

Water Sensitive Urban Design Strategy

Loscam, Erskine Park

Lot 22, DP1178567
Tyrone Place
Erskine Park, NSW

PREPARED BY

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Document Control

Revision	Date	Description	Prepared	Reviewed	Approved
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Introduction

Sparks & Partners have been engaged by Tubb & Associates on behalf of Fife Capital to provide civil engineering services to support the proposed Development Application for an industrial facility at Lot 22 DP1178567, Tyrone Place, Erskine Park NSW. The engineering services include the design and documentation of the concept stormwater drainage infrastructure, Water Sensitive Urban Design (WSUD) strategy and finished pavement levels for the proposed development.

Penrith City Council being the consent authority for the proposed development, require a WSUD strategy be prepared that takes into consideration the objectives and controls under Penrith Development Control Plan 2014 (PDCP) Part C3 Water Management. In response to this requirement Sparks and Partners has undertaken modelling of the proposed integrated water management measures and prepared this report to demonstrate that the proposed industrial development identifies and incorporates water conservation and stormwater management measures into its design and operation in accordance with the requirements of Part C3 of the PDCP.

Existing Site

The site is located at the western end of Tyrone Place, Erskine Park and is currently bounded by the Transpacific landfill facility to the south, a proposed environmental corridor to the west and north, and a proposed industrial facility to the east. It occupies an area of approximately 40,000m² and is currently vacant with no buildings or structures located on the site.

Proposed Development

The proposed industrial development consists of a building, hardstand, car park pavement areas and landscaping and covers an approximate area of 32,000m². The building is to be located in the eastern portion of the site, running north-south and occupies an approximate area of 5,400m², the majority of the development consists predominately of pavement area occupying approximately 24,000m², with the remainder being occupied by landscaping. A portion of the site has been Detailed architectural plans have been prepared by ReidCampbell for the DA submission and are to be read in conjunction with this report.

The proposed stormwater management for the site is to incorporate WSUD strategies as per Council's DCP and policies. It is noted here that a separate DA (Ref: DA15/0907) has been lodged that details the subdivision and drainage channel works of the western environmental corridor. These works include stormwater infrastructure that is to service Lot 22 and the proposed development, and consist of a bio-retention/on-site detention basin. Reference is made to the submitted drawings for this DA prepared by Calibre Consulting ref: X03033.46 and that this WSUD strategy is to be read in conjunction with those plans. Further discussion on this proposed infrastructure is discussed further in the following sections.

Water Sensitive Urban Design

The objective of WSUD is to provide a strategy that brings together the different aspects of the water cycle as a whole rather than an ad hoc approach to water management. This includes the management aspects of freshwater, wastewater and stormwater. The following WUSD strategies have been considered and addressed for the proposed development:

- Employ an integrated water collection and recycling system for capturing and recycling roofwater;
- Control the quality of stormwater that is disposed from the site;
- Control the quantity of stormwater that is discharged for the site.

To demonstrate the above concept stormwater drainage plans and associated details have been prepared along with detailed modelling using the Council endorsed MUSIC software package. The concept stormwater drainage plans detail the location of the water management infrastructure including the pit and pipe network, rainwater tank, bio-retention/on-site detention (OSD) basin and are included in Appendix A.

Water Conservation

Water usage reduction is to be achieved throughout the development through the use of a minimum of 4 Star WELS rated water fixtures and rainwater reuse in accordance with the performance criteria under section 3.1 Water Conservation of the Penrith City Council WSUD Policy, December 2013.

Rainwater Reuse

Through the reuse of collected roofwater for non-potable reuse the proposed demand on potable water resources is reduced. The proposed development will capture roof water from part of the building roof area (3,396m²). This collected roofwater will be conveyed to a 50,000litre tank for storage and reuse throughout the development. Re-use purposes will primarily include toilet flushing and irrigation uses. A water balance of the proposed reuse system has been completed to model the effectiveness and efficiency of the system. The water balance model was constructed using the MUSIC software package with the following inputs:

- Penrith City Council MUSIClink files;
- Total approximate non-potable reuse of 1.2KL per day and 240KL per year based on:
 - Fourteen (14) toilets with each using 0.1KL day for six (6) days of the week;
 - 800m² or irrigated area requiring 0.3KL of irrigation per year.

Using the above determined non-potable demand the MUSIC model determines the rainwater tank has an approximate efficiency of 82.15%. This demonstrates that the reuse efficiency meets the minimum 80% requirement in accordance with the performance criteria under section 3.1 Water Conservation of the Penrith City Council WSUD Policy, December 2013.

Stormwater Quality

To ensure the quality of stormwater leaving the site is acceptable and meets the performance criteria under section 3.2 Stormwater Quality of the Penrith City Council WSUD Policy, December 2013 specific water quality treatment measures are to be employed. These treatment measures are to treat the collected stormwater runoff prior to discharge to the environmental corridor. The treatment measures consist of a GPT, rainwater tank and bio-retention basin. The combination of these measures provides a treatment train approach to the treatment of stormwater runoff.

A bio-retention filter area size of 600m² with an extended detention depth of 0.3m has been nominated by Calibre Consulting as part of DA15/0907 to treat the stormwater runoff generated by the

development. Refer to Appendix B for a copy of the plan showing the location of the basin. To verify this area and extended detention depth MUSIC modelling of the proposed treatment measures has been undertaken using the MUSIC software package version 6. The modelling inputs have been based on the MUSIClink meteorological template file for Penrith, the Penrith City Council standard source nodes, Council's WSUD Technical Guidelines Version 3-2015 and the concept stormwater catchment plan. The modelling results of the water quality achieved for the site is detailed in Table 1 – MUSIC Model Results below, along with a figure of the prepared model.

The modelling demonstrates that the proposed 600m² bio-retention filter with 0.3m extended detention depth provides the necessary treatment to ensure stormwater discharge from the site meets Council's requirements.

	Source Load	Residual Load	% Reduction Achieved	PCC % Reduction Requirement	Compliance with PCC Requirement
Gross Pollutants (kg/yr)	631	25.5	96	90	Yes
Total Suspended Solids (kg/yr)	3,450	467	86.5	85	Yes
Total Phosphorus (kg/yr)	6.0	1.96	67.3	60	Yes
Total Nitrogen (kg/yr)	48.7	21.2	56.4	45	Yes

Table 1 - MUSIC Model Results

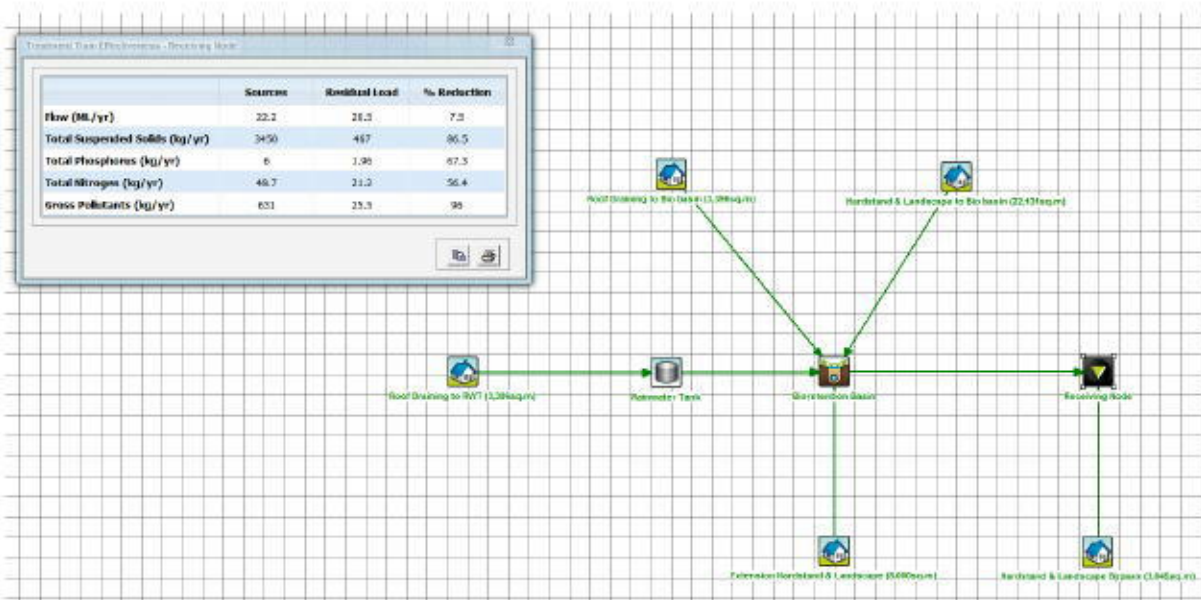


Figure 1 - MUSIC Model

Stormwater Quantity

To control stormwater discharge from the site An OSD basin has been proposed as part of DA15/0907 to service the proposed development. This OSD is to provide an active detention volume of 1,000m³ plus the extended detention of 180m³ of the bio-retention component, and is designed to attenuate flows for storms ranging from the 2 year up to and including the 100 year Average Recurrence Interval (ARI).

Calculations have been undertaken to verify the provided volume using the DRAINS software package. The input values have been based on the DRAINS recommended input values and Intensity Frequency Duration (IFD) data obtained from the Bureau of Meteorology (BOM). The results of the modelling are tabled below and detail the pre-developed and post developed storm flows from the site and the OSD.

ARI (Years)	Peak pre-developed discharge (m³/sec)	Peak post developed discharge (m³/sec)			OSD Storage Volume (m³)	Post less than pre developed discharge
		OSD	Bypass	Total		
2	0.374	0.342	0.030	0.372	260	Yes
5	0.885	0.376	0.054	0.430	450	Yes
10	1.230	0.395	0.076	0.471	570	Yes
20	1.490	0.421	0.090	0.511	730	Yes
50	2.020	0.443	0.106	0.549	900	Yes
100	2.260	0.463	0.120	0.583	1,100	Yes

Table 2 - DRAINS OSD Model Results

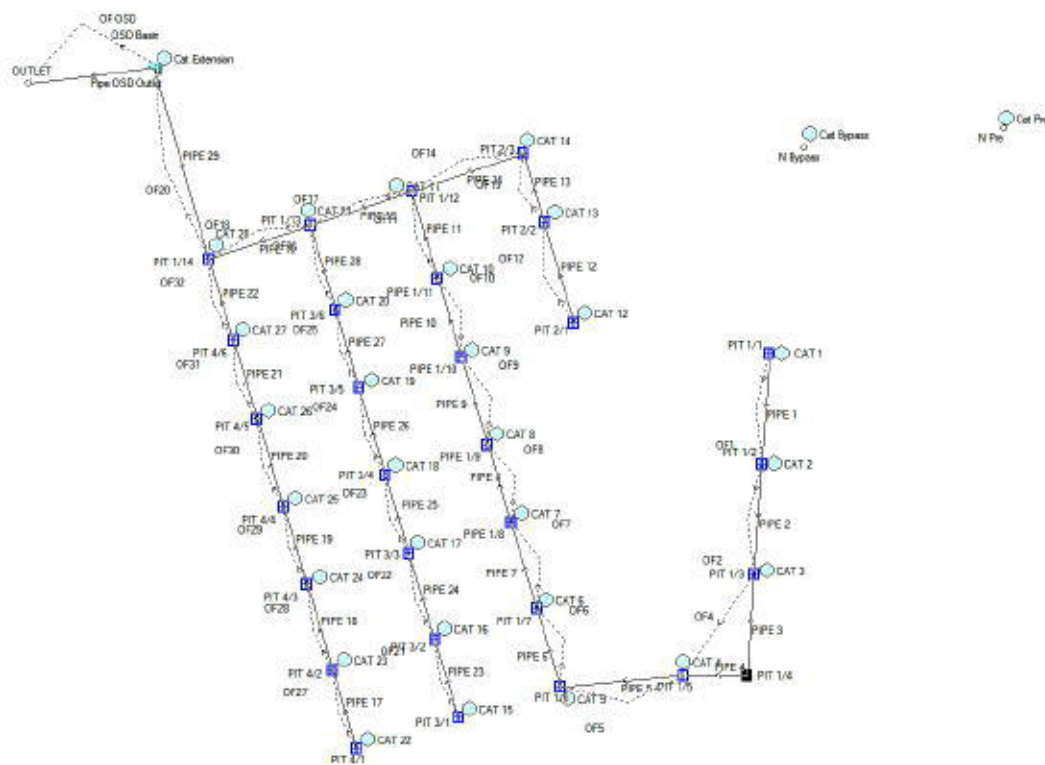


Figure 2 - DRAINS Model

The modelling results indicate that the proposed 1,000m³ active detention storage proposed for Lot 22 as part of DA15/0907 is sufficient in attenuating flows for storms ranging from the 2 year up to and including the 100 year ARI.

Maintenance and Monitoring

To ensure the continued efficient and correct operation of the proposed integrated water management infrastructure a concept 'maintenance and monitoring schedule' is included in the Appendix C of this plan. The schedule details the frequency of inspections, what is to be inspected and what rectifications to make if required for the water management infrastructure located within the proposed development. The schedule is to be implemented upon commissioning of the water management infrastructure and remain in place for the life of the development; with all records kept on site for inspection should the approval authority deem it necessary.

Conclusion

Based on the preparation of the concept stormwater drainage plans and MUSIC modeling results it is demonstrated that the principles of WSUD have been incorporated into the design and operation of the proposed development at Lot 22 DP1178567, Tyrone Pl, Erskine Park NSW in accordance with PDCP 20014 Part C3. It is demonstrated that the proposed development achieves reductions in potable water import by capturing rainwater on site and reusing this for non-potable uses including irrigation and toilet flushing, achieves pollution reduction targets set by council, and employs OSD for the control of stormwater discharge from the site in accordance with targets set by council. It is also demonstrated that the proposed developments employed water conservation measures will continue to operate effectively and efficiently through the implementation and use of a monitoring and maintenance schedule ensuring the integrity of the system is maintained.

Appendix A – Concept Drainage Plans

PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYORONE PLACE, ERSKINE PARK, NSW CONCEPT STORMWATER MANAGEMENT

SITE WORKS - GENERAL

1. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH LOCAL COUNCIL, AUSTRALIAN AND AUTHORITY STANDARDS.
2. ALL TREENING WORKS ARE TO BE RESTORED TO ORIGINAL CONDITION.
3. THE INTEGRITY OF ALL EXISTING AND NEW SERVICES IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
4. ALL PLANS ARE TO BE READ IN CONJUNCTION WITH APPROVED ARCHITECTS, STRUCTURAL ENGINEERS AND OTHER CONSULTANT'S PLANS. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER FOR CLARIFICATION.

SEDIMENT AND EROSION CONTROL

1. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH PENRITH CITY COUNCIL REQUIREMENTS AND THE "BLUE BOOK" (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION, PRODUCED BY THE DEPARTMENT OF HOUSING) THESE MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED.
2. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY, THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCIL'S DESIGN, AND ALL OTHER REGULATORY AUTHORITY REQUIREMENTS.
3. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
 - a. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES, WHERE FENCES ARE ADJACENT TO EACH OTHER THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
 - b. CONSTRUCT TEMPORARY STABILISED SITE ACCESS, INCLUDING SHARK DOWN AND WASH PAD.
 - c. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THESE SEDIMENT AND CONTROL PLANS (ONCE APPROVED).
4. THE CONTRACTOR SHALL UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
5. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. TARPERS MAY BE USED TO CONTROL DUST DURING EXTENDED PERIODS OF DRY WEATHER.
6. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 30 WORKING DAYS FROM PLACEMENT.
7. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LOOSE SEDIMENT HAS BEEN FILTERED OUT.
8. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
9. THE CONTRACTOR SHALL ALLOW FOR THE ESTABLISHMENT OF ANY OTHER EROSION PROTECTION MEASURES, IF APPLICABLE.
10. THE CONTRACTOR SHALL REGULARLY INSPECT MINIMUM TWICE PER WEEK ALL EROSION AND SEDIMENT CONTROL MEASURES TO ENSURE THEY ARE OPERATING EFFECTIVELY, REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.
11. ACCEPTABLE RECEPTORS SHALL BE USED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER. WASTE FROM THESE RECEPTORS SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.

SITE WORKS - ACCESS AND SAFETY

1. ALL WORKS ARE TO BE UNDERTAKEN IN A SAFE MANNER IN ACCORDANCE WITH ALL STATUTORY AND INDUSTRIAL RELATION REQUIREMENTS.
2. ACCESS TO ADJACENT BUILDINGS AND PROPERTIES SHALL BE MAINTAINED AT ALL TIMES.
3. WHERE NECESSARY SAFE PASSAGE SHALL BE PROVIDED FOR VEHICLES AND PEDESTRIANS THROUGH OR ADJACENT TO THE SITE.

STORMWATER

1. DESIGN CRITERIA
 - 1.1. ROOF DRAINAGE - 100YR ARI
 - 1.2. PAVED DRAINAGE - 100YR ARI
 - 1.3. OVERLAND FLOWS - GAP FLOW BETWEEN 100YR ARI & 100YR ARI
2. WORKS SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO FINAL DESIGN AT CONSTRUCTION CERTIFICATE STAGE.
3. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH THE FOLLOWING AUSTRALIAN STANDARDS AS2002, AS3500 AND AS3725 AS A MINIMUM.
4. ALL PIPES LESS THAN OR EQUAL TO 800mm IN SIZE ARE TO BE SOLVENT WELD-JOINTED UPVC CLASS 500 UNO.
5. ALL PIPES 875mm OR GREATER IN SIZE ARE TO BE MIN. CLASS 2 REINFORCED CONCRETE PIPE (RCP) OR FIBRE REINFORCED CONCRETE (FRP) RUBBER RING JOINTED (RRJ) UNO.
6. ALL PIPES ARE TO BE LAID AT MIN. 10% GRADE UNO.
7. PIPE BEDDING IS TO BE H2 UNDER ROADS AND TRAFFICKED AREAS AND SHALL BE H2 IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS UNO.
8. ALL PIPE BENDS AND JUNCTIONS ARE TO BE MADE WITH EITHER PURPOSE MADE FITTINGS OR STORMWATER DRAINAGE PITS.
9. MANHOLE COVER FROM THE OVERTOP OF THE STORMWATER PIPE OF 300mm IS TO BE PROVIDED IN LANDSCAPED AREAS AND 600mm IN VEHICULAR TRAFFICKED AREAS UNO.
10. WHERE MINIMUM COVER CANNOT BE ACHIEVED CONCRETE ENCASMENT OF THE AFFECTED PIPE IS TO BE UNDERTAKEN WITH 20MPa CONCRETE WITH A MIN. COVER OF 150mm TO ALL SIDES OF THE PIPE. THE CONTRACTOR SHALL COMPLY THIS REQUIREMENT WITH THE ENGINEER OR SUPERINTENDENT.
11. LAID PIPELINES ARE TO HAVE THE FOLLOWING CONSTRUCTED TOLERANCES:
 - a. HORIZONTAL - 1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT.
 - b. VERTICAL - 1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT.
12. ALL DRAINAGE PITS ARE TO BE CAST IN-SITU, PRECAST DRAINAGE PITS MAY BE USED WITH APPROVAL FROM THE ENGINEER. THE CONTRACTOR SHALL SUBMIT A PRECAST PIT INSTALLATION WORK METHOD STATEMENT FOR ASSESSMENT BY THE ENGINEER FOR APPROVAL.
11. DRAINAGE PIT COVERS ARE TO BE EITHER GALVANISED STEEL OR CAST IRON CLASS 'B' IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS AND CLASS 'D' IN ALL VEHICULAR TRAFFICKED AREAS UNO.
12. DRAINAGE PIT COVERS ARE TO BE 'HEELSAFE' TYPE IN ALL PEDESTRIAN TRAFFICKED AREAS UNO.
13. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCING WORKS ON SITE.
14. PROVIDE CLEANING EYES (BEDDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
15. DOWN PIPES CONNECTED DIRECT TO PIPES TO BE CONNECTED AT 45° TO THE FLOW DIRECTION WITH A CLEANING EYE PROVIDED AT GROUND LEVEL.

FINISHED LEVELS

1. LEVELS BASED ON SURVEY PREPARED BY G.R. HAWES AND ASSOCIATES PTY LTD (REP. 119, DATED 20.01.2010) THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.
2. FINISHED LEVELS SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED DESIGN PRIOR TO CONSTRUCTION CERTIFICATE APPLICATION. FINAL FINISHED LEVELS TO BE +/- 0.5m FROM LEVELS SHOWN.
3. CARPARK & SERVICE AREA LAYOUT AND GRADES TO COMPLY WITH AS2890.
4. DRIVEWAY LAYOUT AND DESIGN TO COMPLY WITH PENRITH CITY COUNCIL ACCESS DRIVEWAY DESIGN AND CONSTRUCTION SPECIFICATION.
5. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS UNO, IN PLAN.
6. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 10:30.
7. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 25% MINIMUM GRADE.
8. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.



LOCALITY PLAN
NOT TO SCALE - COURTESY OF SIX MAPS

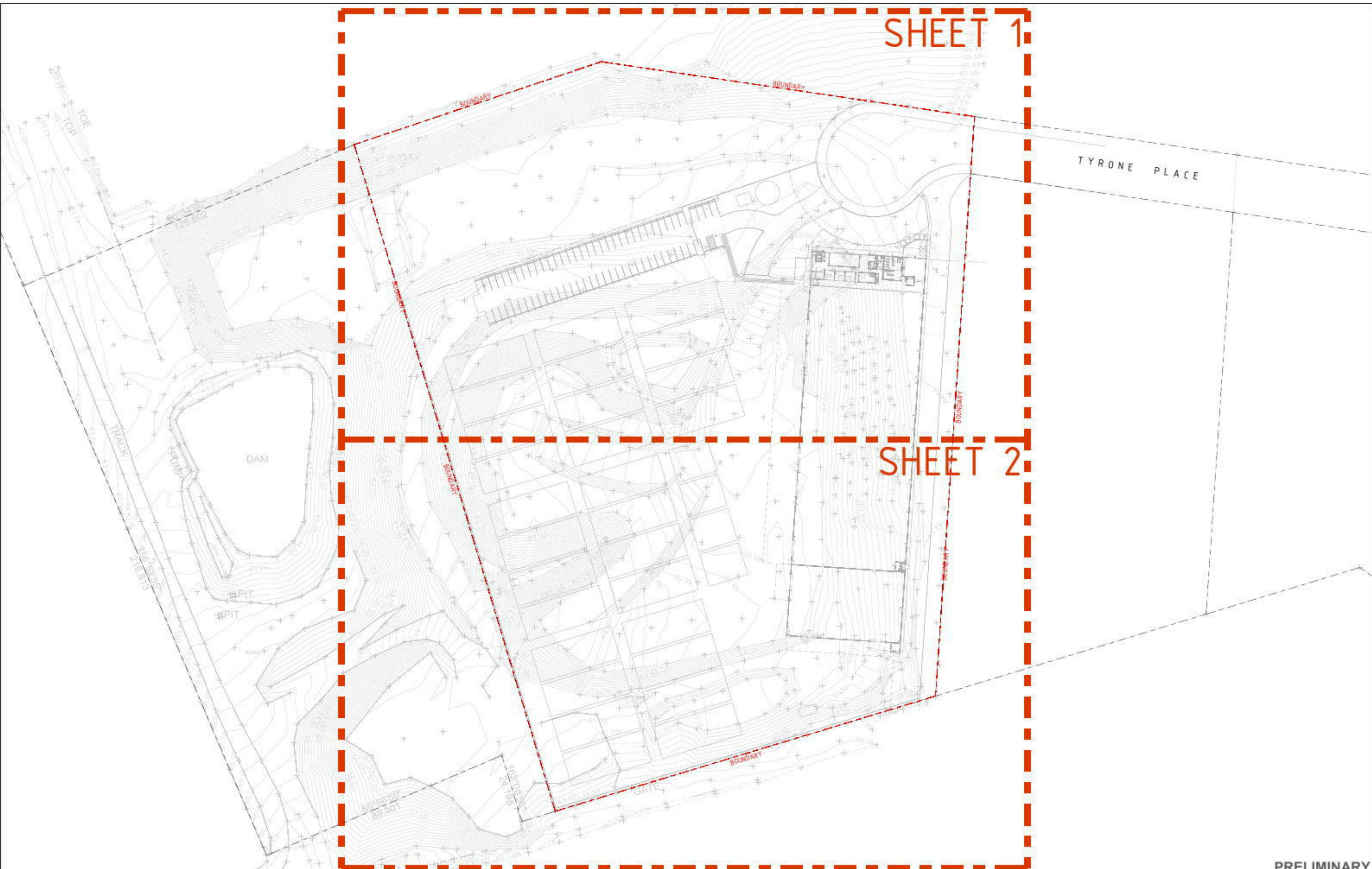
DRAWING SCHEDULE

- DA1.01 COVERSHEET, LOCALITY PLAN & DRAWING SCHEDULE
- DA1.02 GENERAL ARRANGMENT PLAN
- DA2.01 CONCEPT SEDIMENT AND EROSION CONTROL PLAN
- DA2.11 CONCEPT SEDIMENT AND EROSION DETAILS SHEET SHEET
- DA4.01 CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 1
- DA4.02 CONCEPT SITEWORKS AND STORMWATER MANAGEMENT PLAN SHEET 2
- DA4.05 CONCEPT STORMWATER CATCHMENT PLAN
- DA4.11 CONCEPT TYPICAL SECTIONS AND DETAILS SHEET

<p>1. THE CONTRACTOR SHALL VERIFY THE ACCURACY OF ALL INFORMATION AND REPRESENTATIONS AND ASSUMPTIONS...</p> <p>2. THE CONTRACTOR SHALL VERIFY THE ACCURACY OF ALL INFORMATION AND REPRESENTATIONS AND ASSUMPTIONS...</p> <p>3. THE CONTRACTOR SHALL VERIFY THE ACCURACY OF ALL INFORMATION AND REPRESENTATIONS AND ASSUMPTIONS...</p> <p>4. THE CONTRACTOR SHALL VERIFY THE ACCURACY OF ALL INFORMATION AND REPRESENTATIONS AND ASSUMPTIONS...</p> <p>5. THE CONTRACTOR SHALL VERIFY THE ACCURACY OF ALL INFORMATION AND REPRESENTATIONS AND ASSUMPTIONS...</p>	<p>REVISED DATE</p> <p>ISSUED FOR DA</p> <p>DATE OF SALE</p> <p>April 1, 2016</p> <p>NOT TO SCALE</p>		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>No</th> <th>AMENDMENT</th> <th>INT</th> <th>REV</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE	No	AMENDMENT	INT	REV																<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>No</th> <th>AMENDMENT</th> <th>INT</th> <th>REV</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	DATE	No	AMENDMENT	INT	REV																<p>KEY PLAN</p>			<p>PROJECT</p> <p>PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYORONE PLACE, ERSKINE PARK, NSW</p>	<p>SPARKS+PARTNERS CONSULTING ENGINEERS HYDRAULIC & CIVIL ENGINEERS</p> <p>DATE: FEB 2016 SCALE: 1:250@B1 SHEET NO: 15100 DRAWING NO: DA1.01</p>
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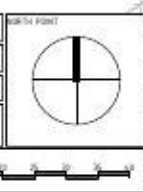
SHEET 1

SHEET 2



1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND REGULATIONS.
2. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
3. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY SURVEY DATA.
4. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY ASSESSMENTS.
5. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSULTATIONS.
6. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS.
7. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY NOTICES.
8. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONDITIONS.
9. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY AGREEMENTS.
10. THE CLIENT SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSENTS.

REVISED	DATE
01	April 1, 2016



DATE	No	AMENDMENT	INT	REV

DATE	No	AMENDMENT	INT	REV

DATE	No	AMENDMENT	INT	REV

FIFECAPITAL

PROJECT MANAGER
 Name: []
 Email: []
 Phone: []
 Fax: []

REID CAMPBELL

ARCHITECT
 1500 B Street
 Suite 100
 Erskine Park, NSW 2756
 Australia
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 Email: []

SPARKS+PARTNERS
 CONSULTING ENGINEERS
 HYDRAULIC & CIVIL ENGINEERS

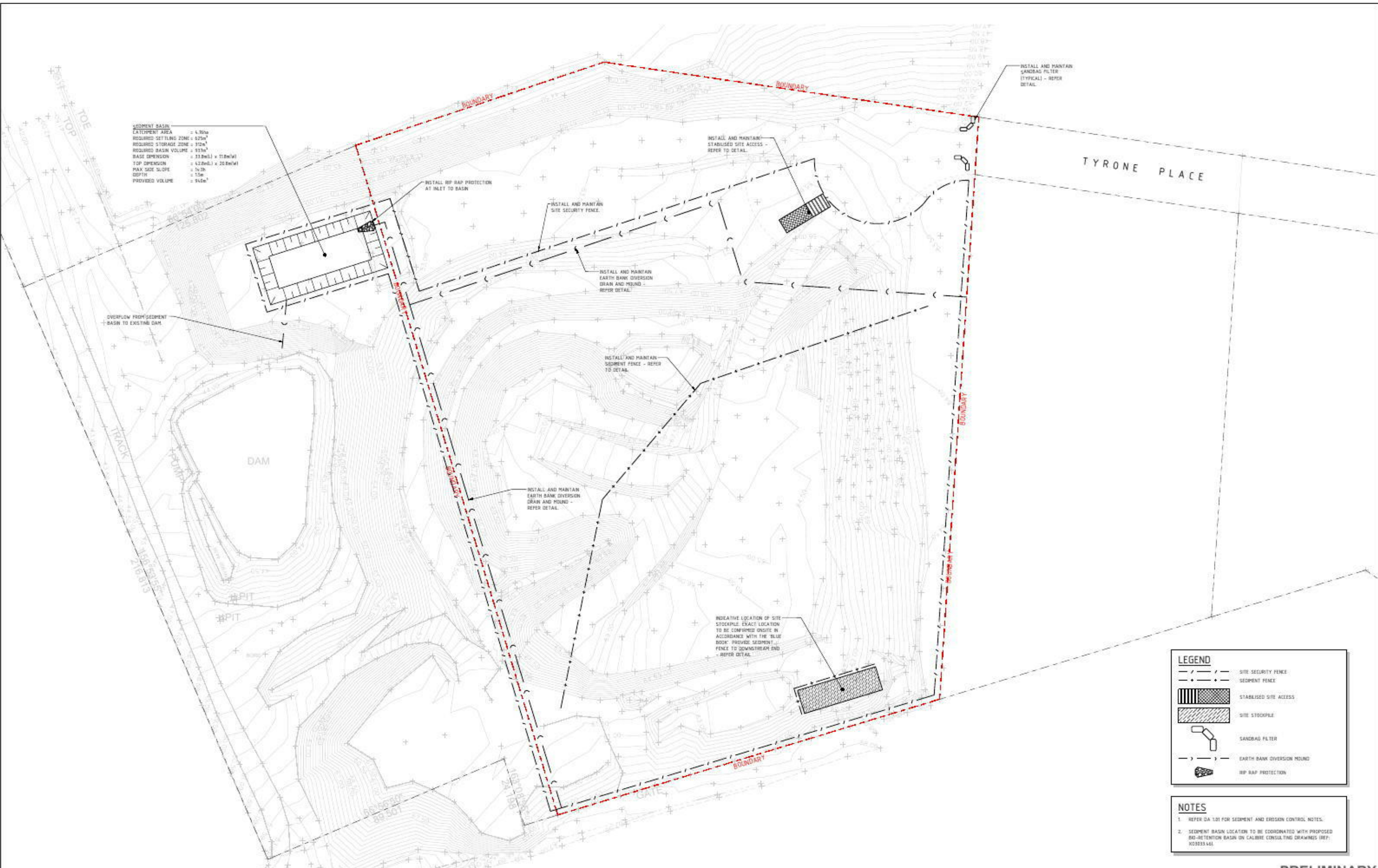
PROJECT
 PROPOSED WAREHOUSE DEVELOPMENT
 PROPOSED LOT 22, TYRONE PLACE,
 ERSKINE PARK, NSW

DRAWING TITLE
 GENERAL ARRANGEMENT PLAN

AHSCA

DATE: FEB 2016
 SCALE: 1:500
 SHEET: 15100
 DRAWING: DA1.02
 OF: 1

SEDIMENT BASIN
 CATCHMENT AREA = 4.30ha
 REQUIRED SETTLING ZONE = 925m³
 REQUIRED STORAGE ZONE = 92m³
 REQUIRED BASIN VOLUME = 937m³
 BASE DIMENSION = 23.8m(L) x 11.8m(W)
 TOP DIMENSION = 42.8m(L) x 20.8m(W)
 MAX SIDE SLOPE = 1:1.5H
 SED'IN = 1.5m
 PROVIDED VOLUME = 946m³



LEGEND

- SITE SECURITY FENCE
- SEDIMENT FENCE
- STABILISED SITE ACCESS
- SITE STOCKPILE
- SANDBAG FILTER
- EARTH BANK DIVERSION MOUND
- RP RAP PROTECTION

NOTES

- REFER DA LOT FOR SEDIMENT AND EROSION CONTROL NOTES.
- SEDIMENT BASIN LOCATION TO BE COORDINATED WITH PROPOSED 80-RETENTION BASIN ON CALBRE CONUL TIND DRAWINGS (REF: X03933-161).

REVISIONS

NO.	DATE	DESCRIPTION
1	13/04/2016	ISSUED FOR DA



DATE	NO.	AMENDMENT	INT.	REV.	DATE	NO.	AMENDMENT	INT.	REV.

KEY PLAN

FIFECAPITAL

PROJECT MANAGER

NAME: [Name]
 PHONE: [Phone]
 EMAIL: [Email]

REID CAMPBELL

CONSULTING ENGINEERS

NAME: [Name]
 PHONE: [Phone]
 EMAIL: [Email]

SPARKS+PARTNERS

CONSULTING ENGINEERS

NAME: [Name]
 PHONE: [Phone]
 EMAIL: [Email]

AHSCA

NAME: [Name]
 PHONE: [Phone]
 EMAIL: [Email]

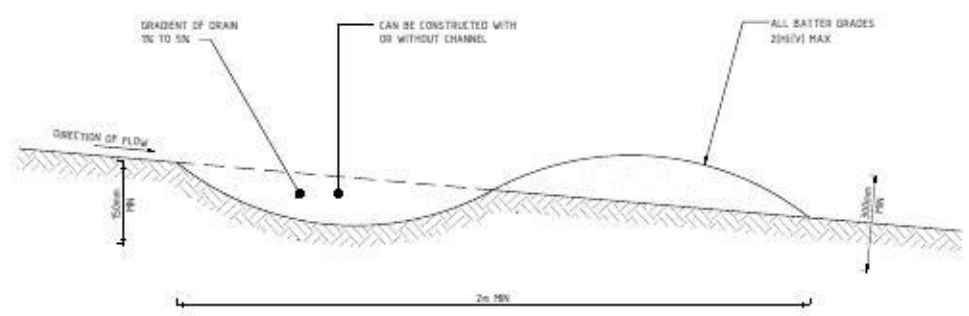
PRELIMINARY

PROPOSED WAREHOUSE DEVELOPMENT
 PROPOSED LOT 22, TYRONE PLACE,
 ERSKINE PARK, NSW

DRAWING TITLE
 CONCEPT SEDIMENT AND EROSION
 CONTROL PLAN

DATE: FEB 2016
 SCALE: 1:500@B1
 SHEET: 15100
 DRAWING NO: DA2.01
 OF: 1

NOTE:
ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 60m



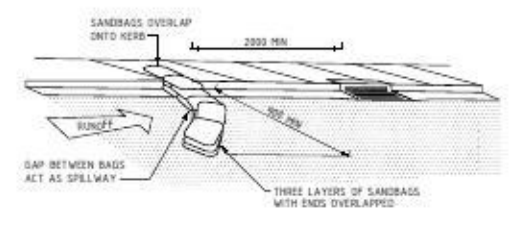
- CONSTRUCTION NOTES:**
- BUILD WITH GRADIENTS BETWEEN 1% AND 5%
 - AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM
 - ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPIDE WATER FLOW
 - BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED
 - ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE
 - COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION

EARTH BANK (LOW FLOW)
NOT TO SCALE

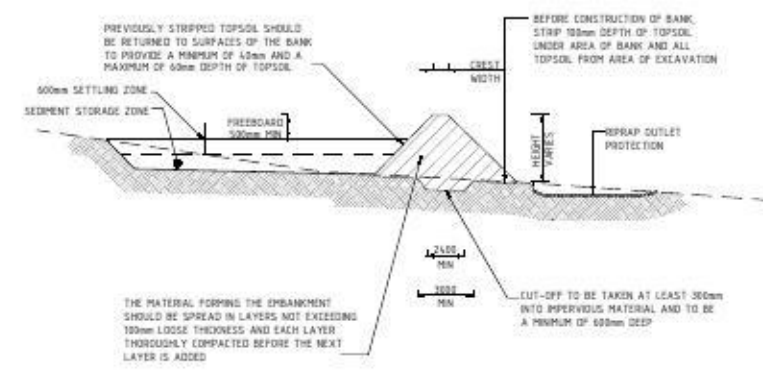


STOCKPILE
NOT TO SCALE

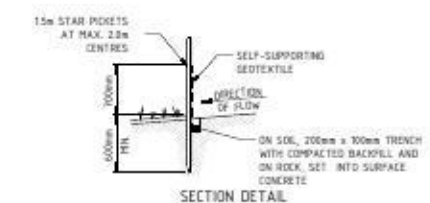
- NOTES:**
- PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
 - CONSTRUCT ON THE CONTOUR AS LOW FLAT, ELONGATED POUNDS.
 - WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT. 4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.3.
 - CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEEDMENT FENCES 1 TO 2 METRES DOWNSLOPE.



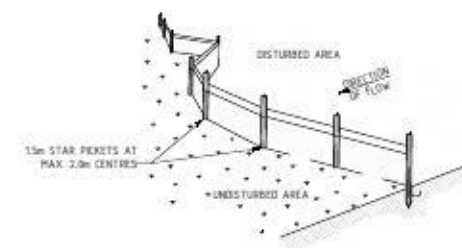
SEDIMENT TRAP FOR KERB INLET (ON GRADE - SANDBAG)
NOT TO SCALE



SEDIMENT BASIN (TYPICAL) CROSS SECTION - TYPE D AND F SOILS
NOT TO SCALE

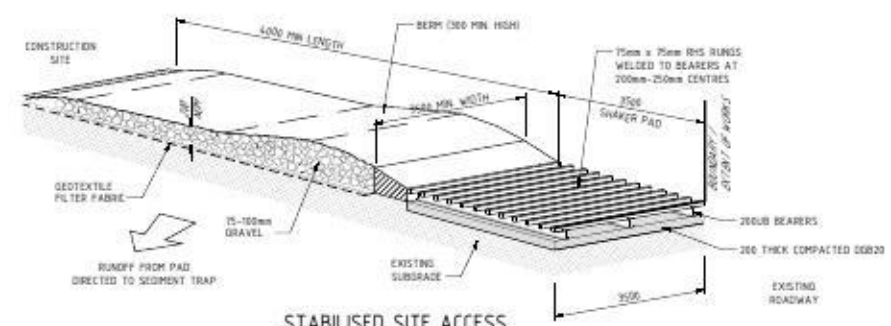


SECTION DETAIL



SEDIMENT FENCE
NOT TO SCALE

- NOTES:**
- CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
 - CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENFORCED.
 - DRIVE 15m LONG STAR PICKETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
 - FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE PICKETS ENSURING IT GOES TO THE BASE OF THE TRENCH FOR THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
 - JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
 - BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



STABILISED SITE ACCESS
NOT TO SCALE

- MAINTENANCE**
- THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY.
 - THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANTUP OF ANY MEASURES USED TO TRAP SEDIMENT.
 - ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
 - INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD.
 - TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
 - INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

<p>1. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FOR THE PROPOSED WORK.</p> <p>2. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FOR THE PROPOSED WORK.</p> <p>3. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FOR THE PROPOSED WORK.</p> <p>4. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FOR THE PROPOSED WORK.</p> <p>5. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FOR THE PROPOSED WORK.</p>
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REVISED DATE	BY	DATE
ISSUED FOR DA		
APR 1 2016		

DATE	No	AMENDMENT	INT	REV

DATE	No	AMENDMENT	INT	REV

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PRELIMINARY

FIFECAPITAL

PROPOSED WAREHOUSE DEVELOPMENT
PROPOSED LOT 22, TYORONE PLACE,
ERSKINE PARK, NSW

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC & CIVIL ENGINEERS

PROJECT MANAGER
Name & Address, P.O. Box
Phone, Fax, Email

PROJECT
Name & Address, P.O. Box
Phone, Fax, Email

DRAWING TITLE
CONCEPT SEDIMENT AND EROSION
DETAILS SHEET

DATE FEB 2016
SCALE NTS
PROJECT NO. 15100
REVISION CV
DATE DA2.11
SCALE 1

NOTES

1. REFER DA4.02 FOR LEGEND.
2. REFER DA01 FOR STORMWATER DESIGN NOTES.
3. DRAWING TO BE READ IN CONJUNCTION WITH CALIBRE CONSULTING DRAWINGS (REF: N03023.43)



REFER DA4.02 FOR CONTINUATION

<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>13/04/2016</td> <td>ISSUED FOR DA</td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	1	13/04/2016	ISSUED FOR DA	<p>DATE</p> <p>13/04/2016</p>	<p>AMENDMENT</p> <p>PRELIMINARY ISSUE</p>	<p>INT</p> <p>CV 1</p>	<p>REV</p> <p>NW 2</p>	<p>DATE</p>	<p>AMENDMENT</p>	<p>INT</p>	<p>REV</p>	<p>KEY PLAN</p>	<p>PROJECT MANAGER</p> <p>REID CAMPBELL</p>	<p>CLIENT</p> <p>FIFECAPITAL</p>	<p>PROJECT</p> <p>PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYRONE PLACE, ERSKINE PARK, NSW</p>	<p>CONSULTANTS</p> <p>SPARKS+PARTNERS CONSULTING ENGINEERS</p>	<p>DATE</p> <p>FEB 2016</p>	<p>SCALE</p> <p>1:250@B1</p>	<p>NO.</p> <p>15100</p>	<p>REV.</p> <p>DA4.01</p>	<p>SHEET</p> <p>2</p>
	NO.	DATE	DESCRIPTION																					
1	13/04/2016	ISSUED FOR DA																						
<p>DATE</p> <p>April 1, 2016</p>	<p>AMENDMENT</p> <p>ISSUED FOR DA</p>	<p>INT</p> <p>CV 1</p>	<p>REV</p> <p>NW 2</p>	<p>DATE</p>	<p>AMENDMENT</p>	<p>INT</p>	<p>REV</p>	<p>DATE</p>	<p>AMENDMENT</p>	<p>CLIENT</p> <p>FIFECAPITAL</p>	<p>PROJECT</p> <p>PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYRONE PLACE, ERSKINE PARK, NSW</p>	<p>CONSULTANTS</p> <p>SPARKS+PARTNERS CONSULTING ENGINEERS</p>	<p>DATE</p> <p>FEB 2016</p>	<p>SCALE</p> <p>1:250@B1</p>	<p>NO.</p> <p>15100</p>	<p>REV.</p> <p>DA4.01</p>	<p>SHEET</p> <p>2</p>							



REFER DA4.01 FOR CONTINUATION

PROPOSED WAREHOUSE
FFL 59.000

PROPOSED BATTER AT MAX. 1:3H
GRADE. EXACT EXTENTS TO BE
CONFIRMED AT DETAILED DESIGN
STAGE FOLLOWING BULK
EARTHWORKS PLATFORMING.

PROPOSED RETAINING WALL EXACT
HEIGHT TO BE CONFIRMED AT
DETAILED DESIGN STAGE FOLLOWING
BULK EARTHWORKS PLATFORMING.

PROPOSED BATTER AT MAX. 1:3H
GRADE. EXACT EXTENTS TO BE
CONFIRMED AT DETAILED DESIGN
STAGE FOLLOWING BULK
EARTHWORKS PLATFORMING.

PROPOSED RETAINING WALL EXACT
HEIGHT TO BE CONFIRMED AT
DETAILED DESIGN STAGE FOLLOWING
BULK EARTHWORKS PLATFORMING.

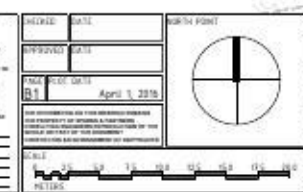
LEGEND

- PROPERTY BOUNDARY LINE
- ADJACENT PROPERTY BOUNDARY LINE
- PROPOSED KERB
- PROPOSED RETAINING WALL
- EXTENT OF BATTER
- FINISHED SURFACE MAJOR CONTOUR LINE
- FINISHED SURFACE MINOR CONTOUR LINE
- FINISHED FLOOR LEVEL OF PROPOSED BUILDING
- FINISHED SURFACE LEVEL
- EXISTING SURFACE LEVEL
- CREST IN PAVEMENT
- PROPOSED STORMWATER PIPE
- PIPE FLOW DIRECTION AND SIZE
- OVERLAND FLOW PATH
- PROPOSED STORMWATER PIT

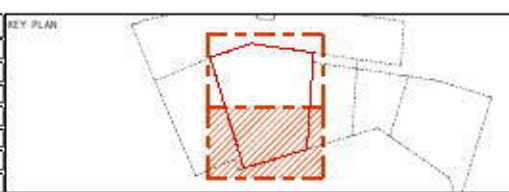
NOTES

- REFER DA4.01 FOR STORMWATER DESIGN NOTES.
- DRAWING TO BE READ IN CONJUNCTION WITH CALIBRE CONSULTING DRAWING (REF. X03033.40)

PROJECT NO.	15100
DATE	April 1, 2016
SCALE	1:500



DATE	NO.	AMENDMENT	INT.	REV.
13/02/16		PRELIMINARY ISSUE	CV	1
10/04/16		ISSUED FOR DA	HW	2



PROJECT MANAGER

NAME: [Name]
PHONE: [Phone]
EMAIL: [Email]

FIFECAPITAL

AGENCY: **REID CAMPBELL**

PRELIMINARY

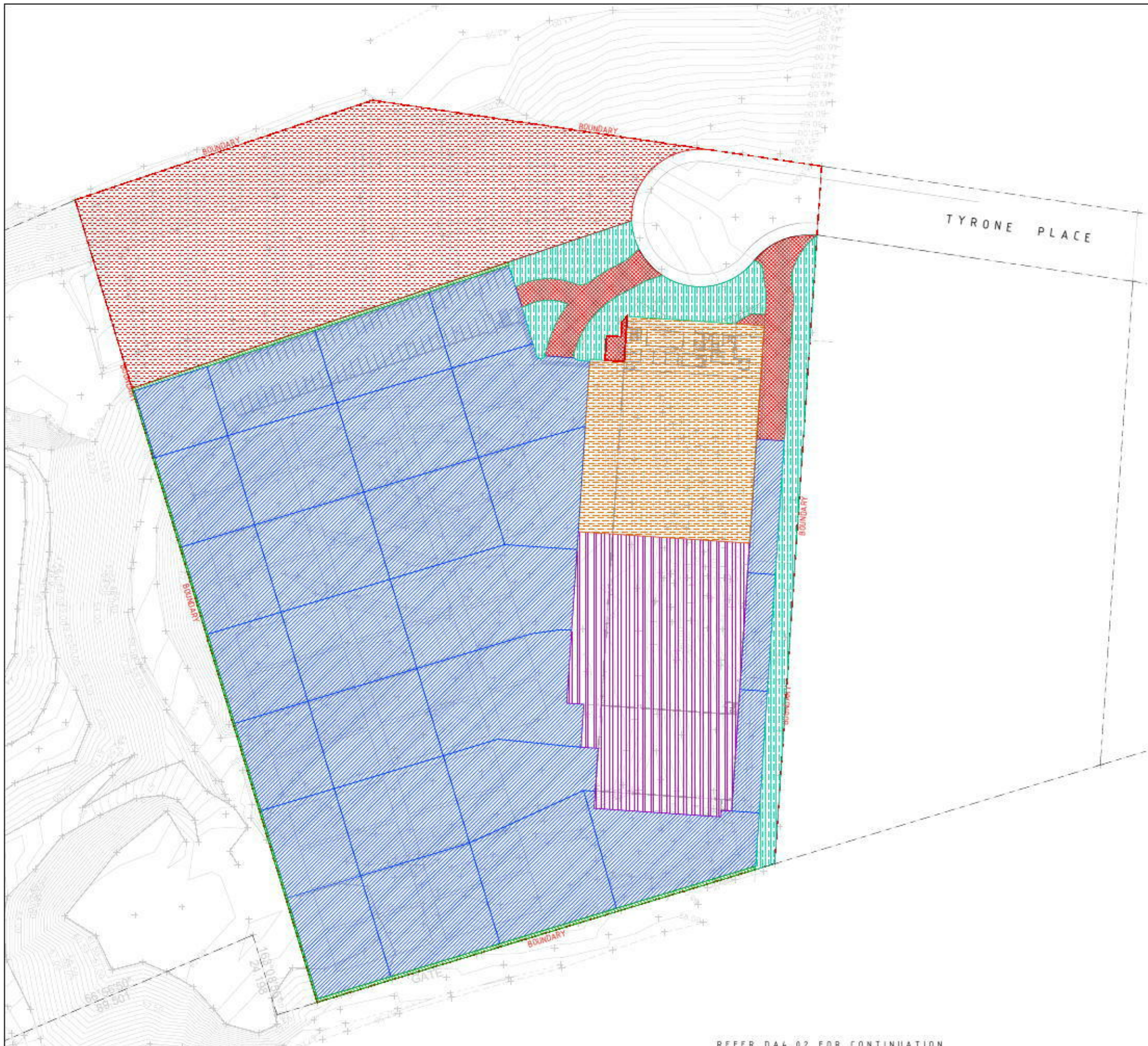
PROJECT: PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYRORNE PLACE, ERSKINE PARK, NSW

DRAWING TITLE: CONCEPT SITWORKS AND STORMWATER MANAGEMENT PLAN SHEET 2

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC & CIVIL ENGINEERS

AHSCA

DATE: FEB 2016
SCALE: 1:250@B1
SHEET: 15100 DA4.02 OF 2



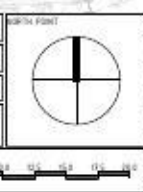
LEGEND	
	IMPERVIOUS CATCHMENT AREA (HARDBUILD) DRAINING TO SORETENTION BASIN - 21,72m ²
	PERVIOUS CATCHMENT AREA (LANDSCAPING) DRAINING TO SORETENTION BASIN - 40m ²
	ROOF CATCHMENT AREA DRAINING TO SORETENTION BASIN - 3,39m ²
	ROOF CATCHMENT AREA DRAINING TO RAINWATER TANK - 3,79m ²
	IMPERVIOUS CATCHMENT AREA (DRIVEWAY) BYPASSING SORETENTION BASIN - 92m ²
	PERVIOUS CATCHMENT AREA (LANDSCAPING) BYPASSING SORETENTION BASIN - 2,09m ²
	FUTURE EXTENSION AREA - 8,00m ²

TYRONE PLACE

REFER DA4.02 FOR CONTINUATION

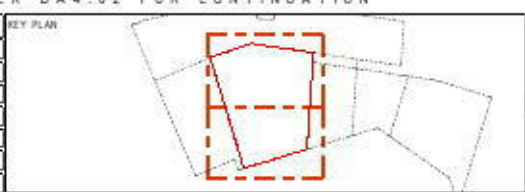
<p>1. THESE PLANS ARE THE PROPERTY OF SPARKS+PARTNERS CONSULTING ENGINEERS. ANY REPRODUCTION OR DISTRIBUTION OF THESE PLANS WITHOUT THE WRITTEN PERMISSION OF SPARKS+PARTNERS IS STRICTLY PROHIBITED.</p> <p>2. THESE PLANS ARE PRELIMINARY AND NOT TO BE USED FOR CONSTRUCTION OR AS EVIDENCE IN COURT.</p> <p>3. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY APPROVALS AND PERMITS FROM THE RELEVANT AUTHORITIES.</p> <p>4. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY INFORMATION FROM THE RELEVANT AUTHORITIES AND PROVIDING IT TO SPARKS+PARTNERS.</p> <p>5. SPARKS+PARTNERS ACCEPTS NO LIABILITY FOR ANY LOSS OR DAMAGE, INCLUDING CONSEQUENTIAL DAMAGES, ARISING FROM THE USE OF THESE PLANS.</p>

<p>REVISIONS</p> <table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td>April 1, 2016</td> <td>ISSUED FOR DA</td> </tr> </table>	NO.	DATE	DESCRIPTION	01	April 1, 2016	ISSUED FOR DA
NO.	DATE	DESCRIPTION				
01	April 1, 2016	ISSUED FOR DA				



DATE	No.	AMENDMENT	INT.	REV.
2016.04.01	01	ISSUED FOR DA		1

DATE	No.	AMENDMENT	INT.	REV.



PROJECT MANAGER

REID CAMPBELL

15100 DA4.05

FIFECAPITAL

REID CAMPBELL

PROJECT: PROPOSED WAREHOUSE DEVELOPMENT PROPOSED LOT 22, TYRONE PLACE, ERSKINE PARK, NSW

DRAWING TITLE: CONCEPT STORMWATER CATCHMENT PLAN

PRELIMINARY

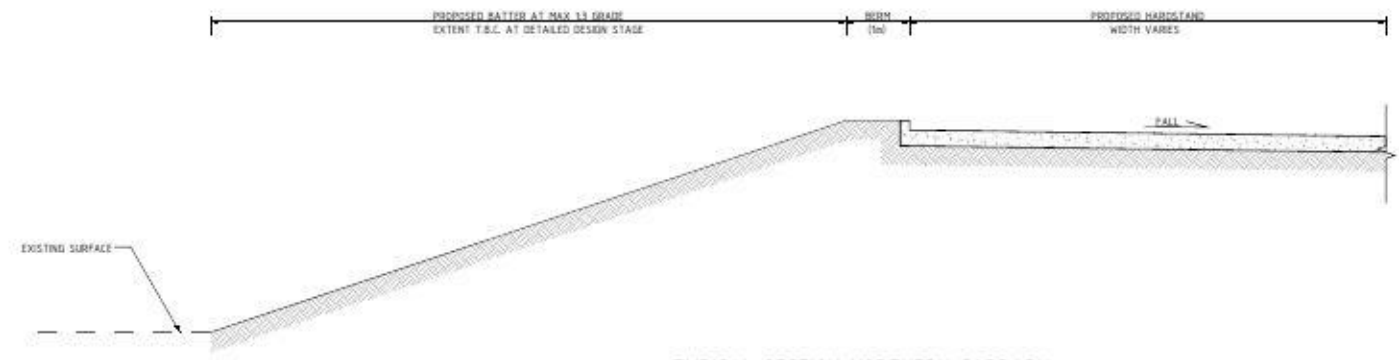
SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC & CIVIL ENGINEERS

DATE: FEB 2016
SCALE: 1:250@B1

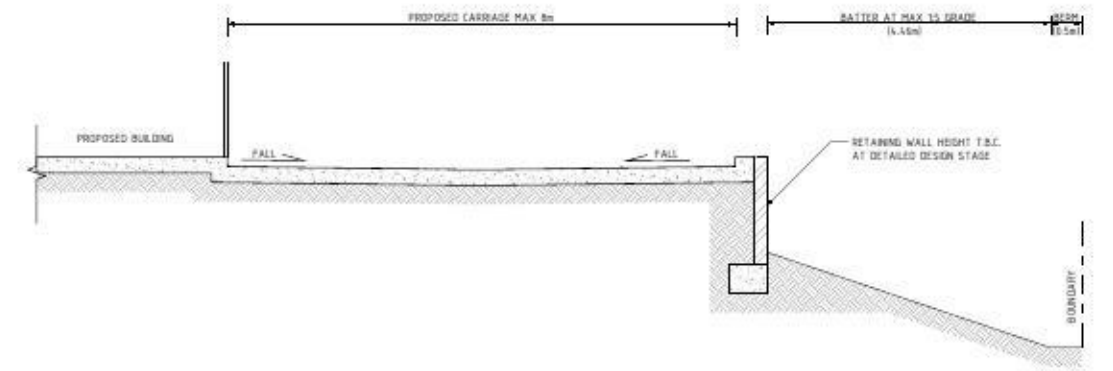
REVISION: CV

AHSCA

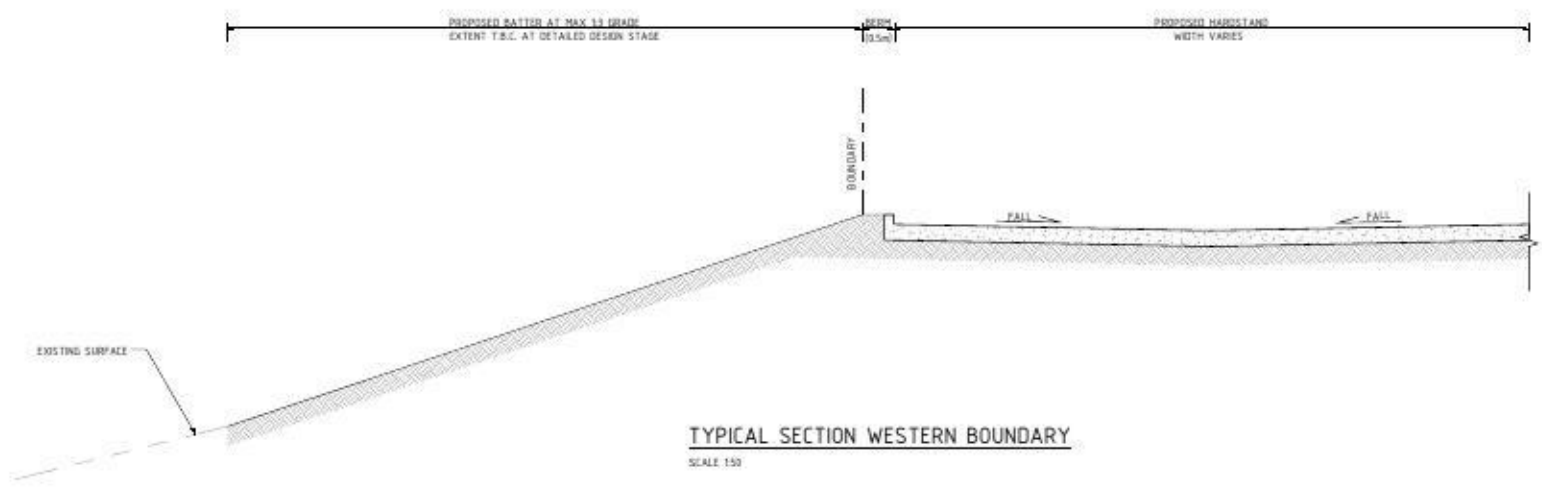
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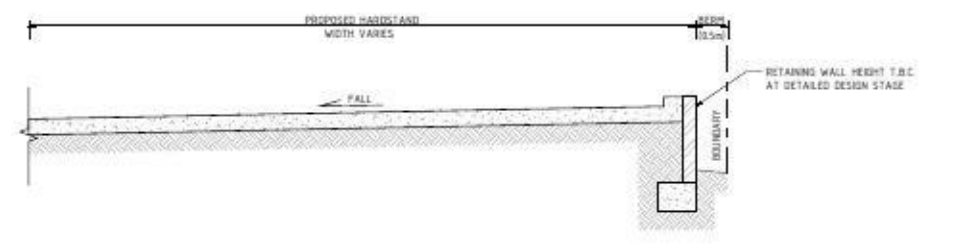
TYPICAL SECTION NORTHERN CARPARK
SCALE 1:50



TYPICAL SECTION EASTERN BOUNDARY
SCALE 1:50



TYPICAL SECTION WESTERN BOUNDARY
SCALE 1:50



TYPICAL SECTION SOUTHERN BOUNDARY
SCALE 1:50

<p>1. THESE PLANS ARE PRELIMINARY AND INTENDED TO ILLUSTRATE CONCEPTS ONLY. THEY ARE NOT TO BE USED FOR CONSTRUCTION OR AS A BASIS FOR ANY CONTRACTS.</p> <p>2. ANY CHANGES TO THESE PLANS MUST BE APPROVED BY THE ENGINEER OF RECORD.</p> <p>3. THE ENGINEER OF RECORD ACCEPTS NO LIABILITY FOR ANY DAMAGE OR LOSS ARISING FROM THE USE OF THESE PLANS.</p> <p>4. THE ENGINEER OF RECORD ACCEPTS NO LIABILITY FOR ANY DAMAGE OR LOSS ARISING FROM THE USE OF THESE PLANS.</p>
--

REVISED DATE	REVISION	DATE	NO.	AMENDMENT	INT.	REV.	DATE	NO.	AMENDMENT	INT.	REV.	KEY PLAN
09/02/2016	1			ISSUED FOR DA		1						
04/01/2016	2											
04/01/2016	3											

<p>PROJECT MANAGER</p> <p>NAME: [Name]</p> <p>PHONE: [Phone]</p> <p>EMAIL: [Email]</p>
--

FIFECAPITAL

REID CAMPBELL

SPARKS+PARTNERS

AHSCA

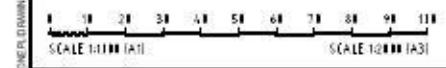
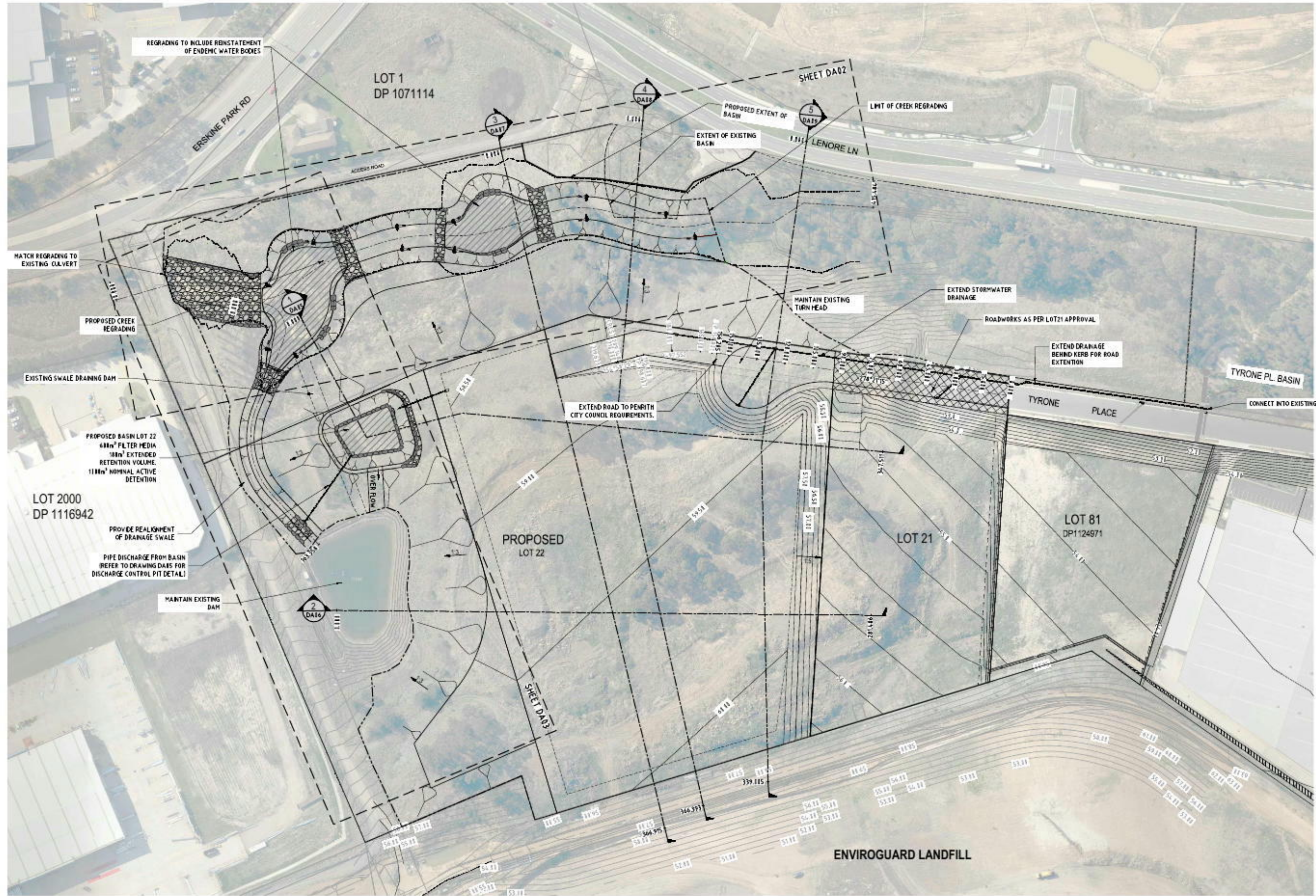
PRELIMINARY

PROJECT: PROPOSED WAREHOUSE DEVELOPMENT
PROPOSED LOT 22, TYDRONE PLACE,
ERSKINE PARK, NSW

DRAWING TITLE:
STORMWATER MANAGEMENT
CONCEPT TYPICAL SECTIONS AND
DETAILS SHEET

DATE: FEB 2016	DESIGN: CV	SCALE: AS SHOWN	REV: 1
PROJECT NO: 15100	DRAWING NO: DA4.11	SHEET NO: 1	

Appendix B – Calibre Consulting Plan



REV	DATE	DESCRIPTION	BY	VER	APP
01	13/04/2016	CLIENT COMMENTS	PS	SAG	
02	14/05/2016	AMENDED INTERIM FILL	CR	BP	
03	16/05/2016	ORDERED INTERIM FILL	CR	BP	
04	31/08/2016	DEVELOPMENT APPLICATION	CR	BP	

Disclaimer and Copyright:
 ALL DIMENSIONS TO BE CHECKED ON SITE BY SUPERINTENDENT PRIOR TO CONSTRUCTION. USE WRITTEN DIMENSIONS ONLY, DO NOT SCALE.
 NOT FOR CONSTRUCTION UNLESS STAMPED BY CERTIFYING AUTHORITY

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AUTHORISED FOR ISSUE
 BY: STUART GREEN
 FEAust. CPEng
 Manager - Urban Development
 SIGN: *[Signature]*
 DATE: 11/11/15

Client: CSR LIMITED
 Project: ERSKINE PARK
 TYRONE PLACE - PROPOSED LOT 22

Drawing: LOT 22 OVERALL SITE PLAN & GRADING STRATEGY

Drawn by: RB
 Design by: FB
 Project No: X03033.46
 Drawing No: DA01
 Scale(A1): 1:1000
 Revision: 04

DEVELOPMENT APPLICATION

Appendix C – Maintenance & Monitoring Schedule

STORMWATER DRAINAGE SYSTEM MONITORING AND MAINTENANCE SCHEDULE

Author Name & Signature: _____

Date: _____

Loscam, Tyone Place, Erskine Park

General Notes:

- 1 - Maintenance is to be carried out with regard to relevant occupational health and safety guidelines and standards. This includes all confined space, traffic management, fall arrest and other requirements.
- 2 - Initial monitoring and inspections of the stormwater system post commissioning are to be carried out every 3 months for the first year of operation. The amount and type of debris is to be noted and recorded. This information shall be used to determine if modification of the frequency of inspections is required.
- 3 - The frequency of inspections shown in the stormwater maintenance schedule are the maximum periods. Inspection frequencies may be reduced upon completion of the initial monitoring and inspection program as noted in note 2.
- 4 - Blank copies of the maintenance schedule are to be made and filled out during each subsequent inspection with the details kept on site for future reference.

Inspected by: _____

Date of Inspection: _____

Date of Next Inspection: _____

Item to be Inspected	Frequency	Performed by	Inspected	Maintenance Required	Maintenance Procedure	Maintenance Completed
			Yes/No	Yes/No		Date
General						
Eaves/Box Guttering System and Downpipes	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect and remove any build up of sediment, debris, litter and vegetation within gutter system.	
Stormwater surface inlet and junction pits	Four Monthly/ After Major Storm	Owner / Maintenance Contractor			Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter and vegetation. (e.g. Vacuum/eductor truck) Inspect and ensure grate is clear of sediment, debris, litter and vegetation. Ensure flush placement of grate on refitment	
General inspection of complete stormwater drainage system (that's visible)	Bi-annually	Owner / Maintenance Contractor			Inspect all drainage structures noting any dilapidation, carry out required repairs.	
Rainwater Tank						
First Flush Device	6 Monthly	Owner / Maintenance Contractor			Inspect first flush device to ensure correct operation. Remove accumulated litter & debris. If device is not functioning properly repair or replace.	
Internal Inspection	6 Monthly	Owner / Maintenance Contractor			Check for evidence of access by animals, birds or insects including the presence of mosquito larvae. If present, identify access point and close. If evidence of algal growth, find and close points of light entry.	
Tank and tank roof	6 Monthly	Owner / Maintenance Contractor			Check structural integrity of tank including roof and access covers. Any dilapidation including holes or gaps are to be noted and repaired.	
Bio-retention/OSD basin						
Evidence of inlet surface erosion	6 Monthly	Maintenance Contractor			Check for scour of filter media at sedimentation chamber overflow. If scour present rake back filter media and provide scour protection.	
filter media	6 Monthly	Owner / Maintenance Contractor			Inspect for surface clogging/ponding in filter. If clogging or ponding present check subsoil drainage line for blockage and cleanout. If no blockage present in sub-soil drainage remove clogged filter media and replace with specified filter media.	
filter area	6 Monthly	Owner / Maintenance Contractor			Inspect filter area for build up of litter and debris, remove any litter present. Inspect filter for distribution of media, if required rake filter media to provide even depth through filter area.	
Outlet/overflow spillway	6 Monthly	Owner / Maintenance Contractor			Inspect spillway to ensure in good condition with no deterioration present. If required provide repairs.	
Trash Screen	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect trash screen to ensure correct operation. Remove accumulated litter & debris. If device is not functioning properly repair or replace.	
Orifice Plate	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect orifice plate to ensure correct operation. Check orifice diameter size is correct and no damage is present to orifice edge. Check orifice plate is securely fastened to wall with no gaps present between plate and face of wall. If gaps are present fill with sealant or mortar to provide water tight seal.	
Weep Holes in base of sump	Six Monthly/ After Major Storm	Owner / Maintenance Contractor			Inspect weep holes in base of sump. Ensure weep holes are able to drain effectively and remove accumulated sediment and debris if present.	