FORUM CONSULTING ENGINEERS

29 May 2020

Ref. 901043

Catholic Schools Office
Diocese of Maitland-Newcastle
C/- Webber Architects
PO Box 807
The Junction NSW 2291
Attention: Sandra Hinchey

RE: St James Primary School – Vista Parade, Kotara: Flooding Review

1. Introduction

1.1 In July 2019 Forum Consulting Engineers prepared a report principally to advise on floor levels and flood hazards within the current site, for proposed redevelopment of the site.

1.2 The report and recommendations were based generally on flood modelling results undertaken for Newcastle City Council in 2009, and Council's flood certificate of 25th February 2019.

1.3 The report identified the following:

1.3.1 The modelling was based on rainfall intensities which have been increased by recent data in Australian Rainfall and Runoff, and therefore the results from the modelling were not conservative.

1.3.2 The major flooding down the open stormwater channel parallel to the site's western boundary had negligible impact on the site, except for minor encroachment of floodwaters along the western fence line, and significant and hazardous flooding in Vista Parade opposite the proposed driveway entry at the south-west corner of the site.

1.3.3 The major contribution to flooding through the site is from a catchment draining across Princeton Avenue approximately along the line of Council's pipeline, flooding across the cycleway running parallel to the sites eastern boundary, breaking into the site, and principally flooding through the area of developed site containing the existing buildings.

1.4 The report further went on to make recommendations relating to the proposed development, based on no changes being made to relieve the site from current flooding events.

PO Box 261, Wickham NSW 2293 | 67 McMichael Street, Maryville 2293
T: 02 4961 4980 | E: admin@forumengs.com.au
Forum Consulting Engineers is a division of Forum Engineering Services Pty Ltd ABN 91 626 002 551

1.5 Council, as part of their review of the proposed development application, have requested a comprehensive assessment of flooding, from both the western stormwater channel and the eastern Princeton Avenue catchment, based on current 2020 data. Their requirements are stated in their email correspondence Amanda Gale, NCC to Megan Eiman, Webber Architects, of 20th February 2020.

1.6 Following Council's response, Forum Consulting Engineers have undertaken the following:

1.6.1 Undertaken a DRAINS analysis to assess current maximum ARI100 flows occurring along the site's eastern boundary, from the Princeton Avenue catchment.

1.6.2 Undertaken a simplified analysis to determine the increased extent of flooding for current rainfall data from the western open stormwater channel.

1.6.3 Determined recommended works about the proposed Vista Parade entry, to allow the entry to proceed in its proposed location, with a risk not exceeding Council and AR&R recommendations, and with an emergency secondary exit point when Vista Parade becomes unsafe for traffic.

1.6.4 Determine recommended works along the site's eastern boundary to intercept the Princeton Avenue flows and divert them parallel to the developed site area through to the retained vegetation area at the north of the site.

1.6.5 The recommended works assessed under clauses 1.6.3 and 1.6.4 above will result in the developed site being now clear of flooding in ARI 100 events, with the only affected area being the proposed road and entry along the site's western boundary.

2. Recommended Works Adjacent to the Cycleway

2.1 Drawing numbers 901043/1-2, attached, detail the proposed location and profiles for the overland flow path, which is to intercept the flows across the cycleway and direct them to the naturally vegetated area at the northern end of the site, from which the flows will sheet across to the open stormwater channel.

2.2 This design has no negative impact on current floodwaters coming through the site and entering the stormwater channel as sheet flow – it simply shifts the entry location downstream of the developed site area.

2.3 The proposal will require the upstream ends of the overland flow channel to be fenced off to restrict access, as VD ratios exceed safe levels.

2.4 Additionally, the open grid fence along the cycleway will need to remain to allow overflowing runoff to enter the site.

2.5 The design has no effect on current flooding conditions along the cycleway.

3. Recommended Works to Proposed Vista Parade Entry & Western Boundary Roadway

3.1 As previously discussed, in extreme flooding events Vista Parade is unsafe for vehicles trying to enter or exit the site at the proposed new driveway location.

3.2 However, to facilitate satisfactory traffic movements for the proposed development, the construction of the driveway at this location is critical.

3.3 The flooding events that negate safe usage are of low frequency (probably about the ARI 20 frequency), therefore it is proposed to utilise the proposed driveway location up until the entry point becomes unsafe, and construct an 'emergency' secondary entry/exit point clear of the ARI 100 flooding extent.

3.4 For the above, the following is proposed:

- The entry into the site will be ramped up to stop the Vista Parade cresting waters entering the site, up to a level 200mm below the assessed ARI 100 flood level (at this depth VD ratios are satisfactory).l The ramp grades satisfy the requirements for medium rigid vehicles (as noted in AS2890.2)
- The sides to the entry will be constructed to stop any water entry entering at other than the ramp, and being diverted back into the stormwater channel.
- The remainder of the roadway will act as an overland flow path at a depth to satisfy safe VD ratios, and graded approximately at a grade to match the invert of the open stormwater channel, such that it is available as the eastern edge of the width of the floodway.

Details for the above are shown as Annexure 'A'.

4. Items raised in Council's Correspondence

Item 1: The proposed works adjacent to the cycleway will stop the current flooding occurring through the site, so current buildings will now satisfy the requirements for safe and serviceable floor levels.

Item 2: The construction of a secondary 'emergency' entry/exit point clear of the ARI 100 flood level addresses this item.

Item 3: Bollards are not required as resultant VD ratios satisfy the requirement for safe pedestrian and vehicle access.

Item 4: Modelling and calculations are attached.

5. Recommendations for a Flood Emergency Response Plan

5.1 With the construction of the recommended works, with the exclusion of the Vista Road entry location, the remainder of the site is flood free up to and including the current ARI 100 flood event.

5.2 Means are to be implemented to accurately determine at which depth the exit onto Vista Parade is unsafe, and the secondary emergency exit is made available. It is suggested this can be easily determined by a depth marker just within the property, and a warning sign advising that entry into Vista Parade is not permitted when the depth marker indicates a depth greater than 300mm in Vista Parade fronting the driveway, and a gate to be closed to ensure that the secondary entrance must be utilised.

5.3 A responsible member of staff would need to monitor the water depth to determine when the diversion to the secondary exit is implemented (or alternatively in predicted heavy rain events simply close off the main entry and open the secondary exit). Parents and staff would need to be informed of the proposed means of implementation.

5.4 From the previous 2009 flood modelling the intersection of Vista Parade and Princeton Avenue was the extent of 'flood fringe' for the then ARI 100 event. For the 2020 ARI 100, this situation is not expected to change such that access through this intersection becomes unsafe. Therefore there will be a permanent exit available from the site through the intersection.

5.5 As the site has permanent ARI 100 safe egress, a PMF refuge is not required.

Yours sincerely
Forum Consulting Engineers

Graeme Holmes
Director/Structural & Civil Engineer
B.E. (Civil) MIEAust CPEng NER

VISTA PARADE/SWC PARALLEL TO WESTERN BOUNDARY

1. From the flood mapping undertaken to this catchment in 2009:
    - Vista Parade is overtopped at the open stormwater channel, with the flooding extending principally easterly up Vista Parade, and travelling diagonally across the site to re-enter the stormwater channel. Council's flood classification map, attached as annexure 'B', illustrates this.
    - Once the above water crossed back into the stormwater into the stormwater channel, the above map indicates flooding is generally lapping the site fence line.
2. To assess the extent of flooding under current AR&R 2020 we have undertaken a simplified assessment, based on determining the approximate flows shown in the 2009 flood maps, and multiplying the change in intensities noted in the 2009 AR&R to the current AR&R. Calculations are detailed in Annexure 'C'.
3. From this analysis:
    - Flooding is exacerbated about the site's south-west corner, where the proposed new entry is located.
    - The extent of flooding now enters the site along the western boundary, but only within the width of the proposed new driveway – attached Annexure 'D' indicates the new ARI 100 flood limits.

PRINCETON AVENUE CATCHMENT

1. From DRAINS analysis, the P100 at the eastern site boundary is 9.6m^3/second.
2. Annexure 'E' approximately defines the length of the cycleway that this water crests over, noting that the extent of existing vegetation makes accurate determination not possible. However, it is clear that the total volume can't break across the cycleway opposite the existing easement (which contains Council's 1200mm diameter pipeline) which traverses the site, and therefore some proportion of this volume travels down the cycleway and breaks through the fence along the school's eastern boundary.

   For design analogy, consider:
   - Maximum 75% enters at the easement (this is clearly conservative), with
   - The remaining 25% entering at say 35m further down the cycleway (again, conservative, as for this analogy the full volume has entered the site, at 35m northerly of the easement).
3. It is proposed to intercept the flows entering the site along the site's eastern boundary. In doing so, this will:
   - Have no adverse flooding effects on the site, and as such
   - Will remove the flooding hazard to the site.
   - Have no adverse effects on the current cycleway flooding.

   This will be achieved by connecting variation on open channels, determined by analysis.
4. There are 3 distinct channel types, being:
   - Commencing at the southern end a narrow, high velocity, rock covered flood channel, noted as channel types 1 and 2, opening up and transitioning into
   - A wider landscaped channel type 3, with some scour protection, lower velocities, opening up and transitioning into
   - A grassed channel type 4, with 'tightly bound' turf (couch, kikuyu, or similar), and can include landscaping, providing the cross-sectional area is not significantly reduced, transitioning into
   - A 'natural' channel, generally following existing contours, lower velocities, allowing retention of existing vegetation if desired, with grassing or equivalent of any 'bare' surfaces likely to scour.

   The channel types are shown on attached drawing 901043-SWD1-2, with calculations attached as Annexure 'F'.

Flood Classification Map

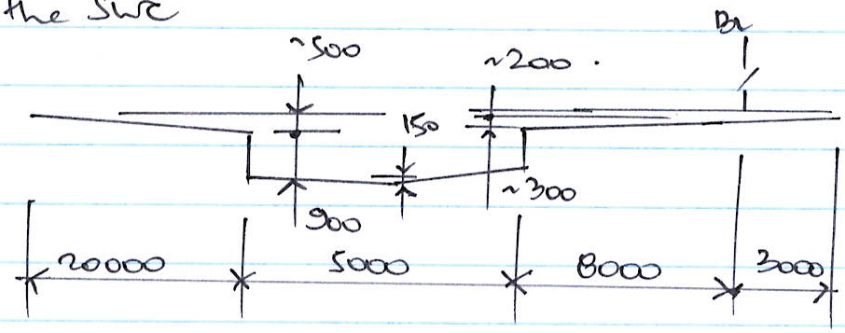
ANNEXURE B

ANNEXURE 'C'

VI.

ASSESSMENT OF CURRENT FLOWS ALONG OPEN SWC.

1. From the limit of flooding shown in the 2009 flood modelling, the affected cross-section is approx. for the SWC



$S \sim 1\%$.

For the above profile, capacity Q

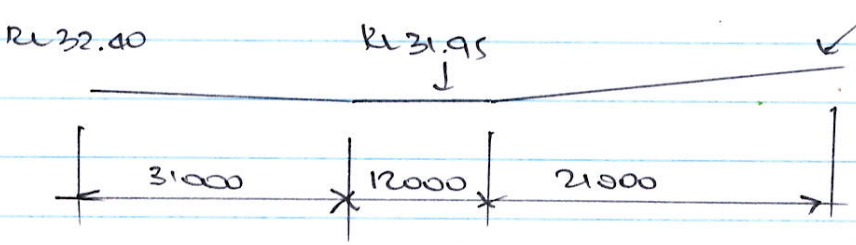
$\sim 20 \times 0.5/2 \left(5/20\right)^{2/3} (0.01)^{1/2}/0.025 = 7.9$

$+ 11 \times 0.5/2 \left(2.75/11\right)^{2/3} (0.01)^{1/2}/0.025 = 4.1$

$+ 5 \times 1.08 \left(7.4/7.6\right)^{2/3} (0.01)^{1/2}/0.014 = 51.0$

Total $63.3 m^3/sec$.

2. Considering the culvert under Vista parade acts as a choke, then from the extent of 2009 flooding across Vista Parade, the approx. flooded cross. section is



As a spillway $Q \sim 1.5 \times 64 \times \left(\frac{0.65 \times 12 + 55/2 \times 0.45}{64}\right)^{3/2}$

$= 52.2 m^3/sec.$

∴ for the 2009 model

- $Q_{100\ ARI}$ in SWC $\sim 63.3 m^3/sec$,
- $Q_{100\ ARI}$ overtopping Vista Parade $\sim 52.2 m^3/sec$, at $\sim$ RL32.60

3. From 1) & 2) the approximate blocked capacity of the culvert beneath Vista parade is approx. $63.3 - 52.2 = 11.1\ m^3/sec$.

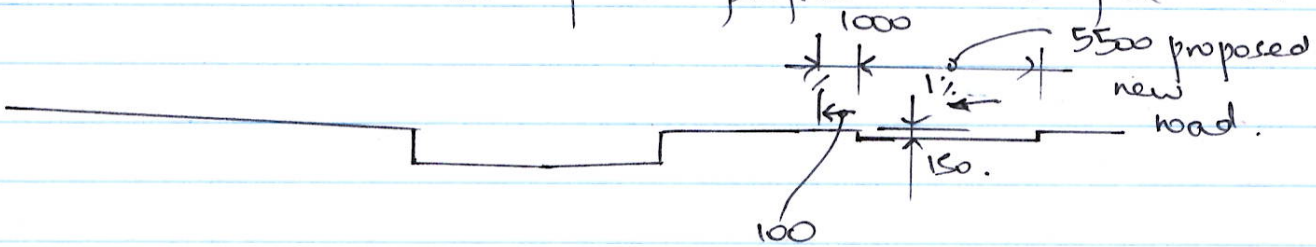
4. For 2020 volumes simply multiply 2009 volumes by the increase in the I100 for a 5 minute storm event (the storm event period is not critical).

ie Q_{100} in SWC now = $316/236 \times 63.3 = 84.2\ m^3/sec$

& Q_{100} overtopping Vista pde. is now

$84.2 - 11.1 = 73.1\ m^3/sec$.

5. Determine the new flood profile in the open SWC:



Flood level similar to 1) assessment

$$\rightarrow Q_{cap} = 51.0 + 7.9 + (9 \times 0.5/2)\left(\frac{2.3}{9}\right)^{2/3}(0.01)^{1/2}/0.025 + 5.5 \times 0.25\left(\frac{0.68}{5.0}\right)^{2/3}(0.01)^{1/2}/0.014$$

$$= 63.7\ m^3/sec.$$

$\therefore$ flood width needs to widen & deepen.

From iteration, for an increase in flood depth x 150mm,

capacity =

$26 \times 0.65/2\left(\frac{0.45}{26}\right)^{2/3}(0.01)^{1/2}/0.025 = 16$

$5 \times 1.63\left(0.15/4.0\right)^{2/3}(0.01)^{1/2}/0.014 = 59$

$9 \times 0.65/2\left(\frac{2.9}{9}\right)^{2/3}(0.01)^{1/2}/0.025 = 6$

$5.5 \times 0.4\left(2.2/5.8\right)^{2/3}(0.01)^{1/2}/0.014 = 8$

$89\ m^3/sec \simeq 84.2\ m^3/sec$

$V = 89/21.72 = 4.1$

$VD = 4.1 \times 0.40 = 1.6$ — too high — road needs to be elevated for safe access.

If raise the road such that maximum flood depth = 0.4 / 4.1 = say 100 mm, then reduction in previous calculation = $5.5 \times 0.3 \left(\frac{1.65}{5.7}\right)^{2/3} (0.01)^{1/2} / 0.014$

$= 5.2$

$\rightarrow$ 89 - 5.2 = 83.8 $\simeq$ 84.2 m^3/sec.

$\therefore$ the road access can be made safely accessible with no effect on the flooding width in the western properties for the ARI 100 2020 volume.

6. Determine the new cresting profile across Vista Parade

From iteration, at flood depth RL 33.20

$$Q \sim 1.5 \times 90 \left(\frac{1.25 \times 12 + 70 \times 1.25/2}{90}\right)^{3/2}$$

$= 80.6 m^3/sec \simeq 73.1 m^3/sec$ — adopt flood height RL 33.20 in Vista Parade.

$V \sim 73.1 / 63.8 = 1.14$

ANNEXURE 'F'

CHANNEL CALCULATIONS.

1. Channel type 1, $Q_{required} = 0.75 \times 9.6 = 7.2 m^3/sec.$

$S \sim 0.5/25 = 2\%$, adopt $n = 0.035$

From iteration 7500 wide x 450 deep,

$Q = 7.5 \times 0.45 \left(\frac{3.38}{8.4}\right)^{2/3} (0.02)^{1/2} / 0.035 = 7.4 m^3/sec$ — OK

$V = 7.2/3.38 = 2.13 m/sec.$ — Scour velocity to high for grasses

for riprap floor protection

$$\frac{2.1}{(9.81 D_{50})^{1/2}} = \frac{2.48 \times 0.02^{0.58} \times 1.5^{-2.22}}{S \qquad C_n}$$

$$\rightarrow D_{50} = \left(2.1/0.1011\right)^2/9.81 = 44mm$$ — say 50mm, with minimum 100 thick layer

$VD = 2.1 \times 0.45 = 0.94 > 0.4$ — access not permissible.

2. Channel type 2, Q req'd $= 9.6 m^3/sec$,

$S \sim 0.9/45 = 2\%$, adopt $n = 0.035$

From iteration 9000 wide x 500 deep

$Q = 9 \times 0.5 \left(4.5/10\right)^{2/3} (0.02)^{1/2} / 0.035 = 10.6 m^3/sec$

— OK

$V = 9.6/4.5 = 2.1$

— maintain same details as channel type 1.

3. Channel type 3, Q req'd = $9.6\ m^3/sec$

$S \sim 0.5/45 = 1.11\%$, adopt $n = 0.030$

from iteration 12000 wide x 400 deep

$Q = 12 \times 0.4 \left(4.8/12.8\right)^{2/3} \left(0.0111\right)^{1/2} / 0.03 = 8.7$

— adopt 13000 x 400

$V = 9.6 / 5.2 = 1.84$ m/sec — too high for grasses

For riprap protection

$$\frac{1.84}{(9.81\ D_{50})^{1/2}} = 2.48 \times 0.0111^{0.58} \times 1.5^{-2.22}$$

$\rightarrow D_{50} = 25mm$ — maintain $D_{50} = 50$ & interplant grasses.

$VD = 1.84 \times 0.4 = 0.74$ — access not permissible.

4. Channel type 4, $Q_{req'd} = 9.6\ m^3/sec$

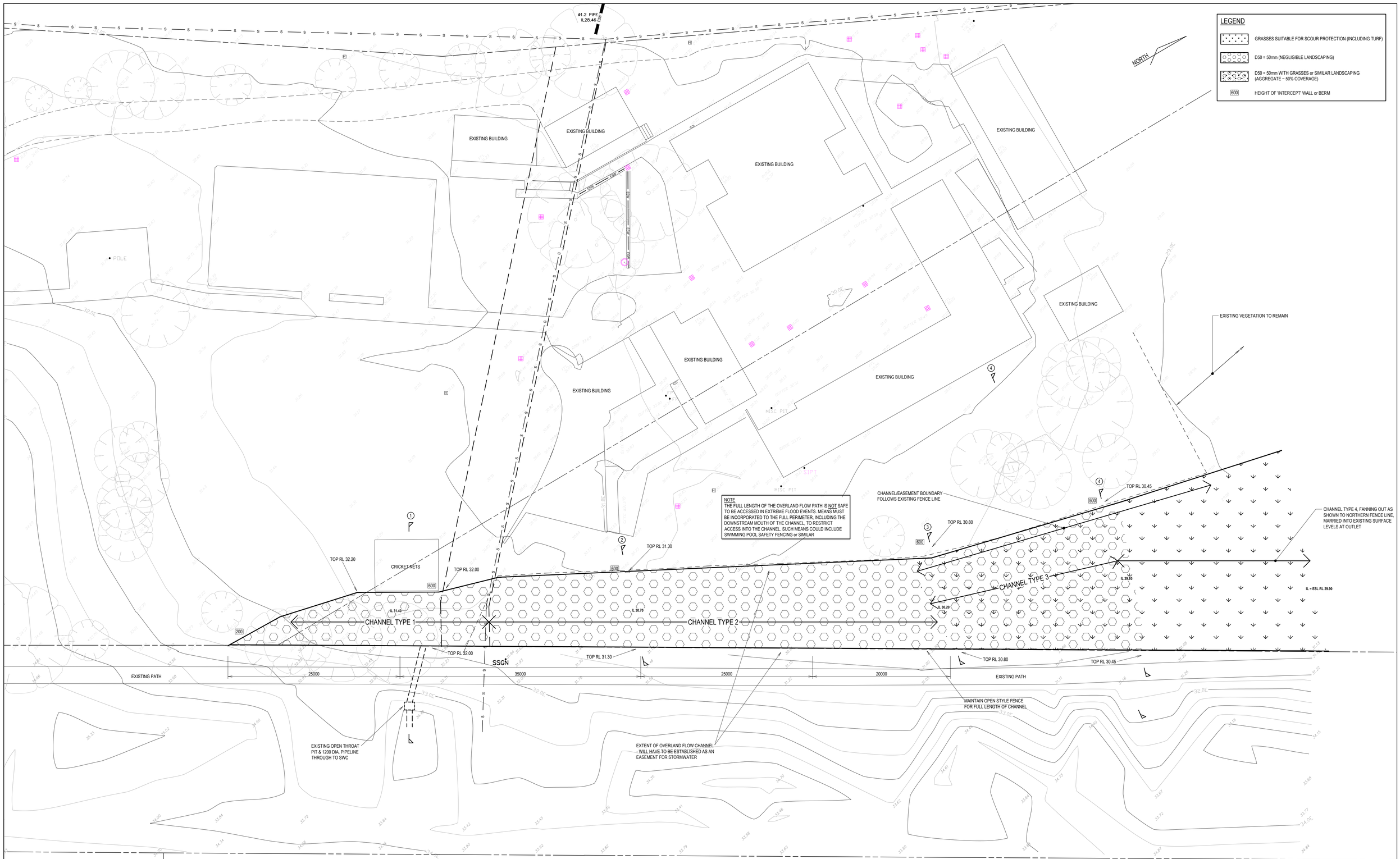
$S \sim 1\%$, adopt $n \sim 0.025$

from iteration 20000 x 300

$Q = 6 \left(6/20.6\right)^{2/3} \left(0.01\right)^{1/2} / 0.025 = 10.5 m^3/sec.$

$V = 9.6/6 = 1.6$ m/sec — suitable for tightly bound grasses.

$VD = 1.6 \times 0.3 = 0.48$ — access not permissible



PROPOSED OVERLAND FLOW PATH

1:250

IT IS THE BUILDERS RESPONSIBILITY TO CONFIRM DEPTH & LOCATION OF ALL SERVICES PRIOR TO CONSTRUCTION AS THIS MAY AFFECT THE DESIGN.

REVISIONS

Rev.	By	Date	Description	Des'd
A	E.R.	04.06.20	ORIGINAL ISSUE	G.H.

FORUM CONSULTING ENGINEERS

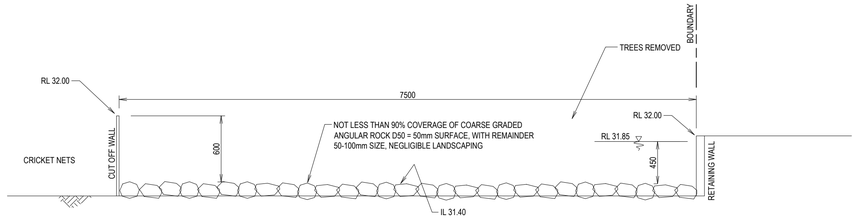
PO BOX 261, WICKHAM 2293 | 67 McMICHAEL ST, MARYVILLE 2293
T: 02 4961 4980 | E: admin@forumengs.com.au
A.B.N. 91 626 002 551

Client: ST THERESE'S & CATHOLIC DIOCESE

Project: PROPOSED CIVIL WORKS
BURKE STREET
NEW LAMBTON

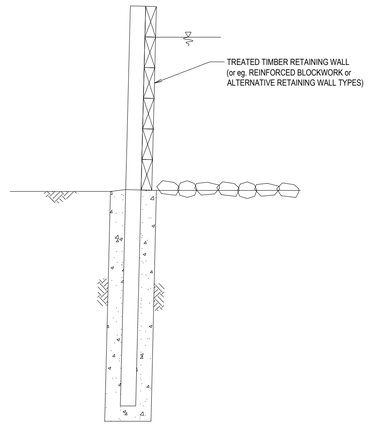
Approved by: NOT FOR CONSTRUCTION

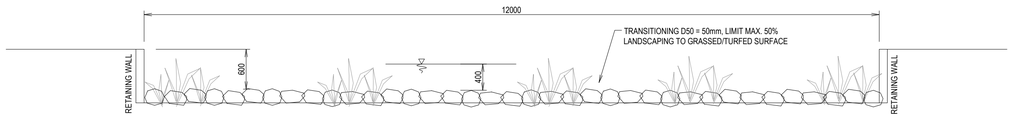
Drawing No.	Revision	Sheet
901043-SWD - 01 OF 02	A	A1



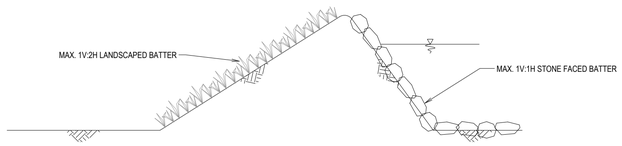
SECTION 1-1 - (SECTION 2-2 SIMILAR, EXCEPT 9000 W. x 500 D.)
NTS

NOTES
1. IN CHANNEL TYPES 3 & 4 TREES CAN BE PLANTED PROVIDING THEY DO NOT REDUCE THE CHANNEL SECTION WIDTH x GREATER THAN 10%.

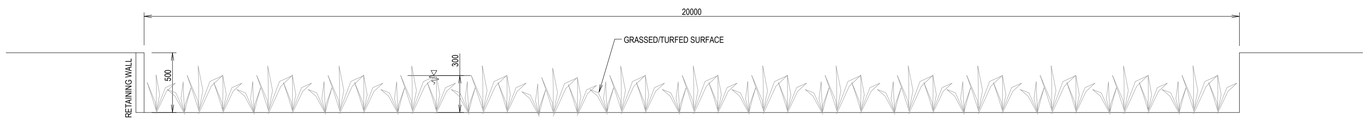




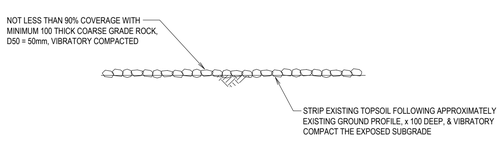
SECTION 3-3
NTS



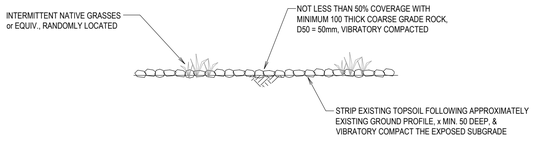
ALTERNATIVE CUTOFF WALL SECTIONS
1:100



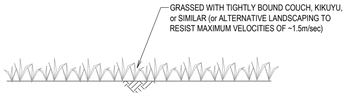
SECTION 4-4
NTS



CHANNEL TYPE 1 & 2
NTS



CHANNEL TYPE 3
NTS



CHANNEL TYPE 4
NTS

REVISIONS

Rev.	By	Date	Description	Des'd
A	E.R.	04.06.20	ORIGINAL ISSUE	G.H.

FORUM CONSULTING ENGINEERS

PO BOX 261, WICKHAM 2293 | 67 McMICHAEL ST, MARYVILLE 2293
T: 02 4961 4980 | E: admin@forumengs.com.au
A.B.N. 91 626 002 551

Client: ST THERESE'S & CATHOLIC DIOCESE

Project: PROPOSED CIVIL WORKS
BURKE STREET
NEW LAMBTON

Approved by: NOT FOR CONSTRUCTION

Drawing No.: 901043-SWD - 02 OF 02

Revision: A

Sheet: A1

STYX CREEK DRAINAGE RESERVE

EXISTING GAS AUTHORITY LINE LOCATED ON SOUTHERN SIDE OF VISTA PARADE. C.O.S. FOR EXACT LOCATION

EXISTING NBN AUTHORITY LINES LOCATED ON SOUTHERN SIDE OF VISTA PARADE. C.O.S. FOR EXACT LOCATION

APPROXIMATE LOCATION OF EXISTING NBN AUTHORITY LINE. C.O.S. FOR EXACT LOCATION

BOUNDARY

Ex. SEWER

CAP EXISTING ϕ450 RCP AND CONNECT TO NEW KERB INLET PIT.

EX. ϕ450 PIPE

KIP 1800 x 900 RL: 31.00 IL: 30.00 CLASS 'C'

ϕ600mm RCP @ 0.5% MIN.

PROVIDE 'OCEAN PROTECT' OCEAN GUARD PIT BASKET.

RAMP CREST.

EXISTING SURFACE LEVEL RL 30.91

RL 30.75

REMAINDER OF DRIVEWAY GRADED AT NOM. 1%

TK NOM. 100mm ABOVE EXISTING SURFACE LEVEL AT BOUNDARY.

PROPOSED ROAD

PROPOSED 196m PRIMARY SCHOOL VEHICLE QUEUING

SUBSOIL DRAIN

GSIP 600 x 600 RL: TBC IL: TBC

ϕ100 AG

GSIP 900 x 600 RL: TBC IL: TBC CLASS 'C'

GSIP 900 x 600 RL: 32.10 IL: 31.50 CLASS 'C'

ϕ100mm uPVC @ 1% MIN.

ϕ300mm uPVC @ 1% MIN.

ϕ375mm uPVC @ 0.5% MIN.

DISH DRAIN

PROVIDE 'OCEAN PROTECT' OCEAN GUARD PIT BASKET.

Ex. ϕ450 SW (C.O.S)

Ex. PIT

600 WIDE DISH DRAIN

ϕ225mm uPVC @ 1% MIN.

GSIP 900 x 600 RL: TBC IL: TBC CLASS 'C'

PROPOSED PRIMARY STAFF PARKING

PROPOSED EEC STAFF & VISITOR PARKING

GSIP 450 x 450 RL: TBC IL: TBC

ϕ100mm uPVC @ 1% MIN.

PROPOSED EARLY EDUCATION CENTRE

RL: 33.42

GSIP 600 x 600 RL: 34.25 IL: 31.85

GSIP 600 x 600 RL: 32.60 IL: 32.00

PROPOSED DETAILS AT VISTA PARADE ENTRY / EXIT = DRIVEWAY.

~ 1: 200

PROPOSED EMERGENCY EXIT TO VISTA PARADE LOCATED CLEAR OF ARI 100 FLOOD LEVEL.

ARI 100 FLOOD LEVEL IN VISTA PARADE (RL 33.20)

PATH

ENTRY FORECOURT

EXISTING STORMWATER LINE TO BE RETAINED

CONNECT NEW STORMWATER PIPE TO EXISTING STORMWATER PIPE.(C.O.S)

ϕ150mm uPVC @ 1% MIN.

SWALE

OVERLAND FLOW PATH

VISTA PARADE

REFER TO DWG. SW.04 FOR CONTINUATION

REFER TO DWG. SW.02 FOR CONTINUATION

STORMWATER DRAINAGE PART PLAN - SHEET 2

SCALE 1:100

SERVICES ON THIS DRAWING ARE SHOWN BELOW SLAB U.N.O.

NOTE: ALL EXISTING DRAINAGE TO BE INSPECTED BY A REGISTERED PLUMBER AND CERTIFIED THAT IT IS IN GOOD WORKING CONDITION. OTHERWISE, ALLOW TO RECTIFY AND/OR REPLACE AS NECESSARY.

NOTE: PROVIDE STEP IRONS TO ALL PITS/OSD TANKS IF DEPTH EXCEEDS 900mm

ANNEXURE A - 1

PRELIMINARY ISSUE NOT FOR CONSTRUCTION

ISSUE	DESCRIPTION	APPROVED	DATE
A	FOR DA APPROVAL		05-08-19

ARCHITECT
webber
Telephone :02 4926 1078
Address :Suite 3, L1, 426 Hunter St. Newcastle

BIRZULIS ASSOCIATES
CONSULTING STRUCTURAL & CIVIL ENGINEERS
105 MEREWETHER STREET, MEREWETHER NSW 2291
tel: (02) 4049 4855 email: pgrogan@birzulisassociates.com
www.birzulisassociates.com

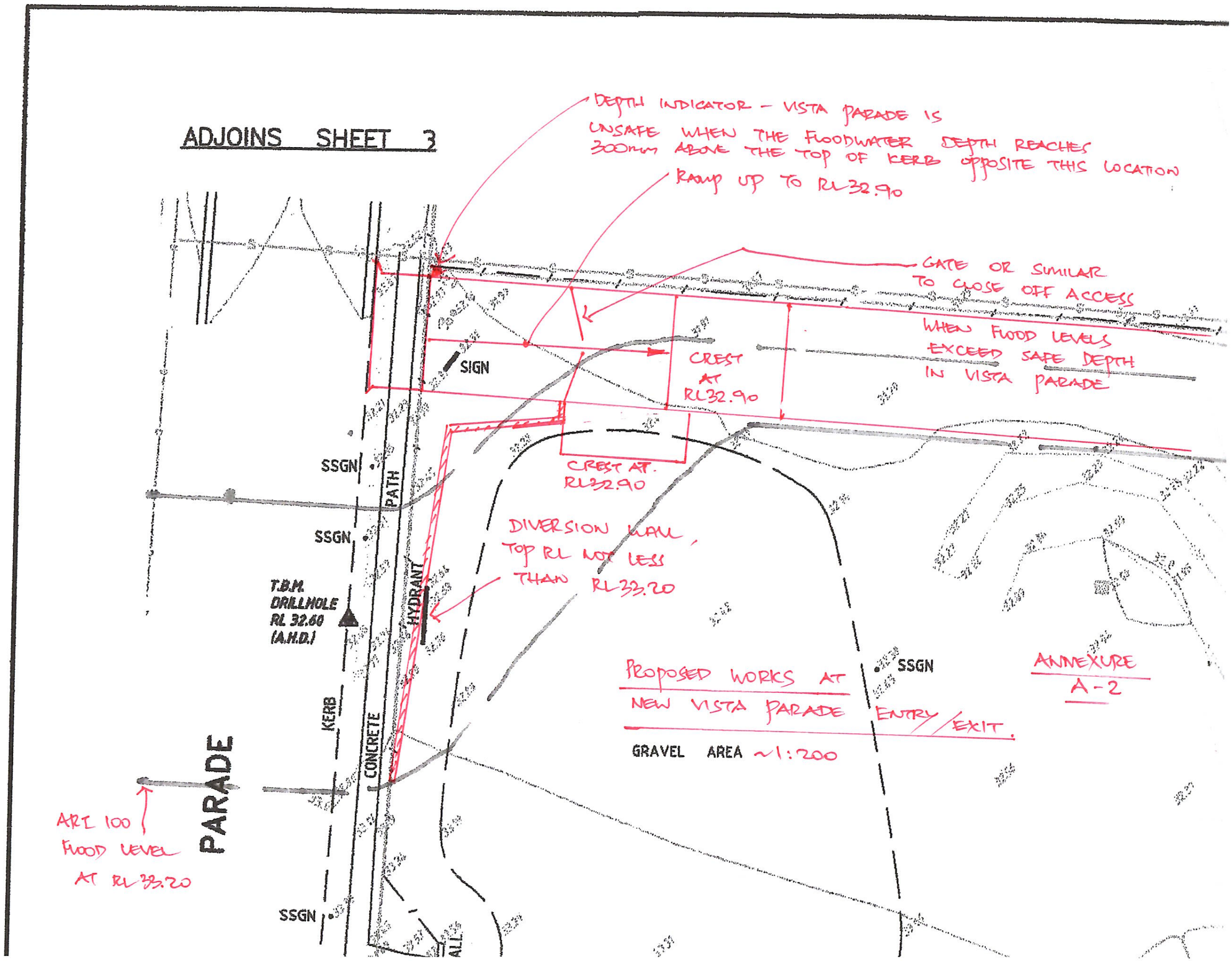
PROJECT
ST. JAMES PRIMARY SCHOOL
VISTA PARADE, KOTARA SOUTH

TITLE
STORMWATER DRAINAGE PART PLAN - SHEET 2

SCALES	DATE
as noted @ A1	JUNE 2019

DRAWN	DESIGN	VERIFIED	APPROVED
CKE	SL		

ISSUE	PROJECT No.	DRAWING No.
A	181019	SW.03


ADJOINS SHEET 3
DEPTH INDICATOR – VISTA PARADE IS UNSAFE WHEN THE FLOODWATER DEPTH REACHES 300mm ABOVE THE TOP OF KERB OPPOSITE THIS LOCATION
RAMP UP TO RL 32.90
GATE OR SIMILAR TO CLOSE OFF ACCESS WHEN FLOOD LEVELS EXCEED SAFE DEPTH IN VISTA PARADE
CREST AT RL 32.90
CREST AT. RL 32.90
SIGN
SSGN
SSGN
PATH
HYDRANT
DIVERSION WALL, TOP RL NOT LESS THAN RL 33.20
T.B.M. DRILLHOLE RL 32.60 (A.H.D.)
KERB
CONCRETE
PARADE
ARI 100 FLOOD LEVEL AT RL 33.20
SSGN
SSGN
PROPOSED WORKS AT NEW VISTA PARADE ENTRY/EXIT.
GRAVEL AREA ~1:200
ANNEXURE A-2

ADJOINS SHEET 3

APPROX. EXTENT OF 2009 FLOOD

APPROX. BOUNDARY FOR 2020 ARI 100 FLOOD

ANNEXURE 'D'

M.M.

PARADE

VISTA

T.B.M. DRILLHOLE RL 32.60 (A.H.D.)

GRAVEL AREA

1 STRY BRICK & CONCRETE BUILDING 'BLOCK G'

TANK

COLA 'BLOCK H'

CONCRETE AREA

SHARED PLAYGROUND SHADE STRUCTURE OVER

DEMOUNTABLE

VER.

TRACK

BITUMEN

CONCRETE PATIO

STEPS

BK WALL

GATE

DRIVEWAY

PATH

CONCRETE

GARDEN

ELEC PITS

PIT SL30.44 IL30.01

PRAM CROSSING

UPRIGHT

KERB

HYDRANT

VALVE

CRICKET NETS

(A) NOT LOCATED BY SURVEY

EXISTING BLOCKED OPEN THROAT PIT.

EXT'G 1200ø RCP

EXISTING UNFORMED NARROW CHANNEL

ADJOINS SHEET 1

ADJOINS SHEET 1

DETAIL 1:250

SCALE 1:250 (A1) 1:500 (A3)

(A) EASEMENT FOR STORMWATER CHANNEL & SEWERMAIN 7 WIDE (DP616629)

CAUTION.
LAND IS AFFECTED BY (SEE CERTIFICATE OF TITLE) -
- COVENANT (J834456)
- EASEMENT FOR STORMWATER CHANNEL (S846861)

LEGEND

- GAS METER
- POWER POLE
- LIGHT POLE
- ELECTRICITY FUSE PILLAR
- WATER METER
- WATER STOP VALVE
- WATER HYDRANT
- WATER TAP
- SERVICE ACCESS CHAMBER
- SEWER INSPECTION PIT
- SEWER VENT
- TELSTRA PIT
- TELSTRA PILLAR
- STORMWATER PIT
- SIGN
- FLUSH POINT
- BOLLARD
- MISCELLANEOUS SERVICE
- UNDERGROUND POWERLINE
- GAS MAIN
- OVERHEAD POWERLINE
- WATER MAIN
- SEWER MAIN
- TELECOMMUNICATION MAIN
- COMMUNICATION MAIN

Table of Tree Data

No.	Trunk	Spread	Height
1	0.8mø	14mø	18m
2	0.8mø	14mø	18m
3	1.1mø	14mø	18m
4	0.3mø	10mø	20m
5	0.3mø	6mø	12m
6	0.3mø	6mø	12m
7	0.4mø	10mø	12m
8	0.3mø	8mø	18m
9	0.5mø	14mø	20m
10	0.5mø	8mø	12m
11	0.3mø	10mø	12m
12	0.3mø	6mø	16m
13	0.8mø	10mø	10m
14	0.4mø	6mø	8m
15	0.9mø	14mø	16m
16	0.3mø	6mø	6m
17	0.3mø	6mø	6m
18	0.3mø	6mø	6m
19	0.4mø	12mø	10m
20	0.4mø	12mø	10m
21	0.3mø	10mø	10m
22	0.3mø	10mø	10m
23	0.4mø	10mø	8m
24	0.3mø	6mø	6m
25	0.4mø	8mø	12m
26	0.4mø	8mø	12m
27	0.4mø	8mø	12m
28	0.4mø	8mø	12m
29	0.4mø	8mø	12m
30	0.8mø	16mø	14m
31	0.3mø	6mø	8m
32	0.3mø	6mø	6m
33	0.4mø	10mø	10m
34	0.5mø	12mø	18m
35	0.3mø	10mø	10m
36	0.8mø	16mø	18m
37	0.4mø	10mø	10m
38	0.6mø	12mø	12m
39	0.3mø	4mø	4m
40	0.3mø	4mø	4m
41	0.4mø	10mø	10m
42	0.4mø	10mø	10m
43	0.6mø	6mø	8m
44	0.6mø	6mø	8m
45	0.5mø	12mø	12m

AMENDMENT	DATE	DESCRIPTION
D	25.03.20.	PLAN ISSUED
C	02.07.19.	PLAN ISSUED
B	19.02.19.	PLAN ISSUED
A	25.01.19.	PLAN ISSUED

NOTES:
1. ALL UNDERGROUND SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM AUTHORITY RECORDS AND ARE APPROXIMATE ONLY. SURFACE INDICATORS WHERE SHOWN ARE TYPICALLY BY SURVEY AND SHOWN FOR PLOT ONLY.
2. THE SITE BOUNDARIES WHERE SHOWN WERE NOT MARKED AT TIME OF SURVEY AND ARE APPROXIMATE. ACCURATE BOUNDARY POSITIONS ARE TO BE DETERMINED ON SITE PRIOR TO ANY WORK.
3. DATUM OF LEVELS IS AUSTRALIAN HEIGHT DATUM (A.H.D.) SOURCE OF LEVELS IS PM18267 RL35.948 BY SCIMS 24.01.19.
4. CONTOUR INTERVALS ARE 0.5 METRES.
5. THIS DOCUMENT IS FOR PLANNING PURPOSES ONLY.
6. CONTOURS, WHERE SHOWN, HAVE BEEN DERIVED FROM THE SPOT LEVELS TAKEN AND PROVIDE A GENERAL INDICATION ONLY OF THE GROUND SURFACE.
7. RIDGES, GUTTERS AND WINDOWS HAVE BEEN LOCATED BY REMOTE MEANS AND ARE APPROXIMATE ONLY

PARKER SCANLON PTY LTD
Surveying, Engineering, Town Planning and Project Management

TITLE:
PLAN OF LOT 12 IN DP560852 & LOT 131 IN DP262057 AT KOTARA
RE: 30 VISTA PARADE

DATE: 25 MARCH 2020
DRAWING: B1890DET-1-D.DWG
DRAWN/SURVEYED/CHECKED: WW/JH/MS
PARKER SCANLON CONTACT: M.SCANLON
DATUM: A.H.D.
REFERENCE No: B1890
SHEET OF SHEETS: 2 4

ANNEXURE 'E'

SITE PLAN
1:1000
0m 5 10 15 20 25 50 75
SCALE 1:1000 (A1) 1:2000 (A3)

DALVERN CL

MELISSA AVE

STAYTON

ADJOINS SHEET 2

METAL BUILDING

CONCRETE

VER.

DISH DRAIN

PIT SL30.37 IL29.83

SHARED PLAYGROUND SHADE STRUCTURE OVER

GARDEN

LONG DRAIN

PATH

STEPS

ROOF

EDGE INTO

PIT SL39.44 IL38.01

1 STRY BRICK & RENDERED BUILDING 'BLOCK C' STAFF

1 STRY BRICK BUILDING 'BLOCK E' CLASSROOM (CANTEEN)

COURTYARD

COLA

1 STRY BRICK & METAL BUILDING

1 STRY METAL BUILDING

TANK

LANDSCAPED AREA

INDIC LOCAT

CRICKET NETS

GARDEN

CONCRETE

PATH

UPRIGHT

KERB

PIT SL34.45 IL33.70

PIT SL34.45 IL32.65

DP 598240

DP 236878

EXISTING OPEN THROAT PIT OVER 1200 DIA. PIPE

WHEN FLOWS MERGE Q = 9.6 m³/sec.

6.7 m³/sec

4.0 m³/sec

EXISTING HOUSES (LOTS NOT SURVEYED)

APPROXIMATE EXTENT OF SHEET FLOW FROM PRINCETON AVENUE CATCHMENT (APPROXIMATE AS THE RESERVE HAS SIGNIFICANT VEGETATION AT GROUND LEVEL & ∴ ACCURATE ASSESSMENT CANNOT BE UNDERTAKEN)

FOR LENGTH SHADED SCHOOL BOUNDARY MUST BE AN OPEN STYLE FENCE TO RECEIVE THIS OVERLAND FLOW

PRINCETON AVENUE

LEGEND

- GAS METER
- POWER POLE
- LIGHT POLE
- ELECTRICITY FUSE PILLAR
- WATER METER
- WATER STOP VALVE
- WATER HYDRANT
- WATER TAP
- SERVICE ACCESS CHAMBER
- SIPT SEWER INSPECTION PIT
- SVNT SEWER VENT
- TELSTRA PIT
- TELSTRA PILLAR
- STORMWATER PIT
- SIGN
- FP FLUSH POINT
- BOL BOLLARD
- MISC MISCELLANEOUS SERVICE
- UNDERGROUND POWERLINE
- G GAS MAIN
- OVERHEAD POWERLINE
- W WATER MAIN
- S SEWER MAIN
- T TELECOMMUNICATION MAIN
- COMM COMMUNICATION MAIN