SPARKS +PARTNERS
CONSULTING ENGINEERS
HYDRAULIC I CIVIL I FIRE

PO Box 979
Level 1, 91 George Street
PARRAMATTA NSW 2150

Office 02 9891 5033
Fax 02 9891 3898
admin@sparksandpartners.com.au

sparksandpartners.com.au

ABN 95 161 152 969

STORMWATER DRAINAGE AND FLOOD MANAGEMENT REPORT

PROPOSED WAREHOUSE FACILITY

4 Johnsons Place, Cranebrook

Date:	19 November 2021
Revision:	2
Issue:	Development Application
Ref. No.:	21300

Prepared for: **APEX BUILDING SYSTEMS PTY LTD**

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Document Control

Revision	Date	Description	Prepared	Reviewed	Approved
1	03.11.21	DA Issue	MG	BB	BB
2	19.11.21	DA Issue	MG	BB	BB

Prepared by	Madhu Giri	Revision	2
Approved by	Benjamin Barrett	Revision	2

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

Sparks & Partners have been engaged by Apex Building Systems to provide civil engineering services to support the proposed Development Application at 4 Johnsons Place, Cranebrook. The engineering services include the design and documentation of the stormwater drainage infrastructure, finished pavement levels and review of flooding controls for the proposed development.

Penrith City Council being the approval authority for the proposed development, require a stormwater management and flood review report be prepared that takes into consideration the objectives and controls under Penrith Development Control Plan 2014 (PCCDCP) and Council's WSUD Policy and Technical Guidelines. This report demonstrates that the proposed Industrial development identifies, incorporates and responds to the relevant requirements of the PCCDCP with respect to stormwater and flood management providing a complying development.

2. INTRODUCTION

2.1 Existing Site

The site is located within the Waterside Corporate, industrial subdivision at Andrews Road, Cranebrook, and is located within the western precinct at 4 Johnsons Place. The site is approximately 1,205m² in area and is bounded by Lot 26 DP 286568 on the eastern boundary, Johnson Place on the northern boundary, Lot 28 DP 286568 (Factory units under construction) on the western boundary and a drainage channel on the north-east boundary. The site is currently vacant and has a general fall toward north of the site. A survey of the site is provided in Appendix A for reference.

Figure 1: Locality plan – Courtesy of Near Maps

2.2 Proposed Development

The proposed development consists of an industrial warehouse, office, hardstand and carparking areas. The warehouse and office are to be located on the southern portion of the site and occupy approximately 676m², the carparking and hardstand areas are located on the northern portion, occupying approximately 405m², with the remaining 124m² being landscaping located along the street and drainage channel frontages. The proposed floor level of the warehouse is RL24.820m AHD, which is the highest floor level that can be achieved based on rising from the street frontage at the maximum grade as permitted by AS2890.1. Detailed architectural plans have been prepared by Apex Building Systems and are to be read in conjunction with this report, along with concept civil engineering plans that are located in Appendix B for reference.

3. WATER MANAGEMENT

3.1 General

Section C3 Water Management of the PCCDCP details the requirements that developments must address with respect to water management. The relevant sections that apply to the proposed development are *C3.1 The Water Cycle/Water Conservation*, *C3.2 Catchment Management and Water Quality* and *C3.5 Flood Planning* and are addressed in the following sections.

3.2 Water Conservation

The development is a new commercial/industrial development that is less than 2,500m² in total site area, therefore the development falls under the third category of the Commercial and Industrial section of *Table C3.1: Developments Required to Consider Water Sensitive Urban Design* of Section C3 of the PCCDCP and is required to comply with Section 5. WSUD Development Controls, A. Water Conservation, section b. This requires the development to install WELS rated fixtures and fittings and a rainwater tank that supplies 80% of the non-potable water demand.

To demonstrate compliance, the sizing of the rainwater tank has been undertaken using the Council endorsed MUSICX software package and the development of a water balance model. The water balance model has been constructed using the following inputs:

- Penrith City Council MUSICX Link;
- Roof catchment area = 801m²;
- Minimum 9kL rainwater tank;
- Reuse demand based on:
    - Four toilets at a usage rate of 0.1kL/day/toilet = 0.4kL/day;
    - Irrigated area of 108m² at 0.4KL/m² or reuse demand = 43.2kL/year.

Using the above inputs, the water balance determines the rainwater tank has an approximate efficiency of 82.8%, which results in an approximate reduction in the proposed demand on potable water supplies.

3.3 Stormwater Quality

The proposed development is less than 2,500m² in area and as such is not required to address the requirements of Stormwater Quality and Water Quantity Flow in accordance with Table C3.1: Developments Required to Consider Water Sensitive Urban Design of Section C3 of the PCCDCP.

3.4 Stormwater Quantity

The site is located outside the OSD catchment areas as mapping shown in Appendix D of Councils Policy *Stormwater Drainage Guidelines for Building Developments, May 2018*, therefore the use of on-site detention to control the quantity of stormwater discharge from the site is not required.

3.5 Flooding

The development has been identified by Council as being flood affected, therefore is required to address items under section *C3.5 Flood Planning* of the PCCDCP.

3.5.1 Nature of Flooding

Council's flood information detailing the impacts of mainstream flooding estimates the 1% AEP flood level is to be RL24.400m AHD. A copy of Council's flood information letter has been provided in Appendix D for reference. Currently Council is undertaking an overland flow flood study for the Cranebrook catchment.

3.5.2 Flood Offset

To manage the flood waters without negatively impacting neighboring sites, the proposed development has been designed such that the development does not reduce the flood storage volume from the predeveloped site. The existing site condition provides a flood storage volume of 26.8m^3, and the proposed development provides a flood storage volume of 27.5m^3, providing an additional 0.7m^3 of flood storage.

3.5.3 Building Floor Level

Due to the site constraints of re-grading the existing site levels across the verge and boundary to meet compliance with Council's driveway guidelines as well as complying with carparking gradients, the highest floor level able to be achieved is RL24.820 AHD. This is calculated by grading up from the boundary level (RL24.050m) at 5.0% for 7.700m (change in height of 0.385m) until the edge of the kerb is reached, where compliant grade of 5.0% for 7.641 (change in height of 0.382) till the building pad is reached, the finished surface of RL24.820 (24.050 + 0.385+0.382). This resultant floor level sits above 1% AEP flood level as per the Acor flood report and does not sit above the freeboard requirement as per Council's flood information for the mainstream flooding from the Nepean River.

To achieve a compliant floor level with Council's flood information of RL24.900m (1% AEP flood level + 500mm freeboard), this would only be possible by having a driveway length of approximately 17m, which would considerably reduce the usable building area to below 30% of the total site area and would render the development unworkable/uneconomical.

3.5.4 Flood Compatibility

The building is to be constructed of concrete tilt panels, with no openings along the southern, eastern, and western facades. This type of flood compatible construction ensures minimal

detrimental effects to the building should the flood waters in the southern and eastern boundaries of the site come in contact with the building. The southern, eastern and western facades would be waterproofed and fully sealed up to RL24.900m (1% AEP Flood Level + 500mm freeboard) to prevent the possible ingress of flood waters into the building.

The office entrance would have flood compatible materials for floor coverings such as tiles or polished concrete, with the lower portion of the walls upto RL24.900 would be constructed of food compatible material such as metal framed stud walls and fibre cement sheet, masonry, or concrete.

Electrical outlets on the ground floor/warehouse would be located above RL24.900.

3.5.5 Risk to Person and Property

In the event of mainstream flooding as per Council's flood, it is likely Johnson Place will be inundated due to flooding within Andrews Road and the adjacent drainage channel. Flood evacuation from the site would not be possible in such an event, and in the extreme event that flood waters inundate the building, persons may take refuge in the mezzanine office located at RL28.220m which provides approximately 3.82m of freeboard to the 1% AEP flood level.

4. MAINTENANCE AND MONITORING

To ensure the continued efficient and correct operation of the proposed water management infrastructure a 'maintenance and monitoring schedule' is included in the Appendix E of this report. 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.

5. CONCLUSION

Based on the preparation of the concept stormwater drainage plans and MUSIC-X modeling results it is demonstrated that the water management principles in terms of water conservation and flood management have been incorporated into the design and operation of the proposed development in accordance with PCCDCP. It is demonstrated that the proposed development achieves reductions in potable water import by capturing rainwater on site and reusing this for toilet flushing and irrigation. The proposed development employs water conservation measures that 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. Persons and property are protected from flood waters with the site being orientated and constructed to prevent the ingress of flood waters into the site, and the in the extreme event that flood inundation occurs safe refuge is available for persons in the mezzanine office, which is located approximately 3.4m above the 1% AEP flood level.

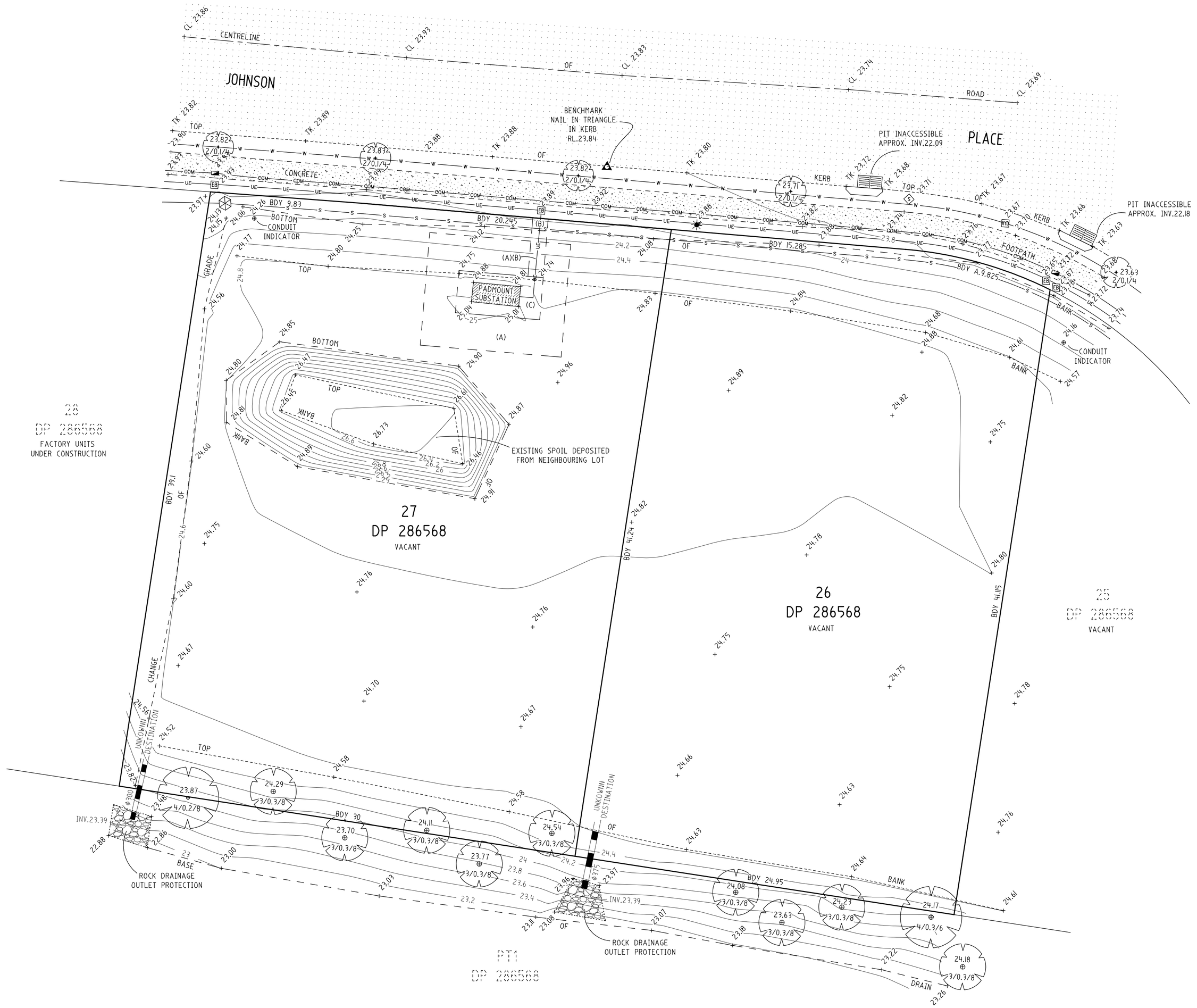
APPENDIX A. SITE SURVEY

A1

CAUTION

* These notes must be included with any copying or reproduction in part or full together with the plan number & any amendment. The information shown on this plan must not be amended or altered.
* The position of features shown have been located for topographical purposes only at the reduction ratio shown. Boundary dimensions have been taken from the Title diagram. The survey has been undertaken in accordance with clause 9(1) of the Surveying & Spatial Information Regulation 2017.
* This survey plan is for planning & design purposes only & is not to be used for construction. If any construction is to be undertaken close to or relative to any boundary, or accurate position of features is needed a specific setout or boundary survey is required.
* Contours shown are indicative of the surface & should not be interpolated to determine accurate levels.
* Trees shown are indicative of their size. The tree spreads are shown central about the trunk & may not be a true indication of their drip line.
* The terms and conditions of Restrictions, Positive Covenants appearing on the Certificate of Title have not been investigated.
* Only visible services of Electricity, Communications, Water, Sewer & Drainage have been located. The plotting of any service from or between visible structures shown hereon (pit, hydrant etc) does not guarantee the service is a straight line nor that the service is directly under the structure.
* The position of underground services shown hereon has been taken from DBYD service authority diagrams. Service authority diagrams provide an indication that an underground service exists and there is no guarantee/warranty that all underground services are shown on the DBYD nor on this plan nor that the location shown on either is accurate. Prior to ANY demolition, excavation or construction, DBYD must be updated and all relevant service authorities MUST be contacted for the possible location of further services & the precise location of all services.
* Any Underground Services shown hereon or on any services plan critical to any design or construction near any service MUST be confirmed for location and level by potholing &/or directly with the relevant service provider.

M.G.A.



LEGEND

- uE — DENOTES UNDERGROUND ELECTRICITY (READ CAUTION NOTE)
- s — DENOTES SEWER (READ CAUTION NOTE)
- w — DENOTES UNDERGROUND WATER (READ CAUTION NOTE)
- com — DENOTES UNDERGROUND TELECOMMUNICATION (NBN/TELSTRA) (READ CAUTION NOTE)
- HYD — DENOTES HYDRANT
- EB — DENOTES ELECTRICITY BOX/PILLAR
- DENOTES TELECOMMUNICATIONS PIT
- DENOTES SIGN
- DENOTES LIGHT POLE
- DENOTES KERB INLET PIT
- DENOTES MANHOLE
- TK 50.23 — DENOTES TOP OF KERB LEVEL
- CL 50.23 — DENOTES CENTRELINE OF ROAD
- 3/0.2/8 — 3/0.2/8 DENOTES APPROXIMATE SPREAD/TRUNK DIAMETER/HEIGHT

1:150

3 1.5 0 3 6 9 12 15

ALL DIMENSIONS IN METRES UNLESS OTHERWISE SHOWN

(A) RESTRICTION ON THE USE OF LAND
(B) EASEMENT FOR UNDERGROUND CABLES 1 WIDE (DP 286568)
(C) EASEMENT FOR PADMOUNT SUBSTATION 2.75 WIDE (DP 286568)

DIAL 1100 BEFORE YOU DIG

	F		0	10	20	30	40	50	MILLIMETRES AT A1	100	110	120	130	140	150
	E														
	D														
	C														
	B														
	A														
Date		REVISION													

DESIGN BY
SURVEY BY K.RYAN
DRAWN BY K.RYAN
CHECKED BY A.EDWARDS
REGISTERED LAND SURVEYOR No. 985

REDUCTION RATIO AT A1 1:150

CONTOUR INTERVAL 0.2m
ORIGIN OF LEVELS SSM 80413
RL.25.447
DATUM A.H.D.

McKINLAY MORGAN & ASSOCIATES Pty Ltd.
ACN 169 615 801 ABN 90 169 615 801
CONSULTING SURVEYORS – PROJECT MANAGERS
333 George Street, Windsor NSW 2756
PO Box 217 Windsor NSW 2756
Phone: 4577 6011
Fax: 4577 4910
Email: mail@mckinlaymorgan.com.au
www.mckinlaymorgan.com.au

DATE OF SURVEY 2/9/2021
FILE No. 94672
COUNCIL REF

CLIENT NAME APEX BUILDING SYSTEMS Pty Ltd
LOCALITY CRANEBROOK LGA PENRITH
PLAN No. 94672:D:1 C.FILE: 94672D1.DWG

PLAN SHOWING LEVELS & CONTOURS OVER LOTS 26-27 DP 286568 JOHNSON PLACE, CRANEBROOK

SHEET No. 1
OF 1 SHEETS

APPENDIX B. CONCEPT CIVIL ENGINEERING PLANS

PROPOSED INDUSTRIAL DEVELOPMENT
4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

LOCALITY PLAN

NOT TO SCALE - COURTESY OF SIX MAPS

DRAWING SCHEDULE

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03.11.21	DA ISSUE	MG	1

DATE	AMENDMENT	INIT	REV

STRUCTURAL -

MECHANICAL -

ELECTRICAL -

CIVIL SPARKS AND PARTNERS CONSULTING ENGINNERS

CLIENT

BUILDER

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
32 Walker Street Windsor NSW 2756 PO Box 853
Telephone: 02 4587 7166
Fax: 02 4587 7130
E-Mail: design@apexbuildingsystems.com
Excellence in Industrial Developments

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

FPA AUSTRALIA Fire Protection Association Australia CORPORATE MEMBER
DNV·GL ISO 9001 QUALITY SYSTEM CERTIFICATION
HCAA

DEVELOPMENT APPLICATION ISSUE

DRAWING TITLE
CIVIL DESIGN
COVER PAGE & DRAWING
SCHEDULE

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

SCALE	SIZE	REVISION
NTS	A1	1

PROJECT No 21300

DRAWING No DA1101

W:\2 - PROJECTS\21\21300 - 4 JOHNSON PLACE, CRANEBROOK\3-DESIGN FILES\A-DESIGN DRAWINGS\B-CIVIL\21300_DA1101.DWG

SURVEY

1. LEVELS BASED ON SURVEY PREPARED BY:
   [MCKINLAY MORGAN & ASSOCIATES PTY LTD, REF: 94672 & DATE:2/9/21

STORMWATER DESIGN CRITERIA

1. DESIGN CRITERIA.
   - 1.1. PIPED DRAINAGE - 1:20YR ARI
   - 1.2. OVERLAND FLOWS - GAP FLOW BETWEEN 1:20YR ARI & 1:100YR ARI

DESIGN GUIDES

1. PENRITH DEVELOPMENT CONTROL PLAN 2014
2. WATER SENSITIVE URBAN DESIGN (WSUD), PENRITH CITY COUNCIL, DEVEMEBR 2013
3. STORMWATER DRAINAGE POLICY, PENRITH CITY COUNCIL, NOVEMBER 2016
4. AS2890.1:2004 PARKING FACILITIES, PART 1: OFF-STREET CAR PARKING
5. AS2890.2:2002 PARKING FACILITIES, PART 2: OFF-STREET COMMERCIAL VEHICLE FACILITIES
6. AS2890.6:2009 PARKING FACILITIES, PART 6: OFF-STREET PARKING FOR PEOPLE WITH DISABILITIES
7. AS3500.3:2018 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE

DEVELOPMENT APPLICATION (DA) STAGE

1. DOCUMENTS ARE PROVIDED FOR DA APPROVAL PURPOSES ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION
2. STORMWATER DESIGN SHOWN IS CONCEPTUAL ONLY AND SUBJECT TO FINAL DESIGN AT CONSTRUCTION CERTIFICATE STAGE
3. FINISHED LEVELS SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED DESIGN AT CONSTRUCTION CERTIFICATE STAGE. FINAL FINISHED LEVELS TO BE ±0.5m FROM LEVELS SHOWN

RAINWATER RE-USE

RAINWATER TANK

EFFECTIVE VOLUME: 9kL

ROOF CATCHMENT AREA: 801m^2

REUSE:

- 108m^2 LANDSCPAING IRRIGATION
- 4 TOILETS FLUSHING

SAFETY IN DESIGN

1. CONTRACTOR SHALL ENSURE ALL ACCESS TO THE TANKS & CHAMBERS ARE COMPLETE WITH RELEVANT CONFINED SPACE SIGNAGE.
2. ALL PERSONNEL REQUIRED TO INSPECT AND MAINTAIN SERVICES WITHIN THESE AREAS SHALL BE TRAINED IN ACCORDANCE WITH WHS/OH&S REQUIREMENTS.
3. REFER TO RELEVANT SAFETY IN DESIGN REPORT FOR CONSTRUCTION RISK MATRIX

SITE WORKS - GENERAL

1. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH LOCAL COUNCIL, AUSTRALIAN AND AUTHORITY STANDARDS.
2. ALL TRENCHING 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.
5. THE ENGINEER SHALL BE GIVEN A MIN. OF 48 HOURS NOTICE FOR ALL STORMWATER DRAINAGE AND PAVEMENT INSPECTIONS. CONCRETE SHALL NOT BE DELIVERED UNTIL ENGINEERS APPROVAL IS OBTAINED.

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.

EXISTING UTILITIES

1. UTILITY INFORMATION SHOWN ON PLAN DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE BASED ON AVAILABLE DOCUMENTARY EVIDENCE
2. THE PRESENCE OF A UTILITY SERVICE, SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION PRIOR TO THE COMMENCEMENT OF ROAD WORKS, AND THE RELATED UTILITY PLANS OBTAINED BY DIALING 110 OR FAX 130 652 077 (DIAL BEFORE YOU DIG)
3. UTILITY LOCATION,SIZE AND DEPTH TO BE CONFIRMED BY SERVICE LOCATING OR NON-DESTRUCTIVE EXCAVATION PRIOR TO CONSTRUCTION. ALL CLASHES WITH PROPOSED SERVICES ARE TO BE RESOLVED
4. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE RELEVANT SERVICES AUTHORITIES OF THE WORKS AND VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO ANY CONSTRUCTION ACTIVITIES COMMENCING
6. THE CONTRACTOR SHALL LIAISE AND COORDINATE THE TIMING OF THE CONSTRUCTION OF THE WORKS WITH THE RELEVANT SERVICES CONCURRENTLY AT THIS SITE
7. THE CONSTRUCTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE CAUSED TO EXISTING SERVICES AS A RESULT OF THE CONSTRUCTION WORKS

SEDIMENT AND EROSION CONTROL

1. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH COUNCIL 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 SHAKE 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. TACIFIERS 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 10 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 LIKELY 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.

FINISHED LEVELS

1. LEVELS BASED ON SITE SURVEY INFORMATION. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION
2. CARPARK & SERVICE AREA LAYOUT AND GRADES TO COMPLY WITH AS2890.
3. DRIVEWAY LAYOUT AND DESIGN TO COMPLY WITH APPROVAL AUTHORITY ACCESS DRIVEWAY DESIGN AND CONSTRUCTION SPECIFICATION.
4. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
5. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
6. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
7. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS U.N.O

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ELECTRICAL
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CLIENT

BUILDER

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
30 Walker Street Windsor NSW 2756 (PO Box 863)
Telephone: 02 4587 7166
Fax: 02 4587 7106
E-Mail: design@apexbuildingsystems.com
Excellence in Industrial Developments

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

FPA AUSTRALIA Fire Protection Association Australia. CORPORATE MEMBER
QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001
HCAA

DRAWING TITLE
CIVIL DESIGN
SPECIFICATION SHEET

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

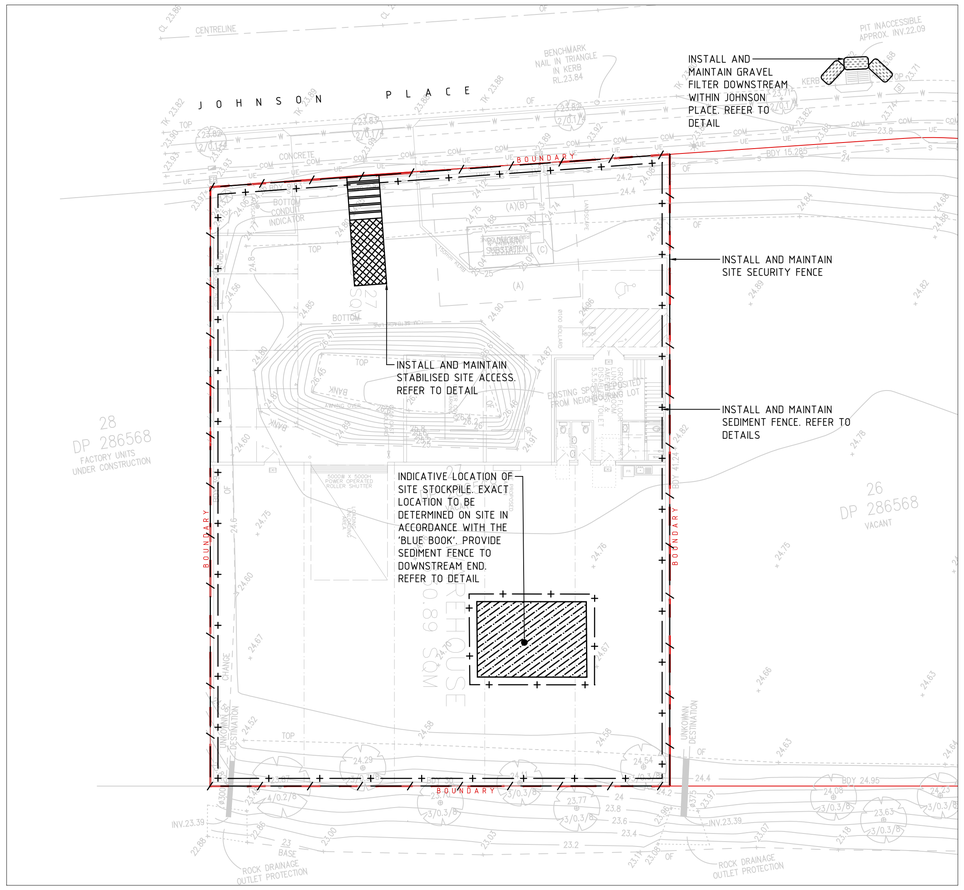
SCALE	SIZE	REVISION
NTS	A1	1

PROJECT No: 21300

DRAWING No: DA1201

DEVELOPMENT APPLICATION ISSUE

W:\2 - PROJECTS\2021\21300 - 4 JOHNSON PLACE, CRANEBROOK\3-DESIGN FILE\A-DESIGN DRAWINGS\B-CIVIL\21300_DA1201.DWG



SEDIMENT AND EROSION CONTROL PLAN

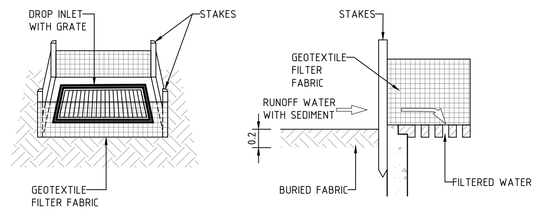
SCALE 1:200

LEGEND

- SITE SECURITY FENCE
- SEDIMENT FENCE
- STABILISED SITE ACCESS
- SITE STOCKPILE
- MESH AND GRAVEL INLET FILTER

SEDIMENT & EROSION CONTROL NOTES

1. REFER TO DA1201 FOR GENERAL NOTES AND SPECIFICATIONS.
2. REFER TO DA2701 FOR SEDIMENT AND EROSION CONTROL DETAILS

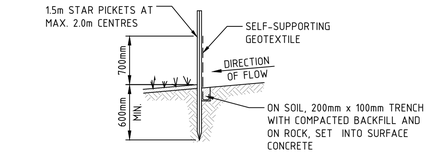


GEOTEXTILE INLET FILTER DROP INLET SEDIMENT TRAP

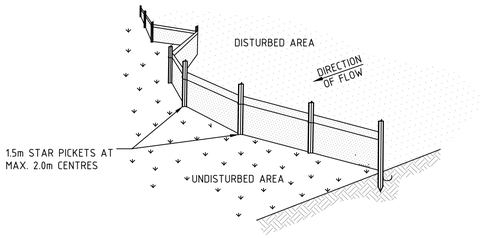
NOT TO SCALE

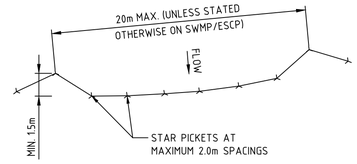
NOTES:

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.0m LONG STAR PICKETS INTO GROUND AT THE FOUR CORNERS OF PIT WALLS. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX 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.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



SECTION DETAIL





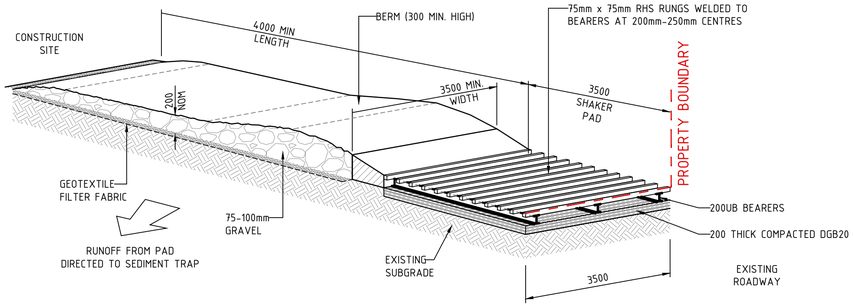
PLAN

SEDIMENT FENCE

NOT TO SCALE

NOTES:

1. 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.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m 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.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX 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.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

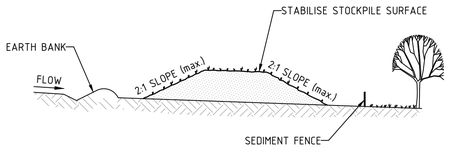


STABILISED SITE ACCESS WITH SHAKER PAD

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 CLEANOUT 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.

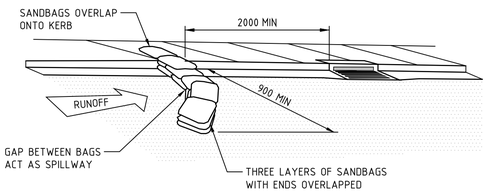


STOCKPILE

NOT TO SCALE

NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. 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 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.



SEDIMENT TRAP FOR KERB INLET (ON GRADE - SANDBAG)

NOT TO SCALE

AS SHOWN

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PROPOSED INDUSTRIAL DEVELOPMENT
4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
30 Walker Street Windsor NSW 2756 PO Box 9631
Ph: 02 4577 7188
Fax: 02 4577 7135
E-Mail: design@apexbuildingsystems.com
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Level 1, 91 George Street | Parramatta | NSW 2150
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DRAWING TITLE
CIVIL DESIGN
CONCEPT SEDIMENT & EROSION CONTROL PLAN

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

PROJECT No	SCALE	SIZE	REVISION
21300	AS SHOWN	A1	1

DRAWING No DA2101

DEVELOPMENT APPLICATION ISSUE

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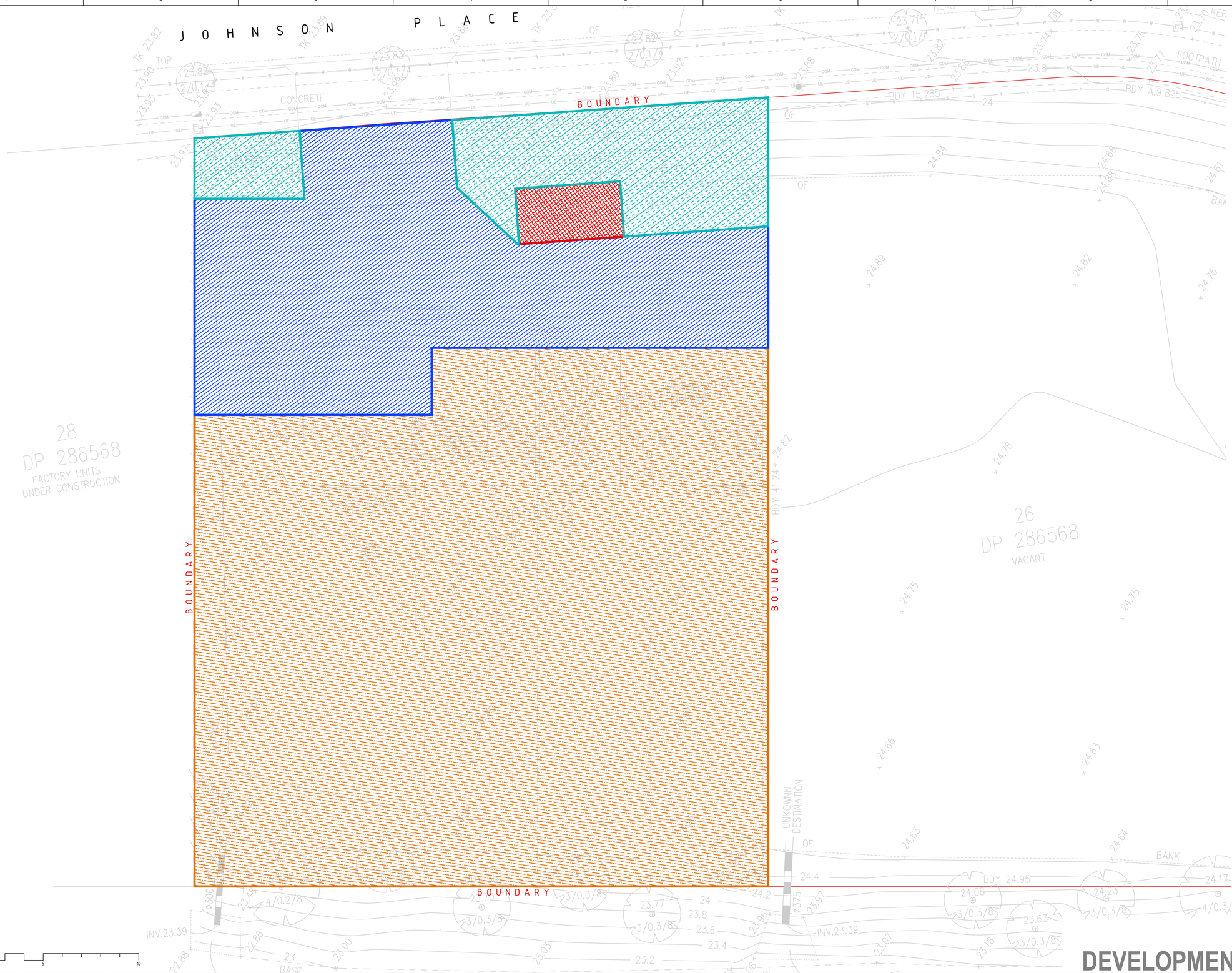

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4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
30 Walker Street Windsor NSW 2756 PO Box 8503
Ph: 02 4577 7788
Fax: 02 4577 7728
E-Mail: design@apexbuildingsystems.com
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DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER
CATCHMENT PLAN

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

PROJECT No	SCALE	SIZE	REVISION
21300	1:100 @ A1	A1	1

DRAWING No DA4301

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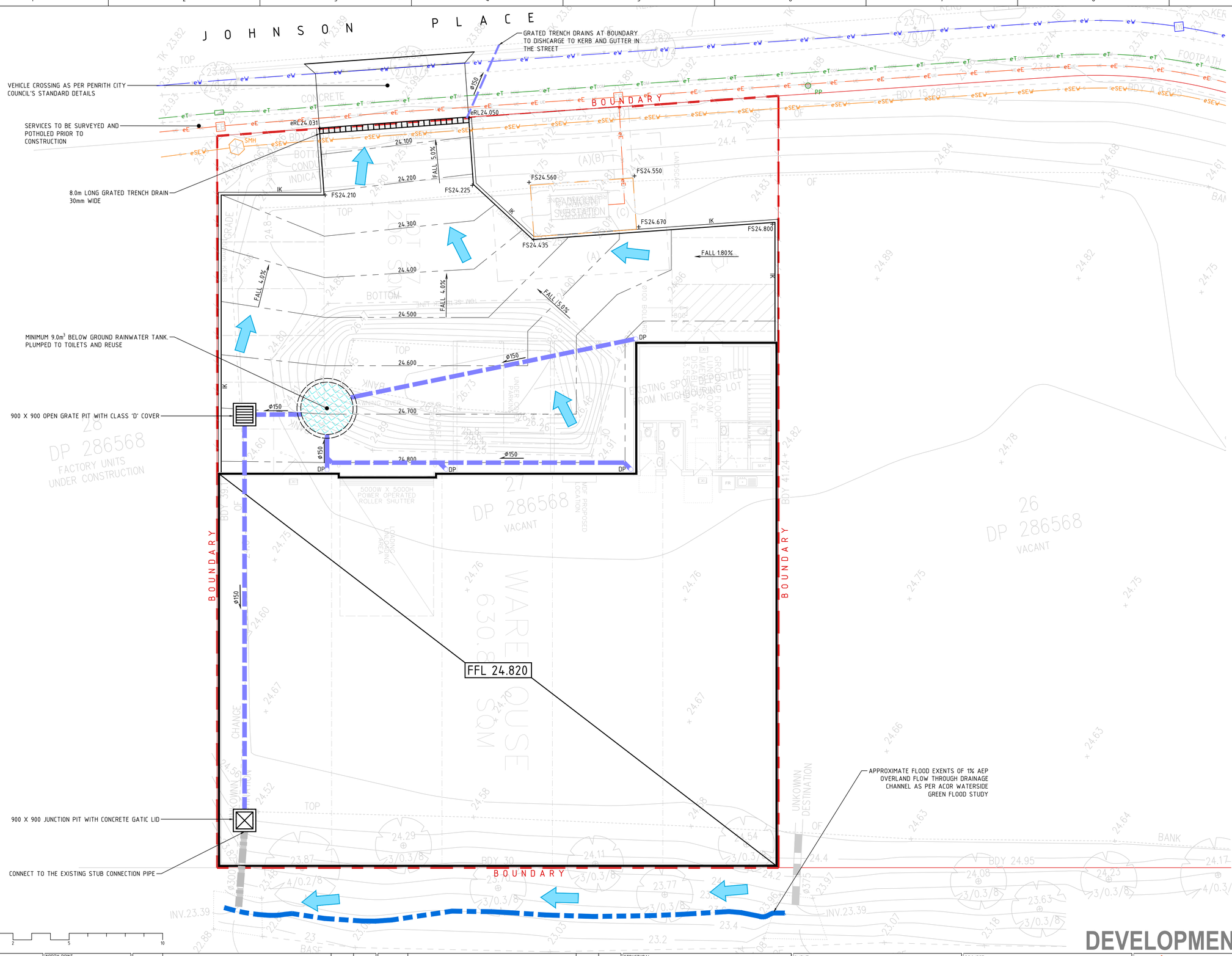

LEGEND

- PROPOSED STORMWATER PIPE (≤Ø300)
- PROPOSED STORMWATER INLET PIT (GRATED COVER)
- PROPOSED STORMWATER JUNCTION PIT (SEALED COVER)
- EXISTING KERB INLET PIT
- GTD — PROPOSED GRATED TRENCH DRAIN
- Ø225 — PIPE FLOW DIRECTION AND SIZE
- RAINWATER TANK
- OVERLAND FLOW PATH
- DP — PROPOSED DOWNPIPE
- LOCAL OVERLAND FLOW 1% AEP EXTENTS
- 20.000 — FINISHED SURFACE MAJOR CONTOUR LINE
- 20.100 — FINISHED SURFACE MINOR CONTOUR LINE
- 20.150 — FINISHED SURFACE CREST/TRANSITION LINE
- FFL 555.555 — FINISHED FLOOR LEVEL OF PROPOSED BUILDING
- + FS55.555 — FINISHED SURFACE LEVEL
- + eRL55.555 — EXISTING REDUCED SURFACE LEVEL
- FALL 1.5% — DIRECTION OF SURFACE FALL
- IK — PROPOSED INTEGRAL KERB - REFER DETAIL
- SMH — SEWER MANHOLE
- eSEW — EXISTING SEWER LINE
- PP — POWER POLE
- eT — EXISTING TELECOM LINE
- eW — EXISTING WATER MAIN LINE
- eE — EXISTING ELECTRICITY LINE
- EASEMENT BOUNDARY

STORMWATER MANAGEMENT NOTES

1. REFER TO DA1201 FOR GENERAL NOTES AND SPECIFICATIONS
2. REFER TO DA4301 FOR STORMWATER CATCHMENT PLAN
3. REFER TO DA4701 FOR STORMWATER MANAGEMENT DETAILS

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CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
30 Walker Street Windsor NSW 2756 (PO Box 853)
Telephone: 02 4587 7166
Fax: 02 4587 7130
E-Mail: design@apexbuildingsystems.com
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DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER & GRADING PLAN

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

PROJECT No	SCALE	SIZE	REVISION
21300	1:100 @ A1	A1	2

DRAWING No DA4101

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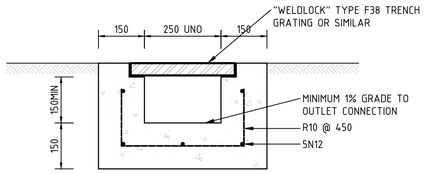
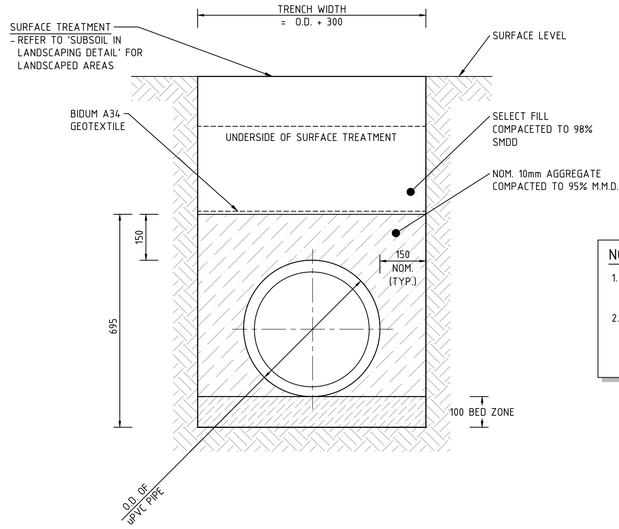
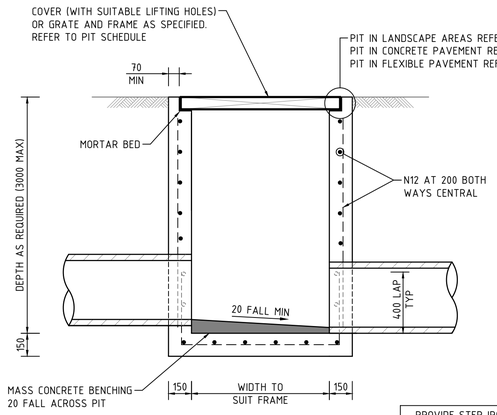


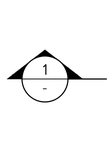
GRATED TRENCH DRAIN
SCALE 1:10

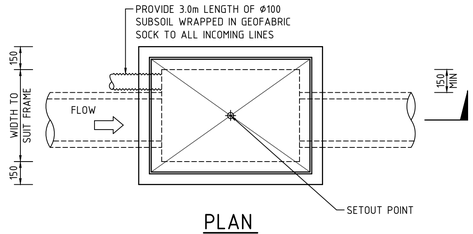


uPVC PIPE TRENCH
SCALE 1:10

NOTES
1. TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING ADEQUATE COMPACTION.
2. THE CONTRACTOR SHALL ENSURE THAT THE SHOREING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.





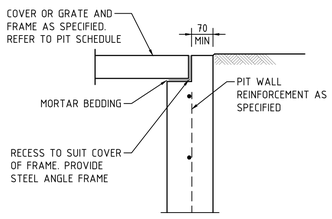


PLAN
SCLAE 1:20

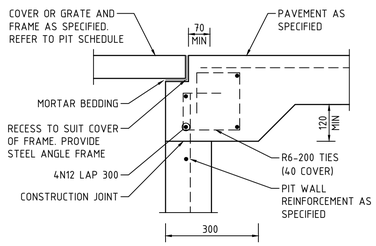
SECTION 1 -
SCALE 1:20

PROVIDE STEP IRONS IF PIT DEEPER THAN 1000 (REFER DETAIL)

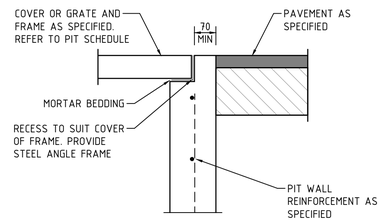
SURFACE INLET / JUNCTION PIT
(PIPE SIZES ≤ ø450)



DETAIL 'A'
SCLAE 1:10



DETAIL 'B'
SCLAE 1:10



DETAIL 'C'
SCLAE 1:10

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DRAWING TITLE
CIVIL DESIGN
CONCEPT STORMWATER
MANAGEMENT DETAILS

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

PROJECT No	SCALE	SIZE	REVISION
21300	AS SHOWN	A1	1

DRAWING No DA4701

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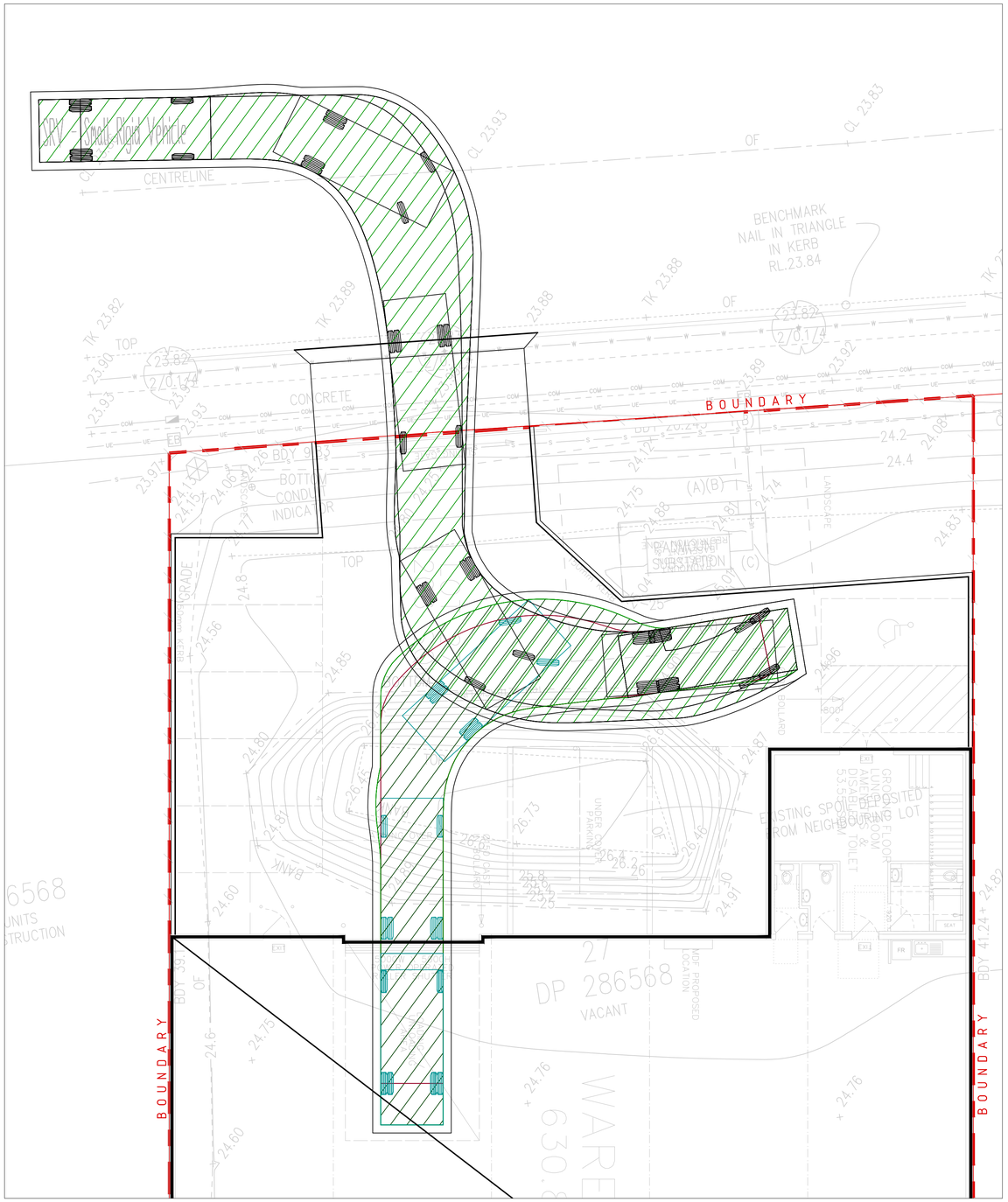
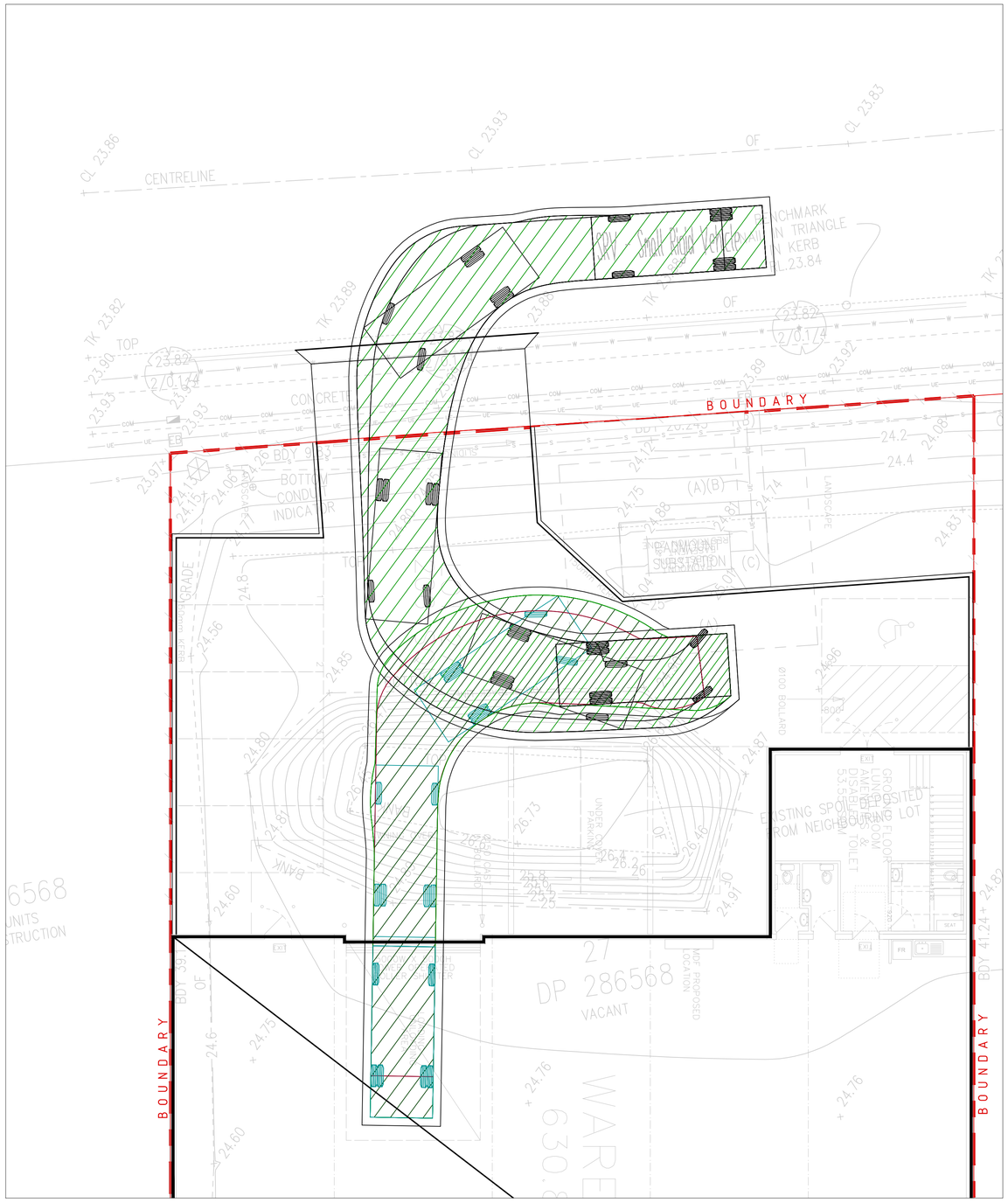


VEHICLE TURN PATH - SRV (6.4m) ENTRANCE MANOEUVRE

SCALE 1:100



VEHICLE TURN PATH - SRV (6.4m) ENTRANCE MANOEUVRE

SCALE 1:100

AS SHOWN

DEVELOPMENT APPLICATION ISSUE

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APEX BUILDING SYSTEMS PTY LTD
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Ph: 02 4577 7188
Fax: 02 4577 7133
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DRAWING TITLE
CIVIL DESIGN
CONCEPT TURNPATH PLAN

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OCT 2021	MG	MG	BB

PROJECT No	SCALE	SIZE	REVISION
21300	AS SHOWN	A1	1

DRAWING No DA7101

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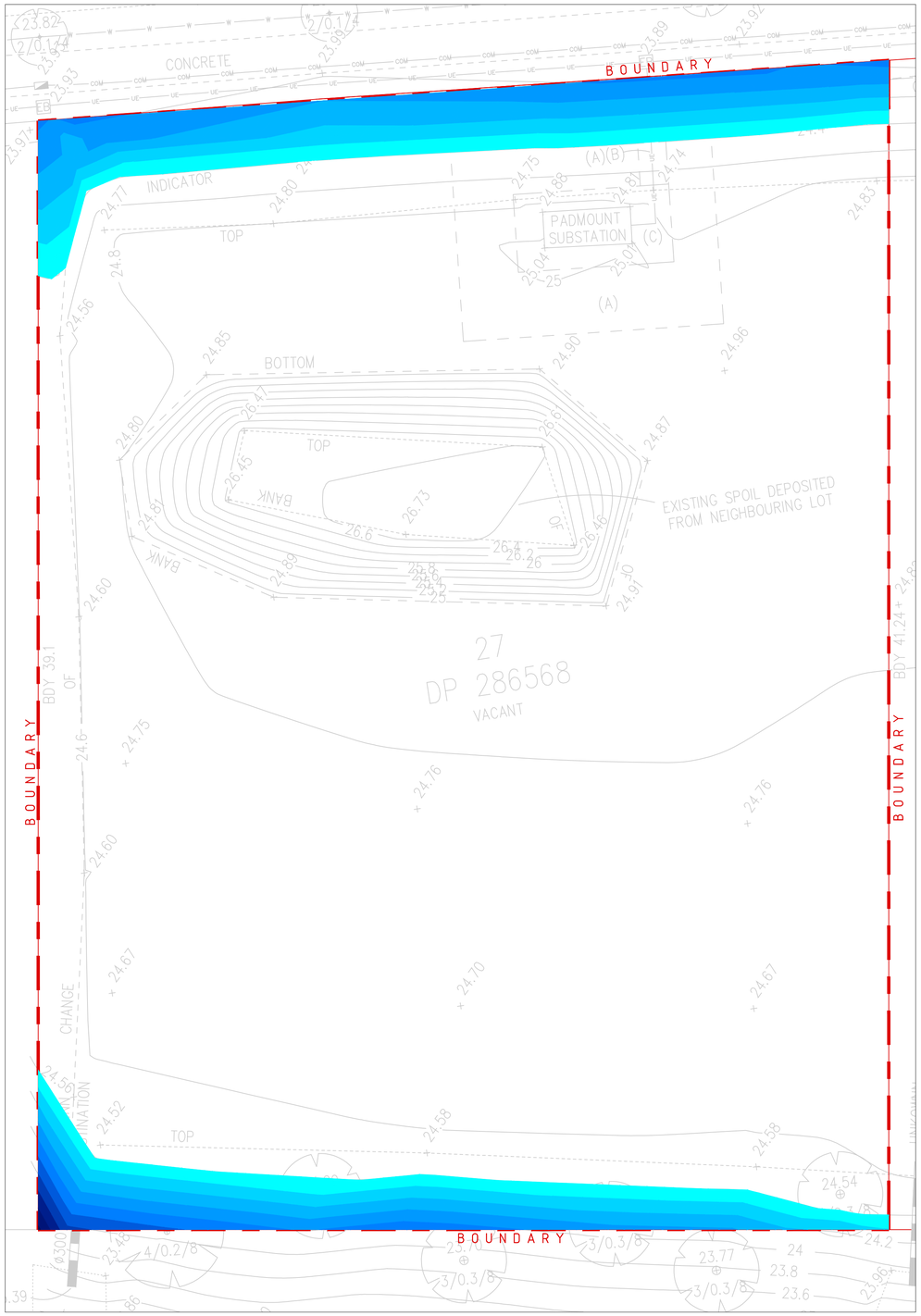
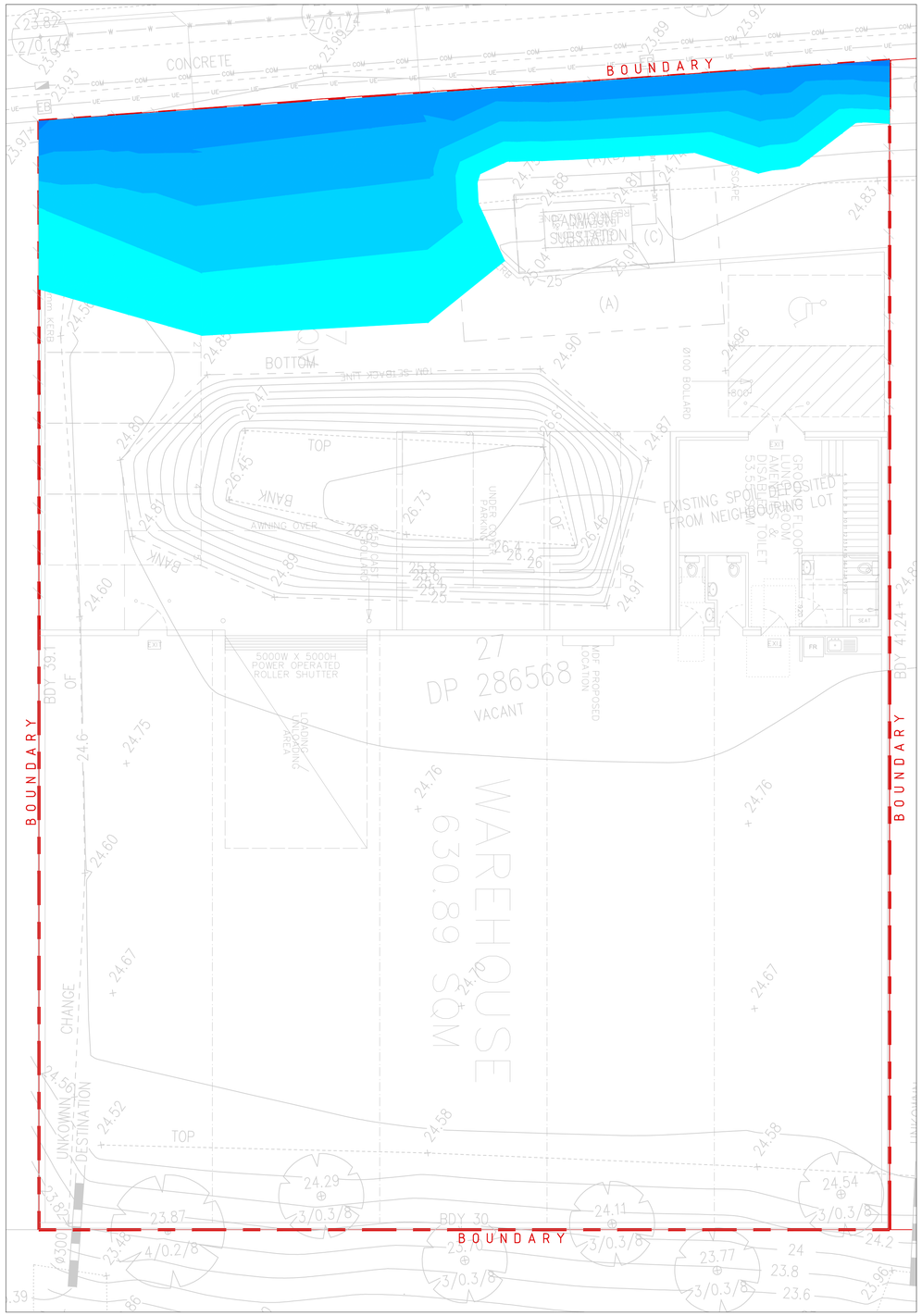


EXISTING FLOOD STORAGE
SCALE 1:100



PROPOSED FLOOD STORAGE
SCALE 1:100

FLOOD STORAGE OFFSET SUMMARY

FLOOD STORAGE VOLUME GAIN/LOSS SUMMARY:

EXISTING FLOOD STORAGE VOLUME =	26.8m^3
PROPOSED FLOOD STORAGE VOLUME =	27.5m^3
NET FLOOD STORAGE VOLUME INCREASE =	0.7m^3

FLOOD MANAGEMENT NOTES

1. MAINSTREAM NEPEAN RIVER 1% AEP FLOOD LEVEL IS 24.400m
2. THE DEVELOPMENT RESULTS IN A NET FLOOD STORAGE INCREASE OF APPROXIMATELY 0.7m^3. THEREFORE, THE DEVELOPMENT WILL HAVE NO IMPACT ON FLOODING WITHIN THE ADJACENT PROPERTIES AND WITHIN THE LOCAL AREA.
3. REFER TO DA1201 FOR GENERAL NOTES AND SPECIFICATIONS
4. REFER TO DA4101 FOR SITEWORKS & DRAINAGE PLAN

LEGEND

FLOW DEPTHS:	
0 TO 0.1m	
0.1 TO 0.2m	
0.2 TO 0.3m	
0.3 TO 0.4m	
0.4 TO 0.5m	
0.5 TO 0.6m	
0.6 TO 0.7m	
0.7 TO 0.8m	
0.8 TO 0.9m	
0.9 TO 1.0m	

0 2 5 10
1:100

DEVELOPMENT APPLICATION ISSUE

IMPORTANT
- DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY
- DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION
- THE INFORMATION ON THIS DRAWING REMAINS THE PROPERTY OF SPARKS & PARTNERS CONSULTING ENGINEERS REPRODUCTION OF THE WHOLE OR PART OF THE DOCUMENT CONSTITUTES AN INFRINGEMENT OF COPYRIGHT©

NORTH POINT

REFERENCES

DATE	AMENDMENT	INIT	REV
03.11.21	DA ISSUE	MG	1

DATE	AMENDMENT	INIT	REV

STRUCTURAL
-
MECHANICAL
-
ELECTRICAL
-
CIVIL
SPARKS AND PARTNERS CONSULTING ENGINNERS

CLIENT

BUILDER

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
4 JOHNSON PLACE, CRANEBROOK
CIVIL SERVICES

ARCHITECT
APEX BUILDING SYSTEMS PTY LTD
32 Walker Street Windsor NSW 2756 PO Box 9503
Telephone: 02 4587 7788
Fax: 02 4587 7120
E-Mail: designs@apexbuildingsystems.com
Excellence in Industrial Developments

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au
https://sparksandpartners.com.au/

FPA AUSTRALIA Fire Protection Association Australia CORPORATE MEMBER
QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001
HCAA

DRAWING TITLE
CIVIL DESIGN
CONCEPT FLOOD EXTENTS PLAN

DATE	DRAWN	DESIGNED	CHECKED
OCT 2021	MG	MG	BB

SCALE	SIZE	REVISION
1:100 @ A1	A1	1

PROJECT No 21300
DRAWING No DA8101

W:\2 - PROJECTS\2021\21300 - 4 JOHNSON PLACE, CRANEBROOK\3-DESIGN FILES\A-DESIGN DRAWINGS\B-CIVIL\21300_DA8101.DWG

APPENDIX C. MUSICLink REPORT

PENRITH CITY COUNCIL

music@link

MUSIC-*link* Report

Project Details		Company Details	
Project:	21300 - 4 Johnson Place, Cranebrook	**Company:**	Sparks and Partners Consulting Engineers
Report Export Date:	2/11/2021	**Contact:**	Sparks and Partners Consulting Engineers
Catchment Name:	Receiving 3	**Address:**	Level 1, 91 George Street, Parramatta
Catchment Area:	0.0801ha	**Phone:**	98915033
Impervious Area*:	100%	**Email:**	madhu@sparksandpartners.com.au
Rainfall Station:			
Modelling Time-step:	Six minutes		
Modelling Period:	01/01/99 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691.065mm		
Evapotranspiration:	1157.977mm		
MUSICX Version:	1.1.0.11873 (5.0.3.11873)		
MUSIC-link data Version:	2.1		
Study Area:	Penrith City Council		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node:	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	25.96%	Rainwater Tank Nodes	1	Urban_Roof Nodes	1
TSS	35.22%				
TP	28.222%				
TN	27.673%				
GP	100%				

Comments

As per the DCP, no water quality treatment is required, but RWT to meet 80% reuse demand for outdoor use (irrigation) and toilets

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Rainwater	9kL RWT	% Reuse Demand Met	80	None	82.333 %
Receiving	Receiving 3	Flow Reduction	None	None	25.96 %
Receiving	Receiving 3	GP Reduction	90	None	100 %
Urban_Roof	Roof Catchment Area = 801m2	Impervious Area	None	None	0.08 ha
Urban_Roof	Roof Catchment Area = 801m2	Pervious Area	None	None	0 ha
Urban_Roof	Roof Catchment Area = 801m2	Total Area	None	None	0.08 ha

Only certain parameters are reported when they pass validation

Failing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Receiving	Receiving 3	TN Reduction	45	None	27.673 %
Receiving	Receiving 3	TP Reduction	60	None	28.222 %
Receiving	Receiving 3	TSS Reduction	85	None	35.22 %
Urban_Roof	Roof Catchment Area = 801m2	Groundwater Daily Baseflow Rate	10	10	5 %
Urban_Roof	Roof Catchment Area = 801m2	Impervious Area Rainfall Threshold	1.4	1.4	0.3 mm/d
Urban_Roof	Roof Catchment Area = 801m2	Nitrogen Constituents.Base Flow.Mean	0.32	0.32	0
Urban_Roof	Roof Catchment Area = 801m2	Nitrogen Constituents.Base Flow.Std Dev	0.12	0.12	0
Urban_Roof	Roof Catchment Area = 801m2	Pervious Field Capacity	70	70	80 mm
Urban_Roof	Roof Catchment Area = 801m2	Pervious Infiltration Capacity Coefficient	150	150	200
Urban_Roof	Roof Catchment Area = 801m2	Pervious Infiltration Capacity Exponent	3.5	3.5	1
Urban_Roof	Roof Catchment Area = 801m2	Pervious Soil Capacity	105	105	120 mm
Urban_Roof	Roof Catchment Area = 801m2	Phosphorus Constituents.Base Flow.Mean	-0.82	-0.82	0
Urban_Roof	Roof Catchment Area = 801m2	Phosphorus Constituents.Base Flow.Std Dev	0.19	0.19	0
Urban_Roof	Roof Catchment Area = 801m2	Total Suspended Solids Constituents.Base Flow.Mean	1.1	1.1	0
Urban_Roof	Roof Catchment Area = 801m2	Total Suspended Solids Constituents.Base Flow.Std Dev	0.17	0.17	0

Only certain parameters are reported when they pass validation

APPENDIX D. PENRITH COUNCIL FLOOD LETTER

PENRITH

Our reference: ECM 9963878
Contact: Dr Elias Ishak
Telephone: 4732 7579

21 October 2021

Benjamin Barrett
91 George Street
PARRAMATTA NSW 2150

Dear Mr Barrett,

Flood Level Enquiry
Lot 27 DP 286568 – No 4 Johnson Place Cranebrook

Please find enclosed Flood Level information for the above property.

Should you require any further information please do not hesitate to contact me on 4732 7579.

Yours sincerely

[redacted]

Dr Elias Ishak
Senior Engineer – Floodplain Management

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

Flood Information
Lot 27 DP 286568 No 4 Johnson Place Cranebrook

Date of issue: 21 October 2021

The mainstream 1%AEP flood level affecting the above property is estimated to be RL24.4m AHD.

Please note that Council is currently in the process of undertaking an overland flow flood study for the Cranebrook Catchment.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions

AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.

AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Notes:

1. Council is currently in the process of reviewing and finalising a contemporary flood model for the Cranebrook Catchment.
2. The contours shown above in yellow numbering are at 0.5m intervals and are based on Aerial Laser Scanning (ALS) Survey undertaken in 2002. The contour levels are approximate and for general information only. Accurate ground levels should be obtained by a Registered Surveyor.
3. The flood level is based on current information available to Council at the date of issue. The flood level may change in the future if new information becomes available. The 1% AEP flood is the flood adopted by Council for planning controls. Rarer and more extreme flood events will have a greater effect on the property.
4. Council has in the past conducted studies of possible overland water flows within the City of Penrith. Those studies have been carried out in good faith, but Council cannot verify their accuracy. In particular, Council believes there are limitations on the accuracy of the past studies in urban areas where the effect of flash flooding, and underground drainage and stormwater disposal systems is largely unknown.
5. Council's studies are reflected in flood mapping for the City which show properties potentially affected by overland flows in excess of 150mm.
6. This property is shown on Council's flood mapping as potentially so affected.
7. Council imposes flood related development controls where, in its opinion, such controls are justified. Such controls may or may not be imposed with respect to this property in the event of an application for development consent.
8. If a development proposal is submitted with respect to this property, Council will consider the possibility of flood or overland flow in the context of the application. Council may impose a requirement that the applicant for development consent carry out a detailed assessment of the possible overland water flows affecting the property (a flood study) and/or may impose other controls on any development designed to ameliorate flood risk.
9. You are strongly advised if you propose to carry out development upon the property, that you retain the assistance of an experienced flooding engineer and have carried out a detailed investigation.
10. Council accepts no liability for the accuracy of the flood levels (or any other data) contained in this certificate, having regard to the information disclosed in Notes "1" to "6". As such you should carry out and rely upon your own investigations.

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

[redacted]

Dr Elias Ishak
Senior Engineer – Floodplain Management

APPENDIX E. MAINTENANCE & MONITORING SCHEDULE

STORMWATER DRAINAGE SYSTEM MONITORING AND MAINTENANCE SCHEDULE

Author Name & Signature: Madhu Giri
Sparks and Partners Consulting Engineers

Date: 03.11.21
Job No 21300

4 Johnson Place, Cranebrook

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 requirments.

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. Vacum/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, carrry 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 inegrity of tank including roof and access covers. Any dilapidation including holes or gaps are to be noted and repaired.	