TTW Structural Civil Traffic Façade

Stormwater Report

49A Frenchs Forest Rd, Frenchs Forest

Prepared for Forest Central Business Park Pty Ltd / 02 September 2019

191134

Taylor Thomson Whitting (NSW) Pty Ltd (ACN 113 578 377)
as trustee for the Taylor Thomson Whitting NSW Trust
(ABN 59 514 956 558) I Consulting Engineers
Level 3, 48 Chandos Street, St Leonards NSW 2065

Your Partner in Engineering

Contents

1.0 Introduction

This report has been prepared to identify stormwater requirements and the potential for the proposed development site at 49A Frenchs Forest Rd Frenchs Forst.

1.1 The Site

The new Maui Oncology Cancer Centre located at 49A Frenchs Forest Rd Frenchs Forest adjacent to Warringah Road services patients from the nearby Northern Beaches Hospital. The centre is located within the southern extreme of an existing commercial/industrial estate, is serviced by a central road leading to the low end of the estate to the site with natural overland flow discharging into the existing On-site detention tank and out to Northern Beaches council drainage infrastructure. The Site which is under the jurisdiction of the Northern Beaches Council local government, located at 49A Frenchs Forest Rd Frenchs Forest, as indicated in Figure 1.

The site area is approximately 1744 m2 and the proposed development includes a multi-storey building and a basement.

Figure 1 **Aerial Photo (source: Google Maps)**

1.2 Proposed Works

The proposed works includes the proposed development of the 1774m^2 section of land into a four storey Oncology Treatment and Consultation centre. See figure 2 and 3 below showing the proposed ground floor layout and building section.

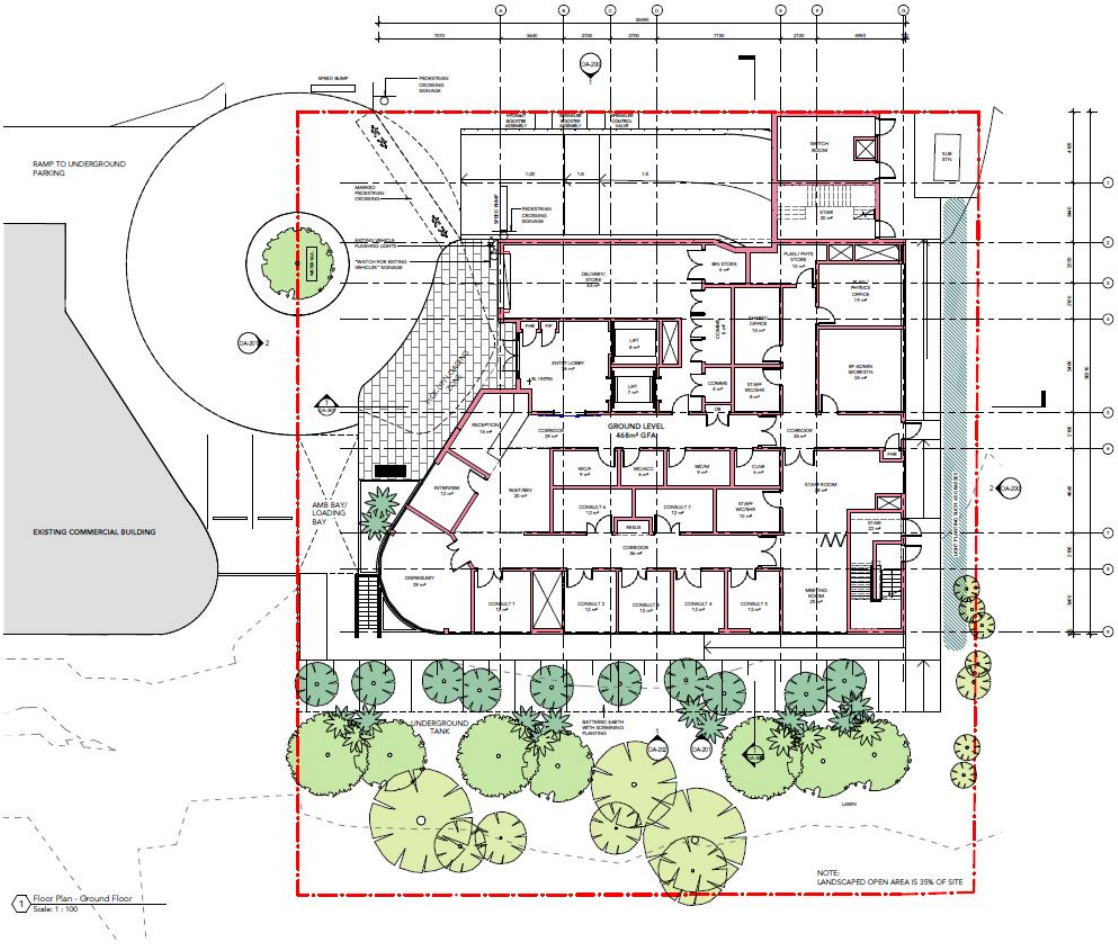

Figure 2 Proposed Building Site Plan

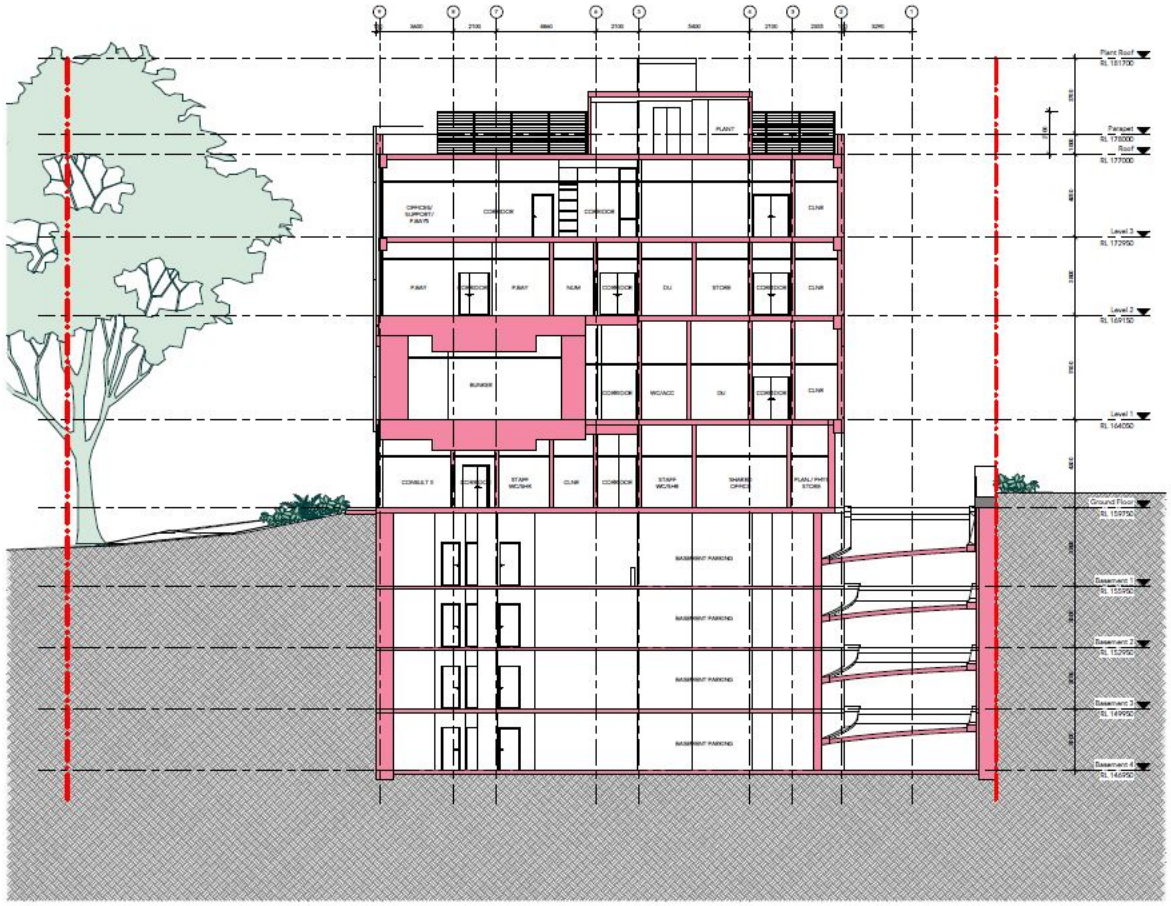

Figure 3 Proposed Building Section

There are some existing easements traversing the site including HV, Sewer, Water and Stormwater.

Maps and reports of existing services have been obtained from the surveyor and a “dial before you dig” (DBYD). A detailed services survey is due for completion and is required to progress the design of proposed and diverted services and infrastructure.

There is an existing On-Site Detention Tank which is approximately 970m^3 in volume as verified by a surveyor.

The survey is shown in figure 4 below.

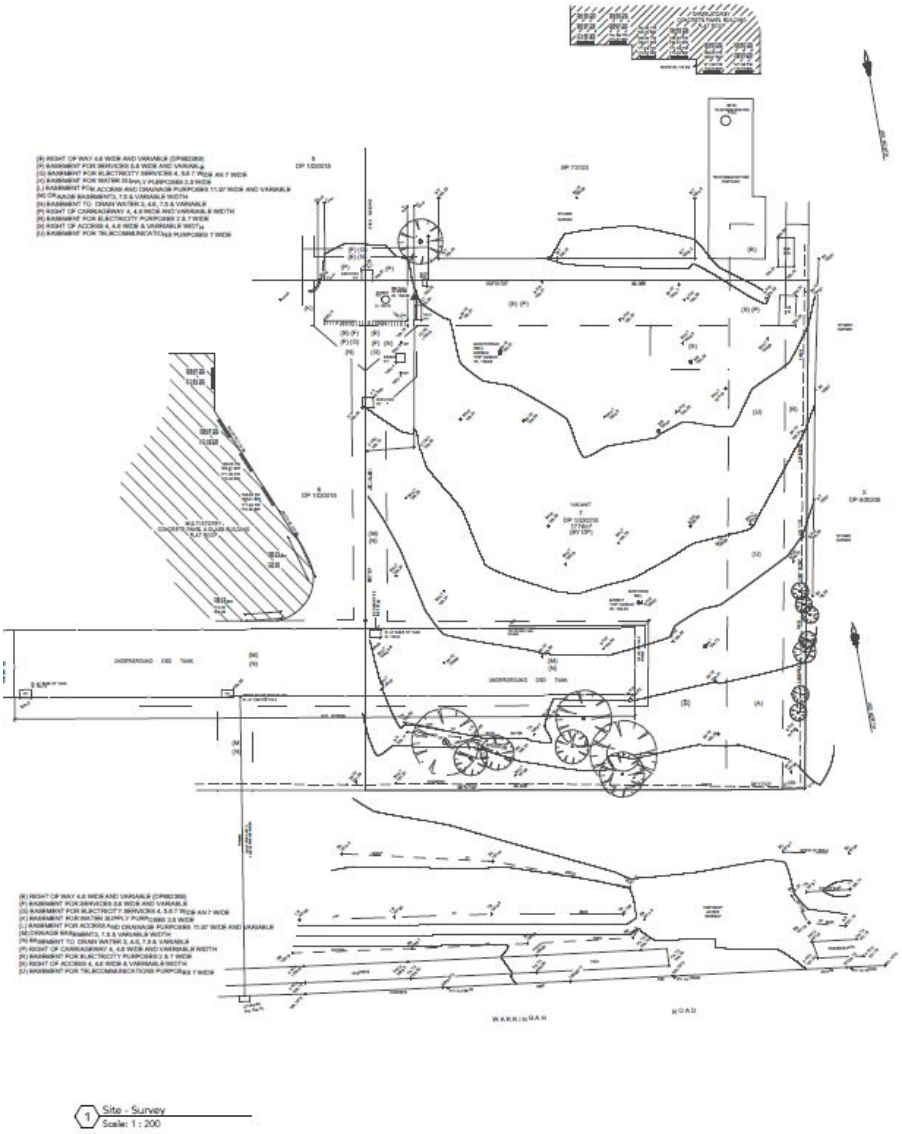

Figure 4 Existing Survey

1.3 Relevant Documents

The following documents have been reviewed in preparing this document:

- Warringah Council On-site Stormwater Detention Technical Specification
- Northern Beaches Council WSUD & MUSIC Modelling Guidelines (2016)
- Water Management Plan (2017)

2.0 Stormwater

2.1 Stormwater Quantity

The Warringah Council On-site Stormwater Detention Technical Specification requests that On-Site Detention (OSD) is required to ensure that the proposed development does not increase stormwater discharge rates compared to the existing site for conditions up to the 1% AEP storm event.

Inline Hydraulic Services have undertaken a review of the existing OSD capacity and total catchment area draining to the OSD. Using the DRAINS stormwater model they determined that the existing 1.33Ha draining to the OSD requires 580m^2 of storage based on the an existing state green field site with a proposed 85% impervious site.

The site currently accommodates 970m^2 of OSD volume therefore further storage will not be required.

Refer to letter report by Inline Hydrauilc Services in Appendix A

2.2 Stormwater Quality

Stormwater quality analysis was undertaken in accordance with the Water Management Policy and the Northern Beaches Council WSUD & MUSIC Modelling Guidelines.

The proposed site has been modelled in MUSIC to demonstrate that the proposed stormwater treatment devices achieve the stormwater treatment targets outlined in section 8.1.1 of the policy:

Pollutant	Performance Requirements
Total Phosphorous	65% reduction in the post development mean annual load[1]
Total Nitrogen	45% reduction in the post development mean annual load[1]
Total Suspended Solids	85% reduction in the post development mean annual load[1]
Gross Pollutants	90% reduction in the post development mean annual load[1] (for pollutants greater than 5mm in diameter)
pH	6.5 - 8.5
Hydrology	The post-development peak discharge must not exceed the pre-development peak discharge for flows up to the 2 year ARI

Table 1 Water Quality requirements

The stormwater treatment chain for the proposed development includes:

- 2x 690 Psorb (MCC) stormfilter with chamber for road treatment (or equivalent)
- 5x 690 Psorb (MCC) stormfilter with chamber for roof treatment (or equivalent)

The category under the “Hydrology” section of Table 1 above is satisfied as the proposed on-site detention will control the flow rate to ensure flows are not exceed the existing in the proposed case.

Table 2 Stormwater quality

Pollutant	Residual Load	Load reduction (%)	Target (%)
Total Suspended Solids (kg/yr)	**47.1**	**85.5**	**85**
Total Phosphorus (kg/yr)	**0.13**	**79.3**	**65**
Total Nitrogen (kg/yr)	**1.91**	**50.6**	**45**
Gross Pollutants (kg/yr)	**0**	**100**	**90**

3.0 Construction Phase Stormwater Management

Construction works to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The exact controls will vary depending on construction methodology and timing, but typically consist of:

- Sediment fences;
- Vehicle shaker grid and wash down;
- Geotextile filters surrounding pits; and
- Sand bags surrounding existing culverts.

A conceptual erosion and sediment control plan has been included in the civil drawing set.

4.0 Conclusions and Recommendations

The proposed site at 49A Frenchs Forest Rd Frenchs Forest consists of a multi-storey commercial building with below ground basement levels.

Stormwater quantity will be controlled with the existing OSD tank which has 970m3 of storage volume (390m3 over and above the required volume for the site). These measures reduce the stormwater discharge of the proposed development so it is not worse than the existing case.

Stormwater quality will be controlled with a treatment train consisting of seven (7) Ocean Protect (Stormwater360) stormfilters. The treatment train will remove 85.5% of Total Suspended Solids, 79% of Total Phosphorous, 51% of Total Nitrogen and 90% gross pollutants.

Prepared by
TAYLOR THOMSON WHITTING (NSW) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST

ANTHONY LAHOUD
Senior Civil Engineer

Authorised By
TAYLOR THOMSON WHITTING (NSW) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST

Stephen Brain
Technical Director

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Appendix A

OSD Report

Unit 19 | 18 Wurrook Circuit
Caringbah NSW 2229
PO Box 284
Gymea NSW 2227
02 9526 1923
paul@inlinehs.com.au
www.inlinehydraulicservices.com

Our Ref: 2019-0229

4 December 2019

Forest Central Business Park Pty Ltd
ACN 098 662 367
PO Box 48
Pymble NSW 2073

Dear Sirs

Maui Oncology, Warringah Road & Wakehurst Parkway, Frenchs Forest (Site)
Detention Tank Report

Background

Inline Hydraulic Services was engaged to conduct a review of the existing Onsite Detention System (OSD) for the above site know as Lot 7, DP 1020015 also known as Building 9 in the Forest Central Business Park.

It is noted that this is not a new complex, the complex has been established for approximately 20 years. Whilst the proposed development is a new construction on a vacant block, the OSD tank and main drainage lines are understood to have been installed at the establishment of the business park to support the future development of all lots within the business Park. Over the past approximately 20 years each lot within the business park has been developed and this proposal will see the completion of the business park as it is the last vacant parcel in the business park.

Previous Submission

The Previous DA submission for this site DA2019/0988 was withdrawn. The engineering referral cited the following actionable items requiring further information which have been addressed in this submission.

1) *The applicant is to provide survey detail including dimensions , width, depth , length,invert levels etc of the existing On Site Stormwater Detention(OSD) Tank.*
   These have been included in Annexure 2 Geomat Engineering Survey Plans Rev_2
2) *A condition report prepared by a structural/civil engineer is to be prepared in regard to the suitability of using the existing OSD tank for the proposed development .*
   A site inspection report of the existing OSD has now been undertaken by TTW and included in annexure 3.

3) *The DRAINS on Site Detention system model is to be submitted to Council for review and summary information presented in the format listed in Councils On Site Detention Technical specification*

This has been undertaken by Inline Hydraulic Service and included in annexure 1

4) *The outlet stormwater line from the detention tank is to be shown together with the connection point to Councils existing stormwater drainage network.*

These have been included in Annexure 2 Geomat Engineering Survey Plans and the pit connection on Warringah Road Referenced in the TTW inspection report in annexure 3.

5) *The landscaping plans detail tree planting above the footprint of the existing OSD tank and given the limited soil cover over the tank lid, the viability of the tree planting may be compromised.*

The landscaping plans have been amended in the updated submission and concerns addressed with shallow plantings sympathetic to both landscaping requirements and the existing OSD tank with limited soil coverage. Refer to Landscape Development Application prepared by Arcadia Landscape Architecture Issue C dated December 2019.

The Proposed Development

- The Development submission proposes construction of a fit for purpose Medical centre.
- Total GFA= 1976m2 (Ground Floor=468m2, Level 1=457m2, Level 2=525m2, Level 3=526m2) Measured as per the LEP Definition.
- Treatment at the facility is by appointment only, No overnight stays, the Hold bays only to facilitate observation prior to patient transfer off site.
- Hours of operation 7am-7pm, six days a week. However no patients booked after 5pm.
- After hours emergency treatment would be approximately 1 patient per 3 months. This is only for emergency spinal compression where immediate treatment is the only relief.
- Cancer treatment centre with Radiation Oncology, Medical Oncology and support services for the management and treatment of cancer.
- Carparking will now include boom gates and approved/controlled access only.
- Staff and patient numbers only to be referenced as per TTPA Traffic report.
- Existing Detention tank and discharge point has been surveyed. As per Drawing 1775G_Frenchs_Forest_Frenchs_Forest_Rd Rev_2 Sheet 1 & 2
- Existing Detention tank has been reviewed for construction and suitability. As Per TTW Site Inspection report 191134 CAAA Report_3 dated 4/12/2019

On Site Detention System

Current conditions

Total Site Area	1.33Ha[1]
Current OSD Volume	828m3 (55m long x 6m wide x 2.51m deep – average depth)

Required conditions

Note, this was undertaken using DRAINS modelling assuming greenfield site to 85% impermeable area. Based on the calculations provided and Council's DCP, we believe that the volume nominated below meets Council's requirements.

Total Site Area	1.33Ha[2]
Required OSD Volume for Total Site Area	580m^3

Subsequent to the volume calculation, a survey of the on-site detention tank has been undertaken and it was found that the existing OSD tank exceeded the minimum Council DCP requirements by some 248m^3.

The 600mm diameter pipe appears in fair condition and is suitable for use. The orifice plate size is 350mm diameter. The tank overflow is sufficient and has a rock apron installed so ensue no erosion occurs during extended large storm events.

Note that this is not a new complex. The complex has been established for approximately 20 years. The proposed development is new however all the systems for the complex are already in place, i.e. main drainage lines etc.

Summary

Based on the information obtained from the supporting annexures including the;

- Geomat Engineering survey,
- TTW Site inspection report,
- DRAINS calculations provided for the 1:20 and 1:100,
- As well as a physical inspection onsite by Inline Hydraulic Services,

Inline Hydraulics Services believes that the capacity of the existing OSD exceeds the volume requirements of the Northern Beaches Council DCP and the good condition of the reinforced concrete tank, is more than capable to support the developments connection to the existing Forest Central Business Park OSD and drainage system for stormwater discharge of the development.

[1] Source: Nearmap
[1] Source: Nearmap

Annexures

Please see attached annexure as per the following;

	NAME	DRAWING/DOCUMENT Number	REV	DATED
Annexure 1	Drains Model Results	1:20 & 1:100		27/11/2019
Annexure 2	Survey Plans	1775G-Frenchs_Forest_Frenchs_Forest_Rd	2	21/08/219
Annexure 3	TTW Site Inspection Report	191134 CAAA	3	4/12/2019

Paul McDonald
Director
Inline Hydraulic Services Pty Ltd
AHSCA Full Member #2508
Dip. Hydraulic Engineering #90967NSW

DRAINS results prepared from Version 2019.09 **1:20 Year Results**

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N728	8.25		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Tc (min)	Due to Storm
Pre Dev	0.755	0	0.755	5	6	5% AEP, 15 min burst, Storm 6
Post Dev	0.814	0.761	0.054	5	6	5% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P1.000	0.271	2.02	8.905	8.254	5% AEP, 30 min burst, Storm 8

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF578	0	0	0.908	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD	9.44	416.4	0.271	0.271	0

Run Log for Frenchs Forest Rd.drn run at 08:36:47 on 27/11/2019

Flows were safe in all overflow routes.

DRAINS results prepared from Version 2019.09 **1:100 Year Results**

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N728	8.29		0				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Tc (min)	Due to Storm
Pre Dev	1.03	0	1.03	5	6	1% AEP, 10 min burst, Storm 1
Post Dev	1.114	1.036	0.08	5	6	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P1.000	0.328	2.22	9.237	8.295	1% AEP, 45 min burst, Storm 6

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

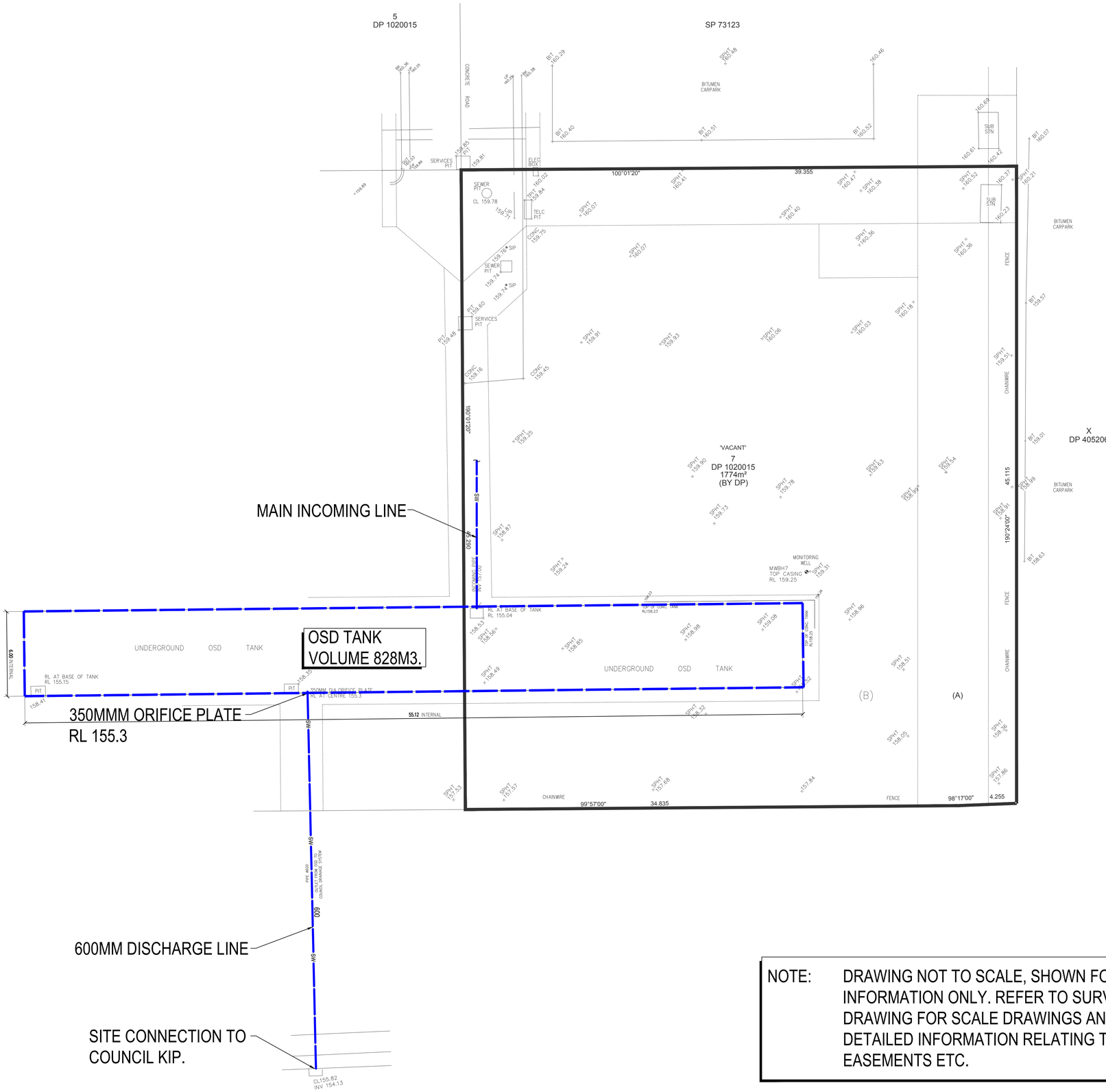
Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF578	0	0	1.479	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD	10.01	580.5	0.328	0.328	0

Run Log for Frenchs Forest Rd.drn run at 08:41:31 on 27/11/2019

Flows were safe in all overflow routes.



NOTE: DRAWING NOT TO SCALE, SHOWN FOR INFORMATION ONLY. REFER TO SURVEY DRAWING FOR SCALE DRAWINGS AND DETAILED INFORMATION RELATING TO EASEMENTS ETC.

No.	Date	Details
P1	10.12.19	FOR INFORMATION

Amendments

North

Architect

Client

RAMSEY HEALTHCARE

Hydraulic Consultant

INLINE HYDRAULIC SERVICES

UNIT 19, 18 WURROOK CIRCUIT, CARINGBAH NSW 2229
PO BOX 284, GYMEA NSW 2227
PHONE No (02) 9526 1923
EMAIL : paul@inlinehs.com.au www.inlinehydraulicservices.com.au

Project

MAUI ONCOLOGY
WARRINGAH ROAD &
WAKEHURST PARKWAY
FRENCHS FOREST

Drawing

HYDRAULIC SERVICES

EXISTING OSD TANK DETAILS

Issue

PRELIMINARY ISSUE: FOR INFORMATION

Date: 10.12.19	Project No. 2019-0229
Scale: NTS	
Drawn: POK	Drawing No. H01 / P1
Design: PM	
No in set: 1	

TTW Structural Civil Traffic Façade

Site Inspection Report

To Erilyan Pty Ltd (NSW)

60 Strathallen Avenue
Northbridge NSW 2063

Project GenesisCare Cancer Centre - Project Maui

Job No 191134 CAAA

Report No 3

Attention James Curtin

Date 04/12/2019

Subject: On-Site Detention Tank

Date of Inspection:	20/11/2019	**Time of Inspection:**	10am
Inspected With:	Ryan Cooke		
Weather:	Sunny		

Site inspection was initiated by Ryan Cooke of Erilyan for the condition of the OSD tank and the confirmation of the OSD outlet direction and location.

Copy to Site Erilyan Pty Ltd (NSW), James Curtin;

Engineer Anthony LAHOUD

TTW Structural Civil Traffic Façade

Site Inspection Report

To Erilyan Pty Ltd (NSW)

60 Strathallen Avenue
Northbridge NSW 2063

Project GenesisCare Cancer Centre - Project Maui

Job No 191134 CAAA

Report No 3

Attention James Curtin

Date 04/12/2019

Visual inspection of interior of onsite detention tank indicated a constructed reinforced concrete tank that it is in generally good condition with no visible structural defects to the interior walls or ceiling. The reinforced concrete floor of the tank is not visible however due to a build-up of silt which is to be cleaned out by the existing tenant. A clause in currents tenants lease which requires the them to clean out silt within the detention tank upon termination of their lease. Please refer to attachment - 2.5.1 (A) -4. The outlet pipe had an existing maxi-mesh screen and orifice plate installed which are still adequately attached.

Copy to Site Erilyan Pty Ltd (NSW), James Curtin;

Engineer Anthony LAHOUD

TTW Structural Civil Traffic Façade

Site Inspection Report

To Erilyan Pty Ltd (NSW)

60 Strathallen Avenue
Northbridge NSW 2063

Project GenesisCare Cancer Centre - Project Maui

Job No 191134 CAAA

Report No 3

Attention James Curtin

Date 04/12/2019

Upon looking at the outlet pipe at 90 degrees to the direction of Warringah Rd being a 600 diameter it seemed clear and ends approximately 25m to a pit opening

Copy to Site Erilyan Pty Ltd (NSW), James Curtin;

Engineer Anthony LAHOUD

TTW Structural Civil Traffic Façade

Site Inspection Report

To Erilyan Pty Ltd (NSW)

60 Strathallen Avenue
Northbridge NSW 2063

Project GenesisCare Cancer Centre - Project Maui

Job No 191134 CAAA

Report No 3

Attention James Curtin

Date 04/12/2019

Although I was unable to lift the lid from projected pit on Warringah Rd due to unsafe nature of lifting the lid on a busy road, the length and direction of the 600 diameter pipe indicates it connects to the kerb inlet pit adjacent to the OSD outlet point and the large RMS information signage pole.Following a survey of the pipe it has been identified that the 600mm pipe connects to the kerb inlet pit adjacent to the OSD outlet and the large signage pole. This connection point is shown on the survey plan.

Copy to Site Erilyan Pty Ltd (NSW), James Curtin;

Engineer Anthony LAHOUD

Appendix B

Civil Drawings

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01

MAUI FRENCHS FOREST
CIVIL WORKS

GENERAL NOTES

1. Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the Engineer .
2. Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
3. Make smooth connection with all existing works.
4. Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
5. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority; the Contractor is to ensure that the drawings used for construction have been approved by all relevant authorities prior to commencement site.
6. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
7. For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

1. These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Consultant	Dwg Title	Dwg No	Rev	Date
TEAM2	ARCHITECTURAL	DA103	2	28.08.19
MEADOWS CONS	SURVEY	2984	A	06.12.05
ARCADIA	LANDSCAPE	19-635	A	30.08.19

CONCRETE FINISHING NOTES

1. All exposed concrete pavements are to be broomed finished.
2. All edges of the concrete pavement including keyed and dowelled joints are to be finished with an edging tool.
3. Concrete pavements with grades greater than 10 % shall be heavily broomed finished.
4. Carborundum to be added to all stair treads and ramped crossings U.N.O.

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from : **CRUX**

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct.
Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

STORMWATER DRAINAGE NOTES

1 Stormwater Design Criteria :
- (A) Average exceedance probability –
  - 1% AEP for roof drainage to first external pit
  - 5% AEP for paved and landscaped areas
- (B) Rainfall intensities –
  - Time of concentration: 5 minutes
  - 1% AEP = mm/hr
  - 5% AEP = mm/hr
- (C) Rainfall losses –
  - Impervious areas: IL = mm , CL = 0 mm/hr
  - Pervious areas: IL = mm , CL = mm/hr

2. Pipes 300 dia and larger to be reinforced concrete Class "2" approved spigot and socket with rubber ring joints U.N.O.
3. Pipes up to 300 dia shall be sewer grade uPVC with solvent welded joints.
4. Equivalent strength VCP or FRP pipes may be used subject to approval.
5. Precast pits may be used external to the building subject to approval by Engineer.
6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
7. Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
8. Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
9. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
10. Care is to be taken with levels of stormwater lines. Grades shown are not to be reduced without approval.
11. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
12. Subsoil drains to be slotted flexible at 0.7% min fall uPVC U.N.O.
13. Adopt invert levels for pipe installation (grades shown are only nominal).

KERBING NOTES

Includes all kerbs, gutters, dish drains, crossings and edges.

1. All kerbs, gutters, dish drains and crossings to be constructed on minimum 75mm granular basecourse compacted to minimum 98% modified maximum dry density in accordance with AS 1289 5.2.1.
2. Expansion joints (EJ) to be formed from 10mm compressible cork filler board for the full depth of the section and cut to profile. Expansion joints to be located at drainage pits, on tangent points of curves and elsewhere at 12m centres except for integral kerbs where the expansion joints are to match the joint locations in slabs.
3. Weakened plane joints to be min 3mm wide and located at 3m centres except for integral kerbs where weakened plane joints are to match the joint locations in slabs.
4. Broomed finished to all ramped and vehicular crossings, all other kerbing or dish drains to be steel float finished.
5. In the replacement of kerbs –
   Existing road pavement is to be sawcut 300mm from lip of gutter. Upon completion of new kerbs, new basecourse and surface is to be laid 300mm wide to match existing materials and thicknesses.Refer to drawing QUE-CE-C21.
   Existing allotment drainage pipes are to be built into the new kerb with a 100mm dia hole.
   Existing kerbs are to be completely removed where new kerbs are shown.

DBYD SERVICES NOTE

"Public Service Utility information shown on plan has been complied from information received from Dial Before You Dig inquiry, reference Number 7991208, which was obtained on 27/11/18.
Unless specifically shown otherwise, this location and depth of services shown on this plan have not been verified.

The location of services shown on this drawing have been plotted as accurately as possible from diagrams provided by service authorities and should be confirmed by site inspection."

EXISTING SEVICES LEGEND

- Existing sewer
- Existing water
- Existing low voltage electrical
- Existing high voltage electrical
- Existing communications
- Existing gas
- Existing stormwater
- Existing service to be removed

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels : BM NAIL IN DRIVE RL159.94
Datum of levels : A.H.D. AUSTRALIAN HEIGHT DATUM
Coordinate system : MGA
Survey prepared by : MEADOWS
Setout Points : CONTACT THE SURVEYOR

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.
Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

PIT SCHEDULE

Note: Grate size does not necessarily reflect pit size, refer pit type details, shown on detail sheets – **C15** .
Final internal pit dimensions are to comply with AS3500

Type	Description	Cover (Clear Opening)	Number
A	Surface inlet pit	600 x 600 Class D galvanised mild steel grate hinged to frame	1,2,3,4
E		Existing pit to remain	5

SITEWORKS LEGEND

- F22.20 — Finished surface level
- F22.00 — Finished contour
- MK — Mountable integral kerb
- DD — Dish drain
- IL10.00 / 600 ø 'Z' / 1.25% / 25m / IL9.65 — Stormwater pit, flow direction and line with; Invert level upstream; Pipe size and class; Pipe grade; Length; Invert level downstream
- GD — Grated drain
- Wheelstop
- RW# — Blockwork retaining wall
- Bolard

SAFETY IN DESIGN

Contractor to refer to Appendix B of the Civil Specification for the Civil Risk and Solutions Register.

EXISTING SERVICES

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicably possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicably possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions.
Refer to geotechnical report by ACT GEOTECHNICAL ENGINEERS for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practices as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to environmental report by EIS for details.

CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing works.

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the surrounding environment.

SITE ACCESS/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshall to supervise vehicle movements where necessary.

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA – Pollution control manual for urban stormwater,
   (C) LANDCOM NSW – Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control **drawings and notes are** provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
   The erosion and sediment control **plan** shall be implemented and adapted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

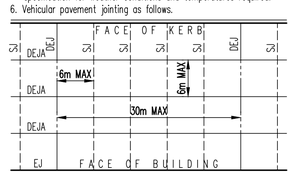
Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following:

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

JOINTING NOTES

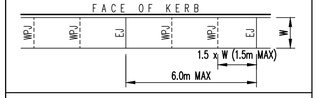
Vehicular Pavement Jointing

1. All vehicular pavements to be jointed as shown on drawings.
2. Keyed construction joints should generally be located at a maximum of 6m centres.
3. Sawn joints should generally be located at a maximum of 6m centres or 1.5 x the spacing of keyed joints, where key joint spacing is less than 4m, with dowelled expansion joints at maximum of 30m centres.
4. Provide 10mm wide full depth expansion joints between buildings and all concrete or unit pavers.
5. The timing of the saw cut is to be confirmed by the contractor on site. Site conditions will determine how many hours after the concrete pour before the saw cuts are commenced. Refer to the specification for weather conditions and temperatures required.
6. Vehicular pavement jointing as follows.



Pedestrian Footpath Jointing

1. Expansion joints are to be located where possible at tangent points of curves and elsewhere at max 6.0m centres.
2. Weakened plane joints are to be located at a max 1.5 x width of the pavement.
3. Where possible joints should be located to match kerbing and / or adjacent pavement joints.
4. All pedestrian footpath jointings as follows (uno).



CONCRETE NOTES

EXPOSURE CLASSIFICATION : External : B2

CONCRETE

Place concrete of the following characteristic compressive strength f'c as defined in AS 1379.

Location	AS 1379 f'c MPa at 28 days	Specified Slump	Nominal Agg. Size
Kerbs	S20	80	20
Retaining wall footing	S40	80	20

1. Use Type 'GP' cement, unless otherwise specified.
2. All concrete shall be subject to project assessment and testing to AS 1379.
3. Consolidate by mechanical vibration. Cure all concrete surfaces as directed in the Specification.
4. For all falls in slab, drip grooves, reglets, chamfers etc. refer to Architects drawings and specifications.
5. Unless shown on the drawings, the location of all construction joints shall be submitted to Engineer for review.
6. No holes or chases shall be made in the slab without the approval of the Engineer.
7. Conduits and pipes are to be fixed to the underside of the top reinforcement layer.
8. Slurry used to lubricate concrete pump lines is not to be used in any structural members.
9. All slabs cast on ground require sand blinding with a Concrete Underlay

FORMWORK

1. The design, certification, construction and performance of the formwork, falsework and backpropping shall be the responsibility of the contractor. Proposed method of installation and removal of formwork is to be submitted to the superintendent for comment prior to work being carried out.

DRAWING SCHEDULE

DRAWING NO.	DRAWING NAME
C00	NOTES AND LEGENDS SHEET
C01	EROSION AND SEDIMENT CONTROL PLAN
C02	STORMWATER PLAN, GROUND FLOOR
C15	DETAILS, SHEET 1

FileName: C00.dwg - USER: sonp - Plot File Created: Sep 02, 2019 - 5:13pm

A1 0 1 2 3 4 5 6 7 8 9 10

PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	AL	SP	02.09.19

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Project
MAUI FRENCHS FOREST
49 FRENCHS FOREST RD,
FRENCHS FOREST

Sheet Subject
NOTES AND LEGENDS SHEET

Scale : A1	Drawn	Authorised
NTS@A1	WW	

Job No	Drawing No	Revision
191134	C00	P1

Plot File Created: Sep 02, 2019 - 5:13pm

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01

PROVIDE STORM FILTER CHAMBER 2x 690 PSORB (MCC) STORMFILTER WITH CHAMBER FOR ROAD TREATMENT

DRAINAGE EASEMENT

EXISTING PIT TO BE RAISED TO MATCH TO NEW FINISHED LEVEL.

EXISTING OSD TANK WITH SUFFICIENT CAPACITY FOR PROPOSED DEVELOPMENT (EXACT BOUNDARIES TBC AT SITE)

500mm WIDE SWALE

PROVIDE STORM FILTER CHAMBER 5x 690 PSORB (MCC) STORMFILTER WITH CHAMBER FOR ROOF TREATMENT

*INVERT LEVEL TBC AT SITE

IL158.5 ø225 '2' 4.0% 5m IL158.3*

IL159.1 ø225 '2' 6.7% 12m IL158.3*

MAKE SMOOTH CONNECTION WITH EXISTING WORKS

450mm WIDE DISC DRAIN (75mm DEEP)

DISH DRAIN

MAKE SMOOTH CONNECTION WITH EXISTING ROLL KERB

MAKE SMOOTH CONNECTION WITH EXISTING WORKS

450mm WIDE DISC DRAIN (75mm DEEP)

DROP OFF BAY

BOLLARDS

AMBULANCE BAY

BASEMENT BELOW

LEVEL ABOVE

TOWARDS FRENCHS FOREST ROAD EAST

TOWARDS WARRINGAH ROAD

BUILDING FFL 159.750

F159.30 F159.80 F159.75 F159.70 F159.10 F159.7 F160.50

DP 1020

AREA 1774m²

VACANT

BRICK TELSTRA BUILDING

CONCRETE CARPARK

CONCRETE

CARPARK

SUBSTATION

DISH DRAIN

PAVEMENT DETAIL

NOTES

PAVEMENT TYPE 1
CRETE PAVING (HEAVY DUTY)

PAVEMENT TYPE 2
NCRETE PAVING (LIGHT DUTY)

PAVEMENT TYPE 3
BLOCK PAVING

SITEWORKS LEGEND

- F22.20 — Finished surface level
- F22.00 — Finished contour
- MK — Mountable integral kerb
- DD — Dish drain
- IL10.00 / 600 ø 'Z' / 1.25% / 25m / IL9.65 — Stormwater pit, flow direction and line with; Invert level upstream; Pipe size and class; Pipe grade; Length; Invert level downstream
- GD — Grated drain
- Wheelstop
- RW# — Blockwork retaining wall
- Bolard

PRELIMINARY

Rev	Description	Eng	Draft	Date
P2	PRELIMINARY	AL	MB	09.09.19
P1	PRELIMINARY	AL	SP	02.09.19

Architect
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Project
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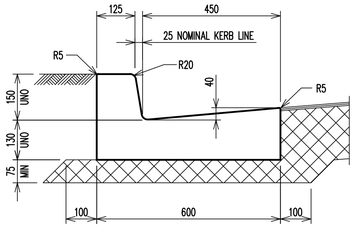
49 FRENCHS FOREST RD,
FRENCHS FOREST

Sheet Subject
SITEWORKS & STORMWATER PLAN

Scale : A1 — 100@A1
Drawn — SP
Authorised
Job No — 191134
Drawing No — C02
Revision — P2
Plot File Created: Sep 09, 2019 - 4:34pm

FileName: C02.dwg - USER: mattb - Plot File Created: Sep 09, 2019 - 4:34pm

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01



KERB AND GUTTER (K&G)

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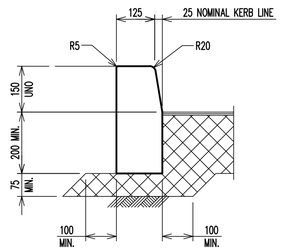

KERB ONLY (KO)

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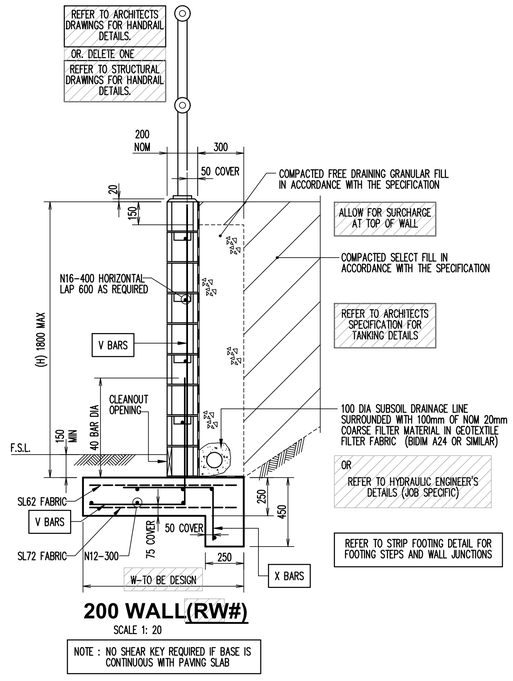

200 WALL(RW#)

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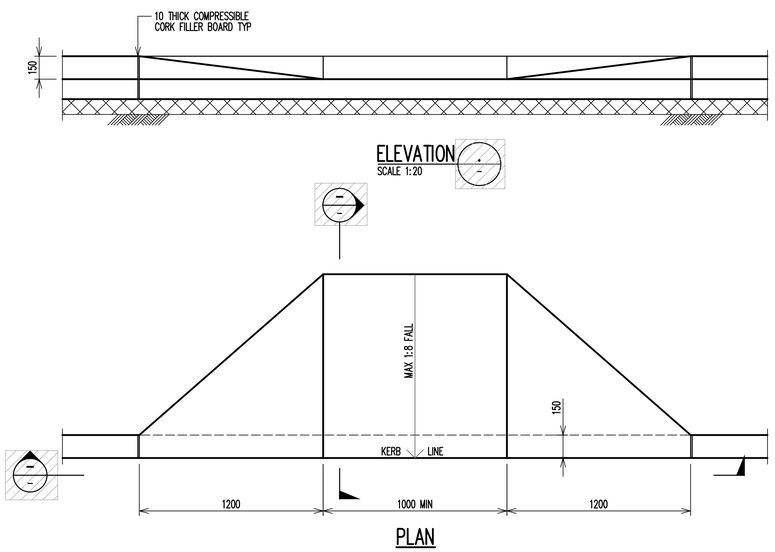

RAMPED CROSSING

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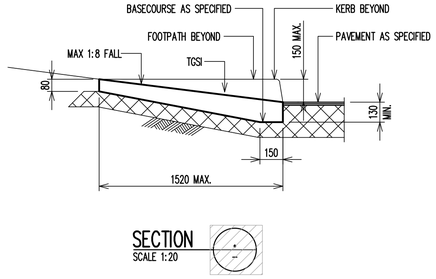

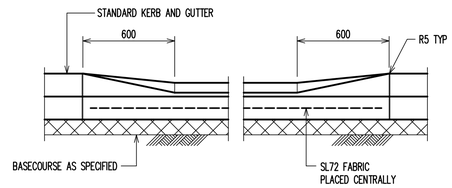

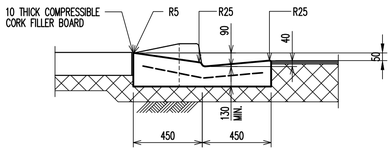

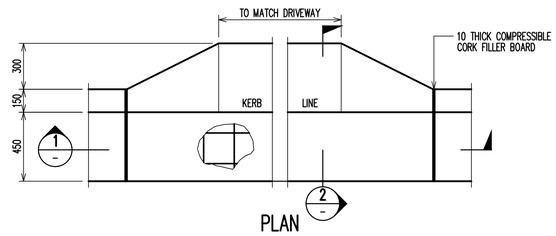

VEHICULAR CROSSING

SCALE 1:20

PRELIMINARY

FileName: C14.dwg – USER: mohlib – Plot File Created: Sep 09, 2019 – 4:35pm

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Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	AL	SP	09.09.19

Architect
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Engineer
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Project
MAUI FRENCHS FOREST
49 FRENCHS FOREST RD,
FRENCHS FOREST

Sheet Subject
DETAIL SHEET 1

Scale : A1	Drawn	Authorised
NTS@A1	JW	

Job No	Drawing No	Revision
191134	C14	P1

Plot File Created: Sep 09, 2019 - 4:35pm

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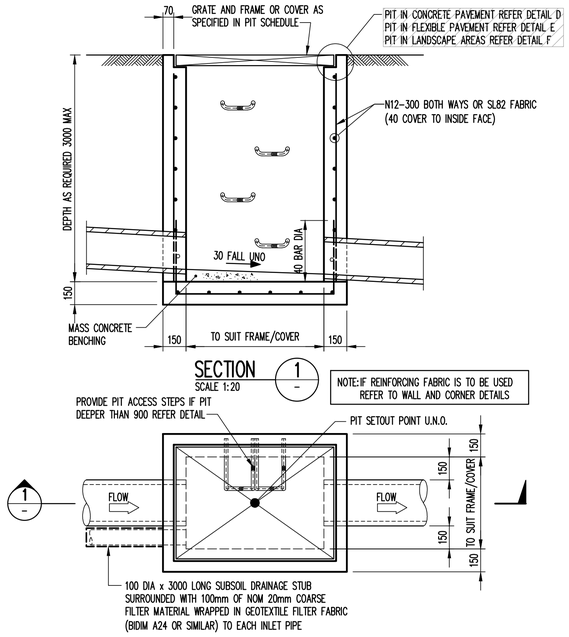
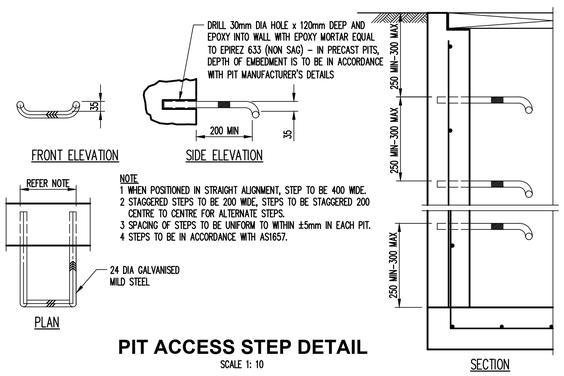
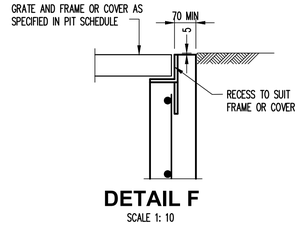


PIT TYPE xx



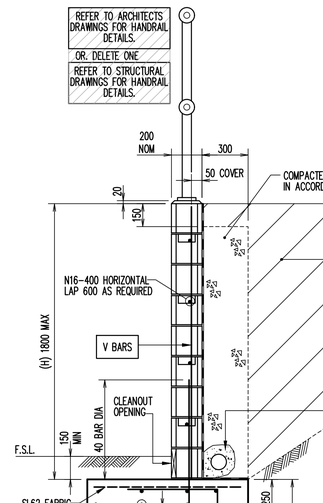
PIT ACCESS STEP DETAIL

SCALE 1: 10



DETAIL F

SCALE 1: 10



200 WALL

SCALE 1: 20

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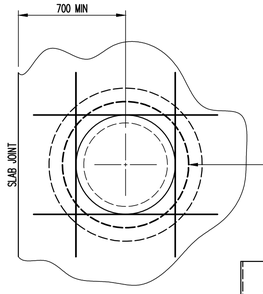
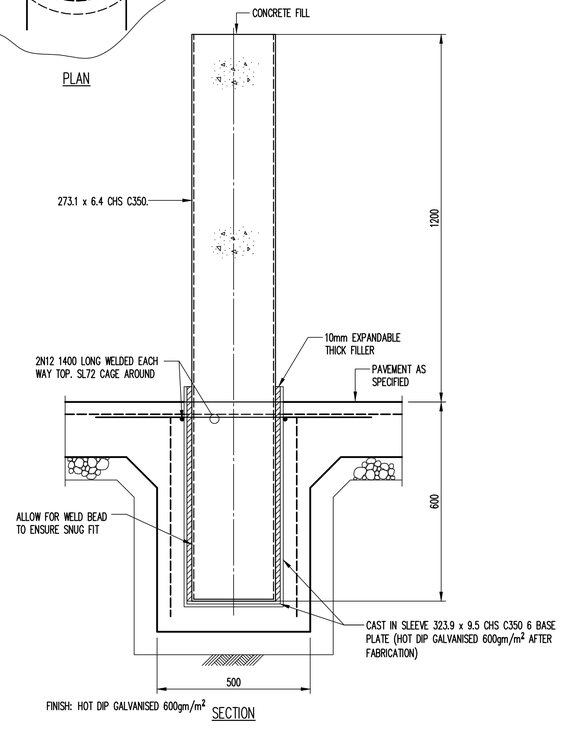
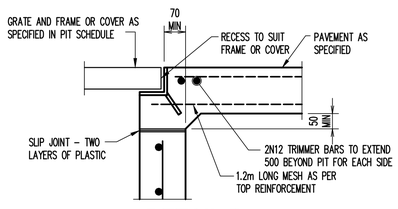




BOLLARD TO CONCRETE PAVEMENT

SCALE 1: 10

(CONFIRM LOCATION WITH BOTH CIVIL ENGINEERING AND ARCHITECTURAL DRAWINGS)



DETAIL D

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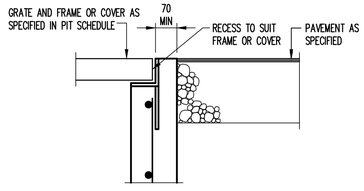

DETAIL E

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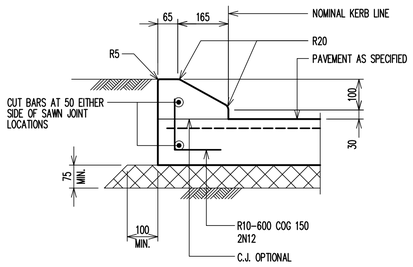
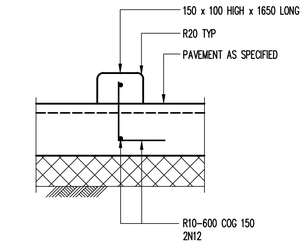


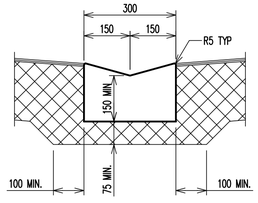
MOUNTABLE INTEGRAL KERB (MIK)

SCALE 1:10



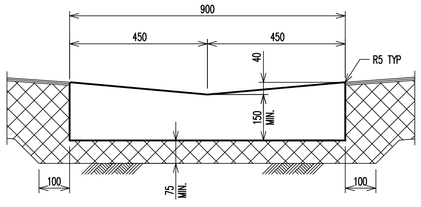
WHEEL STOP IN CONCRETE PAVEMENT

SCALE 1:10



DISH DRAIN TYPE A (DDA)

SCALE 1:10



DISH DRAIN (DD)

SCALE 1:10

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PRELIMINARY

Rev	Description	Eng	Draft	Date
P2	PRELIMINARY	AL	SP	09.09.19
P1	PRELIMINARY	AL	SP	02.09.19

Architect
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Project
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49 FRENCHS FOREST RD,
FRENCHS FOREST

Sheet Subject
DETAIL SHEET 1

Scale : A1	Drawn	Authorised
NTS@A1	JW	

Job No	Drawing No	Revision
191134	C15	P9

Plot File Created: Sep 09, 2019 - 4:35pm