CIVIL

Stormwater Management Strategy

for

Mayo Private Hospital | 2 Potoroo Drive, Taree

for HealtheCare

Level 1, 215 Pacific Highway
Charlestown NSW 2290
02 4943 1777
newcastle@northrop.com.au
ABN 81 094 433 100

16 June 2023

HealtheCare
Greg Campbell

Dear Greg,

Re: Mayo Private Hospital | 2 Potoroo Drive, Taree

Northrop Consulting Engineers have been engaged by HealtheCare to provide concept design plans suitable for Development Approval submission for the proposed new parking areas and multiple building extensions to Mayo Private Hospital, located at 2 Potoroo Drive, Taree.

The purpose of this engineering report is to address civil engineering and stormwater items associated with the proposed development of the site, in particular:

- Water cycle management, including:
  - Stormwater collection.
  - Stormwater quantity control.
  - Stormwater quality control.

This report has been prepared with consideration to and generally in accordance with the MidCoast Council (MCC) Development Control Plan (DCP) and the MCC 'Guidelines for Water Sensitive Design Strategies' (October 2019).

Contained herein is a description of the subject site and development, and a summary of the stormwater quality and quantity assessment. This document should be read in accordance with the engineering drawings NL212450/ DA Series. This report intends to discuss items relating to the site at a level appropriate for a Development Application submission. It does not attempt to provide detailed design solutions to all issues, rather it will investigate the feasibility of solutions based on information that we have gathered to date from various sources and provide outcomes which will be developed further at Construction Certificate and Construction phases of the project.

		Date
Prepared by	EG	16/06/2023
Checked by	KS	16/06/2023
Admin	KS	16/06/2023

Site and Project Description

The proposed development, here after referred to as the site, is located within the MidCoast Council Government Area, off Potoroo Drive, Taree. The site illustrated in Figure 1, covers approximately 8.2 ha and is bounded by Potoroo Drive to the north, east and west and residential properties to the south. The site is currently utilised as a private health service facility, with an associated title/lease boundary area of approximately 3.3 ha, herein referred to as the site.

Figure 1 - Site Schematic

The site generally grades towards the west, with a minimum elevation of approximately 25.31m AHD and maximum elevation of approximately 39.51m AHD on the eastern boundary. Majority of the site is currently serviced by a stormwater pit and pipe network which is conveyed to an existing above-ground landscape onsite detention basin at the northern edge of the site, prior to discharging into the Council drainage network in Potoroo Drive.

As part of the development the following items are proposed:

- Construction of three new building extension ‘zones’ to the private hospital, and associated landscaping and pedestrian accessways;
- Extension of the existing north-eastern carpark and construction of a new western carpark and associated driveways; and
- Removal of existing concrete driveways, landscaping and pedestrian pathways within the development footprint of the proposed works.

Stormwater Management

The following stormwater management strategy has been completed in accordance with consultation with MCC’s Environmental Officer, Belinda Kennewell (9th February 2022), MCC’s Development Engineer, Kieran Woodall (28th March 2022), the MCC DCP and ‘Guidelines for Water Sensitive Design Strategies’ (October 2019) to address the following items:

- Stormwater Quantity Management.
- Stormwater Quality Management.

This document combined with the civil drawings intends to satisfy the abovementioned requirements.

Given the development proposal is located wholly within the lease boundary, the stormwater requirements have been assessed for this only and not the overall 8.2ha lot. The stormwater philosophy adopted onsite for the proposed development can be summarised as follows (and should be read in conjunction with design drawings and Appendix A - Site Catchment Plans):

- The existing above-ground landscape OSD basin located along the northern site boundary is proposed to be retained, with existing flow regimes maintained as close to existing as practical.
- Roof runoff from the Zone 1 extension, a portion of the existing adjacent roof and majority of the western carpark will be conveyed to a proposed biofiltration basin located adjacent to the carpark. The runoff then discharges into a proposed OSD tank located beneath the proposed carpark.
- Stormwater runoff from the western carpark will be managed with a pit and pipe network and conveyed to the biofiltration basin or directly to the OSD tank, OceanGuard pit inserts are to be provided at all stormwater inlets.
- The outlet from the OSD tank is proposed to be connected into the existing stormwater network fronting Potoroo Drive.
- Runoff from the north-eastern carpark extension will be conveyed to a bioretention swale located to the north of the carpark and connected to the existing drainage network that discharges into the existing onsite above-ground detention basin.
- Roof runoff from the Zone 2 and Zone 3 extensions will be connected to the existing drainage network that discharges to the existing basin. These areas and a small portion of the proposed carpark pavement will bypass all treatment measures. This area is proposed to be offset by the treatment of the existing portion of roof connected to Zone 1.

- It is noted the existing southern trunk drainage line which conveys runoff to the existing basin will generally be maintained, as such it is required to be built over for the Zone 1 and 2 works. It is not feasible to redirect the pipe around the extensions due to constraints with cover and/or invert levels. It is noted existing pits located under the building extensions will be removed.

Stormwater Quantity Management Strategy

To reduce the overall site peak post-developed flows to equal to or less than that of the pre-developed scenario, a below-ground onsite detention tank is proposed. This stormwater quantity management strategy has been developed following consultation with MCC.

The proposed OSD tank has been designed to reduce peak stormwater runoff from the new impervious site area only i.e. No additional storage volume is proposed for the existing impervious area throughout the site.

Existing Site Areas:

- Total Lease Boundary Area: 3.3ha
- Existing Impervious Area: 13,030m^2
- Existing Impervious Fraction: 39%

Existing OSD Basin:

The proposed development results in a net reduction of the total area to the existing above-ground basin, however, increases the impervious fraction by 2% (increases existing basin peak flow of approximately 1,730L/s by 9L/s during the 1% AEP storm event). A catchment assessment has not been performed on the basin since the increase in the basin peak flow is only approximately 0.5% and is considered negligible.

- Existing Basin Catchment: 21,810m^2
- Existing Impervious Area: 13,030m^2 (60%)
- Proposed Basin Catchment: 21,750m^2
- Proposed Impervious Area: 13,570m^2 (62%)

The above areas are approximate only but demonstrate the change to the existing basin catchment is negligible. However, to account for the minor increase in the existing basin peak flows, the additional runoff from the proposed impervious area has been implemented as a bypass to the proposed OSD tank (as outlined below). Subsequently, over-detaining the proposed development and maintaining/reducing the total site flows.

Proposed Areas:

- Total Development Footprint: 4,950m^2
  - New Roof Area: 1,920m^2
  - New Hardstand Area: 1,840m^2
  - New Landscape Area: 820m^2
  - Existing Roof Area to OSD Tank: 370m^2
- Increase to Existing Site Impervious Fraction: 29%
- Total Post Developed Site Impervious Fraction: 51%

Site storage for the development has been provided in order to reduce the sites peak discharge flows to that of the pre-developed scenario up to the 1% AEP storm event. The stormwater runoff routing software DRAINS has been utilised to simulate peak site flows.

Figure 2 below shows the DRAINS model layout.

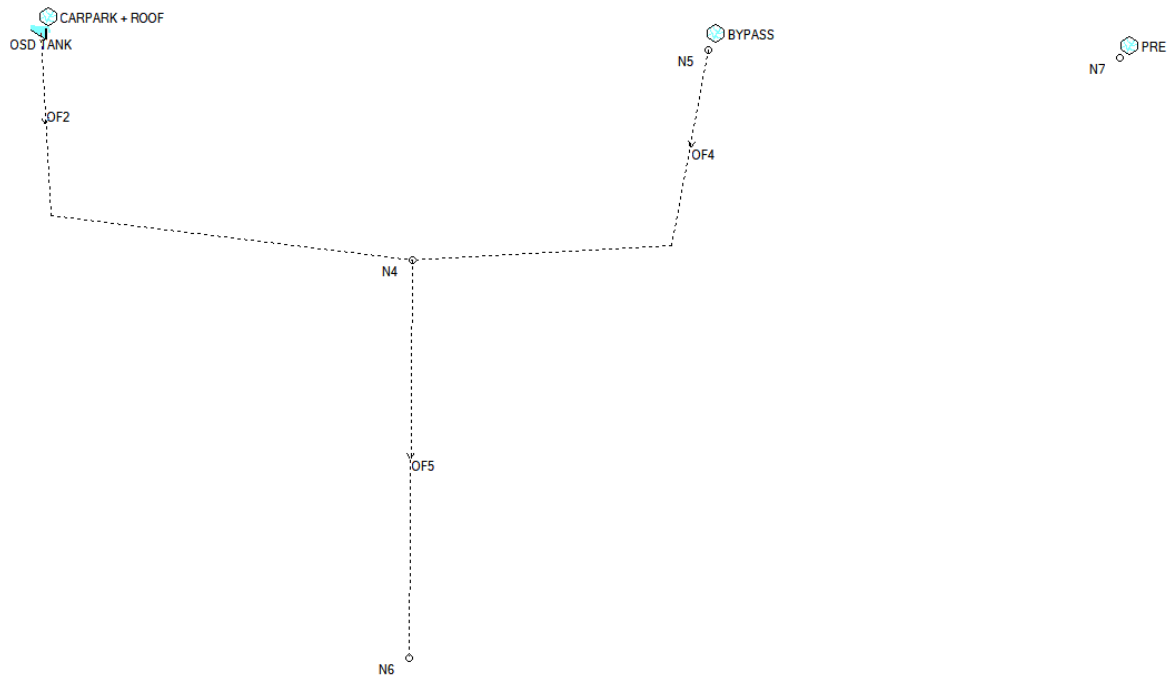

Figure 2 - DRAINS Schematic

Results for storms up to and including the 1% AEP event for the above model can be seen in Table 1 below utilising a minimum 62m^3 onsite detention tank (nominally 1m depth), located beneath the proposed western carpark.

Table 1 - DRAINS Model Results

AEP (%)	Pre-developed peak flows (m3/s)	Post-developed peak flows (m3/s)
0.2EY	0.116	0.115
10	0.156	0.138
5	0.186	0.159
2	0.221	0.194
1	0.256	0.248

Table 1 above shows the provided OSD tank volume is satisfactory in reducing the site peak discharge flows for all storms up to the 1% AEP as modelled by DRAINS.

The DRAINS model can be provided upon request.

Stormwater Quality Management Strategy

The site stormwater quality management has been modelled in MUSIC 6.3 to ensure the proposed treatment train for the development meets Council's stormwater pollution reduction targets. Modelling was completed in accordance with MCC's "Guidelines for Water Sensitive Design Strategies" (MCC, October 2019) and "NSW MUSIC Modelling Guidelines" (BMT WBM, 2015).

It is noted that existing buildings and pavement which are proposed to be retained, have not been considered in the proposed development footprint as this is considered to be as per existing site conditions, with the exception of the portion of the existing roof connected to Zone 1 works.

Treatment Train

The Council pollutant reduction targets are proposed to be met by utilising the following:

1450m^2 of roof runoff from the Zone 1 extension and 370m^2 of existing roof will be conveyed to a proposed biofiltration basin with a minimum biofiltration media area of 100m^2 located adjacent to the western carpark prior to discharging into the proposed OSD tank.

Stormwater runoff from 1040m^2 of western carpark pavement runoff will be conveyed to the bio basin via the pit and pipe network containing the pit inserts, prior to discharging into the OSD tank. 100m^2 of western carpark pavement will be conveyed directly to the tank via a pit and pipe network, with OceanGuard pit inserts provided at all grated stormwater inlets.

440m^2 of runoff from the north-eastern carpark extension will be conveyed to a bioretention swale with minimum 10m^2 filter area and 150mm extended detention volume located to the north of the carpark via overland flow.

Roof runoff from the Zone 2 and Zone 3 extensions, a small portion of the proposed pavement and carpark (190m^2) and 510m^2 of landscape will bypass all treatment measures. The entirety of Zone 2 roof (370m^2) is proposed to be offset by the treatment of the 370m^2 of existing roof that was previously untreated.

Figure 2 depicts the proposed stormwater treatment train and effectiveness for the development as modelled in MUSIC.

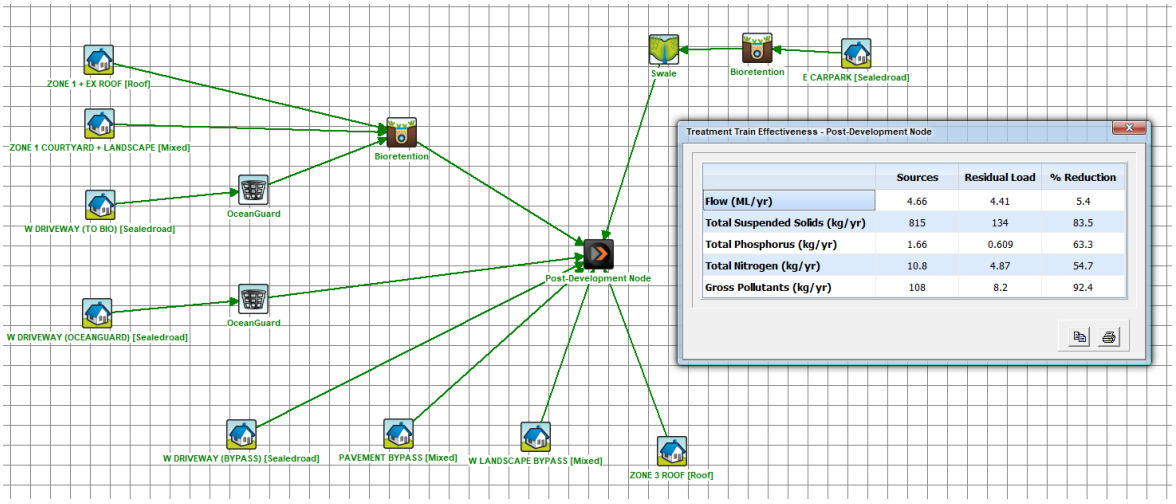

Figure 3 - MUSIC Treatment Train and Effectiveness

Table 2 summarises the results for the resulting MUSIC model and compares the modelled reduction in pollutants to the council reduction targets.

Table 2 – MUSIC Modelling Results

Pollutant	Sources (kg/ yr)	Residual load (kg/ yr)	Reduction (%)	Council Reduction Target (%)
Total Suspended Solids (TSS)	815	134	83.5	80
Total Phosphorus (TP)	1.66	0.61	63.3	60
Total Nitrogen (TN)	10.8	4.87	54.7	45
Gross Pollutants (GP)	108	8.2	92.4	90

Table 2 shows that the proposed stormwater management strategy is predicted to achieve Council's load reduction targets, as estimated by MUSIC. A copy of the MUSIC model can be provided for Council review upon request.

Through the adoption of the above measures, it is considered that the proposed treatment train will effectively meet the design intent of MCC water quality requirements.

Conclusion

Given the above investigations, it is reasoned the development meets MCC's requirements for stormwater management as outlined in Council's DCP.

I trust the above meets your requirements; however, should you have any queries, please feel free to contact the undersigned on (02) 4943 1777.

Yours faithfully,

Emma Gearing
Graduate Civil Engineer
BEng (Civil)

Kane Sinclair
Associate | Civil Engineer
BEng (Civil)

Limitation statement

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Appendix A - Site Catchment Plans

LEASE BOUNDARY AREA + PROPOSED DEVELOPMENT

APPROXIMATE LEASE BOUNDARY AREA

PROPOSED ROOF AREA

PROPOSED PAVEMENT AREA

PROPOSED LANDSCAPE AREA

33,480 sq m

438 sq m

70 sq m

30 sq m

12 sq m

368 sq m

3 sq m

200 sq m

1,450 sq m

1,347 sq m

185 sq m

99 sq m

178 sq m

194 sq m

POTOROO DRIVE

POTOROO DRIVE

POTOROO DRIVE

DRAWN: B. DUGGAN DESIGNED: E. GEARING JOB MANAGER: K. SINCLAIR VERIFIER: K. SINCLAIR

EG 16/06/2023

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE

CLIENT: healthe care

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ARCHITECT: HSPC

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ABN 81 094 433 100

PROJECT: **MAYO PRIVATE HOSPITAL**

POTOROO DRIVE
TAREE NSW
2430

DRAWING TITLE:

JOB NUMBER: **NL212450**

DRAWING NUMBER | REVISION

DRAWING SHEET SIZE = A1

Date 16.06.2023 12:59 PM Plotted By EMMA GEARING Found Y:\YEAR 2021 Jobs\NL212450 - Mayo MH Beds\O - Drawings\CIVIL\03-CAD\01-DA\NL212450-DA C01.11 GA PLAN.dwg

EXISTING ONSITE BASIN CATCHMENT PLAN

APPROXIMATE EXISTING IMPERVIOUS CURRENTLY GOING TO OSD BASIN

APPROXIMATE EXISTING LANDSCAPE CURRENTLY GOING TO OSD BASIN

INDICATIVE LOCATION OF EXISTING ABOVE-GROUND ONSITE DETENTION BASIN

POTOROO DRIVE

POTOROO DRIVE

POTOROO DRIVE

4,149 sq m

13,027 sq m

1,852 sq m

1,422 sq m

796 sq m

584 sq m

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EG 18/07/2022

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PROPOSED DEVELOPMENT CATCHMENT PLAN - DETENTION

NEW AREA CONTRIBUTING TO EXISTING OSD BASIN

NEW IMPERVIOUS AREAS CONTRIBUTING TO EXISTING OSD BASIN (PREVIOUSLY LANDSCAPED)

AREA TO PROPOSED OSD TANK

AREA REDIRECTED TO PROPOSED OSD TANK INSTEAD OF EXISTING OSD BASIN (TO OFFSET)

IMPERVIOUS BYPASS

PERVIOUS BYPASS

INDICATIVE LOCATION OF EXISTING ABOVE-GROUND ONSITE DETENTION BASIN

NEW IMPERVIOUS AREA ~ 510m2 (INCLUDED AS IMPERVIOUS BYPASS TO PROPOSED OSD TANK)

POTOROO DRIVE

438 sq m

NEW AREA TO EXISTING OSD BASIN (PREVIOUSLY DISCHARGE TO POTOROO DRIVE)

OFFSET AREA TO OSD TANK (PREVIOUSLY WENT TO BASIN)

PREVIOUSLY PERVIOUS: 118m2
EXISTING ROOF: 372m2
~ 490m2

70 sq m
66 sq m
30 sq m
252 sq m
12 sq m
490 sq m
3,278 sq m
146 sq m
185 sq m
99 sq m
178 sq m
194 sq m

POTOROO DRIVE

INDICATIVE LOCATION OF PROPOSED BELOW-GROUND ONSITE DETENTION TANK

PROPOSED ROOF AREAS CONVEYED TO EXISTING OSD BASIN (PREVIOUSLY LANDSCAPE TO BASIN)

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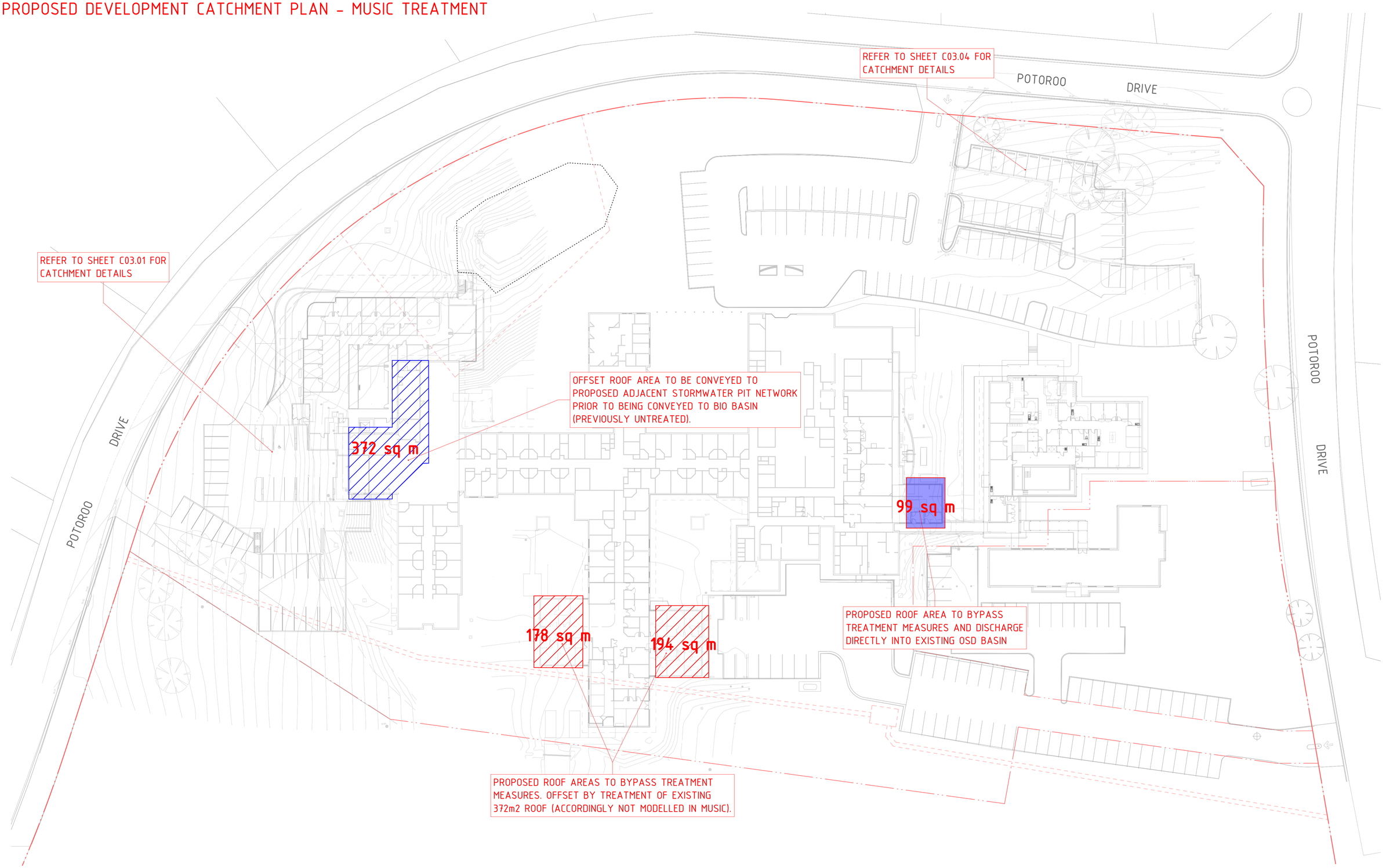
PROPOSED DEVELOPMENT CATCHMENT PLAN - MUSIC TREATMENT



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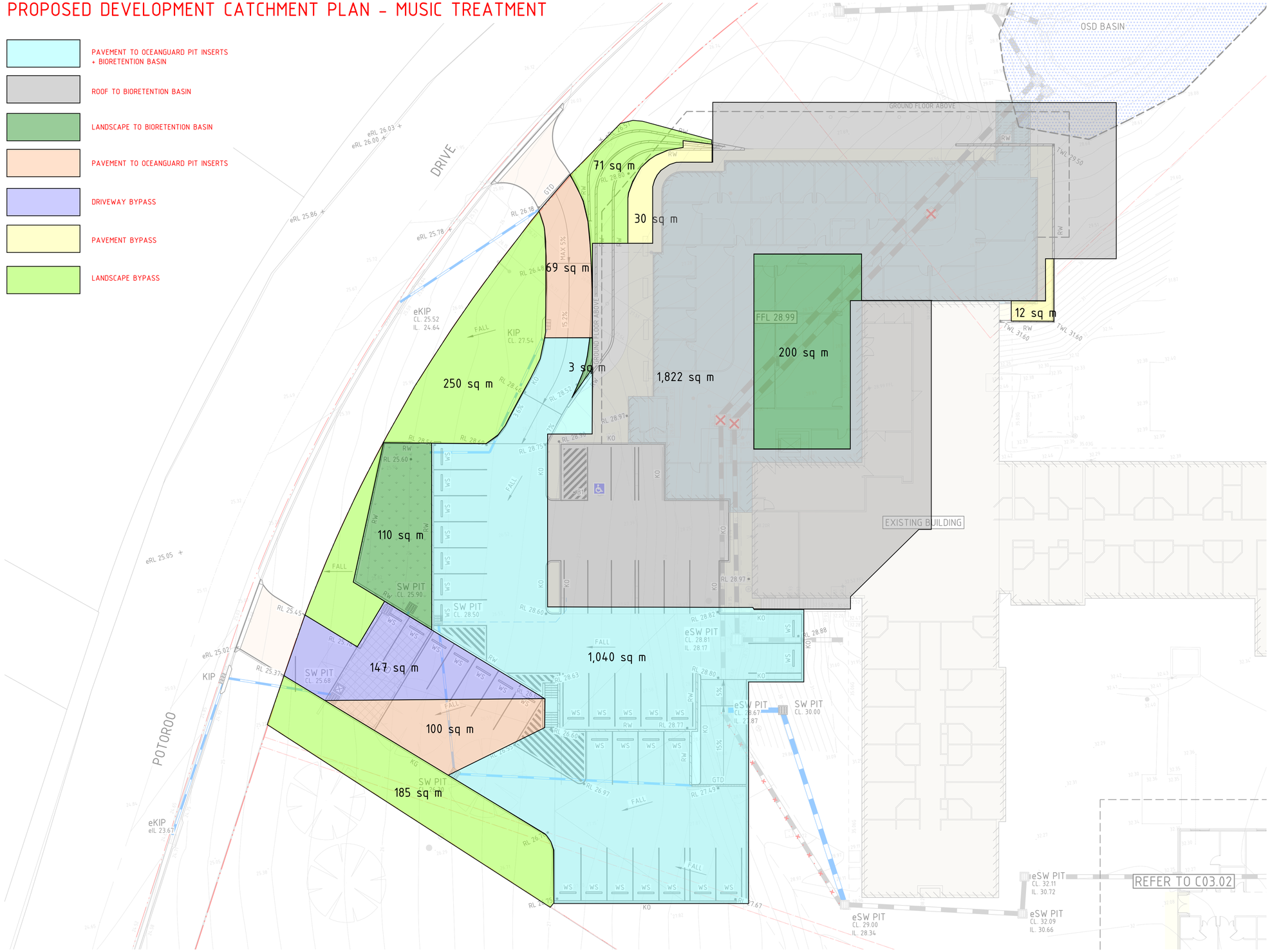
PROPOSED DEVELOPMENT CATCHMENT PLAN - MUSIC TREATMENT

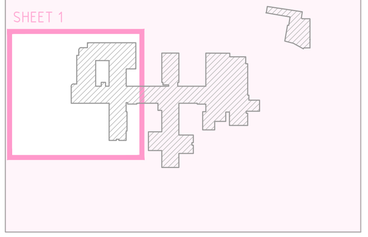
- PAVEMENT TO OCEANGUARD PIT INSERTS + BIORETENTION BASIN
- ROOF TO BIORETENTION BASIN
- LANDSCAPE TO BIORETENTION BASIN
- PAVEMENT TO OCEANGUARD PIT INSERTS
- DRIVEWAY BYPASS
- PAVEMENT BYPASS
- LANDSCAPE BYPASS



LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- EXISTING BUILDING OUTLINE
- PROPOSED BUILDING
- STORMWATER PIPE
- EXISTING STORMWATER PIPE
- DOWNPIPE DRAINAGE LINE
- SW PIT CL xx.xx — PROPOSED STORMWATER PIT AND COVER LEVEL
- EXISTING STORMWATER PIT
- GTD — GRATED TRENCH DRAIN
- LIMIT OF WORKS
- PROPOSED KERB
- EXISTING KERB AND GUTTER
- PROPOSED VEHICULAR PAVEMENT
- CONCRETE FOOTPATH PAVEMENT
- DRIVEWAY CROSSOVER PAVEMENT
- RW — RETAINING WALL
- RL XX.XX — PROPOSED SPOT HEIGHT
- eRL XX.XX — EXISTING SPOT HEIGHT
- TWL XX.XX — PROPOSED TOP OF WALL LEVEL HEIGHT
- FFL XX.XX — PROPOSED FINISHED FLOOR LEVEL
- FALL — DIRECTION OF GRADE
- KO — KERB ONLY
- OSD — ON-SITE DETENTION TANK
- EXTENT OF BIO-FILTRATION MEDIA
- WS — WHEEL STOP
- VEHICULAR CROSSING
- OSD BASIN — EXTENT OF BIO-FILTRATION MEDIUM

KEYPLAN



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DRAWING TITLE: CIVIL ENGINEERING PACKAGE
CIVIL WORKS PLAN - SHEET 1

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DRAWING NUMBER: DA-C03.01
REVISION: C
DRAWING SHEET SIZE = A1

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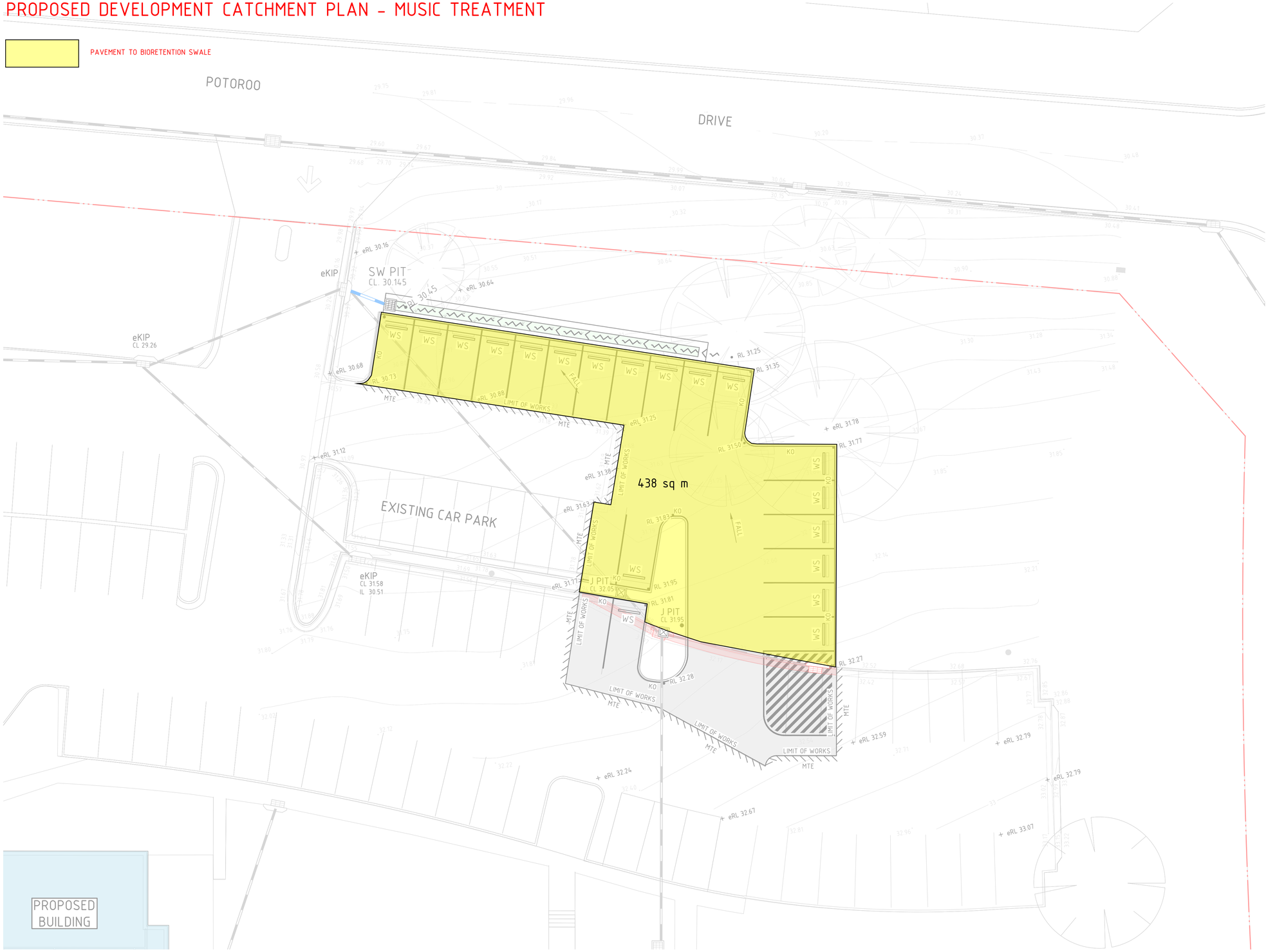
PROPOSED DEVELOPMENT CATCHMENT PLAN - MUSIC TREATMENT

PAVEMENT TO BIORETENTION SWALE



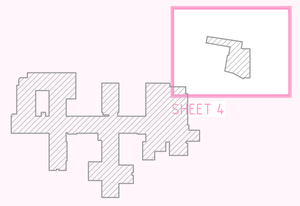
LEGEND

- SITE BOUNDARY LINE
- EXISTING BOUNDARY LINE
- EASEMENT LINE
- BUILDING OUTLINE
- STORMWATER PIPE
- EXISTING STORMWATER PIPE
- SW PIT CL xx.xx — PROPOSED STORMWATER PIT AND COVER LEVEL
- EXISTING STORMWATER PIT
- EXISTING STORMWATER PIT TO BE REMOVED
- LIMIT OF WORKS — LIMIT OF WORKS. CONTRACTOR TO ENSURE FINISHED LEVELS MATCH TO EXISTING (TYPICAL)
- MTE — MATCH TO EXISTING
- PROPOSED KERB
- EXISTING KERB AND GUTTER
- EXISTING KERB AND GUTTER TO BE REMOVED
- PROPOSED VEHICULAR PAVEMENT
- PROPOSED BUILDING
- • RL XX.XX — PROPOSED SPOT HEIGHT
- + eRL XX.XX — EXISTING SPOT HEIGHT
- FALL — DIRECTION OF GRADE
- KO — KERB ONLY
- K+G — KERB AND GUTTER
- WS — WHEEL STOP
- DRAINAGE SWALE
- EXTENT OF BIO-FILTRATION MEDIA

NOTES

ALL LEVELS ARE INDICATIVE AND LOCATIONS TO BE CONFIRMED VIA DETAILED SURVEY PRIOR TO CONSTRUCTION.
ALL EXISTING STORMWATER LINES AND INVERT LEVELS TO BE CONFIRMED ONSITE PRIOR TO CONSTRUCTION

KEYPLAN



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DESIGNED: E. GEARING
JOB MANAGER: K. SINCLAIR
VERIFIER: K. SINCLAIR

EG 16/06/2023

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE

CLIENT: healthe care

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ARCHITECT: HSPC

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SCALE 1:150 @ A1 — 0 1.5 3 4.5 6 7.5m

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PROJECT: MAYO PRIVATE HOSPITAL
POTOROO DRIVE
TAREE NSW
2430

DRAWING TITLE: CIVIL ENGINEERING PACKAGE
CIVIL WORKS PLAN - SHEET 4

JOB NUMBER: NL212450
DRAWING NUMBER: DA-C03.04
REVISION: B
DRAWING SHEET SIZE = A1

Date: 16.06.2023 12:59 PM Plotted By: EMMA GEARING Found: Y:\YEAR 2021 Jobs\NL212450 - Mayo MH Beds\IO - Drawings\CIVIL\03-CAD\01-DA\NL212450-DA C03.01 CIVIL PLAN.dwg