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LANDSCAPING AMENDMENT TO CIVIL DESIGN

BIRZULIS REF:7576

SSD-8114 Mod-2 LINDFIELD LEARNING VILLAGE AT ETON ROAD LINDFIELD NSW 2070

PREPARED BY: CAMERON AMRI

DATE: 20/02/2021

REVISION: **B**

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DOCUMENT VERIFICATION

Project Title	Lindfield Learning Village
Document Title	Landscaping amendment to civil design
Project No.	7576
Description	Discuss updated civil design in landscape areas
Client Contact	Hindmarsh

	Name	Signature
Prepared by	Cameron Amri	
Checked by	Michael Grogan	
Issued by	Michael Grogan	

REPORT DELIVERABLES

Address letter received from Planning Industry & Environment dated 12/02/21

DOCUMENT HISTORY

Date	Revision	Issued to	Description
20/02/21	-A	Hindmarsh	For Approval
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1 EXECUTIVE SUMMARY

Birzulis Associates have been commissioned by Hindmarsh to prepare the “For Construction” civil engineering documentation as required to satisfy the SSDA conditions for the consent SSD-8114.

This report will address the planning considerations and compliance considerations in generating and designing the current design.

This report will satisfy the following objectives:

- Relevant environmental legislation that applies to this project and how it is addressed in the design.
- The relevant guidelines to this project and how they are satisfied in this design.
- Address reasons for changing the design.
- Summarise the inputs for the software modelling to satisfy the above.
- Display how the software modelled results are incorporated into the design.
- Address and comply with water quality discharge requirements for the site.
- Address and comply with water quantity discharge requirements for the site.

1.1 PLANNING RELEVANCE, LEGISLATION, ACT & GUIDELINES

The following legislation and regulatory framework relating to construction soil and water management are outlined below.

Immediate SSD Planning Requirement to be satisfied:

- Condition B25; sub paragraph (i)
- Condition C27

Environmental Planning and Assessment Act 1979 & Environmental Planning & Assessment Regulation 2000.

This Act and regulation establishes a system of environmental planning and assessment of development proposals for the State. This project has been assessed and approved under Section 89E of the Environmental Planning and Assessment Act 1979.

Project Relevance; Approval process for a legal Consent to develop and considerations for such.

National Parks and Wildlife Act, 1974

(1) The objects of this Act are as follows:

- (a) the conservation of nature, including, but not limited to, the conservation of:
 - (i) habitat, ecosystems and ecosystem processes, and
 - (ii) biological diversity at the community, species and genetic levels, and
 - (iii) landforms of significance, including geological features and processes, and
 - (iv) landscapes and natural features of significance including wilderness and wild rivers,

(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:

- (i) places, objects and features of significance to Aboriginal people, and
- (ii) places of social value to the people of New South Wales, and
- (iii) places of historic, architectural or scientific significance,

(c) fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation,

(d) providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation

Project Relevance; relevant as the site falls directly to National Park.

Managing Urban Stormwater: Council Handbook prepared by the NSW Environment Protection Agency

Pertains to stormwater that is directed to the council system. In this project it is only the public domain works.

Developments Adjacent To National Parks And Wildlife Service Lands Guidelines For Consent And Planning prepared by NPWS

Pertains to the stormwater that is directed to the land owned by National Parks and Wildlife Service. Provides guidelines of water quality and quality and improving existing conditions for the environment.

2 DISCUSSION OF TARGETS

2.1 WATER QUALITY

The following is relevant:

1. Based on the document; Developments Adjacent To National Parks And Wildlife Service Lands Guidelines For Consent And Planning:
 - Clearing of native vegetation is kept to a minimum.
 - Water sensitive Urban design principles should be applied to developments in catchments upstream from wetlands.
 - The discharge of stormwater to NPWS land, where the quantity and quality of stormwater differ from natural levels, must be avoided.
 - Where discharging to NPWS land is unavoidable the best interests of the environment should be demonstrated (for example, by addressing existing impacts from unmanaged stormwater).
2. Based on the document; Managing Urban Stormwater: Council Handbook:
 - Clearing of native vegetation is kept to a minimum.

2.2 WATER QUANTITY

The following is relevant:

3. Developments Adjacent To National Parks And Wildlife Service Lands Guidelines For Consent And Planning:
 - No increase in the pre-development peak flows from rainfall events with a 5 year and 100 year occurrence.
 - Clearing of native vegetation is kept to a minimum.
 - Water sensitive Urban design principles should be applied to developments in catchments upstream from wetlands.
 - The discharge of stormwater to NPWS land, where the quantity and quality of stormwater differ from natural levels, must be avoided.
 - Where discharging to NPWS land is unavoidable the best interests of the environment should be demonstrated (for example, by addressing existing impacts from unmanaged stormwater).

2.3 GUIDELINES CONCLUSIONS

Onsite stormwater detention is required to satisfy the peak flow not exceeding the pre-development peak flow.

Water quality treatment determined by a MUSIC software model is required to ensure quality of stormwater is not increased and there is no net increase in the pollutant levels discharged.

3 REPORTING AND MODELLING

3.1 PREVIOUS REPORTING AND MODELING

Previous stormwater quality reporting which was used as an assumption for this project until SSDA conditions could be tested against was completed by EFWF Consulting Engineers in their report referenced 21951.001.R003 latest version was revision H.

The EFWF report addressed the water quality however used an assumption of guideline compliance to Ku-Ring-Gai Council guidelines which is not correct for this site. In addition to this, the SSD Conditions (which were released after this report was prepared) does not reference Ku-Ring-Gai Council stormwater guidelines as a compliance requirement for this site given the stormwater from the site does not drain to a Council system as noted above.

This report also treated the entire site as a new development which is not standard practice. Although the site is large (approximately 4.6ha), the nature of it is an existing operational site with

mostly proposed internal fit-out works. The only new hardstand type works that can attract treatment control are less than 0.3ha (approximately 6.5% of the site). The assumption to treat the entire site is not the intent of any of the above guidelines as this is not a new development. As noted above the guidelines require there to be no increase in the post development peak flow and no increase in the post development pollutant loads.

It should be noted that we have reviewed the above stormwater quality report by EFWF and note the swales were not relied up for treatment reduction only as a method to transport stormwater towards the bio-retention basins.

Because of the uncertainty (preparing a report pre-Conditions of Consent) the entire site was modelled through a Ku-Ring-Gai Council assumption where as we have modelled through the guidelines relevant to this site.

3.2 REPORTING AND MODELING BY US

As noted above we reviewed the design for compliance to the SSD Conditions of Consent after they were issued as part of our internal processes to ensure compliance and quality checking of assumptions used previously in the project.

We created software models to predict and check against the required targets for this project. This particularly being peak discharge not exceeding pre-development conditions and treatment control levels being achieved as noted above. We also reviewed the proposed landscape plan against the consideration of “addressing existing impacts of unmanaged stormwater”.

We used the same concept of treatment as approved through the Schematic Design process however with more accurate results properly addressing the SSD Conditions of Consent.

In summary we updated the following on the civil design based on the more accurate modelling:

1. We reviewed existing stormwater discharge points and upgraded them to ensure compliant energy dissipation measures are designed to prevent scouring of soil and erosion of top-soil conditions downstream of discharge points.
2. We ensured the size and volumes of the bio-retention basins met the targets as noted above. This reduced the size of the basins which was advantageous in limiting the disturbance to native vegetation in the area as per the guideline requirements from NPWS.
3. We reviewed the design to ensure new road hardstand areas created in the development had to flow through a treatment device prior to discharge to the National Park. This resulted in an additional basin being added to detain and treat water from the proposed elevated roadway. This also was beneficial in achieving the guideline requirement of improving the existing conditions as this basin will accept some water from the existing road area.

In our opinion the recommendations of the previous reporting did not fully meet the requirements of the guidelines relevant to discharging water to a National Park given how disruptive they would have been to construct and the required native tree vegetation to facilitate them basins. Based on the topography of the land with existing ground levels being significantly steep and the operational requirement of a school the size and volume of the basins were not consistent with the implied performance function of a school.

3.3 CONSISTENCY

We believe our revisions are “consistent” with the concept civil designs given:

- The treatment methods and approximate locations are very similar.
- The layout of the landscaping is very similar. The landscape layout would have had to have been significantly altered without the checking of assumptions by us. This was one of the primary catalysts for the remodelling.
- The overall topography of grades is consistent.
- The trees that are proposed to remain can now remain which is consistent with the approved plans.
- Concept of civil works in the landscape area of swales directing water to basins is consistent and has been maintained.

4 DEMONSTRATION OF COMPLIANCE

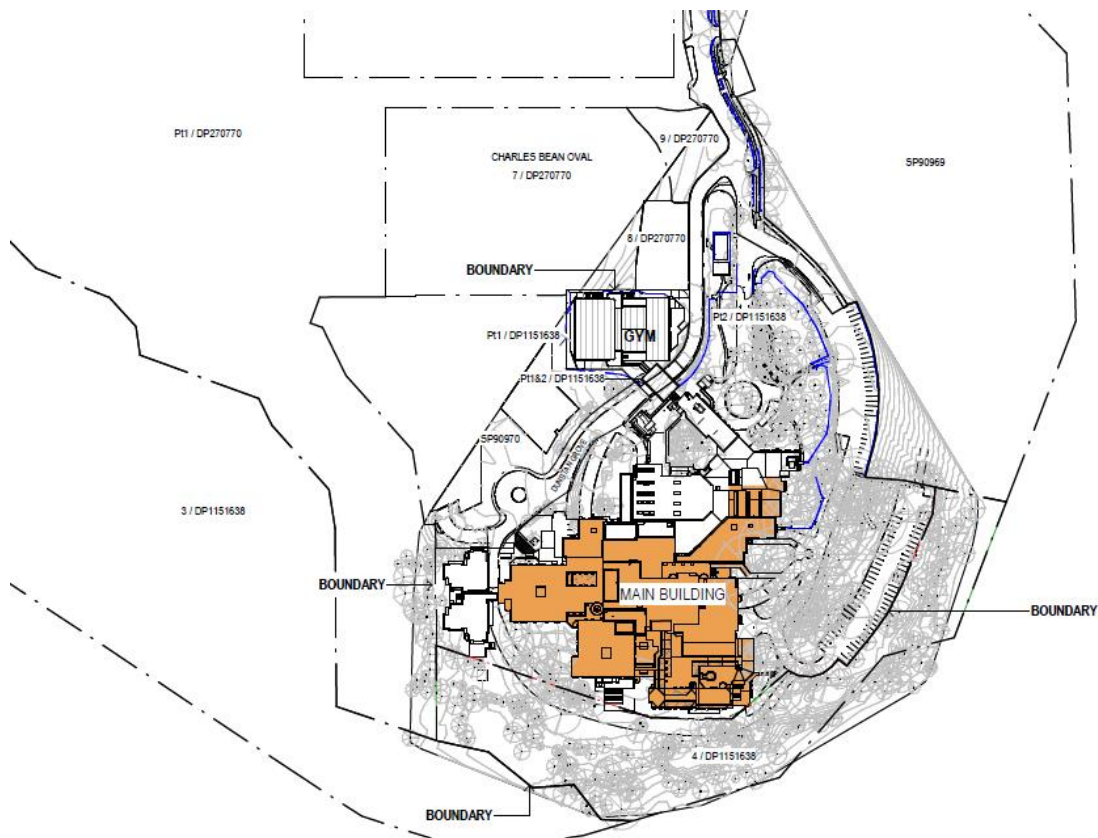


Figure 4.1 – Proposed Overall Site Plan

4.1 STORMWATER QUALITY MODELLING

As previously noted as MUSIC software model has been created by us to confirm the targets of water treatment have been achieved. We created a model of the existing and proposed conditions to model if the target of reduction of flow and pollutant load has been reduced. It should be noted that the below MUSIC model accounts for the full site area.

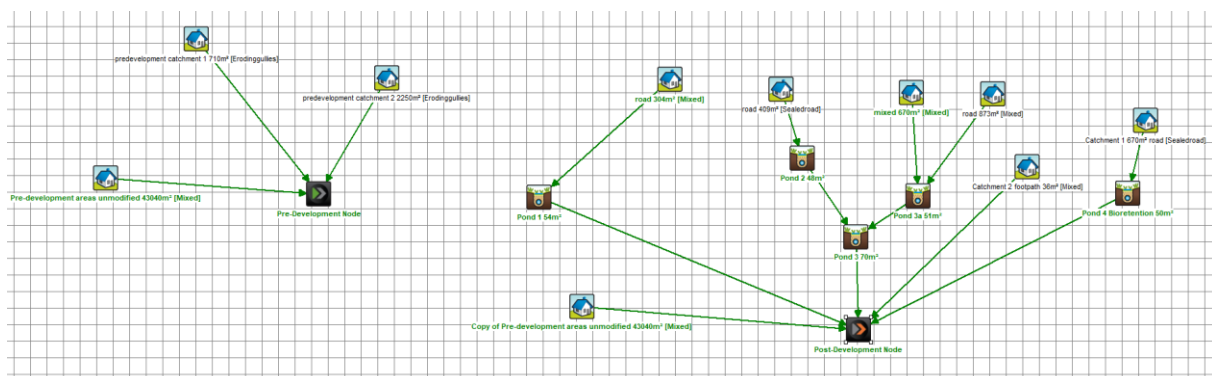


Figure 4.1.1 – MUSIC model layout

As shown below in the treatment train effectiveness the reduction of pollutant loads for the site can be justified. It also shows a reduction in flow for the development based on this treatment arrangement however we have used a DRAINS software model to confirm this. A copy of the MUSIC report is listed in the appendixes which show the inputs used in the model and these are carried through as design stipulations in the civil design drawings which are also an appendix of this report.

Treatment Train Effectiveness - Post-Development Node						
	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	48.3	50.5	48.3	49.8	0	1.39
Total Suspended Solids (kg/yr)	10500	10200	10500	9280	0	9.02
Total Phosphorus (kg/yr)	22.6	21.7	22.6	20.3	0	6.45
Total Nitrogen (kg/yr)	139	147	139	139	0	5.44
Gross Pollutants (kg/yr)	1190	1260	1190	1170	0	7.14

Figure 4.1.2 – Treatment train effectiveness

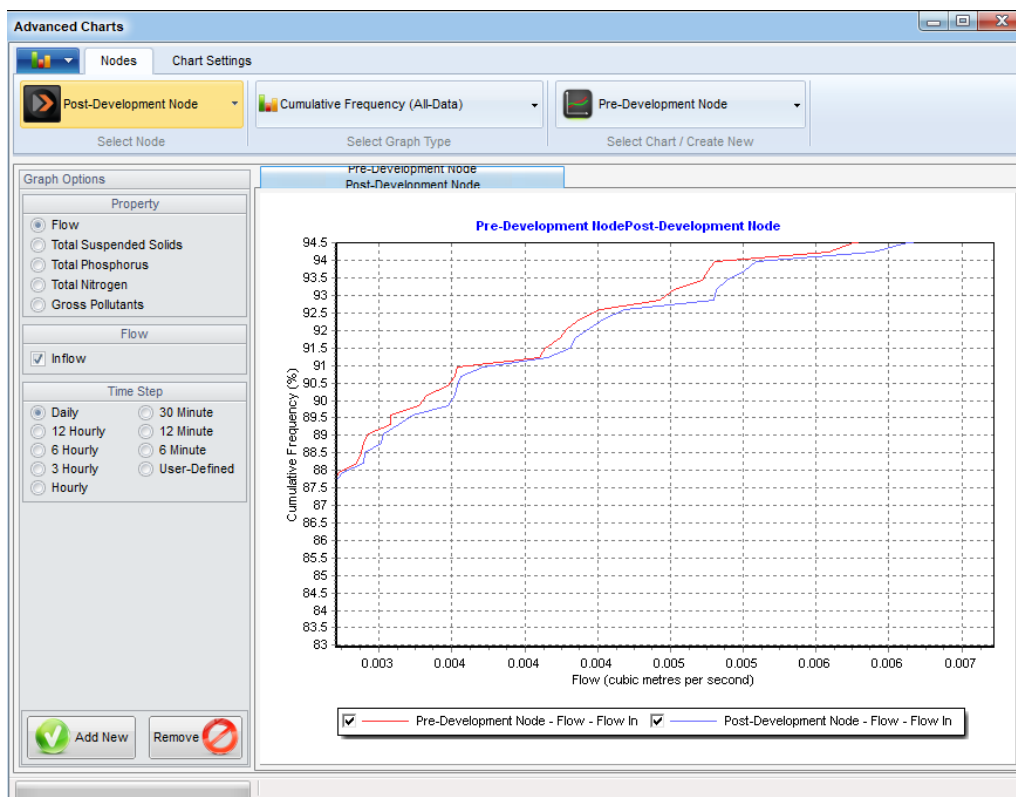


Figure 4.1.3 – Total Flows Cumulative frequency chart

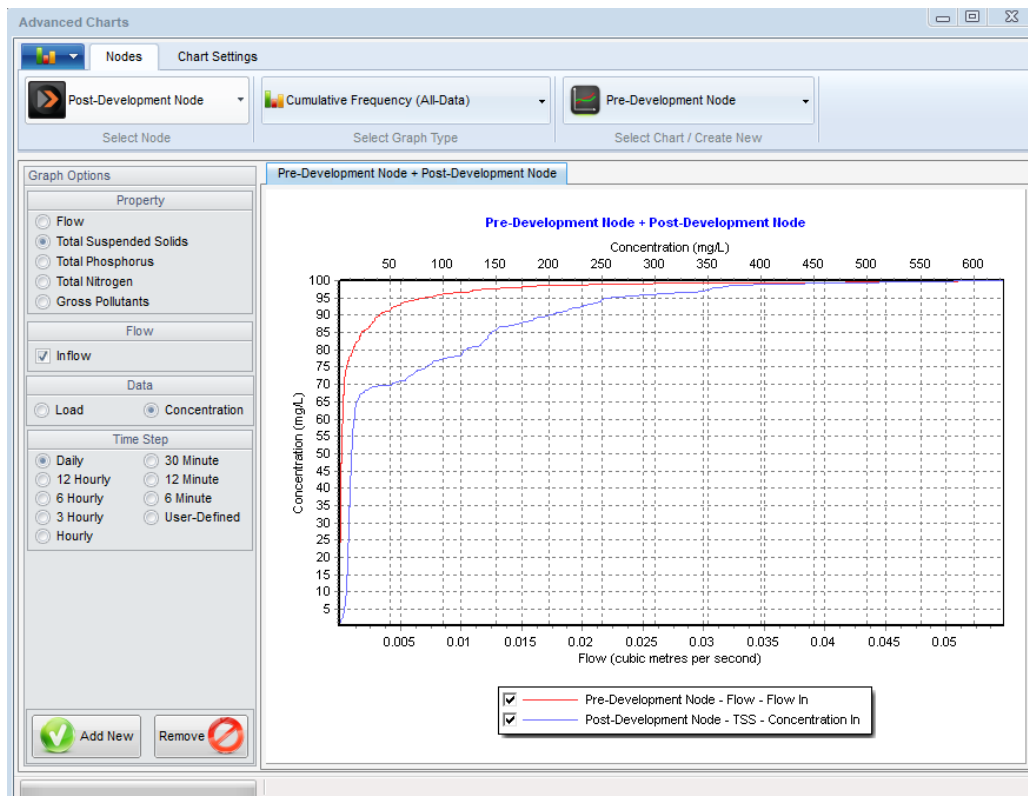


Figure 4.1.4 – Total Suspended Solids Cumulative frequency chart

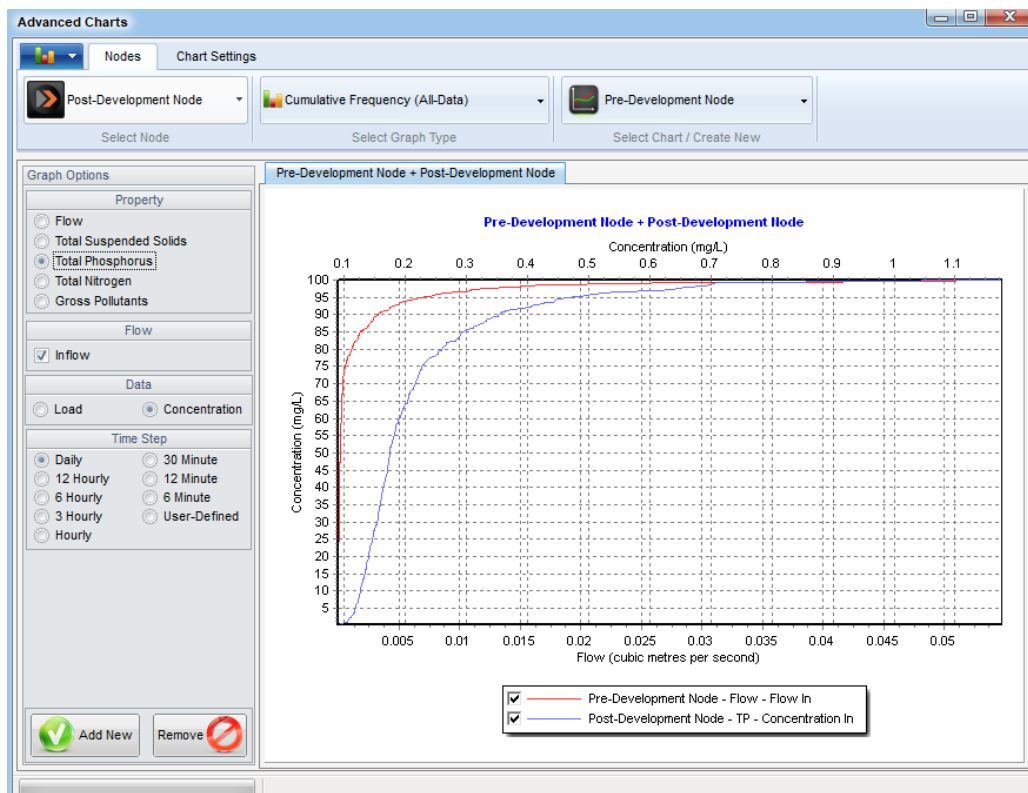


Figure 4.1.5 – Total Phosphorus Cumulative frequency chart

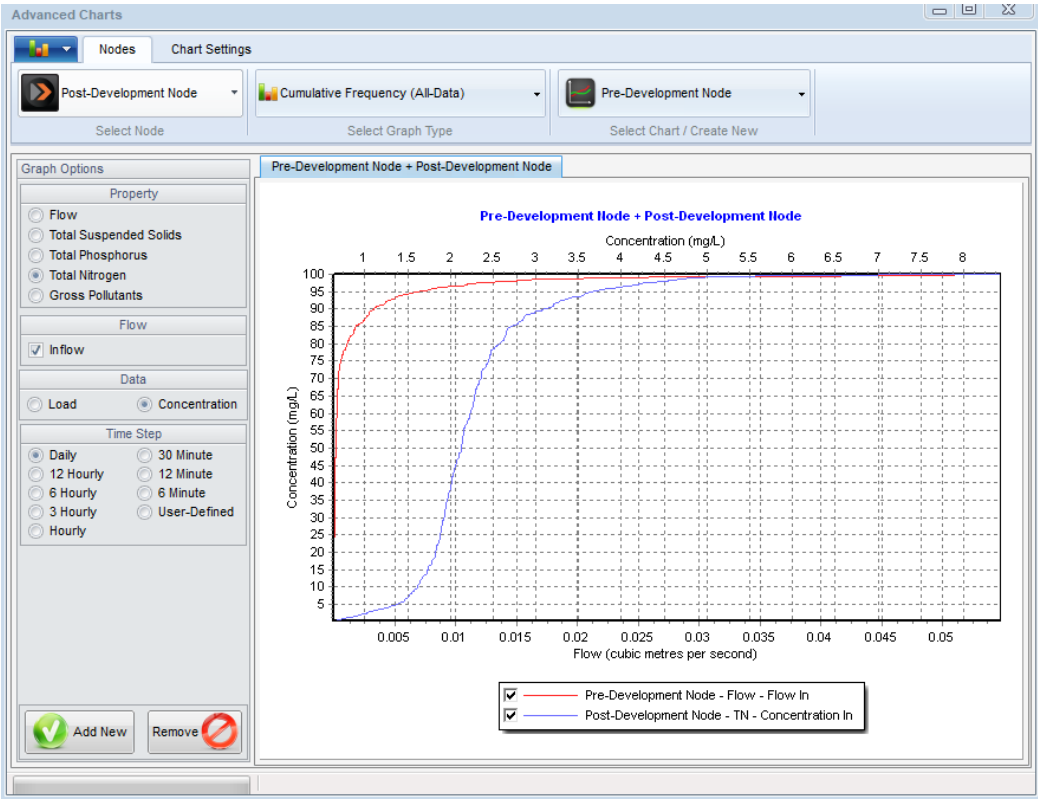


Figure 4.1.5 – Total Nitrogen Cumulative frequency chart

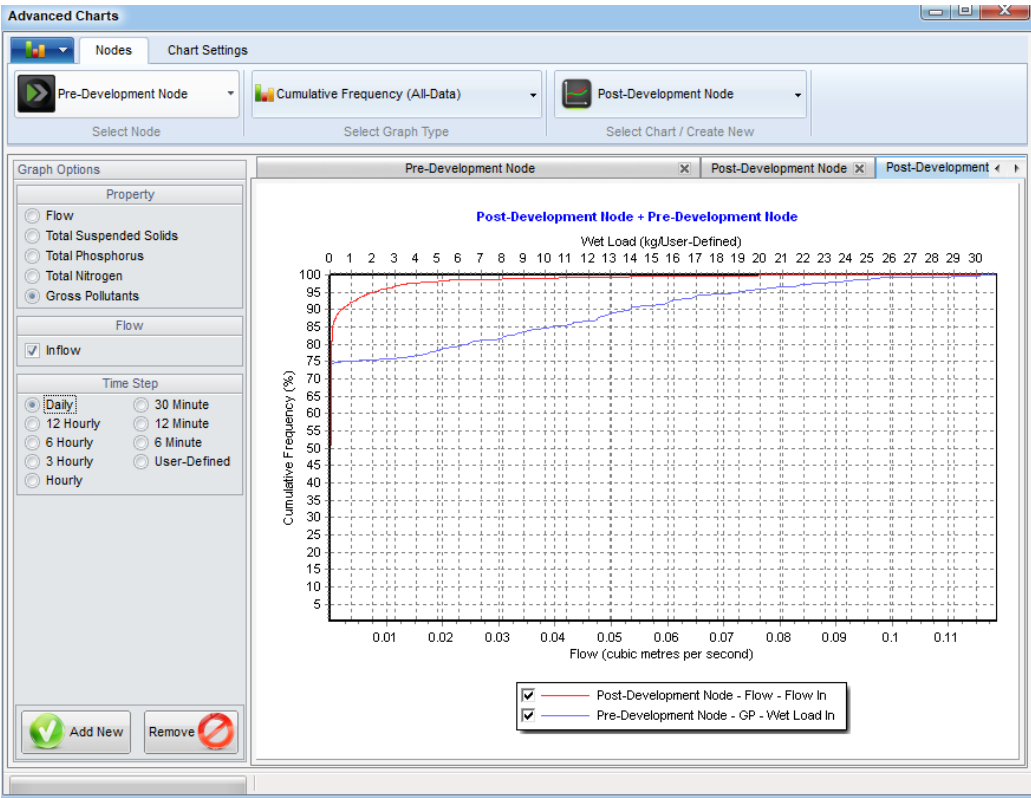


Figure 4.1.5 – Total Gross Pollutants Cumulative frequency chart

4.2 STORMWATER FLOW (QUANTITY) MODELLING

As noted above a DRAINS software model was created to confirm peak flows to the National Park are not increased (which is a target for this development). Also as noted above, the majority of the site is unchanged externally and had no proposed upgrading of stormwater system works as part of the concept plans. We have omitted this as there will be no change in flows from existing to proposed based on no change to impervious area.

The existing condition was modelled so the flow rates for the corresponding post development rain event could be crosschecked for compliance. The individual discharge points were co-located to determine a single site discharge corresponding for the worst-case time of concentration.

DRAINS RESULTS

Rain Event	Pre-Development Discharge	Post-Development Discharge
5 year ARI	450 litres per second	428 litres per second
100 year ARI	885 litres per second	879 litres per second

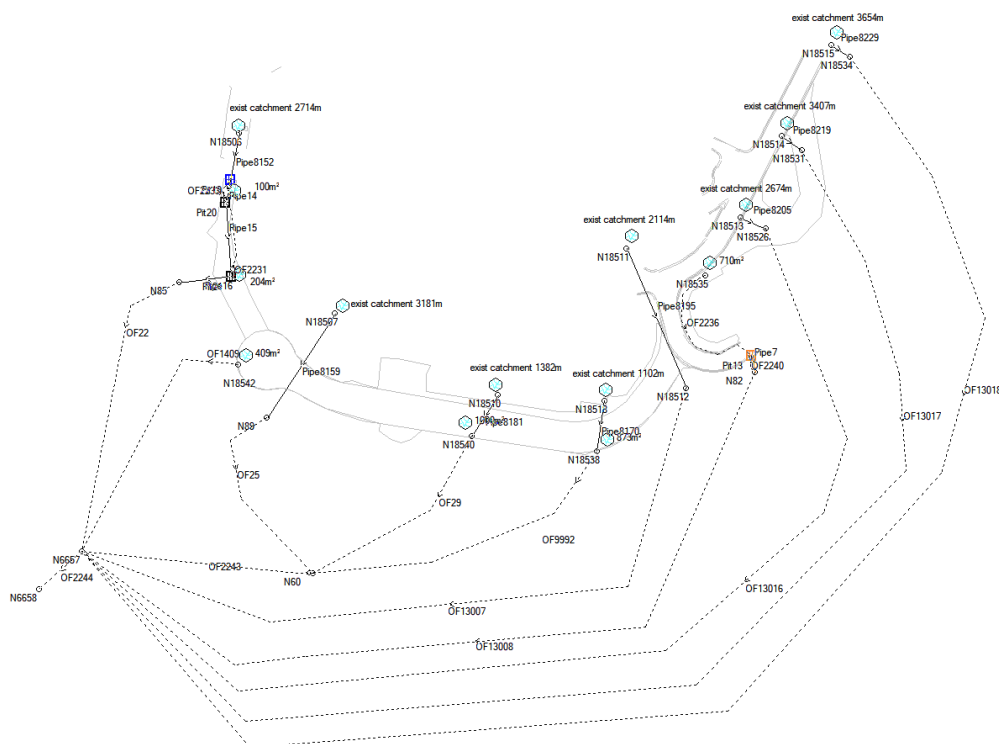


Figure 4.2.1 – DRAINS Pre-Development Condition

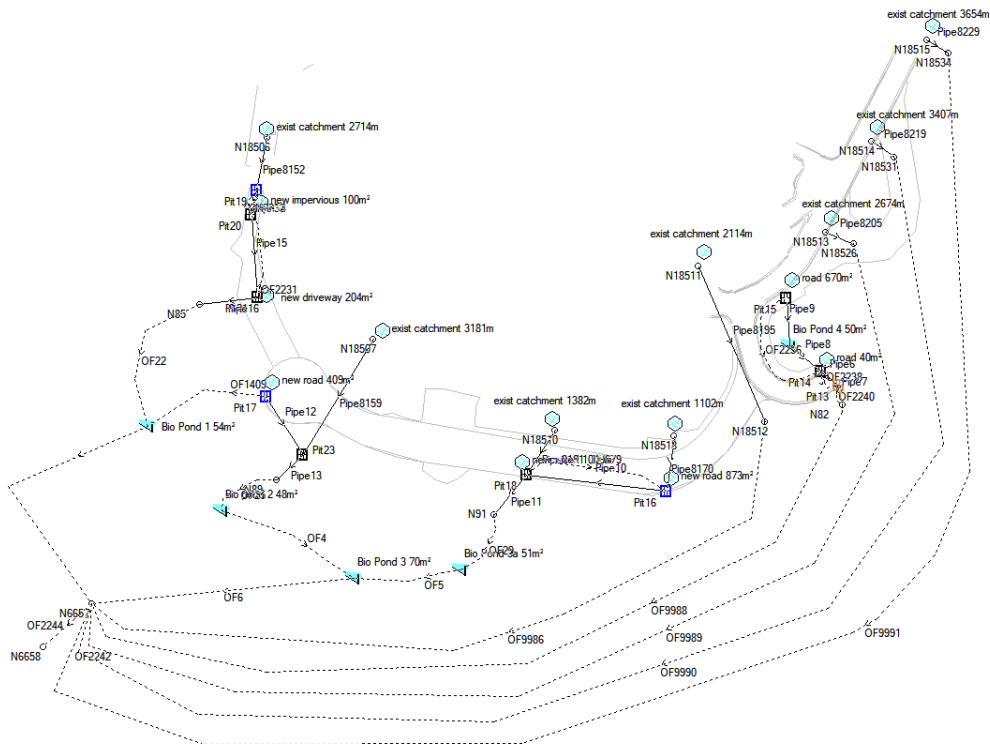


Figure 4.2.2 – DRAINS Post-Development Condition

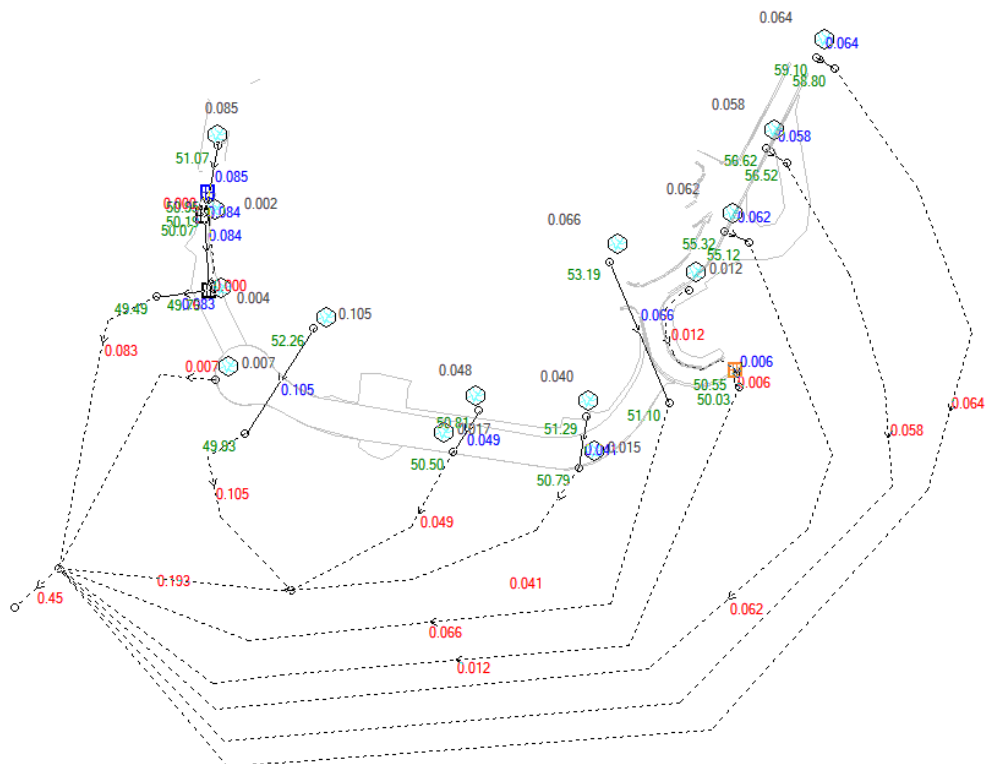


Figure 4.2.2 – DRAINS Pre-Development 5 year ARI

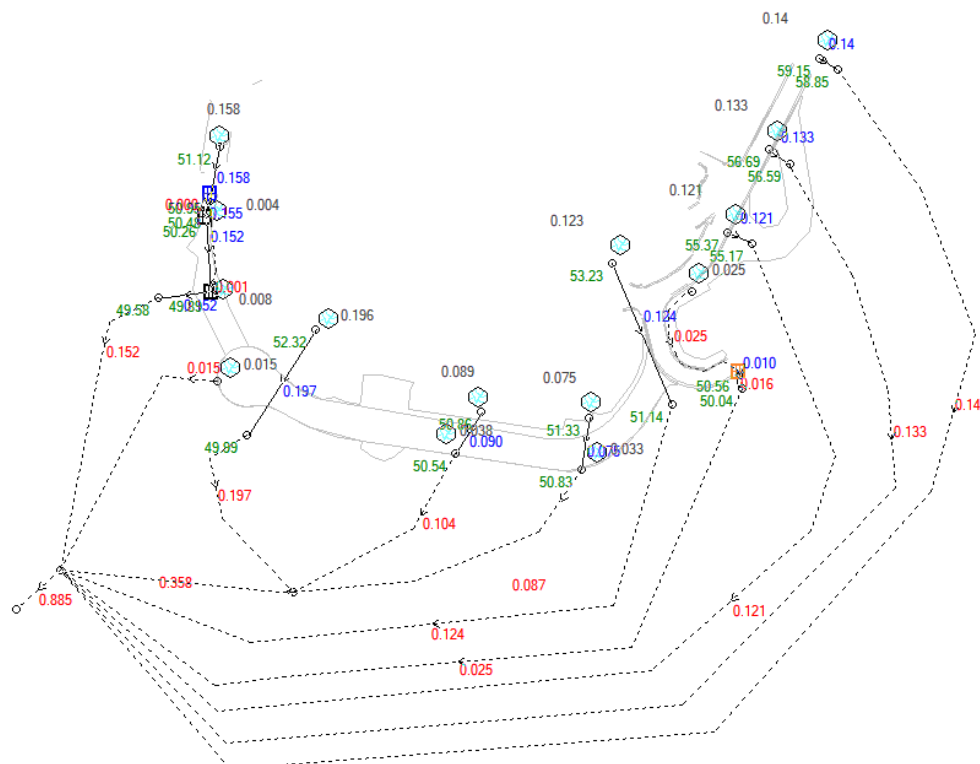


Figure 4.2.3 – DRAINS Pre-Development 100 year ARI

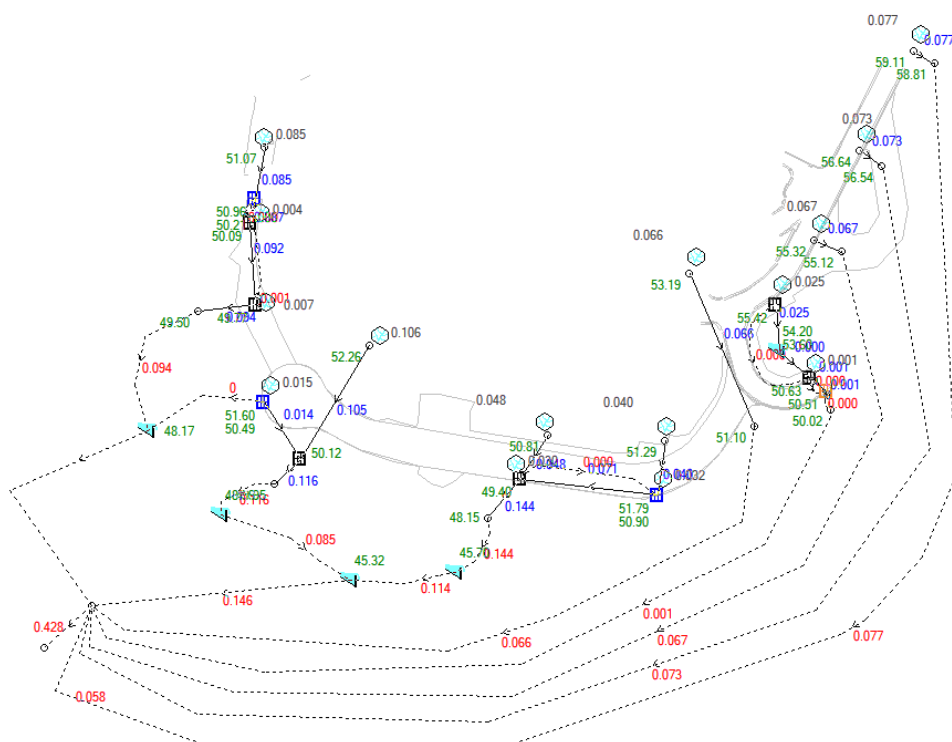


Figure 4.2.3 – DRAINS Post-Development 5 year ARI

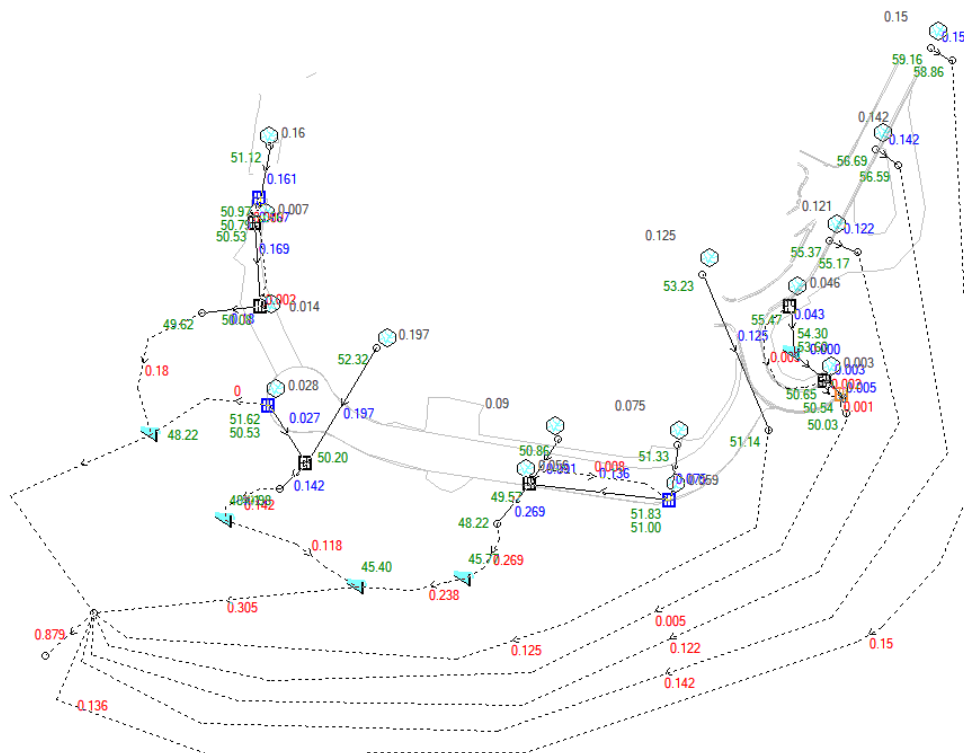


Figure 4.2.3 – DRAINS Post-Development 100 year ARI

5 CONCLUSION & CERTIFICATION

We are satisfied that the targets noted in Part 2 of this report have been properly modelled and are reflected adequately in our design drawings (noted in Appendix D) to achieve a adequate and compliant construction.

We are also satisfied that the updates to the design are consistent with the Consent.

I certify I am a suitably qualified chartered civil engineer and am experienced in this form of construction.

6 REFERENCES

Flood Report by EFWF Pty Ltd dated 17 April 2020
 Stormwater Quality Report by EFWF Pty Ltd dated 17 April 2020
 Existing Infrastructure Investigation Report by EFWF Pty Ltd dated 03/09/20
 SSD 8114 Conditions of Consent
 Managing Urban Stormwater: Council Handbook prepared by the NSW Environment Protection Agency
 Developments Adjacent To National Parks And Wildlife Service Lands Guidelines For Consent And Planning prepared by NPWS

7 APPENDIX A – CV of Engineer



CAMERON AMRI
SENIOR CIVIL & STRUCTURAL ENGINEER

Bachelor of Engineering in Civil Engineering
University of Technology Sydney

Professional memberships

Member of the Institution of Engineers, Australia
Chartered Professional Engineer (CPEng)
Registered on the National Engineering Register (NER)
Registered Professional Engineer of Queensland

Experience

Since completing his degree in 2007, Cameron has worked as a civil structural engineer for MLH, Kneebone & Beretta, E2 Design and for Birzulis Associates Pty Ltd.

A selection of projects Cameron has been involved in:

Aged Care

- HammondGrove, Hammondville
- Scalabrini Village Bexley
- Scalabrini Village Drummoyne
- Scalabrini Village Austral
- Scalabrini Village Chipping Norton
- Scalabrini Village Griffith
- Scalabrini Village Yoogali

Religious

- Our Lady of Mount Carmel
- Catholic Parish of Mary Immaculate

Education

- Thomas Reddall High School
- Westmead Public School
- Springwood High School

- Chifley Campus
- Parramatta West Public School
- Blacktown Tafe
- Wiley Park Girls High School
- Chester Hill High School
- Doonside High School
- Westfield Sports High
- Ingleburn High School
- Wenona School, North Sydney
- Granville Public School
- Bellevue Hill Public School
- Riverstone High School
- Mount Annan Public School
- Matthew Pearce Primary School
- Mount Druitt Tafe
- NirimbaTafe

8 Appendix B –MUSIC REPORT



KU-RING-GAI COUNCIL



MUSIC-link Report

Project Details		Company Details	
Project:		Company:	
Report Export Date:	19/02/2021	Contact:	
Catchment Name:	lindfield MUSIC v4 (link)	Address:	
Catchment Area:	4.6ha	Phone:	
Impervious Area*:	71.61%	Email:	
Rainfall Station:	66062 SYDNEY		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1963 - 31/12/1993 11:54:00 PM		
Mean Annual Rainfall:	1275mm		
Evapotranspiration:	1261mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.33		
Study Area:	Ku-ring-gai Council		
Scenario:	Ku-ring-gai		

* 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: Post-Development Node	Reduction	Node Type	Number	Node Type	Number
Flow	0.0291%	Bio Retention Node	5	Urban Source Node	10
TSS	9.68%				
TP	6.65%				
TN	5.43%				
GP	7.32%				

Comments

All values outside of range at MUSIC default values that differ from Ku-Ring-Gai Council values. Given the water does not flow to Council's system and is governed by National Parks Guidelines we have used the MUSIC default values which is standard practice.



Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Bio	Pond 1 54m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Pond 1 54m	PET Scaling Factor	2.1	2.1	2.1
Bio	Pond 2 48m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Pond 2 48m	PET Scaling Factor	2.1	2.1	2.1
Bio	Pond 3 70m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Pond 3 70m	PET Scaling Factor	2.1	2.1	2.1
Bio	Pond 3a 51m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Pond 3a 51m	PET Scaling Factor	2.1	2.1	2.1
Bio	Pond 4 Bioretention 50m	Hi-flow bypass rate (cum/sec)	None	None	100
Bio	Pond 4 Bioretention 50m	PET Scaling Factor	2.1	2.1	2.1
Post	Post-Development Node	% Load Reduction	None	None	0.0291
Pre	Pre-Development Node	% Load Reduction	None	None	0
Pre	Pre-Development Node	GP % Load Reduction	None	None	0
Pre	Pre-Development Node	TN % Load Reduction	None	None	0
Pre	Pre-Development Node	TP % Load Reduction	None	None	0
Pre	Pre-Development Node	TSS % Load Reduction	None	None	0
Urban	Catchment 1 670m road	Area Impervious (ha)	None	None	0.067
Urban	Catchment 1 670m road	Area Pervious (ha)	None	None	0
Urban	Catchment 1 670m road	Total Area (ha)	None	None	0.067
Urban	Catchment 2 footpath 36m	Area Impervious (ha)	None	None	0.004
Urban	Catchment 2 footpath 36m	Area Pervious (ha)	None	None	0
Urban	Catchment 2 footpath 36m	Total Area (ha)	None	None	0.004
Urban	Copy of Pre-development areas unmodified 43040m	Area Impervious (ha)	None	None	3.011
Urban	Copy of Pre-development areas unmodified 43040m	Area Pervious (ha)	None	None	1.292
Urban	Copy of Pre-development areas unmodified 43040m	Total Area (ha)	None	None	4.304
Urban	mixed 670m	Area Impervious (ha)	None	None	0.053
Urban	mixed 670m	Area Pervious (ha)	None	None	0.0133
Urban	mixed 670m	Total Area (ha)	None	None	0.067
Urban	Pre-development areas unmodified 43040m	Area Impervious (ha)	None	None	3.011
Urban	Pre-development areas unmodified 43040m	Area Pervious (ha)	None	None	1.292
Urban	Pre-development areas unmodified 43040m	Total Area (ha)	None	None	4.304
Urban	road 304m	Area Impervious (ha)	None	None	0.03
Urban	road 304m	Area Pervious (ha)	None	None	0
Urban	road 304m	Total Area (ha)	None	None	0.03
Urban	road 409m	Area Impervious (ha)	None	None	0.041
Urban	road 409m	Area Pervious (ha)	None	None	0
Urban	road 409m	Total Area (ha)	None	None	0.041
Urban	road 873m	Area Impervious (ha)	None	None	0.087
Urban	road 873m	Area Pervious (ha)	None	None	0
Urban	road 873m	Total Area (ha)	None	None	0.087

Only certain parameters are reported when they pass validation



Failing Parameters					
Node Type	Node Name	Parameter	Min	Max	Actual
Post	Post-Development Node	GP % Load Reduction	70	None	7.32
Post	Post-Development Node	TN % Load Reduction	45	None	5.43
Post	Post-Development Node	TP % Load Reduction	65	None	6.65
Post	Post-Development Node	TSS % Load Reduction	85	None	9.68
Urban	Catchment 1 670m ² road	Groundwater Daily Recharge Rate (%)	35	55	25
Urban	Catchment 1 670m ² road	Pervious Area Infiltration Capacity exponent - b	2.4	4.7	1
Urban	Catchment 1 670m ² road	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	Catchment 1 670m ² road	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	Catchment 2 footpath 36m ²	Baseflow Total Nitrogen Mean (log mg/L)	-0.05	0.11	0.32
Urban	Catchment 2 footpath 36m ²	Baseflow Total Phosphorus Mean (log mg/L)	-1.22	-0.85	-0.82
Urban	Catchment 2 footpath 36m ²	Baseflow Total Suspended Solids Mean (log mg/L)	1.15	1.2	1.1
Urban	Catchment 2 footpath 36m ²	Groundwater Daily Recharge Rate (%)	35	55	25
Urban	Catchment 2 footpath 36m ²	Pervious Area Infiltration Capacity exponent - b	2.4	4.7	1
Urban	Catchment 2 footpath 36m ²	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	Catchment 2 footpath 36m ²	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	Catchment 2 footpath 36m ²	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.34	0.42
Urban	Copy of Pre-development areas unmodified 43040m ²	Baseflow Total Nitrogen Mean (log mg/L)	-0.05	0.11	0.32
Urban	Copy of Pre-development areas unmodified 43040m ²	Baseflow Total Phosphorus Mean (log mg/L)	-1.22	-0.85	-0.82
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		Baseflow Total Suspended Solids Mean (log mg/L)			



KU-RING-GAI COUNCIL



Urban	Pre-development areas unmodified 43040m	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	Pre-development areas unmodified 43040m	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	Pre-development areas unmodified 43040m	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.34	0.42

Only certain parameters are reported when they pass validation

Node Type	Node Name	Parameter	Min	Max	Actual
Urban	road 304m	Baseflow Total Nitrogen Mean (log mg/L)	-0.05	0.11	0.32
Urban	road 304m	Baseflow Total Phosphorus Mean (log mg/L)	-1.22	-0.85	-0.82
Urban	road 304m	Baseflow Total Suspended Solids Mean (log mg/L)	1.15	1.2	1.1
Urban	road 304m	Groundwater Daily Recharge Rate (%)	35	55	25
Urban	road 304m	Pervious Area Infiltration Capacity exponent - b	2.4	4.7	1
Urban	road 304m	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	road 304m	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	road 304m	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.34	0.42
Urban	road 409m	Groundwater Daily Recharge Rate (%)	35	55	25
Urban	road 409m	Pervious Area Infiltration Capacity exponent - b	2.4	4.7	1
Urban	road 409m	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	road 409m	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	road 873m	Baseflow Total Nitrogen Mean (log mg/L)	-0.05	0.11	0.32
Urban	road 873m	Baseflow Total Phosphorus Mean (log mg/L)	-1.22	-0.85	-0.82
Urban	road 873m	Baseflow Total Suspended Solids Mean (log mg/L)	1.15	1.2	1.1
Urban	road 873m	Groundwater Daily Recharge Rate (%)	35	55	25
Urban	road 873m	Pervious Area Infiltration Capacity exponent - b	2.4	4.7	1
Urban	road 873m	Pervious Area Soil Initial Storage (% of Capacity)	30	30	25
Urban	road 873m	Pervious Area Soil Storage Capacity (mm)	170	210	120
Urban	road 873m	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.34	0.42

Only certain parameters are reported when they pass validation

9 Appendix C –DESIGN DRAWINGS DEMONSTRATING MODEL INPUTS ARE INCORPORATED INTO PROPOSED CONSTRUCTION

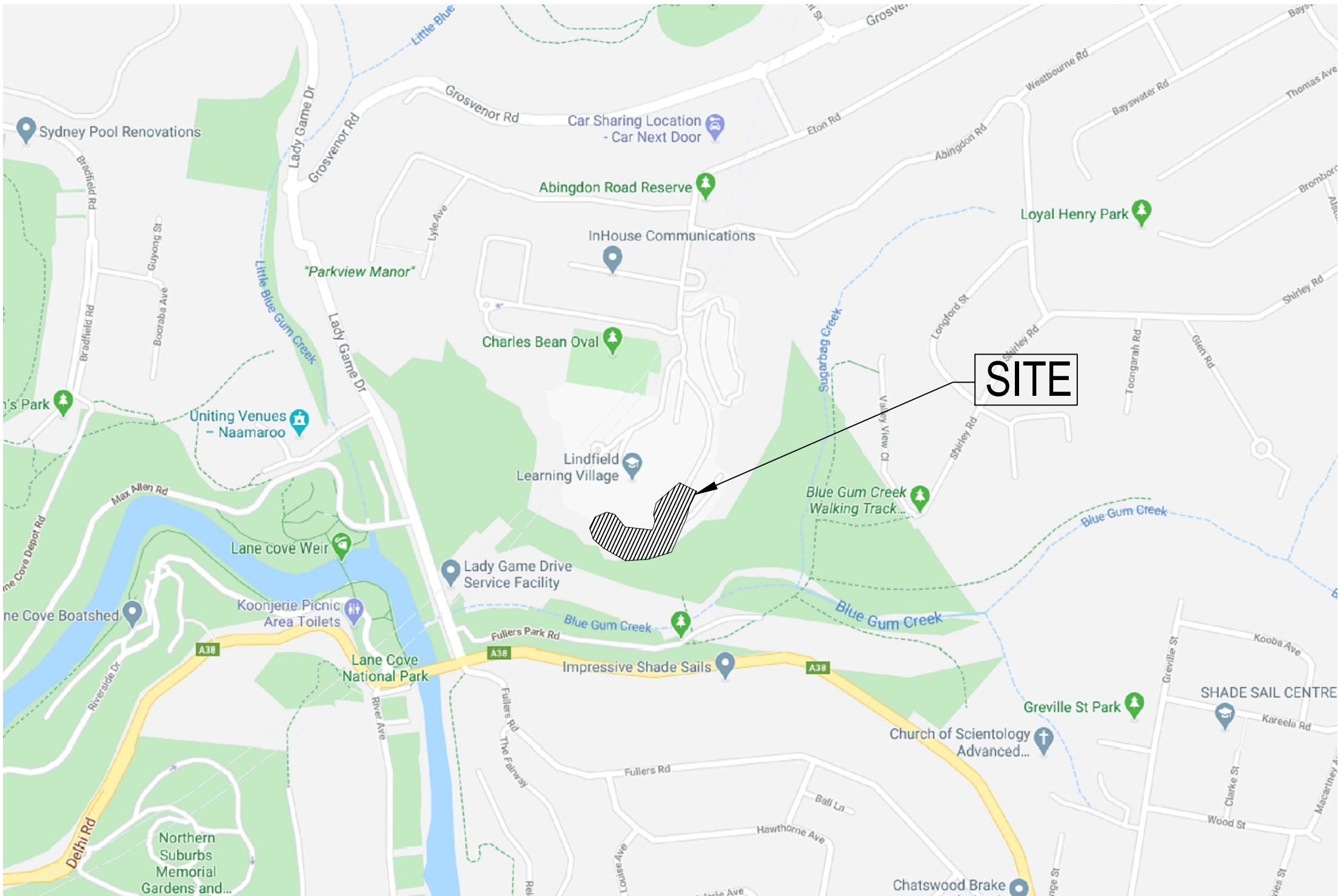
The following drawings are prepared by us with project reference 7576.

Drawing number	Drawing Revision	Drawing Title
C.200	4	COVER SHEET
C.201	4	CONSTRUCTION NOTES
C.202	4	OVERALL SITE LAYOUT
C.210	3	LEGENDS AND SYMBOLS
C.211	7	CIVIL ARRANGEMENT PLAN SHEET 1
C.212	7	CIVIL ARRANGEMENT PLAN SHEET 2
C.213	7	CIVIL ARRANGEMENT PLAN SHEET 3
C.214	7	CIVIL ARRANGEMENT PLAN SHEET 4
C.215	6	CIVIL ARRANGEMENT PLAN SHEET 5
C.216	6	CIVIL ARRANGEMENT PLAN SHEET 6
C.217	7	CIVIL ARRANGEMENT PLAN SHEET 7
C.218	7	CIVIL ARRANGEMENT PLAN SHEET 8
C.219	5	CIVIL ARRANGEMENT PLAN SHEET 9
C.220	4	ALIGNMENT PLAN
C.221	4	ROAD 1 AND 2 LONG SECTIONS
C.222	2	ROAD 2 CROSS SECTIONS
C.226	4	KERB LONG SECTIONS SHEET 1 OF 2
C.227	4	KERB LONG SECTIONS SHEET 2 OF 2
C.228	2	TYPICAL ROAD SECTION
C.231	5	CIVIL DETAILS SHEET 1
C.232	3	CIVIL DETAILS SHEET 2
C.233	5	CIVIL DETAILS SHEET 3
C.234	7	CIVIL DETAILS SHEET 4
C.235	3	CIVIL DETAILS SHEET 5
C.236	2	CIVIL DETAILS SHEET 6

PROPOSED ELEVATED DRIVEWAY

CIVIL ENGINEERING WORKS

LINDFIELD LEARNING VILLAGE, LINDFIELD, NSW



LOCALITY SKETCH
N.T.S

DRAWING LIST	
NO.	TITLE
C.200	COVER SHEET
C.201	CONSTRUCTION NOTES
C.202	OVERALL SITE LAYOUT
C.210	LEGENDS AND SYMBOLS
C.211	CIVIL ARRANGEMENT PLAN - SHEET 1 OF 8
C.212	CIVIL ARRANGEMENT PLAN - SHEET 2 OF 8
C.213	CIVIL ARRANGEMENT PLAN - SHEET 3 OF 8
C.214	CIVIL ARRANGEMENT PLAN - SHEET 4 OF 8
C.215	CIVIL ARRANGEMENT PLAN - SHEET 5 OF 8
C.216	CIVIL ARRANGEMENT PLAN - SHEET 6 OF 8
C.217	CIVIL ARRANGEMENT PLAN - SHEET 7 OF 8
C.218	CIVIL ARRANGEMENT PLAN - SHEET 8 OF 8
C.219	CIVIL ARRANGEMENT PLAN - SHEET 9 OF 9
C.220	ALIGNMENT PLAN
C.221	ROAD 1 AND 2 LONG SECTIONS
C.222	ROAD 2 CROSS SECTIONS
C.226	KERB LONG SECTIONS - SHEET 1 OF 2
C.227	KERB LONG SECTIONS - SHEET 2 OF 2
C.228	TYPICAL ROAD SECTION
C.231	CIVIL DETAILS - SHEET 1 OF 5
C.232	CIVIL DETAILS - SHEET 2 OF 5
C.233	CIVIL DETAILS - SHEET 3 OF 5
C.234	CIVIL DETAILS - SHEET 4 OF 5
C.235	CIVIL DETAILS - SHEET 5
C.236	CIVIL DETAILS - SHEET 6
C.300	ELEVATED ROAD STRUCTURAL PLAN & SECTION
C.301	ELEVATED ROAD REINFORCEMENT PLANS
C.310	ELEVATED ROAD STRUCTURAL DETAILS
C.400	SIGNAGE AND LINE MARKING
SE01	SEDIMENT & EROSION CONTROL PLAN, DETAILS & NOTES
BE01	CUT AND FILL PLAN, VOLUME CALCULATION

4	DRAWING LIST UPDATED	CA	22/12/20
3	DRAWING LIST UPDATED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT

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PROJECT

LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

TITLE

COVER SHEET

SCALES

N/A @ A1

DATE

MAY 2020

DRAWN

DG

DESIGN

DG

VERIFIED

CA

APPROVED

MG

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ISSUE

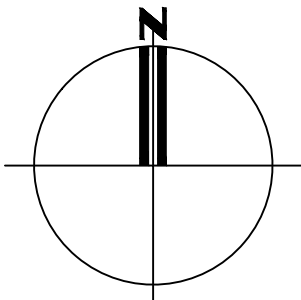
PROJECT No.

DRAWING No.

4

7576

C.200



LINDFIELD LEARNING VILLAGE - STAGE 2 & 3

GENERAL

- These structural drawings shall be read in conjunction with all architectural and other consultant's drawings and specifications and with such other written instructions as may be issued during the course of the contract. Any discrepancy shall be referred to the Superintendent and Council Engineer (where public area works) before proceeding with the work.
- All materials and workmanship shall be in accordance with the relevant current Standards Australia Codes and with the Building Code of Australia.
- All dimensions shown on these structural drawings shall be verified by the Contractor on site. These structural drawings shall not be scaled for dimensions.
- The method of construction and the maintenance of safety during construction is the responsibility of the Contractor. If any structural element presents difficulty in respect of constructability or safety, the matter shall be referred to the Structural Engineer for resolution before proceeding with the work.
- During construction the structure shall be maintained in a stable condition and no part shall be overstressed. The design, installation and maintenance of all temporary propping, bracing and shoring shall be provided by the Contractor to keep the works and excavations stable at all times. The cost of all such work shall be deemed to be included in the Contractor's tender.

FOUNDATIONS

- Bored piers shall be in accordance with AS 2159 SAA Piling Code
- Bored piers have been designed for an allowable end bearing pressure intensity of 1000 kPa, bearing on very low strength bedrock.
- Strip footings and pad footings have been designed for an allowable bearing pressure intensity of 200 kPa, bearing in the stiff to very stiff natural clay materials.
- The Contractor shall obtain approval from the Superintendent of the foundation material before placing reinforcement or concrete.
- Footings shall be located centrally under walls and columns unless noted otherwise.
- Footings shall be constructed and backfilled as soon as possible following excavation to avoid softening or drying out of the foundation material.
- Bored piers shall be concreted on the same day that they are excavated.
- The Contractor shall arrange for a representative from the geotechnical consultant to be present at the time of drilling all of the bored piers to determine the actual founding levels. The cost of this shall be deemed to be included in the contractors tender.

PREPARATION FOR SLAB ON GROUND

- Clear the area to be occupied by the pavement and its adjuncts. Break up and remove slabs, foundations, paving, etc. found on the surface or within 300mm of the basecourse. Remove all topsoil and organic matter and grub out all roots and stumps. Remove all rubble remaining from excavations.
- The subgrade material (natural ground below the excavations) shall be thoroughly compacted by proof rolling with a minimum of 8 passes of a 10 tonne dead weight roller. This proof rolling shall be inspected by an approved geotechnical engineering consultant to determine the extend of replacement of any unsuitable material. The cost of these inspections shall be deemed to be included in the contractors tender.
- Any soft, yielding, organic or other unsuitable material in the subgrade shall be removed for a depth of at least 300mm and holes so formed shall be filled with approved filling compacted in 150mm layers as specified below.
- Bring all filling on to the site unless it can be provided from spoil recovered from the site. Filling shall be sound clean stable material, free of perishable material or any other material that will not form stable fill. The fill material shall be capable of consolidation so that it is firm and unyielding throughout its depth.
- Place filling in layers not exceeding 200mm thick when measured loose. Bring filling to optimum moisture content (+/- 2%) by watering and compact each layer thoroughly and uniformly with a vibrating roller where practicable. Hand tamp in areas not accessible to a vibrating roller.
- For the backfilling of localised excavations lightweight compaction equipment is to be used and filling placed in layers not exceeding 100mm thick when measured loose.
- Consolidate each layer of filling to obtain a uniform density strictly between 98% and 102% of the standard maximum dry density of the material as determined by AS2159.5.1.1.
- The basecourse layer (directly below the slab) shall consist of 100mm finished compacted thickness of crushed rock blinded with 25mm of sand.
- The basecourse material shall be clean, tough, durable and free of any weathered or disintegrated stone, clay, organic matter or any other deleterious materials.
- The crushed rock shall be compacted with approved equipment to obtain a uniform density of not less than 100% of the standard maximum dry density of material as determined by AS1289.5.1.1.
- Finish the basecourse to the following tolerances:
Variation from design level - 5mm
Variation from 3000mm straight edge - 5mm
- All earthworks shall be carried out under Level 1 control as defined in AS3798.
- The Contractor shall allow for testing at the rate of one test per 200 square metres of surface area for each of the following finished surfaces, with a minimum of three tests for each compacted layer:
- Subgrade
- Basecourse (at surface of crushed rock)
- The Contractor shall allow for testing at the rate of one test per 30 cubic metres for the filling, with a minimum of three tests for each compacted layer.
- The location of all tests shall be to the approval of the Superintendent.
- The Contractor shall obtain approval from a registered N.A.T.A. testing authority documented test evidence proving that the compaction figures as required for the materials specified herein have been obtained. The cost of such work shall be deemed to be included in the Contractor's Tender.

CONCRETE

- All workmanship and materials shall be in accordance with AS 3600 current edition with amendments, except where varied by the contract documents.
- Concrete Quality:
Class = Normal
Slump = 80mm
Maximum size of aggregate in structural concrete = 20mm U.N.O.
Cement Type SL
Admixtures = nil, unless noted otherwise or approved in writing.

For concrete cast in contact with ground provide the following additional properties:
Maximum cement content = 330 kg/m³
Maximum water/cement ratio = 0.50

Concrete shall have a characteristic compressive strength at 28 days (f'c) as shown in the following table, unless noted otherwise on the drawings.

ELEMENT	f'c MPa (28 Days)
BORED PIERS	40
STRIP FOOTINGS, FOOTING BEAMS, PAD FOOTING	32
SUSPENDED ROAD	40
COLUMNS	50
EXTERNAL CONCRETE, ALL OTHER CONCRETE U.N.O.	32

- Project control testing shall be carried out in accordance with AS 3600.
- Clear concrete cover in mm to the reinforcement shall be as follows (unless noted otherwise on the drawings):

EXPOSURE CLASSIFICATION TO AS3600	CAST AGAINST FORMWORK			CAST AGAINST GROUND	
	INTERIOR	EXTERIOR	CONTACT WITH GROUND	PROTECTED BY MEMBRANE	NO MEMBRANE
A1	20			30	
A2	25	30	30		50
B1		40			
B2		45			

Exposure classification for exterior concrete - **B1**
Exposure classification for interior concrete - **A2**

- All reinforcement shall be firmly supported on mild steel plastic tipped chairs, plastic chairs or concrete chairs at not greater than 1 metre centres both ways. Bars shall be tied at alternate intersections. In exposure conditions greater than B1 use only plastic chairs.
- Concrete sizes shown do not include thickness of applied finishes.
- Depths of beams are given first and include slab thickness.
- For chamfers, drip grooves, reglets, etc. refer to architect's details. Maintain cover to reinforcement at these details.
- No holes, chases or embedment of pipes other than those shown on the structural drawings shall be made in concrete members without the prior written approval of the Superintendent.
- The finished concrete shall be a dense homogenous mass, completely filling the formwork thoroughly embedding the reinforcement and free of stone pockets. All concrete including slabs on ground and footings shall be compacted with ~~mechanical vibrators~~.
- Concrete construction joints where not shown shall be located to the approval of the Superintendent and Council Engineer (where public area works).
- Curing of all concrete is to be achieved by keeping surfaces continuously wet for a period of 7 days, and prevention of loss of moisture for a total of 14 days followed by gradual drying out. Approved sprayed on curing compounds may be used where no floor finishes are proposed. Polythene sheeting or wet hessian may be used if protected from wind and traffic.
- Construction support propping is to be left in place where needed to avoid overstressing the structure due to construction loading. No masonry or partition walls are to be constructed on suspended levels until all propping is removed and ~~the member has absorbed its dead load deflection~~.
- The Superintendent and Council Engineer (where public area works) shall be given 48 hours notice for reinforcement inspection and concrete shall not be delivered until final approval obtained.
- Conduits, pipes etc., shall only be located in the middle one third of slab depth and spaced at not less than 3 diameters. pipes or conduits shall not be placed within the cover to the reinforcement.
- Reinforcement symbols:
S denotes Grade 230 S Hot rolled deformed bars to AS 1302
N denotes Grade 500 N Deformed bars to AS 4671
R denotes Grade 230 R Hot rolled plain bars to AS 1302
SL/RL/L denotes Grade 500 L Deformed ribbed welded mesh to AS 4671
The figures following the symbol are the number of millimetres in the bar diameter. The figures following the mesh symbol SL, RL, L is the reference number for mesh to AS 4671.
- Reinforcement is represented diagrammatically and not necessarily in true projection.
- Splices in reinforcement shall be made only in positions shown or otherwise approved in writing by the Superintendent. Laps shall be in accordance with AS 3600 and not less than 1.25 times the development length for each bar.
- Mesh reinforcement shall have splices made so that the overlap, measured between the outermost transverse wires of each sheet of mesh, is not less than the spacing of those wires plus 50mm.
- Welding of reinforcement shall not be permitted unless shown on the structural drawings or approved by the Superintendent.
- Joggles to bars shall be 1 bar diameter over a length of 12 bar diameters.
- Bundled bars shall be tied together at 30 bar diameter centres with three wraps of tie wire.
- Where transverse tie bars are not shown provide N12 at 400mm distribution bars unless noted otherwise. Splice distribution bars 500mm where necessary and provide 500mm splice length with main bars unless noted otherwise.
- All dowels placed in joints in concrete slabs shall be placed within the following tolerances:
Level +/- 1 degree
Line +/- 1 degree
Position +/- 5mm
- Sliding bearing strips supporting concrete slabs shall be composed of two layers of 0.4mm thick galvanised steel plate with an intermediate layer of grease (unless noted otherwise). The strips shall be the same width as the bearing surface.

MASONRY WALLS

- All workmanship and materials shall be in accordance with AS 3700. Masonry units shall comply with AS 4455. Wall ties shall comply with AS 2699.
- Walls shown on structural drawings are load-bearing walls, unless noted otherwise. Non-loadbearing walls shall be separated from the concrete structure above them with a minimum 20mm thick approved compressible isolation material.
- No masonry walls which are supported by suspended concrete structure shall be erected until the formwork has been removed.
- Masonry walls supporting concrete slabs and beams shall be trowelled smooth and separated at the bearing surfaces with the slip material specified in the concrete notes.
- The minimum compressive strength of clay masonry bricks shall be 27 MPa. Clay masonry bricks shall have a Characteristic Expansion value no exceeding 0.8 mm/m.
- Concrete masonry blocks shall be of a minimum compressive strength Grade 15 in accordance with AS 4455.
- Mortar for structural concrete masonry walls shall consist of 1 part cement to 0.25 parts of hydrated lime to 3 parts well-graded sand. Mortar for structural brick masonry walls shall consist of 1 part cement to 1 part hydrated lime to 6 parts well-graded sand. All mortar shall conform to requirements of AS 3700. Mortar admixtures shall not be used without the written approval of the Superintendent.
- No chases or recesses are permitted in load bearing and structural masonry without the written approval of the Superintendent.
- All load bearing and structural masonry shall be laid on full beds of mortar and all perpendes shall be solidly filled with mortar.
- Provide vertical control joints at 8m maximum centres, and 5m maximum from corners in masonry walls, unless noted otherwise on the drawings. All masonry walls supporting or supported by concrete floors shall be provided with vertical joints to match any control joints in the concrete.
- Reinforcement for concrete masonry blocks shall be securely tied in position. Provide 20mm minimum grout cover to the reinforcement unless noted otherwise.
- Core fill grout for concrete masonry blocks shall be in accordance with AS 3700 with a minimum characteristic compressive strength of 20 MPa. The grout shall have a slump of 230mm +/- 30mm and the maximum size of aggregate shall be 10mm. Grout shall have a minimum cement content of 300 kg/m³.
- Concrete masonry walls which are to be grout filled shall have cores cleaned of all mortar protrusions and shall be filled with grout in lifts of not more than 1200mm in height. Core fill grout shall be thoroughly compacted in place by internal vibrators. All cores are to be filled without the formation of voids. Clean-out holes shall be provided in the back-filled side at the base of retaining walls.
- Unless noted otherwise on the drawings all masonry walls shall be tied to abutting steel and concrete columns with 38x1.6x300 long crimped galvanised steel straps at maximum 400 centres vertically. Fix straps to steel columns with 2/No. 12 self drilling steel fasteners. Fix straps to concrete columns with 2/Hilti DBZ" masonry anchors. All fixings shall be installed in strict accordance with the manufacturers instructions (Alternative fixings may be submitted for approval).
- Unless noted otherwise on the drawings all masonry walls shall be tied to adjacent parallel steel members with 38x1.6 crimped steel straps at maximum 400mm centres to both the top and bottom of the steel member. The crimped ends of the straps shall be embedded a minimum of 90mm into the mortar joints. Fix straps to steel members with 2/No. 12 self drilling steel fasteners installed in strict accordance with the manufacturers instructions (Alternative fixings may be submitted for approval).

- Do not backfill retaining walls until at least 14 days have elapsed after completion of the grout filling of the walls unless other approved by the Superintendent.
- Do not backfill retaining walls (other than cantilever walls) until a minimum of seven days elapsed from the time of completion of the floor construction at the top & bottom of the wall.
- Backfill to retaining wall shall be a highly permeable granular material. Provide a subsoil drain at the base of the wall connected to the stormwater drainage system unless noted otherwise.

MASONRY FLEXIBLE ANCHORS

- All anchors shall be subject to the approval of the Superintendent.
- All anchors shall be manufactured from hot dip galvanised steel plate.
- All anchors shall permit horizontal and vertical movement in the plane of the wall but shall resist movement in a perpendicular direction to the plane of the wall, unless noted otherwise.
- The anchors shall have the following minimum lateral working load capacities to resist forces in a perpendicular direction to the plane of the wall:
At vertical control joints - 0.30 kN
All other anchors - 0.40 kN

SPECIFICATION FOR CONSTRUCTION OF ROAD FLEXIBLE PAVEMENT

- All work to be in accordance with the Specification.
- SUBGRADE**
 - Clear the area to be occupied by the pavement and its adjuncts. Break up and remove foundations, slabs, paving etc. found on the surface or within 300mm of the basecourse. Remove all topsoil and organic matter and grub out all roots and stumps. Remove all rubble remaining from excavations.
 - The subgrade material (natural ground below excavations) shall be thoroughly compacted by proof rolling with a minimum of 8 passes of a 10 tonne dead weight static smooth drum roller. This proof rolling shall be inspected by the geotechnical engineering consultant, to determine the extent of replacement of any unsuitable material encountered. The cost of all such work shall be deemed to be included in the Contractors tender.
 - Any soft, yielding, organic or other unsuitable material in the subgrade shall be removed for a depth of at least 300mm and holes so formed shall be filled with approved filling compacted in 150mm layers as specified below.
 - Bring all filling on to the site unless it can be provided from spoil recovered from the site. Filling shall be sound clean stable material, free of perishable material or any other material that will not form stable fill. The fill material shall be capable of consolidation so that it is firm and unyielding throughout its depth.
 - Place filling in layers not exceeding 200mm thick when measured loose. Bring filling to optimum moisture content (+/- 2%) by watering and compact each layer thoroughly and uniformly with a vibrating roller.
 - Consolidate each layer of filling to obtain a uniform density of not less than 100% of the standard maximum dry density of the material as determined by AS1289.5.1.1.

BASE

- The basecourse layer shall consist of compacted crushed rock in accordance with RTA QA Specification 3051 and RTA QA Specification R71. The material used for this course shall be Class 1 DGB 20 in accordance with the aforementioned standards.

Design Original Subgrade CBR = 5%
Design Traffic Loading = 5 x 10⁶ ESA

WEARING SURFACE

- The wearing surface course shall be provided with an initial two coat hot bitumen seal.
- The wearing surface course shall be a 50mm compacted thickness of 10mm asphaltic concrete laid on the two coat seal in accordance with RTA QA Specification R106.

TESTING

- The Contractor shall allow for testing at the rate of one test per 200 square metres of surface area for each of the following finished surfaces, with a minimum of three tests for each compacted layer.
- Subgrade
- Sub-basecourse
- Basecourse
- The Contractor shall allow for testing at the rate of one test per 30 cubic metres for the filling, with a minimum of three tests for each compacted layer.
- The location of all tests shall be to the approval of the Superintendent and Council's development overseer.
- The Contractor shall obtain from a registered N.A.T.A. testing authority documented test evidence proving that the compaction figures as required for the materials specified herein have been obtained. The cost of such work shall be deemed to be included in the Contractor's Tender. Test results for each stage (i.e. subgrade, subbase, basecourse and fill where applicable) to be submitted to the Superintendent prior to proceeding to the next stage of the works.

CHEMICAL ANCHORS & MASONRY ANCHORS

- All anchors shall be subject to the approval of the Superintendent.
- Chemical anchors shall consist of a threaded mild steel rod of the size nominated on the drawings embedded in and chemically bonded to the concrete. The chemicals used shall be such that they do not detrimentally affect the surrounding concrete. The rod shall be hot dip galvanised unless noted otherwise.
- Masonry anchor sizes given on the structural drawings refer to the bar diameter required.
- All anchors shall be capable of developing a working load capacity in shear and tension at least 80% of the maximum permissible values for the threaded rod or bolt size nominated.
- All anchors shall be installed in strict accordance with the manufacturers instructions.
- Holes drilled for anchors shall not penetrate reinforcement in suspended concrete slabs, beams, columns and walls. Any holes which are found to clash with such reinforcement shall be relocated as necessary and the initial hole shall be patched to the approval of the Superintendent.

DRAINAGE NOTES:

- All workmanship and materials shall be in accordance with AS3500.3 and other relevant codes where other materials are used.
- For downpipe locations refer architectural drawings and the hydraulic engineers drawings.
- Establish and locate existing invert levels of existing services prior to commencing works and confirm with engineer is the design is based on an assumption in the levels.
- Pipes shall have a minimum fall of 1% unless noted otherwise. A minimum of 1:60 fall shall be provided for downpipes connecting to drainage lines.
- Responsibility of roof drainage is by others unless specifically noted otherwise.
- All UPVC stormwater drainage lines shall be in accordance with the latest version of AS1254 and shall be installed in accordance with the requirements of the latest version of ASS3500.3, AS 2032 & AS2566 unless noted otherwise.
- All reinforced concrete stormwater drainage pipe work (RCP) shall be in accordance with AS1342, RMS standards (now Transport for NSW) requirements and specifications and shall be installed in accordance with AS 3725 or the previous relevant standard/specification whichever is the greater or more appropriate. The pipes shall be of the following minimum classes in accordance with AS 1342 unless noted otherwise:
 - Class 4 under flexible pavements with min 600mm cover
 - Class 2 in other areas with no flexible pavement over and heavy machinery/trucks does not need to pass over and not surcharged by vehicles loads or greater.Pipe laying in public area works shall be in accordance with council drawing 2004-010.
- Subsoil drainage for flexible pavements shall be in accordance with RMS requirements (now Transport For NSW).
- Inspections are required to confirm and certify the standard of construction by us. We shall be provided with 48 hours notice prior to all stormwater elements being backfilled or concealed to inspect. This does not remove the need for other authorities such as Certifiers to conduct inspections. Additional inspections of pavement materials and layers may also be required. Refer pavement or sub-grade specific notes and relevant Specification such as R44 RMS specifications. In public works areas Council shall be given at least 24 hours notice of inspections for drainage excavation, bedding, laying and backfilling.
- Subsoil drainage (minimum 100mm diameter wrapped in a geo sock shall be provided behind and at the base of all retaining walls, upturn walls (with the exception of underpinning and contiguous/solder piling) and shall be backfilled in accordance with crushed rock with 10% cement. The wall shall also be waterproofed and a layer of corflute applied between the waterproofing and the backfill. The backfill shall be wrapped in a geofabric. The subsoil drain shall connect to the downstream stormwater system and have sufficient clean out points to be adequately maintained.
- Subsoil drainage shall be provided in poorly drained law style areas in accordance with best practice.
- Step downs in flooring from internal to external shall be in accordance with the National Construction Code unless noted otherwise.
- Falls in pavements shall be minimum 1% for external areas and 0.5% for external areas protected by a roof or undercover. Sufficient surface drainage shall be provided to facilitate these falls.
- Subsoil drainage for flexible pavements shall be in accordance with RMS requirements (now Transport For NSW).
- All drainage trenches shall not undermine existing structures and shall be in sound material. If soft spots exist they should be removed and backfilled with a compacted roadbase DGB20 or 40 and compacted to minimum 98% solid dry density at plus or minus 2% optimum moisture content.
- All concrete pits deeper than 900mm shall have step irons installed, have a lid as per specification or a pit schedule, have bedding as required and shall have any child protection as required by Council, the Certifying Authority, the engineer or the Building Code of Australia.

- Cover for stormwater pipes shall be:
 - RCP: 600mm under flexible pavements or areas of vehicular loading
 - RCP: 300mm under landscape areas or rigid pavements.
 - UPVC: 300mm subject to vehicular loading
 - UPVC: 600mm subject to vehicular loading with sealed flexible carriageways.
- If not noted in the above the minimum covers shall be obtained from the relevant Australian Standard:
 - AS 1762 for corrugated metal stormwater pipes
 - AS 2032 for PVC stormwater pipes
 - AS.NZS 2566.1 for flexible stormwater pipes
 - AS 3725 for reinforced concrete stormwater pipes
 - AS 2033 for polyethylene stormwater pipes.

- Lids of stormwater pits shall have the following class lids unless noted otherwise:
 - Class B for areas accessed strictly by only pedestrians
 - Class D for areas residential roads and car parks and areas subject to vehicle loads. (heavy vehicle loads included)
- Minimum pit sizes regardless of what is shown on the drawings shall be in accordance with Table 7.5.2.1 of AS/NZS 3500.3
- Where site have a high water table a minimum of 1.5 times the diameter over UPVC or lightweight pipes shall be provided as cover to prevent buoyancy.
- All set out is to the face of the kerb, centreline of fence/bollard/pipe.
- Smooth all transition between new and existing stormwater drainage works in level and alignment.
- All stormwater pits shall have child proof locks.

AUTHORITY STORMWATER NOTES:

- IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK ALL SET OUT AND LEVEL PRIOR TO COMMENCEMENT OF WORKS AND TO REPORT ANY DISCREPANCIES FOUND TO THE SUPERINTENDENT.
- ALL SET OUT DIMENSIONS ARE TO FACE OF KERB, CENTRELINE OF FENCE/BOLLARD/PIPE.
- SMOOTH ALL TRANSITION BETWEEN NEW AND EXISTING WORK IN BOTH LEVEL AND ALIGNMENT.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ALL SAFETY FENCES, WARNING SIGNS, TRAFFIC DIVERSIONS AND THE LIKE DURING CONSTRUCTION. ALL WORKS TO COMPLY WITH OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS AND OTHER RELEVANT AUTHORITY SAFETY REQUIREMENTS.
- NO TREES SHALL BE REMOVED, CUTBACK OR RELOCATED WITHOUT THE WRITTEN INSTRUCTION FROM THE SUPERINTENDENT.
- THE CONTRACTOR SHALL PROVIDE CERTIFICATION AND COMPACTIONS AND PAVEMENT THICKNESS FROM A NATA REGISTERED TESTING AUTHORITY MINIMUM THREE TESTS PER LAYER AS FOLLOWS
PIPE BACKFILL DENSITY INDEX 75
SELECT FILL 95% STANDARD
FOLLOW BASE COURSE 98% MODIFIED
BASE COURSE 100% MODIFIED
- THE AUSPEC SPECIFICATION SHALL BE THE SPECIFICATION FOR THESE WORKS.

SURVEY NOTES:

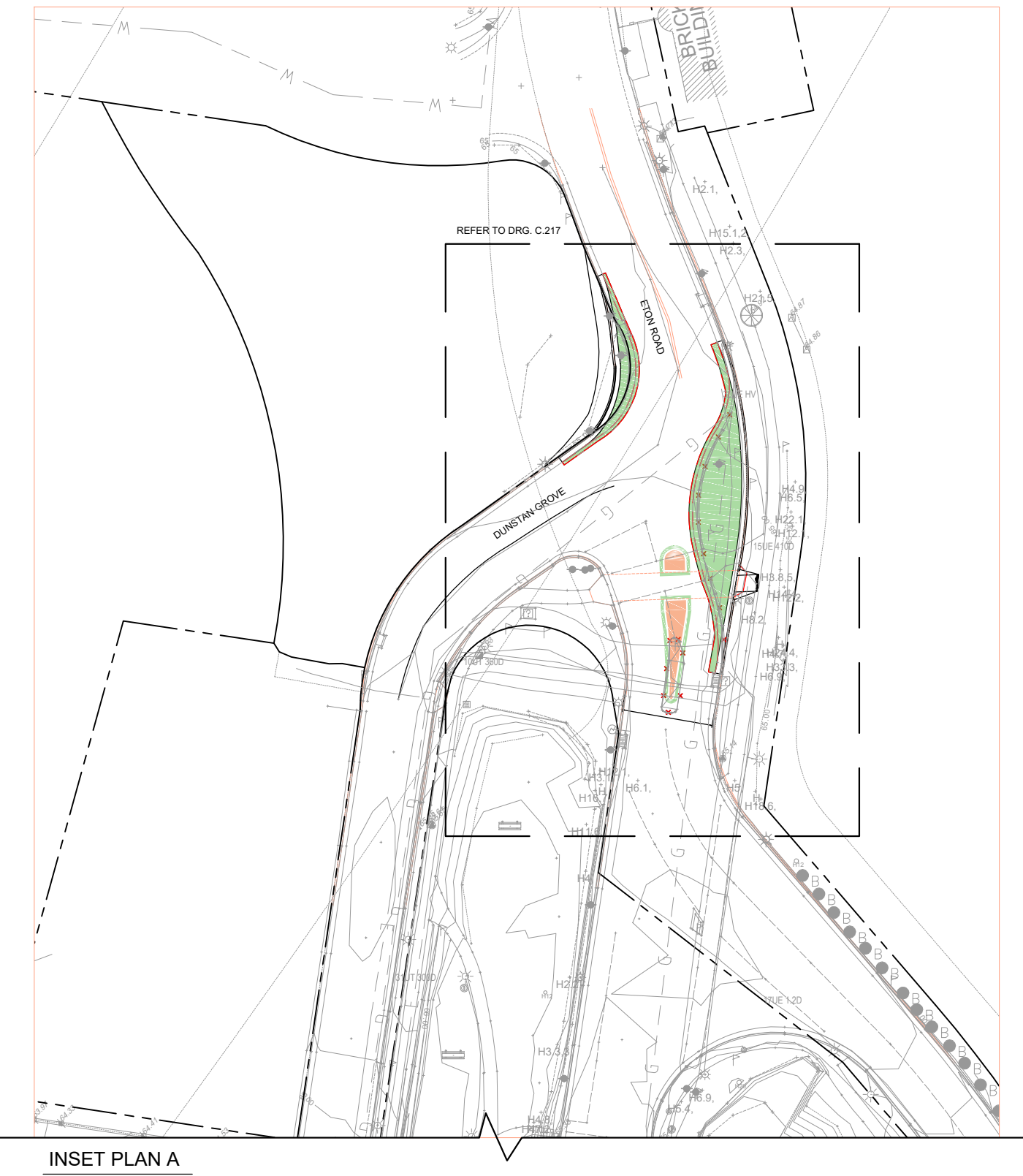
- THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY THE SURVEYOR SPECIFIED IN THE TITLE BLOCK.
- THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. BIRZULIS ASSOCIATES DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.
- SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT BIRZULIS ASSOCIATES. THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM ORIGINAL SURVEY DOCUMENTS.
- SURVEY MARKS TO BE PROTECTED IN ACCORDANCE WITH STATE GOVERNMENT REQUIREMENTS. SEE ATTACHED CONDITIONS FOR FURTHER DETAILS.
- UNDERGROUND SERVICES SHALL BE LOCATED BY CONTRACTOR TO AVOID DAMAGE. ALL SERVICE LOCATION SHALL BE PASSED ON TO DESIGN TEAM. RELOCATION OF SERVICES RESPONSIBILITY OF RELEVANT DESIGN CONSULTANT.

4	NOTES UPDATED	CA	22/12/20
3	NOTES UPDATED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT	
NBRS ARCHITECTURE.	
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 CONSULTING STRUCTURAL & CIVIL ENGINEERS 583 DARLING STREET ROZELE NSW 2039 tel: (02) 9555 7230 email : office@birzulisassociates.com www.birzulisassociates.com			
PROJECT LINDFIELD LEARNING VILLAGE STAGE 2 & 3			
TITLE CONSTRUCTION NOTES			
SCALES	N/A @ A1		DATE MAY 2020
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG
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ISSUE 4	PROJECT No. 7576	DRAWING No. C.201	

CONTINUE ON INSET PLAN A



INSET PLAN A

ISSUE	DESCRIPTION	APPROVED	DATE
4	DRAWING REVISED	CA	22/12/20
3	DRAWING REVISED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20

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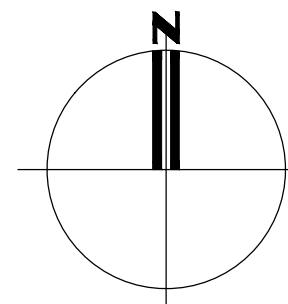
PROJECT

**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE

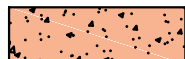
**ELEVATED DRIVEWAY
OVERALL SITE LAYOUT**

SCALES	as noted @ A1	DATE	MAY 2020
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG
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ISSUE 4	PROJECT No. 7576	DRAWING No. C.202	

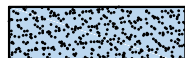


LEGEND:

- 
- PROPOSED NEW ROAD PAVEMENT



PROPOSED NEW FOOTPATH PAVEMENT



PROPOSED NEW DECOMPOSED GRANITE PAVEMENT



PROPOSED CONCRETE FIRE TRAIL PAVEMENT

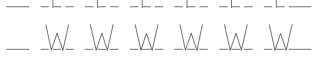


PROPOSED NEW ELEVATED ROAD

EXISTING LEGEND:

- 

EXISTING ROAD PAVEMENT TO BE DEMOLISHED
- 

CUT INTO EXISTING PAVEMENT
- 

LINE OF DEMOLISHED
- 

PROPOSED KERB AND GUTTER
- 

PROPOSED KERB ONLY
- 

PROPOSED V DRAIN
- 

PROPOSED SANDSTONE LOG WALL
- 

PROPOSED RC BLOCK RETAINING WALL
- 

PROPOSED BATTER
- 

PROPOSED GRATED DRAIN
- 

PROPOSED KERB INLET PIT
- 

PROPOSED HEADWALL
- 

PROPOSED STORMWATER
- 

PROPOSED BIO RETENSION BASIN
- 

PROPOSED SWALE



EXISTING ELECTRICAL MAINS LINE



EXISTING GAS LINE



EXISTING SEWER LINE



EXISTING TELSTRA LINES



EXISTING WATER LINE



EXISTING RISING MAIN



EXISTING OPT-FIBRE



EXISTING OPTUS



EXISTING EFFLUENT RISING MAIN



EXISTING INFLUENT RISING MAIN

3	LEGEND LINE UPDATED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

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PROJECT

LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

TITLE

LEGENDS AND SYMBOLS

SCALES

N/A @ A1

DATE

MAY 2020

DRAWN

DG

DESIGN

DG

VERIFIED

CA

APPROVED

MG

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ISSUE

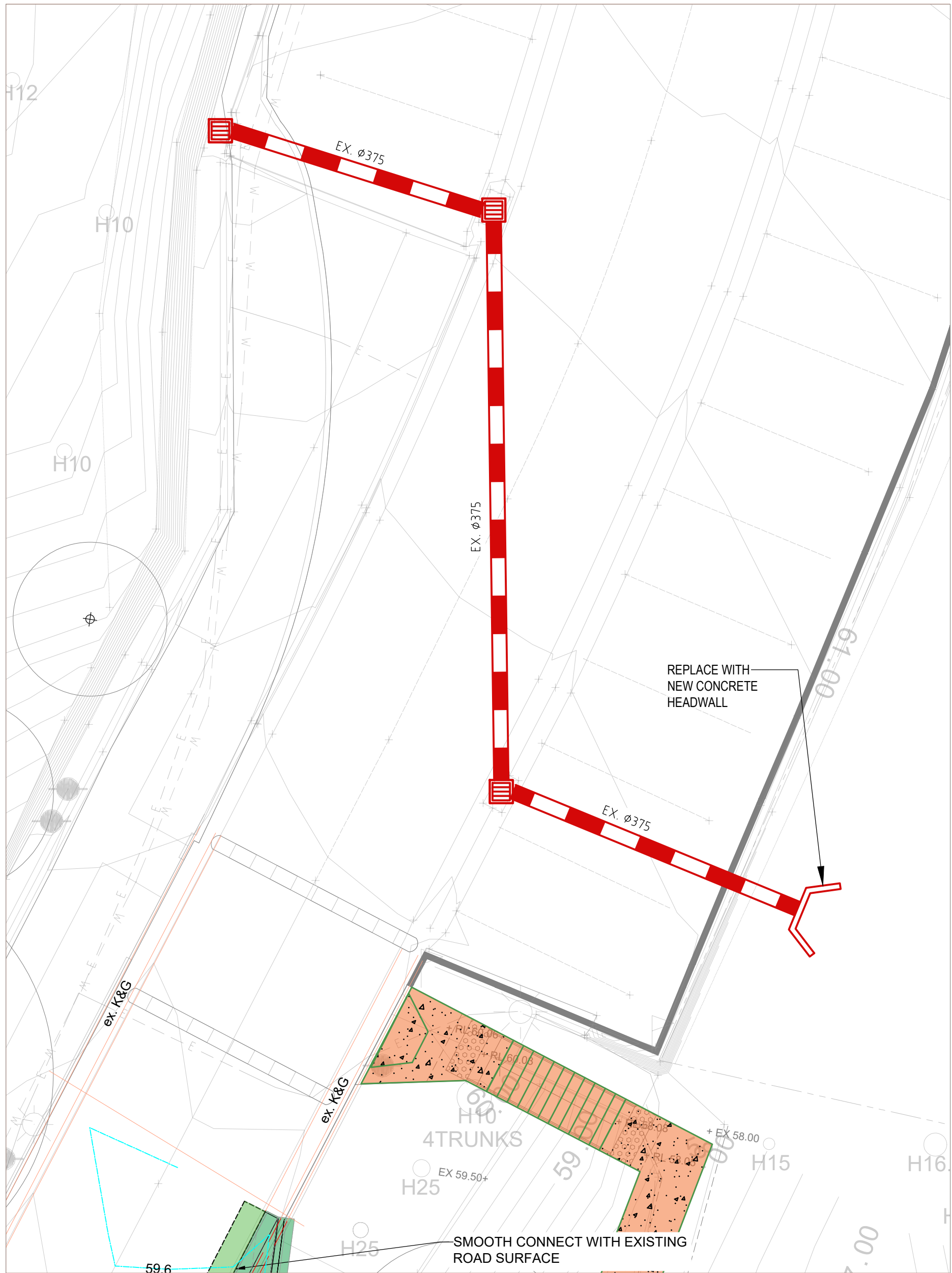
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PROJECT No.

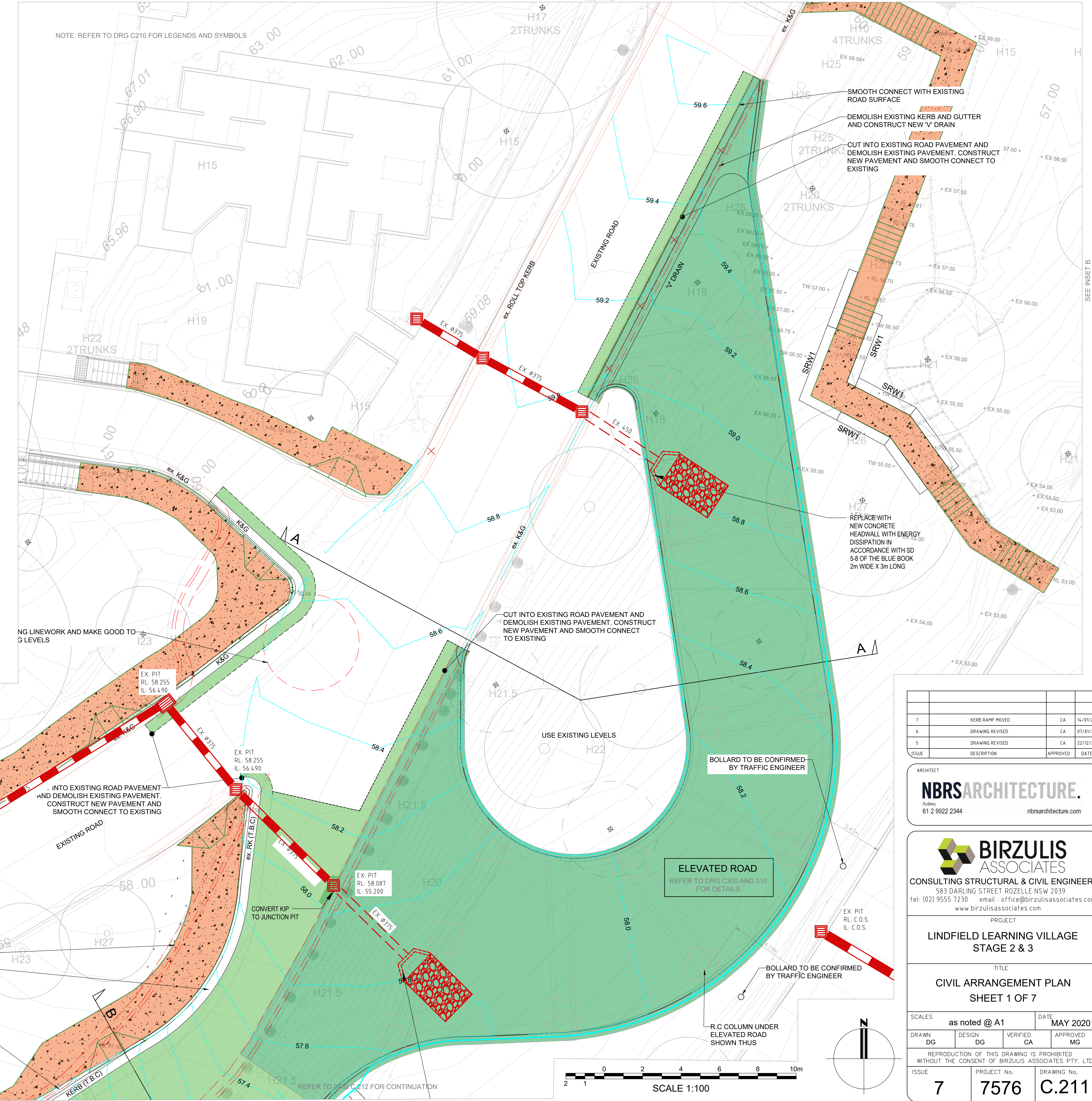
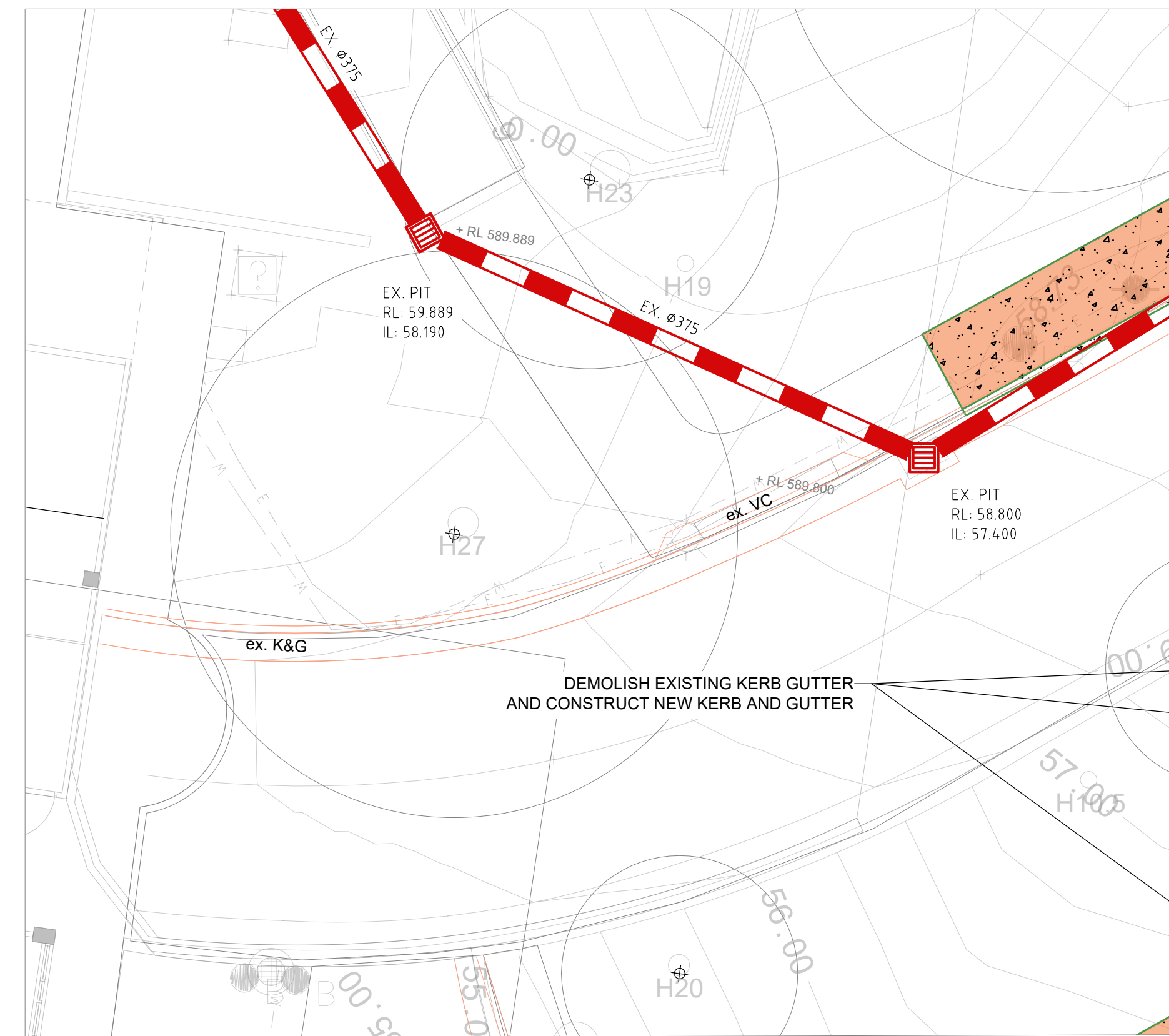
7576

DRAWING No.

C.210



INSET A



ISSUE	DESCRIPTION	APPROVED	DATE
7	KERB RAMP MOVED	CA	14/01/21
6	DRAWING REVISED	CA	07/01/21
5	DRAWING REVISED	CA	22/12/20

ARCHITECT
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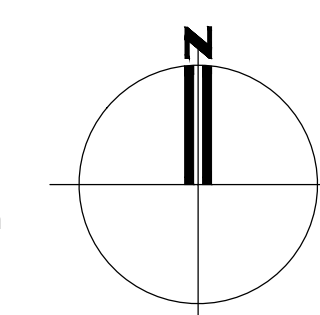
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PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
**CIVIL ARRANGEMENT PLAN
SHEET 1 OF 7**

SCALES	as noted @ A1	DATE	MAY 2020
DRAWN	DG	DESIGN	DG
VERIFIED	CA	APPROVED	MG

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ISSUE	PROJECT No.	DRAWING No.
7	7576	C.211



7	SECTION D-D ADDED	EA	11/02/21
6	DRAWING REVISED	CA	07/01/21
5	DRAWING REVISED	CA	22/10/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT



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PROJECT

LINDFIELD LEARNING VILLAGE

STAGE 2 & 3

TITLE

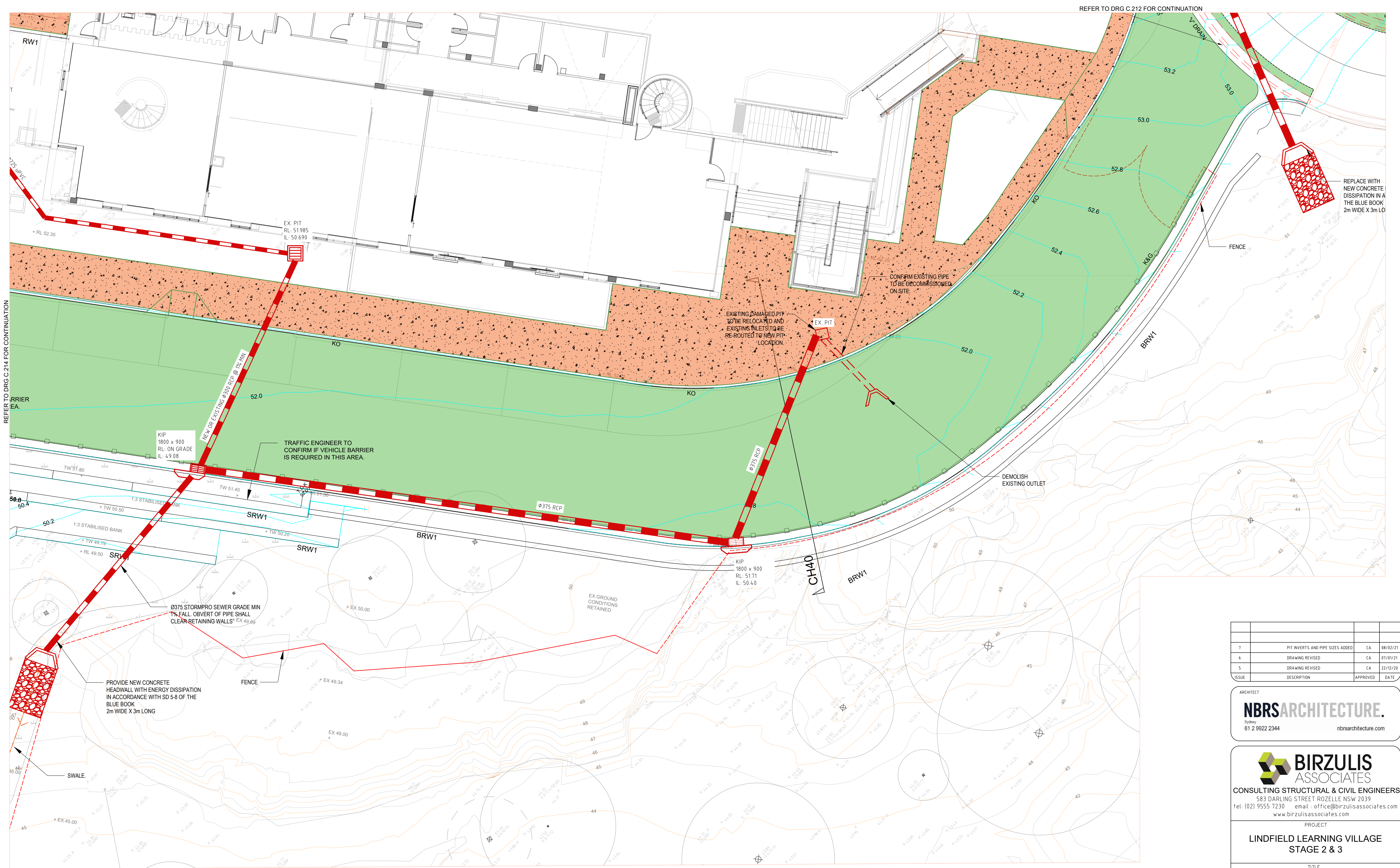
CIVIL ARRANGEMENT PLAN

SHEET 2 OF 7

SCALES			DATE MAY 2020
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG

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ISSUE 7	PROJECT No. 7576	DRAWING No. C.212
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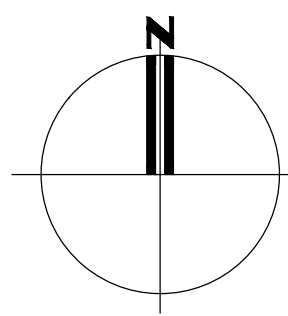
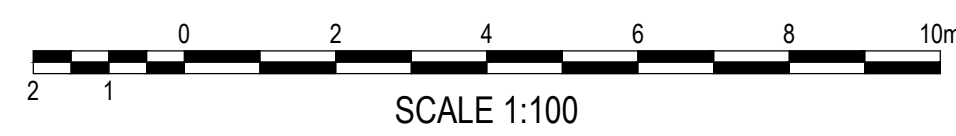


REFER TO DRG C.214 FOR CONTINUATION

REFER TO DRG C.212 FOR CONTINUATION

REFER TO DRG C.215 FOR CONTINUATION

NOTE: REFER TO DRG C.210 FOR LEGENDS AND SYMBOLS



ISSUE	DESCRIPTION	APPROVED	DATE
7	PIT INVERTS AND PIPE SIZES ADDED	CA	08/02/21
6	DRAWING REVISED	CA	07/01/21
5	DRAWING REVISED	CA	22/12/20

ARCHITECT

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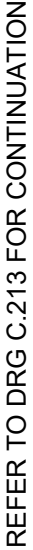
PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
**CIVIL ARRANGEMENT PLAN
SHEET 3 OF 7**

SCALES		DATE	
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG

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ISSUE	PROJECT No.	DRAWING No.
7	7576	C.213



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PROJECT
LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

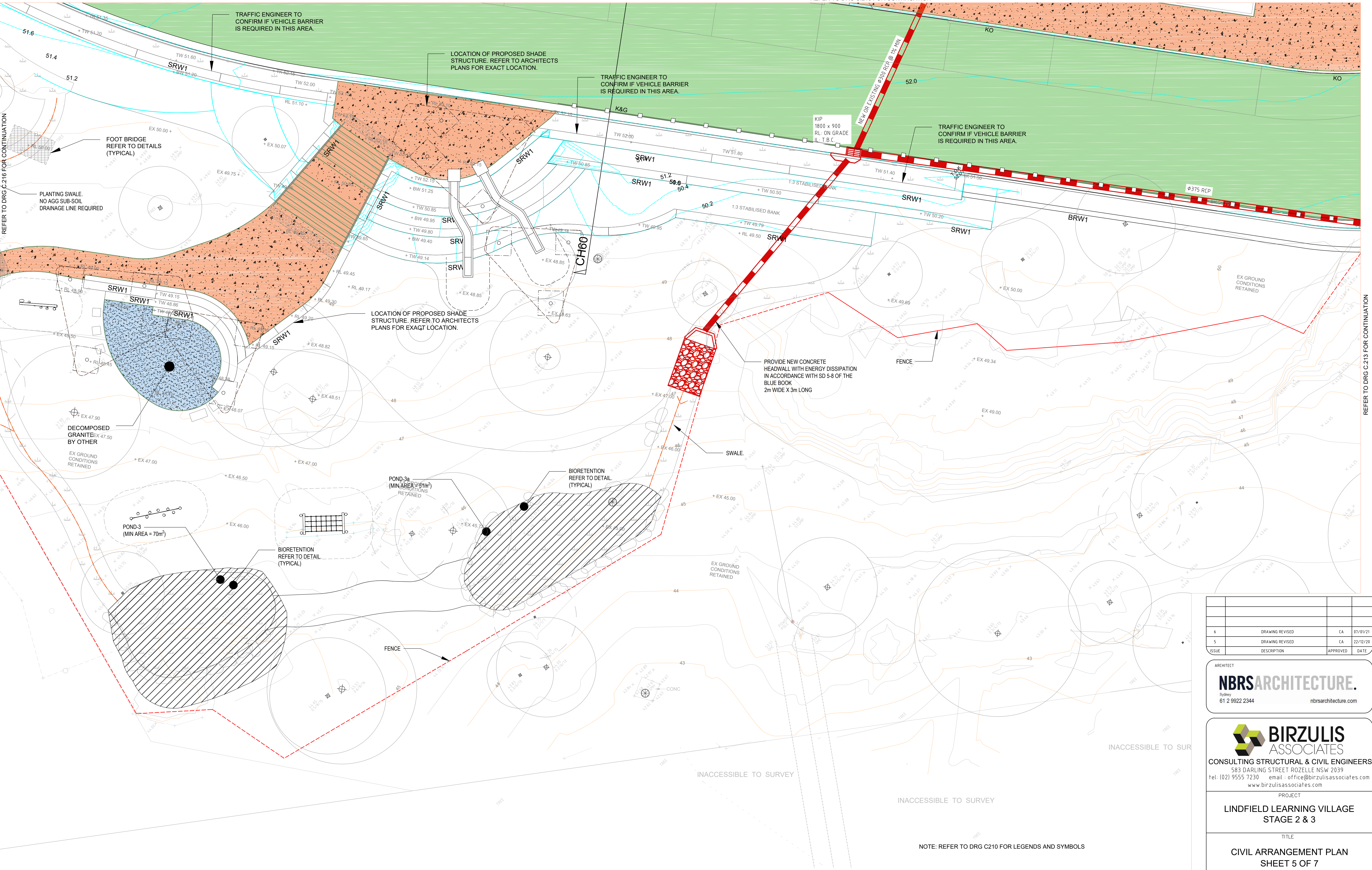
TITLE
CIVIL ARRANGEMENT PLAN
SHEET 4 OF 7

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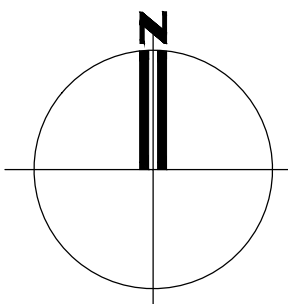
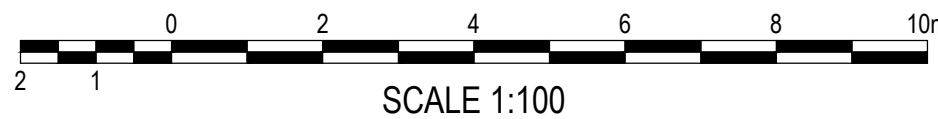
ISSUE 7	PROJECT No. 7576	DRAWING No. C.214
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REFER TO DRG C.214 FOR CONTINUATION

REFER TO DRG C.213 FOR CONTINUATION



NOTE: REFER TO DRG C210 FOR LEGENDS AND SYMBOLS



6	DRAWING REVISED	CA	07/01/21
5	DRAWING REVISED	CA	22/12/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT
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PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
**CIVIL ARRANGEMENT PLAN
SHEET 5 OF 7**

SCALES		DATE	
DRAWN	DESIGN	VERIFIED	APPROVED
DG	DG	CA	MG

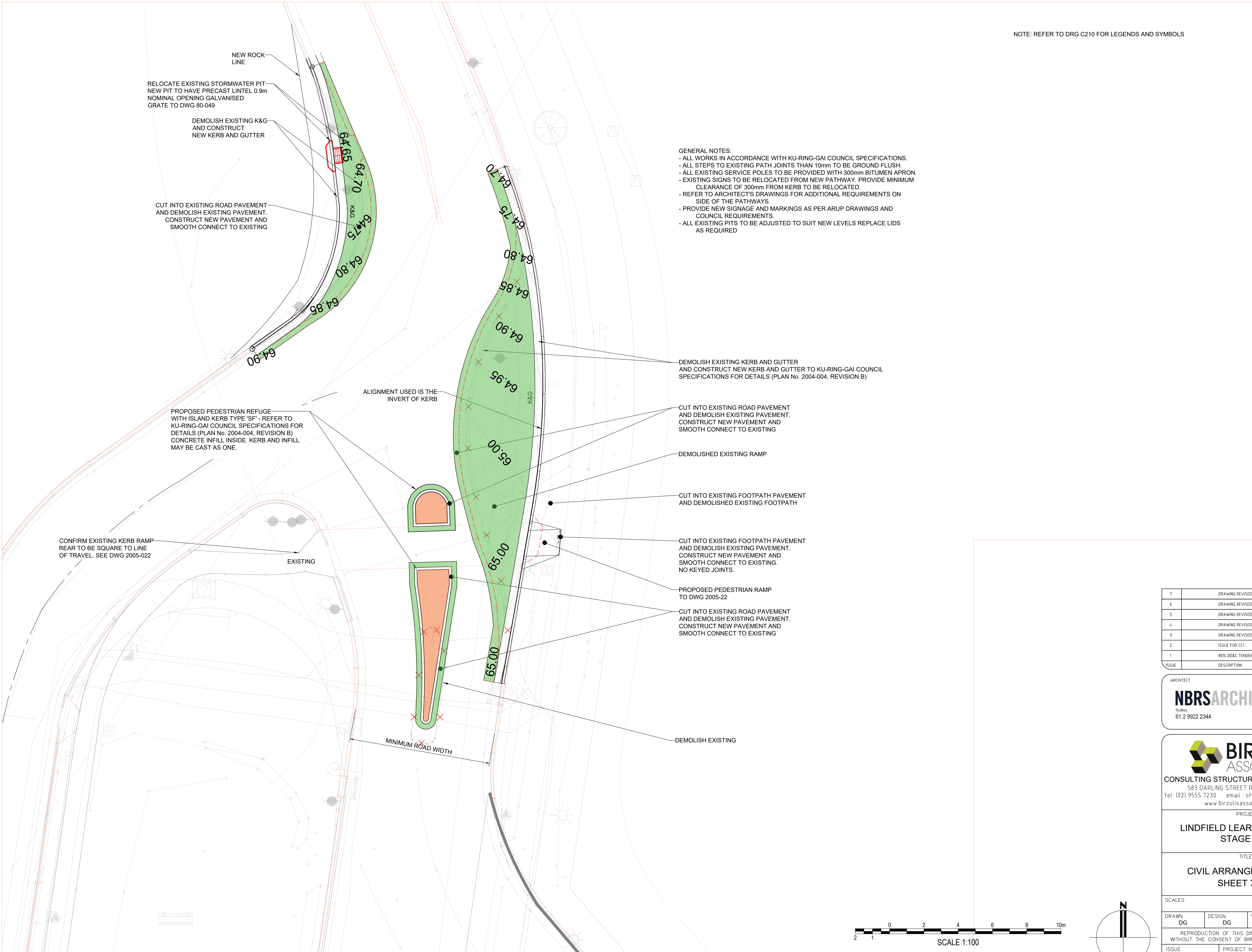
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ISSUE	PROJECT No.	DRAWING No.
6	7576	C.215

REFER TO DRG C.218 FOR CONTINUATION

REFER TO DRG C.214 FOR CONTINUATION





NOTE: REFER TO DRG C210 FOR LEGENDS AND SYMBOLS

7	DRAWING REVISED	CA	23/12/20
6	DRAWING REVISED	CA	22/12/20
5	DRAWING REVISED	CA	02/12/20
4	DRAWING REVISED	CA	18/11/20
3	DRAWING REVISED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DOB&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

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PROJECT

**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE

**CIVIL ARRANGEMENT PLAN
SHEET 7 OF 7**

SCALES			DATE
			MAY 2020
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ISSUE 7	PROJECT No. 7576	DRAWING No. C.217	





NOTE: REFER TO DRG C210 FOR LEGENDS AND SYMBOLS

5	DRAWING REVISED	CA	20/01/21
4	DRAWING REVISED	CA	01/01/21
3	DRAWING REVISED	CA	22/12/20
2	ISSUE FOR INFORMATION	CA	26/11/20
1	ISSUE FOR INFORMATION	CA	06/11/20
ISSUE	DESCRIPTION	APPROVED	DATE

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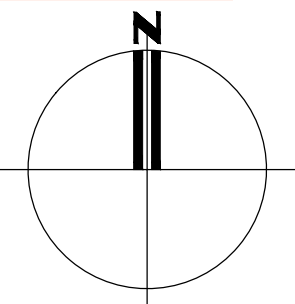
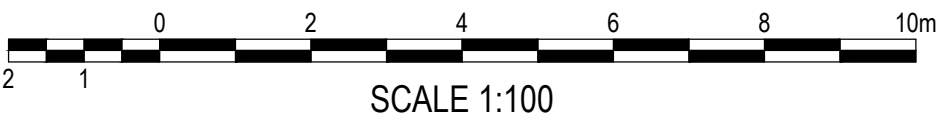
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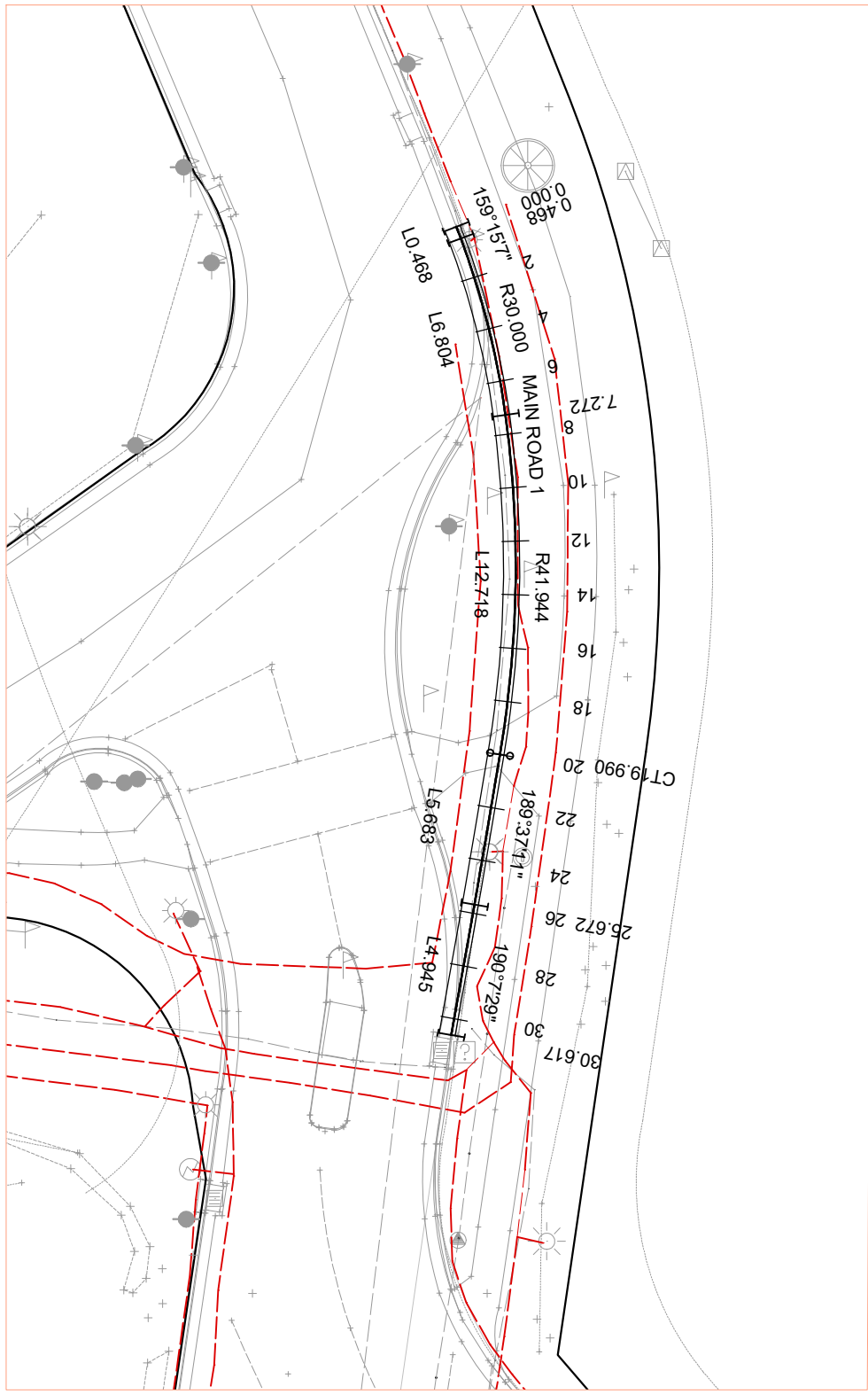
LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

TITLE

CIVIL ARRANGEMENT PLAN
SHEET 9 OF 9

SCALES			DATE
			MAY 2020
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ISSUE	PROJECT No.	DRAWING No.	
5	7576	C.219	





INSET PLAN



4	ISSUE FOR INFORMATION	CA	18/11/20
3	ISSUE FOR INFORMATION	CA	13/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% D&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

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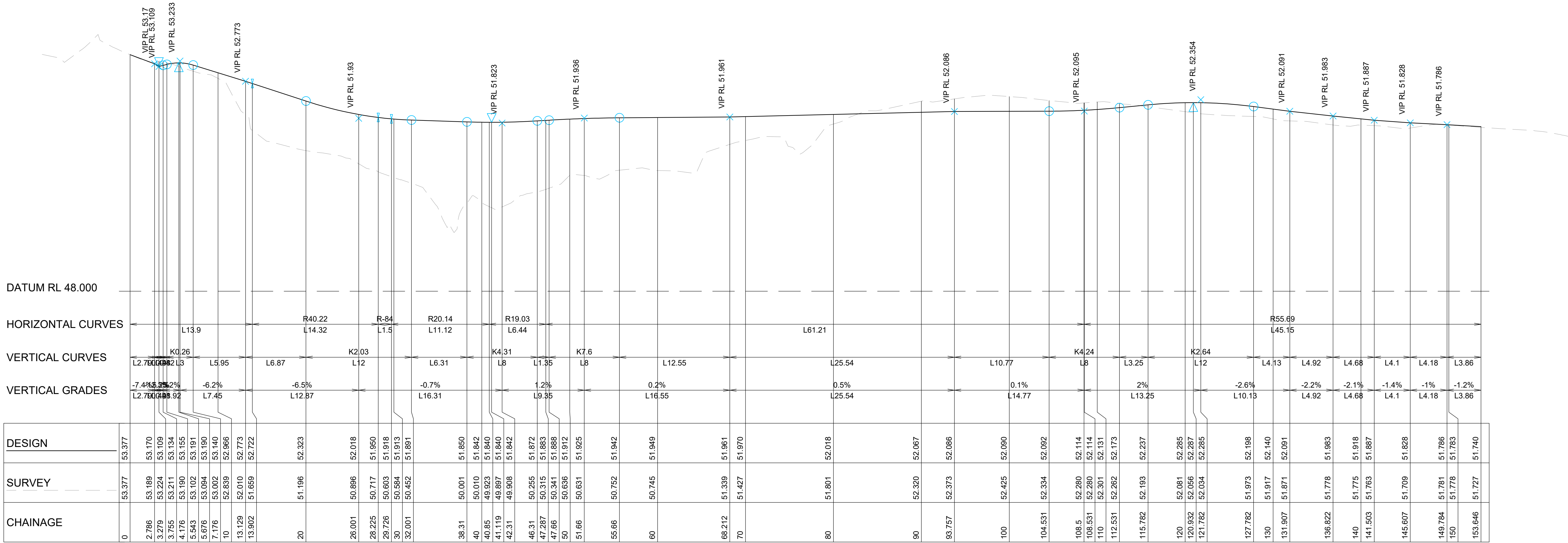
PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
**ELEVATED DRIVEWAY
ALIGNMENT PLAN**

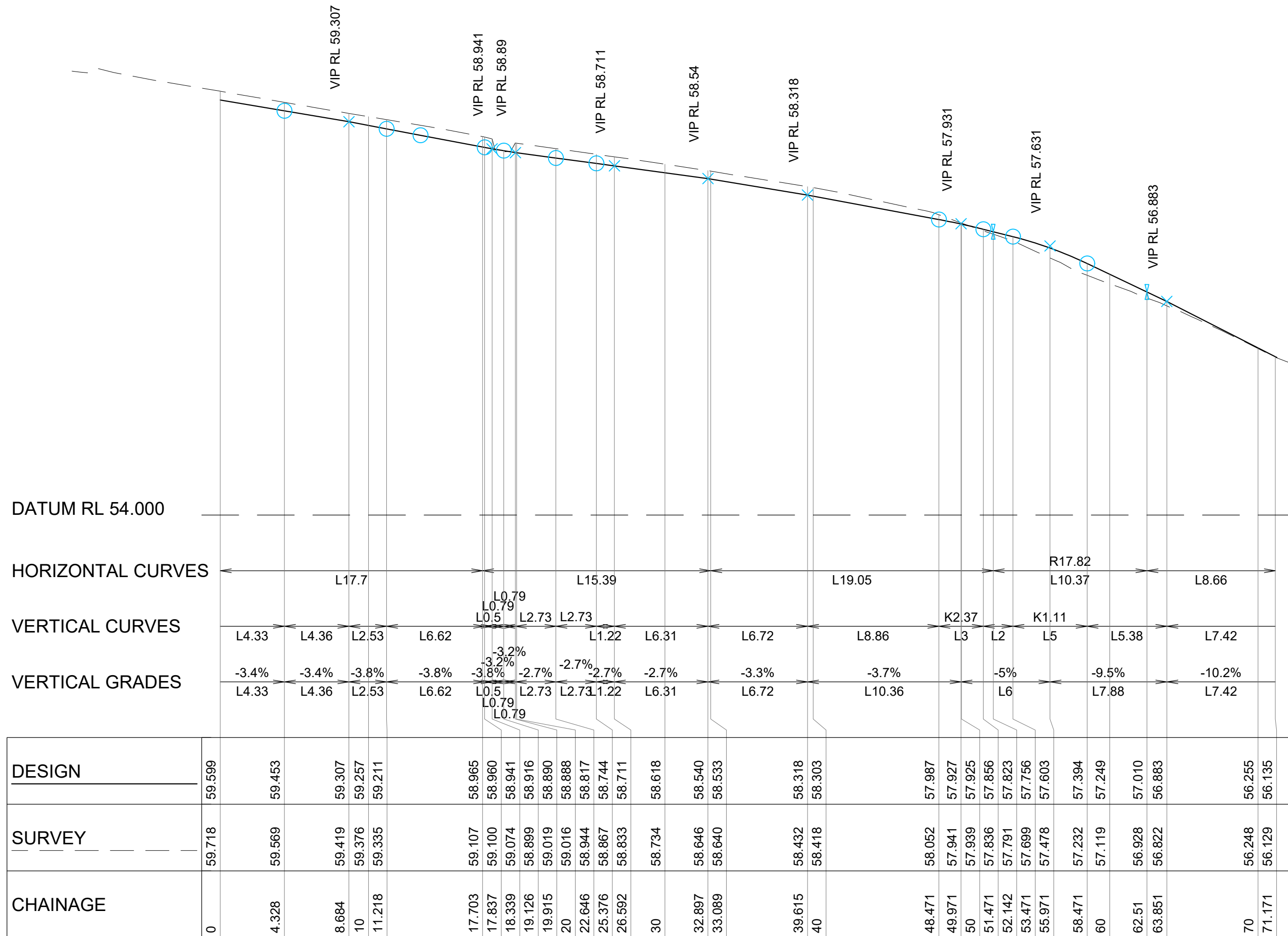
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DRAWN	DESIGN	VERIFIED	APPROVED
DG	DG	CA	MG

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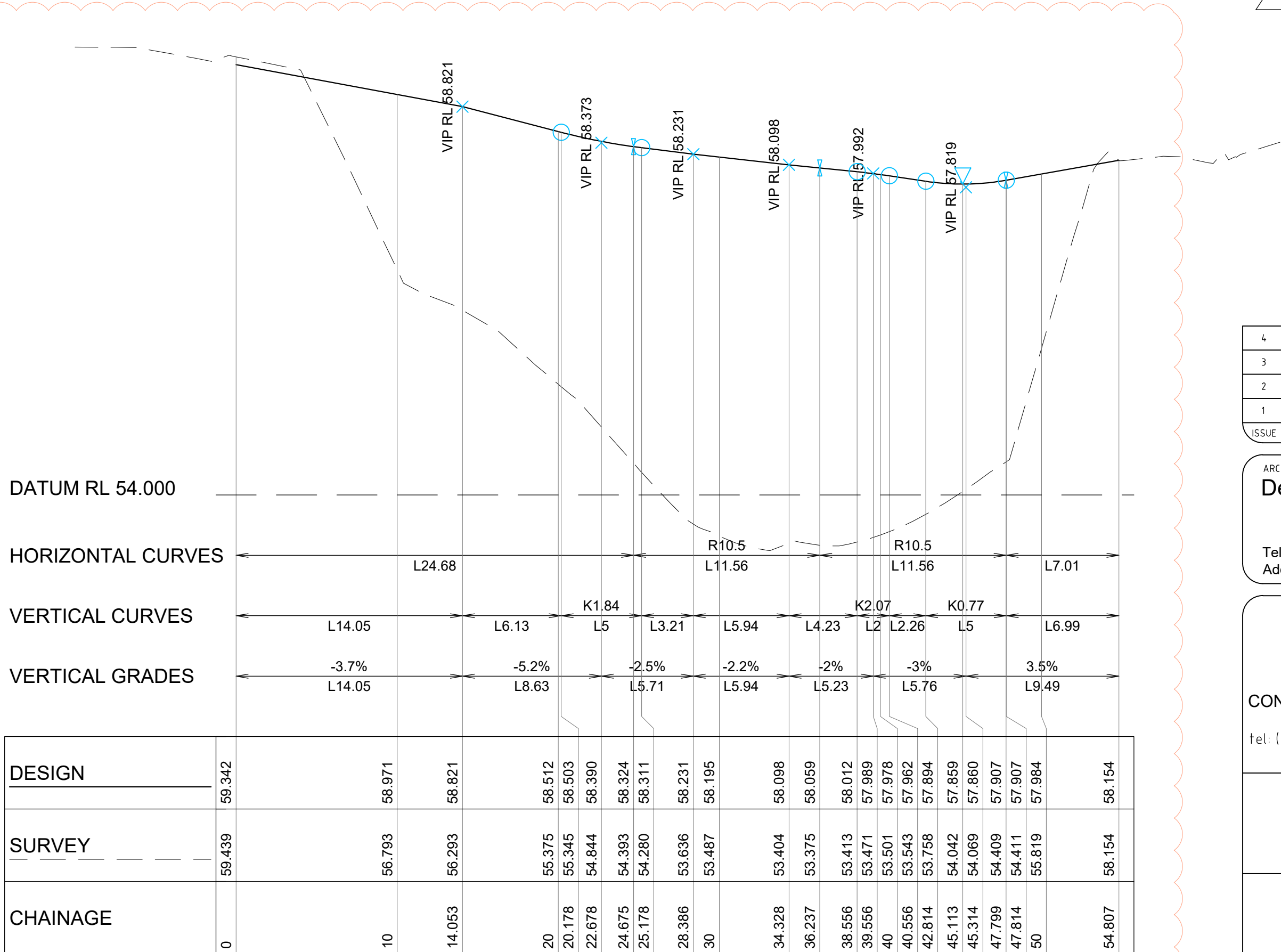
ISSUE	PROJECT No.	DRAWING No.
4	7576	C.220



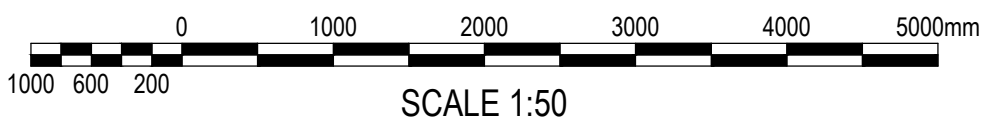
ALX ROAD 2 - LONGITUDINAL SECTION
A1 HORZ SCALE 1:250
A1 VERT SCALE 1:50



ALX ROAD 1 - LONGITUDINAL SECTION
A1 HORZ SCALE 1:250
A1 VERT SCALE 1:50



ALX ROAD 1b - LONGITUDINAL SECTION
A1 HORZ SCALE 1:250
A1 VERT SCALE 1:50



4	ISSUE FOR INFORMATION	CA	18/11/20
3	ISSUE FOR INFORMATION	CA	13/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

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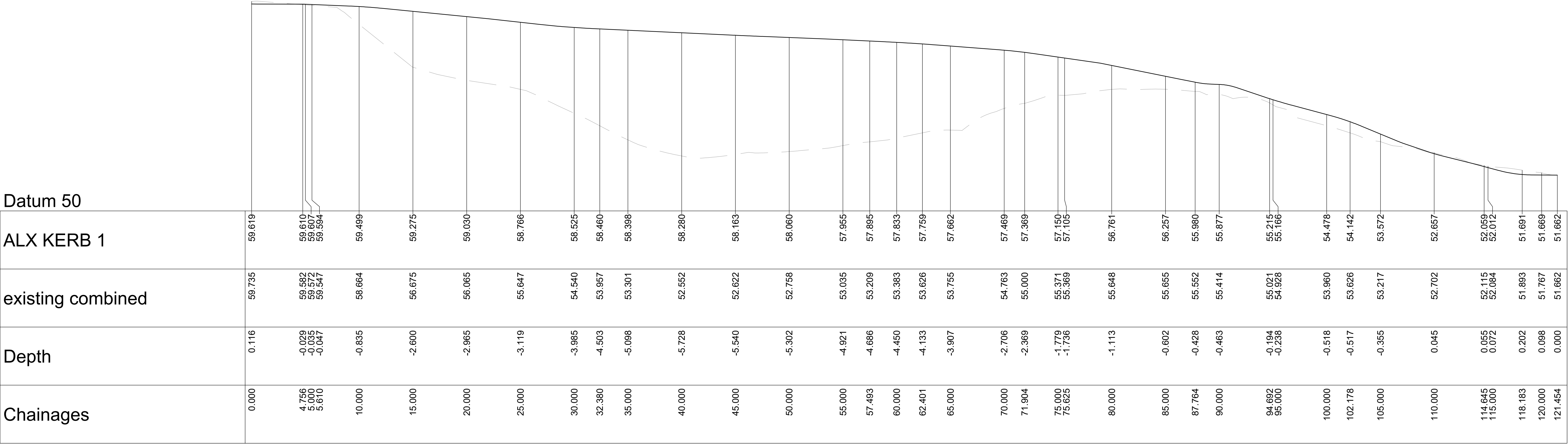
PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
ROAD 1 AND 2 LONG SECTION

SCALES		DATE MAY 2020	
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG

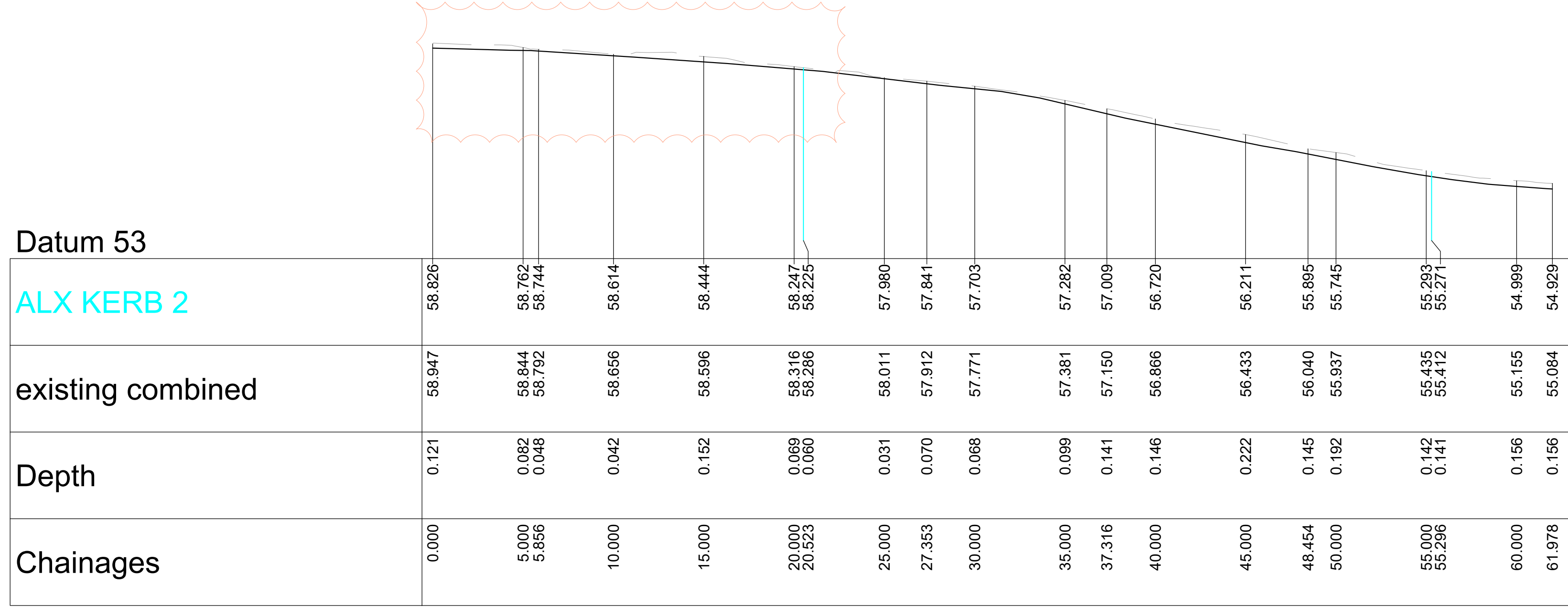
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ISSUE 4	PROJECT No. 7576	DRAWING No. C.221
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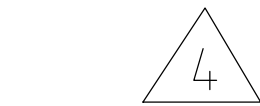
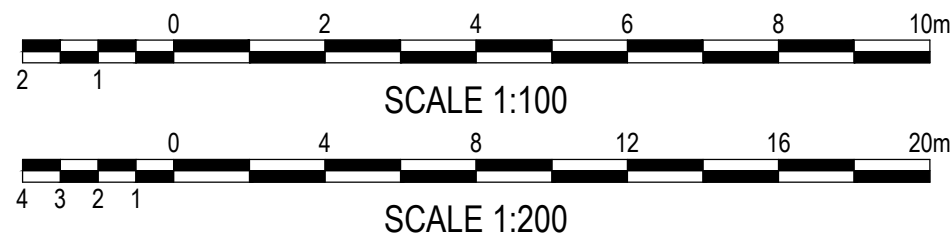


SCALE HORIZONTAL 1:200
SCALE VERTICAL 1:100

FINAL SURVEY ON SITE
PRIOR TO CONSTRUCTION



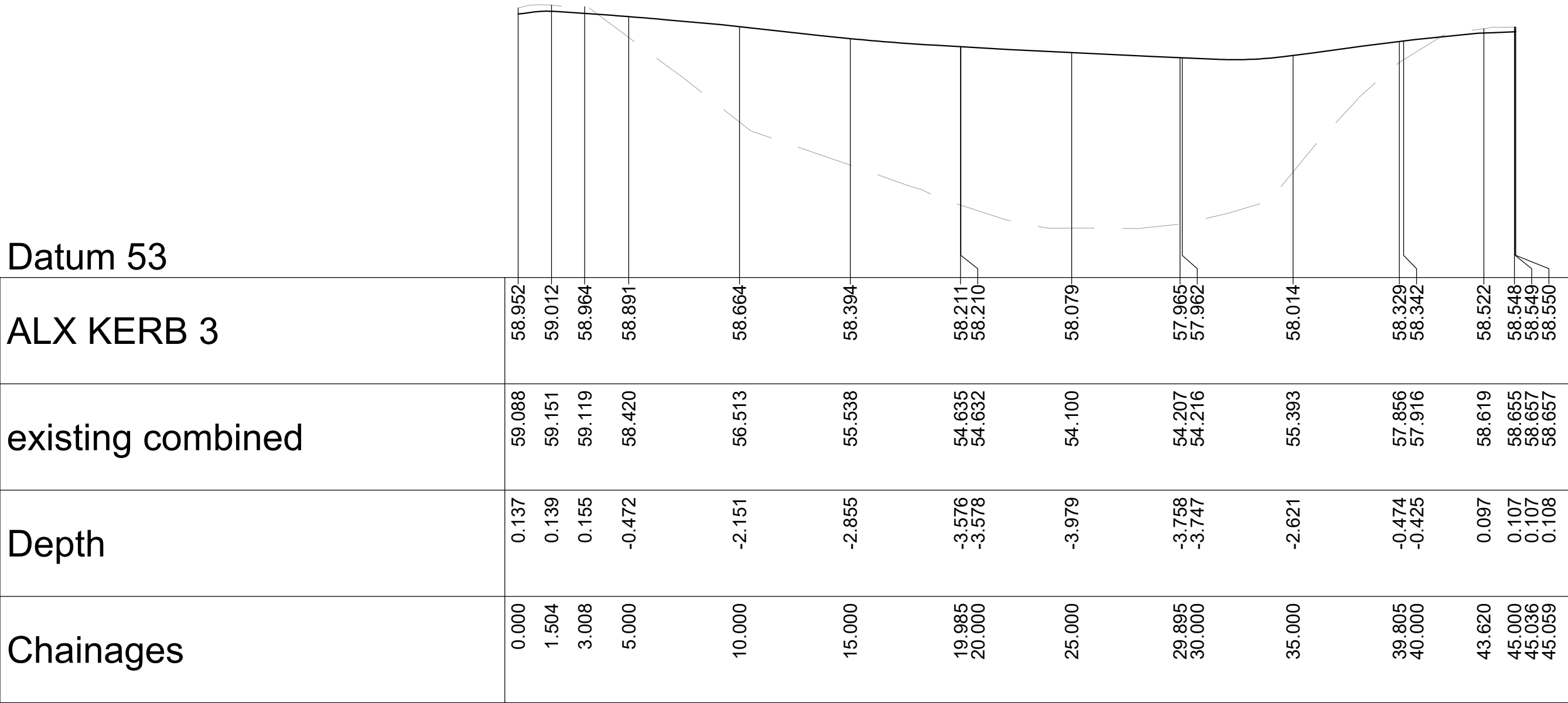
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SCALE VERTICAL 1:100



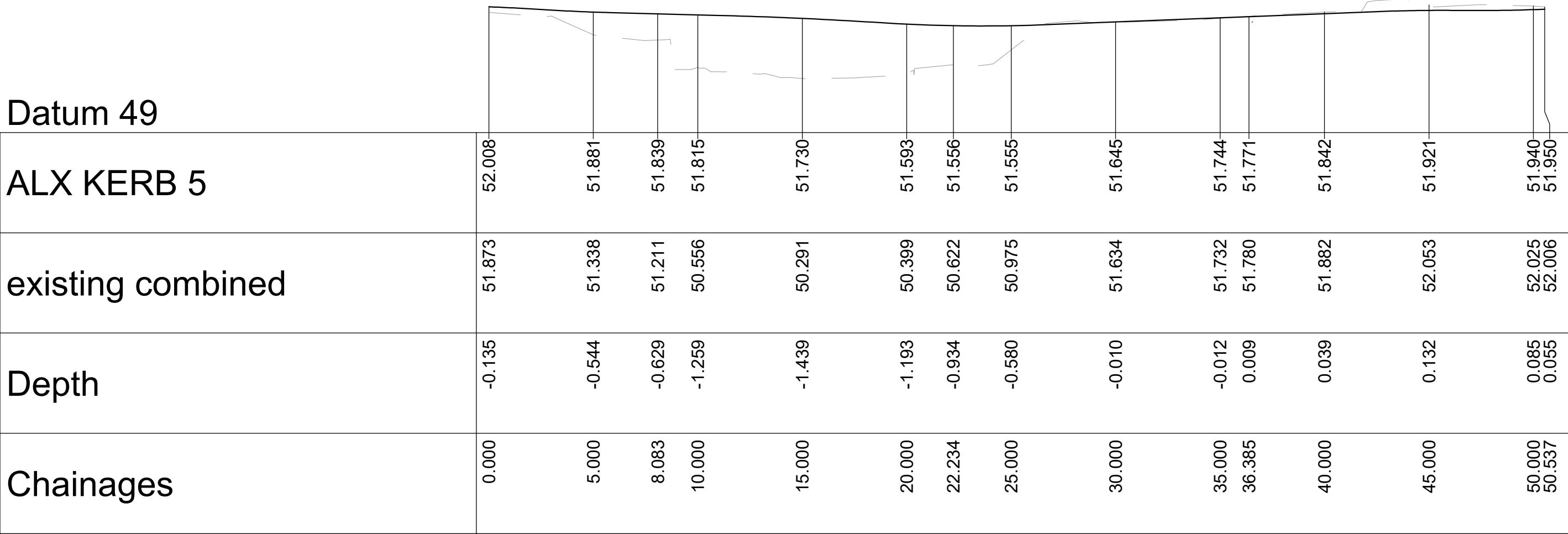
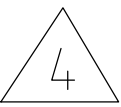
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3	ISSUE FOR INFORMATION	CA	13/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DOB&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT DesignInc Lacoste + Stevenson bmc2 Architects in association			
Telephone : (02) 8905 7100			
Address : L12/77 Pacific Highway, North Sydney NSW			

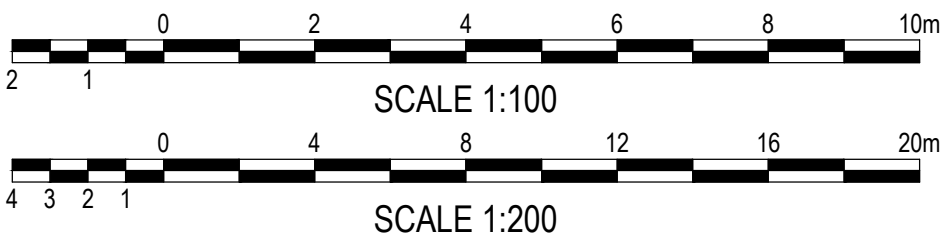
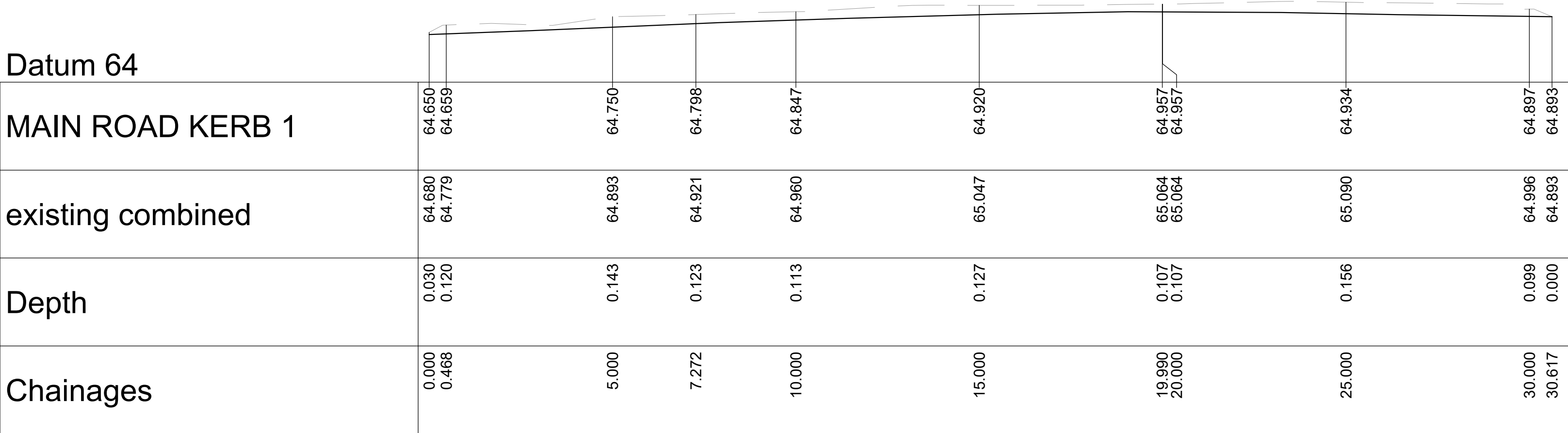
 BIRZULIS ASSOCIATES CONSULTING STRUCTURAL & CIVIL ENGINEERS 583 DARLING STREET ROZELLE NSW 2039 tel: (02) 9555 7230 email : office@birzulisassociates.com www.birzulisassociates.com			
PROJECT LINDFIELD LEARNING VILLAGE STAGE 2 & 3			
TITLE KERB LONG SECTION SHEET 1 OF 2			
SCALES			DATE MAY 2020
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG
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ISSUE 4	PROJECT No. 7576	DRAWING No. C.226	



SCALE HORIZONTAL 1:200
SCALE VERTICAL 1:100



SCALE HORIZONTAL 1:200
SCALE VERTICAL 1:100



4	ISSUE FOR INFORMATION	CA	18/11/20
3	ISSUE FOR INFORMATION	CA	13/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT

DesignInc Lacoste + Stevenson bmc2

Architects in association

Telephone : (02) 8905 7100

Address : L12/77 Pacific Highway, North Sydney NSW



BIRZULIS
ASSOCIATES

CONSULTING STRUCTURAL & CIVIL ENGINEERS

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tel: (02) 9555 7230 email : office@birzulisassociates.com

www.birzulisassociates.com

PROJECT

LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

TITLE

KERB LONG SECTION
SHEET 2 OF 2

SCALES

DATE
MAY 2020

DRAWN
DG

DESIGN
DG

VERIFIED
CA

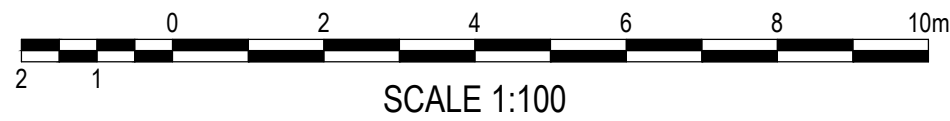
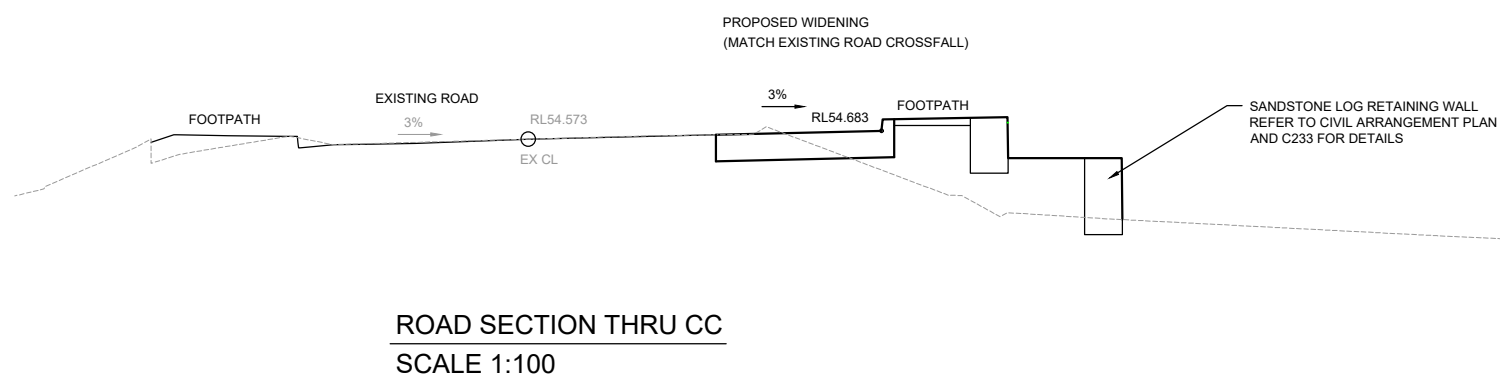
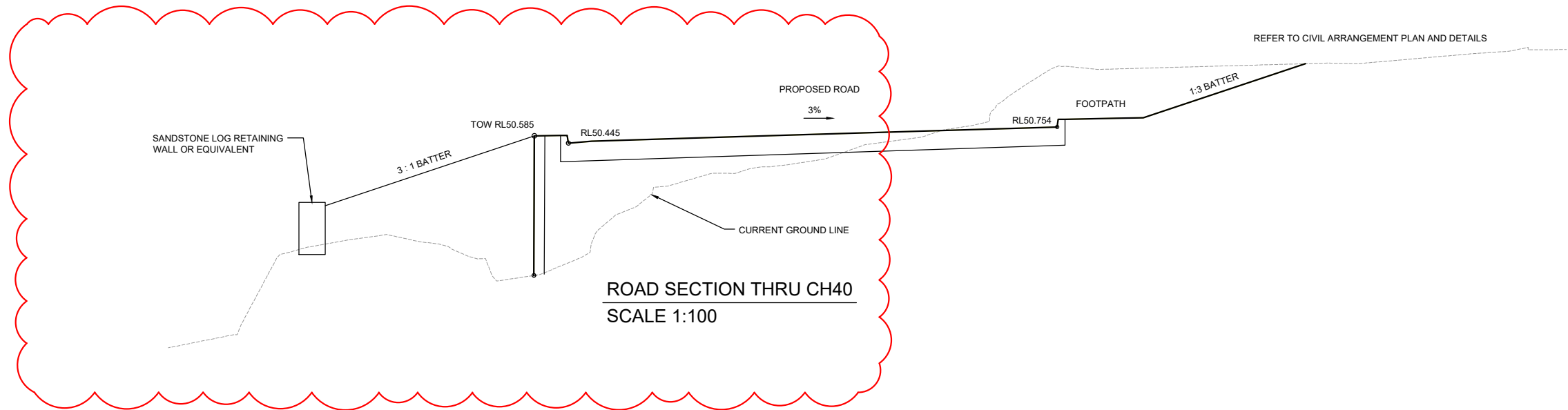
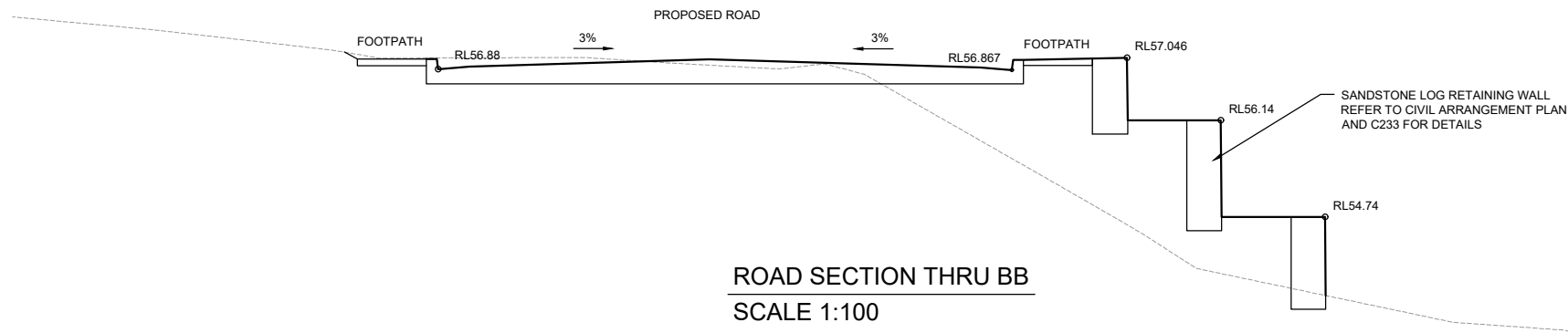
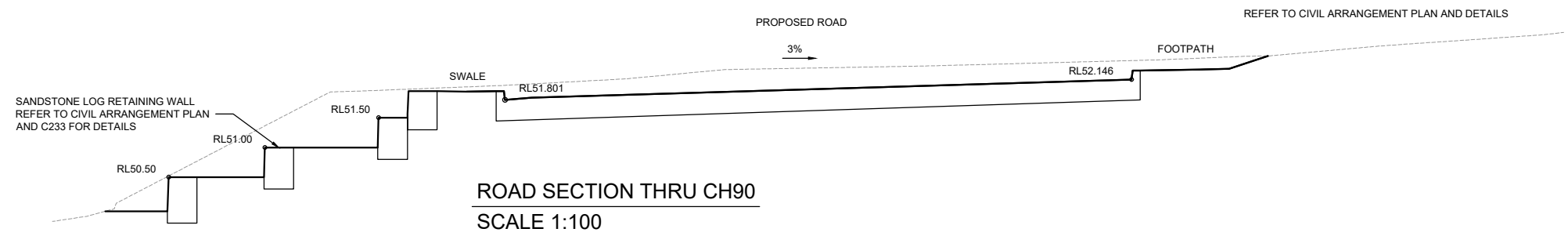
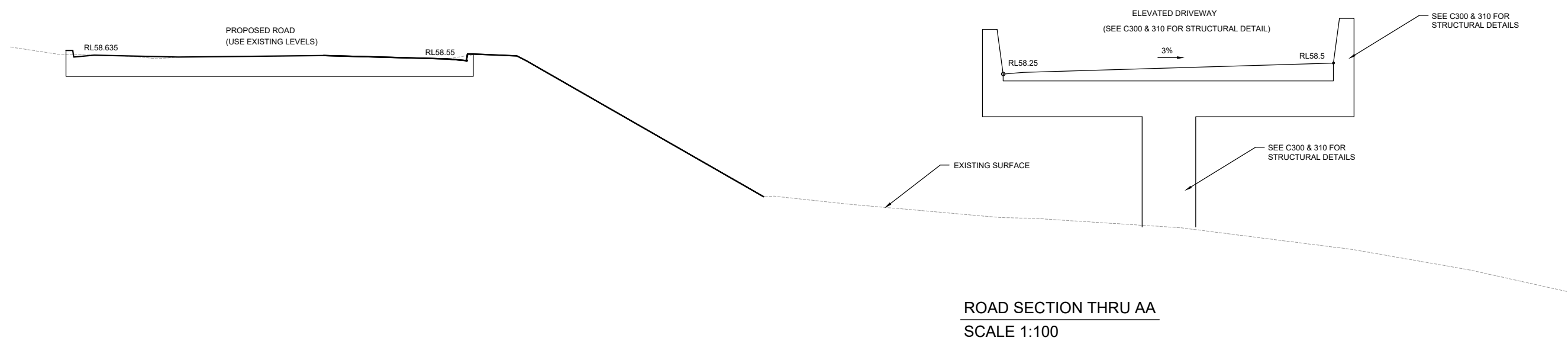
APPROVED
MG

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ISSUE
4

PROJECT No.
7576

DRAWING No.
C.227



2	ISSUE FOR CC1	CA	30/10/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT
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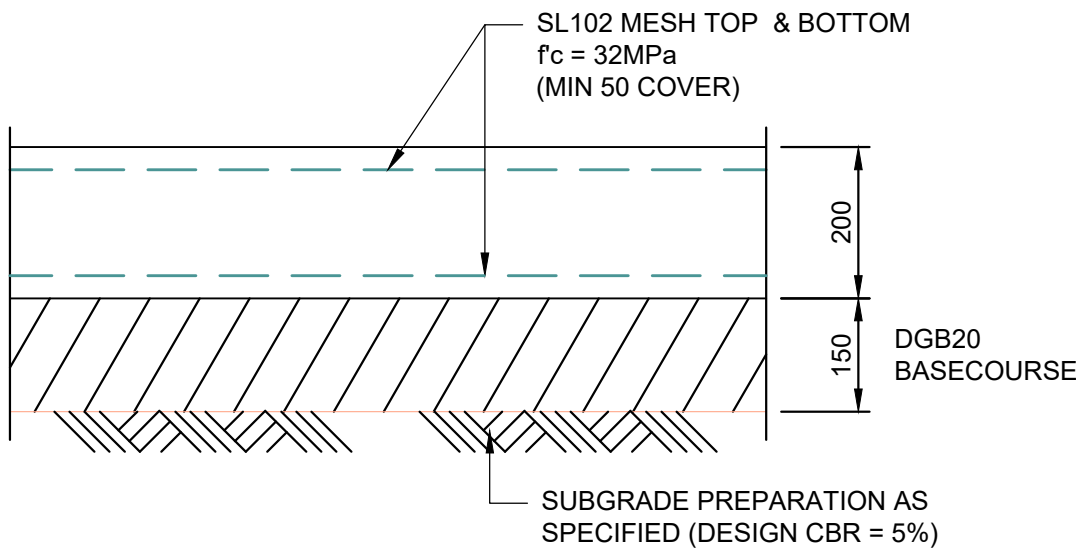
PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE
**TYPICAL ROAD
CROSS SECTION**

SCALES as noted @ A1		DATE MAY 2020	
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG

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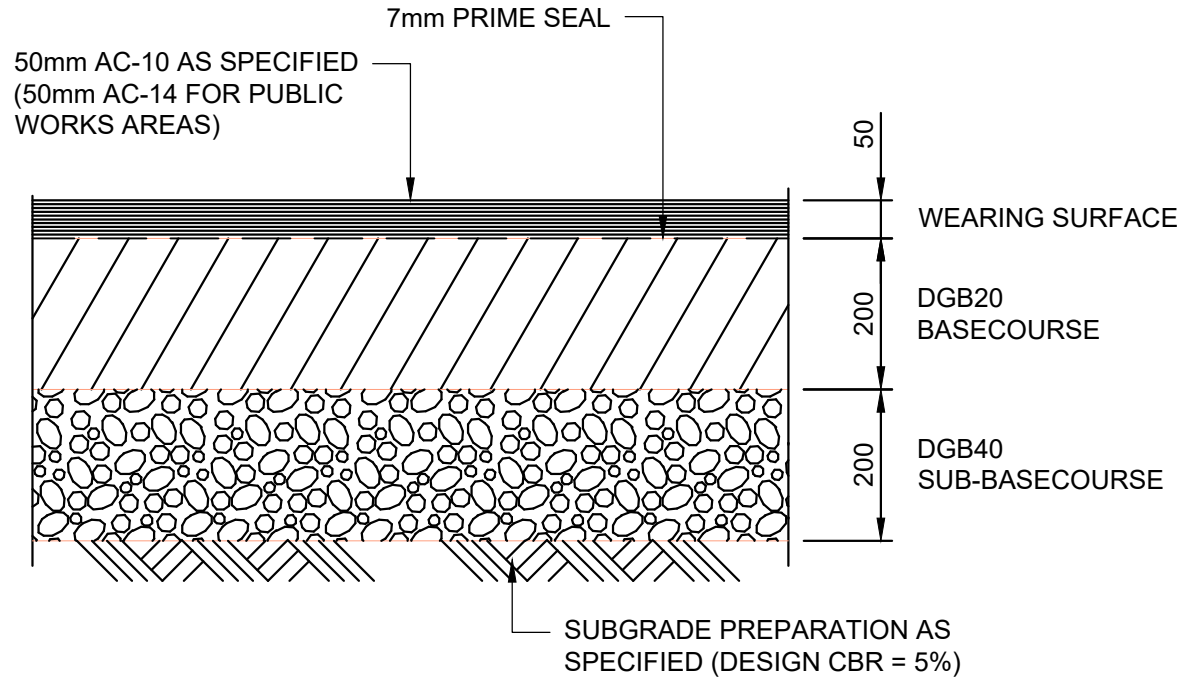
ISSUE 2	PROJECT No. 7576	DRAWING No. C.228
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TYPICAL CONCRETE FIRE TRAIL PAVEMENT SECTION

SCALE 1:10
DESIGN TRAFFIC LOADING = 5x10⁵ ESA

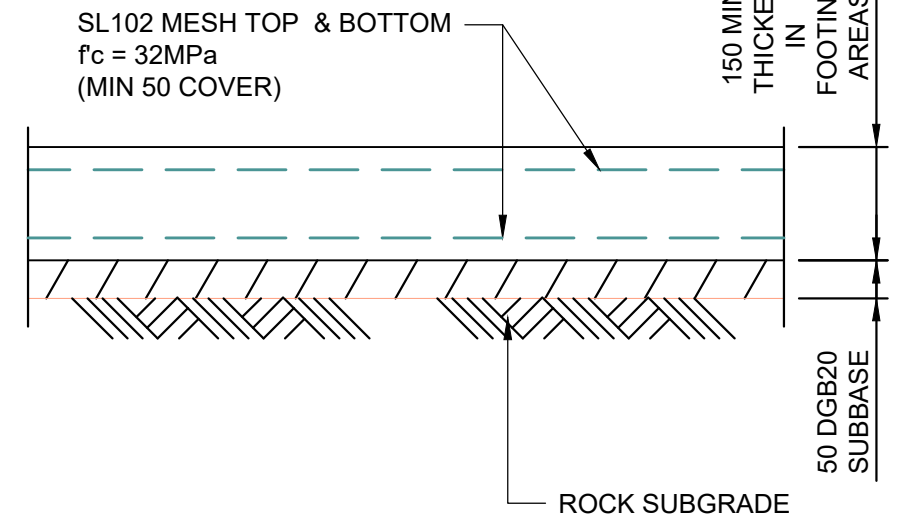
DENOTES ON PLAN



TYPICAL ASPHALTIC ROAD PAVEMENT SECTION

SCALE 1:10
DESIGN TRAFFIC LOADING = 5x10⁵ ESA

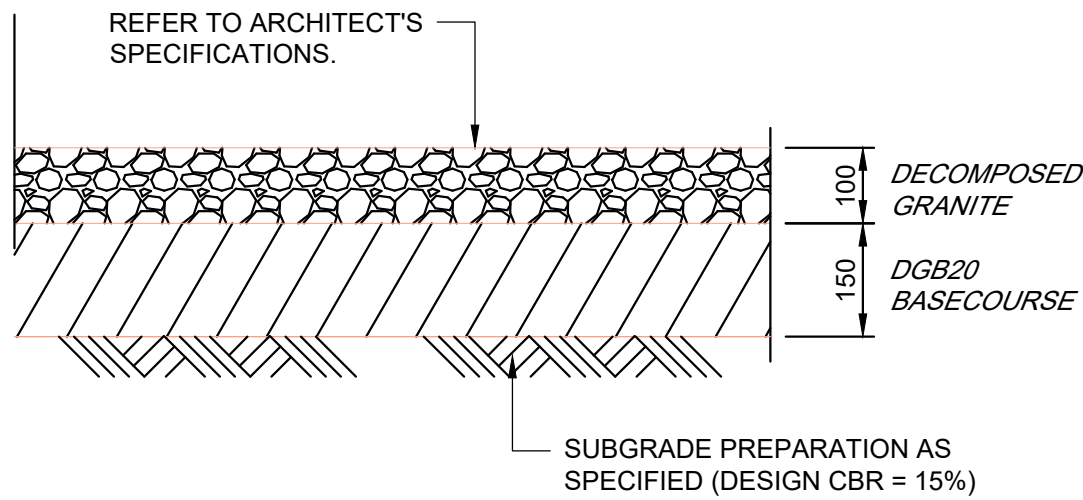
DENOTES ON PLAN



TYPICAL CONCRETE FIRE TRAIL PAVEMENT SECTION "OFF ROCK"

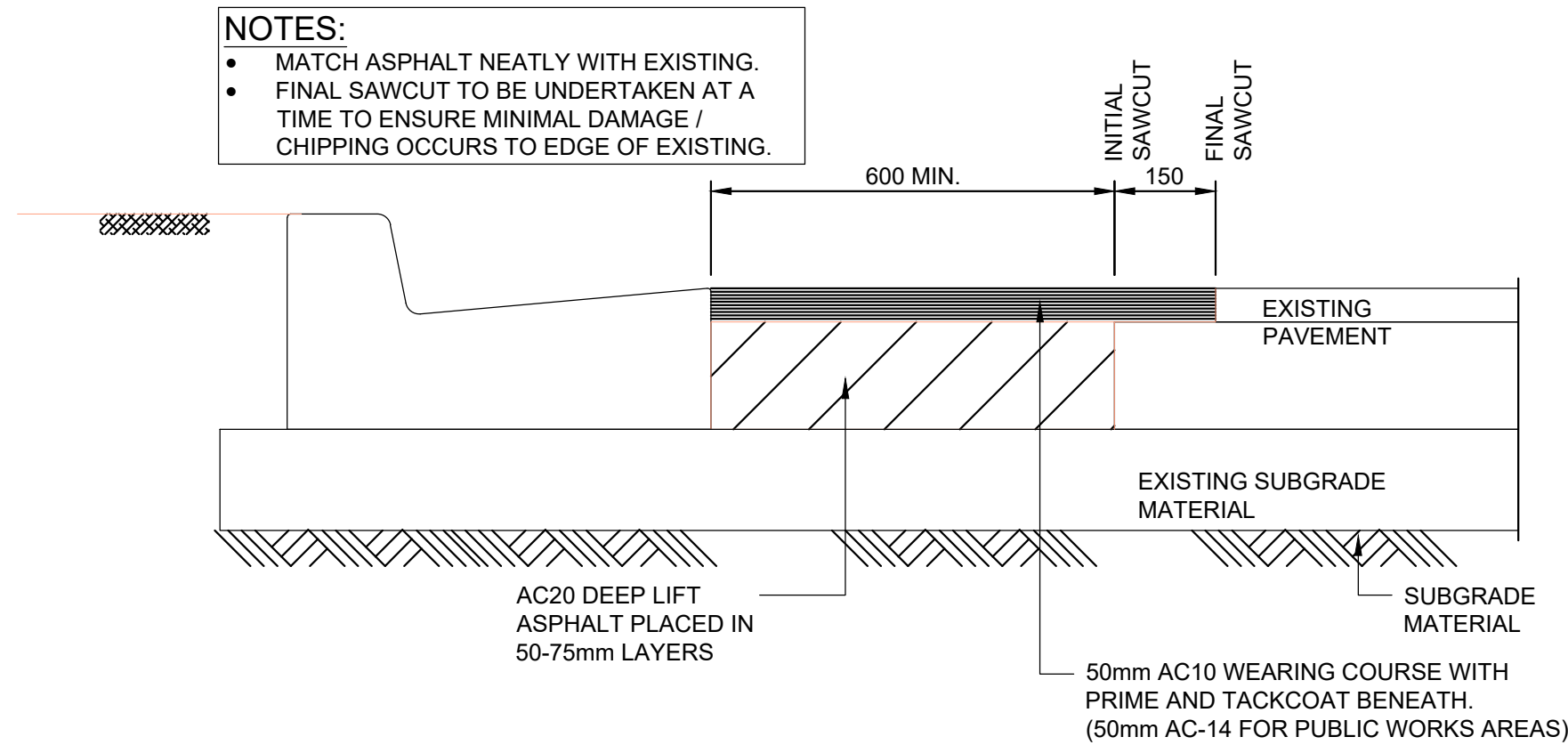
SCALE 1:10
DESIGN TRAFFIC LOADING = 5x10⁵ ESA

DENOTES ON PLAN



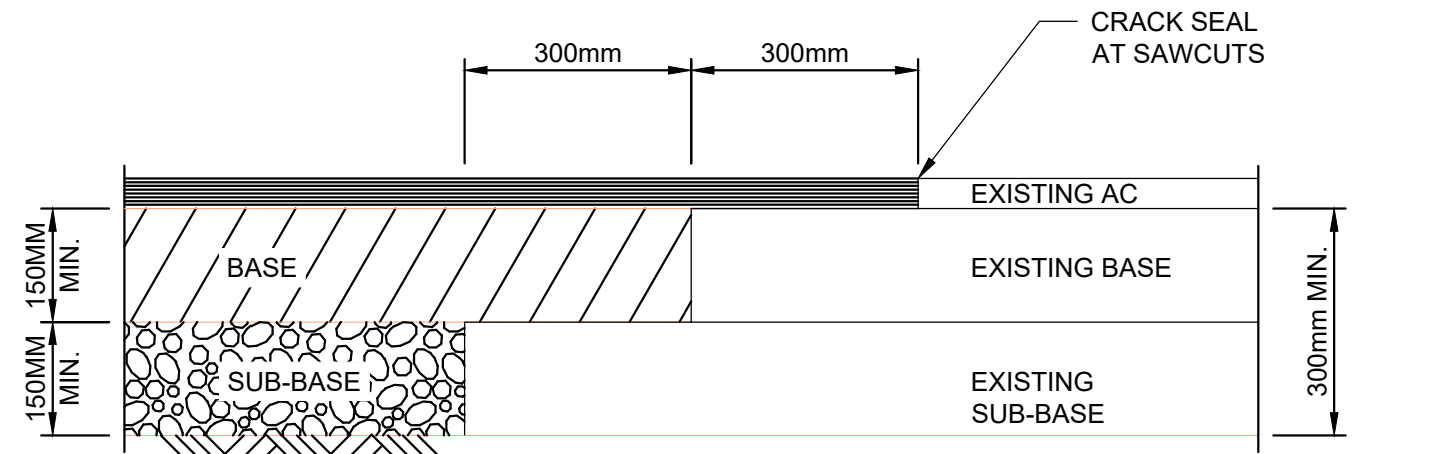
TYPICAL DECOMPOSED GRANITE PAVEMENT

SCALE 1:10
DENOTES ON PLAN



PAVEMENT INTERFACE REINSTATEMENT DETAIL

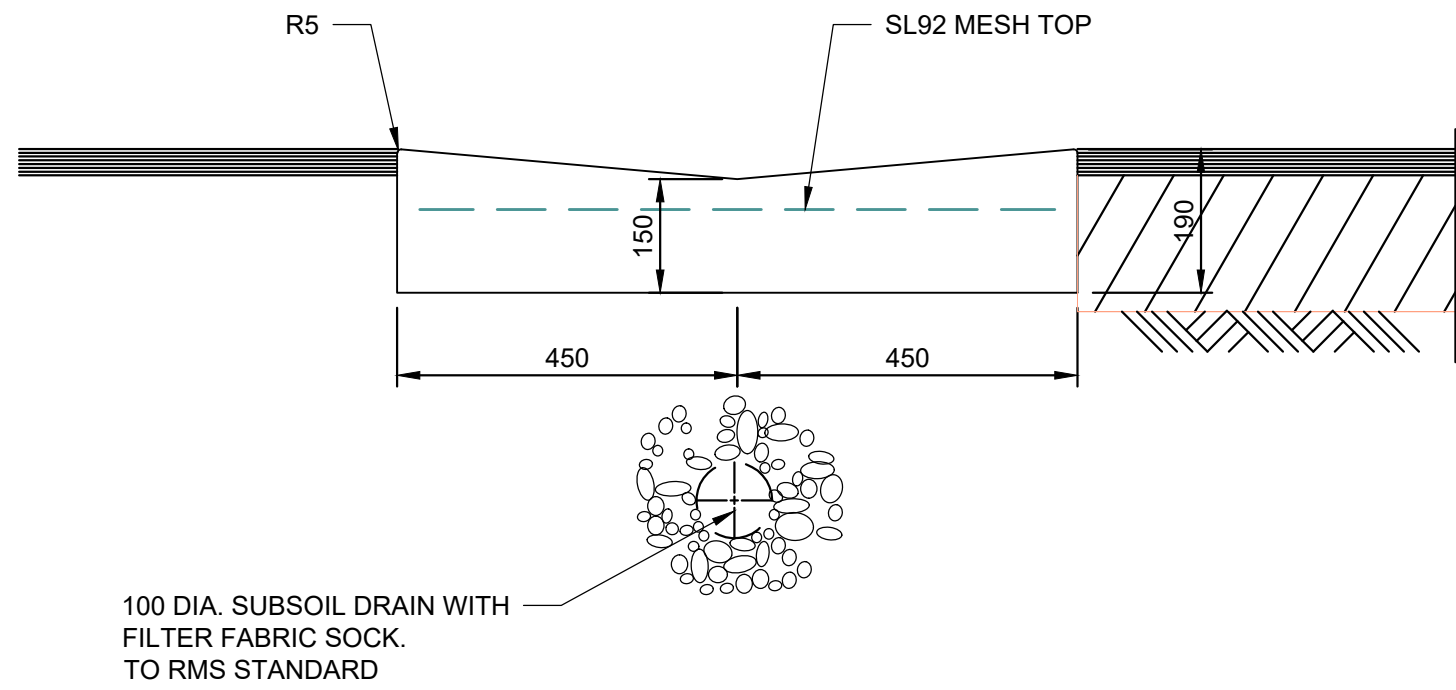
SCALE 1:10



REMOVE A STRIP OF THE EXISTING PAVEMENT AT LEAST 300mm WIDE FOR ITS FULL DEPTH. TRIM THE NEW EDGE TO AN ANGLE OF APPROXIMATELY 45° IN STEPS OF MAXIMUM HEIGHT 150mm. THEN PLACE NEW PAVEMENT MATERIAL. TRIM THE SEAL TO A NEAT EDGE USING PNEUMATIC TOOLS OR OTHER SUITABLE MEANS.

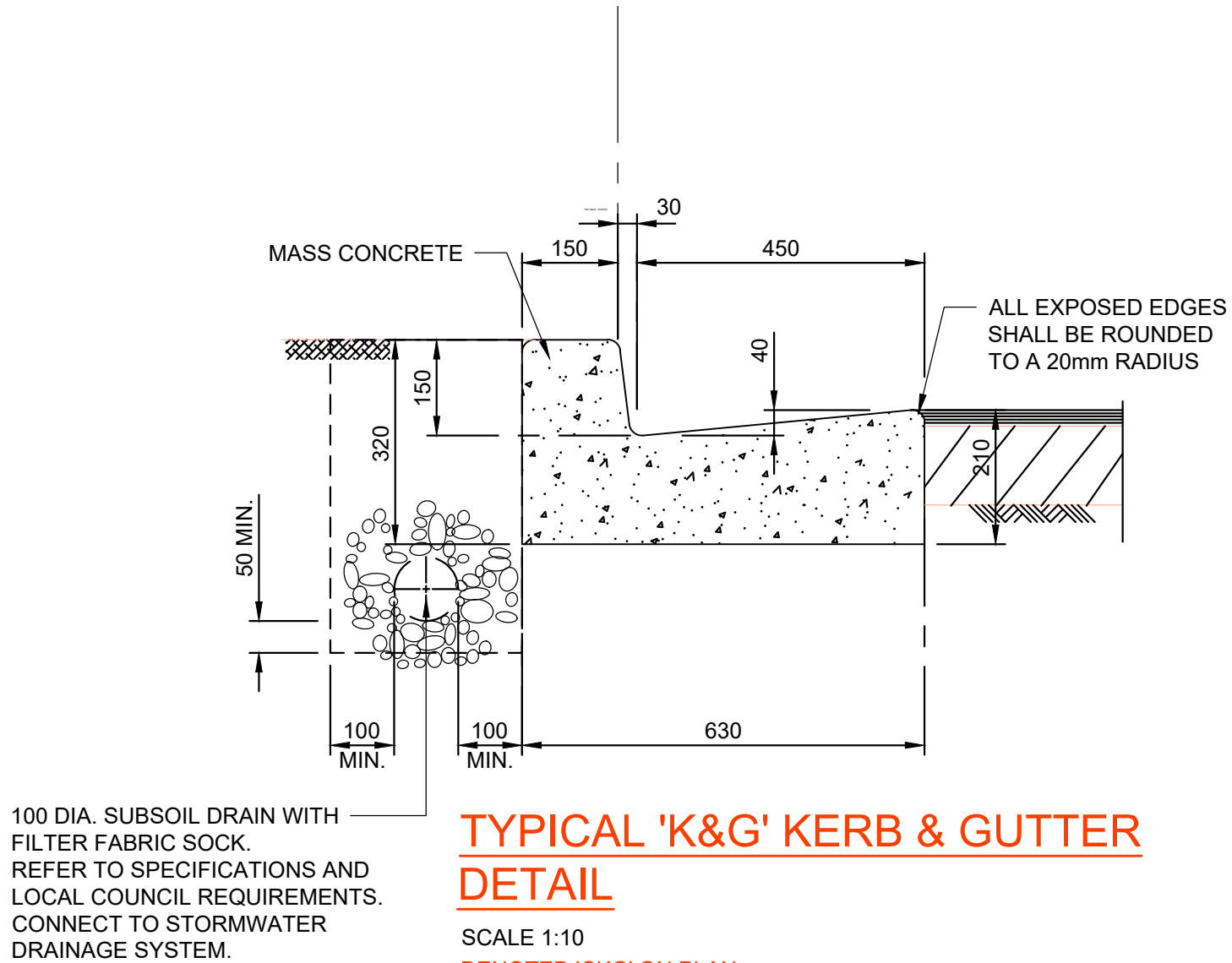
TYPICAL DETAIL OF NEW TO EXISTING PAVEMENT

SCALE 1:10



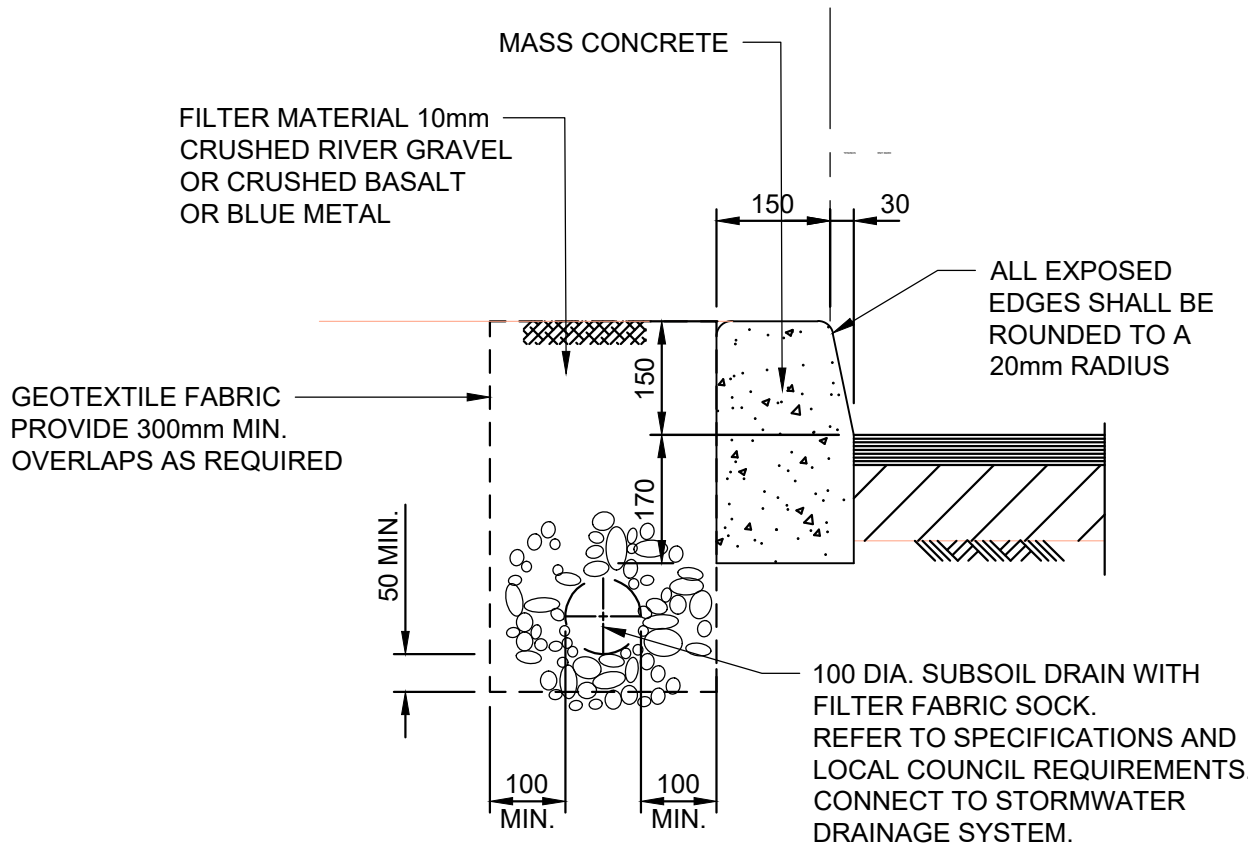
DISH DRAIN CROSSING DETAIL

SCALE 1:10
DENOTES 'VD' ON PLAN



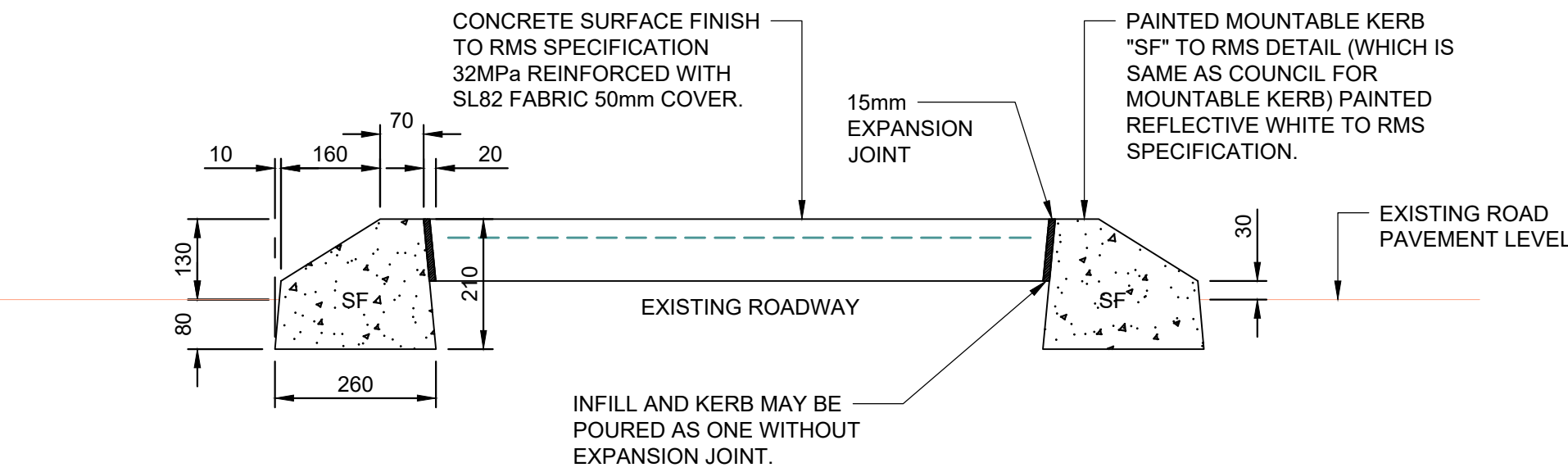
TYPICAL 'K&G' KERB & GUTTER DETAIL

SCALE 1:10
DENOTES 'CKG' ON PLAN
PROVIDE FULL DEPTH 12mm BITUMEN IMPREGNATED FIBREBOARD JOINTS AT 6 METRE MAXIMUM CENTERS



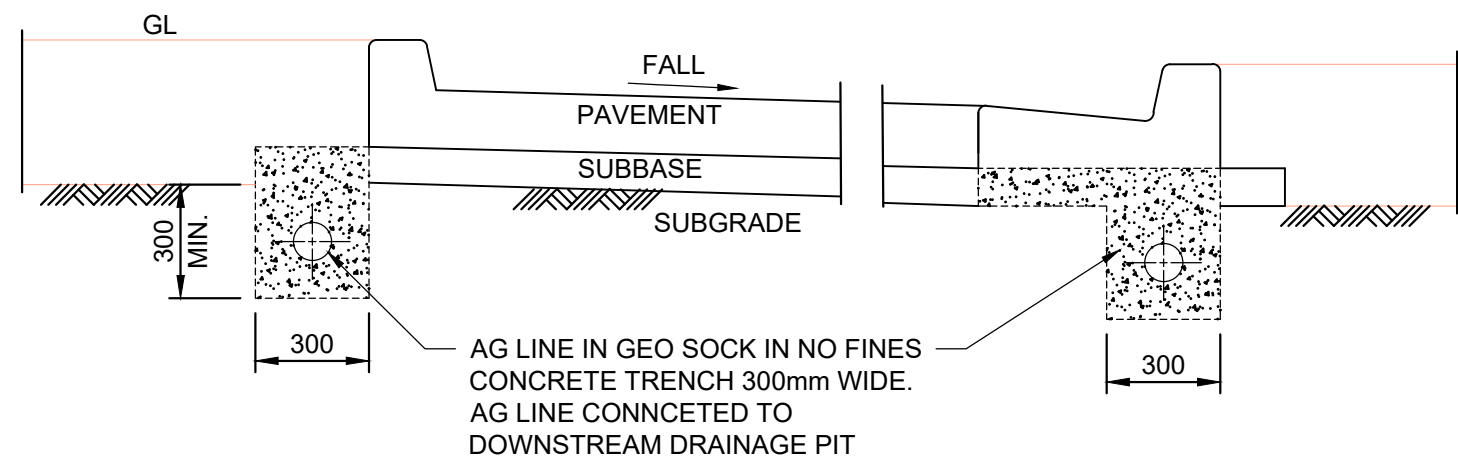
TYPICAL 'KO' KERB ONLY DETAIL

SCALE 1:10
DENOTES 'KO' ON PLAN
PROVIDE FULL DEPTH 12mm BITUMEN IMPREGNATED FIBREBOARD JOINTS AT 6 METRE MAXIMUM CENTERS U.N.O.



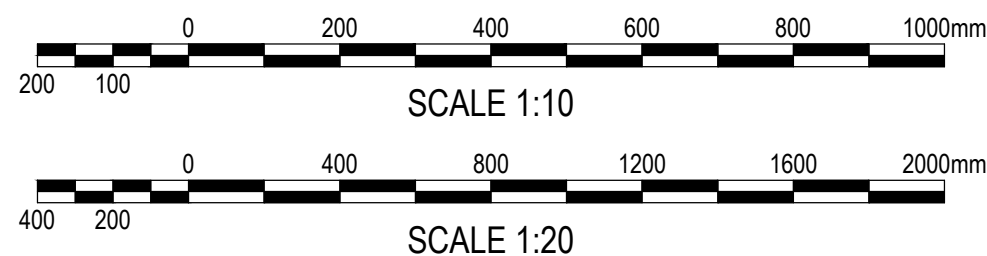
TYPICAL RAISED MEDIANS ISLAND DETAIL

SCALE 1:10



TRAFFICABLE PAVEMENT SUBSOIL DRAINAGE DETAIL

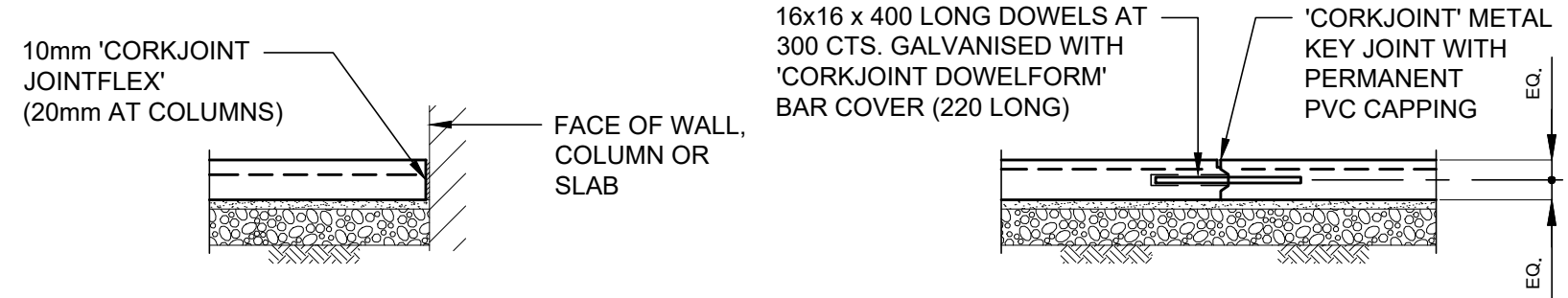
N.T.S.



5	DETAIL REVISED	CA	22/12/20
4	DETAIL ADDED	CA	18/11/20
3	DETAIL ADDED	CA	06/11/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DO&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT	
NBR SARCHITECTURE.	
Sydney 61 2 9922 2344	nbrsarchitecture.com

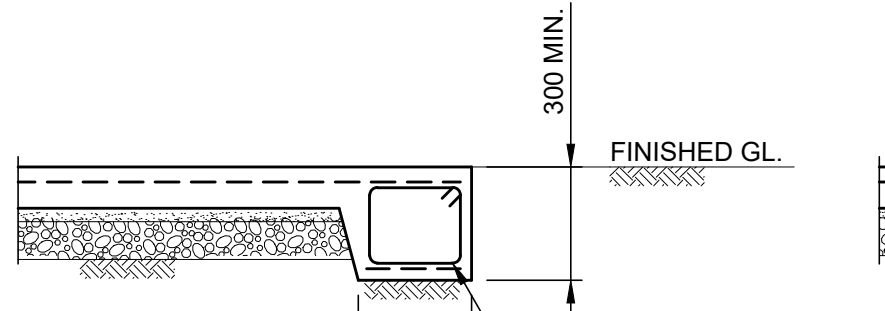
	BIRZULIS ASSOCIATES
CONSULTING STRUCTURAL & CIVIL ENGINEERS 583 DARLING STREET ROZELLE NSW 2039 tel: (02) 9555 7230 email: office@birzulisassociates.com www.birzulisassociates.com	
PROJECT LINDFIELD LEARNING VILLAGE STAGE 2 & 3	
TITLE CIVIL DETAILS SHEET 1	
SCALES	DATE MAY 2020
DRAWN DG	DESIGN DG
VERIFIED CA	APPROVED MG
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ISSUE 5	DRAWING No. C.231



ISOLATION JOINT DETAIL

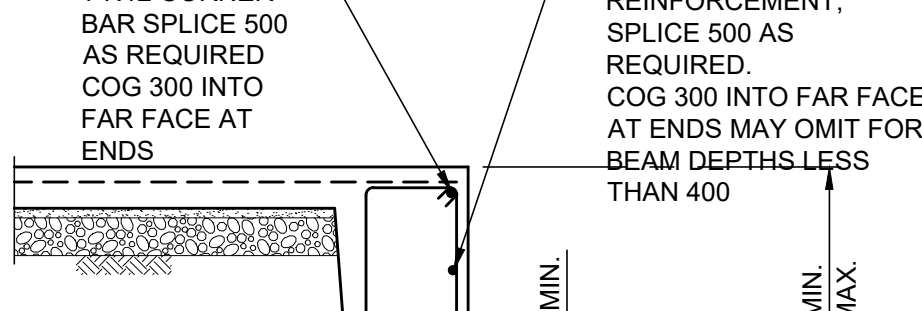
Denotes as 'IJ' IJ
USE AS REQUIRED

DOWELLED KEY JOINT DETAIL
(DO NOT USE IN COUNCIL AREAS)
SHOWN THUS ON PLAN DKJ
PROVIDE AT 6000mm MAX cts.



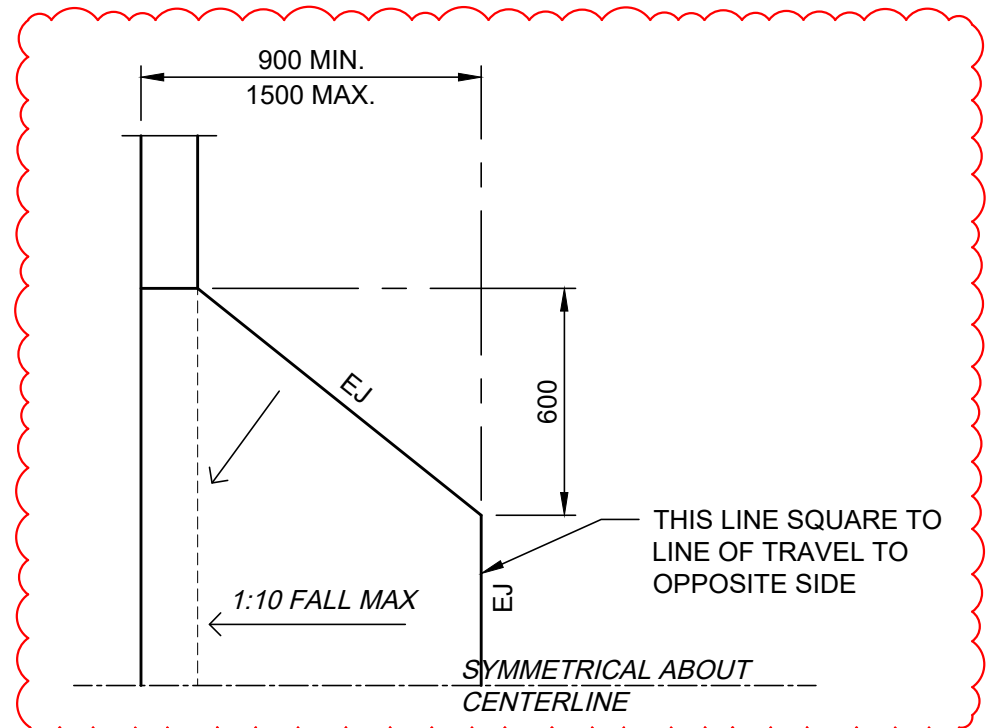
TYPICAL CONCRETE PAVING EDGE THICKENING DETAIL (ET)

SHOWN THUS ON PLAN ET



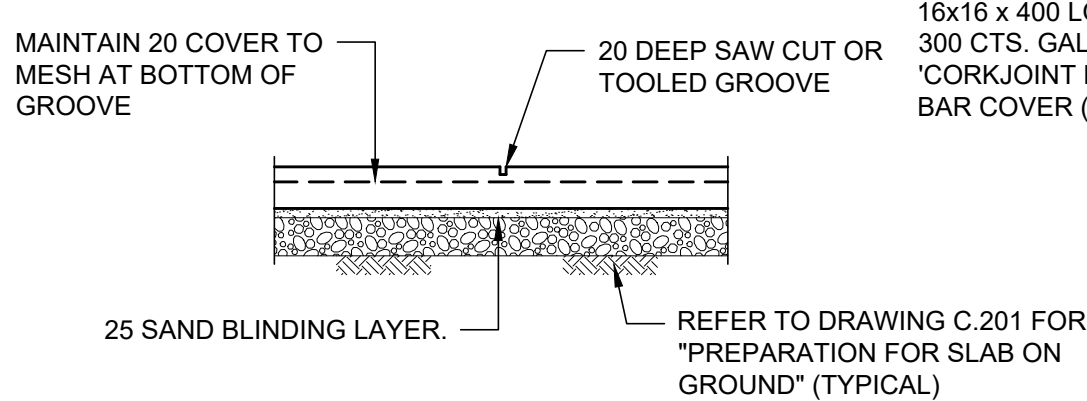
TYPICAL CONCRETE PAVING EDGE THICKENING DETAIL (ET1)

SHOWN THUS ON PLAN ET1



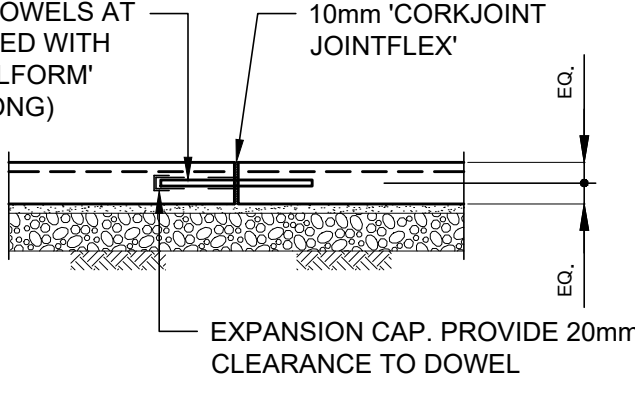
TYPICAL PEDESTRIAN ACCESS RAMP (PRAM RAMP) DETAILS

SCALE 1:20



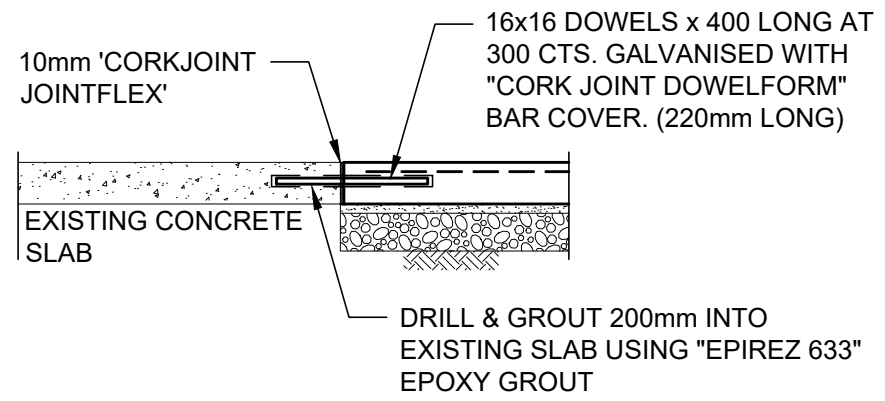
SAWN/TOOLED JOINT DETAIL

SHOWN THUS ON PLAN SJ
PROVIDE AT 3000mm MAX cts.



EXPANSION JOINT DETAIL

SHOWN THUS ON PLAN EJ
PROVIDE AT 18000mm MAX cts.



TYPICAL JUNCTION WITH EXISTING PAVEMENT

TYPICAL EXTERNAL CONCRETE FOOTPATH PAVEMENT JOINT DETAILS

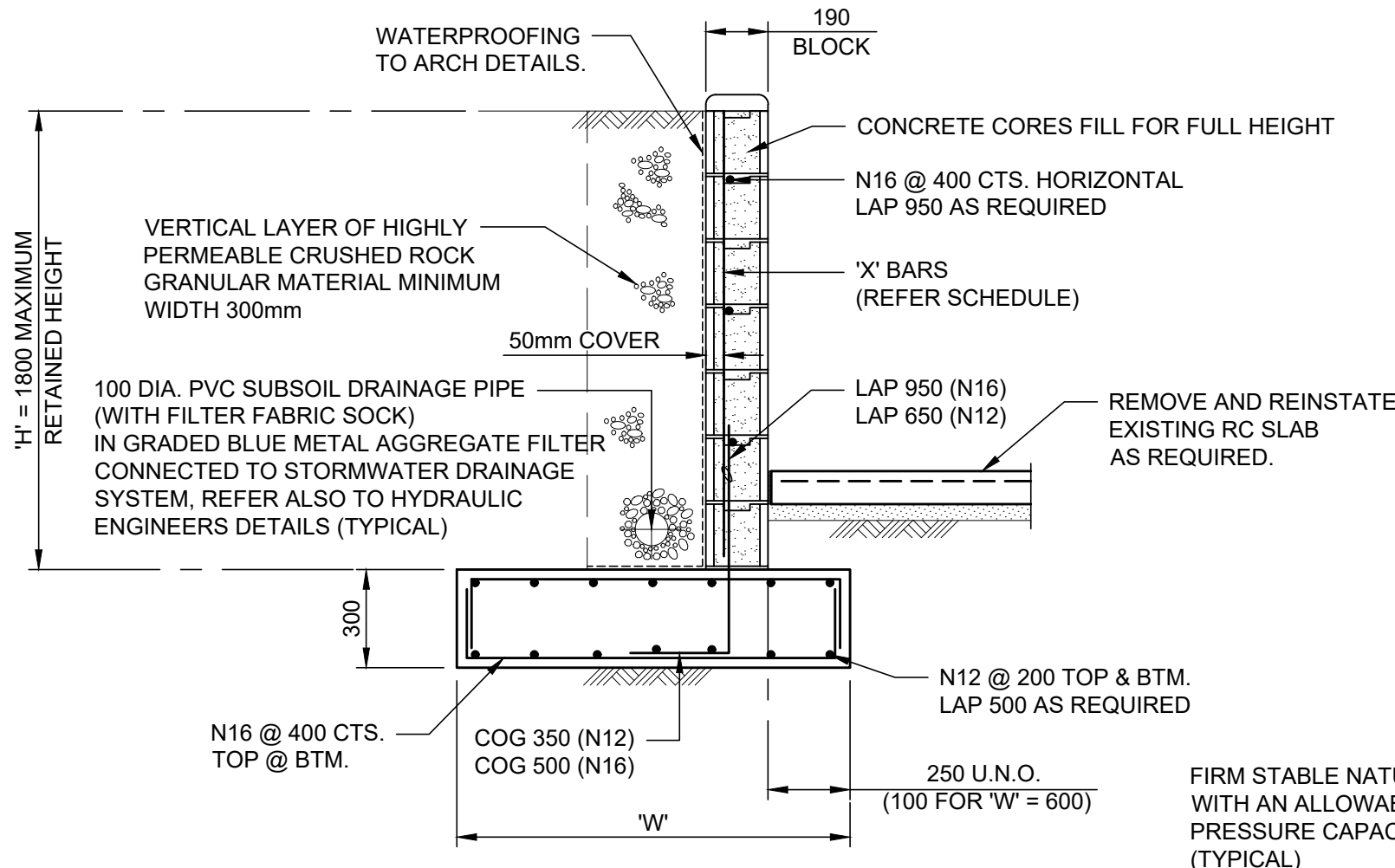
SCALE 1:20

110mm THICK PAVING SLABS WITH SL102 MESH TOP THROUGHOUT U.N.O.
CONCRETE SHALL BE LAID OVER GEOTEXTILE AS REQUIRED BY ARBORIST.

ET DENOTES ON PLAN

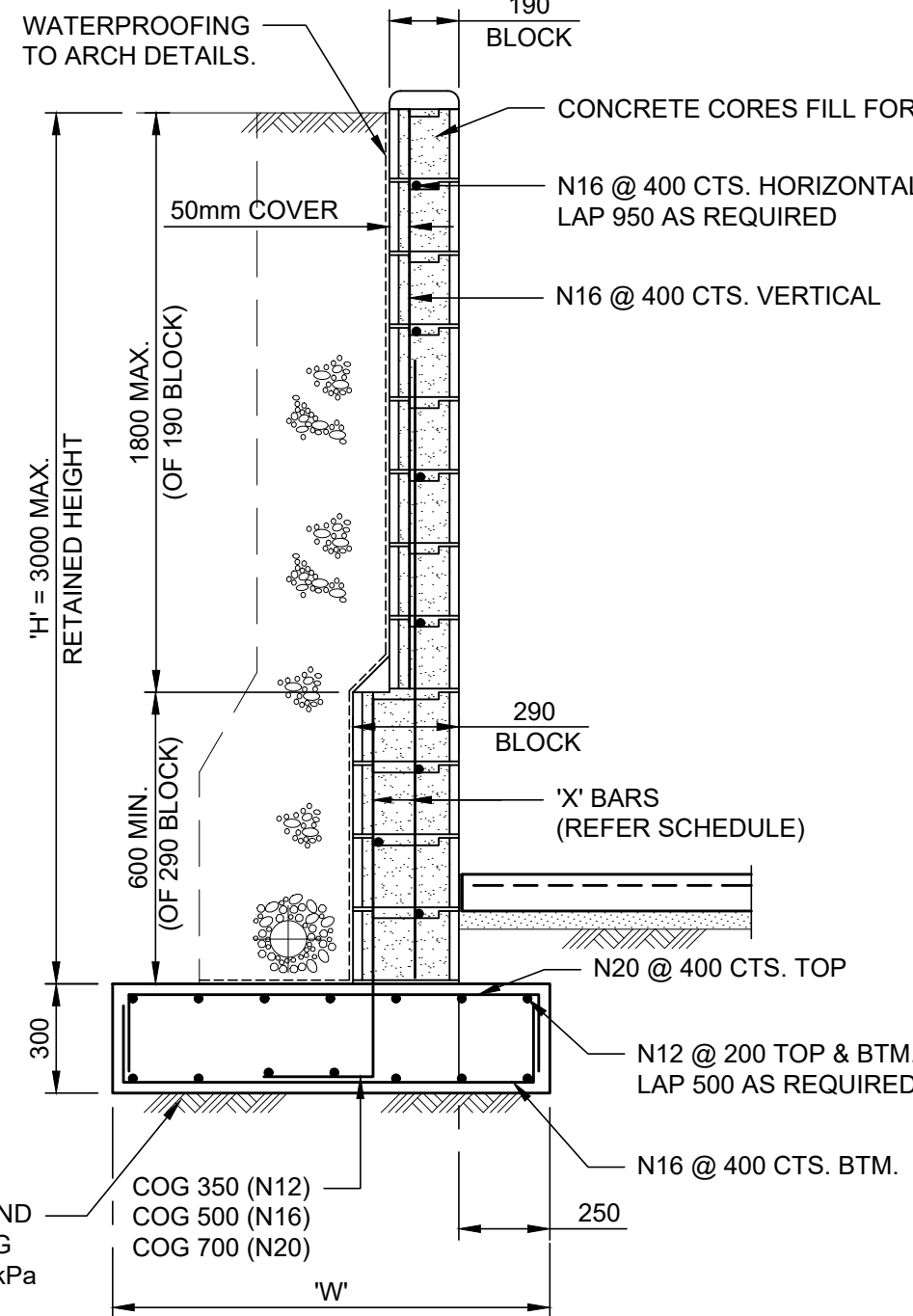
SAW CUTTING TABLE	
DAILY MAXIMUM TEMP. (°C)	LATEST TIME FOR SAWING (HOURS)
< 10	48
10 - 20	36
20 - 30	24
> 30	12

BLOCK RETAINING WALL SCHEDULE			
WALL TYPE	WALL HEIGHT 'H'	FOOTING WIDTH 'W'	REINFORCEMENT 'X' BARS
'C'	3000 - 3600	2300	N20@200 CTS.
	2400 - 3000	2200	N20@200 CTS.
'B'	1800 - 2400	1800	N20@400 CTS.
	1400 - 1800	1200	N16@400 CTS.
'A'	1000 - 1400	1000	N16@400 CTS.
	750 - 1000	800	N12@400 CTS.
	UP TO 750	600	N12@400 CTS.



R.C. BLOCK RETAINING WALL TYPE 'A' - RW1

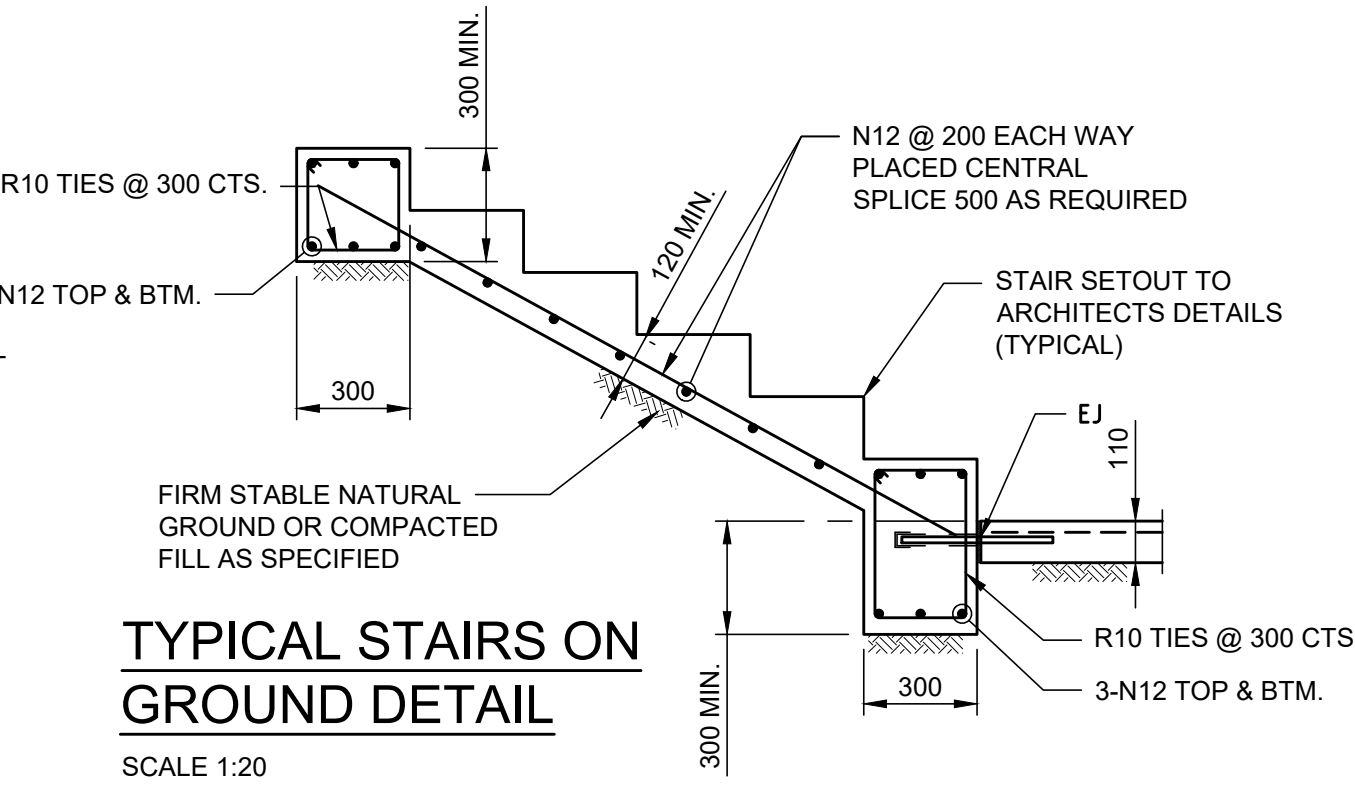
SCALE 1:20



R.C. BLOCK RETAINING WALL TYPE 'B' - RW1

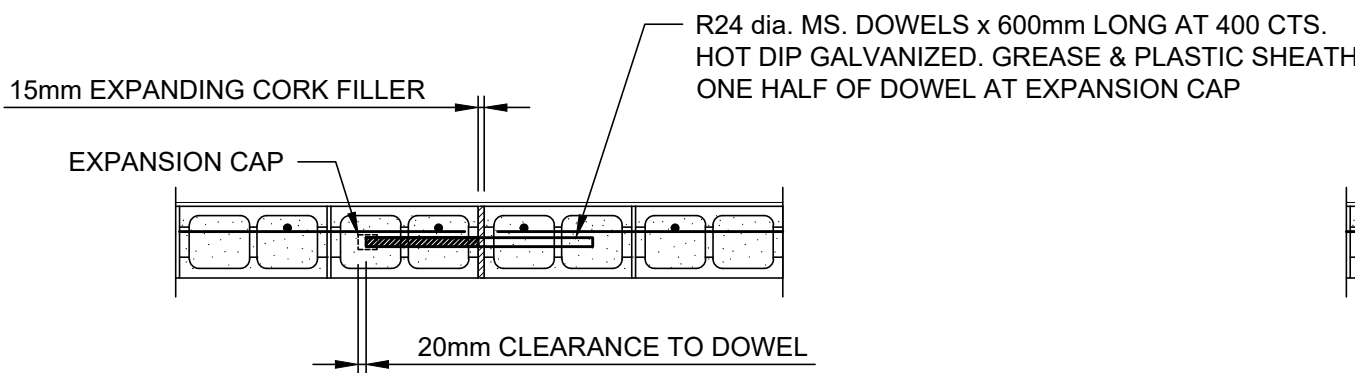
SCALE 1:20

DETAILS AS SHOWN ON TYPE 'A' U.N.O.



TYPICAL STAIRS ON GROUND DETAIL

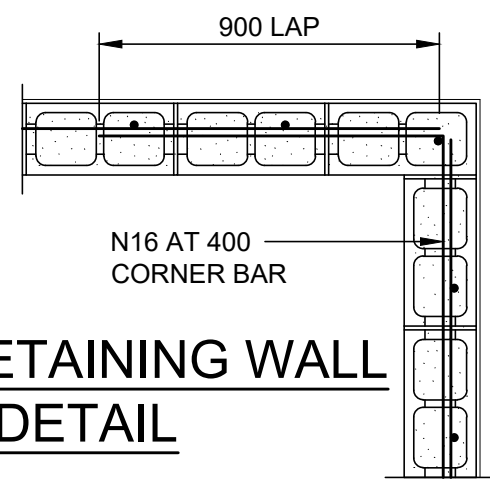
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BLOCK RETAINING WALL VERTICAL CONTROL JOINT

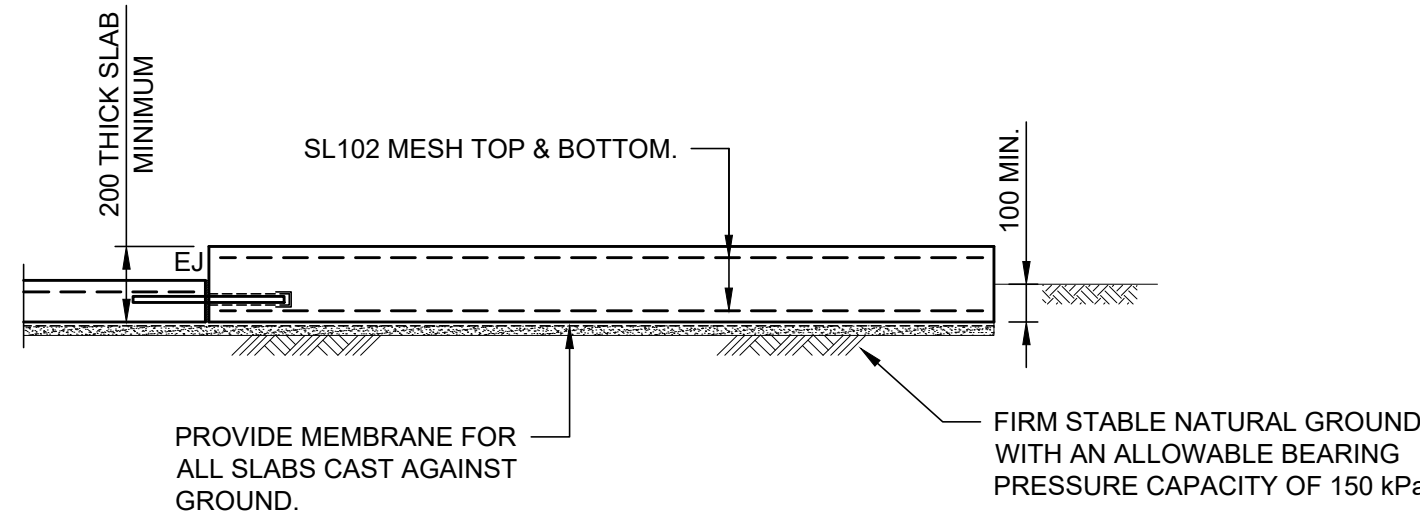
SCALE 1:20

REFER TO ARCHITECTS DRAWINGS FOR LOCATIONS
PROVIDE AT MAXIMUM 8000mm CTS.
5000mm FROM CORNERS U.N.O.



BLOCK RETAINING WALL CORNER DETAIL

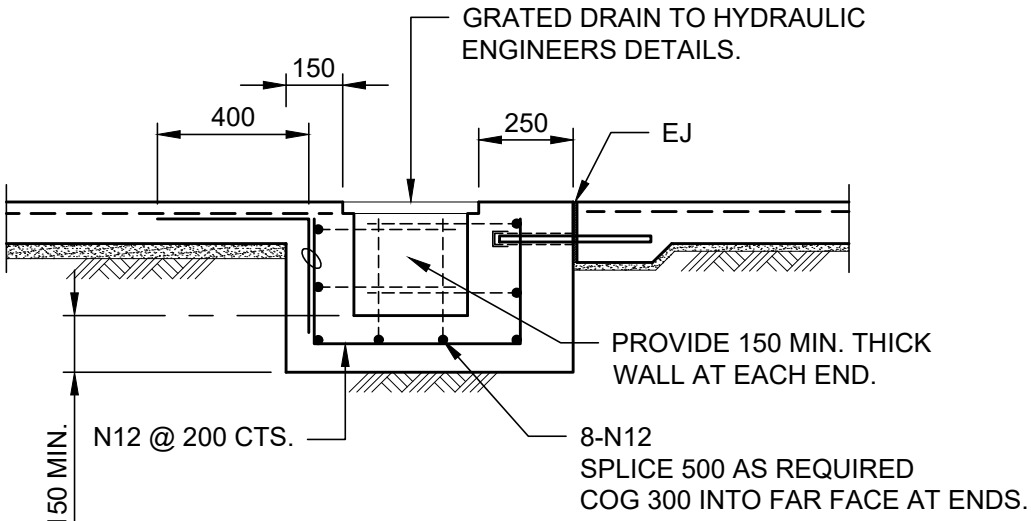
SCALE 1:20



TYPICAL SECTION THROUGH SERVICES PLINTH

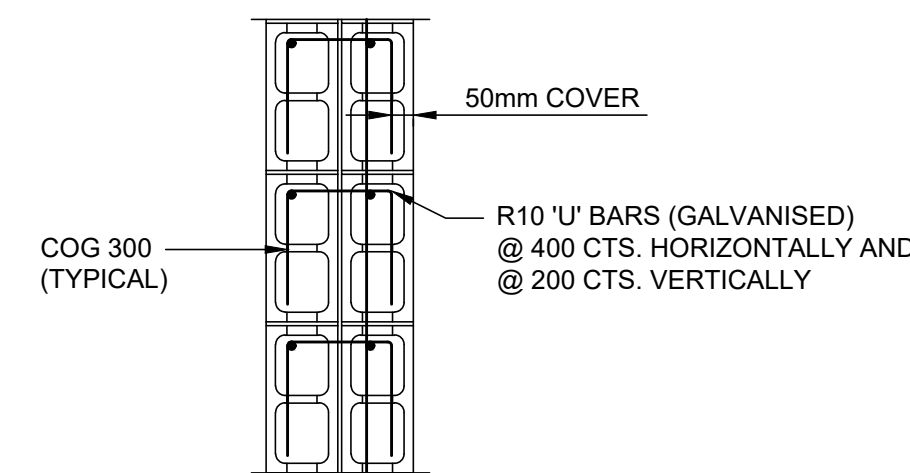
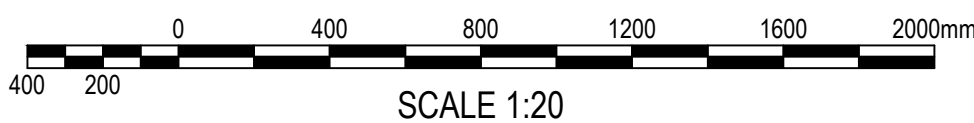
SCALE 1:20

REFER TO ARCHITECTS PLANS FOR LOCATIONS
200mm THICK SLAB ON GROUND (F_c = 32MPa)
PROVIDE SL102 MESH TOP & BOTTOM THROUGHOUT U.N.O.



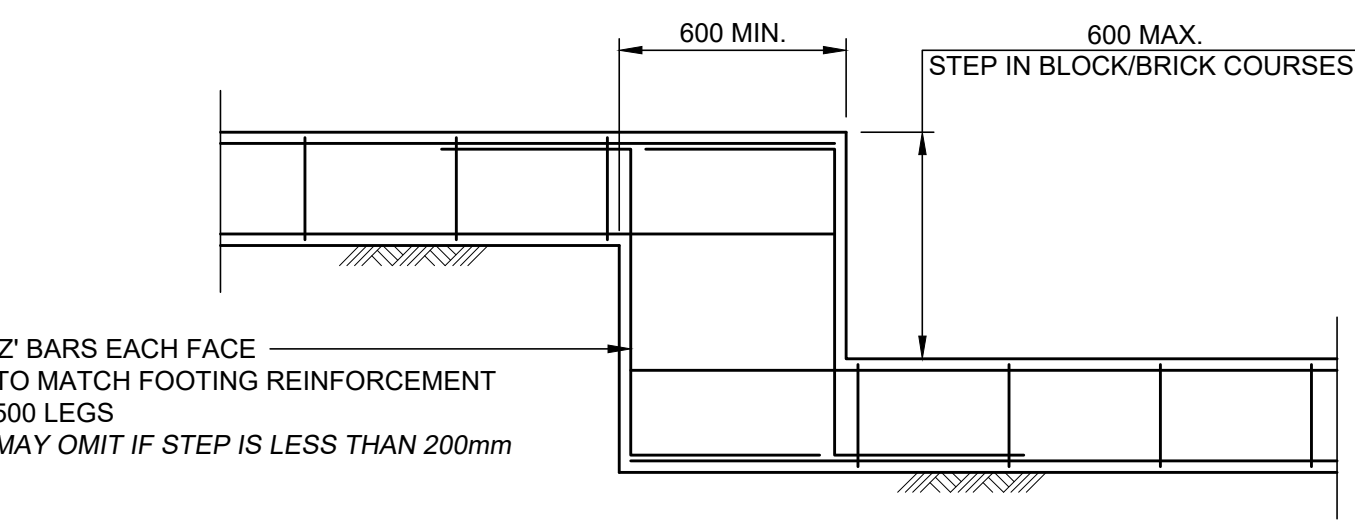
GRATED DRAIN DETAIL

SCALE 1:20



BLOCK RETAINING WALL TYPE 'B' BONDING DETAIL

SCALE 1:20



TYPICAL RETAINING WALL STRIP FOOTING STEP DETAIL

SCALE 1:20

USE AS REQUIRED TO SUIT GROUND CONDITIONS

3	DETAILS REVISED	CA	22/12/20
2	ISSUE FOR CC1	CA	30/10/20
1	80% DOB TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT		NBR ARCHITECTURE.	
Sydney		61 2 9922 2344	
		nbrsarchitecture.com	

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583 DARLING STREET ROZELLE NSW 2039	
tel: (02) 9555 7230 email: office@birzulisassociates.com	
www.birzulisassociates.com	

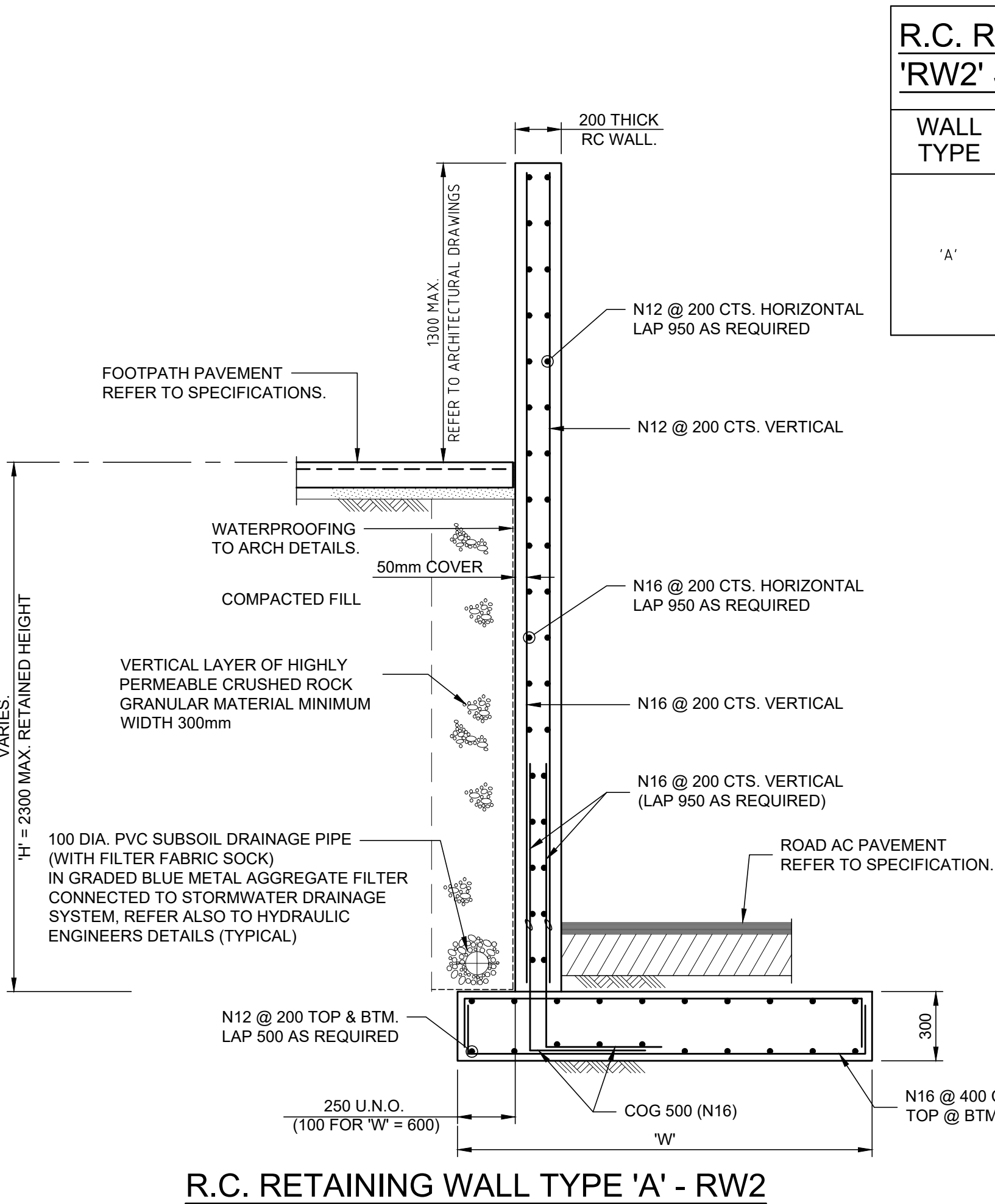
PROJECT	
LINDFIELD LEARNING VILLAGE STAGE 2 & 3	

TITLE	
CIVIL DETAILS SHEET 2	

SCALES		DATE	
		MAY 2020	
DRAWN DG	DESIGN DG	VERIFIED CA	APPROVED MG

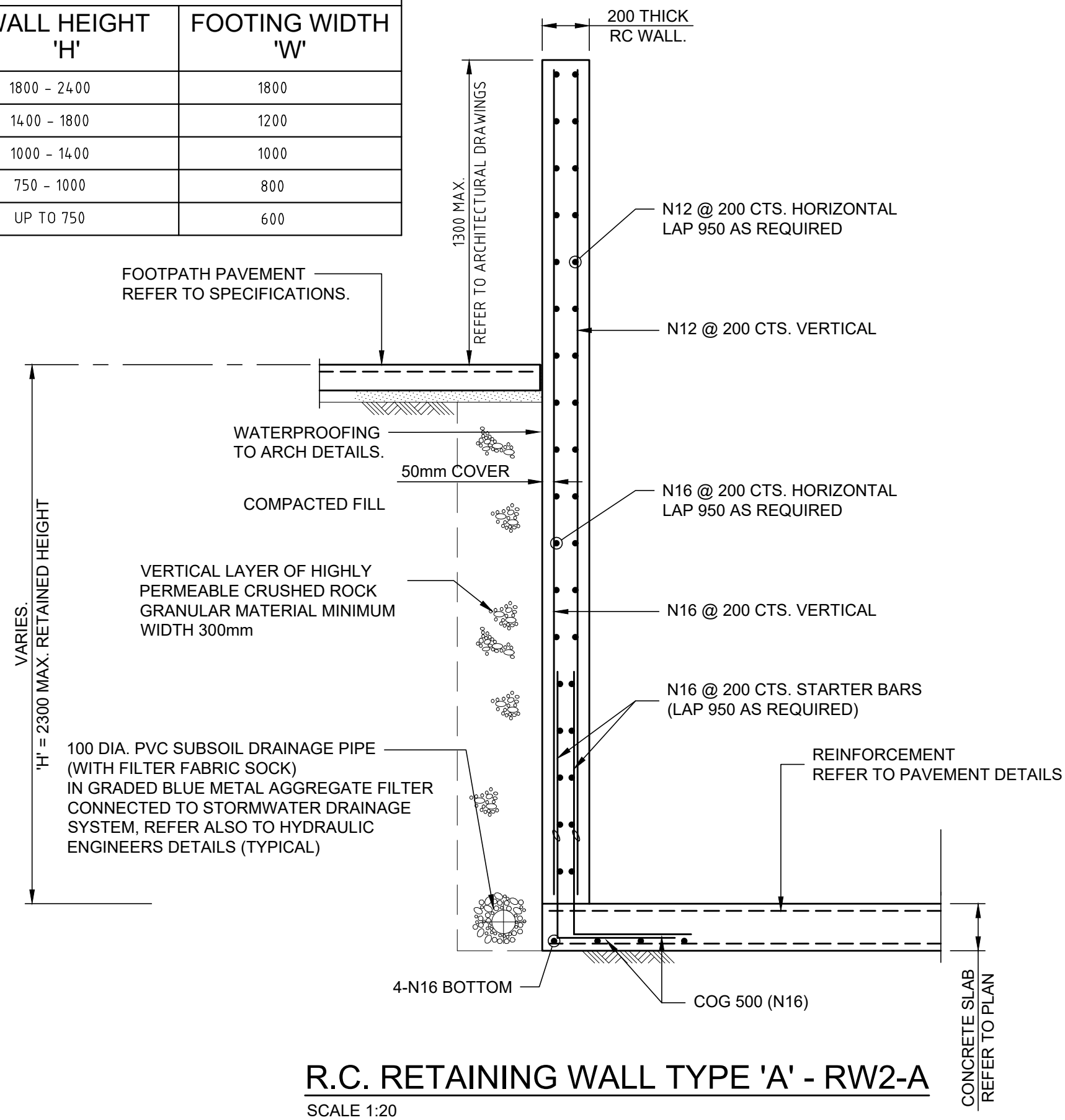
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ISSUE	PROJECT No.	DRAWING No.
3	7576	C.232

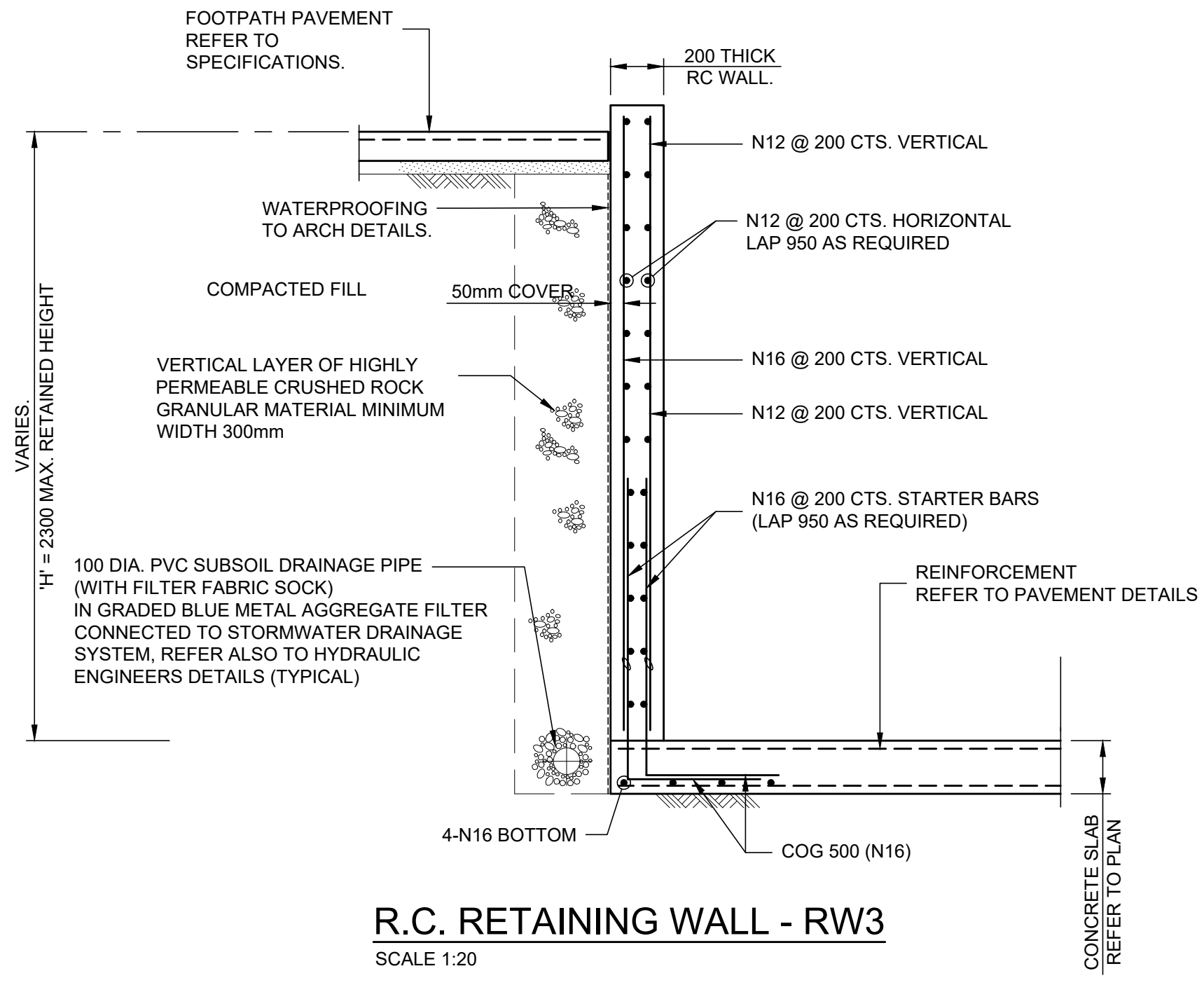


SECTION D
SCALE 1:20
C.218

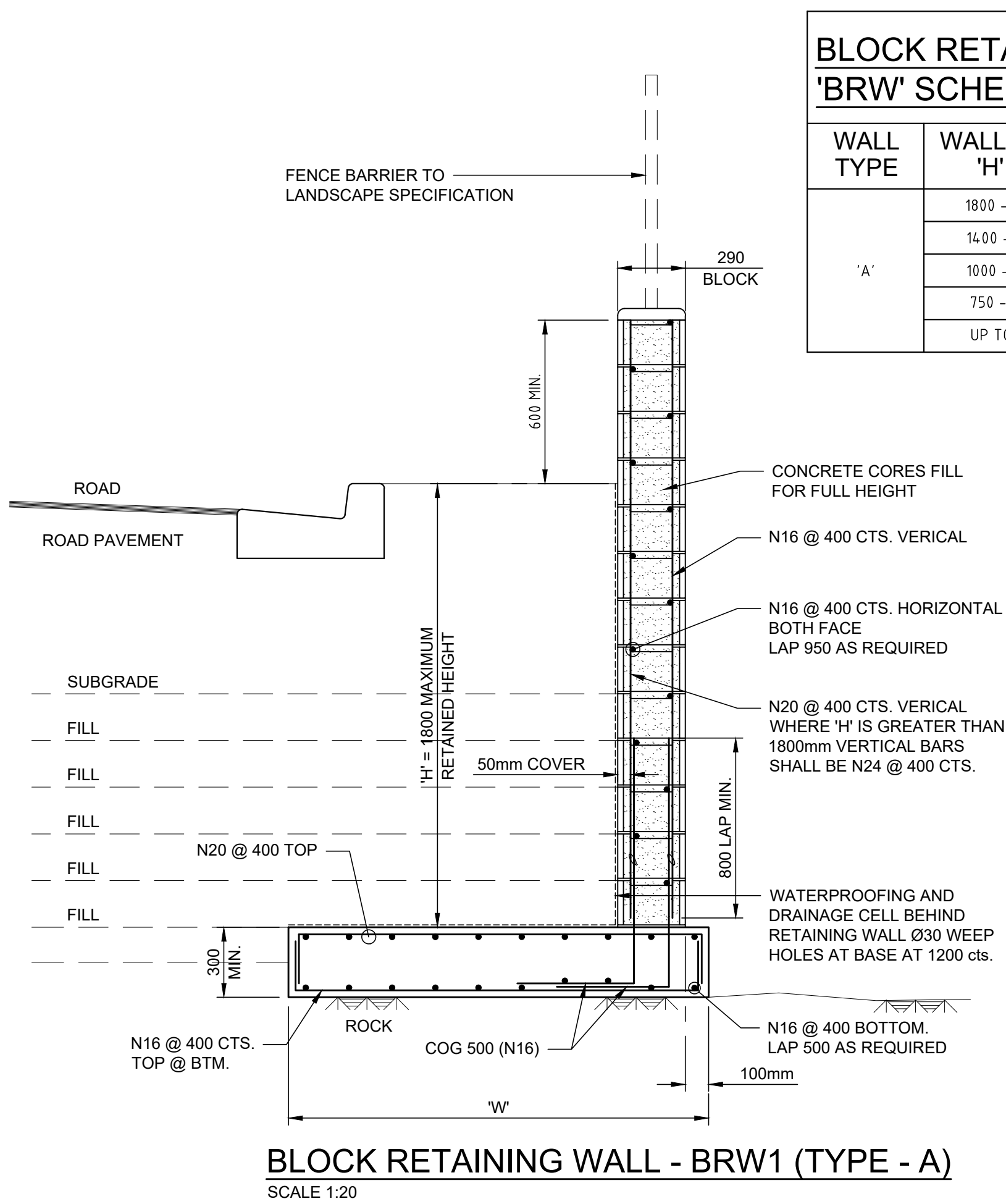
R.C. RETAINING WALL - 'RW2' SCHEDULE		
WALL TYPE	WALL HEIGHT 'H'	FOOTING WIDTH 'W'
'A'	1800 - 2400	1800
	1400 - 1800	1200
	1000 - 1400	1000
	750 - 1000	800
	UP TO 750	600



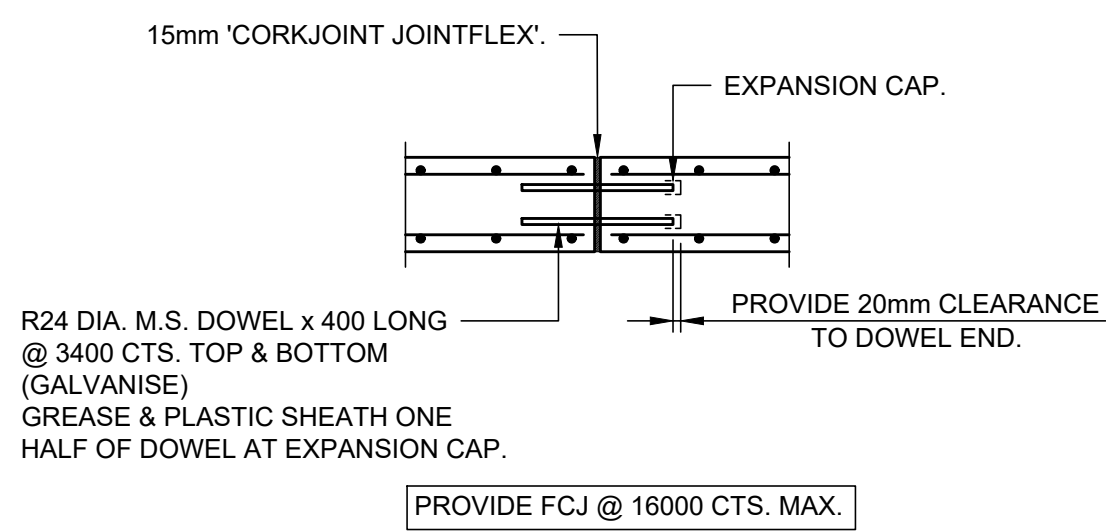
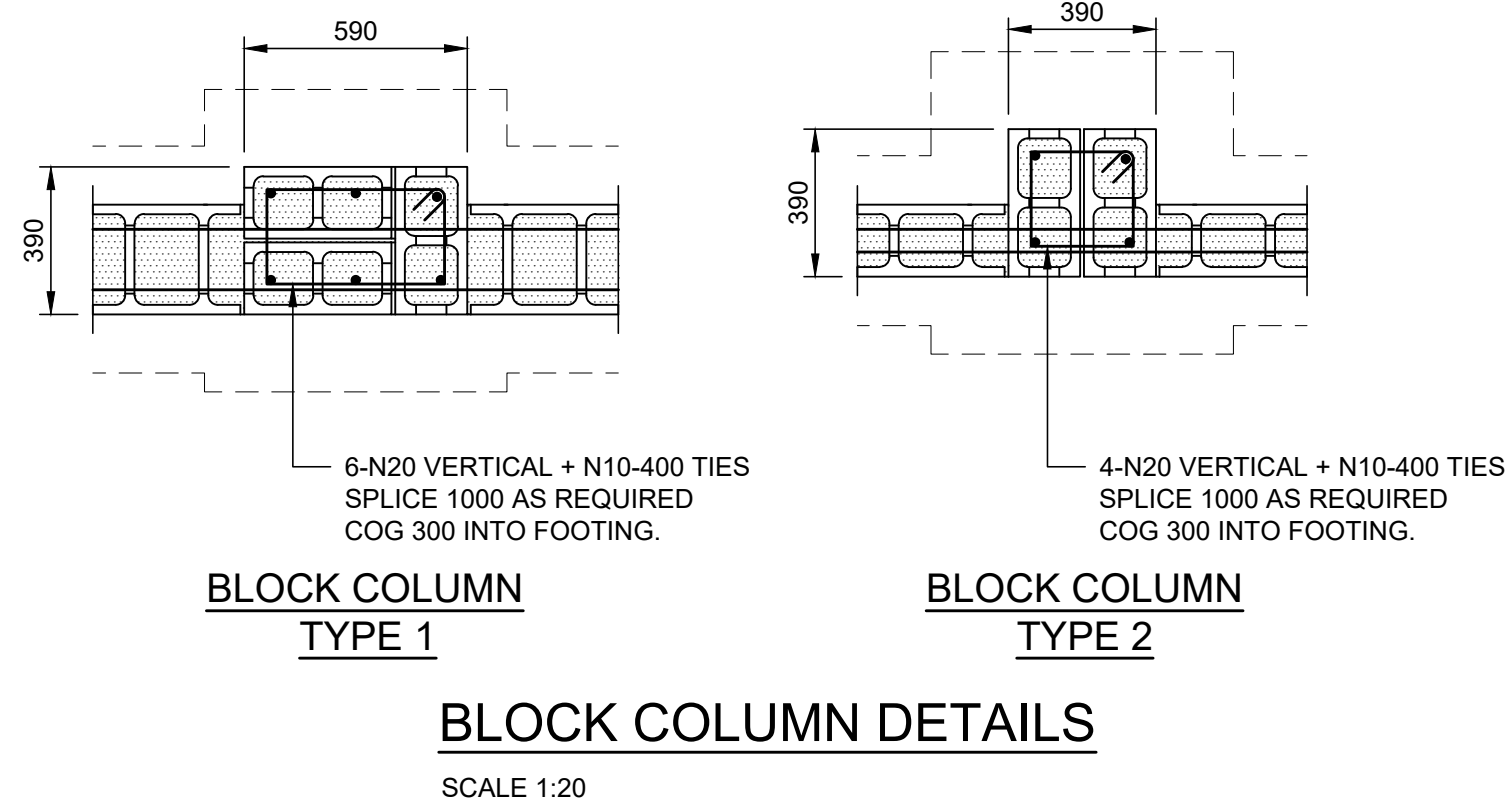
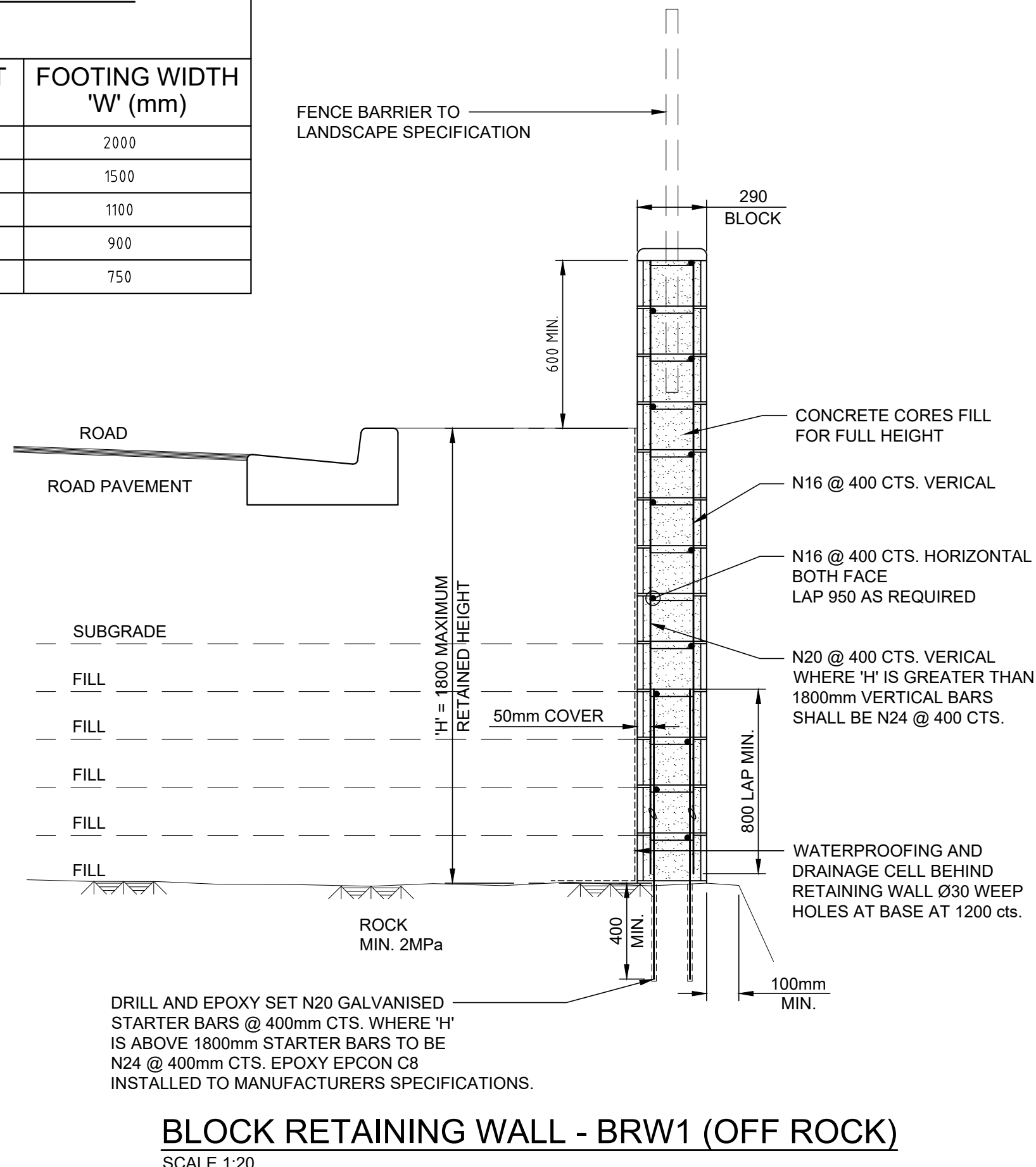
SCALE 1:20



SCALE 1:20



BLOCK RETAINING WALL - 'BRW' SCHEDULE		
WALL TYPE	WALL HEIGHT 'H' (mm)	FOOTING WIDTH 'W' (mm)
'A'	1800 - 2400	2000
	1400 - 1800	1500
	1000 - 1400	1100
	750 - 1000	900
	UP TO 750	750



5	RETAINING WALL DETAILS ADDED	CA	22/12/20
4	BRW1 DETAILS ADDED	CA	06/11/20
3	ISSUE FOR CC1	CA	30/10/20
2	DRAWING REVISED	MG	01/07/20
1	80% DD&C TENDER ISSUE	MG	19/05/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT

NBRSARCHITECTURE.

Sydney
61 2 9922 2344

nbrsarchitecture.com

BIRZULIS ASSOCIATES

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583 DARLING STREET ROZELLE NSW 2039
tel: (02) 9555 7230 email: office@birzulisassociates.com
www.birzulisassociates.com

PROJECT

LINDFIELD LEARNING VILLAGE
STAGE 2 & 3

TITLE

CIVIL DETAILS SHEET 3

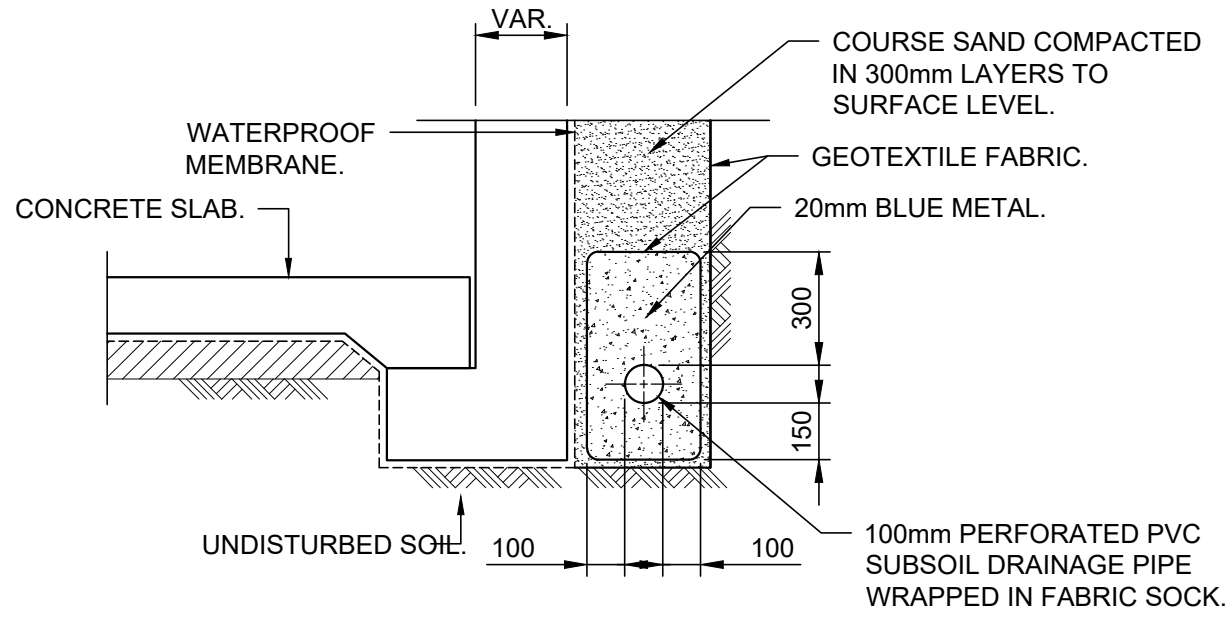
SCALES

DATE MAY 2020

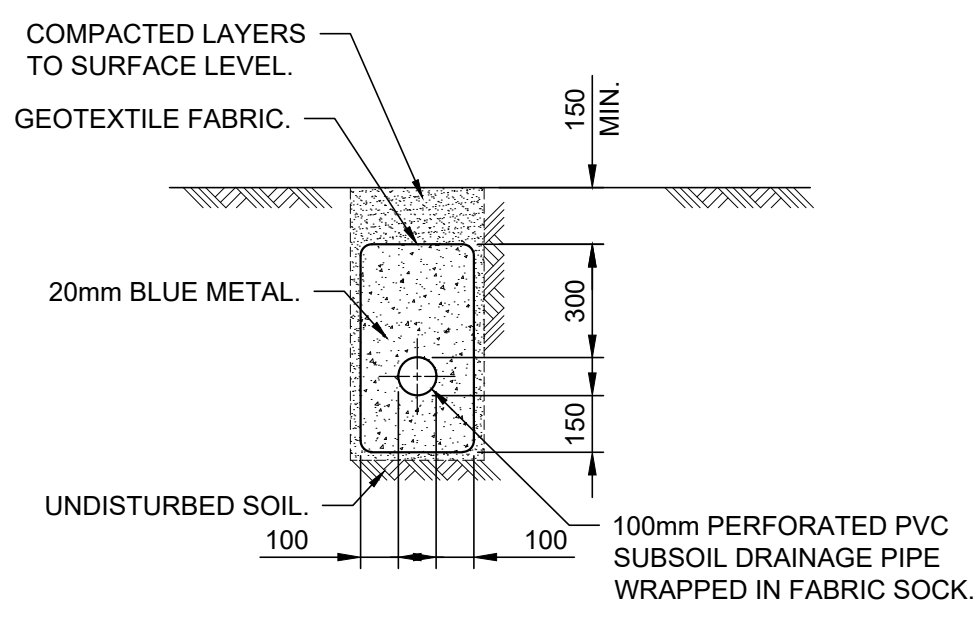
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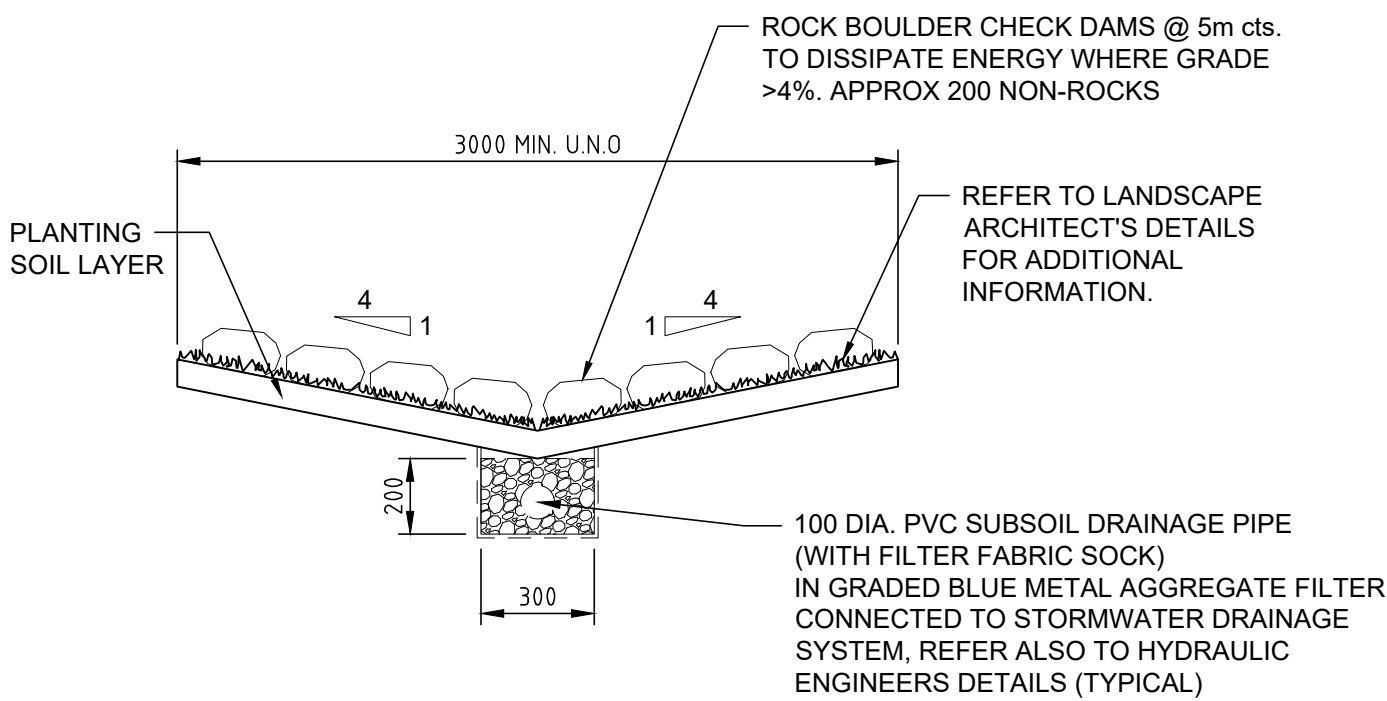
ISSUE 5 PROJECT No. 7576 DRAWING No. C.233



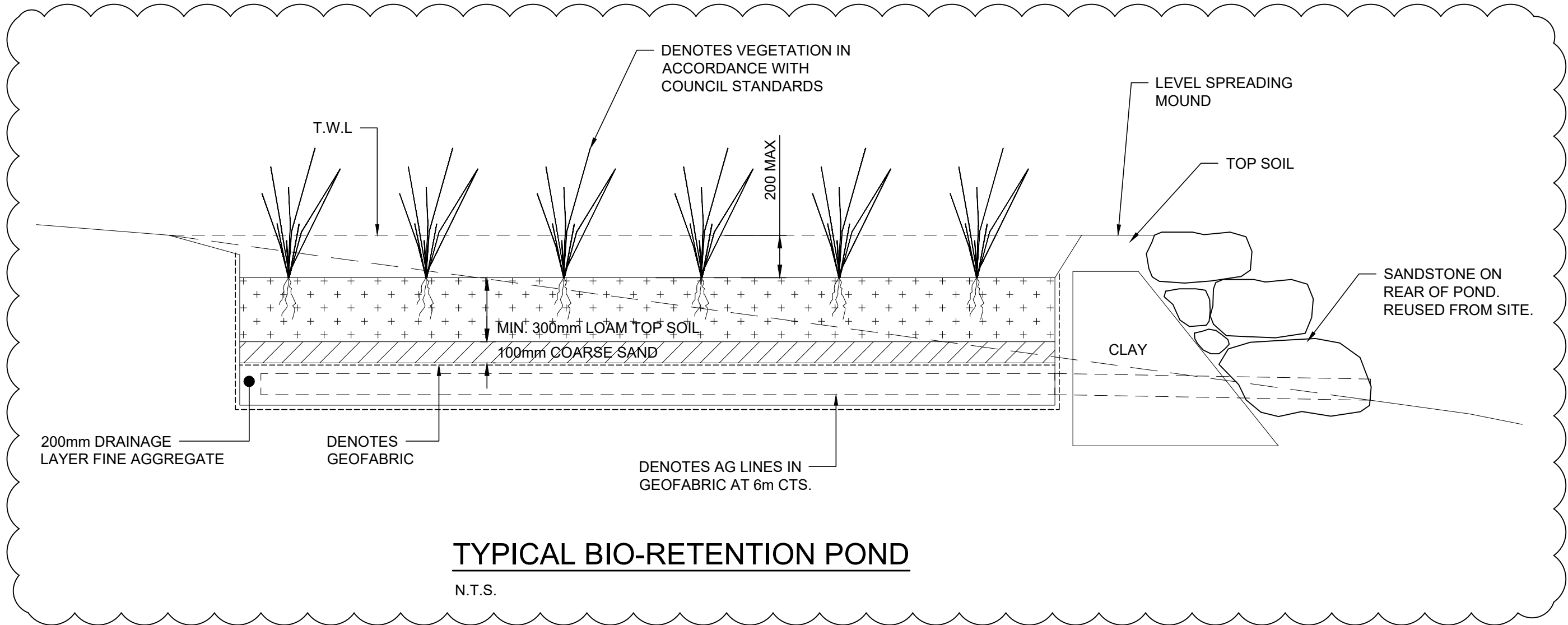
TYPICAL SUBSOIL DRAINAGE DETAIL
SCALE 1:20



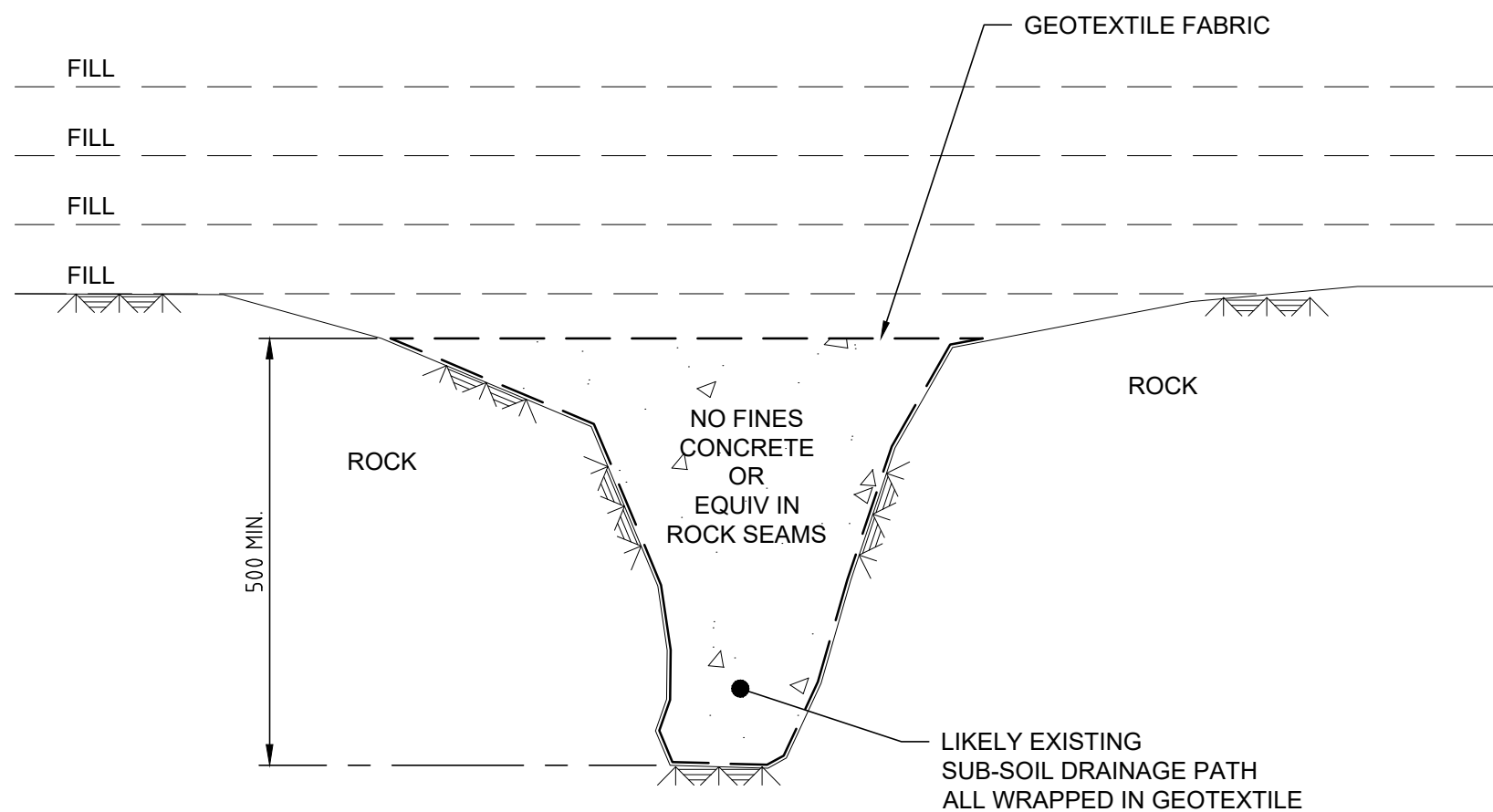
ALTERNATIVE SUBSOIL DRAINAGE DETAIL
SCALE 1:20



TYPICAL VEGETATED SWALE DETAIL
N.T.S.

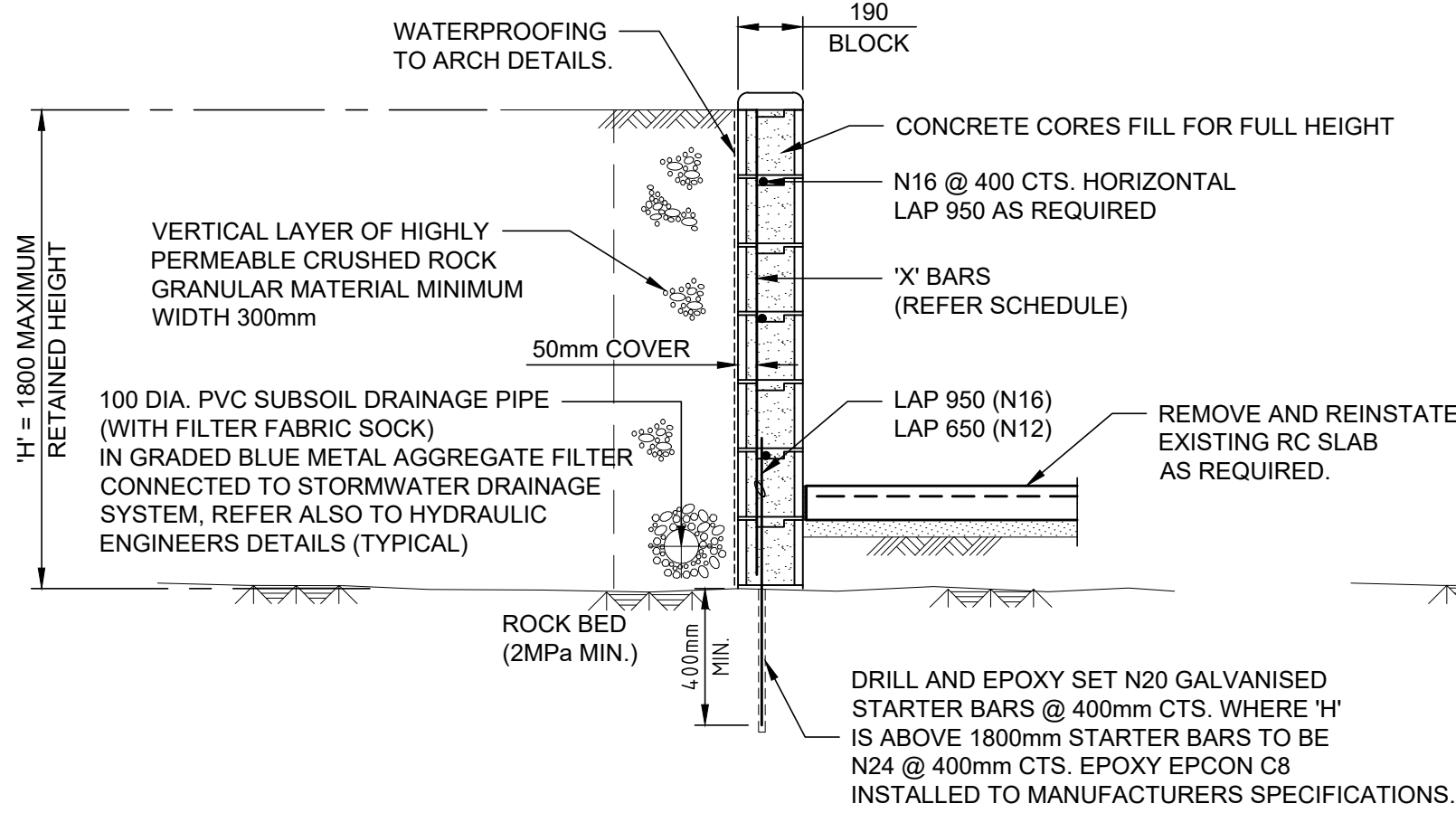


TYPICAL BIO-RETENTION POND
N.T.S.



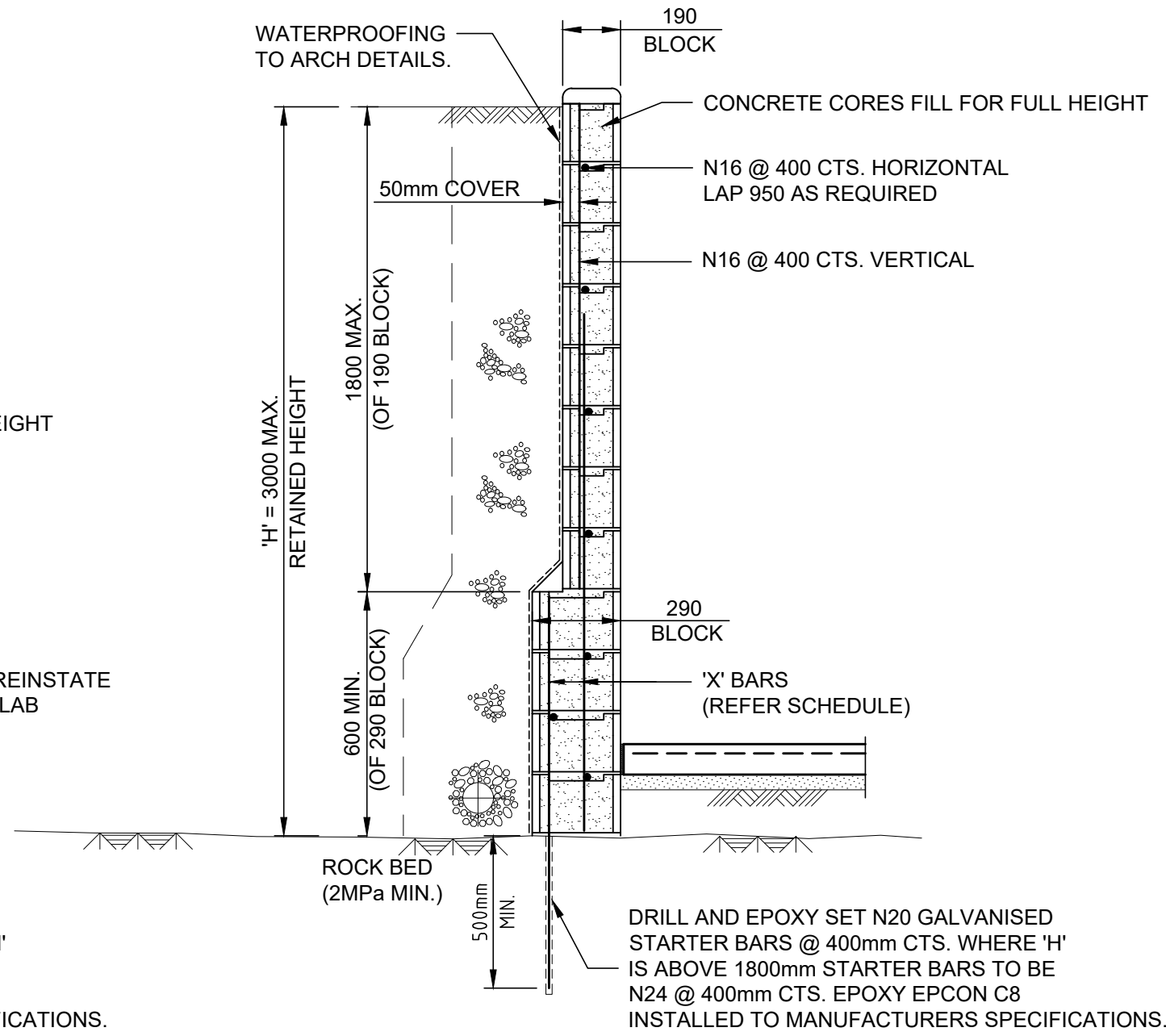
EXISTING ROCK SEAM TREATMENT
N.T.S.

BLOCK RETAINING WALL SCHEDULE - OFF ROCK		
WALL TYPE	WALL HEIGHT 'H'	REINFORCEMENT 'X' BARS
'B'	2400 - 3000	N20@200 CTS.
	1800 - 2400	N20@400 CTS.
'A'	1400 - 1800	N16@400 CTS.
	1000 - 1400	N16@400 CTS.
	750 - 1000	N12@400 CTS.
	UP TO 750	N12@400 CTS.



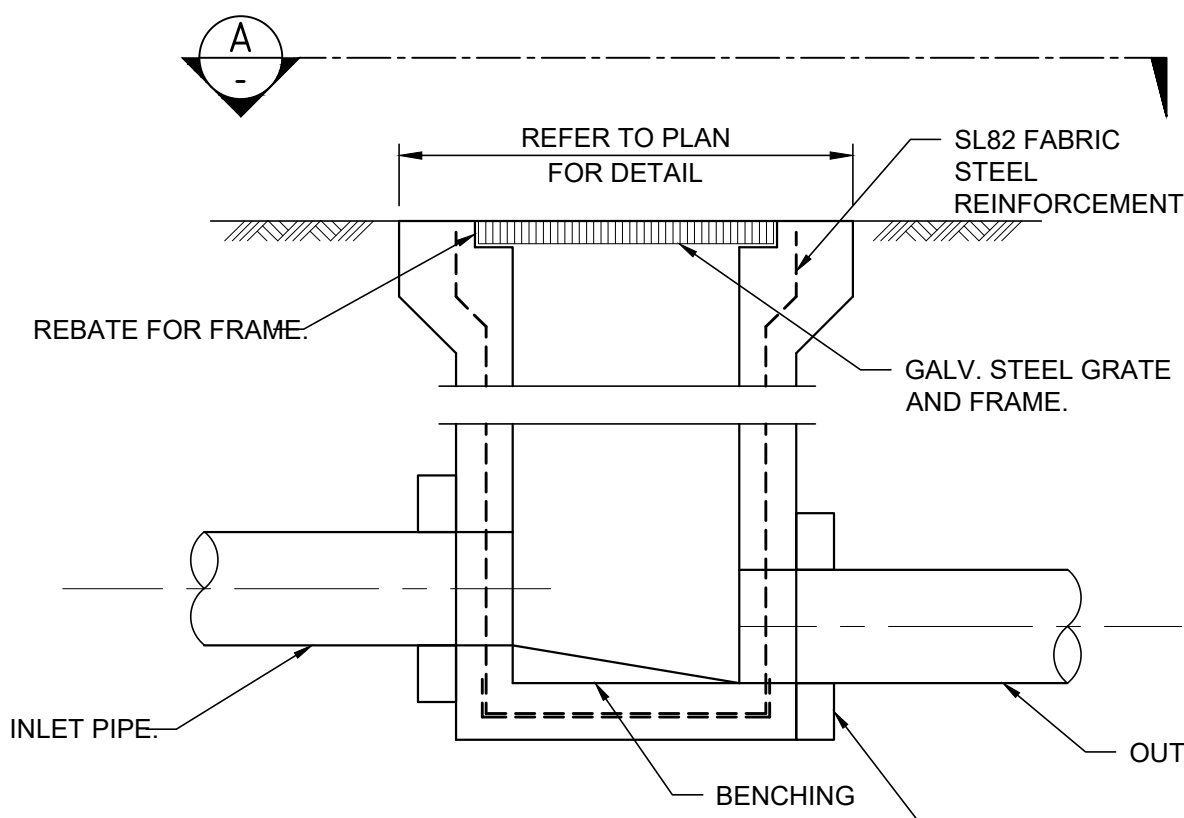
**R.C. BLOCK RETAINING WALL TYPE 'A'
- RW1 (OFF ROCK)**

SCALE 1:20

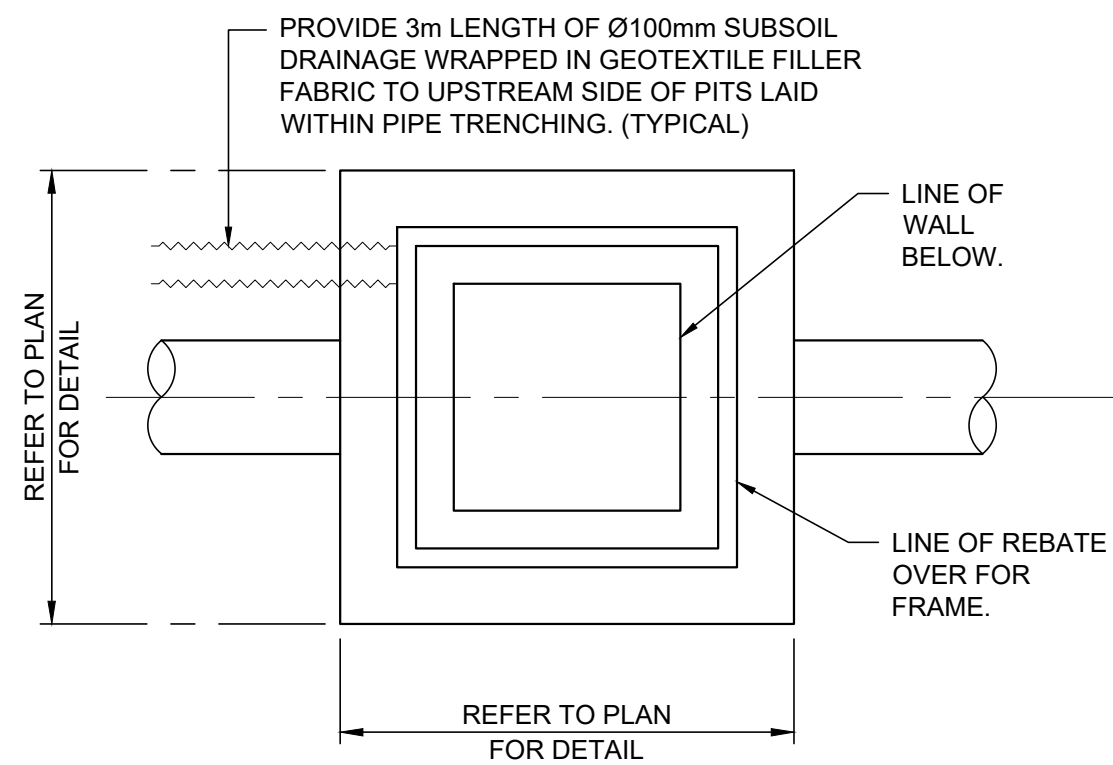


**R.C. BLOCK RETAINING WALL TYPE 'B'
- RW1 (OFF ROCK)**

SCALE 1:20
DETAILS AS SHOWN ON TYPE 'A' U.N.O.



SQUARE STORMWATER PIT DETAIL
N.T.S.



SECTION A
SCALE 1:10

PRECAST PITS: 150 THICK MASS CONCRETE SURROUND TO BE PROVIDED AROUND INLET AND OUTLET PIPES FOR ALL CONCRETE PIT PENETRATIONS. (TYPICAL)

ISSUE	DESCRIPTION	APPROVED	DATE
7	DETAILS REVISED	CA	11/02/21
6	RETAINING WALL (OFF ROCK) DETAILS ADDED	CA	09/02/21
5	DETAILS REVISED	CA	22/12/20

ARCHITECT
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Sydney 61 2 9922 2344 nbrsarchitecture.com

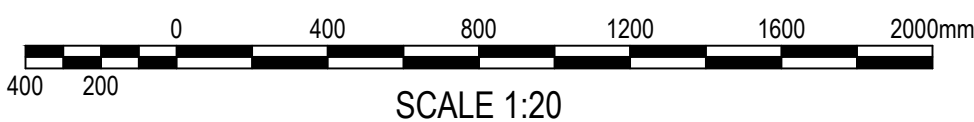
BIRZULIS ASSOCIATES
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583 DARLING STREET ROZELLE NSW 2039
tel: (02) 9555 7230 email: office@birzulisassociates.com www.birzulisassociates.com

PROJECT
**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

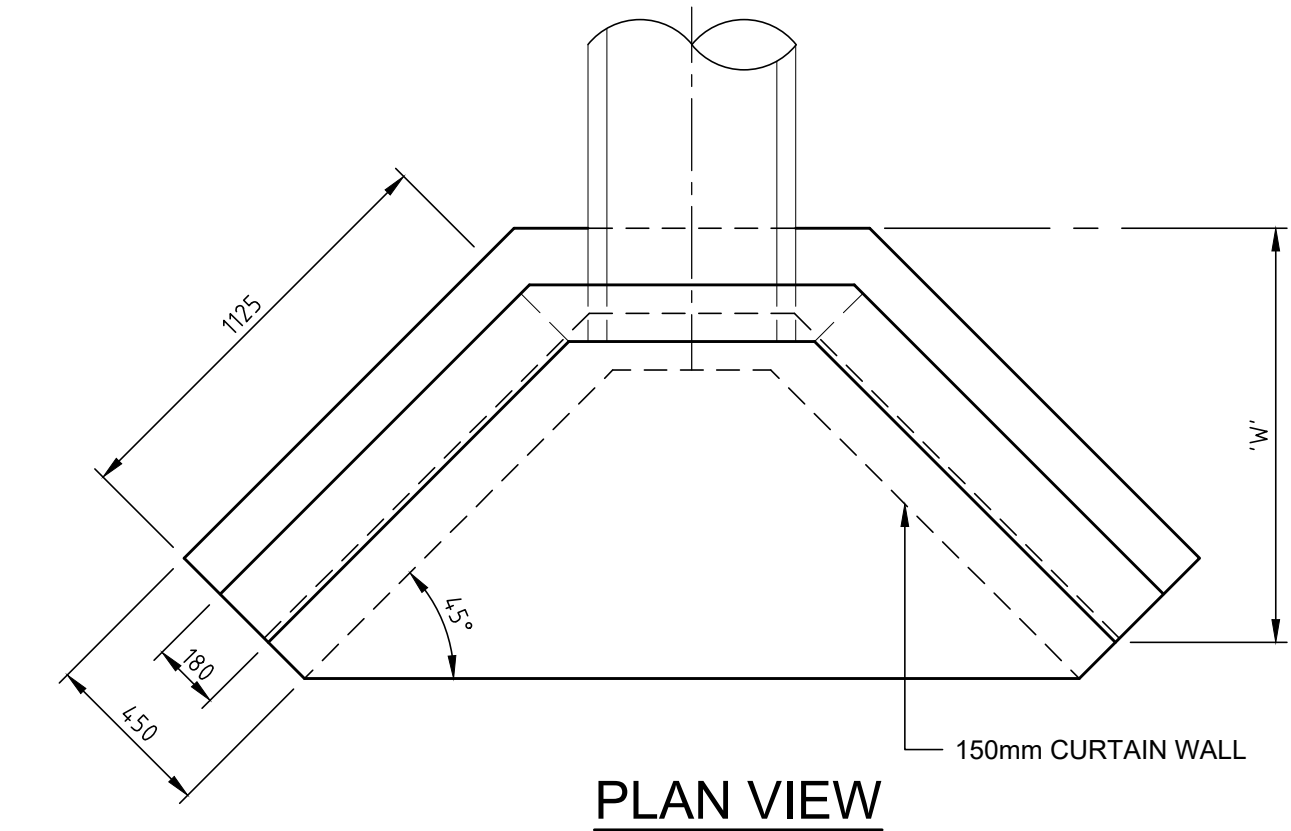
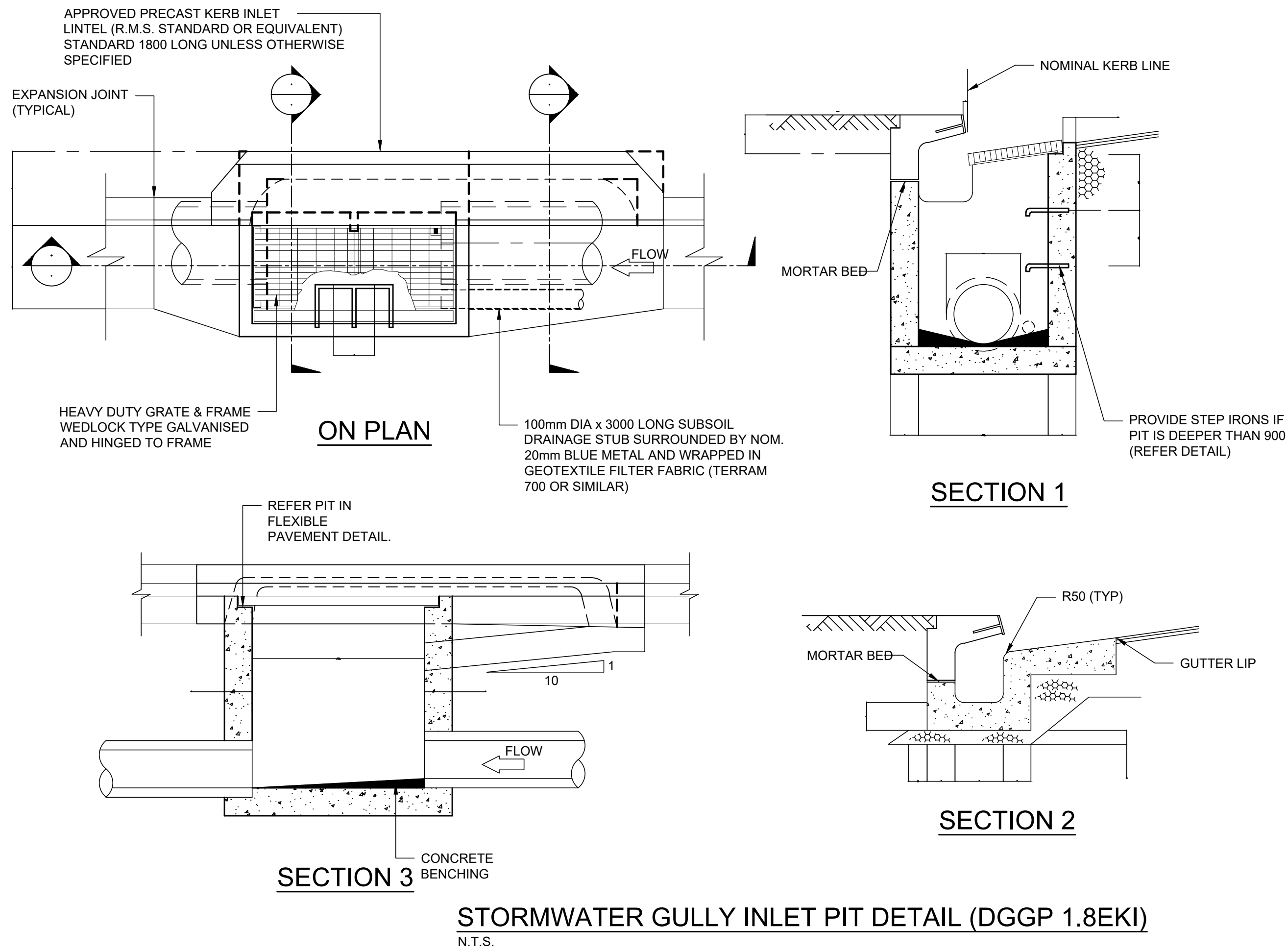
TITLE
CIVIL DETAILS SHEET 4

SCALES DATE
DRAWN DG DESIGN DG VERIFIED CA APPROVED MG
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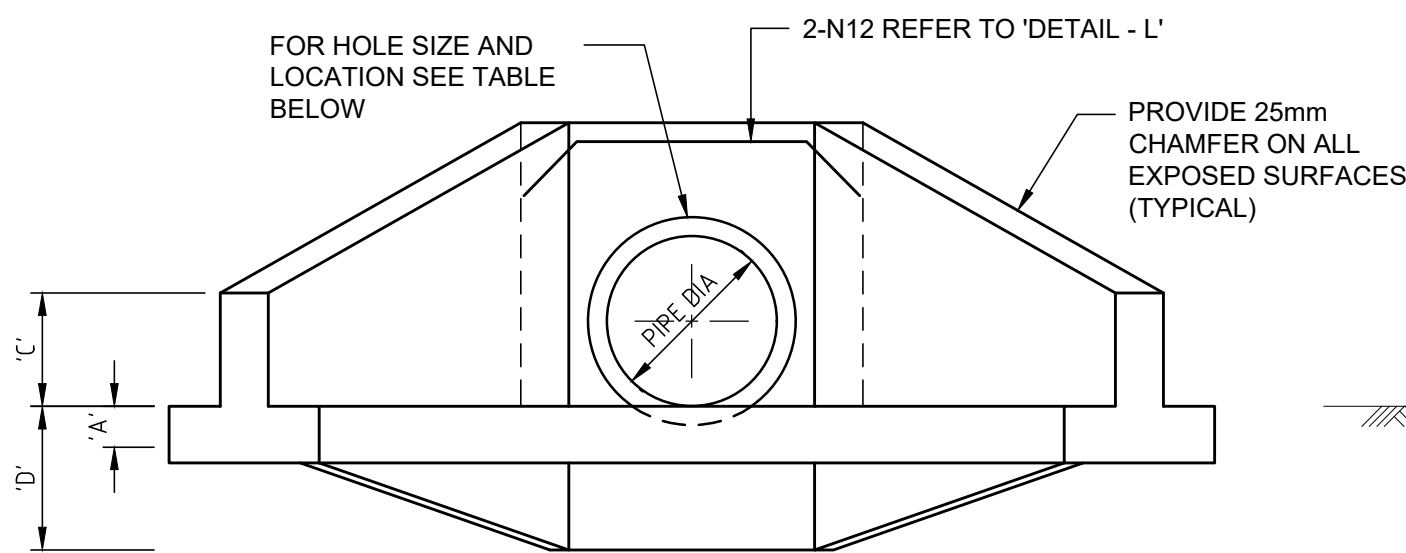
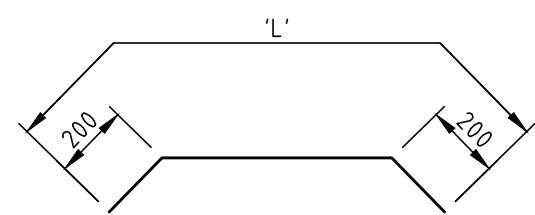
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SCALE 1:20

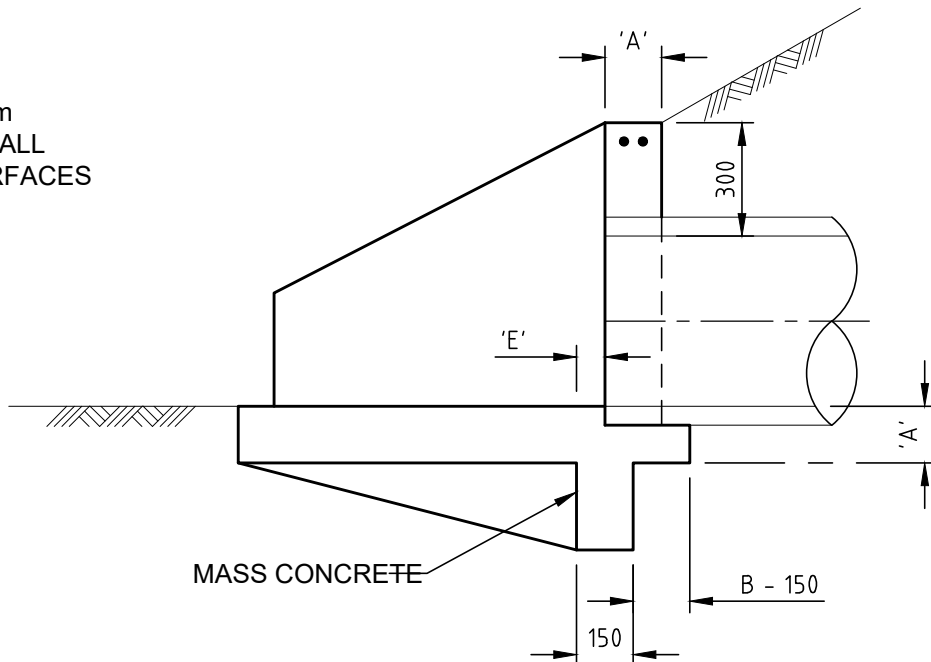


PIPER DIAMETER	300Ø	375Ø	450Ø	525Ø	600Ø	750Ø	900Ø
A	150	150	150	150	180	205	230
B	300	300	300	300	450	450	450
C	300	300	300	300	380	380	380
D	380	380	380	380	530	530	530
E	75	75	75	75	110	110	110
W	690	690	840	990	1120	1450	1780
L	840	840	915	990	1100	1250	1400
CONCRETE QUANTITY (m³)							
	0.25	0.27	0.325	0.38	0.67	1.02	1.40
REINFORCEMENT DIAMETER							
	10	10	10	10	12	12	12
REINFORCEMENT							
LENGTH (mm)	1680	1680	1830	1845	2200	2500	2800
MASS (kg)	1.1	1.1	1.2	1.3	2.0	2.6	2.95



FRONT VIEW

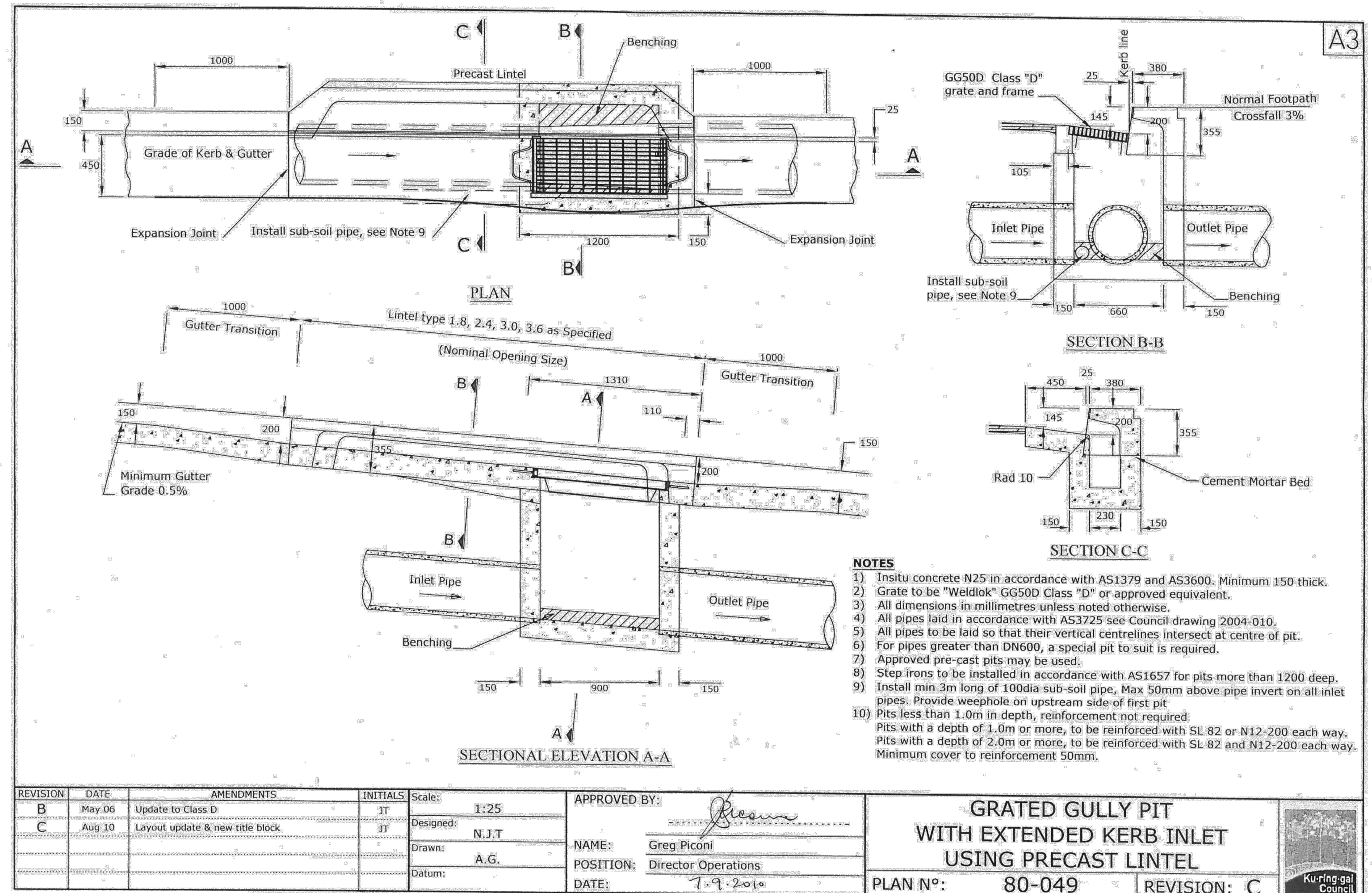
HEADWALL DETAIL
N.T.S.



SECTION VIEW

GENERAL NOTES

1. CONCRETE STRENGTH: 30mPa AT 28 DAYS COMPRESSIVE STRENGTH
2. STEEL REINFORCEMENT: REFER TO AUSTRALIAN STANDARDS
3. MINIMUM REINFORCEMENT COVER: 60mm
4. CHAMFER ON ALL EXPOSED EDGES: 25mm



REVISION	DATE	AMENDMENTS	INITIALS	Scale:	APPROVED BY:
3	May 06	Update to Class D	JT	1:25	
2	Aug 10	Layout update & new title block.	JT	Designed: N.J.T.	
1				Drawn: A.G.	
				Datum:	DATE: 1.9.2018

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PROJECT

LINDFIELD LEARNING VILLAGE STAGE 2 & 3

TITLE

CIVIL DETAILS SHEET 5

SCALES

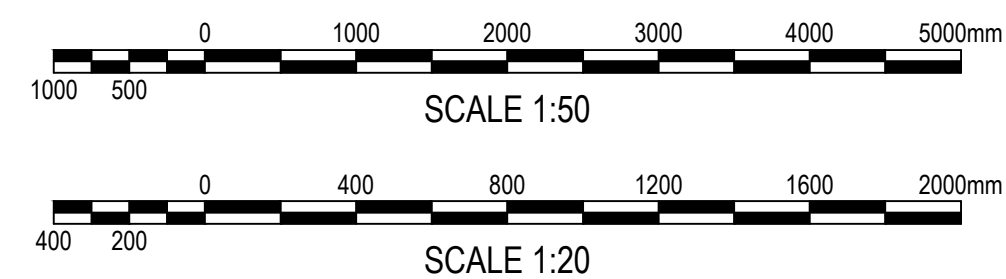
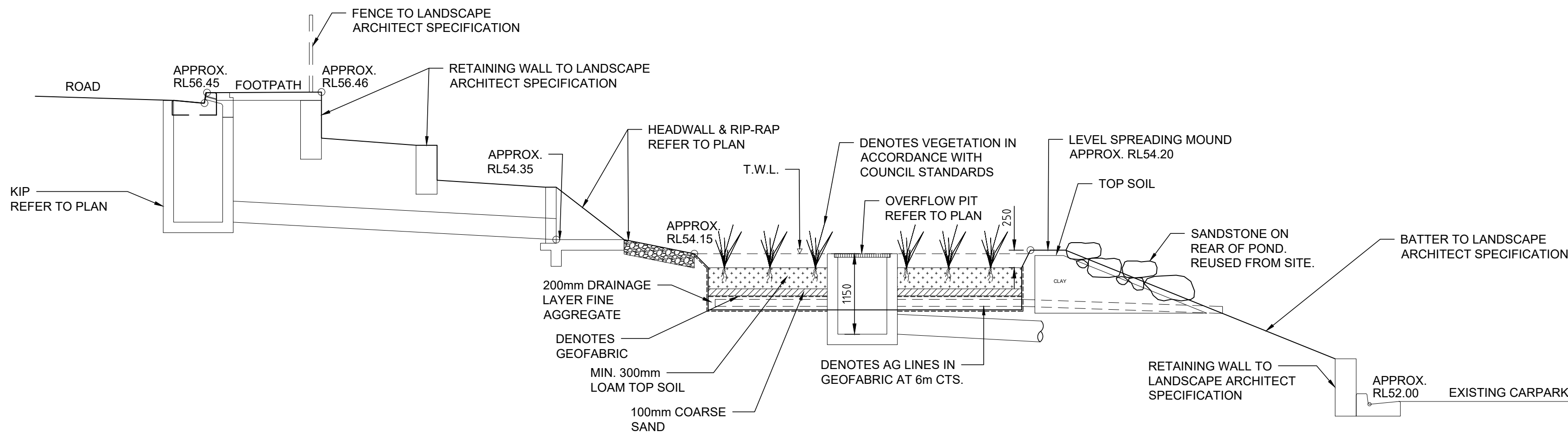
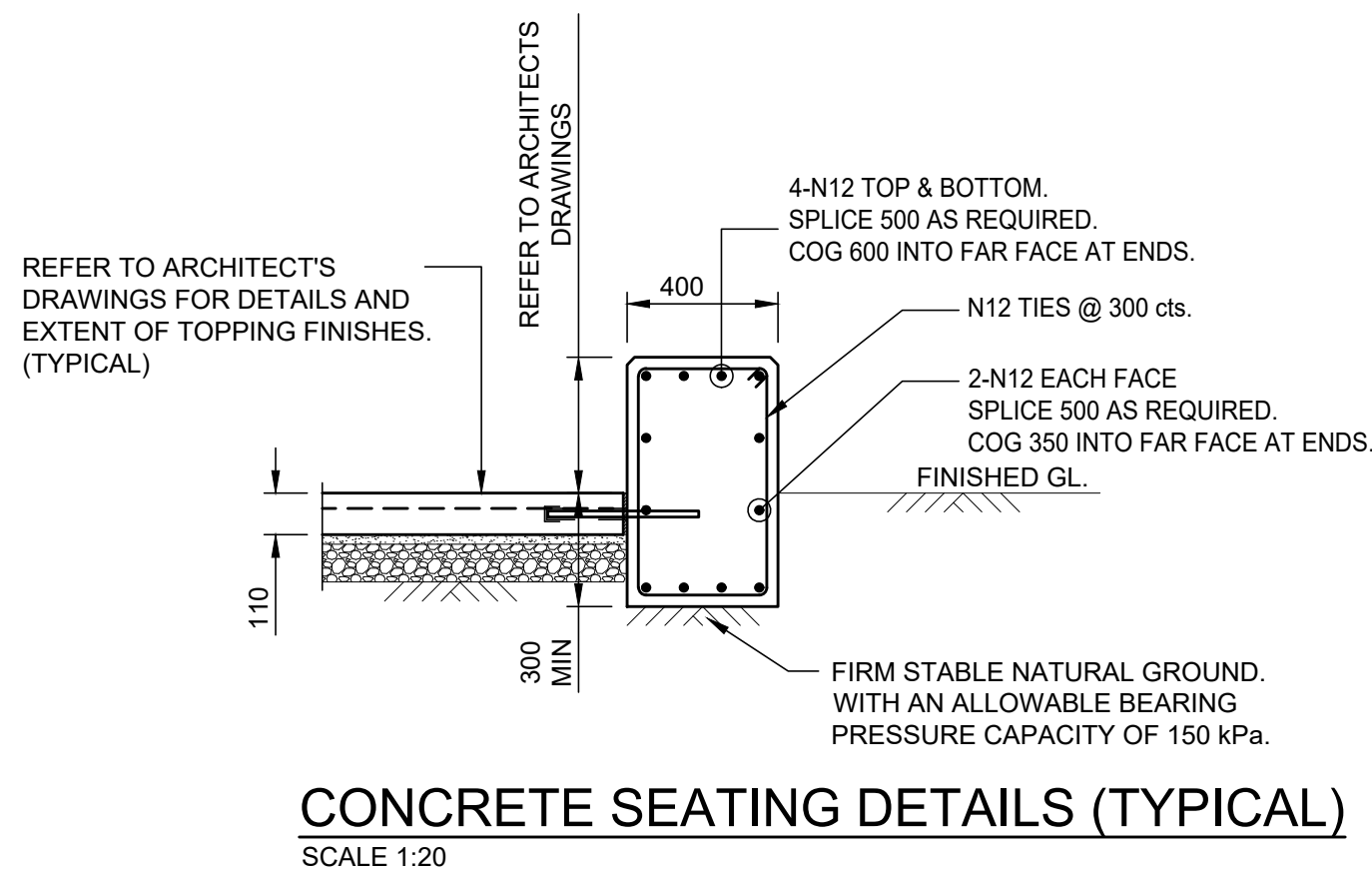
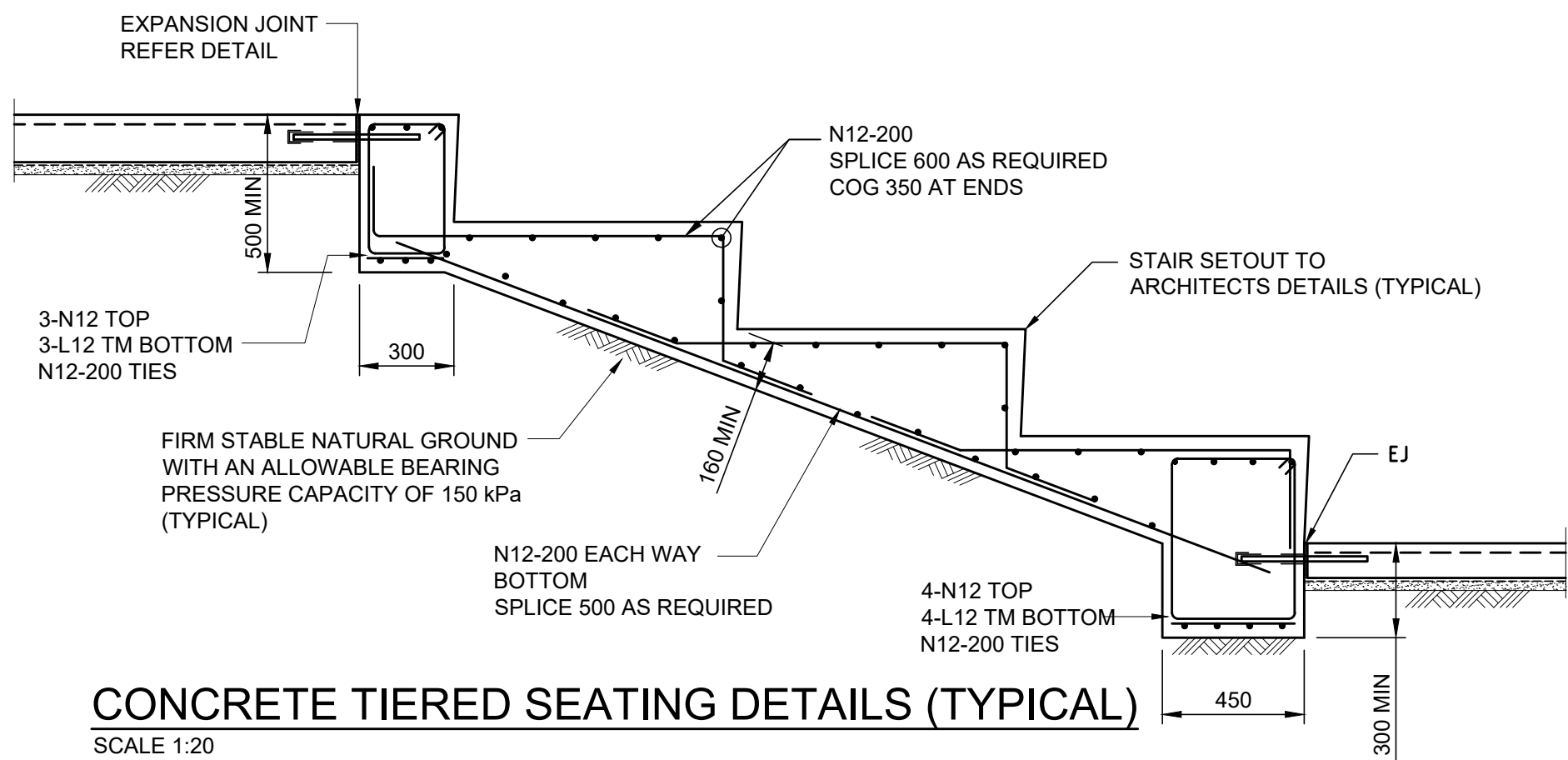
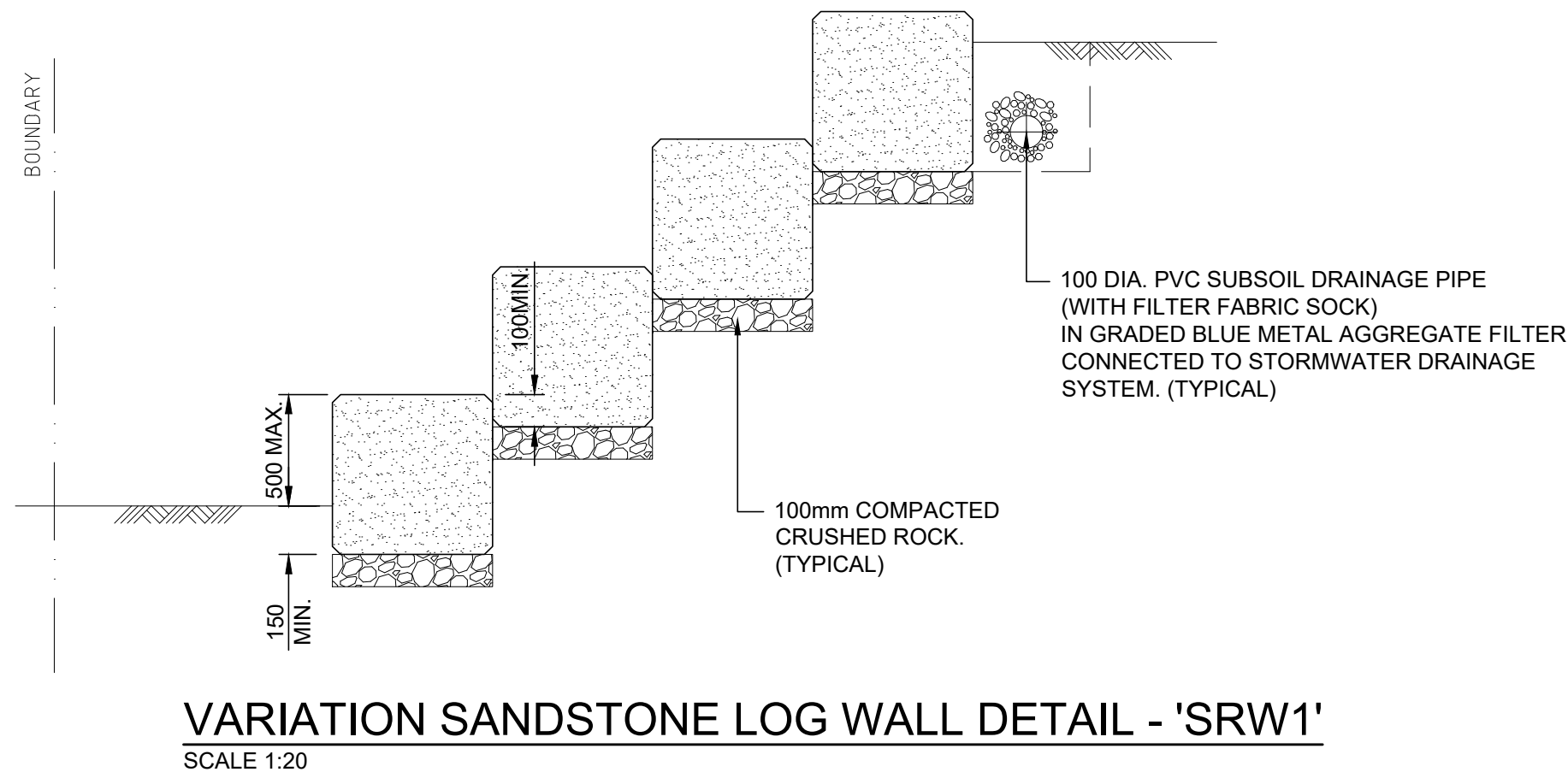
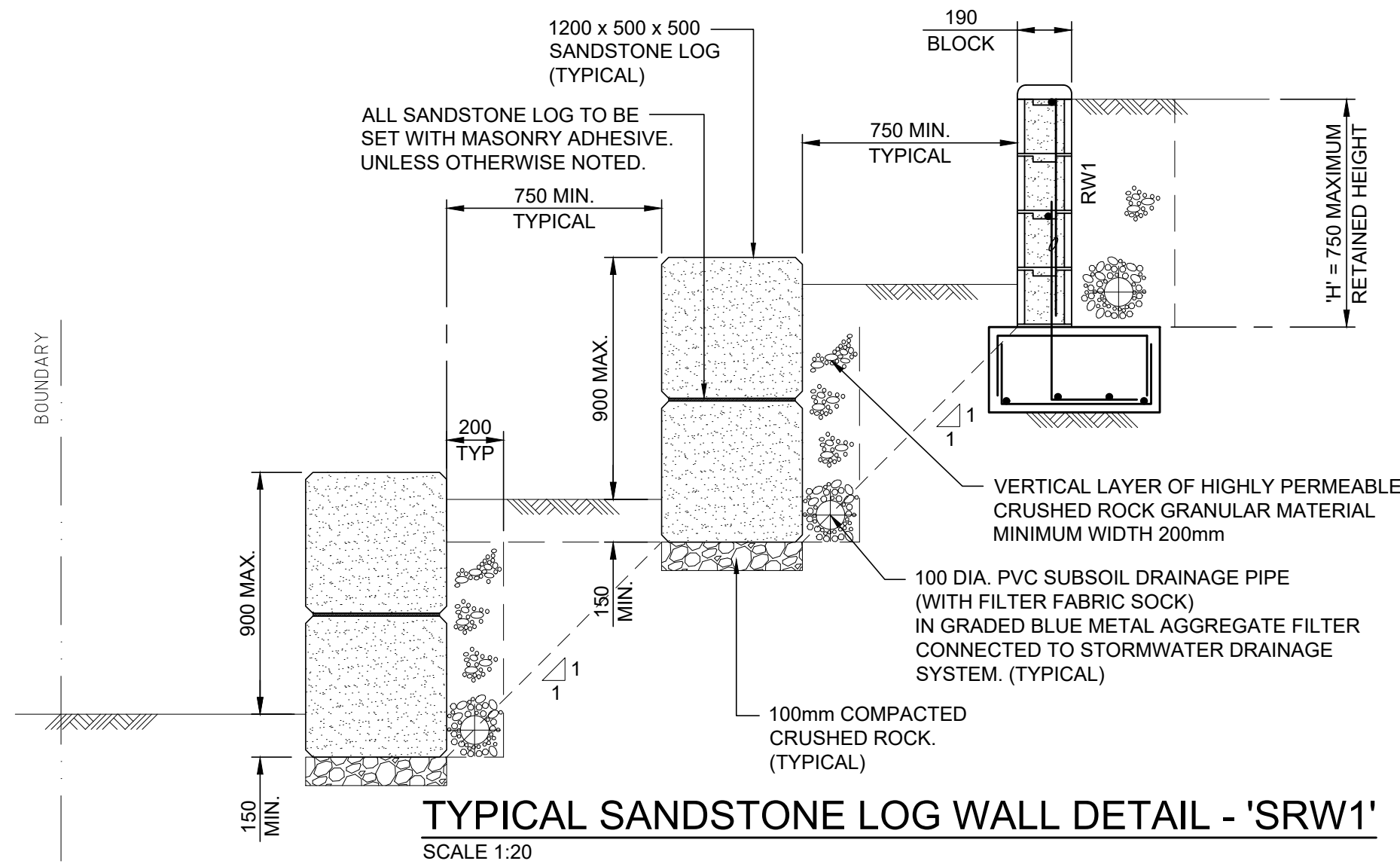
DATE: MAY 2020

DRAWN: DG DESIGN: DG VERIFIED: CA APPROVED: MG

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2	SECTION DETAIL ADDED	CA	11/02/21
1	DETAILS SHEET ADDED	CA	22/12/20
ISSUE	DESCRIPTION	APPROVED	DATE

ARCHITECT

NBRSARCHITECTURE.

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PROJECT

**LINDFIELD LEARNING VILLAGE
STAGE 2 & 3**

TITLE

CIVIL DETAILS SHEET 6

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DRAWN DG	DESIGN DG	VERIFIED CA	MAY 2020 MG

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ISSUE	PROJECT No.	DRAWING No.
2	7576	C.236