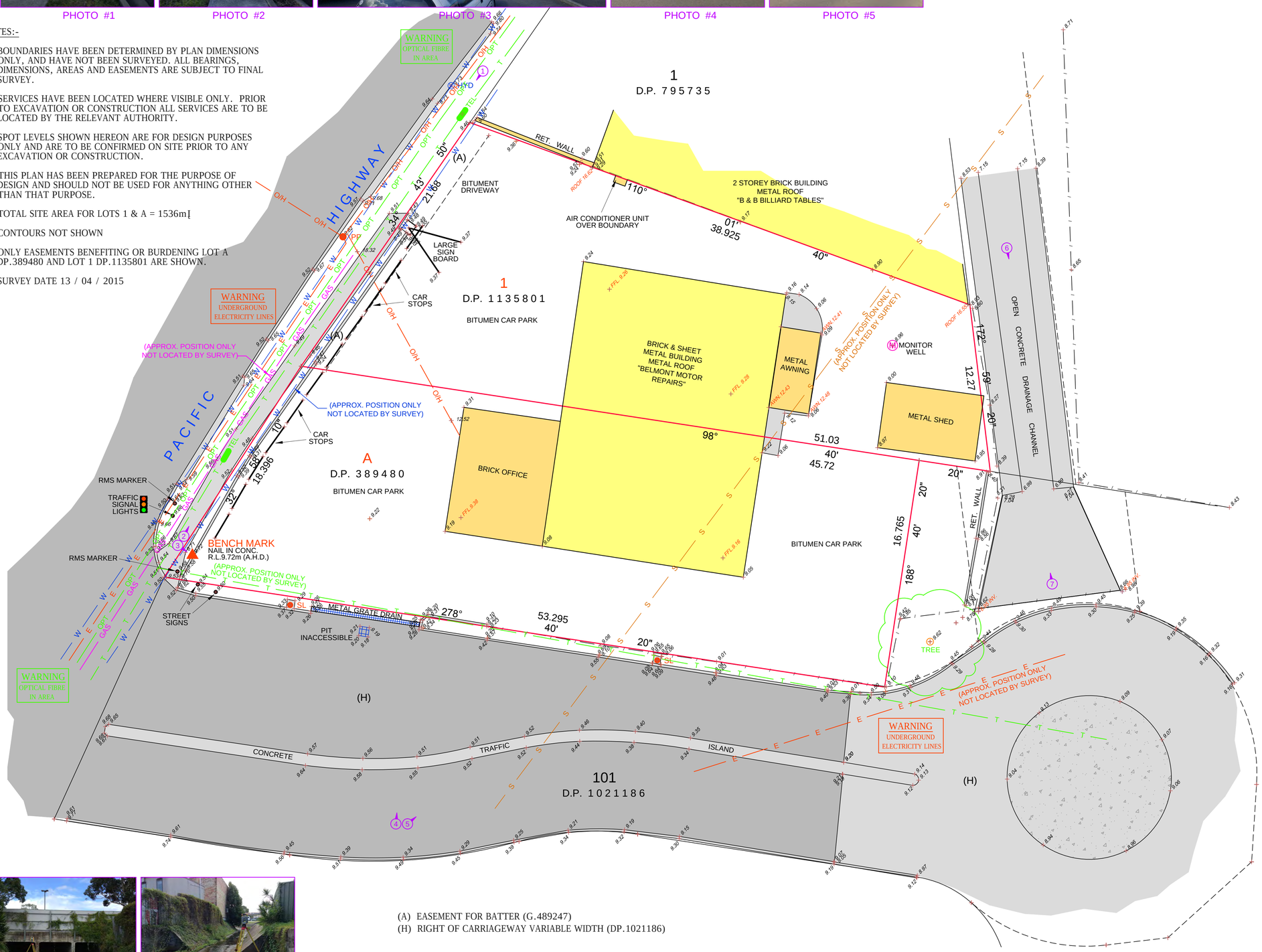

PHOTO #3


PHOTO #4


PHOTO #5

NOTES:-

1. BOUNDARIES HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY, AND HAVE NOT BEEN SURVEYED. ALL BEARINGS, DIMENSIONS, AREAS AND EASEMENTS ARE SUBJECT TO FINAL SURVEY.
2. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
3. SPOT LEVELS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
4. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DESIGN AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.
5. TOTAL SITE AREA FOR LOTS 1 & A = 1536m[
6. CONTOURS NOT SHOWN
7. ONLY EASEMENTS BENEFITING OR BURDENING LOT A DP.389480 AND LOT 1 DP.1135801 ARE SHOWN.
8. SURVEY DATE 13 / 04 / 2015



(A) EASEMENT FOR BATTER (G.489247)
(H) RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP.1021186)


PHOTO #6


PHOTO #7

N

adw johnson

Bar Scale 1: 150 (A1), 1: 300 (A3)

0 2.5 5 7.5 10 15

LEGEND

- BENCH MARK
- PP POWER POLE
- STAY STAY POLE
- HYD HYDRANT
- SV STOP VALVE
- GPIT GRATED PIT
- SIP SEWER INSPECTION PIT
- SMH SEWER MAN HOLE
- TEL TELSTRA PIT
- TPIL TELSTRA PILLAR
- GAS NATURAL GAS METER
- 22 PHOTOGRAPH DIRECTION
- TRAFFIC LIGHTS
- E ELECTRICAL LINE
- F FENCE LINE
- GAS GAS LINE
- W WATER MAIN
- OPT OPTICAL FIBRE
- O/H OVERHEAD POWER LINE
- S SEWER LINE
- T TELSTRA LINE
- STORMWATER PIPE
- BOUNDARY LINE
- TREE DETAILS

DIAL 1100 BEFORE YOU DIG

VER.	DATE	COMMENT	DRAFTER	CO-ORDINATE INFORMATION		LEVEL INFORMATION		
A	14/04/2015	ORIGINAL ISSUE	RC	CO-ORDINATE SYSTEM:	MGA 56	DATUM: A.H.D.	CONT INTERVAL:	n/a
-	-	-	-	ORIGIN OF CO-ORDINATES:	SSM 114233	ORIGIN OF LEVELS:	PM 22771 R.L.9.766m	

SURVEY

PROPERTY DESCRIPTION:

Lot 1 D.P.1135801 and Lot A D.P.389480

PURPOSE:	Design		
COUNCIL:	Lake Macquarie		
DWG REF:	239317-DET-001-A	**PM:**	TC

CLIENT: STEVENSGROUP

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www.adwjohnson.com.au

• project management • civil engineering • infrastructure • superintendency • economic analysis • social impact • town planning • surveying • development feasibility • visualisation • urban planning

APPENDIX 3 -
PROPOSED DEVELOPMENT PLANS PREPARED BY W A BROWN

PROPOSED DEVELOPMENT APPLICATION

FOR

PHARMACY

LOCATED AT

No 389, LOT 1 & LOT A
PACIFIC HIGHWAY
BELMONT
DP1135801 & DP 389480

APPLICANT

STEVENSGROUP PTY LTD

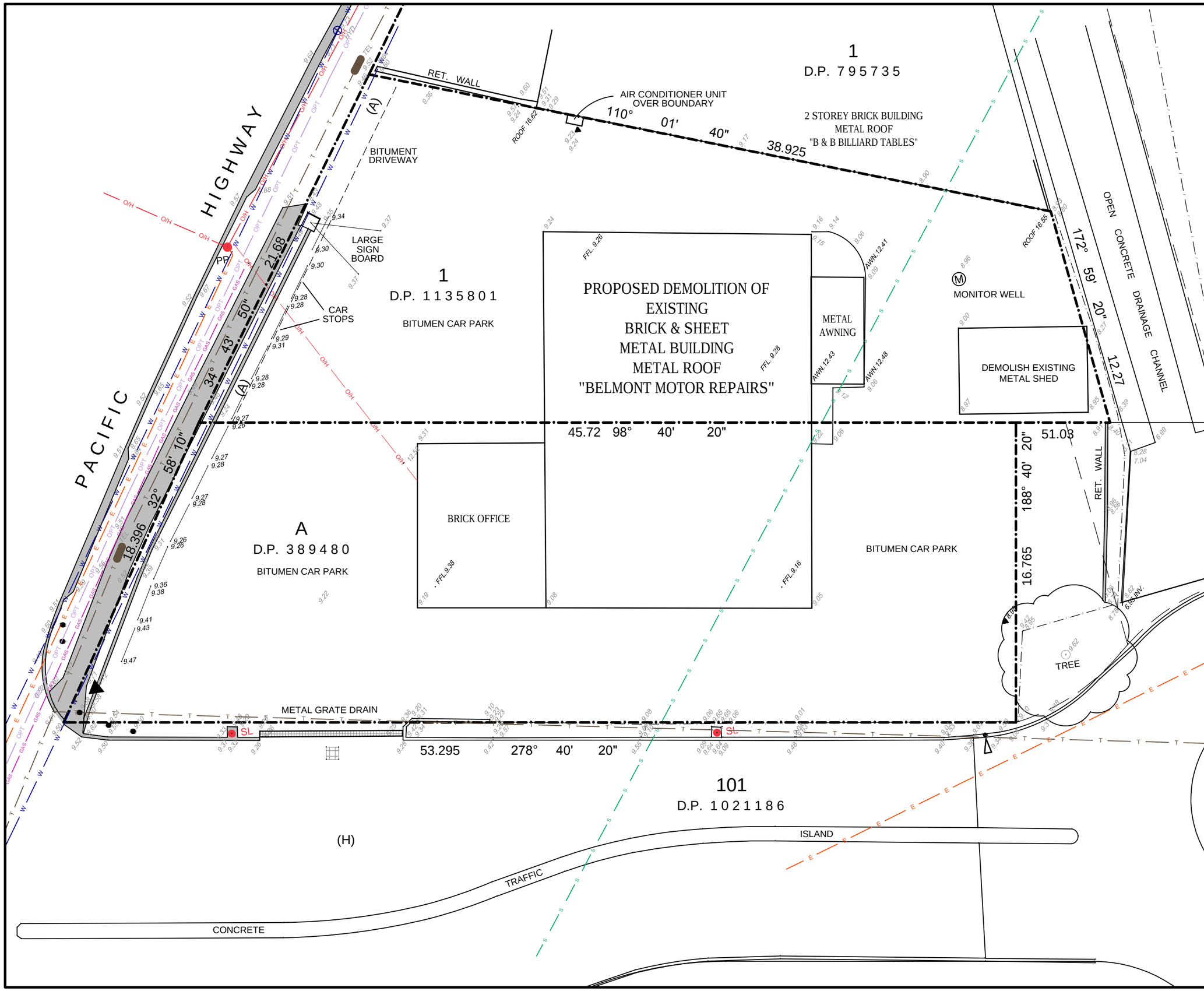
Architectural Drawings Supplied by
W.A.Brown Building Pty Ltd

STEVENSGROUP

No	Drawing	Description	Date	Dwn	Rev
ARCHITECTURAL DRAWINGS					
07	Elevation	DA Submission	20.04.15	MM	A
06	Elevation	DA Submission	12.08.15	MM	D
05	Roof Plan	DA Submission	08.05.15	MM	B
04	Floor Plan	DA Submission	08.05.15	MM	B
03	Vehicle Turning Plan	DA Submission	12.08.15	MM	C
02	Site Plan	DA Submission	12.08.15	MM	F
01	Site Analysis Plan	DA Submission	20.04.15	MM	A

Job No
DA0105

DA SUBMISSION SET



LEGEND

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- S — SEWER LINE
- T — TELSTRA LINE
- STORMWATER PIPE
- BOUNDARY LINE
- TREE DETAILS

(A) EASEMENT FOR BATTER (G.489247)

(H) RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP.1021186)

Issue	Description	Date	Dwn
A	Council Submission	20.04.15	MM

DA SUBMISSION SET

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 200

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 1 of 7

Drawing

SITE ANALYSIS PLAN

Job No DA0105

Issue A

Dwg No. 01

A3 DRAWING SHEET

STEVENSGROUP

(A) EASEMENT FOR BATTER (G.489247)

(H) RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP.1021186)

Issue	Description	Date	Dwn
F	Access Revised	12.08.15	MM
E	Title Revised	08.05.15	MM
D	Tank Added	01.05.15	MM
C	Council Submission	29.04.15	MM
B	Council Submission	27.04.15	MM
A	Council Submission	20.04.15	MM

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 200

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 2 of 7

Drawing

SITE PLAN

Job No DA0105

Issue F

Dwg No. 02

DA SUBMISSION SET

A3 DRAWING SHEET

STEVENSGROUP

(A) EASEMENT FOR BATTER (G.489247)

(H) RIGHT OF CARRIAGEWAY VARIABLE WIDTH (DP.1021186)

Issue	Description	Date	Dwn
C	Access Revised	12.08.15	MM
B	Title Revised	08.05.15	MM
A	Council Submission	20.04.15	MM

DA SUBMISSION SET

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

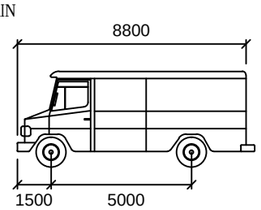
Scaled @	1 : 200
Dwn By :	M.Marshall
Chked By :	W.Brown
Sheet	3 of 7

Drawing

VEHICLE TURNING PLAN

Job No	Issue	Dwg No.
DA0105	C	03

A3 DRAWING SHEET



SERVICE VEHICLE mm

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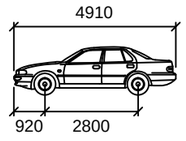
Steering Angle	:	38.7



B85 mm

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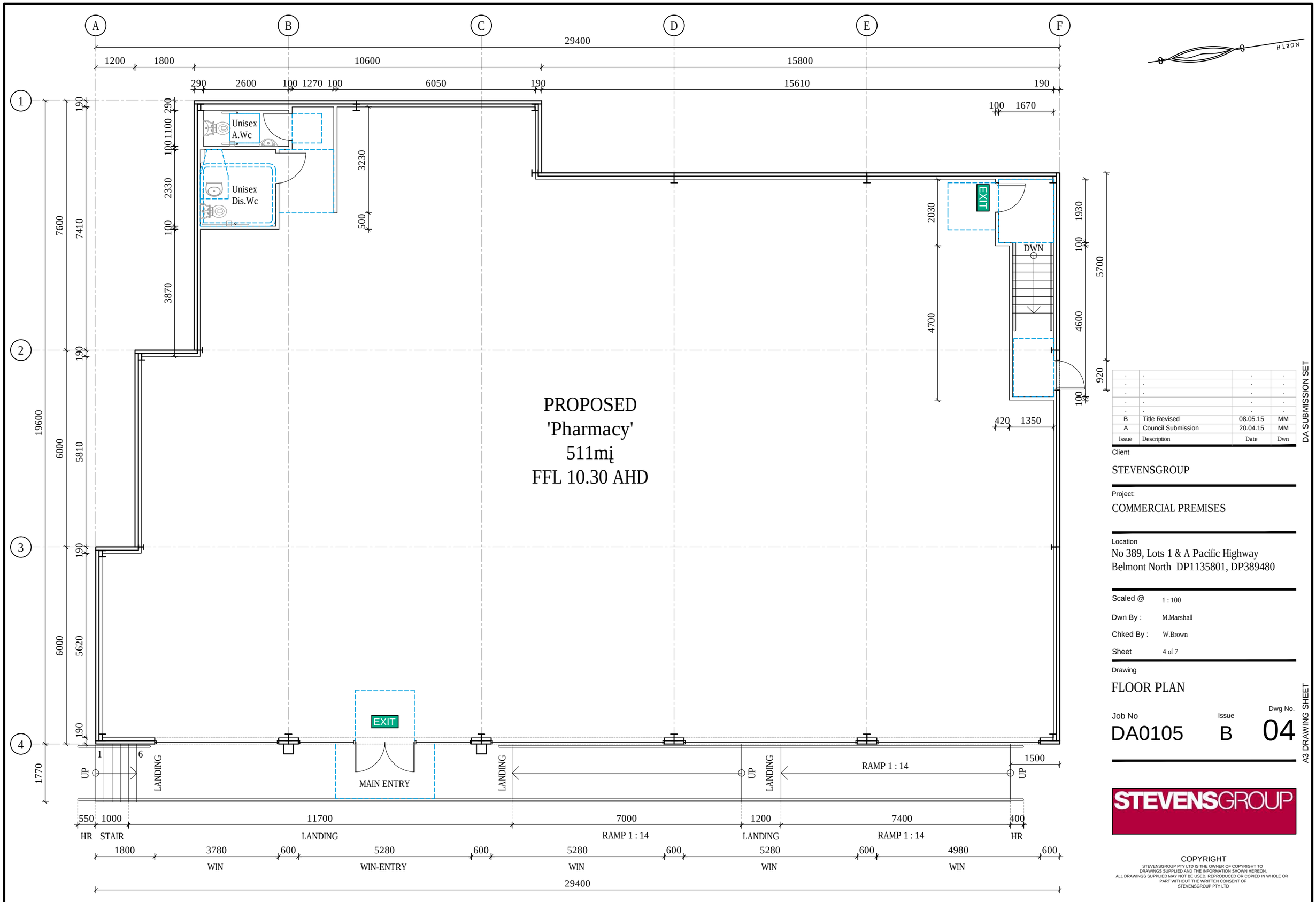
Lock to Lock Time	:	6.0
Steering Angle	:	34.0

STEVENSGROUP



Issue	Description	Date	Dwn
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B	Title Revised	08.05.15	MM
A	Council Submission	20.04.15	MM

DA SUBMISSION SET

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 100

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 4 of 7

Drawing

FLOOR PLAN

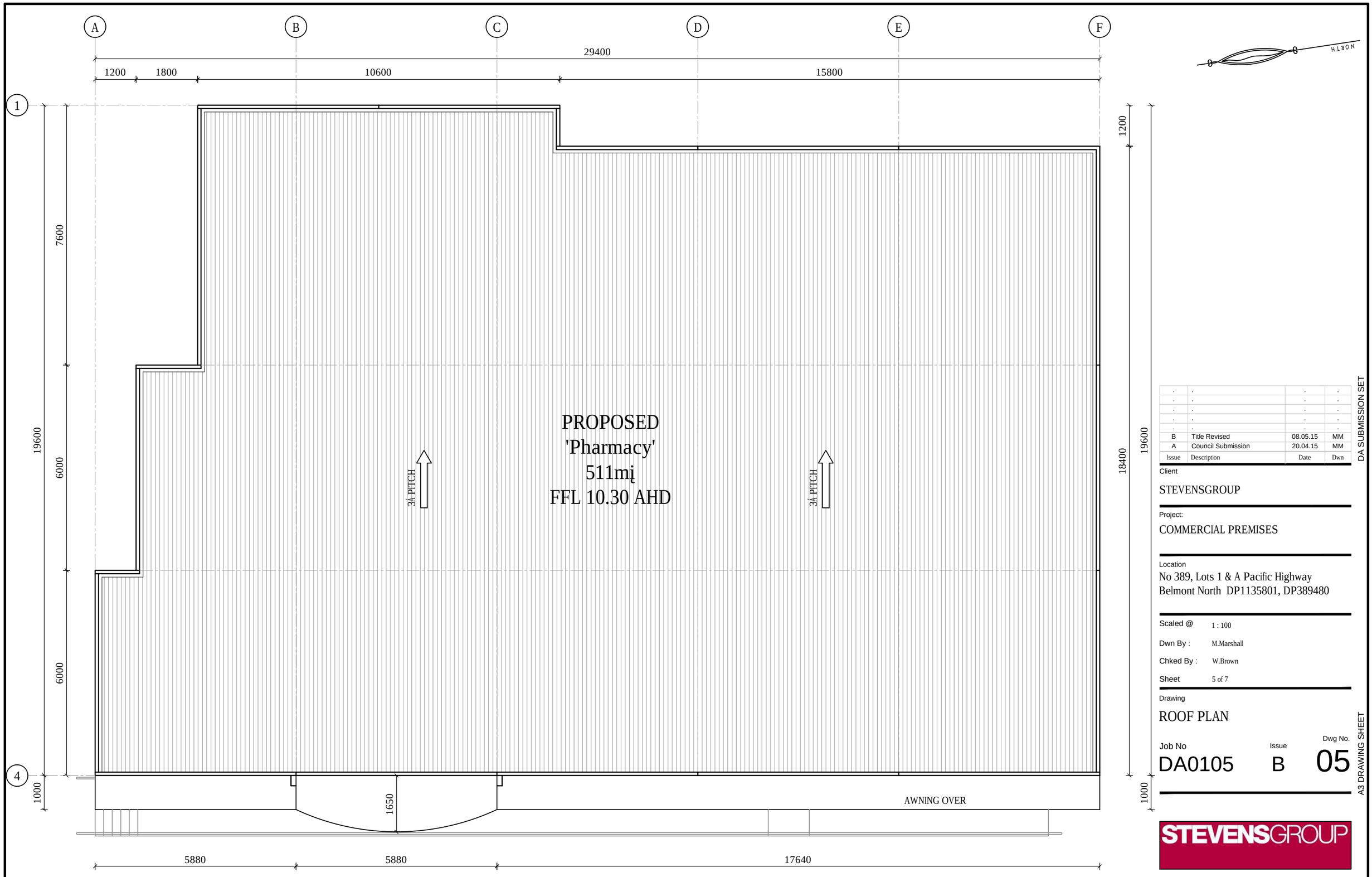
Job No DA0105

Issue B

Dwg No. 04

A3 DRAWING SHEET

STEVENSGROUP



Issue	Description	Date	Dwn
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B	Title Revised	08.05.15	MM
A	Council Submission	20.04.15	MM

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 100

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 5 of 7

Drawing

ROOF PLAN

Job No DA0105

Issue B

Dwg No. 05

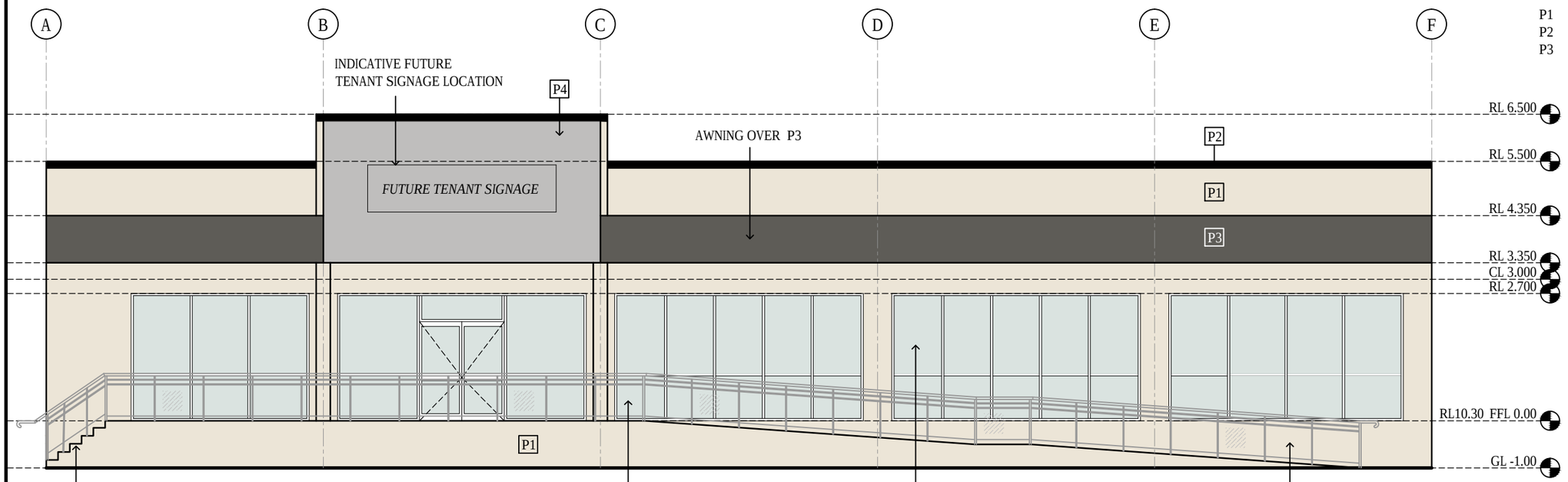
DA SUBMISSION SET

A3 DRAWING SHEET

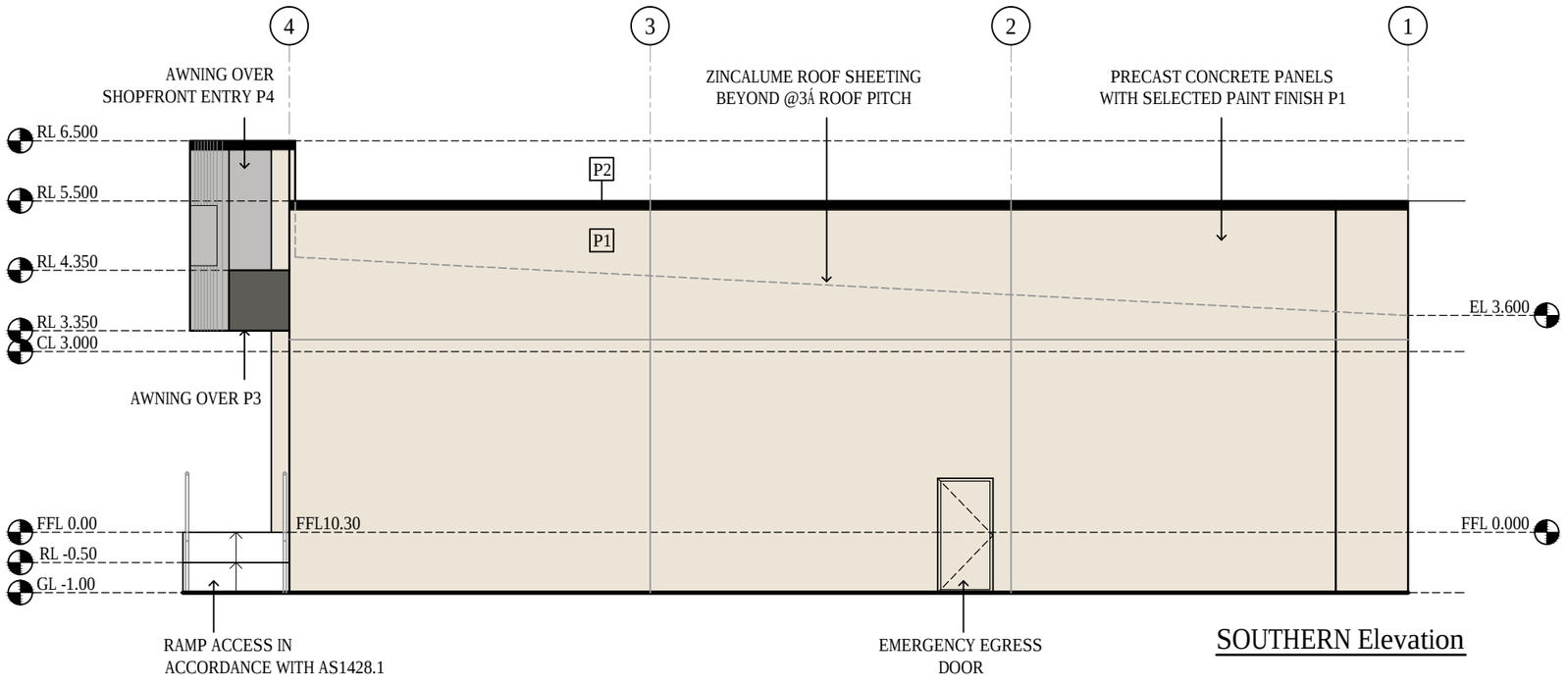
STEVENSGROUP

COLOUR SCHEDULE

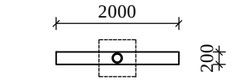
ITEM	COLOUR	BRAND
P1	HOG BRISTLE QUARTER	DULUX
P2	NIGHT SKY	COLORBOND
P3	WOODLAND GREY	COLORBOND



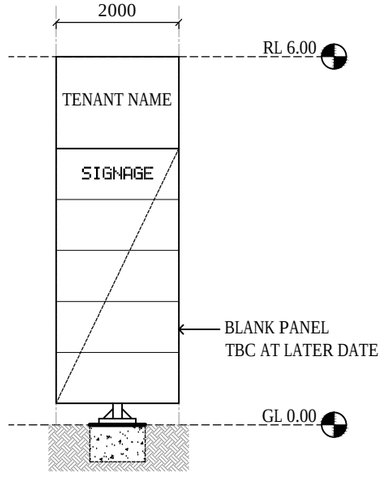
WESTERN Elevation



SOUTHERN Elevation



Plan View



PYLON signage

Issue	Description	Date	Dwn
.	.	.	.
.	.	.	.
.	.	.	.
D	Signage Revised	12.08.15	MM
C	Signage Revised	08.05.15	MM
B	Council Submission	29.04.15	MM
A	Council Submission	20.04.15	MM

DA SUBMISSION SET

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 100

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 6 of 7

Drawing

ELEVATIONS

Job No DA0105

Issue D

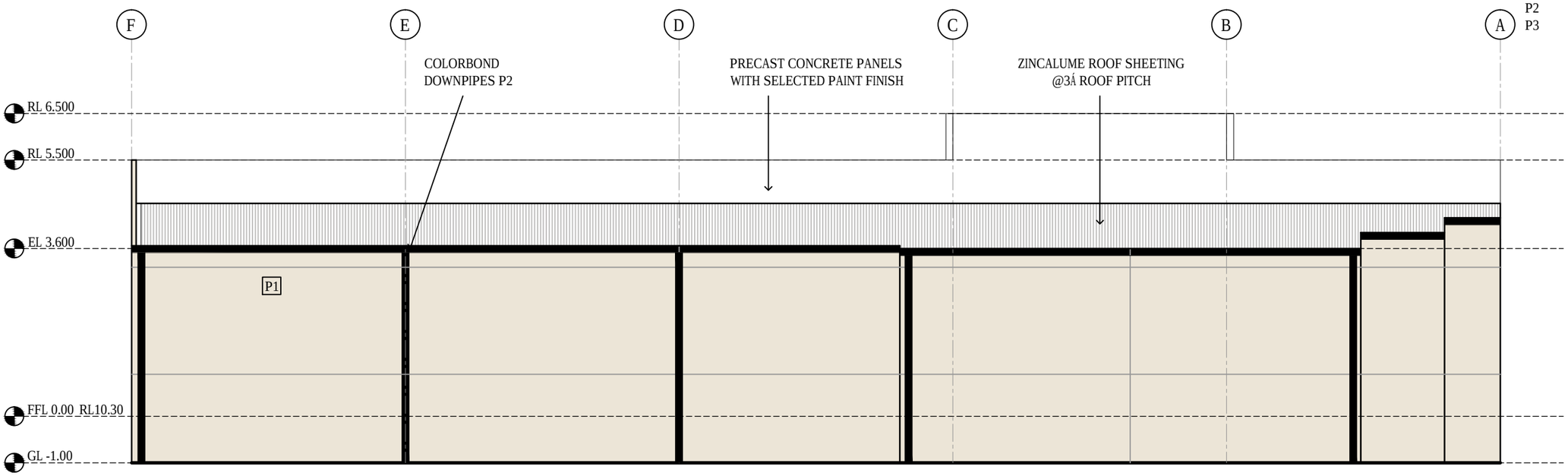
Dwg No. 06

A3 DRAWING SHEET

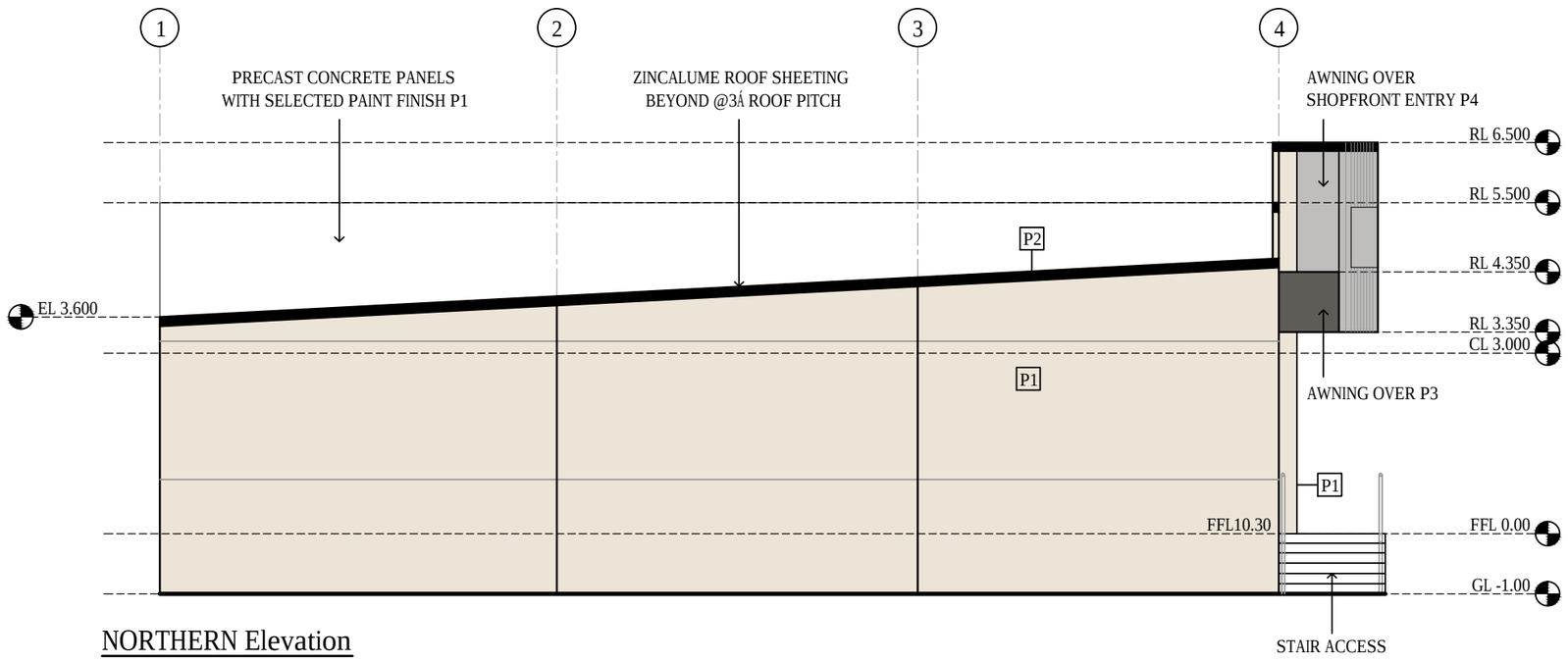
STEVENSGROUP

COLOUR SCHEDULE

ITEM	COLOUR	BRAND
P1	HOG BRISTLE QUARTER	DULUX
P2	NIGHT SKY	COLORBOND
P3	WOODLAND GREY	COLORBOND



EASTERN Elevation



NORTHERN Elevation

Issue	Description	Date	Dwn
A	Council Submission	20.04.15	MM

Client

STEVENSGROUP

Project:

COMMERCIAL PREMISES

Location

No 389, Lots 1 & A Pacific Highway
Belmont North DP1135801, DP389480

Scaled @ 1 : 100

Dwn By : M.Marshall

Chked By : W.Brown

Sheet 7 of 7

Drawing

ELEVATIONS

Job No DA0105

Issue A

Dwg No. 07

STEVENSGROUP

DA SUBMISSION SET

A3 DRAWING SHEET

APPENDIX 4 -
STORM WATER MANAGEMENT PLAN AND SEDIMENTATION AND EROSION CONTROL PLAN PREPARED BY NORTHROP ENGINEERS

BELMONT CHEMIST
No. 389, LOTS 1 & 1A
PACIFIC HWY, BELMONT NORTH
NSW 2280

- CIVIL DRAWINGS -

DRAWING SCHEDULE

DRG No.	DRAWING TITLE
C00DA	COVER SHEET & DRAWING INDEX
C01DA	CONCEPT SEDIMENT & EROSION CONTROL PLAN
C02DA	CONCEPT STORMWATER MANAGEMENT & LEVELS PLAN
C03DA	CIVIL DETAILS & STORMWATER SUMMARY

DRAWN C.DELANEY
DESIGNED B.HOEY
JOB MANAGER A.BROWN
VERIFIER A.BROWN

ISSUED FOR DA APPROVAL ONLY NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR DA APPROVAL	CD	AB	BH	29.04.15

CLIENT
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ARCHITECT
W.A.BROWN BUILDING PTY LTD

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Email newcastle@northrop.com.au ABN 81 094 433 100

PROJECT
No 389, LOTS 1 & 1A PACIFIC HWY BELMONT NORTH NSW 2280 DP1135801, DP389480

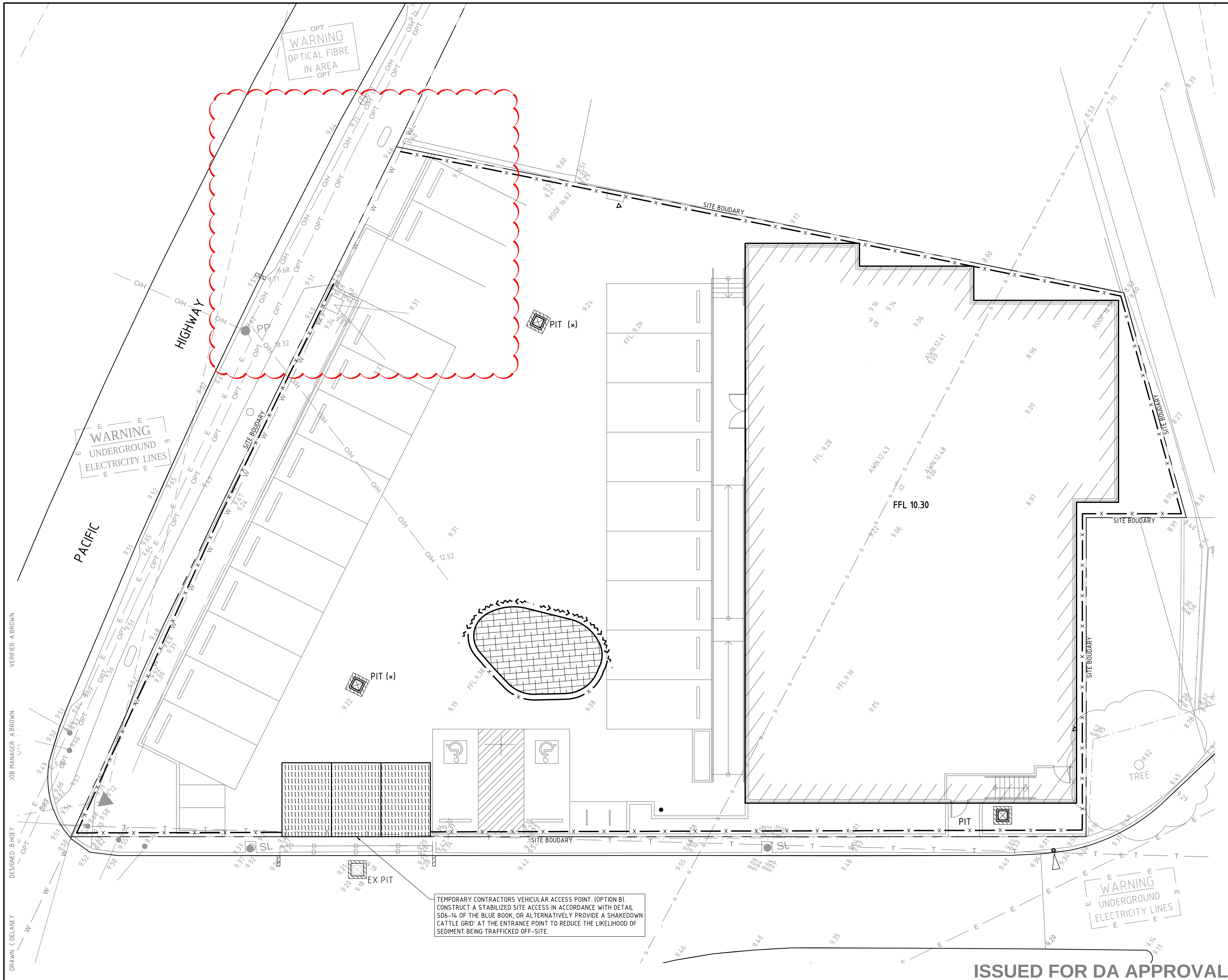
DRAWING TITLE
COVER SHEET & DRAWING INDEX

JOB NUMBER **NL150153**

DRAWING NUMBER **C00DA**

REVISION **A**

DRAWING SHEET SIZE = A1



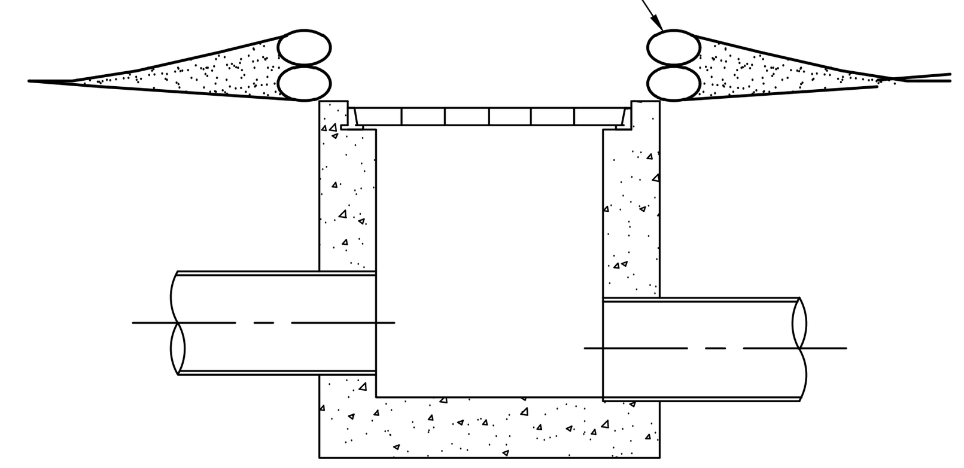
LEGEND

- DENOTES CUT OFF SWALE.
- DENOTES SITE & SEDIMENT CONTROL FENCE.
- DENOTES STABILISED SITE ACCESS.
- PIT — DENOTES PROPOSED STORMWATER PIT.
- DENOTES PROPOSED STOCKPILE LOCATION.
- DENOTES SANDBAG OR GEOTEXTILE SOCK FILLED WITH NO FINES GRAVEL, PLACED IN INVERT OF GUTTER.

EROSION AND SEDIMENTATION CONTROL NOTES

1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE APPROPRIATE FOR THE SEDIMENT TYPE(S) OF THE SOILS ON-SITE, IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION. LANDCOM, 2004), OR OTHER CURRENT RECOGNISED INDUSTRY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR AUSTRALIAN CONDITIONS. THIS INCLUDES SEDIMENT TRAPS AND LINING OF CHANNELS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION AND SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS AND SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ALL MAINTENANCE, CLEANING AND BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.
3. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
4. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
5. INSTALL SEDIMENT FENCING, OR OTHER SEDIMENT CONTROL DEVICES, AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT OR APPROPRIATE COUNCIL OFFICER.
6. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
7. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB & GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION.
8. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ON-SITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
9. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE SPREAD ON-SITE AS DIRECTED BY THE SUPERINTENDENT OR REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
10. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
11. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
12. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
13. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.

THE CONTRACTOR SHALL ENSURE COUNCIL ASSETS AND THE UTILITIES ARE PROTECTED AT ALL TIMES. ANY AND ALL DAMAGES TO COUNCIL ASSETS AND/OR UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SPECIFICATION OF COUNCIL AND THE UTILITIES AUTHORITY AND AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.



PIT PROTECTION DETAIL

(ALTERNATIVE DETAIL SD6-11 OR SD6-12 OF THE BLUE BOOK AS APPROPRIATE)

INSTALL PIT PROTECTION TO ALL NEW & EXISTING STORMWATER PITS.

DRAWN: C DELANEY — DESIGNED: B HOEY — JOB MANAGER: A BROWN — VERIFIER: A BROWN

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR DA APPROVAL	CD	AB	BH	29.04.15
B	ISSUED FOR DA APPROVAL - AMENDED DRIVEWAY	RD	AB	BH	02.09.15

CLIENT: STEVENSGROUP

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ARCHITECT: W.A.BROWN BUILDING PTY LTD

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PLANS 1:100 — 0 1 2 3 4 5m

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Email newcastle@northrop.com.au ABN 81 094 433 100

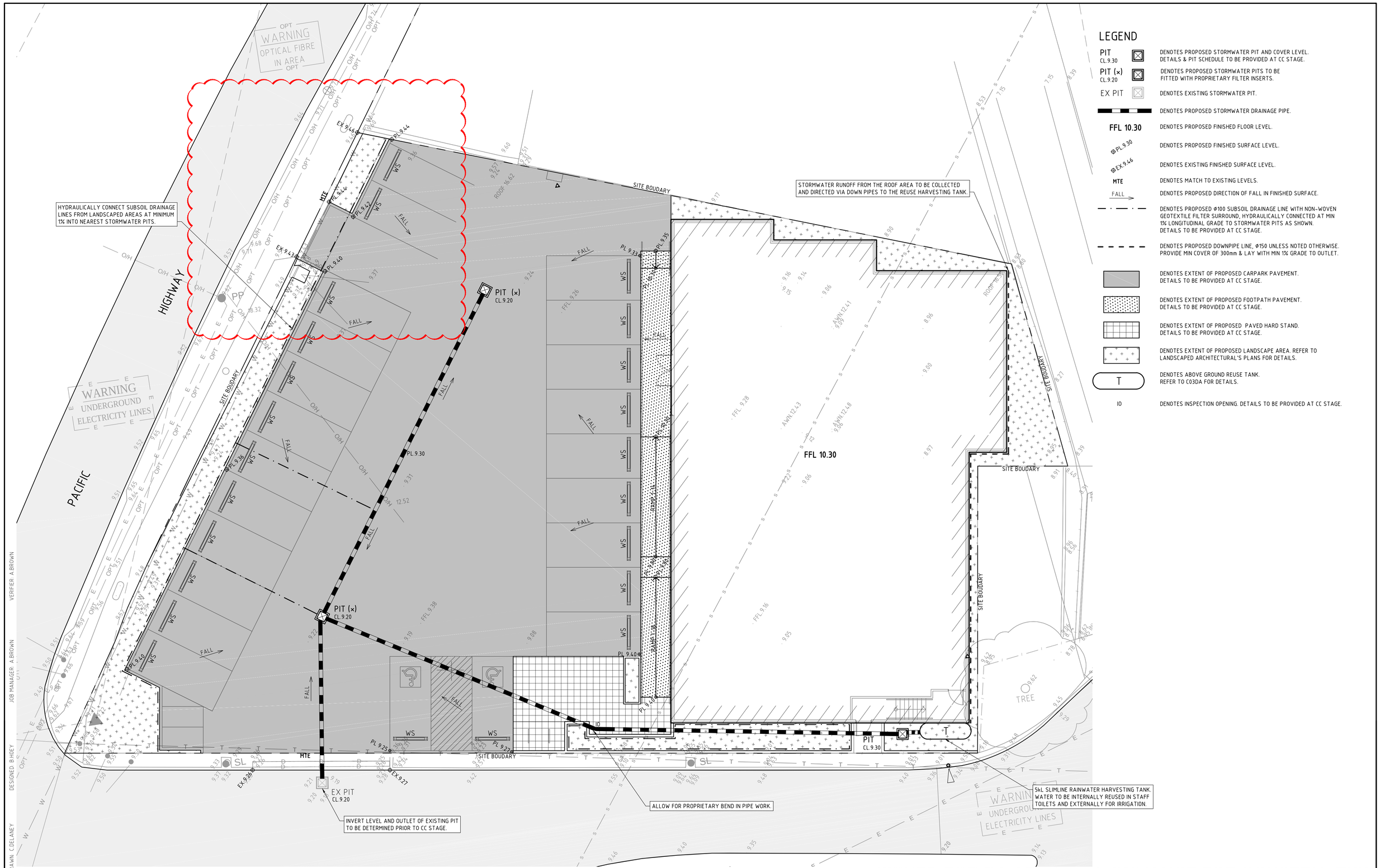
PROJECT: No 389, LOTS 1 & 1A PACIFIC HWY BELMONT NORTH NSW 2280 DP1135801, DP389480

DRAWING TITLE: CONCEPT SEDIMENT & EROSION CONTROL PLAN

JOB NUMBER: NL150153

DRAWING NUMBER: C01DA — REVISION: B

DRAWING SHEET SIZE = A1



LEGEND

PIT CL.9.30	DENOTES PROPOSED STORMWATER PIT AND COVER LEVEL. DETAILS & PIT SCHEDULE TO BE PROVIDED AT CC STAGE.
PIT (x) CL.9.20	DENOTES PROPOSED STORMWATER PITS TO BE FITTED WITH PROPRIETARY FILTER INSERTS.
EX PIT	DENOTES EXISTING STORMWATER PIT.
	DENOTES PROPOSED STORMWATER DRAINAGE PIPE.
FFL 10.30	DENOTES PROPOSED FINISHED FLOOR LEVEL.
Ø PL.9.30	DENOTES PROPOSED FINISHED SURFACE LEVEL.
Ø EX.9.46	DENOTES EXISTING FINISHED SURFACE LEVEL.
MTE	DENOTES MATCH TO EXISTING LEVELS.
FALL	DENOTES PROPOSED DIRECTION OF FALL IN FINISHED SURFACE.
	DENOTES PROPOSED Ø100 SUBSOIL DRAINAGE LINE WITH NON-WOVEN GEOTEXTILE FILTER SURROUND, HYDRAULICALLY CONNECTED AT MIN 1% LONGITUDINAL GRADE TO STORMWATER PITS AS SHOWN. DETAILS TO BE PROVIDED AT CC STAGE.
	DENOTES PROPOSED DOWNPIPE LINE, Ø150 UNLESS NOTED OTHERWISE. PROVIDE MIN COVER OF 300mm & LAY WITH MIN 1% GRADE TO OUTLET.
	DENOTES EXTENT OF PROPOSED CARPARK PAVEMENT. DETAILS TO BE PROVIDED AT CC STAGE.
	DENOTES EXTENT OF PROPOSED FOOTPATH PAVEMENT. DETAILS TO BE PROVIDED AT CC STAGE.
	DENOTES EXTENT OF PROPOSED PAVED HARD STAND. DETAILS TO BE PROVIDED AT CC STAGE.
	DENOTES EXTENT OF PROPOSED LANDSCAPE AREA. REFER TO LANDSCAPED ARCHITECTURAL'S PLANS FOR DETAILS.
T	DENOTES ABOVE GROUND REUSE TANK. REFER TO C03DA FOR DETAILS.
IO	DENOTES INSPECTION OPENING. DETAILS TO BE PROVIDED AT CC STAGE.

VERIFIER A.BROWN
JOB MANAGER A.BROWN
DESIGNED B.HOEY
DRAWN C.DELANEY

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR DA APPROVAL	CD	AB	BH	29.04.15
B	ISSUED FOR DA APPROVAL - AMENDED DRIVEWAY	RD	AB	BH	02.09.15

CLIENT
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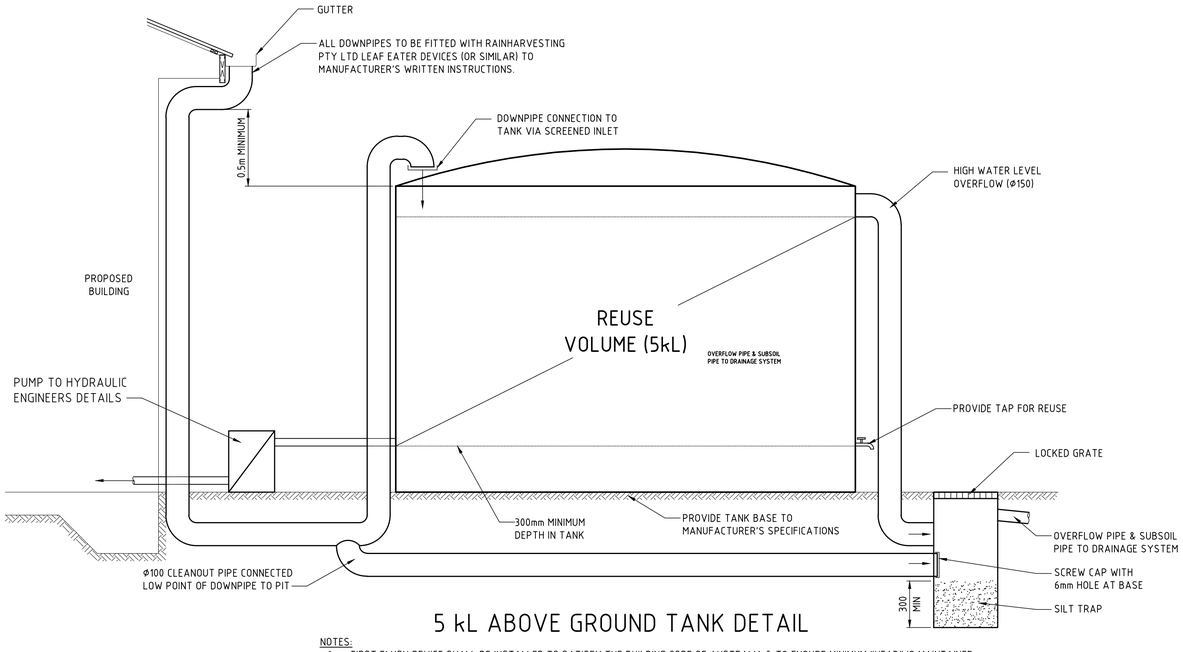
PROJECT
No 389, LOTS 1 & 1A PACIFIC HWY BELMONT NORTH NSW 2280 DP1135801, DP389480

DRAWING TITLE
CONCEPT STORMWATER MANAGEMENT & LEVELS PLAN

JOB NUMBER **NL150153**

DRAWING NUMBER **C02DA** REVISION **B**

DRAWING SHEET SIZE = A1



5 kL ABOVE GROUND TANK DETAIL

NOTES:

1. FIRST FLUSH DEVICE SHALL BE INSTALLED TO SATISFY THE BUILDING CODE OF AUSTRALIA & TO ENSURE MINIMUM "HEAD" IS MAINTAINED
2. THE ENTIRE PRESSURISED DOWNPIPE SYSTEM SHALL BE AIR TIGHT AND BE ABLE TO WITHSTAND ATMOSPHERIC PRESSURE. THE PIPING SYSTEM SHALL BE MINIMUM SN6 AND FITTINGS WITH INTERNAL ULTRA VIOLET STABILISING (OR APPROVED EQUIVALENT).

STORMWATER SUMMARY

NORTHROP CONSULTING ENGINEERS HAVE PREPARED A STORM WATER DRAINAGE DESIGN FOR THE PROPOSED DEVELOPMENT OF 389 PACIFIC HIGHWAY, NORTH BELMONT.

THE SITE IS CURRENTLY OCCUPIED BY BELMONT MOTOR REPAIRS, WHICH CONSISTS OF ITS OFFICE BLOCK, WORK SHEDS AND ASSOCIATED CAR PARKING FACILITIES. THE SITE HAS A TOTAL AREA OF 1536m^2 AND SLOPES AT APPROXIMATELY 1% FROM THE PACIFIC HIGH TOWARDS THE EASTERN BOUNDARY. THE SITE IS BORDERED BY COMMERCIAL PREMISES TO THE NORTH AND SOUTH AND AN OPEN CONCRETE DRAINAGE CHANNEL TO THE EAST. STORMWATER RUNOFF FROM THE EXISTING PAVEMENT AND ROOFED AREA APPEARS TO SHEET ACROSS THE EASTERN BOUNDARY INTO THIS CHANNEL. IT IS UNDERSTOOD THAT THE SITE IS SUBJECT TO FLOODING AND THAT THE 1% AEP (1 IN 100 YEAR) FLOOD LEVEL IS 9.8m AHD. AS A RESULT OF THIS THE MINIMUM FINISHED FLOOR LEVEL OF ANY FUTURE DEVELOPMENT HAS BEEN SET AT 10.30m AHD. THE DEVELOPMENT PROPOSES TO CONSTRUCT A NEW COMMERCIAL PREMISES IN PLACE OF THE EXISTING MECHANICS BUILDING AND REINSTATE/RECONFIGURE THE EXISTING CAR PARK.

NORTHROP SPOKE WITH LAKE MACQUARIE CITY COUNCIL'S CHIEF SUBDIVISION ENGINEER, GREG FIELD ON THE 28/04/2015 REGARDING THE PROPOSED STORMWATER MANAGEMENT PHILOSOPHY.GIVEN THAT THE SITE IS REDEVELOPING AN EXISTING COMMERCIAL PREMISES AND CONSIDERING ITS LOW POSITIONING WITHIN THE CATCHMENT MR FIELD CONFIRMED THAT NO STORMWATER RETENTION OR DETENTION FACILITIES WILL BE REQUIRED.

THE STORMWATER PHILOSOPHY ON SITE CAN BE SUMMARISED AS FOLLOWS;

- ROOF RUNOFF IS COLLECTED AND DIVERTED VIA DOWN PIPES INTO A 5kL PROPRIETARY SLIMLINE RAINWATER HARVESTING TANK. RUNOFF COLLECTED IN THE TANK IS TO BE INTERNALLY REUSED FOR TOILET FLUSHING IN THE STAFF BATHROOM AND EXTERNALLY FOR IRRIGATION.
- TWO CENTRALLY LOCATED SAG PITS ARE TO COLLECT STORMWATER RUNOFF FROM THE PAVED CAR PARK SURFACE. THESE PITS ARE TO BE FITTED WITH PROPRIETY ENVIRO POD FILTER INSERTS OR APPROVED EQUIVALENT TO PROVIDE WATER QUALITY TREATMENT.
- THE SYSTEM IS TO OUTLET INTO THE EXISTING STORMWATER PIT IN THE RIGHT OF CARRIAGE WAY ON THE WESTERN BOUNDARY, THE INVERT AND OUTLET OF WHICH IS TO BE DETERMINED PRIOR TO CC STAGE AS THE PIT IS CURRENTLY COMPLETELY INACCESSIBLE DUE TO BLOCKAGE.

AREA SUMMARY

- TOTAL SITE AREA = 1536m^2
- ROOF AREA =511m^2
- CAR PARKING PAVEMENT = 790m^2
- HARDSTAND PAVEMENT = 88m^2
- PERVIOUS AREA = 147m^2
- TOTAL IMPERVIOUS =1389m^2
- PERCENTAGE IMPERVIOUS =90%

SITE DISCHARGE INDEX (SDI):

THE TOTAL AREA OF THE SITE BEING DEVELOPED IS 1536m^2; OF THIS THE ONLY IMPERVIOUS SURFACE WHICH IS LEFT UNMANAGED PRIOR TO LEAVING SITE IS THE 3m^2 SIDE ACCESS

THEREFORE % OF SITE UNMANAGED = SDI = 3/1536 = 0.002

SDI > 0.1 THEREFORE COMPLIES WITH LMCC DCP.

DRAWN C.DELANEY
DESIGNED B.HOEY
JOB MANAGER A.BROWN
VERIFIER A.BROWN

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR DA APPROVAL	CD	AB	BH	29.04.15

CLIENT
STEVENSGROUP

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DETAILS 1:20 0 200 400 600 800 1000

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PROJECT
No 389, LOTS 1 & 1A PACIFIC HWY BELMONT NORTH NSW 2280 DP1135801, DP389480

DRAWING TITLE
CIVIL DETAILS & STORMWATER SUMMARY

JOB NUMBER **NL150153**

DRAWING NUMBER **C03DA**

REVISION **A**

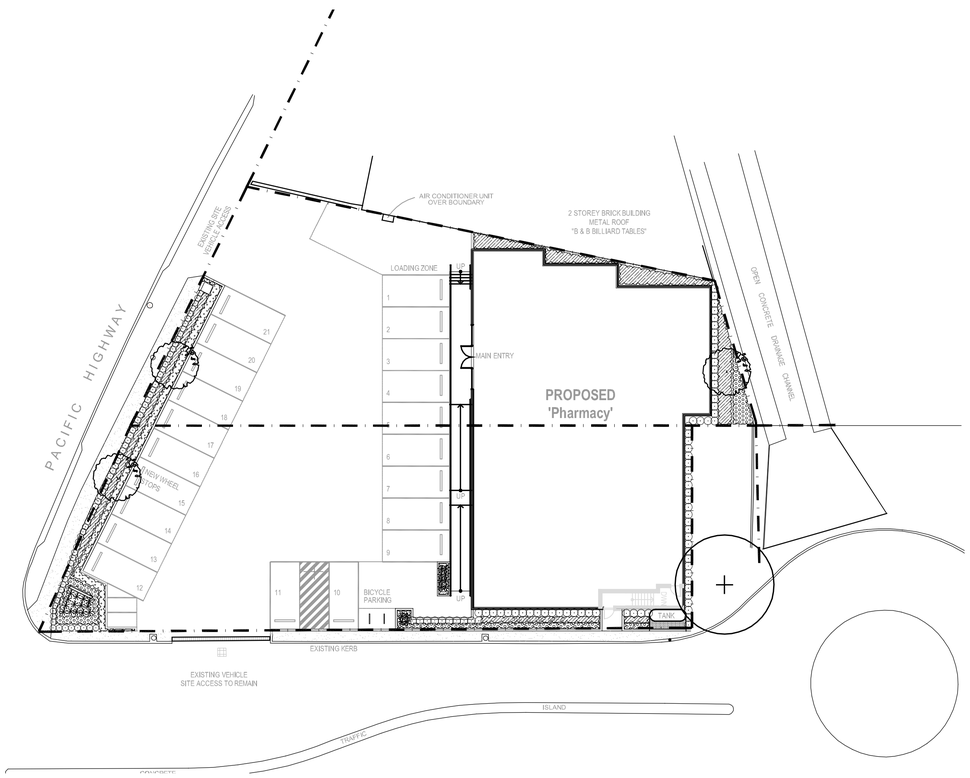
DRAWING SHEET SIZE = A1

APPENDIX 5 -
LANDSCAPE DESIGN PLAN PREPARED BY SITE IMAGE

CHEMIST OUTLET
No 389, Lots 1 & A Pacific Highway Belmont North

DRAWING SCHEDULE

DWG NO.	*DRAWING TITLE*	*SCALE*
000	Landscape Coversheet	
101	Landscape Plan	1:100
501	Landscape Details	As Shown



Site Plan 1:250

NOT FOR CONSTRUCTION

The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

LEGEND

Issue	Revision Description	Drawn	Check	Date
B	ARCHITECTURAL COORDINATION	JZ	NM	14.05.2015
A	PRELIMINARY	JZ	NM	14.04.2015

Key Plan:

SITE IMAGE
Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
STEVENS GROUP

Project:
Chemist Outlet
Commercial Premises

Drawing Name:
Cover Sheet

PRELIMINARY

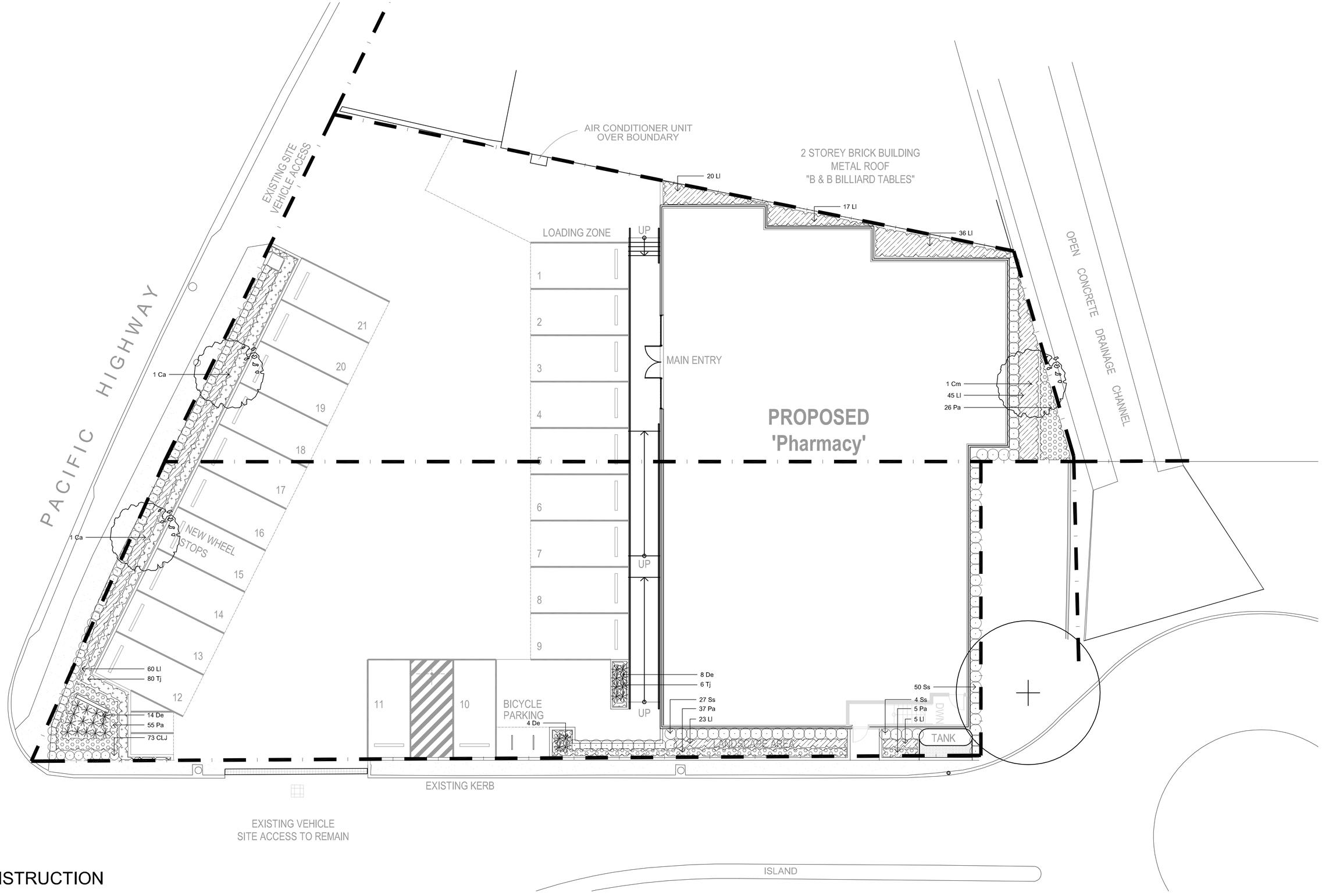
Scale:

Job Number: SS15-3016

Drawing Number: 000

Issue: B

A1



NOT FOR CONSTRUCTION

The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
B	ARCHITECTURAL COORDINATION	JZ	NM	14.05.2015
A	PRELIMINARY	JZ	NM	14.04.2015

LEGEND

- Site Boundary
- Proposed Trees
- Groundcovers & Grasses
- Steel Edge (Refer to Details)
- Turf (Refer to Details)
- Shrub/ Accent Planting
- Gravel
- Existing Trees

Key Plan:

SITE IMAGE
Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
STEVENS GROUP

Project:
Chemist Outlet
Commercial Premises

Drawing Name:
Lanscape Plan

PRELIMINARY

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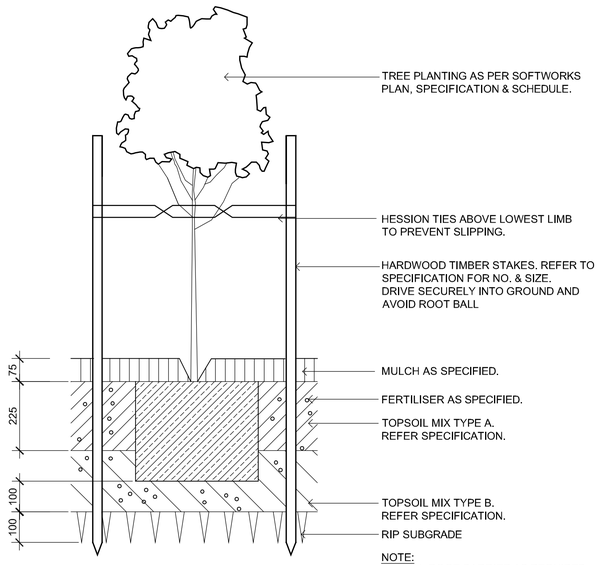
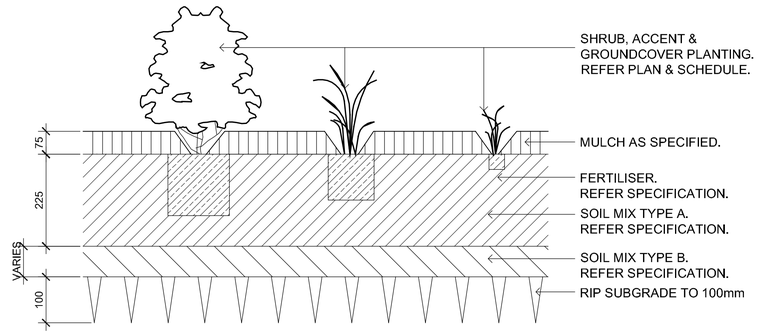
0 1 2 3 4 5m

Job Number: SS15-3016
Drawing Number: 101
Issue: B

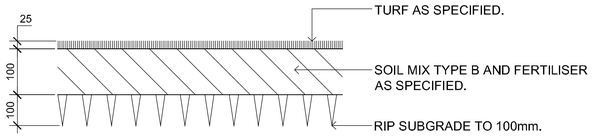
A1



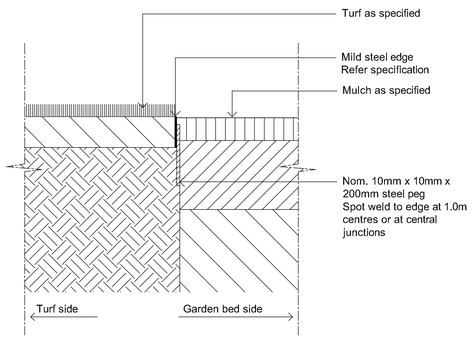
25L-75L TREE PLANTING ON GRADE
SCALE 1:10



SHRUB, ACCENT & GROUNDCOVER PLANTING ON GRADE
SCALE 1:10



TURF ON EVEN GRADE
SCALE 1:10



TYPICAL MILD STEEL EDGE
SCALE 1:10

SS15-3016 Chemist Outlet, Belmont
Plant Schedule

Symbol	Botanic Name	Common Name	Mature Size (h x w) (m)	Pot size	Spacings	Quantity
	Trees					
Ca	*Cupaniopsis anacardioides*	Tuckeroo	7 x 5	75L	As Shown	**2**
Cm	*Corymbia maculata*	Spotted Gum	15 x 7	75L	As Shown	**1**
	Shrubs and Accents					
CLJ	*Callistemon 'Little John'*	Little John Bottlebrush	0.8 x 0.8	300mm	As Shown	**73**
De	*Doryanthes excelsa*	Gymea Lily	2 x 2	300mm	As Shown	**26**
	Groundcovers and Grasses					
Ll	*Lomandra longifolia*	Mat Rush	0.7 x 1.0	150mm	5/m2	**206**
Pa	*Pennisetum alopecuroides*	Swamp Foxtail	0.8 x 0.5	150mm	5/m2	**123**
Tj	*Trachelospermum jasminoides*	Star Jasmine	0.3 x 0.5	150mm	5/m2	**86**

NOT FOR CONSTRUCTION

The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

LEGEND

Issue	Revision Description	Drawn	Check	Date
B	ARCHITECTURAL COORDINATION	JZ	NM	14.05.2015
A	PRELIMINARY	JZ	NM	14.04.2015

A1

Key Plan:

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Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
STEVENS GROUP

Project:
Chemist Outlet
Commercial Premises

Drawing Name:
Landscape Details

PRELIMINARY

Scale: As shown
Job Number: SS15-3016
Drawing Number: 501
Issue: B

APPENDIX 6 -
TRAFFIC AND PARKING IMPACT ASSESSMENT PREPARED BY BJ BRADLEY & ASSOCIATES

TRAFFIC IMPACT ASSESSMENT

REPORT

ON

PROPOSED

RETAIL DEVELOPMENT

ON

LOT 1 DP 1135801 &

LOT A DP 389480

PACIFIC HIGHWAY

BELMONT NORTH

31 AUGUST 2015

BJ Bradley & Associates
Consulting Civil and Traffic Engineers
P O Box 2030
GATESHEAD NSW 2290
Phone and Fax: 02 49485212
Mobile: 0412 490 859

1.0 INTRODUCTION

The purpose of this Traffic Assessment Report is to examine the affect of a proposed retail development on Lot 1 DP 1135801& Lot a DP 389480, Nos. 389-391 Pacific Highway, Belmont North.

The proposal involves the provision of a retail development on a site currently utilised as a mechanical / repair workshop.

The site is located on the eastern side of Pacific Highway, on the north-eastern corner with a right-of-way access to several hospitality / retail developments.

2.0 LOCALITY DIAGRAM

3.0 EXISTING CONDITIONS

3.1 Existing Use of Site

The existing site contains a building serving as a motor vehicle workshop / repair centre that has a GFA of approximately 420 m^2 and that has operated on the site for many years. The existing development on the site has a driveway on the Pacific Highway and also a driveway on the southern service road accessing the major retail / hospitality developments in the complex.

The land is relatively level and abuts a concrete stormwater drain on its eastern boundary.

3.2 Adjacent Developments

There are existing commercial and retail developments along both sides of the Pacific Highway in the vicinity of the subject site.

Some of the nearby developments include a Bunnings hardware outlet, a Red Rooster restaurant, a Hungry Jacks restaurant, a camping goods store and a Woolworths petrol service station that utilise the signalized access road. There are numerous other developments along the Pacific Highway including a billiards supplies shop on the northern side of the site.

Belmont High School is located south of the site with frontage to the Pacific Highway and also Macquarie Drive at Belmont North.

3.3 Traffic Volumes on Pacific Highway

AADT on the Pacific Highway in the vicinity of the proposed development has been recorded at Counting Station 05.022 just north of Avonlea Street. The most recent AADT count at that station was 27,314 in 2004.

The 2015 AADT on the Pacific Highway near the site, taking into account the diversion of traffic along the M1 Pacific Motorway extensions is estimated to have grown by 1% per annum, representing an increase of 12% - an AADT of approximately 30,600.

Peak hourly volumes are approximately 10% of AADT. The estimated southbound PM peak on the Pacific Highway at Belmont North is approximately 3,060 vehicles per hour (two-way).

The southbound morning peak hour flow on the Pacific Highway through Belmont North is noticeably lower than the evening flow. The southbound morning peak

hour flow at permanent counting station V05.201 at Charlestown was recorded as approximately 49% of the southbound afternoon peak hour flow.

The southbound morning peak hour flow on the Pacific Highway at Belmont North, adjacent to the proposed development is estimated to be approximately 765 vehicles per hour.

The southbound afternoon peak volume would be approximately 1,530 vph.

3.4 Pacific Highway Traffic Environment

Pacific Highway is a State Road (A43) serving an arterial road function between major centres.

The Pacific Highway has two northbound through-lanes and two southbound through-lanes past the site.

There is a raised concrete median along the Pacific Highway through the Belmont area with traffic signals at Floraville Road and also at the access to the retail development abutting the site that includes a Bunnings hardware store, a Woolworths service station / convenience store, a Red Rooster restaurant, a Hungry Jacks restaurant and a camping goods store.

Pacific Highway has a slightly curved alignment near the site and relatively level gradients.

3.5 Sight Distances

The existing sight distances at the subject property are not a necessary consideration as southbound movements will be left-in and outward movements will be left-out via the access road along the southern boundary to travel north or south along the Pacific Highway via the signalised intersection.

3.6 Speed Zoning

The existing speed zone on Pacific Highway past the site is 60km/h.

3.7 Pedestrian Amenities

Pedestrian activity in the vicinity of the proposed development is relatively low, except when students at Belmont High School are arriving or departing the school on foot. At such times there is a considerable volume of pedestrians across and along the Pacific Highway in the vicinity of the site for a short period of time, particularly in the afternoons.

The proposed retail development is unlikely to generate considerably higher volumes of pedestrian generation than the existing motor vehicle repair workshop does on the site.

The traffic signals at the access road intersection provide pedestrian facilities across the Pacific Highway and also provide a controlled crossing over the access road.

3.8 Public Transport Accessibility

There are existing bus stops on the southbound carriageway just north of Patrick Street and also just south of Cobbin Parade.

There are existing bus stops on the northbound carriageway just south of Floraville Road and also just south of York Crescent.

4.0 PROPOSED DEVELOPMENT

4.1 Retail Development

The proposed development is for retail development on Lot 1 DP 1135801& Lot A DP 389480, Nos. 389-391 Pacific Highway, Belmont North.

The proposed retail development will operate as a Chemist Outlet and will replace the existing Chemist Outlet situated on the western side of the Pacific Highway near the Wommara Avenue intersection, approximately 370 metres north of the subject site.

The gross floor area of the building is approximately 511 m^2, essentially the same as the existing Chemist Outlet on the western side of the Highway.

4.2 Servicing Provision

The proposed retail development on Lot 1 DP 1135801& Lot A DP 389480 will require servicing using MRV vehicles and garbage trucks only, similar to what exists at the Chemist Outlet further north.

There is a loading bay near the northern end of the site, with access via the service road off the Pacific Highway. Small rigid trucks and light vans would operate in this environment satisfactorily to deliver supplies.

The only other servicing requirements that will also take place on a relatively infrequent basis will be garbage pick-up. Contract garbage trucks will enter the site in a forward direction from the service road and exit also via the service road along the southern boundary of the site, U-turn at the access road roundabout and exit onto the Pacific Highway at the signalized intersection. Garbage would be undertaken during early mornings prior to the chemist outlet opening and when traffic flows are considerably less than in the afternoon period.

Small rigid trucks would be able to manoeuvre within the parking area enabling forward entry from the service road and exit via the service road onto the Pacific Highway at the traffic signals.

4.3 Traffic Generation

RTA Guidelines for Traffic Generating Developments includes a category for slow-trade shops in shopping centres such as chemist stores, as follows:

For Thursdays and Fridays, the models are for the vehicle trips in the evening peak hour - V(P) - where this period has been taken as 4.30-5.30 pm.

For Saturday morning, the peak vehicle hour has been used - PVT. This is typically 11.00 am-12.00 pm. Localised variations in these peak hours can occur.

Thursday Trade

V(P) = 20 A(S)

Where: V(P) = evening peak hour

511 m^2 @ 20 trips per 1,000 m^2
= 11 trips

Saturday Trade

PVT = 38 A(S)

Where: PVT = peak vehicle hour traffic

A(S): Slow Trade gross leasable floor area (Gross Leasable Floor Area in square metres) includes major department stores such as David Jones and Grace Bros., furniture, electrical and whitegoods stores.

Saturdays frequently represent the highest traffic generation for specialty shops such as pharmacies. However, traffic volumes on the Pacific Highway are higher in the evening weekday peak.

511 m^2 @ 38 trips per 1,000 m^2

0.511 x 38 = 19.4 trips in the evening peak

SAY 20 TRIPS

That is, the proposed retail development is estimated to generate approximately 11 trips in the weekday evening peak, and approximately 20 trips in the Saturday peak hour.

It is anticipated that the majority of visits would be relatively short-term and that approximately 50% of evening trips would be outward, and 50% inward.

Estimated Traffic Generation:

Weekday Evening Peak:	six (6) trips inwards five (5) trips outwards
Saturday Peak Hour	
	Ten (10) trips inwards Ten (10) trips outwards

Existing Motor Repair Workshop Traffic Generation

The existing use of the site is a vehicle repair and maintenance workshop. The RTA Guide to Traffic Generating Developments does not provide any traffic generation rates for such developments.

However, the traffic generation rates are likely to be very similar to the proposed development.

The approximate GFA of the existing development is 420 m^2.

The approximate traffic generation for the existing development would therefore be:

420 m^2 @ 20 trips per 1,000 m^2
= 9 trips

The existing motor repair workshop development is estimated to generate approximately 9 fewer trips in the weekday peak period, marginally less than the proposed retail development.

4.4 Parking Demand

Lake Macquarie City Council's DCP 2014 – Revision 3 – Part 4 requires parking for shops with a total area less than 5,000 m^2 as follows:

1 space per 25 m^2

Application of the DCP 1 requirement would require parking as follows:

511 @ 1 space per 25 m^2 = 20.4 spaces

The total car parking proposed for the proposed retail development of Lot 1 DP 1135801& Lot A DP 389480 is:

➔ 22 spaces, and includes motor cycle parking spaces and bicycle racks.

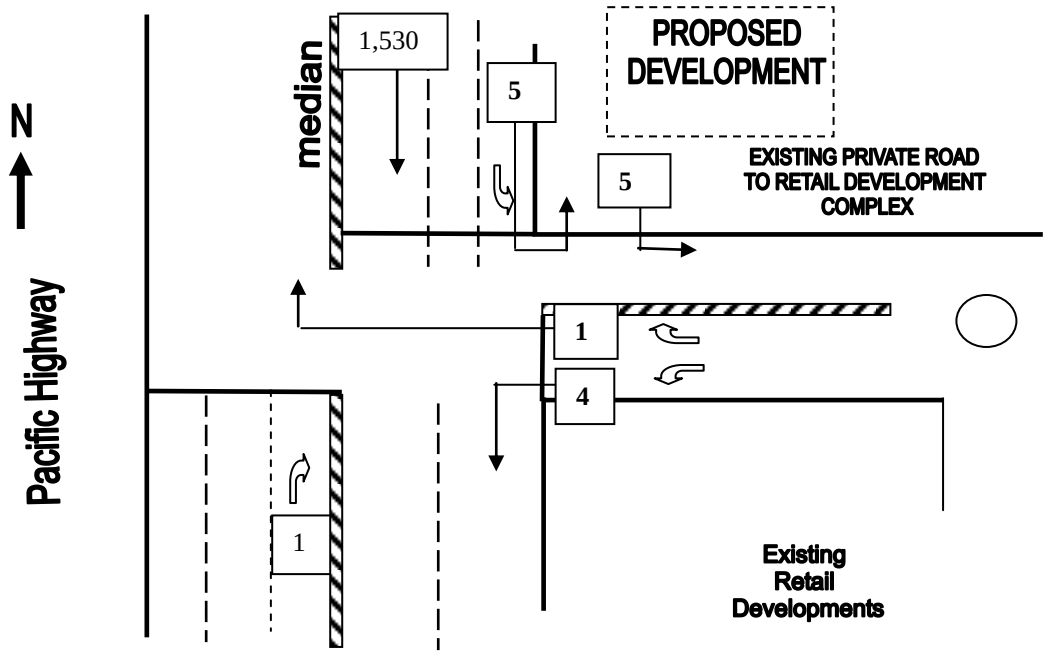
4.5 Origin Destination Considerations

The central median on the Pacific Highway ensures that the majority of movements will be left-in from the Pacific Highway and right-in via the traffic signals onto the service road.

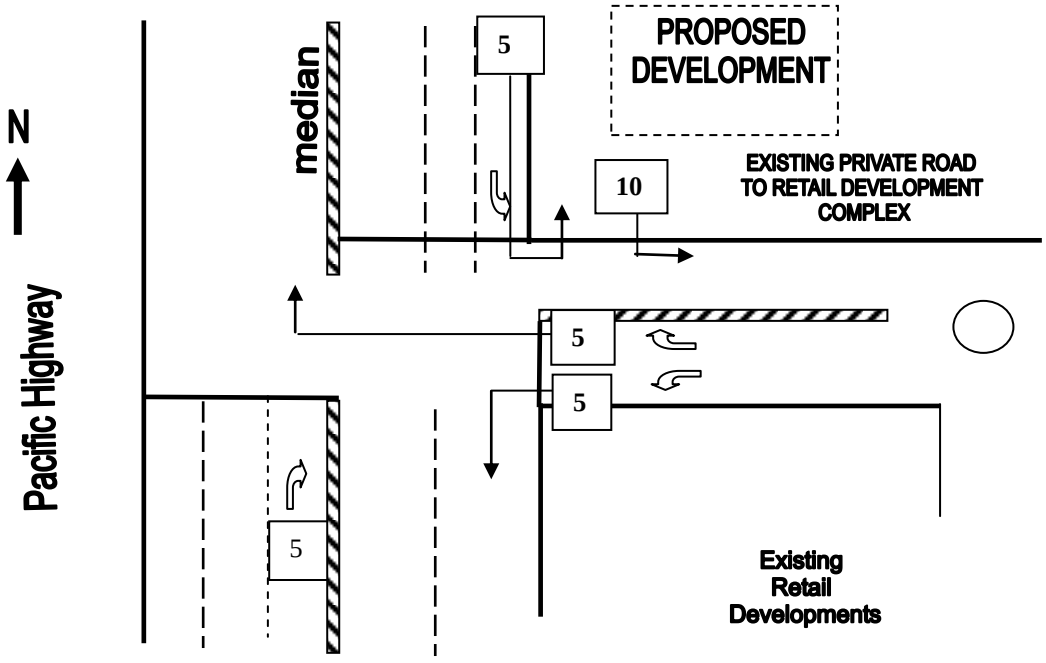
Exit movements will be restricted to the access road which then enables drivers to travel either north or south via the existing traffic signals.

Traffic Generation from the proposed development, is shown diagrammatically below:

Weekday Evening Peak



Saturday Peak Hour



4.6 Access Design

The proposed development will utilize the existing vehicular access to driveway on the service road along the southern boundary of the site. Southbound and northbound vehicles can enter and leave the site via the existing access onto the service road and the traffic signals at the Pacific Highway.

4.7 Internal Road Design

The internal traffic aisles and parking bays comply with the requirements of AS2890.1-2004.

Parking bays will be 2.6 metres wide, and 5.5 metres long. This complies with AS2890.1-2004. The minimum aisle width will be 6.7 metres which also complies with AS2890.1-2004.

5.0 TRAFFIC IMPACTS OF PROPOSED DEVELOPMENT

5.1 Traffic Safety

The development will not impact on existing sight distances at the existing signalized intersection with the private service road that has been unchanged for many years with the current road configuration and development.

5.1.1 Left Turns into the Retail Development

The volume of traffic performing this manoeuvre from the Pacific Highway into the site is expected to be relatively low – approximately 5 trips in the weekday evening peak hour. This movement can be accommodated from the existing left-turn lane approaching the traffic signals and utilizes the existing service road that has been in existence for many years. The existing driveway to the site from the Pacific Highway will be removed.

5.1.2 Left Turns out of Retail Development

Traffic departing the proposed development will turn left onto the southern service road and then return to the traffic signals at the Pacific Highway.

5.1.3 Right Turns into the Retail Development

The volume of traffic performing this manoeuvre from the Pacific Highway into the site is expected to be relatively low – approximately 1 trip in the weekday evening peak hour. This movement can be accommodated from the existing right-turn lane on the Pacific Highway into the service road and development access that has been in existence for many years.

5.2 Pedestrian Safety

The existing traffic signals at the intersection of the Pacific Highway and the adjoining access road enable pedestrians to safely cross the Pacific Highway and also the access road adjoining the site.

Pedestrian pathways existing along both sides of the Pacific Highway and enable a safe pedestrian connection between nearby residential areas and the proposed retail outlet.

It is anticipated that the majority of staff will normally access the development by car. However, bus transport may also prove attractive to some customers.

5.3 Impact on Pacific Highway

The proposed retail development is expected to have a minimal impact on Pacific Highway. The southbound traffic volume on Pacific Highway during the weekday peak period is approximately 1,530 vph. The proposed retail development will increase traffic volumes by approximately 11 trips in the weekday evening peak period, or 0.72%, assuming that all traffic generation is not derived from passing traffic.

The traffic generated by the proposed development will be marginally greater than the traffic that was generated by the existing motor vehicle repair workshop on the site.

It is likely that a significant volume of traffic entering and leaving the development would be from passing traffic.

6.0 SEPP (Infrastructure) 2007

The requirements of SEPP (Infrastructure) 2007 have been considered particularly regarding access and impact on the State Road A43– the Pacific Highway.

The site has frontage to both the Pacific Highway and also to a service road along the southern boundary that services a significant retail and hospitality complex. In consideration of the requirements of Clause 101 of SEPP (Infrastructure) 2007, the only direct vehicular access to the Pacific Highway is an entry-only driveway that has existed for the existing business for many decades. Northbound entry movements and all exit movements will be from the signalized access road adjoining the site.

The design and nature of the development has been prepared in consideration relevant Standards and Council requirements and the proposed development complies with the intent of Clause 101.

The nature of the proposed development replaces an existing motor vehicle repair workshop and is consistent with numerous other developments and permissible within the B4 Business Zone along the Pacific Highway at Belmont North.

The access driveway on the service road from the Pacific Highway enables service vehicles to access the site satisfactorily. The driveway on the adjoining access road will enable service vehicles to enter and leave the site in a forward direction and will not adversely impact on the level of service, level of average delays of capacity of the Pacific Highway.

The proposed retail outlet is estimated to generate a marginal increase in traffic generation compared with the existing usage and essentially a large proportion of customers will be from passing traffic.

In my opinion, the proposed retail development satisfactorily complies with the intentions of Clause 101 and also Clause 104 of the SEPP (Infrastructure) 2007.

7.0 SUMMARY

- The proposed development involves a retail development with a gross floor area of approximately 511 m^2.

- Access to the off-street customer parking area will be off the Pacific Highway for southbound traffic and off the existing service road for northbound traffic.

- The estimated weekday evening peak traffic volume on Pacific Highway past the site is approximately 1,530 (southbound).

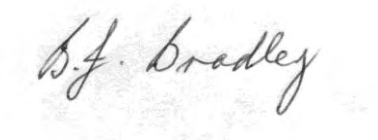
- Access will be via the combined entry / exit driveway which is 8.0 metres wide on the service road along the southern boundary. The driveway arrangement complies with a Class 3 parking facility for less than 25 car spaces in accordance with AS 2890.1-2004 for an arterial road and also Council's DCP 2014 – Revision 3 – Part 4.

- The proposed development will generate negligible traffic volumes – calculated using RTA Guidelines for Traffic Generating Developments to be 11 trips during the weekday evening peak on Pacific Highway, and approximately 20 trips in the Saturday peak hour, marginally more than the existing motor repair workshop on the site.

- Design of all car parking spaces is in accordance with AS 2890.1-2004 and Council's DCP 2014 – Revision 3 – Part 4. Twenty two (22) car spaces will be provided onsite, including 2 accessible spaces plus two motorcycle spaces and bike racks, in compliance with the requirement calculated in accordance with Council's DCP 2014 – Revision 3 – Part 4. Some customers may also park in the adjacent Bunnings parking area or the fast food outlets parking areas to attend the Chemist Outlet whilst in that vicinity.

8.0 RECOMMENDATION

I recommend that the proposed retail development as a suitable development on the site, as it replaces an existing Chemist Outlet on the northern side of the Pacific Highway and will cause no detrimental effects on the Level of Service, Capacity or Level of Safety of Pacific Highway.



B J Bradley BE Grad Dip Man MIEAust

8.0 APPENDICES

Appendix A – Site Photographs

Photo No. 1: Looking generally north along the eastern side of the Pacific Highway showing the existing access to the site that will be removed.

Photo No. 2: Looking generally east from the Pacific Highway showing the existing access to the site from the service road to the existing retail / hospitality complex.

Photo No. 3: Looking generally west towards the Pacific Highway showing the existing service road to the existing retail / hospitality complex and signalized intersection.

Photo No. 4: Looking generally south along the eastern side of the Pacific Highway showing the existing signalized intersection with the service road to the existing retail / hospitality complex.

APPENDIX 7 -
REMEDIATION ACTION PLAN PREPARED BY EP RISK MANAGEMENT

Remediation Action Plan

389-391 Pacific Highway, Belmont, NSW

Prepared for: The Trustee for Mayfield Super Fund C/- Stevens Holdings Pty Ltd

EP0194 17/03/2015

EP Risk Management

Remediation Action Plan

389-391 Pacific Highway, Belmont, NSW

The Trustee for the Mayfield Super Fund
C/- Stevens Holdings Pty Ltd
Suite 2, 257-259 Central Coast Highway
Erina, NSW, 2250

17/03/2015

Our Ref: EP0194

LIMITATIONS

This Remediation Action Plan was conducted on the behalf of Stevens Holdings Pty Ltd on behalf of the Trustee for Mayfield super Fund or the purpose/s stated in **Section 1**.

EP Risk has prepared this document in good faith, but is unable to provide certification outside of areas over which he had some control or are reasonably able to check. The report also relies upon information provided by third parties. EP Risk has undertaken all practical steps to confirm the reliability of the information provided by third parties and do not accept any liability for false or misleading information provided by these parties.

It is not possible in a Remediation Action Plan to present all data, which could be of interest to all readers of this report. Readers are referred to any referenced investigation reports for further data.

Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

All work conducted and reports produced by EP Risk are based on a specific scope and have been prepared for Stevens Holdings Pty Ltd and therefore cannot be relied upon by any other third parties unless agreed in writing by EP Risk.

The report(s) and/or information produced by EP Risk should not be reproduced and/or presented/reviewed except in full.

QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	S Lord	16/3/15	P Simpson	17/3/15	P Simpson	17/3/15

DOCUMENT CONTROL

Version	Date	Reference	Version	Submitted to
v1	17/3/15	*EP0183 Mayfield Super Fund_Belmont_DSI_v1*	v1	*Stevens Holdings Pty Ltd*

Executive Summary

EP Risk Management Pty Ltd ('EP Risk') was engaged by Stevens Holdings Pty Ltd ('Stevens') on behalf of The Trustee for Mayfield Super Fund to prepare a Remediation Action Plan ('RAP') for the remediation of petroleum hydrocarbon impacted soil and groundwater at 389-391 Pacific Highway, Belmont, NSW ('the Site'). The Site is known as Lot 1 in Deposited Plan 1135801 and Lot A in Deposited Plan 389480. The Site is approximately 1,600m² in size and it is understood that the Site will be redeveloped into future commercial / industrial land use.

Previous investigations undertaken at the Site have identified petroleum hydrocarbon impacted soil and groundwater at isolated areas across the Site. It is considered that the impact is likely due to surface spills associated with the historical operations undertaken at the Site.

The RAP was commissioned to detail the preferred methodology to remediate petroleum hydrocarbon impacted soil and groundwater at the Site and has been undertaken in accordance with the requirements of State Environmental Planning Policy No. 55 ('SEPP 55').

The preferred remedial strategy adopted for the Site includes removal of all identified underground Storage tanks ('USTs') from the Site, excavation and landfarming of secondary impacted soils and monitored natural attenuation of any residual impact to groundwater. All excavations and stockpiled material will be validated and with remediated soils classified against the adopted criteria.

EP Risk considers that following implementation of the remedial measures and associated activities documented in the RAP and provision of a validation report, the Site can be made suitable for the proposed redevelopment.

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List of Attached Figures

List of Appendices

1 Introduction

1.1 Overview

EP Risk Management ('EP Risk') was engaged by Stevens Holdings Pty Ltd ('Stevens') on behalf of The Trustee for Mayfield Super Fund to prepare a Remediation Action Plan ('RAP') for the remediation of petroleum hydrocarbon impacted soil and groundwater at 389-391 Pacific Highway, Belmont, NSW ('the Site'). The Site is known as Lot 1 in Deposited Plan 1135801 and Lot A in Deposited Plan 389480. The Site is approximately 1,600m² in size and it is understood that the Site will be redeveloped into future commercial / industrial land use.

Previous investigations undertaken at the Site have identified petroleum hydrocarbon impacted soil and groundwater at the Site in isolated hotspots across the Site.

The RAP was commissioned to detail the preferred methodology to remediate petroleum hydrocarbon impacted soil and groundwater at the Site.

1.2 Objectives

The specific objectives of the RAP are to:

1. Review potential remedial options with respect to regulatory requirements and Site constraints for the shallow petroleum hydrocarbon impacted soil.
2. Develop and appropriate remedial strategy for remediation of the contamination previously identified at the Site.
3. Document the procedures to be followed.

1.3 Scope of Work

The scope of work was carried out in general accordance with EP Risk's proposal (EP10303 dated 16th December 2014) and comprised the following:

1. Review all of the existing documentation and analytical data collected at the Site.
2. Preparation of a RAP report in accordance with the requirements of State Environmental Planning Policy No. 55 ('SEPP 55') and the Office of Environment and Heritage (OEH) (2011) Guidelines for Consultants Reporting on Contaminated Site (2011).

2 Site Identification

The site identification details are presented in **Table 1** below.

Table 1 – Site Identification

Item	Description
Site Address	389-391 Pacific Highway, Belmont, NSW (see **Figure 1**)
Legal Description	Lot 1 in Deposited Plan 1135801 and Lot A in Deposited Plan 389480 (The approximate location of the proposed parcel of land is presented in **Figure 1**).
Approximate Site area	1,600m²
Site Owner	Gallucci Investments Pty Ltd
Municipality	Lake Macquarie City Council ('Council')
Site Zoning	Lake Macquarie Local Environmental Plan 2014 identifies the land as **B4 Mixed Use**.

3 Site History

3.1 Previous Investigations

Previous investigations undertaken at the Site include:

1. Parsons Brinckerhoff, Decommissioning of Underground Storage Tanks, Belmont Motor Repairs, Pacific Highway, Belmont, dated September 2002 (ref: 212249A).
2. EP Risk Management Pty Ltd, Detailed Site Investigation, 389-391 Pacific Highway, Belmont, NSW, 12th February 2015 (ref: EP0183_Mayfield Super Fund_Belmont_DSI_v1).

Decommissioning of Underground Storage Tanks (Parsons Brinckerhoff, 2002)

Parsons Brinckerhoff ('PB') undertook an investigation at the Site in September of 2002 to assess potential petroleum hydrocarbon impact in relation to the decommissioning of two USTs located at the Site. It is understood that the two USTs contained petroleum and were decommissioned in May of 2002 by Coast & Valley by removing any remaining fuel and filling the tanks with lean mix concrete.

The investigation involved the drilling of four boreholes to a maximum depth of approximately 3 mbgs; installation of groundwater monitoring wells in each location to a maximum depth of 3 mbgs; sampling and analysis of two soil samples per borehole and groundwater sampling from each monitoring well. All samples were analysed for Total Petroleum hydrocarbon ('TPH'), Benzene/Toluene/Ethylbenzene/Xylene ('BTEX') with analysis against the threshold concentrations for sensitive land use contained in the NSW EPA Guidelines for Assessing Service Station Sites (1994) and the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZEC, 2000).

Elevated concentrations of TPH C_6-C_{36} in excess of the adopted guidelines were recorded in three soil samples collected; H1 at 1 m (3,838 mg/kg), HA at 1 m (14,546 mg/kg) and 2 m (1,071 mg/kg). Minor elevated TPH impacts were recorded in all GW monitoring wells with the exception of H2, although all concentrations were less than the adopted criteria. Groundwater was recorded at levels ranging from 0.9 mbgs at H3 to 1.5 mbgs at H1.

PB concluded that the USTs had been adequately abandoned and the residual petroleum impacts at the Site not to pose a significant risk to human health and the environment in the Site present condition, although if the Site was to change to a more sensitive land use, then further investigation and likely remediation would be required.

Detailed Site Investigation (EP Risk, 2015)

EP Risk was engaged by Stevens on behalf of The Trustee for Mayfield Super Fund to undertake a Detailed Site Investigation ('DSI') at the Site to characterise the level of contamination from the historical use of the Site as a motor vehicle mechanical workshop in order to develop a remedial strategy to facilitate commercial/industrial land use at the Site.

The DSI was undertaken in accordance with the requirements of SEPP55 and the OEH Guidelines for Consultants Reporting on Contaminated Sites (2011). An assessment of Site history identified that

the Site had been utilised as a motor vehicle workshop with associated since the 1960's. Potentially contaminating activities included: historical operation of a vehicle servicing facility; fuel and oil storage on Site and the storage of waste oil drums and engine parts.

Soil investigations included the collection of 13 samples from seven targeted locations across the Site with the majority of the soil bores advanced to a maximum depth of 5 mbgs. GW investigations included the collection of samples from two additionally installed GW monitoring wells, to a maximum depth of 4 mbgs and one out of two existing GW monitoring wells installed during a previous investigation (PB, 2002). Soil and GW samples were selectively analysed for Total Recoverable Hydrocarbons ('TRHs'); benzene, toluene, ethylbenzene and xylene ('BTEX'); Polycyclic Aromatic Hydrocarbons ('PAHs') and heavy metals (Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Nickel (Ni), Lead (Pb), and Zinc (Zn)).

Elevated concentrations of TRH (C_{16}-C_{34}) and TRH (F2) were recorded in excess of the adopted ecological and management limit criteria at MW01, with TRH concentrations in a deeper sample recording levels below the LOR. No contamination was identified in the remaining sampling locations which indicated that the impact at MW01 is considered to be localised to this area.

Light non-aqueous Phase Liquid ('LNAPL') was identified at HA during the current round of groundwater sampling which exceeds the notification triggers for groundwater in the DECC (2009) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997. Due to the location of HA being in close proximity to the Site boundary, lateral delineation was not achieved.

Slightly elevated Copper and Zinc concentrations in groundwater were identified in all groundwater wells sampled by EP Risk and are considered to be representative of background levels. All other chemicals of potential concern ('CoPC') were recorded below the adopted environmental criteria.

It was concluded that on the basis of the results obtained in the previous assessment by PB and the current assessment, EP Risk considered that the Site would require remediation or management of the petroleum impacted soils and groundwater in the south eastern portion of the Site in order to facilitate the proposed development.

4 Site Condition and Surrounding Environment

4.1 Current Land Use and Layout

The Site currently consists of 2 lots, currently operating as a motor vehicle mechanical workshop, and is located approximately 15 km south west of Newcastle Central Business District ('CBD'). The entire lot layout is shown in **Figure 2**.

4.2 Proposed Land Use

It is understood that the site is proposed to be redeveloped into commercial / industrial land use consisting of a chemist retail facility ('Proposed Development').

4.3 Surrounding Land Use

The Site is located within a mix of residential and commercial land use area and as of the 16th January 2015, surrounding land uses comprise of:

Land use to the North

- Commercial business adjacent.
- Pacific Highway located approximately 60 m to the north.
- Mix of residential and commercial properties beyond.

Land use to the South

- Fast food retailers with associated car parking area located approximately 50 m to the south.
- Caltex service station located approximately 90 m to the south.
- Blacks Smash Repairs located approximately 180 m to the south.
- Residential properties.
- Lake Macquarie located approximately 1.4 km south-west.

Land use to the East

- Stormwater drainage channel adjacent to eastern Site boundary.
- Bunnings Warehouse with associated car parking area.
- Small water body located approximately 450 m to the east.
- SEPP 14 Coastal Wetlands located approximately 767 m south-east with the Pacific Ocean beyond.

Land use to the West

- Pacific Highway adjacent.
- Local business (Five Star Campers and Caravans) with residential properties beyond.
- Green Point Foreshore Reserve located approximately 2 km west with Lake Macquarie beyond.

4.4 Topography and Drainage

The topography of the Site and surrounding area is relatively flat (approximate elevation of 9 mAHD) with a gentle slope towards the east. As there are no stormwater pits located within the Site boundary, surface water migrates as overland flow and collects in the south eastern corner of the Site. As for the front portion of the Site, it is anticipated that surface runoff will flow towards the storm-water drainage lines along the Pacific Highway.

4.5 Geology

A review of the regional geology indicates that the Site is underlain by Permian; Newcastle Coal Measures; consisting of shale, sandstone, conglomerate, tuff, chert and coal seams.

4.6 Hydrogeology

A search of the NSW Department of Primary Industries Office of Water Groundwater database has indicated that there was no registered groundwater bores located at the Site or within a 2 km radius. A total of six groundwater monitoring wells have been installed at the Site during previous investigations with details of the wells presented in Table 2 below and their locations provided in **Figure 3**.

Table 2 – Groundwater Monitoring Wells Installed During Previous Investigations

Bore ID	Install Date	Depth of Bore (mbgs)[1]	Screen depth (mbgs)	Soil horizon screened	Standing Water Level (mAHD)
H1	2002	2.96[2]	-	-	8.37[3]
H2	2002	2.93[2]	-	-	8.8[4]
H3	2002	3.0[2]	-	-	8.5[4]
HA	2002	2.76[2]	-	-	7.81[3]
MW01	2015	4.0[5]	1.0-4.0	sandy silt underlain by sandy silty clay	7.77
MW02	2015	4.0[4]	1.0-4.0	sandy silt underlain by sandy silty clay	7.86

Four groundwater monitoring wells were installed at the Site during the PB investigation undertaken in 2002, although limited information was available about their construction. The depth of the bores

[1] "mbgs" metres below top of casing.

[2] Parsons Brinckerhoff, Decommissioning of Underground Storage Tanks, Belmont Motor Repairs, Pacific Highway, Belmont, dated September 2002 (ref: 212249A).

[3] Measured and calculated by EP Risk on 27th January 2015.

[4] Depth of bore and SWL measured by EP Risk on 27th January 2015. It is noted that location HA contained approximately 0.1 m of LNAPL, therefore the corrected groundwater level was calculated by multiplying the thickness of LNAPL by specific gravity of the LNAPL (assumed 0.8) with the resulting calculation added to the original measured depth of groundwater.

[5] EP Risk Management Pty Ltd, Detailed Site Investigation, 389-391 Pacific Highway, Belmont, NSW, 12th February 2015 (ref: EP0183_Mayfield Super Fund_Belmont_DSI_v1)

and the depth of groundwater were measured by EP Risk on 27th January 2015. It was identified that groundwater bore HA contained LNAPL of an approximate thickness of 0.1 m. The corrected groundwater in this location was re-calculated due to the presence of the LNAPL.

The groundwater monitoring wells installed during the EP Risk (2015) DSI and historically installed by PB in 2002 were surveyed after installation and gauged prior to sampling in order to calculate the hydraulic heads and groundwater contours. Groundwater levels recorded at wells screened within residual soils were observed at depths between 1.3 m below top of casing ('mbtoc') and 1.5 mbtoc.

Potentiometric groundwater levels from wells screened within the residual soil were calculated from the relative levels of the top of casing of each well to produce a potentiometric surface map as presented in **Figure 4**. With reference to the potentiometric surface map for groundwater within residual soils, the inferred groundwater flow direction was calculated to be flowing at an angle of 101 degrees from the north axis towards the Pacific Ocean.

An assessment of average linear groundwater velocity was undertaken and the hydraulic gradient was calculated to be 0.015 across the Site.

The hydraulic conductivity of residual soils at the Site was estimated at 1×10^{-4} for the sand and gravel layer at 1.4 to 1.5mbgs from literature values provided by C.W. Fetter (1998). The effective porosity of residual soil at the Site was calculated at being 0.33 from literature values contained in McWhorter and Sunada (1977). On the basis of this data the average linear velocity at the Site was calculated at 1.5 m/year.

Given that the average linear groundwater velocity values are based upon literature data and the fact the no construction details of the wells installed by PB were provided, the calculations above can be considered to be to be indicative only.

4.7 Acid Sulfate Soils

With reference to the CSIRO National Acid Sulfate Soil Database, the Site is located within an area of no known occurrence of acid sulfate soils. In relation to the Lake Macquarie Council Local Environmental Plan ('LEP') (2014) the Site is located in an Acid Sulfate Soils Class 5, which requires Development Consent for Works within 500 metres of adjacent Class 1, 2, 3 or 4 land, which are likely to lower the watertable below one metre AHD on adjacent Class 1, 2, 3 or 4 land.

5 Conceptual Site Model

A Conceptual Site Model ('CSM') has been developed based upon the information provided in sections of this report.

5.1 Mechanisms of Contamination

A number of potential contaminating activities have been undertaken at the Site as follows:

- Operation of motor vehicle mechanical workshop.
- Two decommissioned USTs with associated infrastructure (fuel dispenser which has been removed).
- Storage of car parts and vehicle parking.
- Oil storage in areas of the Site.

5.2 Affected Media

The potentially affected media at the Site include soil, groundwater, stormwater and soil vapour. The soil and groundwater exceedances at the Site are shown in **Figures 5** and **6.**

5.3 Type and Extent of Contamination

Soil

A summary of the analytical results combining data collected during the previous assessments undertaken at the Site is summarised below, with the areas of exceedances shown in **Figure 5** and **Table 3** below.

Table 3 –Summary of Soil Analytical Exceedances

Location ID	Area of Environmental Concern	Depth (m)	Matrix	Analyte	Conc. (mg/kg)	Exceeds	>250%
H1[6]	Front portion of Site	1.0	Likely Natural	TRH (C_6C_{36})	3,838	NSW EPA (1994)	Yes
HA[7]	Rear of Site. Down-gradient of USTs	1.0	Likely Natural	TRH (C_6C_{36})	14,546	NSW EPA (1994)	Yes
		2.0	Natural	TRH (C_6C_{36})	1,071	NSW EPA (1994)	No
MW01	Rear of Site. Down-gradient of mechanical workshop	1.0	Natural	TRH (C_{16}-C_{34})	9,240	ESL	Yes
						Management Limits	No
				TRH (F2)	400	ESL	No

[6] Parsons Brinckerhoff, Decommissioning of Underground Storage Tanks, Belmont Motor Repairs, Pacific Highway, Belmont, dated September 2002 (ref: 212249A).

Groundwater

LNAPL of an approximate measured thickness of 0.1 m was identified at monitoring well HA during the sampling event undertaken by EP Risk on 27th January 2015.

5.4 Human and Ecological Receptors

Potential human and ecological receptors include the following:

- Current Site users, sub-surface maintenance workers and customers.
- Future commercial Site users, visitors and construction and maintenance workers.
- Small open water body located approximately 450 m east of the Site,
- Open storm water drainage channel adjacent to the eastern Site boundary,
- SEPP 14 Coastal Wetlands located approximately 767 m south-east, and
- SEPP 71 Coastal Protection Zone located approximately 210m south west of the Site.

5.5 Potential and Complete Exposure Pathways

An analysis of the potential exposure pathways between the CoPC and the identified human and ecological receptors are presented in **Table 4** below.

Table 4 – Potential Exposure Pathways

Sources	Media	Release Mechanism	Pathway	Current Site users, sub-surface maintenance workers and customers	Future commercial Site users	Future construction and maintenance workers	Small open water body located approximately 450 m to the east	Open storm water drainage channel adjacent to eastern Site boundary	SEPP 14 Coastal Wetlands located approximately 767 m south east	SEPP 71 Coastal Protection Zone located approximately 210 m south west
Petroleum hydrocarbon leaks and spills from fuel and oil storage and vehicle maintenance	Soil	Fugitive Dust	Air – ingestion	No	No	Yes	No	No	No	No
		Direct Contact	Soil – Dermal contact	Yes	No	Yes	No	No	No	No
			Soil – Ingestion	Yes	No	Yes	No	No	No	No
		Vapour intrusion	Vapour – inhalation	Yes	Yes	Yes	No	No	No	No
	Groundwater	Vapour intrusion	Vapour – inhalation	Yes	Yes	Yes	No	No	No	No
		Direct Contact	Groundwater – Dermal contact	Yes	No	Yes	No	No	No	No
			Groundwater – Ingestion	Yes	No	Yes	No	No	No	No
		Vapour intrusion	Vapour – inhalation	Yes	Yes	Yes	No	No	No	No
		Discharge to surface water	Groundwater discharge	No	No	No	Yes	Yes	Yes	Yes
		Bioaccumulation	Uptake by plants	No	No	No	No	No	No	No
	Stormwater	Overland flow	Surface water and sediments	No	No	No	No	Yes	No	No
			Ingestion by fish / shellfish	No	No	No	No	Yes	No	No

Notes:

Yes Current potential

Yes Future potential

6 Basis for the Remediation Criteria

6.1 Relevant Guidelines

The relevant guidelines used to assess the Site's contamination status and guide remediation works are those made or approved by the NSW EPA under Section 105 of the CLM Act 1997 as follows:

- OE&H (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, August 2011.
- DEC NSW (2006) Contaminated Sites: Guidelines for NSW Site Auditor Scheme, 2nd edition.
- NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines.
- NSW EPA (2014) Technical Note - Investigations of Service Station Sites.
- NSW EPA (2014) Best Practice Note: Landfarming.
- NSW DECC (2009) Waste Classification Guidelines, Part 1: Classifying Waste.
- NSW ECCW (2008) Guidelines for Implementing the Protection of the Environmental Operations (UPSS) Regulation.
- NSW ECCW (2010) UPSS Technical Note: Site Validation Reporting.
- NSW DECC (2009) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997.
- NSW DECC (2007) Guidelines for the Assessment and Management of Groundwater Contamination.
- NEPC (1999) National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council (NEPC).
- NEPC (2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure, National Environment Protection Council (NEPC).
- Australian and New Zealand Guidelines for Fresh Water Quality – 95% protection for slightly disturbed to moderately disturbed ecosystems ANZECC (2000).
- (NHMRC/NRMMC 2004) Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2004.

6.2 Soil Investigation and Remediation Levels

The current assessment criteria used in NSW to evaluate soil analytical results are based on the DEC NSW, Guidelines for the NSW Site Auditor Scheme, 2nd Ed. (2006) and the National Environment Protection (Assessment of Site Contamination) Amendment Measure (ASC NEPM, 2013). These combined guidelines present a range of Health-Based Soil Investigation Levels (SILs), sensitive land use thresholds and expected background concentration ranges for urban redevelopment sites in NSW. Application of these guidelines is briefly described below.

- **Health-based Criteria for the current and proposed land use**: ASC NEPM (2013) Health-based Investigation levels ('HILs') for Commercial/Industrial land use, the Health Screening Levels (HSLs) and the CRC Care (2011) Soil Health Screening Levels for Direct Contact ('HSLs').
- **Environmental Criteria**: ASC NEPM (2013) Ecological Screening Levels ('ESLs') and Ecological Investigation Levels (EILs) for Commercial/Industrial land use.
- **Aesthetics**: The consultant should also consider the need for remediation based on the 'aesthetic' contamination as outlined in Schedule B (1) of the ASC NEPM (2013) that states that *'there are no numeric Aesthetic Guidelines however site assessment requires balanced consideration of the quality, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity*'. Soil odour and discolouration will need to be assessed during remediation.
- **General**: Although the ASC NEPM (2013) guidelines indicate that site specific risk based remediation criteria should be developed as remediation criteria in preference to use of investigation levels ('ILs') (as they may be more conservative than required) the guidelines referenced above are considered appropriately conservative to be used for site remediation criteria based on the proposed residential land use and proximity of neighbouring residential sensitive receptors.

The National Environment Protection Council ('NEPC') has amended the National Environment Protection (Assessment of Site Contamination) Measure 1999 on the 11 April 2013. It is understood that the amendment (ASC NEPM, 2013) took effect in each jurisdiction on 16 May 2013, the day after it was registered on the Federal Register of Legislative Instruments ('FRLI').

6.3 Soil Remediation Criteria

In accordance with these guidelines, the following remediation criteria presented in **Table 5** has been adopted.

Table 5 – Soil Criteria (mg/kg)

Analyte	ASC NEPM 2013 HIL D Commercial/ Industrial	ASC NEPM 2013 HSLs for Vapour Intrusion Commercial/ Industrial			CRC Care (2011) SHSL for Direct Contact Commercial/ Industrial	ASC NEPM 2013 ESLs Commercial/ Industrial	ASC NEPM 2013 Site Specific EILs Commercial/ Industrial[7]	ASC NEPM 2013 Management Limits for TPH fractions Commercial/ Industrial
		Sand	Silt	Clay				
Heavy metals								
Arsenic	3,000	-	-	-	-	-	160	-
Cadmium	900	-	-	-	-	-	-	-
Chromium	3,600[8]	-	-	-	-	-	310 (Cr III)	-
Copper	240,000	-	-	-	-	-	140	-
Nickel	6,000	-	-	-	-	-	5	-
Lead	1,500	-	-	-	-	-	1,800	-
Zinc	400,000	-	-	-	-	-	110	-
Mercury (inorganic)	730	-	-	-	-	-	-	-

[7] Based on the most conservative site specific EILs calculated from the 'Ecological Investigation Levels – Interactive (Excel) Calculation Spreadsheet – December 2010 for Residential, Parkland and public open space (ASC NEPM, 2013).

[8] Chromium (IV).

Table 5 – Soil Criteria (mg/kg)

Analyte	ASC NEPM 2013 HIL D Commercial/ Industrial	ASC NEPM 2013 HSLs for Vapour Intrusion Commercial/ Industrial			CRC Care (2011) SHSL for Direct Contact Commercial/ Industrial	ASC NEPM 2013 ESLs Commercial/ Industrial	ASC NEPM 2013 Site Specific EILs Commercial/ Industrial[7]	ASC NEPM 2013 Management Limits for TPH fractions Commercial/ Industrial
		Sand	Silt	Clay				
Total Recoverable Hydrocarbons								
>C6-C10 fraction	-	-	-	-	-	-	-	700/800[16]
>C6-C10 fraction (F1)	-	260/370/630/NL[9]	250/360/590/NL[11]	310/480/NL[13]	26,000	215[15]	-	-
>C10-C16	-	-	-	-	20,000	170[17]	-	1,000[18]
>C10-C16 fraction (F2)	-	NL[10]	NL[12]	NL[14]	-	-	-	-
>C16-C34 fraction (F3)	-	-	-	-	27,000	1,700/2,500[17]	-	3,500/5,000[18]
>C34-C40 fraction (F4)	-	-	-	-	38,000	3,300/6,600[17]	-	10,000[18]

[9] HSLs for vapour intrusion assuming sandy soil (0-<1m/1-<2m/2-<4m/4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[10] HSLs for vapour intrusion assuming sandy soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[11] HSLs for vapour intrusion assuming silty soil (0-<1m/1-<2m/2-<4m/4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[12] HSLs for vapour intrusion assuming silty soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[13] HSLs for vapour intrusion assuming clay soil (0-<1m/1-<2m/2-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[14] HSLs for vapour intrusion assuming clay soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[15] TRH fractions F1 - F4, BTEX and Benzo(a)pyrene in soil for (coarse/fine) soil and Commercial/Industrial land use (ASC NEPM, 2013).
[16] Management Limits for TRH fractions F1-F4 in soil assuming (coarse/fine) soil and Commercial/Industrial land use (ASC NEPM, 2013).

Table 5 – Soil Criteria (mg/kg)

Analyte	ASC NEPM 2013 HIL D Commercial/ Industrial	ASC NEPM 2013 HSLs for Vapour Intrusion Commercial/ Industrial			CRC Care (2011) SHSL for Direct Contact Commercial/ Industrial	ASC NEPM 2013 ESLs Commercial/ Industrial	ASC NEPM 2013 Site Specific EILs Commercial/ Industrial[7]	ASC NEPM 2013 Management Limits for TPH fractions Commercial/ Industrial
		Sand	Silt	Clay				
BTEX								
Benzene	-	3[17]	4/4/6/10[19]	4/6/9/20[21]	430	75/95[23]	-	-
Toluene	-	NL[19]	NL[20]	NL[22]	99,000	135[25]	-	-
Ethylbenzene	-	NL[19]	NL[22]	NL[24]	27,000	165/185[25]	-	-
Xylenes	-	230/NL[18]	NL[12]	NL[24]	81,000	180/95[25]	-	-

[17] HSLs for vapour intrusion assuming sandy soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[18] HSLs for vapour intrusion assuming sandy soil (0-1/1-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[19] HSLs for vapour intrusion assuming silty soil (0-<1m/1-<2m/2-<4m/4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[20] HSLs for vapour intrusion assuming silty soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[21] HSLs for vapour intrusion assuming clay soil (0-<1m/1-<2m/2-<4m/4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[22] HSLs for vapour intrusion assuming clay soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[23] TRH fractions BTEX in soil for (coarse/fine) soil and Commercial/Industrial land use (ASC NEPM, 2013).

Table 5 – Soil Criteria (mg/kg)

Analyte	ASC NEPM 2013 HIL D Commercial/ Industrial	ASC NEPM 2013 HSLs for Vapour Intrusion Commercial/ Industrial			CRC Care (2011) SHSL for Direct Contact Commercial/ Industrial	ASC NEPM 2013 ESLs Commercial/ Industrial	ASC NEPM 2013 Site Specific EILs Commercial/ Industrial[7]	ASC NEPM 2013 Management Limits for TPH fractions Commercial/ Industrial
		Sand	Silt	Clay				
Polycyclic Aromatic Hydrocarbons (PAHs)								
Benzo(a)pyrene	-	-	-	-	11,000	1.4[27]	-	-
Benzo(a)pyrene TEQ (WHO)	40	-	-	-	-	-	-	-
Total PAH	4,000	-	-	-	-	-	-	-
Naphthalene	-	NL[24]	NL[25]	NL[26]	-	-	370	-
Phenols								
Phenol	240,000	-	-	-	-	-	-	-

[24] HSLs for vapour intrusion assuming sandy soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[25] HSLs for vapour intrusion assuming silt soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[26] HSLs for vapour intrusion assuming clay soil (0-4m+) and Commercial/Industrial land use (ASC NEPM, 2013).
[27] TRH fractions Benzo(a)pyrene in soil for (coarse/fine) soil and Urban Residential and Public Open Space land use (ASC NEPM, 2013).

6.4 Soil Vapour Remediation Criteria

For the purposes of assessing the results of analytical testing of vapour samples at the Site, the following soil vapour remediation criteria in Table 6 were adopted:

Table 6 – Soil Vapour Remediation Criteria (mg/m^3)

Analyte	ASC NEPM 2013 Soil Vapour HSLs for Vapour Intrusion HSL D - Commercial/ Industrial (mg/m^3)														
	Sand					Silt					Clay				
Depth	0m to <1m	1m to <2m	2m to <4m	4m to <8m	8m+	0m to <1m	1m to <2m	2m to <4m	4m to <8m	8m+	0m to <1m	1m to <2m	2m to <4m	4m to <8m	8m+
Toluene	4,800	16,000	39,000	84,000	NL	5,700	63,000	NL	NL	NL	6,500	100,000	NL	NL	NL
Ethylbenzene	1,300	4,600	11,000	25,000	53,000	1,500	19,000	54,000	NL	NL	1,800	31,000	NL	NL	NL
Xylenes	840	3,200	8,000	18,000	37,000	1,000	13,000	38,000	NL	NL	1,200	21,000	NL	NL	NL
Naphthalene	3	15	35	75	150	4	50	150	350	750	4	85	240	560	1,200
Benzene	4	10	30	65	130	4	50	140	320	670	5	80	230	530	1,100
TRH F1	680	2,800	7,000	15,000	32,000	850	11,000	33,000	77,000	160,000	1,000	19,000	55,000	130,000	270,000
TRH F2	500	2,400	NL	NL	NL	670	NL	NL	NL	NL	800	NL	NL	NL	NL

6.5 Groundwater Remediation Criteria

An assessment of environmental values to be protected at the Site and the associated Groundwater Investigation Levels which are required to be applied was undertaken as per DEC NSW (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*.

For the purposes of assessing the results of analytical testing of groundwater at the Site, the following guidelines were considered:

- NSW DEC (2006) Guidelines for the NSW Auditor Scheme (Second Edition);
- NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure (ASC NEPM) officially approved by the Standing Council of Environment and Water (SCEW) on 11 April 2013;
- (ANZECC/ARMCANZ 2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000;
- (NHMRC 2011) Australian Drinking Water Guidelines, National Health and Medical Research Council; and
- (DEC 2007) Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW DEC, March 2007.

In accordance with NSW (DEC, 2007), the NSW EPA regards aquatic ecosystems and drinking water as default criteria in all preliminary assessments of groundwater contamination. Where the default criteria are exceeded, additional investigations may be required. Where no criterion is available, the background levels (if known) or the laboratory limit of reporting can be adopted as the groundwater criteria.

The adopted groundwater remediation criteria are presented in **Table 7** below. Given that the closest open water sensitive receptors are fresh water, fresh water criteria were adopted.

Table 7 – Groundwater Criteria (mg/L)		
Analyte	**ASC NEPM GILs – Fresh Water[28] (µg/L)**	**ASC NEPM GILs - Drinking Water[29] (µg/L)**
Metals		
Arsenic	24 (III) / 13 (V)	10
Cadmium	0.2	2
Chromium	1 (VI)	50 (VI)
Copper	1.4	200
Nickel	11	20
Lead	3.4	10
Zinc	8	-
Mercury (Total)	0.06[30]	1
Petroleum Hydrocarbons		
C6-C10 fraction	600[31]	-
>C6-C10 fraction (F1)	-	-
>C10-C16 fraction (F2)	-	-
BTEX		
Benzene	950	100
Toluene	-	800
Ethylbenzene	-	300
Xylenes	-	600
Xylenes (o)	350	-
Polycyclic Aromatic Hydrocarbons		
Naphthalene	16	-
Anthracene	0.1[32]	-
Phenanthrene	0.6[37]	-
Fluroanthene	1	-
Benzo(a)pyrene	-	0.01

[28] ASC NEPM (2013) Fresh Water GILs.

[29] ASC NEPM (2013) Drinking Water GILs.

[30] Low reliability trigger values (95% level of protection) from Volume 2 of ANZECC (2000).

[31] Netherlands Intervention Value for Mineral Oil (2000).

[32] Low reliability trigger values from Volume 2 of ANZECC (2000); ANZECC (2000) 99% protection level due to potential for bio accumulation or acute toxicity to particular species.

7 Remediation Objectives and Options

7.1 Remediation Objectives

The remediation objectives are outlined as follows:

- Undertake remediation to render the Site suitable for the proposed commercial development;
- Validate the remedial works in accordance with the relevant guidelines; and
- Document the validation process.

7.2 Remedial Options

Site Infrastructure

For the Site to be remediated removal the two Underground Storage Tanks ('USTs') with their associated infrastructure will be required. The approximate location of the USTs at the Site and underground services is presented in **Figure 2.** Insitu decommissioning of the two USTs was undertaken by PB in 2002, however the USTs remain in place. Disposal of the USTs should be undertaken in accordance with AS 4976-2008 to an appropriately licensed facility.

Site Soils

Remediation and/or management of the contaminated soils are required so that the Site does not pose an unacceptable risk to human and ecological health with respect to the proposed commercial land use.

Remedial options that may achieve the remedial objectives are listed in the following order in DEC, *Guidelines for the NSW Auditor Scheme,* 2006:

- On-Site treatment utilising in-situ bioremediation.
- On-Site treatment utilising ex-situ bioremediation and/or volatilization.
- Off-Site disposal to licensed disposal facility.
- Consolidation and isolation onsite by engineered barrier containment.

An assessment of the suitability of landfarming to remediate petroleum hydrocarbon impacted soils was undertaken in accordance with the NSW EPA (2014) Best Practice Note: Landfarming as summarised in **Table 8** below.

Table 8 – Assessment of the Suitability of Landfarming	
Factor	**Assessment of Suitability**
Contaminant Types	Predominately higher chain petroleum hydrocarbons requiring remediation were found in Site soils and therefore will take a longer time to biodegrade.
Contaminant Concentrations	TPH concentrations have been observed at levels below 8% and are therefore considered suitable for landfarming.
Volume of contaminated soils	The volume of petroleum hydrocarbon impacted soil requiring remediation has not been estimated, although it is considered to be low due to the impacts identified in isolated hot-spots across the Site. The maximum concentrations of TPH have been recorded at relatively low levels.
Site Area	The Site is approximately 1,600 m^2 in size with the building structures on Site covering the majority of the area. The Site is also located adjacent to a main arterial road with surrounding land use consisting of a mix a commercial, industrial and residential land use. Lockable fencing separates the front portion of the Site to the rear.
Site topography	The topography of the Site is relatively flat with an approximate elevation of 9 mAHD.
Local geology	As the Site is underlain by sandy silt, sandy silty clay and silty clays, the landfarm will be located on a temporary impermeable layer and bunding forming an impermeable base.
Hydrogeology	Groundwater has been identified within the residual soil aquifer across the Site at depths ranging from 0.62 m to 1.16 m btoc with a low linear groundwater velocity to the east south east. The closest sensitive receptor is located adjacent to the eastern Site boundary.
Meteorology	As the source consists of higher chained hydrocarbons (waste oil) the risk of volatilisation and generation of odours is considered to be low. Predominate wind direction at the Site during the year is generally from the south east with the exception of June to August when it is from the north west[33]. A copy of the windrose for the area of Newcastle showing the predominant annual wind is obtained in **Appendix A**.
Time	Given that the concentrations of TRH in soils are low; the height of the landfarm can be kept low; the soils may be retained within the boundary of the Site and will be validated against commercial/industrial criteria, reasonable time frames for remediation can be achieved.
Cost	Given the location of the Site with respect to licensed, controlled waste

[33] Windrose information obtained from the Bureau of Meteorology, Climate statistics for Australian locations website http://www.bom.gov.au/climate/averages/tables/cw_061055.shtml

Table 8 – Assessment of the Suitability of Landfarming	
Factor	**Assessment of Suitability**
	facilities lawfully able to accept the waste and the cost of transport and tip fees, landfarming is considered to be a cost effective remediation option.

In summary, given that the TRH impacted soils are predominantly higher chain with concentrations relatively low and therefore unlikely to generate a significant odour problem that cannot be managed, landfarming is considered a viable option.

In order to determine the optimal remediation approach in accordance with the hierarchy above, and with consideration to the assessment in **Table 8** , the following remedial options were reviewed:

- Excavation and off-Site disposal to a waste management facility lawfully permitted to accept the materials.
- Excavation, stockpiling and bioremediation.
- In-situ chemical oxidation.

The three options were assessed with consideration to minimising risk to human health and the environment. A summary of the three options including an assessment of the advantages and disadvantages is presented in **Table 9** below.

Table 9 – Comparison of Remedial Options

Option	Strategy	Advantages	Disadvantages	Option Comparison
1. Excavation and off-Site disposal to a waste management facility lawfully permitted to accept the materials.	Source Removal	• Removes potential future liability. • Mitigates exposure pathways to future Site users and occupiers of adjacent land. • No ongoing management required.	• Soil would need to be classified as a waste. • Not environmentally sustainable with excessive use of landfill space and a large carbon footprint. • Potential to generate odours and dust. • High up front cost.	• Least environmentally sustainable option with the greatest financial cost.
2. Excavation, stockpiling and bioremediation.	On-Site treatment of contamination	• No off-site disposal of spoil to landfill. • Mitigates exposure pathways to future Site users and occupiers of adjacent land. • Sufficient space is available for the stockpiled material to be placed in a bioremediation pad within the portion of the Site proposed for the Wastewater Treatment Plan. • No ongoing management required. • Environmentally sustainable.	• Longer remediation time period required given that some higher chain hydrocarbons are encountered. • Management of odours and dust required.	• Environmentally sustainable and economical.
3. In-situ chemical oxidation	On-Site containment	• No off-site disposal of spoil to landfill. • Mitigates exposure pathways to future Site users and occupiers of adjacent land. • Environmentally sustainable.	• May not address areas with LNAPL.	• Environmentally sustainable but may not be effective in addressing source areas where LNAPL is present.

8 Remediation Strategy

8.1 Preferred Remedial Strategy

Based on the three feasible remedial options presented in **Table 9**, the first option (*Option 1*) to dispose of the contaminated fill to landfill is the most expensive and least environmentally sustainable option.

The second option (*Option 2*) to excavate, stockpile and biopile is considered to be the most cost effective and sustainable option for petroleum hydrocarbon impacted soils given the limited extent of impact and the available Site area.

The third option (*Option 3*) of in-situ chemical oxidation would not likely be effective in source zone areas where LNAPL is present.

This assessment is based on the lowest potential impact on the community, highest environmental sustainability and net cost-benefit and is in accordance with the hierarchy for preferred remedial options. Therefore it is considered that the preferred remedial strategy for the Site to excavate, stockpile and biopile the contaminated soil on-Site (*Option 2*).

8.2 Remedial Option Scope

The scope of work associated with the preferred remedial option can be broken down into the following stages:

1. Assigning roles and responsibilities.
2. Regulatory approval and Licensing.
3. Preparation of construction (short-term) management controls, Work Health Safety ('WHS') plans, Construction Environmental Management Plan ('CEMP').
4. Site establishment.
5. Removal of USTs at the Site.
6. Excavation of petroleum hydrocarbon impacted soils.
7. Validation of the petroleum hydrocarbon excavation areas.
8. Stockpiling TRH impacted soils and construction and operation of a biopile located at the Site.
9. Validation and classification of remediated soils for potential re-use at the Site.
10. Demobilisation.

8.3 Assigning Roles and Responsibilities

For the purposes of the remedial work the roles and responsibilities are presented in **Table 10**.

Table 10 – Roles and Responsibilities

Role	Party	Responsibilities
Principal/Owner	Stevens Holdings Pty Ltd/Mayfield Super Fund	To engage the consultants and contractors and undertake all stakeholder management.
Contractor	TBC[34]	To carry out the civil works associated with the remediation and ensure compliance with WHS controls and the CEMP. Require contractors to maintain written records of activities undertaken each day and manage any unexpected findings.
Environmental Consultant	EP Risk Management Pty Ltd	• To validate all excavations and remediated soils. • To prepare a validation report.

8.4 Regulatory Approval and Licensing

The work should be undertaken with all due regard to the minimisation of environmental effects and to meet all statutory requirements, including provisions specified in:

- Environmental Planning and Assessment Act 1979.
- State Environmental Planning Policy 55 ('SEPP55') Remediation of Land.

The proposed remediation works at the Site are considered to comprise Category 2 works as defined in Clause 9 of SEPP55 based on the following:

- The work is not a designated development, as soil quantities and areas less than 30,000m^3 and 3 hectares.
- The work is not to be carried out on land declared critical habitat.
- The work is not likely to have a significant effect on a critical habitat or threatened species, population or ecological community.
- The work proposed falls within the Part 3A planning framework and requires Part 3A planning approval.
- The work is not to be carried out in an area where any of the following classifications apply: coastal protection, conservation or heritage conservation, habitat area, habitat protection corridor, environment protection, escarpment, escarpment protection or escarpment preservation, floodway, littoral rainforest, nature reserve, scenic area or scenic protection, wetland.

[34] To be confirmed

- The work will be carried out in accordance with all applicable policies.

SEPP 55 requires:

- Notification of the proposed remediation works is to be provided to Council 30 days prior to the commencement of remediation.
- Remediation works to be carried out in accordance with the Contaminated Land Planning Guidelines (DUAP, 1998), with the guidelines published under section 105 of the Contaminated Land Management Act 1997, and with a plan prepared under the Contaminated Land Planning Guidelines (DUAP, 1998), i.e. this RAP.
- Notification of completion is to be provided to the local Council within 30 days of Completion.

Removal of USTs at the Site should be undertaken in accordance with the requirements of the following:

- Clause 174ZF of the Occupational Health and Safety Regulation 2001: Cleaning or decommissioning plant, equipment and containers.
- Code of Practice: Storage and handling of dangerous goods (NSW WorkCover Authority 2005).
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008.
- AS1940–2004: Storage and handling of flammable and combustible liquids (AS 2004).
- AS4976–2008: Removal and disposal of underground petroleum storage tanks (AS 2008).

8.5 Preparation of Construction Management Plans

Prior to commencing the remedial works, all documentation must be finalised with staff and any other affected stakeholders informed. The likely documentation required would include:

- All regulatory and landowner approvals and notifications.
- Up to date insurance certificates.
- A WHS Plan including and Emergency Response Procedures, to manage the civil works.
- CEMP.
- A Construction Quality Assurance Plan.

8.6 Site Establishment

Following approval of all the required documentation the contractor can mobilise all plant, equipment and amenities as required, to complete the remedial works.

The works areas must be delineated with temporary fencing with adequate warning signage and restricted access including the adoption of appropriate induction procedures.

8.7 Removal of USTs at the Site

Decommissioning of two USTs located at the Site was undertaken in May of 2002 by Coast and Valley which involved the removal of any remaining petroleum fuel from within the tanks and filling them with lean mix concrete. It is understood that the USTs were formally abandoned on the 20th July 2002.

For the Site to be remediated and to facilitate future re-development, removal the two USTs with their associated infrastructure will be required. Validation of the tank pit and classification of the excavated tankpit soils would also be required.

8.8 Excavation of TRH impacted Soil

The civil/remediation contractor will be required to develop the methodology for the works which should include at a minimum the following:

- All necessary environmental controls conforming at a minimum with those outlined in the CEMP are to be implemented prior to commencing the remedial works and appropriately maintained throughout the works period.
- All excavation, loading and transport of soil must be undertaken in a manner to minimise the generation of dust, potential odours and cross-contamination of uncontaminated areas of the Site.
- Monitoring for potential odours at the Site boundary.
- Odour suppressant will be sprayed on open excavations (if required) and stockpiles and the stockpiles will be covered with thick plastic.
- Excavations will be inspected by a suitably experienced environmental engineer/scientist to confirm that the visual and olfactory characteristics of the excavated materials are consistent with the remediation criteria.
- Where field screening identifies potentially contaminated soil in the walls or base of the excavation, additional chase out of impacted soil will be undertaken.
- Imported fill for backfilling the excavations may include Excavated Natural Material ('ENM') or Virgin Excavated Natural Material ('VENM') and should be characterised in accordance with remediation criteria or the revised ENM exemption (2012) as appropriate prior to being imported to Site.

The approximate extent of known soil contamination identified at the Site requiring excavation is presented in **Figure 7**.

8.9 Stockpiling and Operation of a Biopile

The excavated petroleum hydrocarbon impacted material will be stockpiled and a biopile constructed. The principles of biopiling involve the optimisation of conditions to promote aerobic bacteria to biodegrade the petroleum hydrocarbons. In order to achieve optimum conditions, aerobic microbial activity is stimulated through aeration and/or the addition of nutrients and moisture. The civil/remediation contractor will finalise the design of the biopile which will likely include the following:

- Constructions of an impermeable layer beneath to prevent leaching from the biopile with appropriate capacity for collection of leachate and prevent sediment migration.
- Placement of impacted soils in piles no greater than 0.5 m to 1.0 m high and 2.5 m wide.
- Regular irrigation of water over the biopile to maintain optimal moisture conditions. Addition of nutrients as appropriate.
- Regular tilling of the soil will be undertaken for aeration.
- Implementation of control measures to prevent the generation of odours and dust.
- Monitoring of odours at the Site boundary.

8.10 Groundwater Remediation

The methodology to remediate petroleum hydrocarbon impact to groundwater can be summarised as follows:

- Removal of primary sources of petroleum hydrocarbon impact including the USTs and associated infrastructure.
- Excavation of secondary impacted soils in the vicinity of the identified hot spots to the extent practicable.
- Replacement of any wells destroyed during the remediation works and the implementation of a program of monitored natural attenuation for any residual petroleum hydrocarbon (if required).

8.11 Contingencies

The following contingences presented in **Table 11** should be considered for unexpected findings and issues.

Table 11 – Remediation Contingencies

Anticipated Issues	Actions
Surplus material requiring off-Site disposal	Any materials to be disposed of off-Site must be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines Part 1: Classifying Waste, for off-Site disposal to a waste management facility lawfully permitted to accept the materials.
Additional tanks are discovered during excavation and construction works.	If any additional USTs are encountered during remediation works then they will be removed in accordance with WorkCover NSW Code of Practice: Storage and Handling of Dangerous Goods and Australian Standard (AS) 1904-2004: Storage and Handling of flammable and combustible liquids. The USTs will be disposed in accordance with AS 4976-2008 to an appropriately licensed facility.
Removal of building	Should the building currently on-Site be removed as part of the redevelopment process, additional sampling of the building footprint and areas of concern will be required.
Additional contamination is identified beneath building footprints or in between sampling locations.	Should any contamination not identified in the DSI (EP Risk, 2015) be uncovered then an unexpected finds protocol should be adopted by the civil contractor. The unexpected finds protocol is contained in **Appendix B**.
Contaminated soil is found to have migrated off-Site beyond the Site boundaries.	Excavate to the extent practicable at the Site so as not to compromise the structural integrity of off-site structures. Undertake additional delineation of soil impact off-Site (subject to approval from off-Site land owners). Should additional soil impact be detected off-site then additional vapour sampling, health risk assessment, remediation and/ or on-going management may be required.
Residual Contamination to soil or groundwater cannot practically be removed due geotechnical or structural integrity issues.	Undertake a human health risk assessment to assess the risk posed by the residual contamination.
Contaminated groundwater is found to have migrated off-Site beyond the Site boundaries.	Undertake additional delineation of groundwater impact off-Site (subject to approval from off-Site land owners). Should additional groundwater impact be detected off-Site then additional vapour sampling, health risk assessment, remediation and/or on-going management may be required.
Residual LNAPL remains in monitoring wells after the completion of source removal	An assessment of the LNAPL transmissivity will be undertaken to determine the recoverability of LNAPL at the Site. A human health risk assessment will be undertaken to

Table 11 – Remediation Contingencies	
Anticipated Issues	**Actions**
works.	determine the risk of the residual LNAPL to potential exposed receptors.
Material imported into the Site does not meet the criteria for ENM/VENM	Inspect, collect and analyse samples of the imported material from the source site prior to importing to the Site. Visually inspect each load imported into the Site to confirm it originated from the source site.
Changes in future land use for the Site	Should the proposed land use change then the RAP should be revised to ensure that the adopted remedial option is suitable for the intended use.
Odours/vapours at the Site boundary	It is unlikely that odours will cause a nuisance to Site workers or neighbors; however odours should be monitored at the Site boundary. If excessive organic vapours are generated then stop works and undertake air monitoring. Control measures such as respirators for Site workers, odour suppressants should be considered.
Heavy rain or flooding	Construct sediment and surface water controls prior to commencing works.
Water accumulating in excavations	Collect and analyse samples from the ponded water and determine disposal options based upon an assessment of the results.
Noise levels exceeding applicable criteria	Monitor noise levels during the works and implement mitigation measures if exceedances of the adopted criteria are recorded.

9 Validation of Remedial Works

9.1 Data Quality Objectives

In order to ensure an appropriate sampling strategy is adopted for the Validation Assessment, EP Risk has adopted the Data Quality Objectives ('DQOs') planning process as recommended in the ASC NEPM (2013), required within the DEC (2006) and with consideration to technical details outlined in US EPA (2006) and AS 4482.1.

State the Problem

Previous assessments undertaken at the Site, by PB (2002) and EP Risk (2015) identified elevated petroleum hydrocarbon impact to soil in isolated areas across the Site. LNAPL of an approximate thickness of 0.1 m was also identified in a GW monitoring well (HA) at the Site.

The potentially contaminated media at the Site includes soil, groundwater, storm water and soil vapour. The potential receptors include current Site users, sub-surface maintenance workers and customers; future commercial Site users, visitors and construction and maintenance workers; small open water body located to the east; open storm water drainage channel adjacent to the eastern Site boundary; SEPP 14 Coastal Wetlands to the south-east and SEPP 71 Coastal Protection Zone to the south west of the Site.

Data gaps include off-Site delineation of soil and groundwater impact located in the south eastern (HA) and the south western (H1) corners of the Site as well as inaccessible areas beneath building footprints.

The problem to be addressed is that to facilitate the proposed re-development, the Site requires remediation / management to ensure that there is no current or future ecological or health risk posed to future Site users or occupiers.

Identify the Decision

The decision entails whether remediation of the impacted soil/groundwater can render the Site suitable for the proposed redevelopment. Based on the remediation options review, it is considered that this will be best achieved by removal of the USTs, excavation of impacted soils to the extent practicable, on-Site bioremediation and monitored natural attenuation of any residual petroleum hydrocarbon impact to groundwater.

Identify Inputs into the Decision

The inputs required to make the decision include the following:

- Results of analytical testing of the CoPC in soil and remediated soil.
- Results of analytical testing of the CoPC in groundwater.
- Results of analytical testing of CoPC in soil vapour (if required).

Define the Boundaries of the Study

The spatial boundaries of the assessment comprise Lot 1 in Deposited Plan 1135801 and Lot A in Deposited Plan 389480 with a maximum proposed depth for the investigation has been set at 5 mbgs with the approximate boundaries identified in **Figure 1**.

The temporal boundaries were determined on the basis that the previous data collected by PB (2002) will be relied upon for the purposes of the investigation. The temporal boundary from 2002 to the current investigation was adopted.

A number of practical constraints to collecting the data exist within the areas of the Site including the location of buildings and structures.

Develop a Decision Rule to Identify the Decision

The Remediation Criteria for the contaminants of concern are presented in Section 6. These criteria have been used as screening levels to determine whether additional assessment is required. The following decision statements for analysis of the results were adopted with respect to the adopted criteria:

Soil Health-Based Remediation Criteria

I. Where the data sets are not sufficiently populated to allow calculation of the 95% Upper Confidence Limit ('UCL_{mean}') then the individual results must be less than the adopted criteria. If all the individual results are below the adopted criteria then no additional assessment and/or management is required. Where individual results exceed that adopted criteria, then further assessment and/or management is required.

II. In accordance with the ASC NEPM (2013), where 95% UCL_{mean} of the average concentration for each soil analyte can be calculated, then the 95% UCL_{mean} must be below the adopted criteria; no single analyte concentration exceeds 250% of the adopted criteria; the standard deviation of the results must be less than 50% of the adopted criteria; and the normal distribution will only be used where the coefficient of variance is not greater than 1.2. Where 95% UCL_{mean} results exceed the aforementioned criteria, then further assessment and/or management is required.

Soil Ecological-Based Remediation Criteria

The same approach as adopted above for assessment against health-based criteria will also be applied to the assessment against ecological criteria. However, where exceedances are observed, the data will also be compared to published background levels which, if exceeded, will require further assessment and/or management.

Groundwater Remediation Criteria

I. Measurement of any LNAPL within the wells to demonstrate that it is not present or has been cleaned up to the extent practicable.

II. Where residual LNAPL is found at the completion of remediation works, then LNAPL transmissivity testing will be undertaken to determine the recoverability of the LNAPL.

III. Where LNAPL is not present, assessment of each groundwater analyte result will be made against the adopted criteria with consideration to the proposed land use and environmental receptors. If all the individual results are below the adopted criteria then no additional assessment and/or management is required.

IV. Where exceedances of the adopted criteria are observed then an assessment of upgradient versus downgradient concentrations over time as well as a regression analysis will be undertaken to determine the requirement for additional assessment and/or management as well as the requirement for ongoing monitored natural attenuation.

Soil Vapour Remediation Criteria

I. Assessments of each soil vapour analyte against the adopted soil vapour criteria with consideration to the proposed land use and environmental receptors. If all the individual results are below the adopted criteria then no additional assessment and/or management is required.

Specify Acceptable Limits of Decision Errors

The acceptable limits will be as follows:

I. Individual or 95% UCL_{mean} soil concentrations are below the adopted criteria.

II. No LNAPL is present.

III. If LNAPL is identified, then it must be demonstrated that the LNAPL plume is not expanding and that LNAPL transmissivity testing identifies low recoverability of the LNAPL to confirm clean up to the extent practicable.

IV. Individual groundwater dissolved phase concentrations are below the adopted criteria.

V. Monitored natural attenuation results of dissolved phase concentrations indicate that the mass is degrading.

VI. Individual soil vapour concentrations are below the adopted criteria or do not pose an unacceptable risk to human health or the environment.

VII. Should exceedances of Remediation Criteria be identified then a Site specific health risk assessment would be undertaken to if the residual concentrations of the CoPC present a risk of harm to human health or the environment with respect to the Proposed Development.

VIII. 95% of the data will satisfy the Data Quality Indicators (‘DQIs’) which were determined for completeness, representativeness, precision and accuracy of both field and laboratory data. Therefore the limit on the decision error will be 5% that a conclusive statement may be incorrect.

IX. A comprehensive Quality Assurance/Quality Control (‘QA/QC’) program will be undertaken including representative sampling and sampling at an appropriate density for the purpose of the investigation.

The acceptable limit of error for sampling techniques and laboratory analysis is defined by the DQIs as follows:

Data Representativeness

Expresses the accuracy and precision with which sample data represents an environmental condition. Data representativeness is achieved by the collection of samples at an appropriate pattern and density as well as consistent and repeatable sampling techniques and procedures.

Completeness

Refers to, the percentage of data that can be considered valid data. Sufficient data is required to enable an assessment of the Decision Rules.

Comparability

A qualitative comparison of the confidence with which one data set can be compared to another. This is achieved through consistent sampling and analytical testing and reporting techniques.

Precision

Is a measure of the reproducibility of on measurements under a given set of conditions the Relative Percent Difference ('RPD') has been adopted to assess the precision of data between duplicate sample pairs according to the following equation.

$$RPD\% = \frac{[\mathrm{Cp} - \mathrm{Cd}]}{\mathrm{Cp} + \mathrm{Cd}} \times 200$$

Where:
Cp = Primary sample
Cd = Duplicate Sample

An acceptance criterion of ±30% had been adopted for inorganic field duplicates and triplicates and ±50% for organic field duplicates and triplicates. However, it should be noted that exceedances of these criteria are common for heterogeneous soil or fill or for low analyte concentrations.

Accuracy

Is a measure of the bias in the analytical results and can often be attributed to: field contamination; insufficient preservation or sample preparation; or inappropriate analytical techniques. Accuracy of the analytical data is assessed by consideration of laboratory control samples, laboratory spikes and analytical techniques in accordance with appropriate standards. Accuracy of the fieldwork is assessed against an assessment of field blank, field trip and rinsate results.

Optimise the Design for Obtaining Data

A number of potentially contaminating activities, historical and current, have been undertaken at the Site associated with the operation of the Site as a mechanical repair facility.

A systematic and target based validation sampling pattern is proposed based on a visual inspection and field screening of the Site. A comprehensive suite of CoPC was selectively adopted for

assessment to provide characterisation of the status of soil contamination (if any). The adopted sampling approach is consistent with AS4482.1 (2005) and the objectives of the assessment.

9.2 Data Quality Indicators

The data quality objectives, requirements and indicators for the assessment are presented in **Table 12** below.

Table 12 – Data Quality Objectives, Requirements and Indicators

Data Quality Objective	Requirement	Data Quality Indicator
Precision		
Intra-laboratory Duplicates	1 per 20 samples	RPDs < 50%
Inter-laboratory Duplicates	1 per 20 samples	RPDs < 50%
Laboratory Duplicates	Minimum of 1 per batch per analyte.	RPDs < 50%
Accuracy		
Laboratory Matrix Spikes	1 per batch per volatile/semi-volatile analyte	Recoveries 50% to 150%
Laboratory Surrogate Spikes	1 per volatile/semi-volatile analyte sample (as appropriate)	Recoveries 70% to 130%
Laboratory Method Blanks	At least 1 per batch per analyte tested for	Result < Limit of reporting
Laboratory Control Samples	At least 1 per batch per analyte tested for	Result < Limit of reporting
Trip Blanks	1 per lab batch for volatile analytes	Result < Limit of reporting
Trip Spikes	1 per lab batch for volatile analytes	Recoveries 60-100%
Representativeness		
Sampling methodology	Appropriate for the sample type and analytes	Meet Requirement
Samples extracted and analysed within holding times	Specific to each analyte	Meet Requirement
Comparability		
Sampling approach	Consistent for each sample	Meet Requirement
Analysis methodology	Consistent methodology for each sample	Meet Requirement
Handling conditions and sampler	Consistent for each sample	Meet Requirement
Field observations and analytical	Field observations to support analytical results	Meet Requirement
Consistent laboratory Limit of Reporting (LOR)	Consistent between primary and secondary laboratories	Meet Requirement
Completeness		
Chain of Custody Documentation	Appropriately completed	Meet Requirement

Table 12 – Data Quality Objectives, Requirements and Indicators		
Data Quality Objective	**Requirement**	**Data Quality Indicator**
Field Sampling Documentation	Appropriately completed	Meet Requirement
Satisfactory QA/QC procedures	In accordance with relevant guidance	Meet Requirement

9.3 Validation Works

The methodology to validate all soils which will remain on the Site will be undertaken according to the methodology in the sections below.

9.4 General Excavations

Validation of excavations will be undertaken according to the following methodology:

- One sample will be collected from every 10 lineal metre of excavation wall.
- Additional samples will be taken from each soil horizon visible on the excavation walls with sampling targeted of more permeable layers.
- On sample will be taken from every 25 m^2 of excavation base.
- All samples will be screened with a Photoionisation detector (PID).
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals and Phenols where waste oils had been used or stored and TRH (silica gel clean-up), BTEX, PAH and lead for areas where petrol and diesel had been stored.

9.5 Building Footprints

- Validation beneath building footprint areas will be undertaken by means of test pitting using a grid-based sampling program at a density in accordance with the NSW EPA (1995) Sampling Design Guidelines.
- Samples will be collected from 0 – 0.1 m, 0.5 m, 1 m and every metre thereafter until a maximum depth of 3 m.
- All samples will be screened with a PID.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals, Phenols and asbestos.

9.6 Tankpit Excavations

Validation of tankpit excavations will be undertaken according to the following methodology:

UST length < 4 m in Length

- At least one sample will be collected from the centre of the tankpit base.
- At least one sample will be collected from each of the four tankpit walls. Additional samples will be collected where different soil horizons are observed with sampling targeted to more permeable layers.
- All samples will be screened with a PID.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals, Phenols for waste oil USTs.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH and lead for petrol and diesel USTs.

UST length 4 m-10 m in Length

- At least two samples will be collected from under each end of the tankpit base.
- At least two samples will be collected from each of the four tankpit walls. Additional samples will be collected where different soil horizons are observed with sampling targeted to more permeable layers.
- All samples will be screened with a PID.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals, Phenols.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH and lead for petrol and diesel USTs.

UST length >10 m in Length

- At least three samples will be collected from under each end of the tankpit base.
- At least three samples will be collected from each of the four tankpit walls. Additional samples will be collected where different soil horizons are observed with sampling targeted to more permeable layers.
- All samples will be screened with a PID.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals, Phenols for waste oil USTs.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH and lead for petrol and diesel USTs.

9.7 Bowsers, fill points and fuel lines

Validation of bowser and fuel line excavations will be undertaken according to the following methodology:

- One sample beneath the location of each bowser and analysed for TRH (silica gel clean-up), BTEX, PAH and lead.
- One sample for every 5m of fuel line and analysed for TRH (silica gel clean-up), BTEX, PAH and lead.
- One sample beneath each remote fill point and analysed for TRH (silica gel clean-up), BTEX, PAH and lead.

9.8 Remediated Soils

Validation of remediated soils will be undertaken according to the following methodology:

- One sample will be collected from every 25 m^3 of stockpile volume up to a volume of 200 m^3.
- For stockpile volumes greater than 200 m^3, eight samples will be collected for the first 100 m^3 and one sample for every 100 m^3 thereafter.
- All samples will be screened with a PID.
- All samples will be selectively analysed for TRH (silica gel clean-up), BTEX, PAH, Metals, Phenols.

9.9 Imported Fill

Validation of any VENM imported to Site to backfill excavations will be undertaken according to the following methodology:

- The material will be inspected for visual signs of potential contamination.
- All samples will be screened with a PID.
- One sample will be collected from every 100 m^3 of stockpile volume with a minimum of four primary samples collected.
- All samples will be analysed for TRH (silica gel clean-up), BTEX, PAH, OCPs, OPPs PCBs, asbestos and heavy metals (As, Cd, Cr, Cu, Pb, Ni, Hg and Zn).

Imported ENM materials should be analysed in accordance with the NSW EPA (2012) Excavated Natural Material Exemption.

During sampling, the following methodology as a minimum should be adopted:

- All field equipment should be calibrated prior to use.
- All sampling equipment should be decontaminated with phosphate free detergent prior to and in between sampling events.

- Samples should be placed into appropriately prepared sampling jars provided by the laboratory and stored in a chilled esky for transport to the laboratory.
- A chain of custody document should be filled out listing unique identification names for each sample and the analytical testing required.
- QA/QC sampling should include i) Blind and Split duplicate samples at a rate of 1 in 20. ii) One rinsate sample per day of sampling. iii) One trip blank sample and one trip spike sample per batch.

Alternatively, material cut from the Site that meets the VENM / ENM criteria can be used to backfill excavations.

9.10 Validation of Groundwater

Validation of groundwater will be undertaken as follows:

- Replacement of any monitoring wells destroyed during excavation works and installation of monitoring wells off-Site to delineate the off-Site plume (subject to approval from off-Site land owners). All wells will be surveyed including the top of casing elevation and geographical co-ordinates.
- Gauging of all monitoring wells for the presence of LNAPL. Should LNAPL be identified then LNAPL transmissivity testing will be undertaken.
- Sampling of all monitoring wells not containing LNAPL and analytical testing for TRH, BTEX, PAH, lead as well as additional monitored natural attenuation parameters nitrate, ferrous iron, dissolved methane, manganese and sulfate as well as field parameters including redox, pH, electrical conductivity, dissolved oxygen and temperature.
- Should concentrations of the CoPC exceed the adopted criteria then a Groundwater Management Plan ('GMP') will be developed detailing the program for on-going monitored natural attenuation to demonstrate that the mass of dissolved phase contaminants is degrading.

9.11 Validation of Surface water

Given the close proximity of the off-site surface water drain to the eastern boundary, validation of surface water will be undertaken as follows:

- Inspection of the concrete stormwater channel walls and base for evidence of seepage and petroleum hydrocarbon staining.
- Collection of an upstream and downstream water sample from the stormwater channel and analytical testing for TRH, BTEX and PAH.

9.12 Validation of Soil Vapour

Should residual soil or groundwater petroleum hydrocarbon impact in excess of the adopted Remediation Criteria be identified at the completion of remediation works then validation of soil vapour will be undertaken as follows:

- Revision of the CSM to assess the potential exposure pathways via the inhalation pathway.
- Selection of soil vapour sampling locations based upon the revised CSM.
- Collection and analysis of vapour samples for the CoPC.

9.13 Validation Reporting

At the completion of the remedial works a Validation Report should be prepared in accordance with the requirements of the OE&H (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, including:

- A description of the works undertaken;
- A presentation of the laboratory analytical data;
- An assessment of whether the Site is suitable for commercial / industrial land-use; and
- Recommendations for further investigation and/or remediation works required at the Site (if required).

10 Construction Environmental Management Plan

10.1 Overview

A CEMP will be required for the remedial works (prepared by the contractor) prior to commencing the works.

A summary of the minimum environmental safeguards to be implemented during remediation works is provided.

10.2 Hours of Operation

Remediation works shall be undertaken as required during the following hours:

- Monday to Friday: 7:00 am to 5:00 pm.
- Saturday: 8:00 am to 1:00pm.
- Public Holidays and Sunday: No work permitted.

Emergency work is permitted to be completed outside of these hours.

10.3 Soil and Water Management

To prevent the migration of impacted soil off-Site, silt fences shall be constructed at the down-gradient boundaries of the works. Any material which is collected behind the sediment control structures shall be transported to the stockpile or biopile.

In a storm event, the structures located on-site for sediment control will need to be monitored and replaced or altered if necessary. Collected material will need to be managed in accordance with the remediation works.

10.4 Disposal of Contaminated Soil

Should there be surplus soil that cannot be accommodated within the site; the spoil will then need to be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste.

10.5 Site Access

During remediation works, the works area will need to be secured around the perimeter of the remediation area which will restrict access to the Site. Only authorised persons will be able to enter the Site.

10.6 Noise and Vibration

All machinery and equipment used on-site will be in good working order and will be fitted with appropriate silencers when necessary and all equipment will be operated in an efficient manner. The contractor will adopt suitable methodology to ensure that vibrations will not cause damage to structures located at the Site and on adjoining land.

10.7 Air Quality

Dust Control

Dust emissions should be confined within the Site boundary. The following dust control procedures will be employed to comply with this requirement as necessary:

- Covering of all stockpiles of contaminated soil remaining on-Site more than 72 hours.
- Keeping excavation and stockpile surfaces moist.

Odour Control

If significant odours are identified at the boundary of the Site, then appropriate actions will be taken to reduce the odours, which may include: increasing the amount of covering of excavations/stockpiles; mist sprays; odour suppressants or maintenance of equipment.

10.8 Imported Fill

Any materials which are imported onto the site (e.g. to backfill excavations) must be classified as VENM or ENM and an appropriate report for the material must be made available to the environmental consultant prior to importation of the material.

11 Health and Safety

Health and Safety during the remediation works will be the responsibility of the contractor, including the preparation of a Health and Safety Plan and a hazard assessment.

11.1 Worker Health and Safety Plan

A Worker Health and Safety Plan ('WHSP') will be prepared for the remedial works by the contractor. The purpose of the WHSP is to provide all relevant information to all Site personnel to ensure that they are aware of the hazards and the protective measures adopted to mitigate the identified hazards.

11.2 Hazard Assessment

All hazards associated with the remedial works should be identified by the contractors and incorporated into the WHSP.

11.3 Safe Work Practices

The WHSP will document all safe work practices required to protect personnel at the Site involved in the remedial works.

12 Conclusions

EP Risk was engaged by Stevens Holdings Pty Ltd ('Stevens') on behalf of The Trustee for Mayfield Super Fund to prepare a RAP for the remediation of petroleum hydrocarbon impacted soil and groundwater at 389-391 Pacific Highway, Belmont, NSW ('the Site'). The Site is known as Lot 1 in Deposited Plan 1135801 and Lot A in Deposited Plan 389480. The Site is approximately 1,600m² in size.

Previous investigations undertaken at the Site have identified petroleum hydrocarbon impacted soil and groundwater at isolated areas across the Site. It is considered that the impact is likely due to surface spills associated with the historical operations undertaken at the Site.

The RAP was commissioned to detail the preferred methodology to remediate petroleum hydrocarbon impacted soil and groundwater at the Site and has been undertaken in accordance with the requirements of State Environmental Planning Policy No. 55 ('SEPP 55').

The preferred remedial strategy adopted for the Site includes removal of all identified underground Storage tanks ('USTs') from the Site, excavation and landfarming of secondary impacted soils and monitored natural attenuation of any residual impact to groundwater. All excavations will be validated and with remediated soils classified against the adopted criteria.

EP Risk considers that following implementation of the remedial measures and associated activities documented in the RAP and provision of a validation report, the Site can be made suitable for the proposed redevelopment.

Figures

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 1 – Site Location

Approximate boundary

EP Risk Management
Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 49 13 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Job No: EP0194
Date: 5/03/2015
Drawing Ref: EP0194 Fig1_Site location
Version No: v1

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

EP Risk Management

Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 2 – Site Layout

Job No: EP0194
Date: 5/03/2015
Drawing Ref: EP0194 Fig2_Site layout
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

EP Risk Management
Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 3 – Sampling Locations

Job No: 94
Date: 5/03/2015
Drawing Ref: Fig3_Sampling Locations
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 4 – Groundwater Contours

Job No: EP0194
Date: 5/03/2015
Drawing Ref: EP0194 Fig4_Groundwater Contours
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: SixMaps

Approximate boundary
EP Risk GW well
PB. GW well
Groundwater Contours
XX.X m Stabilised Groundwater Level

Sampled By	Date	Analyte	Depth	Concentration	Guideline Exceedance
EP Risk	2015	TRH >C16-C34	1.0 m	9240 mg/kg	ASC NEMP 2013 Management Limits and ESLs for fine soils
		TRH F2		400 mg/kg	ASC NEPM 2013 ESLs for fine soils

Pacific Highway

Drainage Channel

BH06

BH07

H2

MW02

BH04

MW01

BH05

H1

BH03

HA

H3

Sampled By	Date	Analyte	Depth	Concentration	Guideline Exceedance
PB	2002	TRH >C6-C36	1.0 m	3838 mg/kg	NSW EPA Service Station 1994

Sampled By	Date	Analyte	Depth	Concentration	Guideline Exceedance
PB	2002	TRH >C6-C36	1.0 m	14546 mg/kg	NSW EPA Service Station 1994
			2.0 m	1071 mg/kg	

Legend

- Approximate Site Boundary
- Decommissioned USTs
- Waste Oil Separator
- Decommissioned fuel dispenser
- Empty 44 gallon oil drums
- Rubbish bin
- Underground Power
- Underground Telecom
- Sewer
- Water
- Overhead Power
- EP Risk Soil Bore
- EP Risk GW Well
- PB GW Well

EP Risk Management
Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 5 – Soil Impact Plan

Job No: EP0194
Date: 5/03/2015
Drawing Ref: EP0194 Fig5_Soil Impact Plan
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

Sampled By	Date	Analyte	Concentration	Guideline Exceedance
EP Risk	2015	Copper	2 µg/L	ASC NEMP 2013 GILs - Fresh Water
		Zinc	50 µg/L	

Sampled By	Date	Analyte	Concentration	Guideline Exceedance
EP Risk	2015	Copper	5 µg/L	ASC NEMP 2013 GILs - Fresh Water
		Zinc	35 µg/L	

Sampled By	Date	Analyte	Concentration	Guideline Exceedance
EP Risk	2015	Copper	2 µg/L	ASC NEMP 2013 GILs - Fresh Water
		Zinc	35 µg/L	

Sampled By	Date	Comment
EP Risk	2015	LNAPL thickness of 0.1 m noted in EP Risk field investigations

EP Risk Management
Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 6 – Groundwater Impact Plan

Job No: EP0194
Date: 3/05/2015
Drawing Ref: EP0194 Fig6_GW Impact Plan
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

EP Risk Management
Newcastle
Suite 3, 19 Bolton Street, Newcastle, NSW, 2300
tel: 02 4913 5650 w: www.eprm.com.au
ABN: 81 147 147 591

Remediation Action Plan
389-391 Pacific Highway, Belmont, NSW

Figure 6 – Approximate Extent Requiring Remediation

Job No: EP0194
Date: 5/03/2015
Drawing Ref: EP0194 Fig7_Extent of Remediation
Version No: v1

N

0 5 10 20
Meters

Co-ordinate system: MGA 56
Drawn by: SL Checked by: PS
Scale of regional map not shown
Source: Google Maps

Appendix A

ANNUAL WINDROSE FOR NEWCASTLE

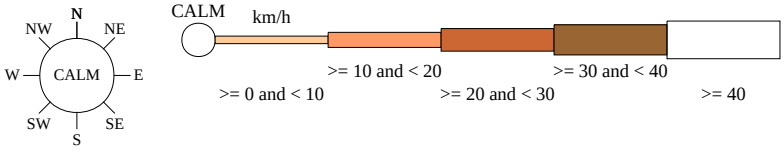
Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 30 Sep 2010)

Custom times selected, refer to attached note for details

NEWCASTLE NOBBYS SIGNAL STATION AWS

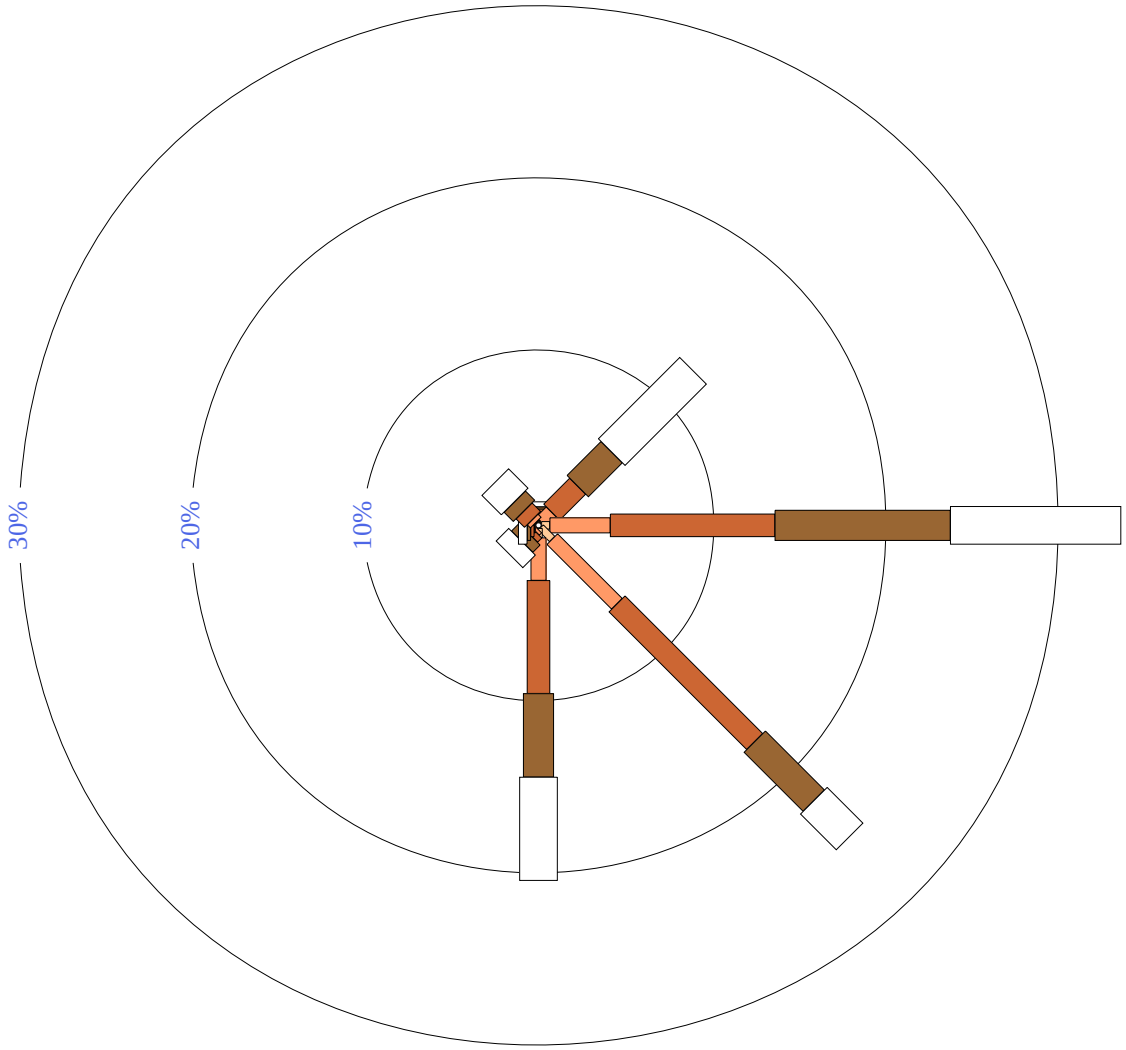
Site No: 061055 • Opened Jan 1862 • Still Open • Latitude: -32.9184° • Longitude: 151.7985° • Elevation 33m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.



3 pm Jan
1602 Total Observations

Calm 1%



Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 30 Sep 2010)

Custom times selected, refer to attached note for details

NEWCASTLE NOBBYS SIGNAL STATION AWS

Site No: 061055 • Opened Jan 1862 • Still Open • Latitude: -32.9184° • Longitude: 151.7985° • Elevation 33m

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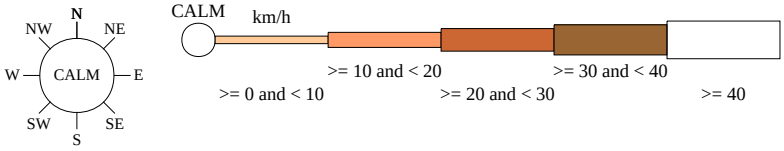
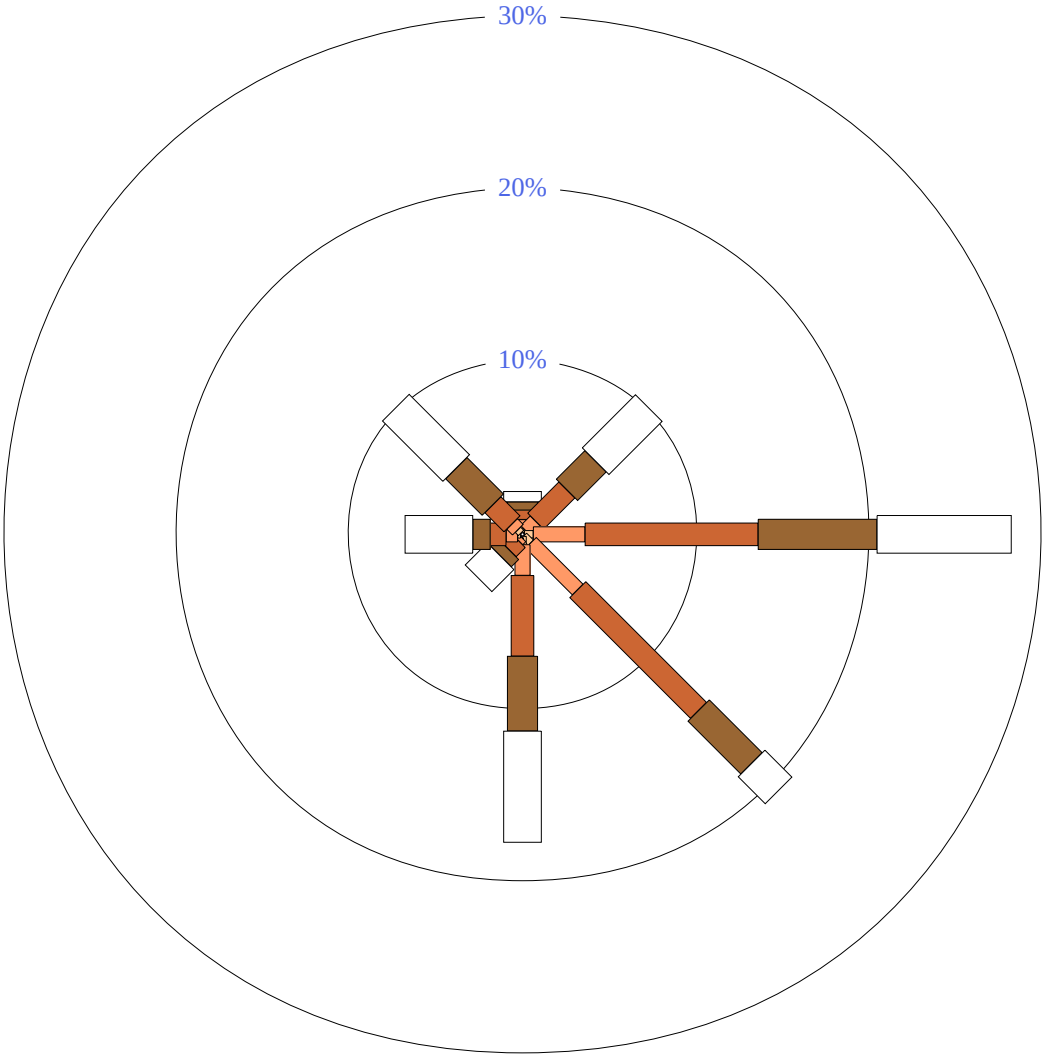


3 pm Oct
1604 Total Observations

Calm *



Appendix B
UNEXPECTED FINDS PROTOCOL

UNEXPECTED FINDS PROTOCOL

In the event of an "unexpected find" as defined in Section 4;
STOP WORKS IMMEDIATELY and **CONTACT THE SITE MANAGER**

Site Manager to construct **exclusion zone temporary barricades** around unexpected find area and install any emergency stormwater / sediment controls or other measures to prevent an escalation of the problem

Site Manager to **contact EP RISK** and arrange urgent inspection of site

Sydney	Newcastle	Maitland
Tel: 02 8324 7508	Tel: 02 4913 5650	Tel: 02 4913 5650

www.eprm.com.au

EP RISK will conduct **inspection, sampling & analysis** as required and as documented in the Unexpected Finds Procedure

EP RISK in consultation with all Stakeholders will conduct a **Risk Review** and recommend **Remediation Actions** to overcome "unexpected find" event.

If substance or event is demonstrated to be **"safe"** -within the accepted risk profile for this acceptable risk for this property

The Site Manager may **remove the Exclusion Zone** and proceed with construction works.

If substance or event is demonstrated to be a "**risk to health or the environment**"

Construct proposed remedial actions. EP RISK will supervise and validate the works.

EP RISK will produce a **Close Out Report** to allow for Independent Auditing and/or CLM Auditor sign off for the property.

Procedure BMS8.5.2/8.5.3 – Unexpected Finds Protocol

1 Purpose

The purpose of this procedure is to communicate the protocol to be followed by the site personnel in the event of an unexpected find being uncovered during site excavation works. The protocol is based on the ***8D Problem Solving*** method for the analysis of an unplanned or unexpected event and to develop an appropriate planned response.

This approach promotes orderly-oriented and proven methods using facts rather than personal bias. This will ensure safety of workers and the environment on the project.

2 Scope

The 8D Problem Solving Process is a proven method for addressing concerns including those issues concerning: customer, regulator, report and/or system issues. The 8D approach applies to any problem or activity and assists in achieving effective communication exchange between customer, supplier and EP RISK Management Pty Ltd (EP RISK) that share a common objective.

3 References

- AS/NZS ISO 9001:2008, Quality Management Systems – Requirements
- AS/NZS ISO 14001:2004, Environmental Management Systems – Requirements
- Code of Practice for Excavation: NSW WorkCover
- OH&S Regulations 2011 - REG 174ZF
- NSW WorkCover: Fact Sheet 3_1; Dangerous Goods - Abandoning Disused Underground Tanks
- NSW WorkCover: Notification of disused underground/partially underground tanks
- NSW WorkCover: Notification of dangerous goods on premises guide
- NSW EPA: Environmental Action for Service Stations; Information Sheet No 6- Underground Storage Tanks
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008
- AS 1940-2004: The storage and handling of flammable and combustible liquids.
- AS 4976-2008: The removal and disposal of underground petroleum storage tanks

4 Definitions

- All terminology shall be in accordance with AS/NZS ISO 9001:2008.
- ***Unexpected Find*** – shall mean the unearthing of any contaminated land or groundwater, asbestos, pipework, old drums, tanks, pits, services, structures or unusual change in ground conditions.

- ***8D*** **–** shall mean the eight disciplines that make up a proven structured problem solving method and technique.
- ***EP RISK*** **–** EP Risk Management Pty Ltd
- ***QS*** **–** Quality System(s)

5 Procedure

The flow chart included in the appendix, shall be displayed in prominent locations throughout the site and personnel shall be trained in the requirements of the Unexpected Finds Protocol during the site induction process.

D1 – Immediate Containment Action & Verification

Upon discovery of an unexpected find, **stop work immediately** and inform the site manager. The site manager will instruct on any short term measures required to prevent any potential escalation of the problem (i.e. backfill excavation to make safe or the like).

The affected area will be closed off by the use of barrier tape and warning signs. Warning signs shall be erected and be specific to the suspected Hazards and shall comply with the Australian Standard 1319-1994 – Safety Signs for the Occupational Environment.

D2 – Form a Team

The site manager will inform EP RISK of the Unexpected Find and gather a team to identify the appropriate response to the event. The team must consist of a minimum of the Site Manager (or delegated officer), EP RISK technical staff member and additional stakeholders as required. EP RISK will assume the role of team leader, unless otherwise notified and will complete the 8D form (see attachments). The form numbering shall be as follows:

REPORT NUMBER-YEAR e.g. 001-2014; 002-2014.

The form number must be chosen sequentially, reported to the Site Manager and recorded in the Unexpected Finds Register.

D3 – Problem Description

EP RISK will define the problem unearthed by the Unexpected Find and the appropriate controls required to implement an appropriate response.

The location of the identified unexpected find/asbestos material or other will be surveyed and recorded.

Contamination/ Asbestos

EP RISK will send an Environmental Scientist/ Asbestos Assessor to inspect the area and confirm the presence of asbestos and to determine extent of remediation works to be undertaken. A report detailing this information will be compiled by EP RISK and provided to the Principal (or their representative) and the site manager.

Impacted Groundwater

EP RISK will send an Environmental Scientist to sample the water and record any visible oily sheen. The water sample will be analysed in a laboratory to determine if there are any contamination above the allowable discharge guidelines for the property. A water treatment methodology such as oily

water separator or discharge as trade waste will be identified based on the contaminate load in the water body.

Old Pipe/ Utility

EP RISK will investigate the pipe to determine if it is an active service. If the pipe is disused, any liquids or residue within the pipe will be tested for presence of potential contaminates of concern. If it is a live service that was not identified by DBYG or potholing the utility provider will be will contacted to provide advice on possible relocation, removal and/or temporary protection.

Man Made Items -Drum, UST, containers, pit or other structures

EP RISK will send an Environmental Scientist to inspect the uncovered drum, UST, pit or structure. Photographic records will be taken of the items and any labelling that has remained intact on the drum, UST, pit or structure will be recorded and checked against published records of chemical and/or dangerous goods.

The integrity of the drums, UST, pit or structure will be assessed to allow the risk of collapse to be determined when removal works are commenced.

If possible, the lid/ covers will be carefully removed to allow investigation of any materials contained within the structure.

Samples of solid and/or liquid waste will be collected from the unexpected find to determine the volatility and toxicity of any substance enclosed within or surrounding the unexpected find.

Vapour monitoring may be required if extremely odorous or suspected toxic vapours are encountered.

Ground Conditions:

A sudden change in ground conditions such as sand, rubble, clay layers may indicate a buried service, buried waste in a containment cell, historical water course or geological feature. EP RISK will investigate any sudden change in ground conditions and obtain specialist geotechnical advice as appropriate.

D4 – Root Cause

EP RISK will define and verify the root cause of the unexpected find and identify potential sources.

Contamination/ Asbestos

Review data on previous land use, use of uncontrolled fill on the land, potential for illegal dumping at the property, industrial discharge and/or old asbestos buildings/ outbuildings.

Impacted Groundwater

Impacted Groundwater may indicate hydrocarbons in the soils or a source of contamination up stream of the event. EP RISK will review existing groundwater data and bores prior to undertaking any additional investigative work.

Old Pipe/ Utility

The pipe location will be cross referenced to Dial Before You Dig records, existing service location drawings, pot hole records and service locator searches to determine why the potential service was not identified prior to excavation commencing. If the service is inactive, information on the likely content of the pipe will be researched.

Man Made Items -Drum, UST, containers, pit or other structures

EP RISK will review any labelling or identification marks and attempt to trace the origins of any drums, UST, containers or the like discovered during excavation works.

This information will be cross referenced to previous land use records to determine what process, if any would have required these items to be present on the property.

The possibility of uncontrolled importation of fill materials or illegal dumping of waste materials will be investigated.

Ground Conditions

EP RISK will review the records of any controlled fill placed on the site, the geotechnical profile of the property and historical records of land use for previous excavation events.

D5 – Planned Remediation Action to Overcome Un-Expected Find

EP RISK will provide recommendation on the actions and controls required to overcome the identified event and root cause. A Risk Assessment in consultation with the site manager and workers will be conducted prior to the implementation of the proposed actions.

Note: If the Risk Assessment identifies that the system requires an update, alter the system and communicate change to all staff.

Contamination/ Asbestos

EP RISK will test and characterise the soil for off-site disposal or beneficial reuse. A soil classification report will be issued to the Site Manager.

Soils contained within the area of the Unexpected Find that cannot remain within the property for beneficial reuse must be removed to a licenced waste facility by an experienced Contractor.

Material that is found to be impacted with Asbestos will be classified as “Special Waste containing Asbestos” and disposed at a Licensed Landfill by a licensed Contractor. In dry and windy conditions any exposed or stockpiled soils will be lightly wetted whilst awaiting disposal.

All work associated with asbestos in soil will be undertaken by a contractor holding a class AS-1 License. WorkCover must be notified 5 days in advance of any asbestos works;

As required, monitoring for airborne asbestos fibres is to be carried out during the soil excavation in asbestos contaminated materials

Contaminated/Asbestos impacted soils will be chased out until all contamination has been removed from the location of the unexpected find event.

Impacted Groundwater

Contaminated groundwater if present on the property will be treated to ensure compliance with the discharge conditions prescribed for this property. Depending on volumes, profile of contamination and contaminate load the appropriate treatment option may be:

- Off-site disposal using a tanker to a licensed facility;
- Treatment on site using an oily water separator, reagents or the like;
- Disposal under a Trade Waste Agreement; or
- Volume and quality of waters will be monitored at the discharge point.

Old Pipe/ Utility

The disused pipe will be carefully drilled or cut open to determine if there are any contaminates or residual liquids such as coal tar or diesel product resident in the pipework. Care must be taken to ensure there is no explosive risk when handling the old pipe work.

If the pipe is found to be asbestos or containing contaminates, it will be treated as described above.

The disused pipe will be carefully excavated and removed from the required excavation area. The pipe may be interconnected or intertwined with live services and care must be exercised not to drag it out of the ground with the potential to impact on other areas of the property.

The pipe may be cut up and disposed as scrap once cleared by EP RISK.

If the service is found to be live, the utility owner will advise on termination, relocation, protection and temporary diversion.

Man Made Items -Drum, UST, containers, pit or other structures

EP RISK will conduct sampling and analysis testing of materials contained within and surrounding any Man Made Structures uncovered to determine the volatility and toxicity of the suspect substances. This may also be used to provide Waste Classification Certification for the disposal of the materials.

Drums, plastic fuel containers, paint tins, oil cans and the like are to be removed and placed in a bunded container with 110% capacity. If the conditions of drums have deteriorated (rusted) to the point that it cannot be handled safely then an excavator will remove the drum and the surrounding soils and place them in a bunded area or a skip with 110% capacity.

UST encountered will be vented to release any trapped gases and any liquids removed to a licenced waste facility. The tank will be removed and dispose3d to a licenced facility in accordance with AS 4976-2008: The removal and disposal of underground petroleum storage tanks and NSW WorkCover Guidelines.

Pits or other structures will be cleaned of any waste or liquids entombed within the structure. The structure will be demolished using excavators and hydraulic hammers.

The pit structure may be sent for disposal at a recycling facility if EP RISK assess that no contamination has seeped into the structural elements.

Ground Conditions

EP RISK will supervise additional pot holing investigation to ensure that dramatic changes materials types are not symptomatic of buried sources of contamination, utility sand backfill or the like.

If the pothole investigation reveals the presence of contamination or asbestos, the soils will be treated as described previously.

If the sudden change in ground conditions is related to geotechnical issues such as structurally unsuitable soils or stability of excavation face, then the Site Manager may require a Geotechnical Engineer to provide instruction on appropriate ground improvements.

D6 - Verification of Works

EP RISK will provide evidence that the works to resolve the issues identified by the Unexpected Find have been completed as planned. This will provide demonstrable evidence for audit review or sign off as required.

Contamination/ Asbestos

At the completion of the excavation works EP RISK will undertake a clearance inspection including taking samples from the walls and floor of excavations to demonstrate that all of the contaminated soils have been removed.

All soils will be tracked for off-site disposal and documentary evidence (weighbridge dockets, truck tally) of correct disposal is to be provided to the Principal.

If any fill materials are imported to the site, EP RISK will conduct inspection and check the soil classification (VENM or ENM) as appropriate for the property approvals.

Impacted Groundwater

EP RISK will monitor the volumes of groundwater discharged from the site and conduct validation sampling of the discharge waters to confirm that they meet the approved discharge limits. Documented records will be kept of discharge events and provided to the Principal for use in Audit Review or sign off as required.

Old Pipe/ Utility

EP RISK will monitor the removal of old pipework to ensure that any contaminated materials of liquids are identified and disposed of in a controlled manner.

Records of these works will be kept and provided to the Principal for use in Audits and sign-off as required.

Man Made Items -Drum, UST, containers, pit or other structures

At the completion of the removal of any Man Made Items, EP RISK will undertake a clearance inspection including taking samples from the walls and floor of excavations to demonstrate that all of the contaminated soils have been removed.

All materials will be tracked for off-site disposal and documentary evidence (weighbridge dockets, destruction certificates, truck tally) of correct disposal is to be provided to the Principal.

Notifications to Authorities in regards to the safe removal of UST's, drums containing scheduled wastes or the like will be issued by EP RISK on behalf of the Principal.

Ground Conditions

EP RISK will document the investigation works around any dramatic changes in geotechnical conditions by providing logs of pothole investigations and testing of any suspect materials.

D7 – Lessons Learned

EP RISK will review the Unexpected Find event and provide any observation to the Principal that may assist them in planning the works to reduce the potential for unplanned or unexpected events for the remainder of the current project and future projects by their firm.

Contamination/ Asbestos

- Are there opportunities to identify suspected hot spots of contamination or asbestos more thoroughly in the investigation of the project?
- Were there incidents of harm or potential harm due to the unplanned event?
- Did the site history indicate the potential for unknown contamination events?
- Did the unplanned event incur a penalty cost greater than the costs of additional investigation?

Impacted Groundwater

- Was there evidence of groundwater levels during initial planning of the works?
- Is there a source of potential groundwater contamination that should have been assessed?
- Was there an additional cost penalty over and above the costs of treating groundwater due to the unplanned nature of the event?

Old Pipe/ Utility

- Was it possible to identify the presence of the pipe prior to excavation commencing through DBYG or the like?
- Did the unknown pipe/utility location present a safety risk to workers?

Man Made Items -Drum, UST, containers, pit or other structures

- Were there any indicators of Man Made Item identified in the Site Investigation reports?
- Were there incidents of harm or potential harm due to the unplanned event?
- Did the unplanned event incur a penalty cost greater than the costs of additional investigation?

- Were ground conditions assessed in the planning phase of the works?
- Were changes in surface ground profiles assessed in the planning phase?
- Are there structural implications for future development works?

D8 – Close Out Report

A report detailing all of the information as discussed above will be compiled by EP RISK and provided to the Principal (or their representative) and the site manager.

This report may be a simple letter format or a more substantial report depending on the extent of the issues identified by the Unexpected Find.

The content of the report may be communicated to all stakeholders through Tool Box Talks, Notice Boards and the like.

The report shall also be provided to the systems managers to ensure that any changes required in planning of the works are addressed.

6 Attachments

EP RISK - Unexpected Finds Protocol.pdf

Version Control Record

Compiled By:	Approved by:	Date:	Issue:	Procedure No.
S Lord	P Simpson	07/02/2014	V2	**BMS8.5.2_8.5.3**