



STORMWATER MANAGEMENT REPORT

RICHARD GILL SCHOOL

157 MAITLAND STREET, MUSWELLBROOK NSW 2333

PREPARED FOR

STANTON DAHL

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1 INTRODUCTION

Greenview have been engaged by Stanton Dahl to provide a report on the infrastructure implications, including system capacity and compliance, of the proposed refurbishment of the existing building at 157 Maitland Street, Muswellbrook NSW 2333.

2 PROPOSED DEVELOPMENT

- Council Chambers Building: The existing building is proposed to have significant internal alterations and additions to accommodate the Richard Gill School, although we understand that no increase in building footprint is proposed.
- New Playground Area: We note that a new playground area is proposed outside the existing building. We understand that this is to be landscaped and that no additional hardstand is proposed.

3 EXISTING STORMWATER

A site visit was undertaken on the 14th of April 2020 to analyse the existing stormwater infrastructure on site.

- We note the drainage lines appear to be capturing all existing hardstand and draining to the stormwater system in New England Highway.
- The drainage lines were measured to be between Ø375mm and Ø450mm RCJ pipes
- Drainage channels were present directing flow into the pits
- At least one pit is capturing ground surface water and believed to be discharging into the existing lagoon
- Downpipe locations were noted. Some downpipes were seen to be discharging to the kerb. Some downpipes were unable to be viewed due to the façade.
- An existing culvert was noted at the New England Highway access point
- No on-site detention tank was observed, though it is understood that the existing lagoon is acting as detention basin.

A detailed sketch of the existing stormwater infrastructure can be seen in the appendix of this report.

4 PROPOSED STORMWATER

4.1 STORMWATER RUNOFF IN COUNCILS DCP

Muswellbrook Shire Development Control Plan (dated April 2009) Section 25 Storm Water Management Clause 25.2 General states:

“Development has the potential to increase the impermeable area of the site and this has an impact on the quantity, quality and frequency of stormwater flowing from the site. The rapid, concentrated collection and increased volume and discharge of stormwater can contribute to nuisance localised flooding, increased soil erosion, sedimentation of water ways and destruction of aquatic eco systems. Appropriate stormwater management is essential for maintaining the amenity of urban areas and health of the environment.”

It is understood to be the intent of council to control water from developments due to increased stormwater runoff from additional impermeable area included in the proposal. Council’s policy reiterates this in Clause 25.2.3 Flooding and Runoff Regimes Objective A)

“To ensure that post development runoff reflects pre-development conditions”

And again in Clause 25.2.4 Overflow disposal objective:

“To ensure that stormwater discharges do not cause excessive nuisance to adjoining or neighbouring lands”

4.2 PROPOSED STORMWATER

We note that the proposed alterations and additions are internal only and there is no increase in building footprint. We also note that no new rainwater tank is being proposed, nor is there any changes to the existing roof. We recommend the existing roof drainage to be checked if serviceable by a qualified plumber / builder and the existing drainage to remain. Where a downpipe is found to be in an unserviceable state, we would recommend a new downpipe is installed of similar size (diameter or rectangular) with a discharge that mimics the existing conditions.

We note that the new playground area is understood to be landscaped area and thus will not increase the stormwater runoff to the existing system.

As it is currently designed, we do not recommend or propose any new stormwater drainage for the proposed internal alterations and external landscaped play area. We understand that this is addressing councils objectives as outlined in 4.1 above.

4.3 COUNCIL FEEDBACK ON STORMWATER RUNOFF

Muswellbrook Council has been approached for feedback and provided a comprehensive email which can be seen in the appendix. It is understood that councils feedback predominantly addresses any potential future works to be included at a later stage. It has been flagged that a drainage assessment of the site should be undertaken prior to any future to ensure the capacity of the existing network (including the detention basin) is sufficient to drain any additional hardstand works.

5 PROPOSED WATER TREATMENT

5.1 STORMWATER TREATMENT TARGETS IN COUNCILS DCP

Muswellbrook Shire Council notes the following in Clause 25.2.5 Pollutants:

"All litter that finds its way onto roads and into drainage systems ends up in creeks, rivers and the ocean. Litter is a continuing threat to healthy aquatic ecosystems and the visual amenity of waterways. A number of key pollutants present a significant threat to waterways. Dissolved and absorbed pollutants and emulsified hydrocarbons can in some cases be toxic to aquatic ecosystems while nutrients can promote exotic plant growth, including toxic forms of algae. All of these represent a threat to visual amenity, aquatic ecosystems and to recreational values."

The listed objective for this Pollutants clause in the DCP is as follows:

"To ensure that stormwater generated from development does not result in pollution of water courses or receiving waters"

They list the following controls:

- i) *"Stormwater systems are to be designed to capture and remove all litter larger than 5mm in size."*
- ii) *"The event mean concentration of specific pollutants is not to exceed that in the following table":*

Pollutant	Maximum Event Mean Concentration
Sediment	100mg/L
Hydrocarbons	500ug/L
Total Nitrogen	1000ug/L
Ammonia	15ug/L
Phosphorus	100ug/L

Figure 1 Muswellbrook DCP Pollutant Concentration Targets (DCP Section 25.2)

5.2 EXISTING STORMWATER TREATMENT

No stormwater treatment device was visible from our site inspection and we have not been made aware that any such system is currently installed.

5.3 PROPOSED STORMWATER TREATMENT

We again note that no increase in impermeable hardstand is proposed, and thus there is no “*stormwater generated from development*” to be treated as required by Councils Pollutant objective (refer 5.1).

It is Greenview’s opinion and understanding, therefore, that no treatment device is required to be installed for a development of this scope (internal alterations and external landscaping).

5.4 COUNCIL FEEDBACK ON STORMWATER TREATMENT

Muswellbrook Council has been approached for feedback and provided a comprehensive email which can be seen in the appendix. Council has recommended that in the future appropriate consideration is made for the introduction of Gross Pollutant Traps upstream of discharge points on site to reduce the mobilising of stormwater pollutants into the detention/retention basin and into local drainage systems fronting the highway. Council has also recommended consideration of replanting of the basin with suitable local plant species to contribute to increased stormwater quality (subject to a design assessment for flood capacity).

6 MAINTENANCE

6.1 PURPOSE OF MAINTENANCE

Greenview notes that every stormwater system will be subject to the build up of sediment and debris over time. It is always recommended that pits are routinely cleaned and pipes flushed as necessary to ensure the continued effectiveness of the drainage system. Similarly, channel drainage often experience the build up of silt / sediment / debris and will require regular routine maintenance.

6.2 COUNCIL FEEDBACK ON MAINTENANCE

Council has commented on the sediment mobilisation on the site and recommended a landscape management plan to be prepared to establish improved ground cover of vegetation and localised berms as appropriate to prevent mobilisation of sediment and other erosion mitigation measures. It is understood that a landscape plan has been prepared by Moir Landscape Architecture.

It is noted that the detention basin is reasonably shallow and this is expected to be due to sediment deposition since the 1980’s. It is noted that dredging and reconstruction of this detention basin may be required in the future. Council has flagged that some remediation work may be required on the northern edge of the detention basin which appears to be unstable.

Council has noted that there is some heaving visible of the existing concrete V-drain adjacent to the cul-de-sac bulb near the administration building, potentially due to root intrusion from adjacent trees. It may be required to saw-cut and reinstate this area at a future stage if deemed necessary.

7 OTHER COMMENTS

7.1 COUNCIL COMMENTS ON SAFETY

Council has flagged that it may be required to lock access gates on the boundary fence of the detention basin to prevent access from future students.

7.2 COUNCIL COMMENTS ON EASEMENTS

Council has noted that "Easements should be provided over the site's drainage network and detention basin for Council to inspect as required."

8 SUMMARY

8.1 SUMMARY OF STORMWATER RUNOFF

Greenview notes that these internal alterations and additions coupled with minor external landscaping will not add any additional flows to the existing stormwater network and, as such, does not believe that a full drainage assessment is required for the scope of works of this particular DA. Greenview recommends, in keeping with councils comments, that a drainage assessment of the existing stormwater infrastructure will be required for any potential future works that propose additional hardstand.

8.2 SUMMARY OF STORMWATER TREATMENT

It is believed that councils feedback addressed potential future works that would involve the increase in hardstand area. Greenviews understanding of the DCP remains that no stormwater treatment is required for the scope of this particular DA.

Understanding the nature of the drainage system which includes an onsite detention/retention basin, Greenview does note that sediment build up over time will occur which will require future maintenance (see Section 6). The introduction of Gross Pollutant Traps, although not specifically required, could be introduced to mitigate the need (or at least lengthen the time) future maintenance of the basin takes place, including the potential for dredging. It is understood from the DCP that stormwater treatment would be required for any future works that involve an increase in hardstand area.

8.3 SUMMARY OF OTHER CONSIDERATIONS

The client should be made aware that routine maintenance of the existing drainage system is important to ensure the continuing adequate draining of stormwater from site. As part of this continued maintenance, inspections from council may be required and **easements over the drainage network will be required.**

This site has known experiences of erosion; although the landscape plans are expected to establish improved ground cover of vegetation it is noted that the client should aware of locations where localised erosion persists in the future. Consideration should be made for the introduction of localised berms, stormwater treatment devices, and at the very least regular maintenance particularly after heavy rainfall events.

It is noted that any potential future works involving the introduction of additional hardstand will require a full drainage assessment of the site and adequate water treatment to be provided, **although this is understood to not be a part of the scope of this particular DA.**

9 APPENDICES

- A. Greenview Stormwater Drawings
 - I. C01 Notes & Legends
 - II. C02 Ground Floor Drainage Plan
- B. Greenview Environmental Site Management Plans
 - I. ESM1 Notes & Legends
 - II. ESM2 Environmental Site Management Layout
- C. Site Markup of Existing Civil Ground Infrastructure
- D. Site Markup of Existing Council Chambers Downpipe Locations
- E. Council Feedback (Email Dated Friday 15th May 2020)
- F. S4500-46_Detail Survey (Boardman Peasley Dated 24th Feb 2014)
- G. DA03 Architectural Site & External Works Plan

APPENDIX B: Greenview Stormwater Drawings

i C01 Notes & Legends

CIVIL DESIGN

FOR PROPOSED DEVELOPMENT AT

Richard Gill National Music Academy Muswellbrook

GENERAL NOTES

- ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE NOMINATED OR APPLICABLE COUNCIL SPECIFICATION.
- THE CONTRACTOR SHOULD REPORT ANY DISCREPANCIES ON THE DRAWINGS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN.
- CONTRACTOR IS NOT TO ENTER UPON NOR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT THE PERMISSION OF THE OWNER.
- SURPLUS EXCAVATED MATERIAL SHALL BE PLACED WHERE DIRECTED OR REMOVED FROM SITE.
- ALL NEW WORKS SHALL MAKE A SMOOTH JUNCTION WITH EXISTING.
- ALL DRAINAGE LINES THOUGH ADJACENT LOTS SHALL BE CONTAINED WITHIN EASEMENTS CONFORMING TO COUNCIL'S STANDARDS.
- PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL PROVIDE A TRAFFIC MANAGEMENT PLAN PREPARED BY AN ACCREDITED PERSON IN ACCORDANCE WITH RMS REQUIREMENTS; FOR ANY WORK ON OR ADJACENT TO PUBLIC ROADS, PLANS TO BE SUBMITTED TO COUNCIL & RMS AS REQUIRED.
- THESE PLANS SHALL BE A READ IN CONJUNCTION WITH OTHER RELEVANT CONSULTANTS' PLANS, SPECIFICATIONS, CONDITIONS OF DEVELOPMENT CONSENT AND CONSTRUCTION CERTIFICATE REQUIREMENTS.
- THE BUILDER/CONTRACTOR SHALL LOCATE ALL EXISTING PUBLIC UTILITY SERVICES WITHIN THE SITE, FOOTPATH AREA AND ROAD RESERVE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ALL LOCATIONS AND LEVELS OF SERVICES SHALL BE REPORTED TO THE STORMWATER ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS TO ENSURE THERE ARE NO OBSTRUCTIONS IN THE LINE OF THE DRAINAGE DISCHARGE PIPES.
- THE BUILDER IS TO VERIFY ALL LEVELS ON SITE PRIOR TO COMMENCING CONSTRUCTION.
- ALL THE CLEANING EYES (OR INSPECTION EYES) FOR THE UNDERGROUND PIPES HAVE TO BE TAKEN UP TO THE FINISHED GROUND LEVEL FOR EASY IDENTIFICATION AND MAINTENANCE PURPOSES.
- ALL TERRACE FLOOR AND PLANTER GRATES TO HAVE FIRE COLLARS FITTED.
- ALL PITS HAVING AN INTERNAL DEPTH THAT EXCEEDS 1.0m SHALL BE PROVIDED WITH GALVANIZED STEP IRONS AT 300 mm CENTRES PLACED IN A STAGGERED PATTERN AND SHALL BE IN ACCORDANCE WITH THE AUSTRALIAN STANDARDS AS4198-1994.
- ALL MULCHINGS TO BE USED WITHIN THE AREA DESIGNATED AS ON SITE DETENTION STORAGE SHALL BE OF A NON-FLOATABLE MATERIAL SUCH AS DECORATIVE RIVER GRAVEL. BARK MULCHING SHALL NOT BE USED WITHIN THE DETENTION STORAGE AREA.
- PRIOR TO COMMENCING ANY WORKS ON THE SITE, THE BUILDER SHALL ENSURE THAT THE INVERT LEVELS OF WHERE THE SITE STORMWATER SYSTEM CONNECTION INTO COUNCIL'S KERB/DRAINAGE SYSTEM MATCH THE DESIGN LEVELS, ANY DISCREPANCIES SHALL BE REPORTED TO THE DESIGN ENGINEER IMMEDIATELY.
- GREENVIEW IS NOT RESPONSIBLE FOR THE ACCURACY OF ANY SURVEY INFORMATION PROVIDED ON THIS DRAWING.
- ALL LEVELS SHOWN ARE EXPECTED TO BE TO A.H.D.
- ALL CHAINAGES AND LEVELS ARE IN METERS, AND DIMENSIONS IN MILLIMETRES, UNLESS NOTED OTHERWISE.
- THE SURVEY INFORMATION ON THIS DRAWING HAS BEEN PROVIDED BY THE ARCHITECT.
- CONTRACTORS SHALL ARRANGE FOR THE WORKS TO BE SET OUT BY A REGISTERED SURVEYOR.
- W.A.E DRAWINGS BY A REGISTERED SURVEYOR ARE REQUIRED PRIOR TO CERTIFICATION OF DRAINAGE.
- WHERE THESE PLANS ARE NOTED FOR DEVELOPMENT APPLICATION PURPOSES ONLY, THEY SHALL NOT BE USED FOR OBTAINING A CONSTRUCTION CERTIFICATE NOR USED FOR CONSTRUCTION PURPOSES WITHOUT WRITTEN APPROVAL.
- WATER TREATMENT DEVICES TO STRICTLY COMPLY WITH MANUFACTURING SPECIFICATIONS.

RAINWATER REUSE SYSTEM NOTES

- RAINWATER SUPPLY PLUMBING TO BE CONNECTED TO OUTLETS WHERE REQUIRED BY BASIX CERTIFICATE (BY OTHERS).
- NO DIRECT CONNECTION BETWEEN TOWN WATER SUPPLY AND THE RAINWATER SUPPLY.
- PROVIDE AN APPROVED STOP VALVE AND/OR PRESSURE LIMITING VALVE AT THE RAINWATER TANK.
- PROVIDE AT LEAST ONE EXTERNAL HOSE COCK ON THE TOWN WATER SUPPLY FOR FIRE FIGHTING.
- PROVIDE APPROPRIATE FLOAT VALVE AND/OR SOLENOID VALVES TO CONTROL TOWN WATER SUPPLY INLET TO TANK IN ORDER TO ACHIEVE THE TOP-UP INDICATED ON THE TYPICAL DETAIL.
- ALL PLUMBING WORKS ARE TO BE CARRIED OUT BY LICENSED PLUMBERS IN ACCORDANCE WITH AS/NZ3500.1 NATIONAL PLUMBING AND DRAINAGE CODE.
- PRESSURE PUMP ELECTRICAL CONNECTION TO BE CARRIED OUT BY A LICENSED ELECTRICIAN.
- ONLY ROOF RUN-OFF IS TO BE DIRECTED TO THE RAINWATER TANK SURFACE WATER INLETS ARE NOT TO BE CONNECTED.
- PIPE MATERIALS FOR RAINWATER SUPPLY PLUMBING ARE TO BE APPROVED MATERIALS TO AS/NZ3500 PART 1 SECTION 2 AND TO BE CLEARLY AND PERMANENTLY IDENTIFIED AS 'RAINWATER'. THIS MAY BE ACHIEVED FOR BELOW GROUND PIPES USING IDENTIFICATION TAPE (MADE IN ACCORDANCE WITH AS2648) OR FOR ABOVE GROUND PIPES BY USING ADHESIVE PIPE MARKERS (MADE IN ACCORDANCE WITH AS1345).
- EVERY RAINWATER SUPPLY OUTLET POINT AND THE RAINWATER TANK ARE TO BE LABELLED 'RAINWATER' ON A METALLIC SIGN IN ACCORDANCE WITH AS1319.
- ALL INLETS AND OUTLETS TO THE RAINWATER TANK ARE TO HAVE SUITABLE MEASURES PROVIDED TO PREVENT MOSQUITO AND VERMIN ENTRY.
- ALL DOWNPIPES CHANGED TO THE RAINWATER TANK ARE TO BE SEALED UP TO GUTTER LEVEL AND BE PRESSURE TESTED AND CERTIFIED.
- TOWN WATER CONNECTION TO RAINWATER TANK TO BE TO THE SATISFACTION OF THE REGULATORY AUTHORITY. THIS MAY REQUIRE PROVISION OF:
 - PERMANENT AIR GAP
 - BACKFLOW PREVENTION DEVICE

SAFETY IN DESIGN NOTES

THERE ARE INHERENT RISKS WITH CONSTRUCTING, MAINTAINING, OPERATING, DEMOLISHING, DISMANTLING AND DISPOSING. WE NOTE THIS DESIGN IS TYPICAL OF SIMILAR DESIGNS. AS FAR AS IS REASONABLY PRACTICABLE RISKS HAVE BEEN ELIMINATED OR MINIMISED THROUGH THE DESIGN PROCESS. HAZARD CONTROLS MUST STILL BE IMPLEMENTED BY THE CONTRACTOR, OWNER OR OPERATOR TO ENSURE THE SAFETY OF WORKERS. GREENVIEW ASSESSMENT DID NOT IDENTIFY ANY UNIQUE RISKS ASSOCIATED WITH THE DESIGN.

EARTHWORK NOTES

- IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY EARTHWORKS.
- THE CONTRACTOR SHALL CLEAR THE SITE BY REMOVING ALL RUBBISH, FENCES AND DEBRIS ETC. TO THE EXTENT OF THE PROPOSED DEVELOPED AREA.
- PROVIDE PROTECTION BARRIERS TO PROTECTED/SENSITIVE AREAS PRIOR TO ANY BULK EXCAVATION.
- OVER FULL AREA OF EARTHWORKS, CLEAR VEGETATION, RUBBISH, SLABS ETC. AND STRIP TOP SOIL AVERAGE 200mm THICK. REMOVE FROM SITE, EXCEPT TOP SOIL FOR RE-USE.
- CUT AND FILL OVER THE SITE TO LEVELS REQUIRED.
- PRIOR TO ANY FILLING IN AREAS OF CUT OR IN EXISTING GROUND, PROOF ROLL THE EXPOSED SURFACE WITH A ROLLER OF MINIMUM WEIGHT OF 5 TONNES WITH A MINIMUM OF 10 PASSES.
- EXCAVATE AND REMOVE ANY SOFT SPOTS ENCOUNTERED DURING PROOF ROLLING AND REPLACE WITH APPROVED FILL COMPACTED IN LAYERS. THE WHOLE OF THE EXPOSED SUBGRADE AND FILL SHALL BE COMPACTED TO 98% STANDARD MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT $\pm 2\%$.
- FOR ON SITE FILLING AREAS, THE CONTRACTOR SHALL TAKE LEVELS OF EXISTING SURFACE AFTER STRIPPING TOPSOIL AND PRIOR TO COMMENCING FILL OPERATIONS.
- WHERE HARD ROCK IS EXPOSED IN THE EXCAVATED SUB-GRADE, THIS WILL BE INSPECTED AND A DECISION MADE ON THE LEVEL TO WHICH EXCAVATION IS TAKEN.
- FILL IN 200mm MAXIMUM (LOOSE THICKNESS) LAYERS TO UNDERSIDE OF BASE COURSE THEN THE TOPSOIL. FILL TO BE 450 SQUARE PLASTIC PIT INSTALLED WITH A 150mm DIA. CONNECTION TO FORMAL DRAINAGE SYSTEM.
- ALL DRIVEWAY PITS TO BE 600 SQUARE UNLESS NOTED OTHERWISE.
- ALL PLANTER BOXES AND CONJONIES TO BE CONNECTED TO THE PROPOSED STORMWATER DRAINAGE LINE.
- ALL STORMWATER DRAINAGE WORK TO AVOID TREE ROOTS. WHERE NOT POSSIBLE, ALL EXCAVATIONS IN VICINITY OF TREE ROOTS ARE TO BE HAND DUG.
- GEOTEXTILE FABRIC TO BE PLACED UNDER RIP RAP SCOUR PROTECTION WHERE APPLICABLE.
- ALL BASES OF PITS TO BE BENCHED (TO HALF PIPE DEPTH) TO THE INVERT OF THE OUTLET PIPE AND PROVIDE GALVANISED ANGLE SURROUNDINGS TO GRATE.
- ANY VARIATION TO THAT WORKS AS SHOWN ON THE APPROVED DRAWINGS ARE TO BE CONFIRMED BY THE ENGINEER PRIOR TO THE COMMENCEMENT.
- ALL BALCONIES AND ROOFS TO BE DRAINED AND TO HAVE SAFETY OVERFLOWS IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
- ALL GRATES TO HAVE CHILDPROOF LOCKS.
- ALL WORK WITHIN COUNCIL RESERVE AREAS TO BE INSPECTED BY COUNCIL PRIOR TO BACKFILLING.
- COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS OWN. ISSUED BY COUNCIL.
- WATER PROOF ALL CONCRETE BALCONIES & ROOFS TO ARCHITECTS DETAILS.
- ALL BALCONIES TO HAVE FLOOR WASTE AND 1% FALL WITH SAFETY OVERFLOW.
- ALL SUBSOIL DRAINAGE SHALL BE A MINIMUM OF $\phi 65mm$ AND SHALL BE PROVIDED WITH A FILTER SOCK. THE SUBSOIL DRAINAGE SHALL BE INSTALLED IN ACCORDANCE WITH DETAILS TO BE PROVIDED BY THE LANDSCAPE CONSULTANT.
- SUBSOIL DRAINAGE PIPES AND FITTINGS SHALL BE PERFORATED PLASTIC TO CURRENT AUSTRALIAN STANDARDS. LAY PIPES ON FLOOR OF TRENCH GRADED AT 1% MIN. AND OVERLAY WITH FILTER MATERIAL. EXTENDING TO WITHIN 200mm OF SURFACE. PROVIDE FILTER FABRIC OF PERMEABLE POLYPROPYLENE BETWEEN FILTER MATERIAL AND TOPSOIL. PROVIDE FLUSHING EYES AT HIGH POINTS OR TO COUNCILS REQUIREMENTS.
- GRATES TO BE IN ACCORDANCE WITH TABLE BELOW:

DRAINAGE INSTALLATION

RCP CONVENTIONAL

INSTALLATIONS & ROAD CROSSINGS

- SUPPLY & INSTALLATION OF DRAINAGE WORKS TO BE IN ACCORDANCE WITH THESE DRAWINGS, THE COUNCIL SPECIFICATION AND THE CURRENT APPLICABLE AUSTRALIAN STANDARDS.
- BACKFILL SHALL BE PLACED & COMPACTED IN ACCORDANCE WITH THE SPECIFICATION. A GRANULAR GRAVEL AGGREGATE MATERIAL ($\phi 10mm$) BACKFILL IS RECOMMENDED FOR THE BEDDING, HAUNCH SUPPORT AND SIDE ZONE DUE TO ITS SELF COMPACTING ABILITY.
- A MINIMUM OF 150mm CLEARANCE IS TO BE PROVIDED BETWEEN THE OUTSIDE OF THE PIPE BARREL AND THE TRENCH WALL FOR PIPES $\phi 600$ DIA. 200mm CLEARANCE FOR PIPES 600 TO 1200 DIA. AND DIA CLEARANCE FOR PIPES $\phi 1200$ DIA.
- BEDDING OF THE PIPELINES IS TO BE TYPE 'HS2' IN ACCORDANCE WITH THE STANDARDS AND AS FOLLOWS:
 - COMPACTED GRANULAR MATERIAL IS TO COMPLY WITH THE FOLLOWING GRADINGS:

M	19	2.3600	0.6000	0.3000	0.1500	0.0750
% MASS PASSING	100	50-100	20-90	10-60	0-25	0-10
 - AND THE MATERIAL PASSING THE 0.075 SIEVE HAVING LOW PLASTICITY AS DESCRIBED IN APPENDIX D OF AS1726.
 - BEDDING DEPTH UNDER THE PIPE TO BE 100mm.
 - BEDDING MATERIAL TO BE EXTENDED FROM THE TOP OF THE BEDDING ZONE UP TO 0.3 TIMES PIPE OUTSIDE DIAMETER. THIS REPRESENTS THE 'HAUNCH ZONE'.
 - THE BEDDING & HAUNCH ZONE MATERIAL IS TO BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 98% WITHIN ROAD RESERVES AND TRAFFICABLE AREAS AND 95% ELSEWHERE FOR COHESIVE MATERIAL OR A MINIMUM DENSITY INDEX OF 70% IN ACCORDANCE WITH THE STANDARDS FOR COHESIONLESS MATERIAL.
 - COMPACTION TESTING SHALL BE CARRIED OUT BY AN APPROVED ORGANISATION WITH A NATA CERTIFIED LABORATORY FOR ALL DRAINAGE LINES LAID WHOLLY OR IN PART UNDER THE KERB & GUTTER OR PAVEMENT

ROOF DRAINAGE

- ALL ROOF DRAINAGE IS TO BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE CURRENT APPLICABLE AUSTRALIAN STANDARDS INCLUDING AS3500.3, NCC AND COUNCIL'S SPECIFICATIONS.
- DOWNPIPES SHOWN ARE INDICATIVE ONLY. REFER ARCHITECTURAL FOR FINAL LOCATIONS.
- ALL DOWNPIPES TO BE CONSTRUCTED OF ONE MATERIAL FOR AESTHETICS REASONS AND PAINTED TO PROTECT THEM AGAINST ULTRA-VIOLET LIGHT DAMAGE, UNLESS APPROVED OTHERWISE BY THE PROJECT ARCHITECT.
- ALL DOWNPIPES TO HAVE LEAF GUARDS.
- ALL EAVES GUTTERS ARE TO BE DESIGNED TO THE 5% AEP (20YR) STORM EVENTS UNO.
- EAVES GUTTER OVERFLOWS ARE TO BE IN ACCORDANCE WITH AS3500.3 G3.
- ALL BOX GUTTERS ARE TO BE DESIGNED TO CATER TO THE 1% AEP (100YR) STORM EVENTS UNO.
- IN ACCORDANCE WITH AS3500.3 CLAUSE 3.7.6 G, BOX GUTTERS SHALL:
 - BE STRAIGHT (WITHOUT CHANGE IN DIRECTION)
 - HAVE A HORIZONTAL CONSTANT WIDTH BASE (SOLE) WITH VERTICAL SIDES IN A CROSS-SECTION.
 - HAVE A CONSTANT LONGITUDINAL SLOPE BETWEEN 1:200 AND 1:40.
 - DISCHARGE AT THE DOWNSTREAM END WITHOUT CHANGE OF DIRECTION (I.E. NOT TO THE SIDE); AND
 - BE SEALED TO THE RAINHEADS AND SUMPS
- GREENVIEW RECOMMENDS THAT THE BUILDER VERIFIES THAT ANY AND ALL BOX GUTTERS HAVE BEEN DESIGNED BY A QUALIFIED CIVIL ENGINEER PRIOR TO THE COMMENCEMENT OF WORKS.
- GREENVIEW RECOMMENDS A SPECIFIC INSPECTION AND CERTIFICATION BY A QUALIFIED CIVIL ENGINEER OF ANY AND ALL BOX GUTTERS INSTALLED ON THE PROJECT PRIOR TO OCCUPATION CERTIFICATE

STORMWATER DRAINAGE NOTES

- STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS INCLUDING AS3500.3, NCC AND COUNCIL'S SPECIFICATION.
- PIPES OF 225mm DIA. AND UNDER SHALL BE UPVC.
- PIPES OF 300mm DIA. AND LARGER SHALL BE FRC OR CONCRETE CLASS 2 RUBBER RING JOINTED UNO.
- ALL FRC OR RCP STORMWATER PIPES WITHIN ROAD RESERVE AREAS TO BE CLASS 3 U.N.O. BY COUNCILS SPECIFICATION.
- PIPES SHALL GENERALLY BE LAID AT THE GRADES INDICATED ON THE DRAWINGS.
- MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK & ROADWAY AREAS UNO.
- ALL PIPES LOCATED IN LANDSCAPE AREAS TO HAVE 300mm COVER. WHERE NOT POSSIBLE AND COVER IS BETWEEN 150mm AND 300mm USE SEWER GRADE PIPE.
- PIPES 225mm DIA AND OVER SHALL BE LAID AT 0.5% MIN. GRADE U.N.O.
- PIPES UP TO 150mm DIA SHALL BE LAID AT 1.0% MIN. GRADE U.N.O.
- BACKFILL TRENCHES WITH APPROVED FILL. COMPACTED IN 200mm LAYERS TO 98% OF STANDARD DENSITY.
- ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS.
- THE MINIMUM SIZES OF THE STORMWATER DRAINAGE PIPES SHALL NOT BE LESS THAN 90mm DIA FOR CLASS 1 BUILDINGS AND 100mm DIA FOR OTHER CLASSES OF BUILDING OR AS REQUIRED BY THE REGULATORY AUTHORITY.
- BUILD TRENCHES WITH APPROVED FILL. COMPACTED IN 200mm LAYERS TO PITS TO MATCH PIT INVERTS.
- ALL LANDSCAPED PITS TO BE 450 SQUARE UNO.
- GREENVIEW RECOMMENDS ALL COURTYARDS TO HAVE 450 SQUARE PLASTIC PIT INSTALLED WITH A 150mm DIA. CONNECTION TO FORMAL DRAINAGE SYSTEM.
- ALL DRIVEWAY PITS TO BE 600 SQUARE UNLESS NOTED OTHERWISE.
- ALL PLANTER BOXES AND CONJONIES TO BE CONNECTED TO THE PROPOSED STORMWATER DRAINAGE LINE.
- ALL STORMWATER DRAINAGE WORK TO AVOID TREE ROOTS. WHERE NOT POSSIBLE, ALL EXCAVATIONS IN VICINITY OF TREE ROOTS ARE TO BE HAND DUG.
- GEOTEXTILE FABRIC TO BE PLACED UNDER RIP RAP SCOUR PROTECTION WHERE APPLICABLE.
- ALL BASES OF PITS TO BE BENCHED (TO HALF PIPE DEPTH) TO THE INVERT OF THE OUTLET PIPE AND PROVIDE GALVANISED ANGLE SURROUNDINGS TO GRATE.
- ANY VARIATION TO THAT WORKS AS SHOWN ON THE APPROVED DRAWINGS ARE TO BE CONFIRMED BY THE ENGINEER PRIOR TO THE COMMENCEMENT.
- ALL BALCONIES AND ROOFS TO BE DRAINED AND TO HAVE SAFETY OVERFLOWS IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS.
- ALL GRATES TO HAVE CHILDPROOF LOCKS.
- ALL WORK WITHIN COUNCIL RESERVE AREAS TO BE INSPECTED BY COUNCIL PRIOR TO BACKFILLING.
- COUNCIL'S ISSUED FOOTWAY DESIGN LEVELS TO BE INCORPORATED INTO THE FINISHED LEVELS OWN. ISSUED BY COUNCIL.
- WATER PROOF ALL CONCRETE BALCONIES & ROOFS TO ARCHITECTS DETAILS.
- ALL BALCONIES TO HAVE FLOOR WASTE AND 1% FALL WITH SAFETY OVERFLOW.
- ALL SUBSOIL DRAINAGE SHALL BE A MINIMUM OF $\phi 65mm$ AND SHALL BE PROVIDED WITH A FILTER SOCK. THE SUBSOIL DRAINAGE SHALL BE INSTALLED IN ACCORDANCE WITH DETAILS TO BE PROVIDED BY THE LANDSCAPE CONSULTANT.
- SUBSOIL DRAINAGE PIPES AND FITTINGS SHALL BE PERFORATED PLASTIC TO CURRENT AUSTRALIAN STANDARDS. LAY PIPES ON FLOOR OF TRENCH GRADED AT 1% MIN. AND OVERLAY WITH FILTER MATERIAL. EXTENDING TO WITHIN 200mm OF SURFACE. PROVIDE FILTER FABRIC OF PERMEABLE POLYPROPYLENE BETWEEN FILTER MATERIAL AND TOPSOIL. PROVIDE FLUSHING EYES AT HIGH POINTS OR TO COUNCILS REQUIREMENTS.
- GRATES TO BE IN ACCORDANCE WITH TABLE BELOW:

PIT GRATE INLINE TYPE

GRATE TYPE	TRAFFIC CONDITIONS
A - EXTRA LIGHT DUTY	FOOTWAYS AND AREAS ACCESSIBLE ONLY TO PEDESTRIANS AND PEDAL CYCLISTS.
B - LIGHT DUTY	FOOTWAYS THAT CAN BE MOUNTED BY VEHICLES.
C - MEDIUM DUTY	MAILS AND PEDESTRIAN AREAS OPEN TO SLOW MOVING COMMERCIAL VEHICLES.
D - HEAVY DUTY	CARRIAGEWAYS OF ROADS AND AREAS OPEN TO COMMERCIAL VEHICLES.

TABLE AS PER AS3506 - 2006. ENGINEER TO BE NOTIFIED IF LOAD CONDITIONS LISTED ABOVE ARE EXCEEDED.

- COVER TO PIPE TO BE AS PER TABLE BELOW:

COVER TABLE

LOCATION	PIPE TYPE	COVER
LANDSCAPE	PVC	300
LANDSCAPE (SINGLE DWELLING)	PVC	100
UNDER TRAFFICABLE AREA	PVC	100 BELOW UNDERSIDE OF PAVEMENT
CONCRETE	STEEL	NIL BELOW UNDERSIDE OF PAVEMENT
ROADS	RCP	600 BELOW UNDERSIDE OF PAVEMENT

- GREENVIEW'S STORMWATER SYSTEM HAS BEEN DESIGNED TO CAPTURE SURFACE RUNOFF FROM THE SITE ITSELF BUT DOES NOT INCORPORATE SPECIFIC GROUNDWATER CAPTURE MECHANISMS. IN SOME CASES, GROUNDWATER INUNDATION MAY BE A SIGNIFICANT SOURCE OF WATER DURING A STORM EVENT. GREENVIEW RECOMMENDS THAT ALL RETAINING WALLS CLOSE TO HABITABLE AREAS BE FITTED WITH AN IMPERMEABLE MEMBRANE AND SUBSOIL DRAINAGE TO PREVENT GROUNDWATER INGRESS.
- GREENVIEW RECOMMENDS ALL IN-GROUND STORMWATER PIPE RUNS ARE SET OUT BY THE BUILDER PRIOR TO COMMENCEMENT OF WORKS. WHERE 300MM COVER IS NOT ACHIEVED, NOTIFY ENGINEER.
- WHERE STORMWATER DRAINAGE WORKS ARE TO BE UNDERTAKEN PRIOR TO THE CONSTRUCTION OF THE BUILDING, THE BUILDER IS TO SET OUT THE FLOOR LEVELS AND ENSURE PROPOSED STORMWATER DRAINAGE LEVELS AND BUILDING LEVELS ARE COMPATIBLE. NOTIFY ENGINEER IMMEDIATELY IF ANY DISCREPANCIES.

ON-SITE DETENTION

- ON-SITE DETENTION (OSD) TANKS ARE TO BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE CURRENT APPLICABLE AUSTRALIAN STANDARDS INCLUDING AS3500.3, NCC AND COUNCIL'S SPECIFICATIONS.
- IT IS CRITICAL THAT THE MINIMUM OSD VOLUME AS CALCULATED BY THE DESIGN AND NOTED ON THESE PLANS IS ACHIEVED ON SITE. VOLUMES TO BE VERIFIED BE REGISTERED SURVEYOR AND NOTED IN THE WAE SURVEY PRIOR TO CERTIFICATION.
- OSD VOLUME MAY BE ACHIEVED IN BELOW GROUND TANK, OR ABOVE GROUND PONDING, OR RAINWATER TANK OFFSET, OR INFILTRATION/ABSORPTION SYSTEM. EACH COUNCIL HAS SPECIFIC GUIDELINES FOR HOW STORMWATER FLOWS ARE TO BE CONTROLLED AND DISCHARGED.
- PONDING AND OVERFLOW LEVELS FROM THE OSD SHALL BE NOT LESS THAN 300mm BELOW THE EXPOSED SURFACE AND HABITABLE FLOOR LEVELS OF BUILDINGS AND NOT LESS THAN 150mm BELOW NON-HABITABLE FLOOR LEVELS (AS3500.1 CLAUSE 7.10.1).

BELOW GROUND OSD TANKS

- THE HYDRAULIC CONTROL FOR THE STORAGE (USUALLY ORIFICE PLATE) SHALL BE FIRMLY FIXED IN PLACE TO PREVENT REMOVAL OR TAMPERING. A PLATE OF 3mm TO 5mm THICK STAINLESS STEEL WITH A CIRCULAR HOLE SHALL BE USED, PROVIDED:
 - IT IS MACHINED TO 0.5mm ACCURACY
 - IT RETAINS A SHARP EDGE; AND
 - THE ORIFICE DIAMETER IS NOT LESS THAN 25mm (AS 3500.3 CLAUSE 7.10.2)
- INSPECTION / ACCESS OPENINGS SHALL BE PROVIDED ABOVE THE LOCATION OF THE ORIFICE WITH DIMENSIONS AT LEAST 600mm x 600mm OR 600mm DIAMETER FOR STORAGE UP TO 800mm DEEP AND 600mm x 900mm FOR DEEPER STORAGE. THERE SHALL BE NO IMPEDIMENTS TO THE REMOVAL OF DEBRIS THROUGH THIS OPENING. INSPECTION SHALL BE POSSIBLE WITHOUT RESIDENTS OR OWNERS HAVING TO REMOVE HEAVY ACCESS COVERS (AS3500.3 CLAUSE 7.10.2.b.ii).
- WHERE STORAGE ARE NOT DEEP ENOUGH TO WORK IN (<1.5m DEEP), ACCESS SHALL BE PROVIDED AT INTERVALS OF APPROXIMATELY 10m TO ALLOW THE SYSTEM TO BE FLUSHED TO THE STORAGE OUTLET> ACCESS SHALL BE PROVIDED AT THE OUTLET (AS3500.3 CLAUSE 7.10.2.b.iii).
- A SUMP SHALL BE PROVIDED AT THE OUTLET POINT SET BELOW THE LEVEL OF THE MAIN STORAGE TO COLLECT DEBRIS. WHERE A DISCHARGE CONTROL PIT IS INCLUDED IN THE STORAGE< THIS SHALL CONTAIN A SUMP SET A MINIMUM OF 15 TIMES THE DIAMETER OF THE ORIFICE OF THE OUTLET BELOW THE CENTRE OF THE ORIFICE. SUMPS SHALL BE PROVIDED WITH WEEP HOLES TO DRAIN OUT TO THE SURROUNDING SOIL, AND SHALL BE FOUND ON A COMPACTED GRANULAR BASE.
- WHERE THE DEPTH OF THE TANK EXCEEDS 1.2m, A LADDER IN ACCORDANCE WITH AS3500.3 CLAUSE 7.5.6.4 SHALL BE INSTALLED.
- BELOW GROUND OSD SYSTEMS SHALL CONFORM WITH AS2865.
- IN ACCORDANCE WITH AS3500.3 CLAUSE 7.10.2 D SCREENS (TRASH RACKS) WITH THE FOLLOWING CHARACTERISTICS SHOULD BE PROVIDED TO COVER EACH ORIFICE OUTLET:
 - FOR ORIFICES UP TO 150mm DIA. A FINE APERTURE-EXPANDED METAL MESH SCREEN WITH A MINIMUM AREA OF 50 TIMES THE AREA OF THE ORIFICE. FOR LARGER DIA. ORIFICES, A COARSER GRID MESH WITH A MINIMUM AREA OF 20 TIMES THE ORIFICE AREA MAY BE USED AS AN ALTERNATIVE.
 - STEEL SCREENS SHOULD BE STAINLESS STEEL OR HOT-DIP GALVANIZED
 - WHERE APERTURE-EXPANDED MESH SCREENS ARE EMPLOYED, THEY SHOULD BE POSITIONED SO THAT THE OVAL-SHAPED HOLES ARE HORIZONTAL, WITH THE PROTRUDING LIP ANGLED UPWARDS AND FACING DOWNSTREAM. A HANDLE MAY BE FITTED TO ENSURE CORRECT ORIENTATION AND EASY REMOVAL FOR MAINTENANCE.
 - SCREENS SHOULD BE PLACED NO FLATTER THAN 45 DEGREES TO THE HORIZONTAL IN SHALLOW STORAGE UP TO 600mm DEEP. IN DEEPER OR MORE REMOTE LOCATIONS, THE MINIMUM ANGLE SHOULD BE 60 DEGREES TO THE HORIZONTAL.
- IF THE BELOW GROUND OSD STORAGE IS SEALED, A VENT SHOULD BE PROVIDED TO EXPEL ANY NOXIOUS GASES (AS3500.3 CLAUSE 7.10.2.D.B).
- THE STORAGE SHOULD BE DESIGNED TO FILL WITHOUT CAUSING OVERFLOWS IN UPSTREAM CONDUITS DUE TO BACKWATER EFFECTS (AS3500.3 CLAUSE 7.10.2.D.C).
- BELOW GROUND STORAGE'S SHALL BE CONSTRUCTED OF CONCRETE, MASONRY, ALUMINIUM/ZINC AND ALUMINIUM/ZINC/MAGNESIUM ALLOY-COATED STEEL, ZINC-COATED STEEL, GALVANISED IRON OR PLASTICS (AS3500.3 7.10.3).

ABOVE GROUND OSD TANKS

- WHERE ABOVE-GROUND OSD SYSTEMS ARE PROPOSED TO BE LOCATED IN LANDSCAPED AREAS THE FOLLOWING CRITERIA IS RECOMMENDED IN ACCORDANCE WITH AS3500.3 N12.2 A.
 - A DESIRABLE MINIMUM SLOPE FOR SURFACES DRAINING TO AN OUTLET TO BE 1:60, AND AN ABSOLUTE MINIMUM SLOPE TO BE 1:100.
 - THE DESIRABLE MAXIMUM DEPTH OF PONDING UNDER DESIGN CONDITIONS TO BE 300mm.
- STORAGE VOLUMES IN LANDSCAPING AREAS TO BE INCREASED BY 20% TO ALLOW FOR VEGETATION GROWTH, CONSTRUCTION INACCURACIES AND POSSIBLE FILLING.
- SUBSOIL DRAINS TO BE PROVIDED AROUND OUTLETS TO PREVENT THE GROUND BECOMING SATURATED DURING PROLONGED WET WEATHER; AND
- WHERE THE STORAGE IS LOCATED IN AREAS WHERE FREQUENT PONDING WOULD CAUSE MAINTENANCE PROBLEMS OR INCONVENIENCE, THE FIRST 10% TO 20% OF THE STORAGE SHOULD BE IN AN AREA THAT CAN TOLERATE FREQUENT INUNDATION, SUCH AS A PAVED OUTDOOR ENTERTAINMENT AREA, A SMALL UNDERGROUND TANK, A PERMANENT WATER FEATURE OR A ROCKERY.
- WHERE ABOVE-GROUND OSD SYSTEMS ARE PROPOSED TO BE LOCATED IN DRIVEWAY AND CAR PARK SITES, THE FOLLOWING CRITERIA IS RECOMMENDED IN ACCORDANCE WITH AS3500.3 N12.2 B.
 - DEPTHS OF PONDING TO NOT EXCEED 200mm UNDER DESIGN CONDITIONS
 - TRANSVERSE PAVING SLOPES WITHIN STORAGE TO BE NOT LESS THAN 1:140; AND
 - WHERE THE STORAGE IS LOCATED IN COMMONLY USED AREAS WHERE PONDING WOULD CAUSE INCONVENIENCE, PART OF THE STORAGE SHOULD BE PROVIDED IN AN AREA OR FORM THAT WILL NOT CAUSE A NUISANCE.

MAINTENANCE SCHEDULE: ON

SITE DETENTION (OSD)

ALL OSD MAINTENANCE TASKS SHOULD BE UNDERTAKEN AFTER A SIGNIFICANT STORM EVENT

6 MONTHLY

ELEMENT	TASK	DESCRIPTION / ACTION
ORIFICE PLATE	INSPECT FOR BLOCKAGE	CHECK PLATE FOR BLOCKAGE AND CLEAN
TRASH SCREEN	CHECK / CLEAN	CHECK AND CLEAN TRASH SCREEN
PIT SUMP	CHECK FOR SEDIMENT	CHECK FOR SEDIMENT / LITTER / SLUDGE AND CLEAN-OUT
GRATED LIDS	CHECK FOR DAMAGE	CHECK FOR CORROSION OR OTHER DAMAGE AND REPAIR / REPLACE AS NEEDED
	CLEAR BLOCKAGES	CHECK AND CLEAR BLOCKAGES
STORAGE LIDS	CHECK	REMOVE DEBRIS / MULCH / LITTER / SEDIMENT
OUTLET PIPES	CHECK FOR BLOCKAGES	CHECK / CLEAN / FLUSH OUTLET PIPES, REMOVE ANY BLOCKAGES
STEP IRONS	CHECK FIXING	ENSURE STEP-IRON FIXINGS ARE SECURE AND REPAIR AS NEEDED

ANNUALLY

ELEMENT	TASK	DESCRIPTION / ACTION
ORIFICE PLATE	CHECK ATTACHMENT	ENSURE PLATE IS MOUNTED SECURELY, TIGHTEN AND SEAL GAPS AS REQUIRED
TRASH SCREEN	CHECK ATTACHMENT	ENSURE PLATE IS MOUNTED SECURELY, TIGHTEN AND SEAL GAPS AS REQUIRED
	CHECK CORROSION	CHECK TRASH SCREEN FOR CORROSION, ESPECIALLY AT CORNERS NEAR WELDS AND REPAIR / REPLACE AS NEEDED
STEP IRONS	CHECK FOR CORROSION	EXAMINE STEP IRONS AND REPAIR ANY DAMAGE
INTERNAL WALLS	CHECK	CHECK FOR CRACKS / SPALLING AND REPAIR AS NEEDED
OSD SURROUNDS	CHECK FOR SUBSIDENCE	CHECK FOR SUBSIDENCE (WHICH MAY INDICATE LEAKS) AND REPAIR AS NEEDED

5-YEARLY

ELEMENT	TASK	DESCRIPTION / ACTION
ORIFICE PLATE	CHECK ORIFICE PLATE	CHECK ORIFICE SIZE AGAINST WAE AND CHECK FOR FITTING / SCARRING, REPLACE IF NECESSARY

COLOUR LEGEND

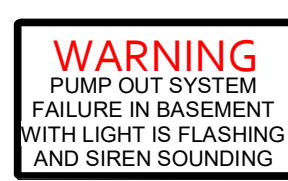
NEW (REFER TO SCHEDULES FOR COLOUR DEFINITION)

EXISTING

REMOVED OR RELOCATED

GREENVIEW CIVIL SHEET LIST		
No.	SHEET NAME	REV.
C01	NOTES & LEGENDS	2
C02	GROUND FLOOR DRAINAGE PLAN	2

RECOMMENDED SAFETY SIGNS



BASEMENT PUMP OUT FAILURE WARNING SIGN

- SIGN SHALL BE PLACED IN A CLEAR AND VISIBLE LOCATION WHERE VEHICLES ENTER THE BASEMENT



CONFINED SPACE DANGER SIGN

- A CONFINED SPACE DANGER SIGN SHALL BE POSITIONED IN A LOCATION AT ALL ACCESS POINTS, SUCH THAT IT IS CLEARLY VISIBLE TO PERSONS PROPOSING TO ENTER THE BELOW GROUND TANKS CONFINED SPACE.
 - MINIMUM DIMENSIONS OF THE SIGN:
 - 300mm x 450mm (LARGE ENTRIES, SUCH AS DOORS)
 - 250mm x 180mm (SMALL ENTRIES SUCH AS GRATES & MANHOLES)
- THE SIGN SHALL BE MANUFACTURED FROM COLOUR BONDED ALUMINIUM OR POLYPROPYLENE
- SIGN SHALL BE AFFIXED USING SCREWS AT EACH CORNER OF THE SIGN.

EXISTING SERVICES



ABBREVIATIONS

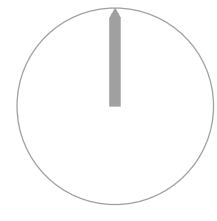
DP	DOWN PIPE
FFL	PROPOSED FINISHED FLOOR LEVEL
GL	PROPOSED PIT SURFACE LEVEL
LANDSC	PROPOSED PIT INVERT LEVEL
IO	INSPECTION OPENING
K&G	KERB & GUTTER
P	FIREPRESSURE PAVEMENT LEVEL
RCP	REINFORCED CONCRETE PIPE
RKG	ROLL KERB & GUTTER
RL	FINISHED SURFACE LEVEL
RWO	RAINWATER PROVISION OR PROPOSED RAINWATER TANK
RWT	TOP OF NEW KERB LEVEL
TK	TOP OF NEW RETAINING WALL LEVEL
TOW	TOP OF WATER LEVEL
TWL	RIGID PVC PIPE
UPVC	VERTICAL DROPPER
VD	

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2	06.05.20	JPS	ISSUED FOR APPROVAL	
1	05.05.20	JPS	ISSUED FOR REVIEW	
REV.	DATE	BY	DESCRIPTION	

PROPOSED DEVELOPMENT

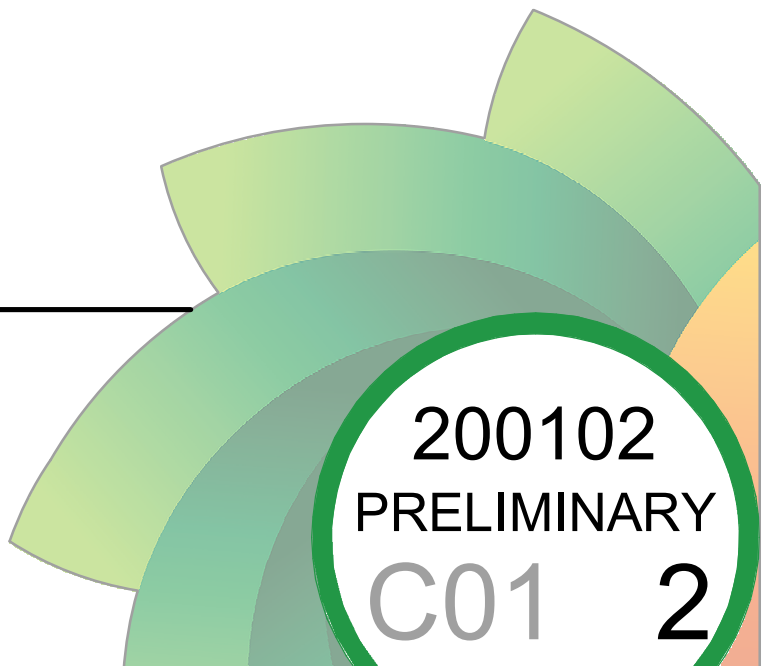
Richard Gill National Music Academy
Muswellbrook

Stanton Dahl



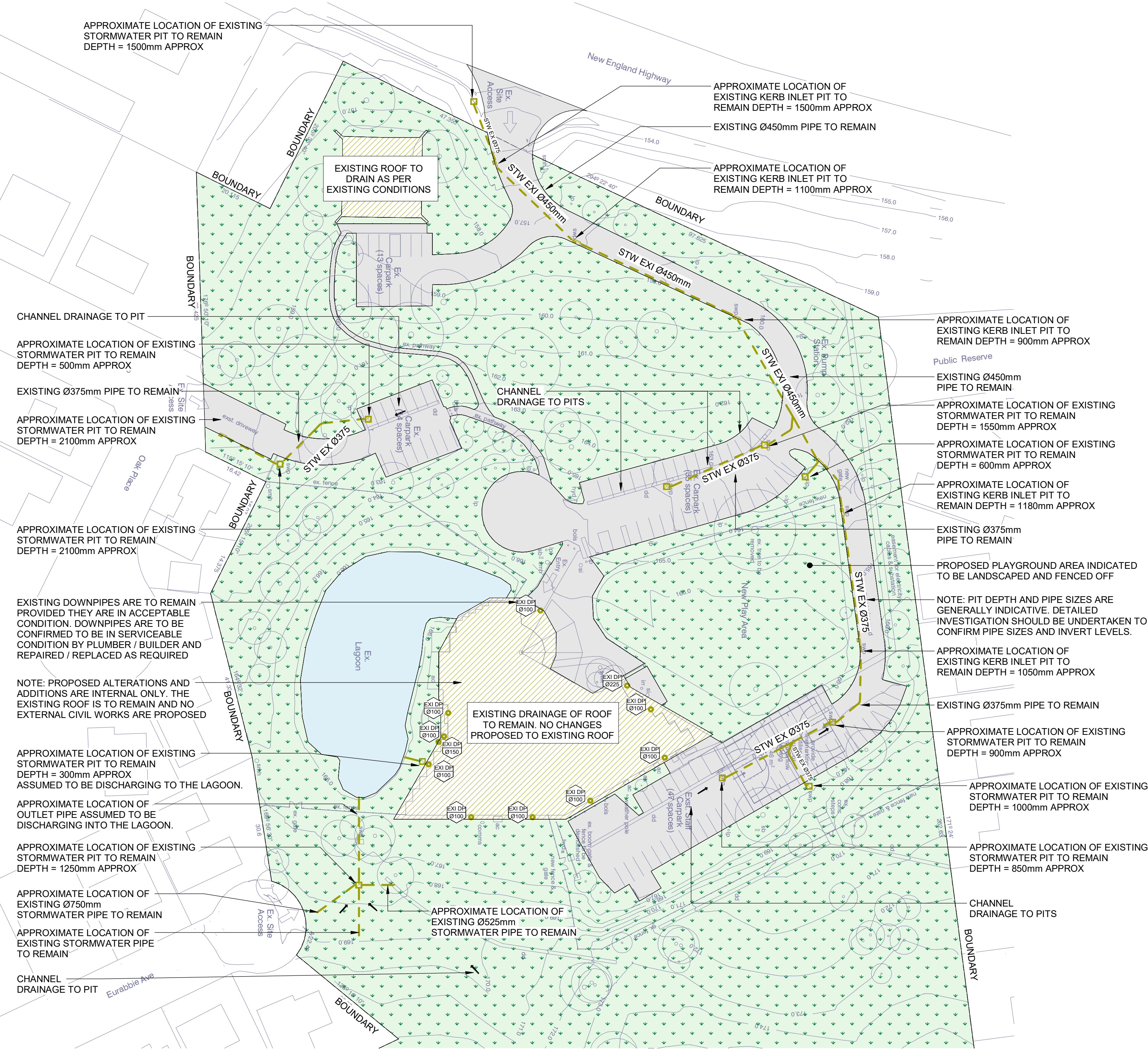
CIVIL DESIGN

NOTES & LEGENDS



APPENDIX B: Greenview Stormwater Drawings

ii C02 Ground Floor Drainage Plan



GENERAL LEGEND

LANDSCAPE
HARDSTAND
ROOF AREA TO DRAIN
EXISTING ROOF AREA TO DRAIN



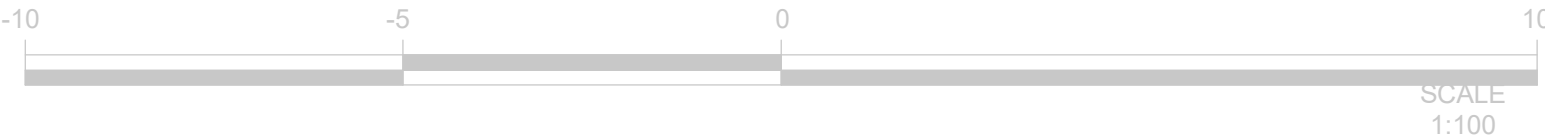
CIV - FIXTURES SCHEDULE		
	TYPE	DESCRIPTION
		GRATED STORMWATER PIT

CIV - STORMWATER SERVICES		
	TYPE	DESCRIPTION
	STW EX	EXISTING STORMWATER

GROUND FLOOR DRAINAGE PLAN

Scale: 1 : 650

1. ALL NEW WORKS SHALL MAKE A SMOOTH JUNCTION WITH EXISTING.
2. THE BUILDER/CONTRACTOR SHALL LOCATE ALL EXISTING PUBLIC UTILITY SERVICES WITHIN THE SITE. FOOTPATH AREA AND ROAD RESERVE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ALL LOCATIONS AND LEVELS OF SERVICES SHALL BE REPORTED TO THE STORMWATER ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS TO ENSURE THERE ARE NO OBSTRUCTIONS IN THE LINE OF THE DRAINAGE DISCHARGE PIPES.
3. PRIOR TO COMMENCING ANY WORKS ON THE SITE, THE BUILDER SHALL ENSURE THAT THE INVERT LEVELS OF WHERE THE SITE STORMWATER SYSTEM CONNECTION INTO COUNCIL'S KERB/DRAINAGE SYSTEM MATCH THE DESIGN LEVELS. ANY DISCREPANCIES SHALL BE REPORTED TO THE DESIGN ENGINEER IMMEDIATELY.
4. ALL STORMWATER DRAINAGE WORK TO AVOID TREE ROOTS. WHERE NOT POSSIBLE, ALL EXCAVATIONS IN VICINITY OF TREE ROOTS ARE TO BE HAND DUG.
5. ALL BASES OF PITS TO BE BENCHED (TO HALF PIPE DEPTH) TO THE INVERT OF THE OUTLET PIPE WITH ALL PIPES CUT FLUSH WITH SIDE OF PIT, TO ALLOW SMOOTH FLOW OF STORMWATER.
6. PROVIDE GALVANISED ANGLE SURROUNDINGS TO GRATE WHERE IN TRAFFICABLE AREAS.
7. PROVIDE 100mm GAP IN BASE OF FENCE FOR EMERGENCY OVERFLOWS.
8. PROVIDE SUBSOIL DRAINAGE AND OUTLETS TO ALL ON PODIUM PLANTER BOXES. OUTLET PIPES NOT SHOWN FOR CLARITY OF DOCUMENTATION.

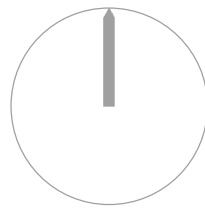


REV.	DATE	BY	DESCRIPTION
2	06.05.20	JPS	ISSUED FOR APPROVAL
1	05.05.20	JPS	ISSUED FOR REVIEW

PROPOSED DEVELOPMENT

Richard Gill National Music Academy
Muswellbrook

Stanton Dahl



CIVIL DESIGN

GROUND FLOOR DRAINAGE PLAN

200102
PRELIMINARY
C02 2

APPENDIX B: Greenview Environmental Site Management Plan i ESM1 Notes & Legends

CIVIL DESIGN FOR PROPOSED DEVELOPMENT AT Richard Gill National Music Academy Muswellbrook

GENERAL INSTRUCTIONS

- 1. THIS SOIL AND WATER MANAGEMENT PLAN IS TO BE READ IN CONJUNCTION WITH OTHER ENGINEERING PLANS RELATING TO THIS DEVELOPMENT.
- 2. CONTRACTORS WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN AS INSTRUCTED IN THIS SPECIFICATION AND CONSTRUCTED FOLLOWING THE GUIDELINES OF "MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION", DEPT OF HOUSING, 1998 (BLUE BOOK).
- 3. ALL SUBCONTRACTORS WILL BE INFORMED OF THEIR RESPONSIBILITIES IN REDUCING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE AREAS.
- 4. THESE PLANS SHALL BE READ IN CONJUNCTION WITH OTHER RELEVANT CONSULTANTS' PLANS, SPECIFICATIONS, CONDITIONS OF DEVELOPMENT CONSENT AND CONSTRUCTION CERTIFICATE REQUIREMENTS, WHERE DISCREPANCIES ARE FOUND NOTIFY ENGINEER IMMEDIATELY FOR VERIFICATION.
- 5. WHERE THESE PLANS ARE NOTED FOR DEVELOPMENT APPLICATION PURPOSES ONLY, THEY SHALL NOT BE USED FOR OBTAINING A CONSTRUCTION CERTIFICATE NOR USED FOR CONSTRUCTION PURPOSES.

LAND DISTURBANCE INSTRUCTIONS

- 1. DISTURBANCE TO BE NO FURTHER THAN 5 (PREFERABLY 2) METRES FROM THE EDGE OF ANY ESSENTIAL ENGINEERING ACTIVITY AS SHOWN ON APPROVED PLANS. ALL SITE WORKERS WILL CLEARLY RECOGNISE THESE ZONES THAT, WHERE APPROPRIATE, ARE IDENTIFIED WITH BARRIER FENCING (UPSLOPE) AND SEDIMENT FENCING (DOWNSLOPE) OR SIMILAR MATERIALS.
- 2. ACCESS AREAS ARE TO BE LIMITED TO A MAXIMUM WIDTH OF 10 METRES THE SITE MANAGER WILL DETERMINE AND MARK THE LOCATION OF THESE ZONES ON-SITE. ALL SITE WORKERS WILL CLEARLY RECOGNISE THESE BOUNDARIES THAT, WHERE APPROPRIATE, ARE IDENTIFIED WITH BARRIER FENCING (UPSLOPE) AND SEDIMENT FENCING (DOWNSLOPE) OR SIMILAR MATERIALS.
- 3. ENTRY TO LANDS NOT REQUIRED FOR CONSTRUCTION OR ACCESS IS PROHIBITED EXCEPT FOR ESSENTIAL THINNING OF PLANT GROWTH.
- 4. WORKS ARE TO PROCEED IN THE FOLLOWING SEQUENCE:
 - A. INSTALL ALL BARRIER AND SEDIMENT FENCING WHERE SHOWN ON THE PLAN.
 - B. CONSTRUCT THE STABILISED SITE ACCESS.
 - C. CONSTRUCT DIVERSION DRAINS AS REQUIRED.
 - D. INSTALL MESH AND GRAVEL INLETS FOR ANY ADJACENT KERB INLETS.
 - E. INSTALL GEOTEXTILE INLET FILTERS AROUND ANY ON-SITE DROP INLET PITS.
 - F. CLEAR SITE AND STRIP AND STOCKPILE TOPSOIL IN LOCATIONS SHOWN ON THE PLAN.
 - G. UNDERTAKE ALL ESSENTIAL CONSTRUCTION WORKS ENSURING THAT ROOF AND/OR PAVED AREA STORMWATER SYSTEMS ARE CONNECTED TO PERMANENT DRAINAGE AS SOON AS PRACTICABLE.
 - H. GRADE LOT AREAS TO FINAL GRADES AND APPLY PERMANENT STABILISATION (LANDSCAPING) WITHIN 20 DAYS OF COMPLETION OF CONSTRUCTION WORKS.
 - I. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER THE PERMANENT LANDSCAPING HAS BEEN COMPLETED.
- 5. ENSURE THAT SLOPE LENGTHS DO NOT EXCEED 80 METRES WHERE PRACTICABLE. SLOPE LENGTHS ARE DETERMINED BY SILTATION FENCING AND CATCH DRAIN SPACING.
- 6. ON COMPLETION OF MAJOR WORKS LEAVE DISTURBED LANDS WITH A SCARIFIED SURFACE TO ENCOURAGE WATER INFILTRATION AND ASSIST WITH KEYING TOPSOIL LATER.

SITE MAINTENANCE INSTRUCTIONS

- 1. THE SITE SUPERINTENDENT WILL INSPECT THE SITE AT LEAST WEEKLY AND AT THE CONCLUSION OF EVERY STORM EVENT TO:
 - A. ENSURE THAT DRAINS OPERATE PROPERLY AND TO EFFECT ANY NECESSARY REPAIRS.
 - B. REMOVE SPILLED SAND OR OTHER MATERIALS FROM HAZARD AREAS, INCLUDING LANDS CLOSER THAN 5 METRES FROM AREAS OF LIKELY CONCENTRATED OR HIGH VELOCITY FLOWS ESPECIALLY WATERWAYS AND PAVED AREAS.
 - C. REMOVE TRAPPED SEDIMENT WHENEVER THE DESIGN CAPACITY OF THAT STRUCTURE HAS BEEN EXCEEDED.
 - D. ENSURE REHABILITATED LANDS HAVE EFFECTIVELY REDUCED THE EROSION HAZARD AND NOT TO INITIATE UPGRADING OR REPAIR AS NECESSARY.
 - E. CONSTRUCT ADDITIONAL EROSION AND/OR SEDIMENT CONTROL WORKS AS MIGHT BECOME NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS. MAKE ONGOING CHANGES TO THE PLAN WHERE IT PROVES INADEQUATE IN PRACTICE OR IS SUBJECTED TO CHANGES IN CONDITIONS ON THE WORK-SITE OR ELSEWHERE IN THE CATCHMENT.
 - F. MAINTAIN EROSION AND SEDIMENT CONTROL STRUCTURES IN A FULLY FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE IS REHABILITATED.

THE SITE SUPERINTENDENT WILL KEEP A LOGBOOK MAKING ENTRIES AT LEAST WEEKLY, IMMEDIATELY BEFORE FORECAST RAIN AND AFTER RAINFALL. ENTRIES WILL INCLUDE:

- A. THE VOLUME AND INTENSITY OF ANY RAINFALL EVENTS.
- B. THE CONDITION OF ANY SOIL AND WATER MANAGEMENT WORKS.
- C. THE CONDITION OF VEGETATION AND ANY NEED TO IRRIGATE.
- D. THE NEED FOR DUST PREVENTION STRATEGIES.
- E. ANY REMEDIAL WORKS TO BE UNDERTAKEN.

THE LOGBOOK WILL BE KEPT ON-SITE AND MADE AVAILABLE TO ANY AUTHORISED PERSON UPON REQUEST. IT WILL BE GIVEN TO THE PROJECT MANAGER AT THE CONCLUSION OF THE WORKS.

SAFETY IN DESIGN NOTES

- 1. THERE ARE INHERENT RISKS WITH CONSTRUCTING, MAINTAINING, OPERATING, DEMOLISHING, DISMANTLING AND DISPOSING. WE NOTE THIS DESIGN IS TYPICAL OF SIMILAR DESIGNS. AS FAR AS IS REASONABLY PRACTICABLE RISKS HAVE BEEN ELIMINATED OR MINIMISED THROUGH THE DESIGN PROCESS. HAZARD CONTROLS MUST STILL BE IMPLEMENTED BY THE CONTRACTOR, OWNER OR OPERATOR TO ENSURE THE SAFETY OF WORKERS. GREENVIEW ASSESSMENT DID NOT IDENTIFY ANY UNIQUE RISKS ASSOCIATED WITH THE DESIGN.

SEDIMENT CONTROL INSTRUCTIONS

- 1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN ON THE PLAN AND ELSEWHERE AT THE DISCRETION OF THE SITE SUPERINTENDENT TO CONTAIN SOIL AS NEAR AS POSSIBLE TO THEIR SOURCE.
- 2. SEDIMENT FENCES WILL NOT HAVE CATCHMENT AREAS EXCEEDING 900 SQUARE METRES AND HAVE A STORAGE DEPTH OF AT LEAST 0.6 METRES.
- 3. SEDIMENT REMOVED FROM ANY TRAPPING DEVICES WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS CANNOT OCCUR.
- 4. STOCKPILES ARE NOT TO BE LOCATED WITHIN 5 METRES OF HAZARD AREAS INCLUDING AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS AND DRIVEWAYS.
- 5. WATER WILL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR WATER HAS BEEN TREATED BY AN APPROVED DEVICE.
- 6. TEMPORARY SEDIMENT TRAPS WILL REMAIN IN PLACE UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.
- 7. ACCESS TO SITES SHOULD BE STABILISED TO REDUCE THE LIKELIHOOD OF VEHICLES TRACKING SOIL MATERIALS ONTO PUBLIC ROADS AND ENSURE ALL-WEATHER ENTRY/EXIT.

SOIL EROSION CONTROL INSTRUCTIONS

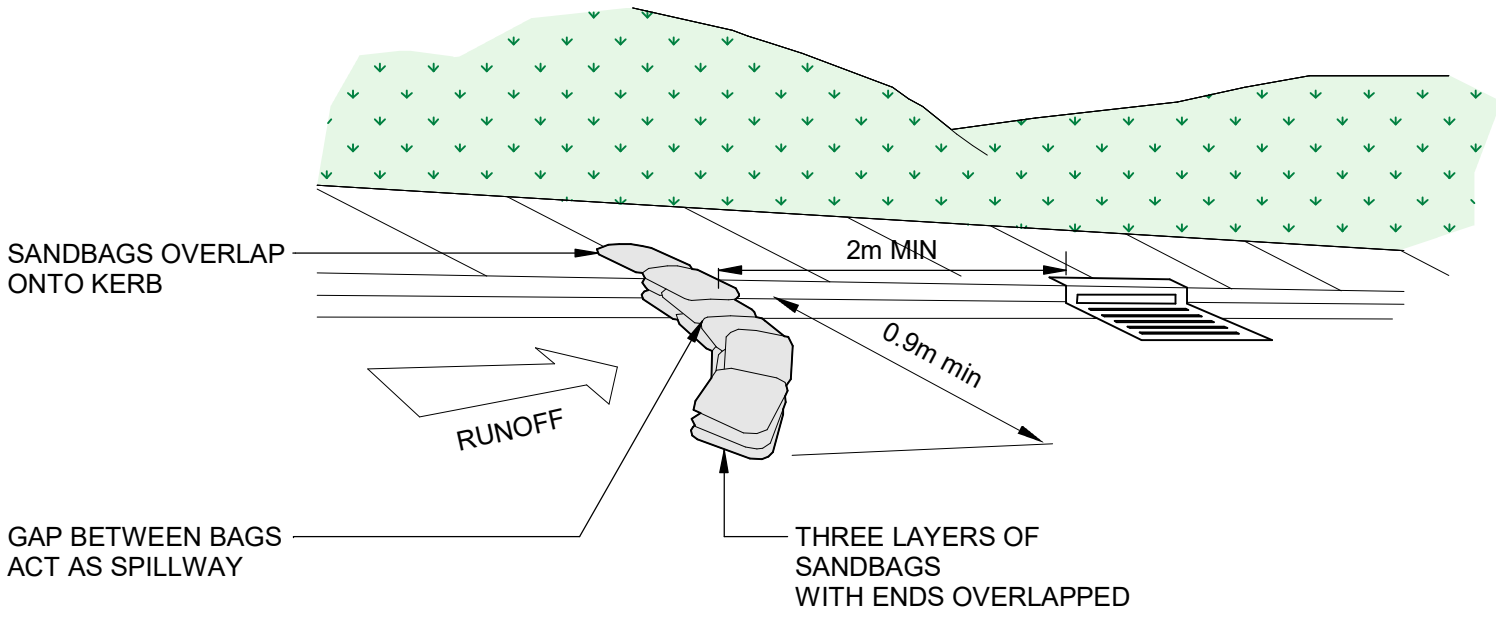
- 1. EARTH BATTERS WILL BE CONSTRUCTED WITH AS LOW A GRADIENT AS PRACTICABLE BUT NO STEEPER, UNLESS OTHERWISE NOTED, THAN:
 - 2(H):1(V) WHERE SLOPE LENGTH LESS THAN 12 METRES.
 - 2.5(H):1(V) WHERE SLOPE LENGTH BETWEEN 12 AND 16 METRES.
 - 3(H):1(V) WHERE SLOPE LENGTH BETWEEN 12 AND 20 METRES.
 - 4(H):1(V) WHERE SLOPE LENGTH GREATER THAN 20 METRES.
- 2. ALL WATERWAYS, DRAINS, SPILLWAYS AND THEIR OUTLETS WILL BE CONSTRUCTED TO BE STABLE IN AT LEAST THE 1:20 YEAR ARI, TIME OF CONCENTRATION STORM EVENT.
- 3. WATERWAYS AND OTHER AREAS SUBJECT TO CONCENTRATED FLOWS AFTER CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND COVER C-FACTOR OF 0.05 (70% GROUND COVER) WITHIN 10 WORKING DAYS FROM COMPLETION OF FORMATION. FLOW VELOCITIES ARE TO BE LIMITED TO THOSE SHOWN IN TABLE 5-1 OF "MANAGING URBAN STORMWATER-SOILS AND CONSTRUCTION", DEPT OF HOUSING 1998 (BLUE BOOK). FOOT AND VEHICULAR TRAFFIC WILL BE PROHIBITED IN THESE AREAS.
- 4. STOCKPILES AFTER CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND-COVER C-FACTOR OF 0.1 (60% GROUND-COVER) WITHIN 10 WORKING DAYS FROM COMPLETION OF FORMATION.
- 5. ALL LANDS, INCLUDING WATERWAYS AND STOCKPILES, DURING CONSTRUCTION ARE TO HAVE A MAXIMUM GROUND-COVER C-FACTOR OF 0.15 (50% GROUND COVER) WITHIN 20 WORKING DAYS FROM INACTIVITY EVEN THOUGH WORKS MAY CONTINUE LATER.
- 6. FOR AREAS OF SHEET FLOW USE THE FOLLOWING GROUND COVER PLANT SPECIES FOR TEMPORARY COVER: JAPANESE MILLET 20 KG/HA AND OATS 20 KG/HA.
- 7. PERMANENT REHABILITATION OF LANDS AFTER CONSTRUCTION WILL ACHIEVE A GROUND-COVER C-FACTOR OF LESS THAN 0.1 AND LESS THAN 0.05 WITHIN 60 DAYS. NEWLY PLANTED LANDS WILL BE WATERED REGULARLY UNTIL AN EFFECTIVE COVER IS ESTABLISHED AND PLANTS ARE GROWING VIGOROUSLY. FOLLOW-UP SEED AND FERTILISER WILL BE APPLIED AS NECESSARY.
- 8. REVEGETATION SHOULD BE AIMED AT RE-ESTABLISHING NATURAL SPECIES. NATURAL SURFACE SOILS SHOULD BE REPLACED AND NON-PERSISTANT ANNUAL COVER CROPS SHOULD BE USED.

WASTE CONTROL INSTRUCTIONS

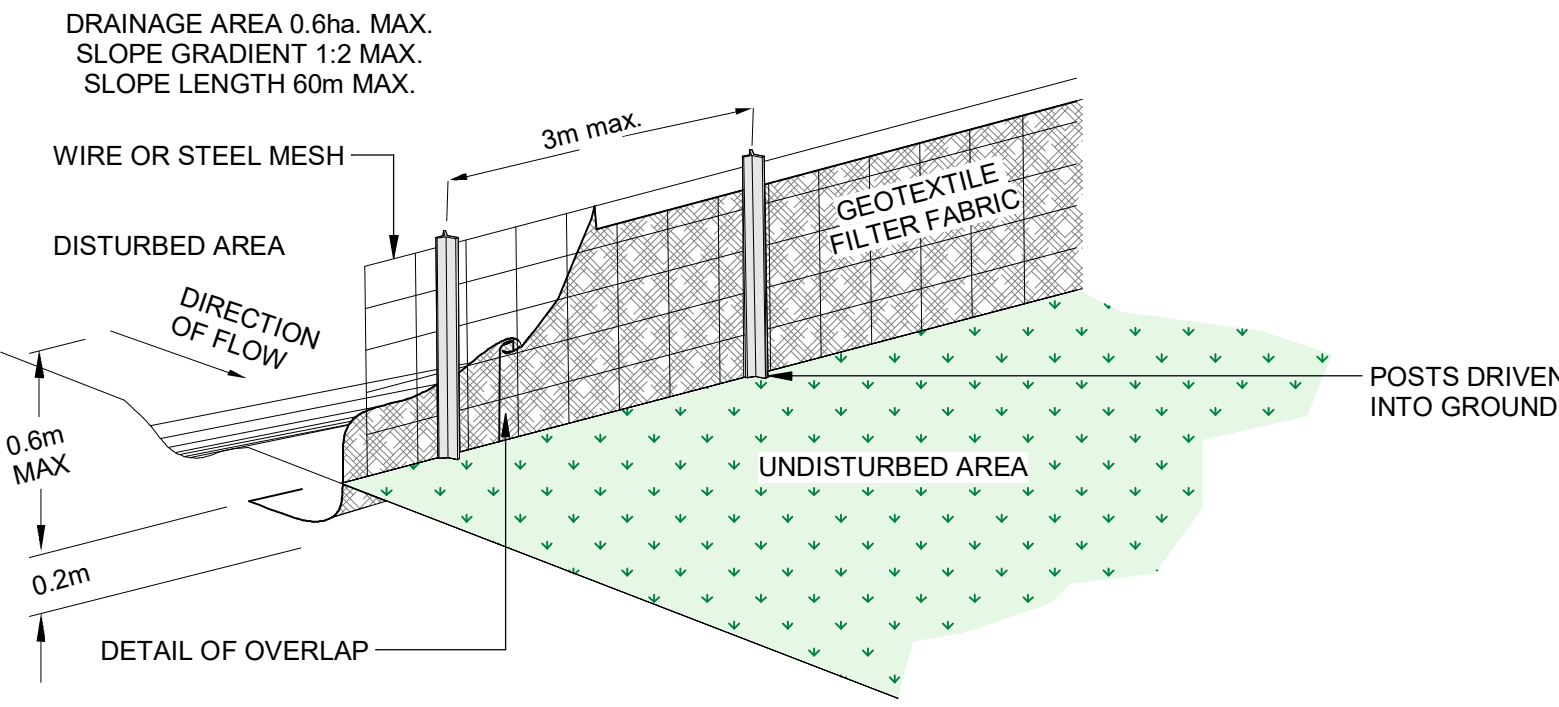
- 1. ACCEPTABLE BINS WILL BE PROVIDED FOR ANY CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHING, LIGHTWEIGHT WASTE MATERIALS AND LITTER. CLEARANCE SERVICES WILL BE PROVIDED AT LEAST WEEKLY. DISPOSAL OF WASTE WILL BE IN A MANNER APPROVED BY THE SITE SUPERINTENDENT.
- 2. ALL POSSIBLE POLLUTANT MATERIALS ARE TO BE STORED WELL CLEAR OF ANY POORLY DRAINED AREAS, FLOOD PRONE AREAS, STREAMBANKS, CHANNELS AND STORMWATER DRAINAGE AREAS. STORE SUCH MATERIALS IN A DESIGNATED AREA UNDER COVER WHERE POSSIBLE AND WITHIN CONTAINMENT BUNDS.
- 3. ALL SITE STAFF AND SUB-CONTRACTORS ARE TO BE INFORMED OF THEIR OBLIGATION TO USE WASTE CONTROL FACILITIES PROVIDED.
- 4. ANY DE-WATERING ACTIVITIES ARE TO BE CLOSELY MONITORED TO ENSURE THAT WATER IS NOT POLLUTED BY SEDIMENT, TOXIC MATERIALS OR PETROLEUM PRODUCTS.
- 5. PROVIDE DESIGNATED VEHICULAR WASHDOWN AND MAINTENANCE AREAS WHICH ARE TO HAVE CONTAINMENT BUNDS.

PROCEDURE FOR DE-WATERING

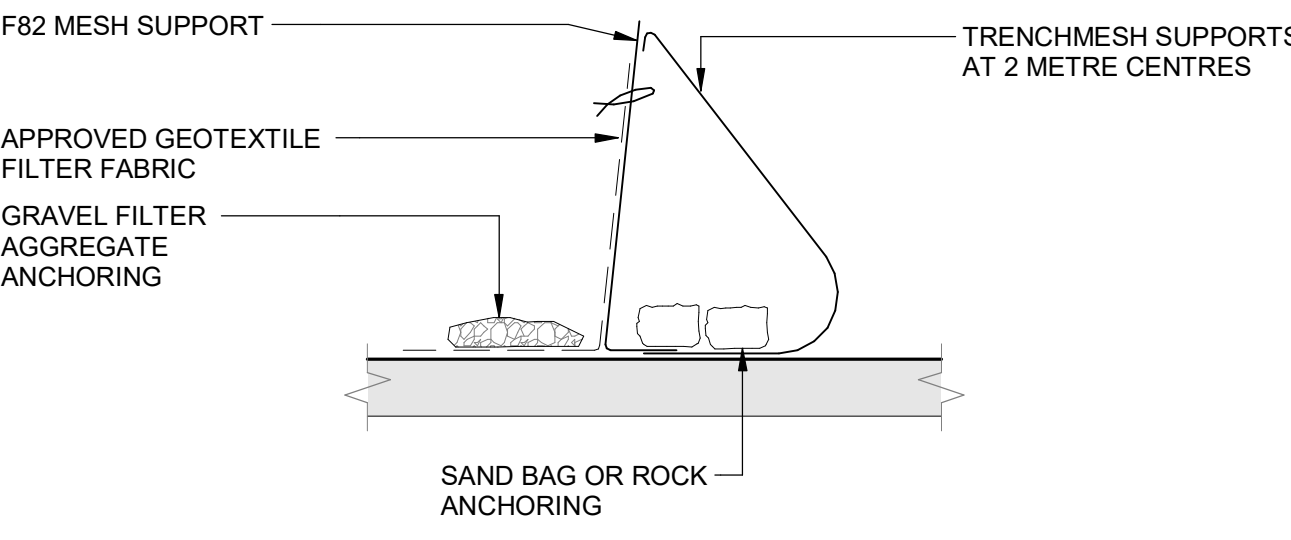
- 1. ENSURE PERMISSION FOR DE-WATERING IS RECEIVED FROM AUTHORITIES BEFORE PUMPING OUT.
- 2. AN ON-SITE TREATMENT PROCESS DISCHARGING TO THE STORMWATER SYSTEM WILL BE IMPLEMENTED. ALL SITE WATERS DURING CONSTRUCTION WILL BE CONTAINED ON SITE AND RELEASED ONLY WHEN pH IS BETWEEN 8.5 & 6.5, SUSPENDED SOLIDS ARE LESS THAN 50mg/L, TURBIDITY LESS THAN 100 NTUS, OIL AND GREASE LESS THAN 10mg/L AND BIOCHEMICAL OXYGEN DEMAND (BOD5) LESS THAN 30mg/L (FOR STORMS LESS THAN 1 IN 5 YEAR EVENTS).
- 3. METHODS OF SAMPLING AND ANALYSIS OF WATER QUALITY WILL BE IN ACCORDANCE WITH THE APPLICABLE METHOD LISTED IN THE EPA PUBLISHED APPROVED METHODS FOR THE SAMPLING ANALYSIS OF WATER POLLUTANTS IN NEW SOUTH WALES.
- 4. WHERE LABORATORY ANALYSIS IS REQUIRED AS INDICATED BY IN-SITU TESTING, APPROPRIATE SAMPLE BOTTLES AND PRESERVATIVES WILL BE USED AND GUIDANCE FOR THE SAMPLING METHOD OBTAINED FROM APPLICABLE PARTS OF ASS667.1 AND ASS667.5. ANALYSIS WILL BE UNDERTAKEN WHERE PRACTICAL BY A NATA REGISTERED LABORATORY CERTIFIED TO PERFORM THE APPLICABLE ANALYSIS.
- 5. AS EXCAVATION TO TOP SOIL PROGRESSES, ANY WATER COLLECTED AT THE BOTTOM OF EXCAVATIONS WILL BE DIVERTED TO A TEMPORARY SEDIMENTATION BASIN OR SETTLEMENT TANK. IF THE WATER CONTAINS ONLY SEDIMENTS, IT WILL BE FILTERED AND PUMPED TO STORMWATER. BEFORE THIS CAN HAPPEN IT MUST CONTAIN LESS THAN 50mg/L TOTAL SUSPENDED SOLIDS.
- 6. POLLUTED WATER MUST NOT ENTER THE STORMWATER SYSTEM. IN SOME CIRCUMSTANCES, A LIQUID WASTE COMPANY MAY BE REQUIRED TO COLLECT CONTAMINATED WATER FOR DISPOSAL AT A LICENSED TREATMENT FACILITY.



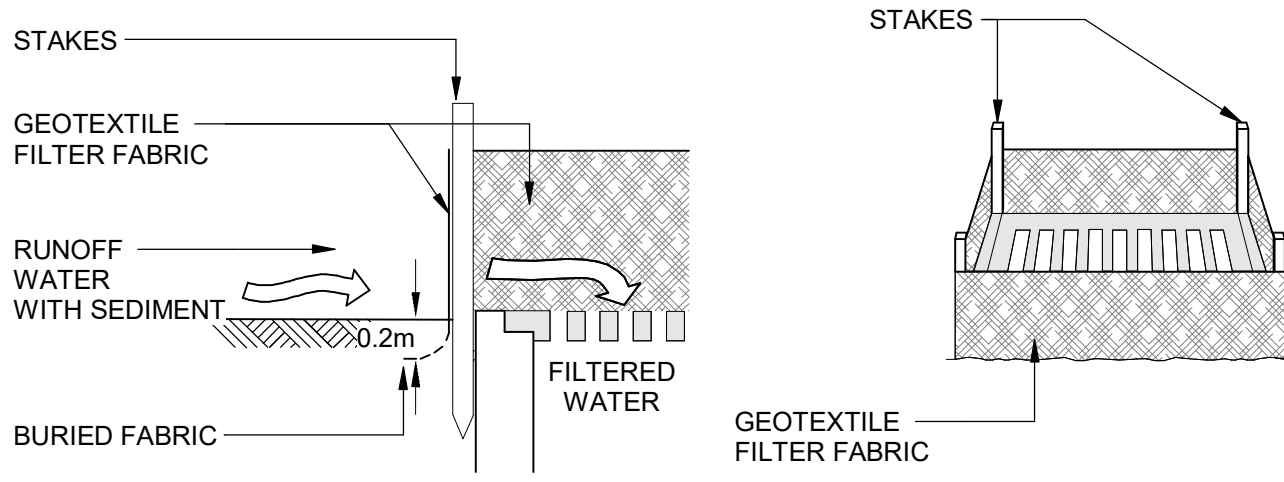
SANDBAG SEDIMENT TRAP Scale: 1 : 20



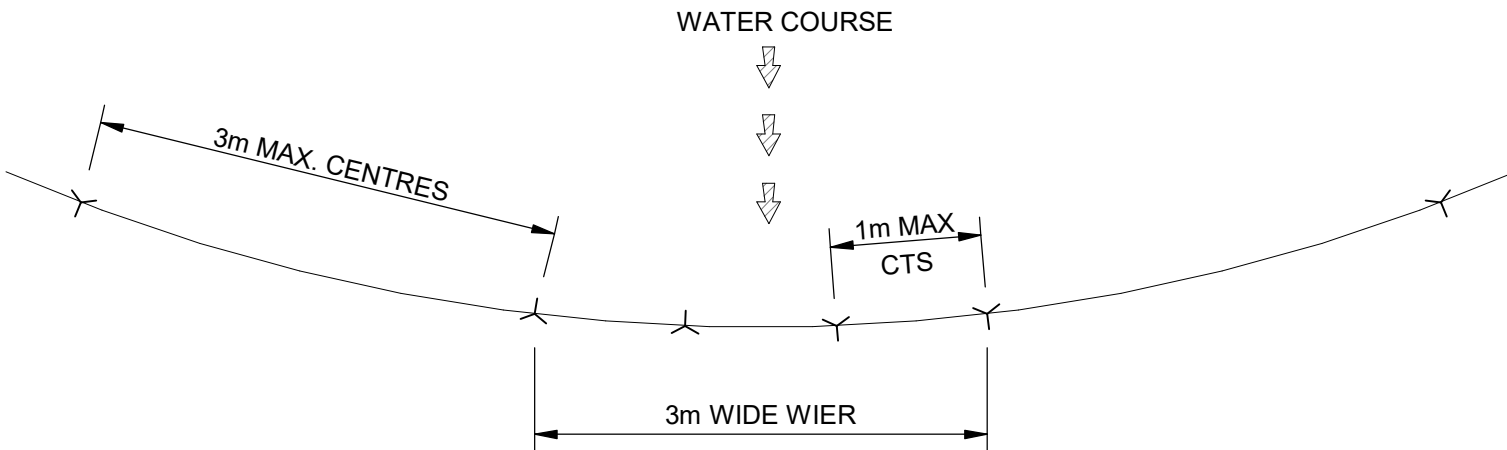
SEDIMENT SILT FENCE Scale: 1 : 20



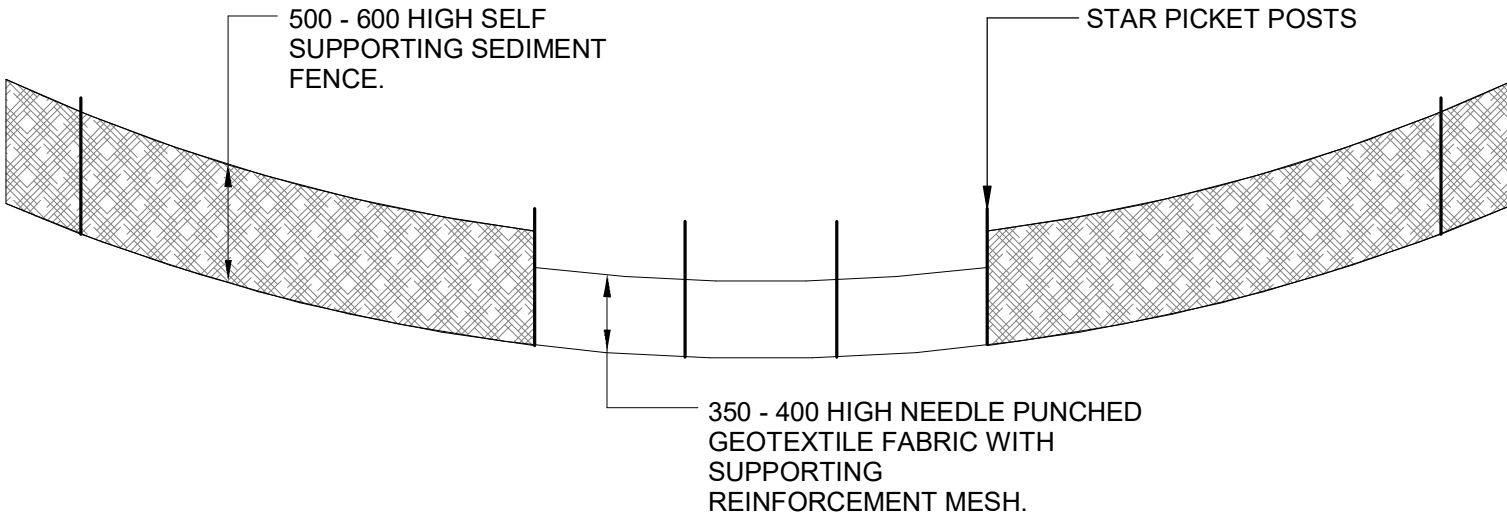
SILT FENCE BARRIER DETAIL Scale: 1 : 20



INLET SEDIMENT TRAP Scale: 1 : 20

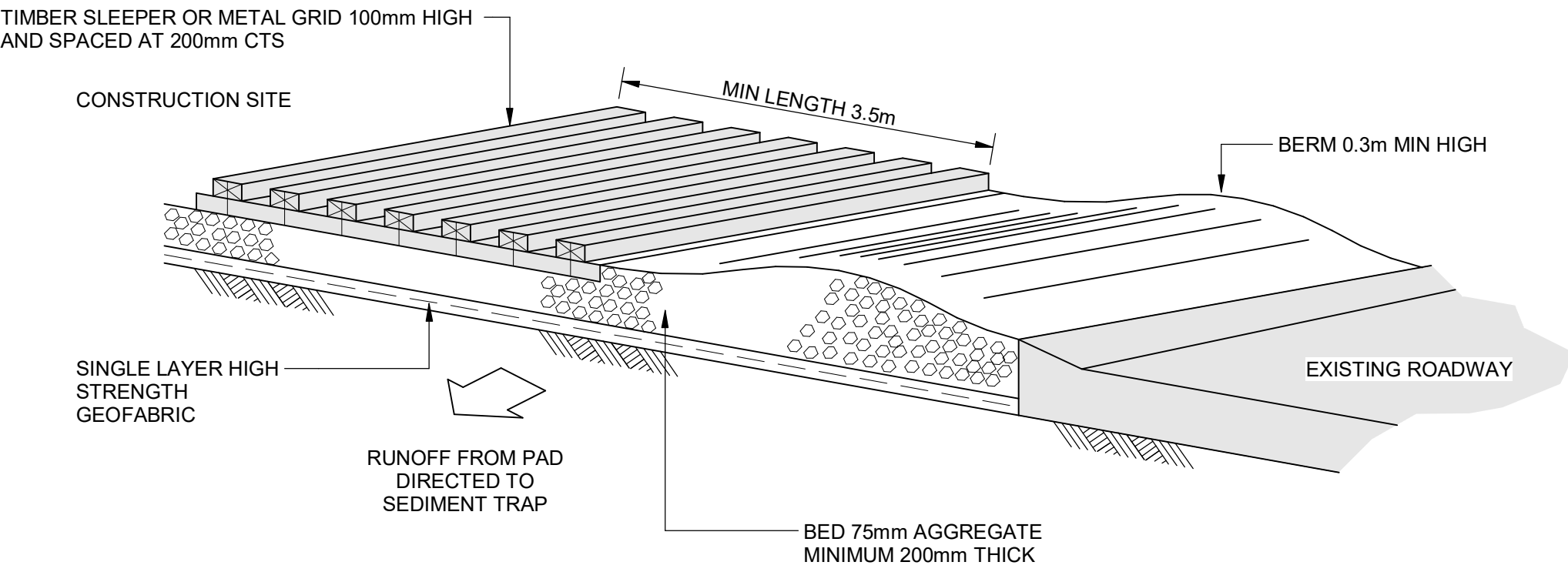


PLAN



ELEVATION

ESM_SEDIMENT FENCE WEIR Scale: 1 : 20



TEMPORARY CONSTRUCTION EXIT Scale: 1 : 20

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	2	06.05.20	JPS	ISSUED FOR APPROVAL	
	1	05.05.20	JPS	ISSUED FOR REVIEW	
REV.	DATE	BY		DESCRIPTION	

PROPOSED DEVELOPMENT

Richard Gill National Music Academy Muswellbrook

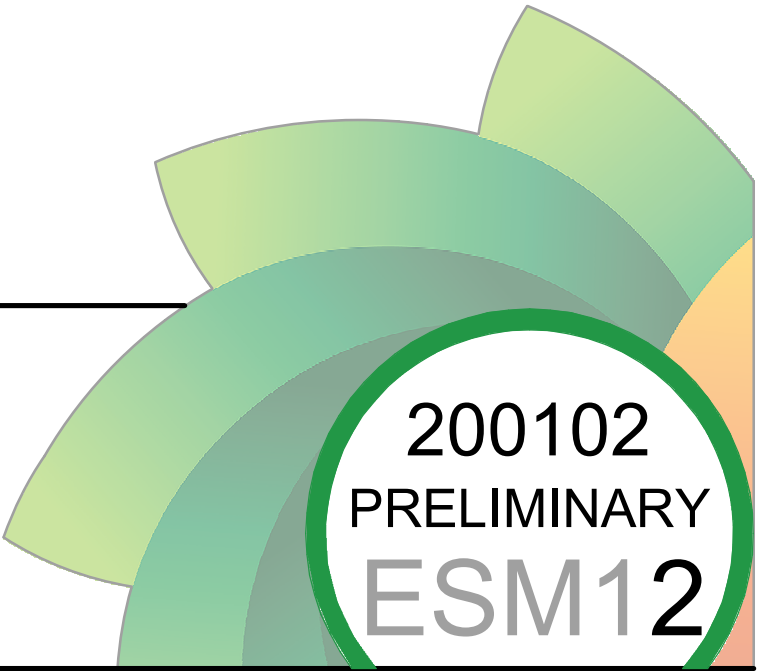
Stanton Dahl



		CHECKED: AMcK	SIZE: A1	SCALE: As indicated
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CIVIL DESIGN

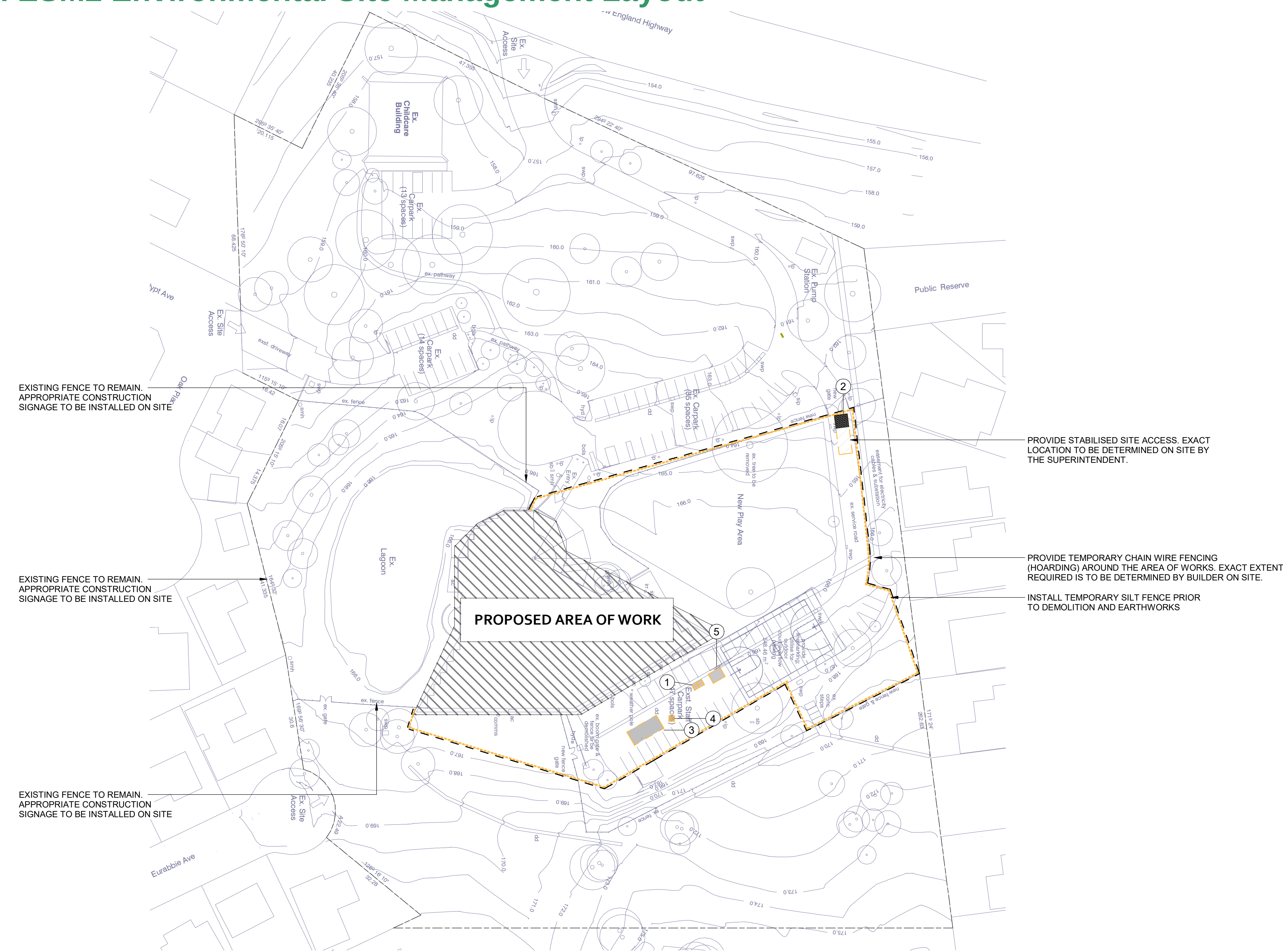
NOTES & LEGENDS



APPENDIX B: Greenview

Environmental Site Management Plan

ii ESM2 Environmental Site Management Layout



SITE MANAGEMENT LEGEND

- CHAIN WIRE FENCE
- SILT FENCE

ESM - SITE MANAGEMENT SCHEDULE	
TYPE	DESCRIPTION
1	SKIP BIN (PROVIDE COVER)
2	SITE ACCESS GRATE
3	MATERIALS STOCKPILE (RELOCATE AS NECESSARY)
4	TOILET FACILITY
5	SITE SHED

- NOISE CONTROL**
- WHERE POSSIBLE, STRATEGICALLY PLACE NOISE-GENERATING PLANT / EQUIPMENT TO TAKE ADVANTAGE OF NATURAL SCREENING (E.G. BUILDINGS)
 - AVOID PLACING NOISE-GENERATING PLANT / EQUIPMENT CLOSE TOGETHER AND/OR OPERATE SIMULTANEOUSLY
 - MAINTAIN ALL PLANT & EQUIPMENT TO MINIMISE NOISE EMISSIONS (E.G. REPAIR BROKEN SILENCING EQUIPMENT, TIGHTEN RATTLING COMPONENTS ETC)
 - ALL PLANT & EQUIPMENT TO BE OPERATED IN THE CORRECT MANNER TO AVOID UNNECESSARY NOISE EMISSIONS
 - ALL DELIVERIES TO SITE TO BE IN ACCORD WITH THE RELEVANT CONSTRUCTION TRAFFIC MANAGEMENT PLAN (CTMP)
 - NO PUBLIC ADDRESS SYSTEMS TO BE USED EXCEPT IN THE CASE OF EMERGENCIES
 - WHERE NECESSARY, FIT PLANT WITH SILENCERS AND/OR OTHER NOISE ATTENUATION MEASURES
 - ENSURE CONSTRUCTION VEHICLES AND PLANT/EQUIPMENT ARE TURNED OFF WHEN NOT IN USE (I.E. AVOID IDLING)

- VIBRATION MANAGEMENT**
- USE LOW-VIBRATION EMITTING PLANT & EQUIPMENT WHERE POSSIBLE
 - WHERE PRACTICAL, USE NON-PERCUSSIVE PILING TECHNIQUES OR PROVIDE ACOUSTIC SHIELDING

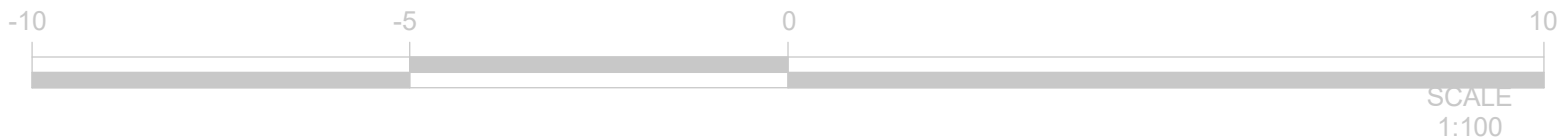
- DUST CONTROL**
- WHERE POSSIBLE, STAGE ANY VEGETATION REMOVAL TO MINIMISE EXPOSED AREAS
 - AREAS EXPOSED (IN THE SHORT TERM) TO BE STABILISED USING WATERING AND/OR GEO-FABRICS AS APPROPRIATE TO MINIMISE DUST GENERATION
 - MODIFY / REDUCE CONSTRUCTION ACTIVITIES DURING HIGH WIND CONDITIONS IF INCREASED DUST GENERATION IS A POSSIBILITY
 - DUST CONTROL MEASURES TO BE IMPLEMENTED AS THE SITE SUPERVISOR DEEMS APPROPRIATE, INCLUDING WATER CARTS, SPRINKLERS, SPRAYS, DUST SCREENS, ETC
 - CHECK EROSION CONTROL MEASURE REGULARLY TO ENSURE CAPTURED SILT DOES NOT BECOME AIRBORNE

- ODOUR CONTROL**
- SEGRATE AND COLLECT WASTE REGULARLY TO ENSURE ODOURS ARE MINIMISED
 - NO BURNING-OFF OF WASTE AT ANY TIME
 - REMOVE WASTE BINS FROM SITE REGULARLY

ENVIRONMENTAL SITE MANAGEMENT LAYOUT

Scale: 1 : 650

FOR NOISE CONTROL, VIBRATION MANAGEMENT, DUST CONTROL, ODOUR CONTROL REFER TO NOTES ON THIS DRAWING,
FOR OTHER NOTES (LITTER/WASTE, STORMWATER) REFER ESM1

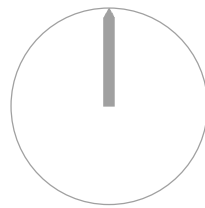


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PROPOSED DEVELOPMENT

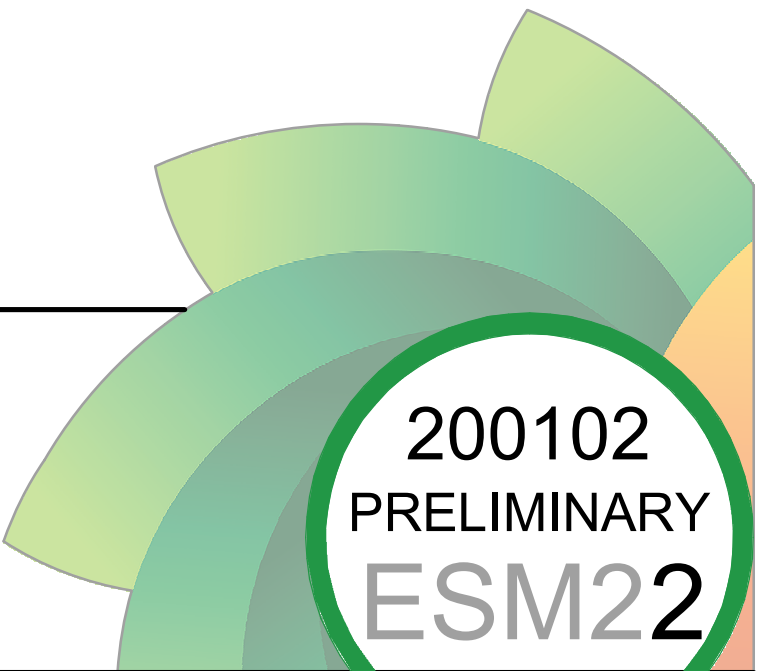
Richard Gill National Music Academy
Muswellbrook

Stanton Dahl



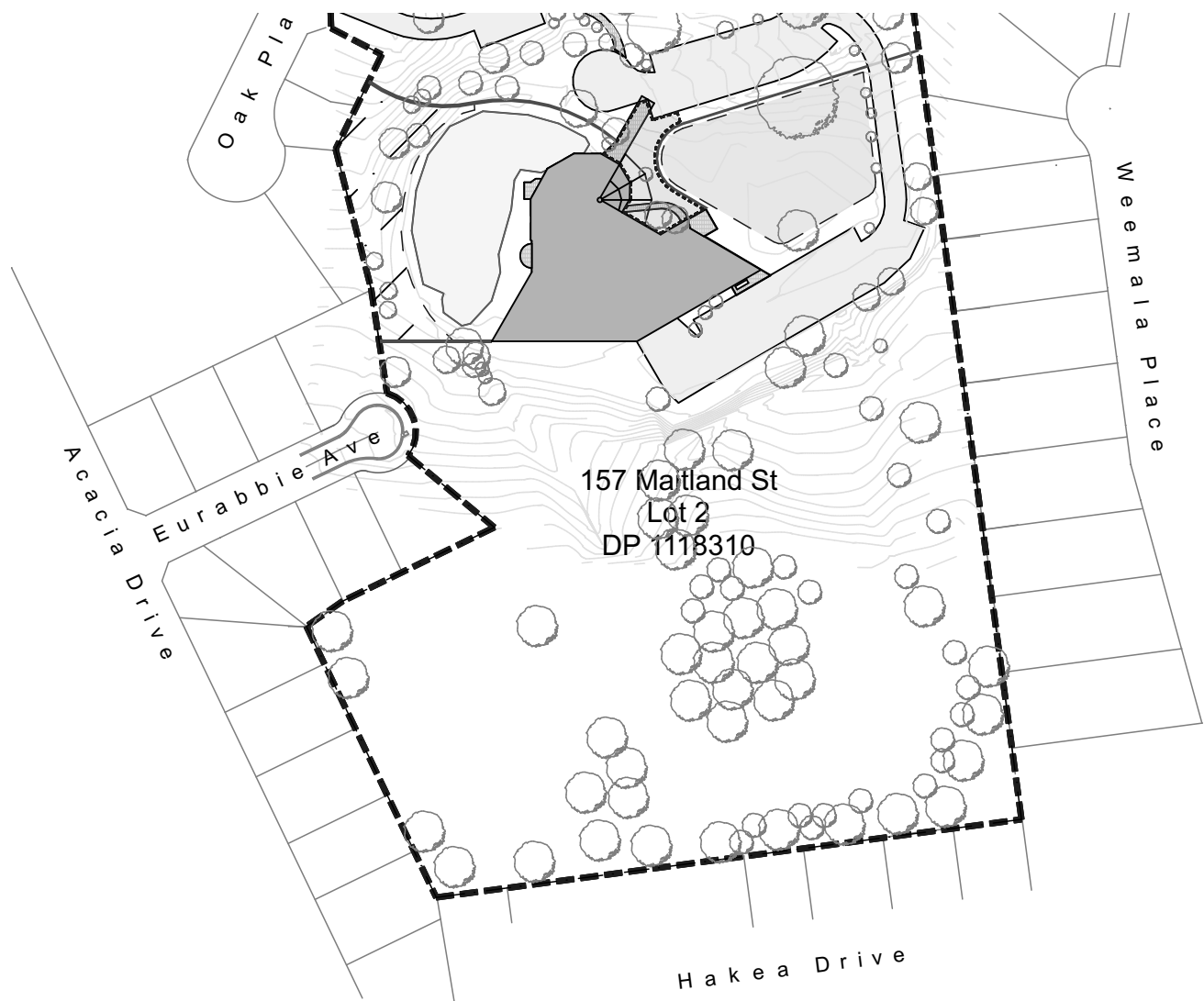
CIVIL DESIGN

ENVIRONMENTAL SITE MANAGEMENT LAYOUT

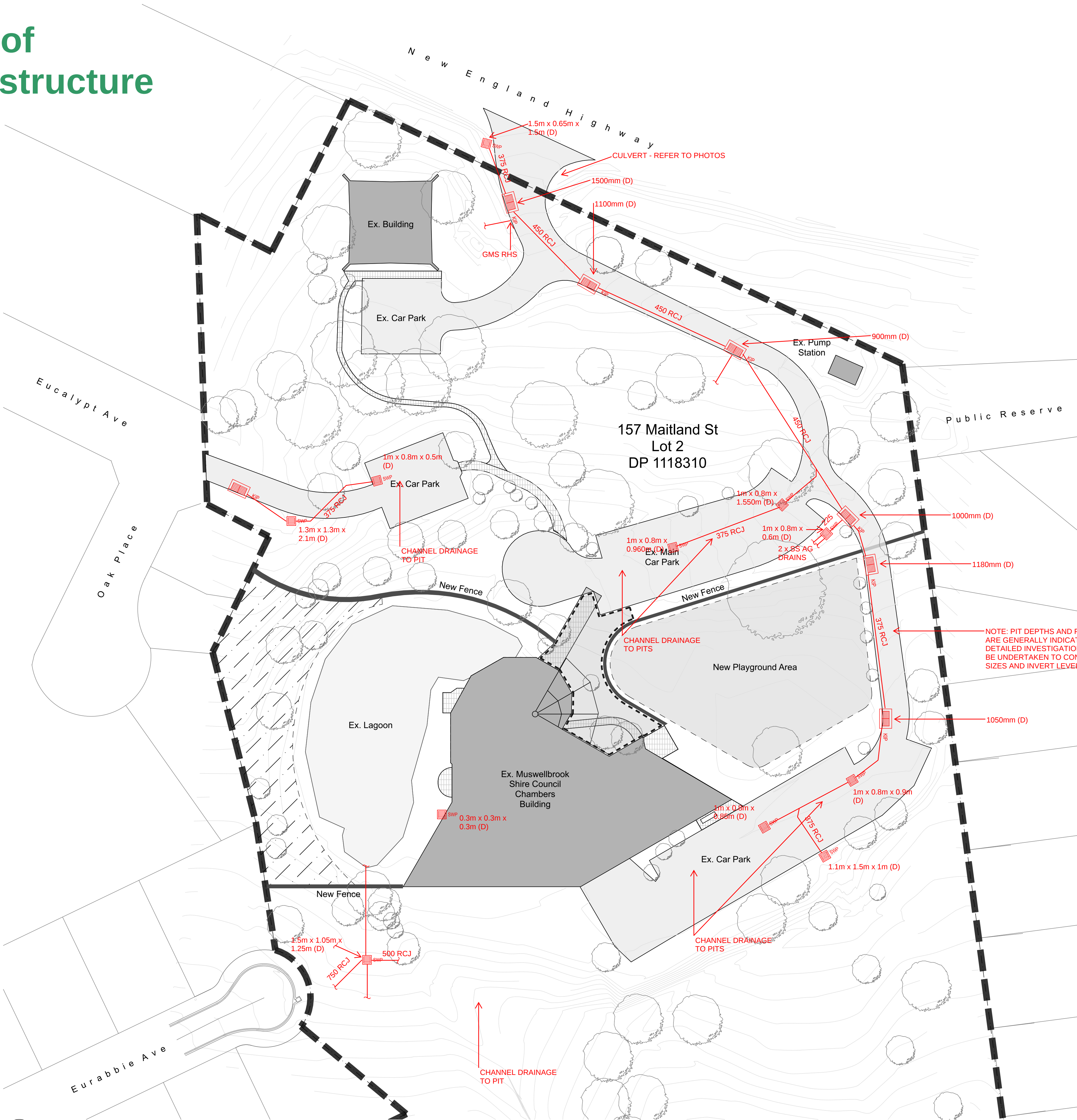


APPENDIX C: Site Markup of Existing Civil Ground Infrastructure

(Site Inspection Dated 14th April 2020)



01 Site Plan
1:2000



02 Site & External Works Plan
1:500

Stanton Dahl & Associates Pty Ltd ABN 12 002 762 7016
Nominated Architects - DSP Stanton 3642, S.M Evans 7686
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Stanton Dahl Architects
PO Box 833, Epping, NSW 1710, Australia
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www.stantondahl.com.au

All dimensions to be verified on site and any discrepancies referred to architect for determination. figured dimensions to take precedence over scaled dimensions.
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Rev	Issue	Date

Architecture
Project management
Interior design



stanton dahl
architects

Richard Gill National
Music Academy Ltd

Richard Gill National Music Academy
Muswellbrook
157 Maitland Street,
Muswellbrook, NSW

Drawn; PR
Checked; TA
Plot date; 19/9/19

Scale; 1:2000, 1:500 as noted @ AI

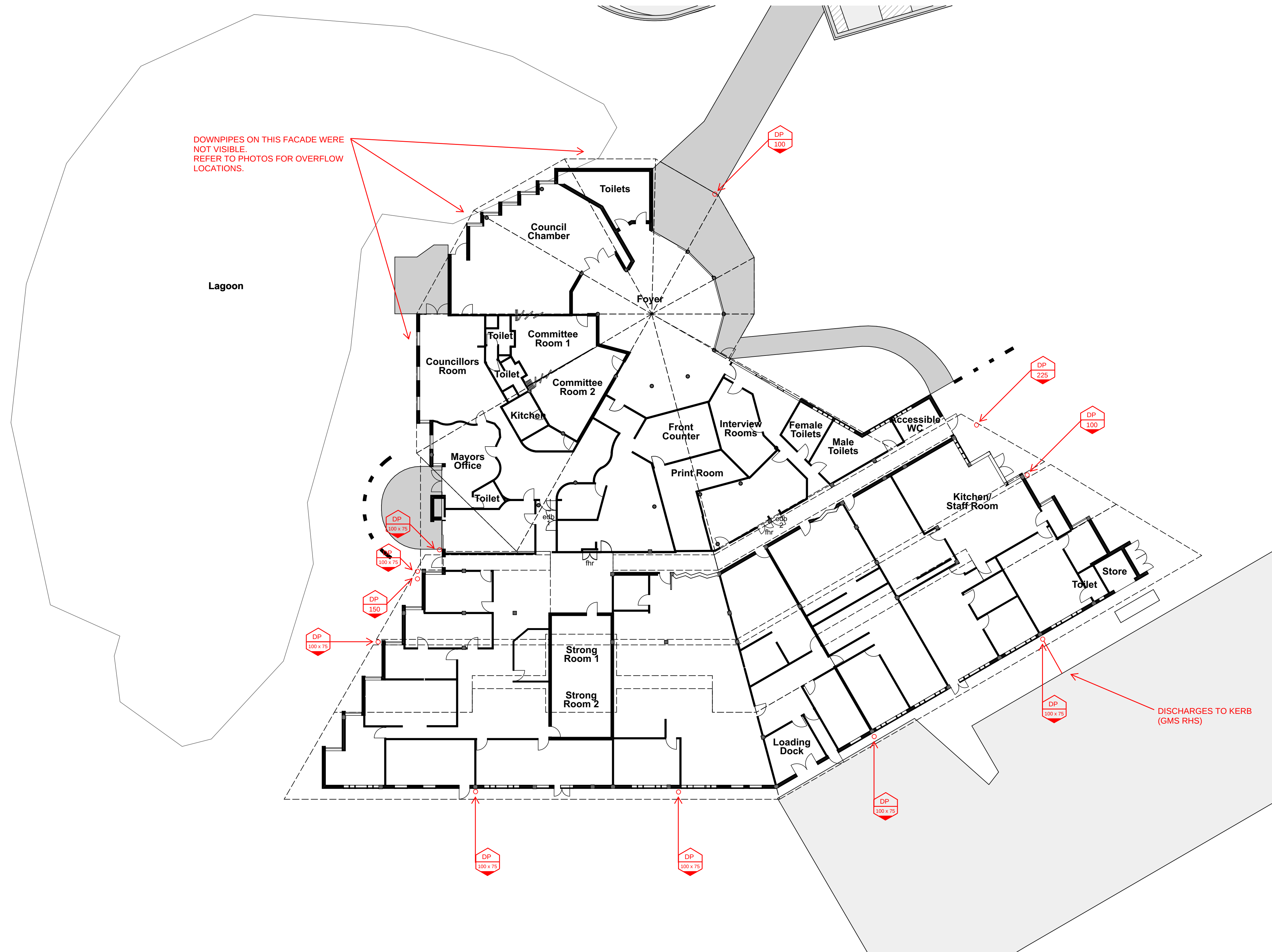
Project No;
2412.19

Drawing No;
A00

Revision#;

Site Plan

(Site Inspection Dated 14th April 2020)



Existing Plan

Ben Vanmidde

From: Peter Chambers <Peter.Chambers@muswellbrook.nsw.gov.au>
Sent: Friday, 15 May 2020 4:59 PM
To: Ben Vanmidde
Subject: Advice to consultant for Richard Gill Music School - MSC

Hi Ben,

Thankyou for your recent enquiry to Muswellbrook Shire Council for the Richard Gill Music School.

Although the current stage of the DA does not involve formal design or construction works, there are some issues on site which require further investigation, maintenance and localised erosion mitigation works.

Due to the issues outlined below, a **landscape management plan** for the site is recommended for this stage of the works to establish ground cover and mitigate known erosion issues around the site for this development application.

Easements should be provided over the site's drainage network and detention basin for Council to inspect as required.

It would be recommended in the future to consider gross pollutant traps and a stormwater capacity assessment for the site including improvement works as part of expansion of increased traffic, sportfield construction and increased hardstand areas from carpark expansion works.

Erosion / Sediment Management Issues

The weathered rock wall and predominately clay catchment to the south of the site has some erosion issues, mobilising sediment material north into local pits, dish drains and in the gutters of the southern carpark area. Some existing sediment fences and concrete exclusion barriers have been placed to mitigate the issue. During significant storm events, some sediment plumes has been mobilised to the north of the site.

The grassed area fronting the main administration building steepens over a short clay embankment towards existing lintel pits, which have become blocked with sediment. Other areas similarly have issues with establishment of vegetation and therefore also subject to erosion. It is recommended to **prepare a landscape management plan** to establish improved ground cover of vegetation, localised berms as appropriate to prevent mobilisation of sediment and other erosion mitigation measures.

With regards to the masterplan and future development of the site including the expanded carparking areas and sporting fields, it is recommended to **prepare a drainage assessment of the site** to determine the capacity of the existing network, including the detention basin. The detention basin appears to be reasonably shallow, which may have in part been from sediment deposition since the 1980s. It has not been determined if dredging and reconstruction of this detention basin is required. The northern edge of the detention basin also appears to be unstable and may require remediation. The spillway adjacent to the basin and into the central carpark area was witnessed by Council staff to be in reasonably good condition and vegetated inside of the exclusion fence. As a safety consideration, it may be required to lock access gates on the boundary fence of the detention basin to prevent access from future students.

Maintenance

Where localised erosion issues have been identified leading to sediment deposition of lintels, drains or pits, Council will undertake maintenance to remediate these areas prior to site handover. It is recommended however that the school consider maintenance requirements in areas where erosion is witnessed to maintain stormwater quality from the site, and to maintain stormwater capacity of the existing network.

Stormwater Quality

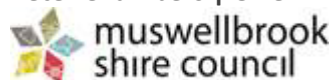
Gross pollutant traps are also recommended upstream of discharge points on site to reduce the mobilising of stormwater pollutants into the detention basin and into local drainage systems fronting the highway. Comment from Council staff indicates the detention/retention basin was previously more significantly vegetated, and following a design assessment for flood capacity, and as part of improvement works the basin could be replanted with suitable local plant species to contribute to increased stormwater quality.

The **future sportsfield area will also require an engineering design and risk assessment** for pedestrian and disability access requirements between the upstream and downstream areas of the southern catchment adjacent to the rock wall and existing carpark areas. There is an existing stepped concrete spillway between the proposed sportfield area and top carpark which is currently used as an informal access for local residents. Council plans some remediation work in this area to reduce erosion prior to handing over the site, with a rock mattress prior to an existing drainage pit adjacent to the carpark could be bridged by a future disabled-friendly access path.

The lower carpark area has some minor pavement damage towards the edge of the gutter which would benefit from some minor remediation works/patching. Council plans to patch these areas prior to handover. There is also some heaving visible of the existing concrete V-drain adjacent to the cul-de-sac bulb near the administration building, potentially due to root intrusion from adjacent trees. It may be required to saw-cut and reinstate this area at a future stage if deemed necessary.

Kind regards
Peter Chambers
Chief Engineer
Muswellbrook Shire Council
0455 450 148

Peter Chambers | Chief Engineer



T: (02) 6549 3761 | E: Peter.Chambers@muswellbrook.nsw.gov.au | W: www.muswellbrook.nsw.gov.au

Peter Chambers | Chief Engineer

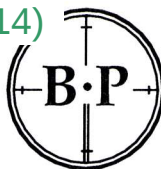


T: (02) 6549 3761 | E: Peter.Chambers@muswellbrook.nsw.gov.au | W: www.muswellbrook.nsw.gov.au

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Muswellbrook Shire Council ABN 86 864 180 944

BOARDMAN



PEASLEY PTY LTD

Registered Land Surveyors

ACN 003 388 083 ABN 22 003 388 083

Muswellbrook (Head) Office

Suite 2, "Market House"
4 Market Street,
PO Box 404
MUSWELLBROOK NSW 2333
Phone (02) 65 433600
Facsimile (02) 65 425957
Website: www.boardmanpeasley.net.au
All correspondence to Muswellbrook Office

Registered Surveyors

Mr R.A. Peasley MIS (NSW)
CSA J.P.

Associates

Mr T. J. Sigley
Registered Associate
Surveyors Board of Qld

Scone Office

109 Susan Street
SCONE, NSW 2337
Mobile (0429) 433600

Mr S. Walker

Diploma in Surveying

Mr J. Garland

Diploma in Surveying

28th February 2014

Our Reference: S4500-46

The General Manager
Muswellbrook Shire Council
PO Box 122
MUSWELLBROOK NSW 2333

Your Reference: O/N 94852

Attention: Mr Abdullah Mahmud – Technical Officer – Facilities & Assets

E-mail: Abdullah.mahmud@muswellbrook.nsw.gov.au

Dear Sir,

RE: SITE #1 MUSWELLBROOK ADMINISTRATION BUILDING

As instructed by you we have finalised the remaining of the Contour/Detail Survey of the Muswellbrook Administration Building.

Please find herewith our Survey Plan and our Memorandum of Fees per our Fee Proposal Q1694.

Thank you for your time and instructions with this matter.

Yours faithfully

BOARDMAN PEASLEY PTY LIMITED

*Surveyor Registered under the
Surveying and Spatial Information Act, 2002, as amended*



*Liability limited by a Scheme approved
under Professional Standards legislation*



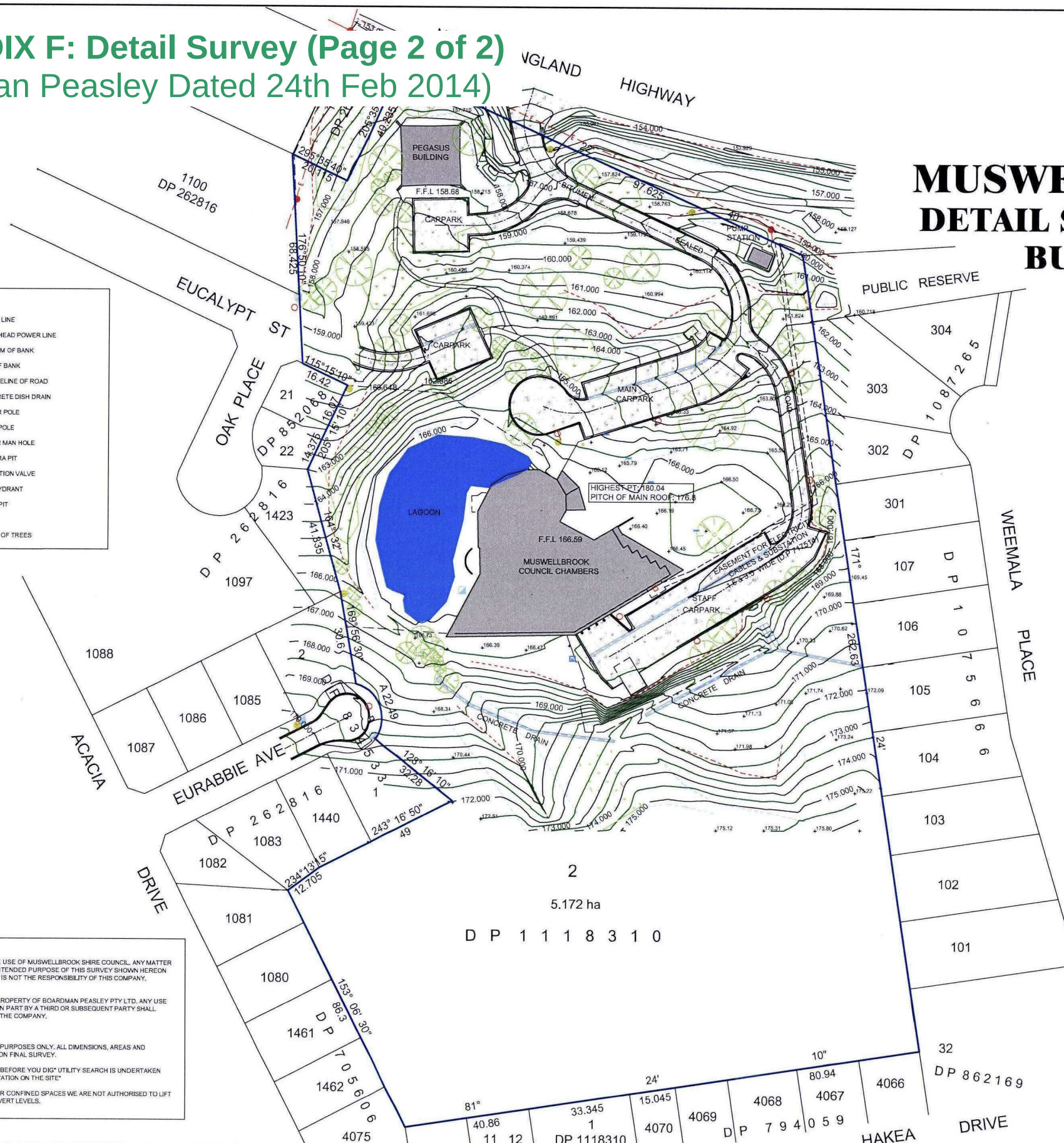
APPENDIX F: Detail Survey (Page 2 of 2) (Boardman Peasley Dated 24th Feb 2014)



**muswellbrook
shire council**

MUSWELLBROOK SHIRE COUNCIL DETAIL SURVEY OF COUNCIL CHAMBERS BUILDING AND SURROUNDS

LEGEND:	
	FENCE LINE
	OVER HEAD POWER LINE
	BOTTOM OF BANK
	TOP OF BANK
	CENTRELINE OF ROAD
	CONCRETE DISH DRAIN
	POWER POLE
	LIGHT POLE
	SEWER MAN HOLE
	TELSTRA PIT
	IRRIGATION VALVE
	FIRE HYDRANT
	DRAIN PIT
	TREE
	CLUMP OF TREES



LOCALITY DIAGRAM: MUSWELLBROOK COUNCIL CHAMBERS

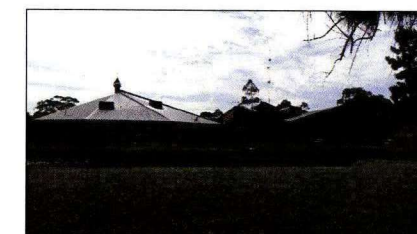


PHOTO 1: LOOKING EAST AT COUNCIL CHAMBERS BUILDING ACROSS LAGOON.



PHOTO 2: LOOKING NORTH AT ENTRANCE TO COUNCIL AND HIGHWAY.

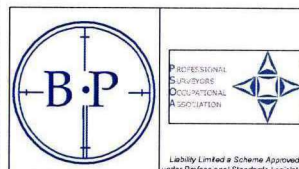


PHOTO 3: LOOKING SOUTH EAST TOWARDS PUMP STATION AND ACCESS ROAD.



PHOTO 4: LOOKING SOUTH AT COUNCIL CHAMBERS BUILDING AND LAWN.

- NOTES:
- (1) THIS PLAN IS FOR THE EXCLUSIVE USE OF MUSWELLBROOK SHIRE COUNCIL. ANY MATTER ARISING FROM THE MISUSE OF THE INTENDED PURPOSE OF THIS SURVEY SHOWN HEREON BY A THIRD OR SUBSEQUENT PARTY IS NOT THE RESPONSIBILITY OF THIS COMPANY.
 - (2) THIS PLAN IS THE INTERLECTUAL PROPERTY OF BOARDMAN PEASLEY PTY LTD. ANY USE OF THIS PLAN EITHER IN WHOLE OR IN PART BY A THIRD OR SUBSEQUENT PARTY SHALL REQUIRE THE WRITTEN CONSENT OF THE COMPANY.
 - (3) CONTOUR INTERVAL IS 0.5m.
 - (4) THIS PLAN IS FOR DEVELOPMENT PURPOSES ONLY. ALL DIMENSIONS, AREAS AND HEIGHTS ARE TO BE DETERMINED UPON FINAL SURVEY.
 - (5) IT IS RECOMMENDED THAT A "DIAL BEFORE YOU DIG" UTILITY SEARCH IS UNDERTAKEN PRIOR TO ANY DEVELOPMENT/EXCAVATION ON THE SITE.
 - (6) DUE TO OH&S REQUIREMENTS FOR CONFINED SPACES WE ARE NOT AUTHORISED TO LIFT SEWER MANHOLE LIDS TO OBTAIN INVERT LEVELS.



REV	DESCRIPTION	DATE	BY	CHECKED



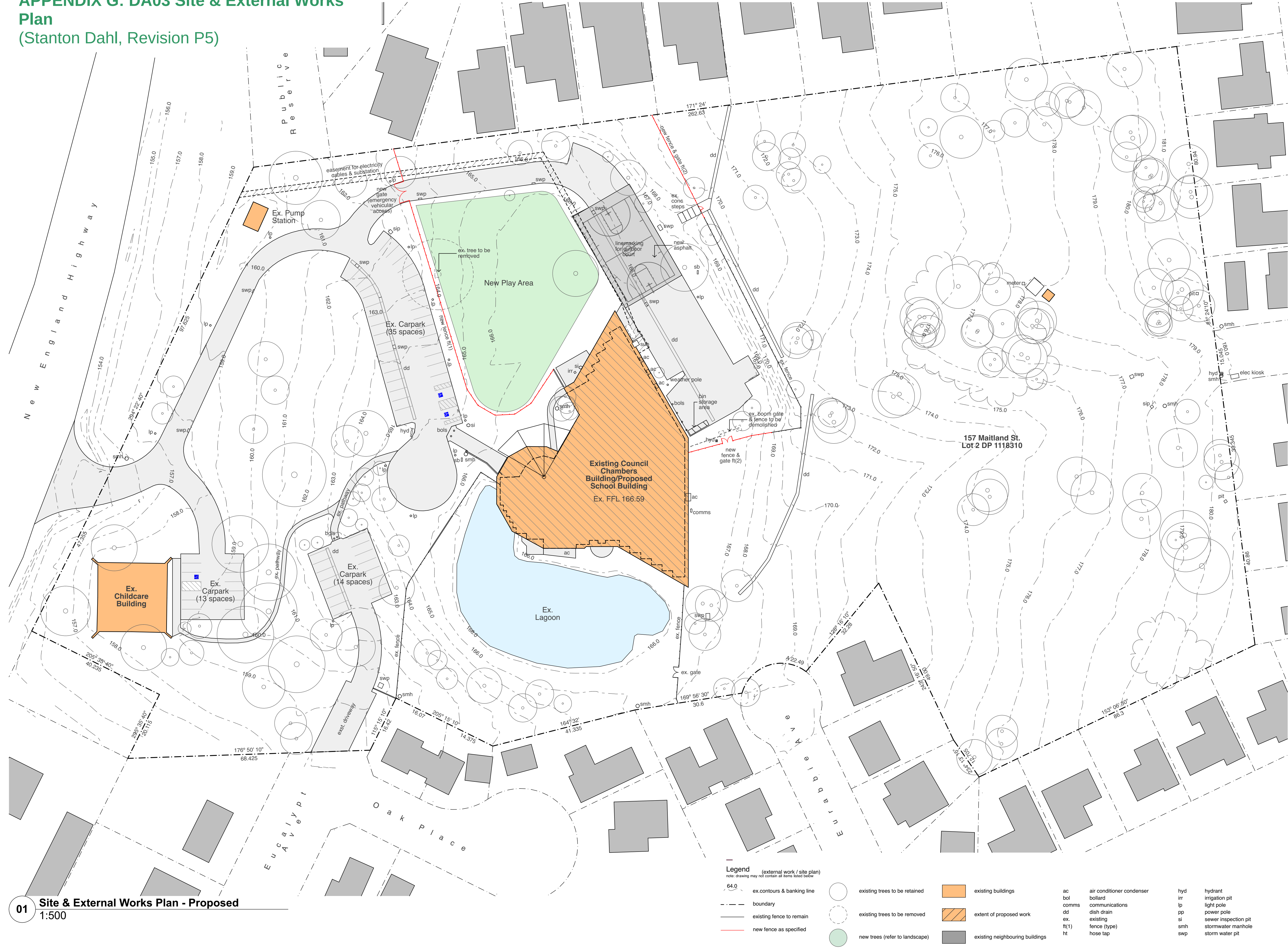
BOARDMAN PEASLEY Pty Ltd.
Registered Land Surveyors
www.boardmanpeasley.net.au
Muswellbrook Head Office
Suite 2, 11 Market Street
Muswellbrook NSW 2333
P.O. Box 404
(Ph) 0265 435600 (Fax) 0265 426957

MUSWELLBROOK SHIRE COUNCIL		Sheet No. 1 of 1	
DETAIL OF MUSWELLBROOK COUNCIL CHAMBERS		Job No. S4500-46	
DRAWING FILE: S4500-46_Detail.dwg		Plan No. 001	
SURVEY FILE: S4500-46_Detail.ccx		SCALES:	
SURVEY: JG		1 : 750 (A1)	
DRAWN: JG		Revision No.	
DESIGNED: N/A		0	
CHECKED: R.P.			
DATUM: M.G.A./A.H.D			
DATUM SOURCE: PM53060			
RL 219.247			
DATE: FRIDAY 28th FEBRUARY 2014			

0 5000 10 000 15 000 20 000 25 000 30 000 35 000 40 000 45 000 50 000
scale: 1:500 @A1

APPENDIX G: DA03 Site & External Works Plan

(Stanton Dahl, Revision P5)



01 Site & External Works Plan - Proposed
1:500

Stanton Dahl & Associates Pty Limited, ABN 32 602 261 396
Nominated Architects - DP Stanton 3642, S.M Evans 7686
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Stanton Dahl Architects
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Rev	Issue	Date
P1	Preliminary Issue	25/03/20
P2	Preliminary Issue	23/04/20
P3	Preliminary Issue	29/04/20
P4	Preliminary Issue	07/05/20
P5	Preliminary Issue	08/05/20

Stanton
Dahl
Architects



Richard Gill School
Music Academy Pty

Richard Gill School
157 Maitland St,
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Drawn: PR
Checked: TA
Plot date: 8/5/20

Scale: 1:500 as noted @ A1

Project No:
2412.19

Drawing No; DA03
Revision#; P5

Site & External Works
Plan