MOTT MACDONALD

The Fiveways Triangle Crows Nest

Stormwater Management Report

August 2024

Acknowledgment of Country

On behalf of Mott MacDonald, we would like to begin by acknowledging the Traditional Custodians of the land on which we meet today, and pay our respects to their Elders past and present.

We recognise and respect their cultural heritage, beliefs, continued connection to the land and water and commit to building a brighter future together.

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The Fiveways Triangle Crows Nest

Stormwater Management Report

August 2024

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	24.08.23	S. Saiara	A. Tarshan	D. Fettell	Draft Issue for Information
B	18.09.23	S. Saiara	A. Tarshan	D. Fettell	Issue for Information
C	12.03.24	S. Saiara	A. Tarshan	D. Fettell	Issue for Development Application
C	30.08.24	S. Saiara	A. Tarshan	D. Fettell	Issue for SSDA

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Contents

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Executive summary

Mott MacDonald has been engaged by Deicorp Projects Crows Nest Pty Ltd to develop a Stormwater Management Plan for the development of the 'Five Ways Triangle' site, located at 391-423 Pacific Hwy, 3-15 Falcon Street, and 8 Alexander St, Crows Nest NSW 2065. This plan will support the delivery of the site as it will identify opportunities, constraints, and risks related to civil design. The scope of this report summarises the existing and proposed stormwater drainage design as well as the design approach, key assumptions, relevant references, and standards that will be applied to the development of concept civil design documentation for the proposed development.

In further detail, the report expounds on the design methodology, inputs, and guidelines, all of which are comprehensively explained in Sections 2 and 3.

Additionally, Section 4 delves into stormwater management, taking into account existing site conditions, flooding information, and tailwater assumptions. The introduction of On-site Detention is proposed to ensure a gradual release into the existing kerb inlet pit located in Alexander Street, guaranteeing a safe overland flow path at all times.

Section 5 of the report delineates the objectives of Water Sensitive Urban Design (WSUD) and outlines the proposed water quality modelling strategy.

Finally, the report further discusses the implementation of erosion and sediment control measures designed to minimise the sediment contents generated during the construction phase.

1 Introduction

1.1 Purpose of Report

The purpose of this report is to summarise the design approach key assumptions, and relevant references and standards applied to the development of the concept civil design documentation for the 'Five Ways Triangle' site, located at 391-423 Pacific Hwy, 3-15 Falcon Street, and 8 Alexander St, Crows Nest NSW 2065.

The report discusses the two main sections:

- Stormwater Drainage Design Approach
- Water Sensitive Urban Design

In addition, this report has been developed to:

- Describe how input data has been obtained, collected, and interpreted.
- Discuss the key design standards used for the design.
- Present the civil and stormwater strategies that have been developed for this site.

1.2 The Site

The subject site is located within the North Sydney City Council LGA. The site (Figure 1-1) is located at 391-423 Pacific Highway, 3-15 Falcon Street and 8 Alexander Street, Crows Nest. The site is also known as the Five Ways Triangle and spans the entire street block bounded by the Pacific Highway, Falcon Street and Alexander Street. The total site area is 3,201sqm and it is currently occupied by commercial, and retail uses with building heights ranging between one and four storeys. The site is 240m south of an entrance to the proposed Crows Nest Metro Station and 4km north of the Sydney CBD.

Figure 1-1: Site Locality

2 Methodology

This section details the approach to civil design service and provides a brief overview of the input data and coordination sought from other disciplines and design interfaces.

2.1 Methodology and Approach

- Review of the survey information prepared by Daw & Walton Consulting Surveyors, Job No. 4950-20, Revision 3b, dated 29/03/2023.
- Review of the utility search information prepared by SureSearch, Job No. 88201, dated 14/09/2023.
- Review of the architectural plans prepared by Turner Studio, Project No. 19073, dated 07/03/2024.
- Mott MacDonald queried Council regarding the on-site detention sizing approach for the type of developments within the North Sydney Council LGA.
- North Sydney Council reference documents and guidelines were reviewed to prepare a design criterion.
- Coordinated stormwater overland flow and ponding analysis to understand the flooding constraints including flood planning levels and downstream tailwater level.
- Civil design for stormwater and grading interfaces with site constraints to ensure the proposed design complies with the standards.
- Preparation of a MUSIC model to investigate the treatments required for the site to achieve the pollutant reduction targets in accordance with North Sydney Council guidelines.

2.1.1 Assumptions

In our stormwater management assessment, the following assumptions have been made:

- The existing kerb inlet pit along Alexander Street will serve as the designated connection point for the piped drainage system. It is assumed that the current council drainage infrastructure is in a serviceable condition to and devoid of any major defects.
- The optimal point of discharge is governed by the pit depth, stormwater drainage pipes invert levels and tailwater level.

3 Design Inputs and Guidelines

3.1 Consultation

Mott MacDonald is in consultation with the project team throughout the design phase to obtain a feasible design solution for the proposed development site. Iterations of the design were prepared in conjunction with the flood engineers input to flood levels, hydraulic engineers, landscape architects and architects. The proposed stormwater drainage design was conducted in accordance with North Sydney Council Development Control Plan (DCP) and other relevant guidelines.

3.2 Codes and Guidelines

The design has been undertaken in compliance with the relevant Australian Standards, and local government guidelines. Key documents used as guidance for the design are summarised in Table 3-1:

Table 3-1: Design Standard and References

Reference	Title	Version or Date
AS/NZS 3500.3	Plumbing and Drainage – Stormwater Drainage	2021
ARQ	Australian Runoff Quality – A Guide to Water Sensitive Urban Design (National Committee for Water Engineering)	2006
BCA	Building Code of Australia	2019
Blue Book	Managing Urban Stormwater - Soils and Construction, Volume 1, 4th edition, March 2004, Landcom	Mar 2004
eWater	MUSIC User Manual	V6
North Sydney Council	Infrastructure Specification for Roadworks, Drainage, and Miscellaneous Works	2022
North Sydney Council	North Sydney Development Control Plan	2013
North Sydney Council	Section 18 Stormwater Management	2013

3.3 Other Consultant Inputs

The proposed stormwater design is also based on the following source of information received:

- Architectural design layouts provided by Turner Studio, Project No. 19073, dated 29/08/2024.
- Survey undertaken by Daw & Walton Consulting Surveyors, Job No. 4950-20, Revision 3b, dated 29/03/2023.

3.4 Stormwater Management Design

3.4.1 Design Storm Events

The proposed site stormwater drainage design has been sized to accommodate the 5% AEP storm events, while the proposed On-site Detention has been sized to accommodate the 1% AEP storm events.

3.4.2 Design Requirements

The listed North Sydney Council guidelines in Table 3-1 above provides the synopsis of the design requirements for the subject site. Design criteria has been developed to ensure the proposed design adheres to the requirements denoted in the North Sydney Council guidelines. Table 3-2 below summarises the design criteria for hydrology and hydraulic analysis.

Table 3-2: Hydraulic and Hydrology Design Criteria

Item	Standard	Adopted
Hydrology & Hydraulics		
Hydrological Model	North Sydney	DRAINS file (ILSAX type time-area method)
Minor Design Storm	AR&R	20yr Average Recurrence Interval (5% AEP)
Major Design Storm	North Sydney	100yr Average Recurrence Interval (1% AEP)
Design Rainfall	*NA*	AR&R 2019 values
Urban Rainfall Losses	*NA*	Paved (impervious) area depressions storage (mmm)=1 Supplementary area depression storage (mm) =1 Grassed (previous) area depression storage (mm) = 5
Pipe Size	AR&R 2019	Pipelines – 375mm nominal diameter
Retardance Coefficient	AR&R 2019	Impervious = 0.01 Industrial/commercial = 0.2-0.5 Residential (low density) = 0.1-0.2 Residential (high density) = 0.2-0.5 Open previous areas, minimal vegetation (grassed) = 0.03-0.05 Open previous areas, moderate vegetation (shrubs) = 0.05-0.07 Open previous areas, thick vegetation (trees) = 0.07-0.12
Pit Losses	AR&R 2019	Missouri charts
Pit Blockage Factors	AR&R 2019	Sag blockage factor: kerb inlet <= 1.0m – 0.7 kerb inlet > 1.0m – 0.5 v grate or grate only – 0.9 strip drain or other – 0.95 On grade blockage factor: kerb inlet <= 1.0m – 0.5

Item	Standard	Adopted
		kerb inlet > 1.0m – 0.2 v grate or grate only – 0.9 strip drain or other – 0.95
Tail water level/sea water level	NIL	Flood Level undertaken by Mott MacDonald Flooding Engineer
Overland Flow Safety Criteria	AR&R	Max Depth x Velocity = 0.4m2/s Maximum depth less than 0.5m
Pollution reduction targets	North Sydney Council	Gross Pollutants 70% TSS 80% TP 45% TN 45%
Stream Erosion Metrics	AR&R 2019	Maximum 3.5

4 Stormwater Management Design

4.1 Proposed Development

The development site has an approximate total area of 3,200m^2. In the post-development scenario, the site will be retained as 100% impervious like the pre-existing scenario. However, upon consultation with North Sydney Council, it has been advised that "On-site Detention must be provided to ensure that the maximum discharge of stormwater collected from the undeveloped site, which would occur during a 1 in 5-year storm of 1-hour duration is not exceeded. All other stormwater run-off from the site for all storms up to a 1 in 100-year storm event is to be retained on the site for gradual release to the kerb and gutter or piped drainage system" The coordination with North Sydney Council engineer has been attached in Appendix A of this report.

4.2 Flood Risk Assessment

According to the flooding assessment conducted by Mott MacDonald, there is no regional flooding issue, due to the site location at the very upstream extent of the catchment. Additionally, the site is located outside of the flood planning area (FPA). According to the North Sydney Council policy, all entry levels must be 0.30m above surrounding ground levels. Nonetheless, during the assessment, potential ponding issues were observed at the low point (sag) situated at the southern end of Alexander Street, close to the Pacific Highway.

The ponding level determined by the flooding engineer during the major storm events, has been incorporated as the downstream tailwater condition for the proposed stormwater drainage system.

Table 4-1 below outlines the results of the Flood Planning Levels (FPL). The relevant flood levels interpreted from:

- Alexander Street sag for freeboard levels to southern buildings;
- Alexander mid-point for basement entry ramp position; and
- Regular spacing around building perimeter for freeboard to adjacent overland flow path in the street.

Table 4-1: Downstream Tailwater Levels Findings

Location	Alexander Street SAG	Alexander Street mid-point	Alexander Street upper	Falcon Street upper	Falcon Street lower	Pacific Hwy Upper	Pacific Hwy Lower
Spill Level (m AHD)	95.48	n/a	-	n/a	n/a	n/a	n/a
Surface Level (m AHD)	95.38	95.74	96.11	98.09	96.74	97.03	95.77
20% AEP water level (m AHD)	95.64	95.82	96.19	98.15	96.81	97.09	95.85
20% AEP CC water level (m AHD)	95.66	95.84	96.20	98.15	96.81	97.09	95.85
5% AEP water level (m AHD)	-	-	96.20	-	-	-	-

Location	Alexander Street SAG	Alexander Street mid-point	Alexander Street upper	Falcon Street upper	Falcon Street lower	Pacific Hwy Upper	Pacific Hwy Lower
5% AEP CC water level (m AHD)	-	-	96.21	-	-	-	-
1% AEP water level (m AHD)	95.70	95.87	96.22	98.16	96.82	97.10	95.87
1% AEP CC water level (m AHD)	95.71	95.89	96.23	98.17	96.83	97.10	95.87
PMF water level (m AHD)	95.87	96.21	96.71	98.21	96.88	97.14	95.93
FPL (m AHD)	96.00	96.21	-	98.46	97.12	97.40	96.17
Basement Entry Level (m AHD)	n/a	96.22	-	n/a	n/a	n/a	n/a
Ground Floor FL (m AHD)	96.1	96.12	-	99.2	97.2	97.8	96.3
Comment	Above FPL, ok	Above FPL, ok	-	Above FPL, ok	Above FPL, ok	Above FPL, ok	Above FPL, ok

4.3 Tailwater Assumption

The downstream tailwater level is typically utilised to assess and account for any potential backwater effects in the proposed outlet. It is worth noting that the North Sydney Council guidelines do not specifically outline a downstream tailwater level requirement. Consequently, the ponding levels supplied by the flood engineers have been embraced as a best practice approach.

4.4 On-site Detention

The proposed On-site Detention (OSD) is suspended below the ground floor level. The OSD has been sized to detain the post-development flow for all storms up to a 1 in 100-year storm event to a 1 in 5-year storm of 1-hour duration pre-development.

Mott MacDonald prepared a catchment plan and a DRAINS model to undertake the hydraulic and hydrological assessment for the site. The total permissible site discharge (PSD) is inclusive of the area bypassing the OSD and controlled flow.

Emergency overflow grates have been incorporated within the OSD and located below the 5m wide walkway towards Falcon Street at the northern side of the site to allow and surcharge during any occurrences of orifice blockage.

Table 4-2 below outlines the calculated catchment area for the site, including total site area, area bypassing OSD, storage required, and storage provided.

Table 4-2: Calculation Results

Total Site Area	3,201m^2
Area Bypassing On-site detention tank	164m^2
Bypassing Percentage	5%
On-site Detention volume required	74.50m^3
On-site Detention volume provided	85m^3

All roof and podium drainage are to be reticulated to the proposed rainwater tank and overflow to the Water Quality Chamber (WQC) incorporated within the On-site Detention system. Refer Hydraulic design documentation for internal building pipe reticulation.

4.5 Overland Flow Path

As a significant portion of the development site is covered by roofs, the remaining 5% of bypassing areas have been graded toward the surrounding streets. Additionally, the small size nature of these sub-catchment areas, which bypass the On-site Detention, resulted in a safe overland flow path.

4.6 Point of Discharge

The survey information provided identified existing stormwater infrastructure along Alexander Street which serves as the designated point of discharge for the development site, in particular the kerb inlet pit mid Alexander Street.

4.7 Stormwater Quantity Modelling

In accordance with guidance provided by the North Sydney Council, we have conducted a hydraulic assessment using DRAINS to determine the necessary volume for the proposed On-site Detention system. As outlined in the Mott MacDonald Water Quality Catchment Plan, a portion of the ground floor is permitted to bypass the On-site Detention. Our DRAINS analysis ensures that the maximum discharge of stormwater collected from the undeveloped site, which would occur during a 1 in 5-year storm of 1-hour duration is not exceeded. The results from the DRAINS model are tabulated below in Table 4-3 and illustrated in the subsequent figures.

Table 4-3: DRAINS Hydraulic Assessment Results

	20% AEP Storm Event (1hr)		1% AEP Storm Event	
Catchment Area (m^2)	Pre-Development Flow (L/s)	Post-Development Flow (L/s)	Post-Development bypass flow (L/s)	Total flow (L/s)
3201	106	83	12	95

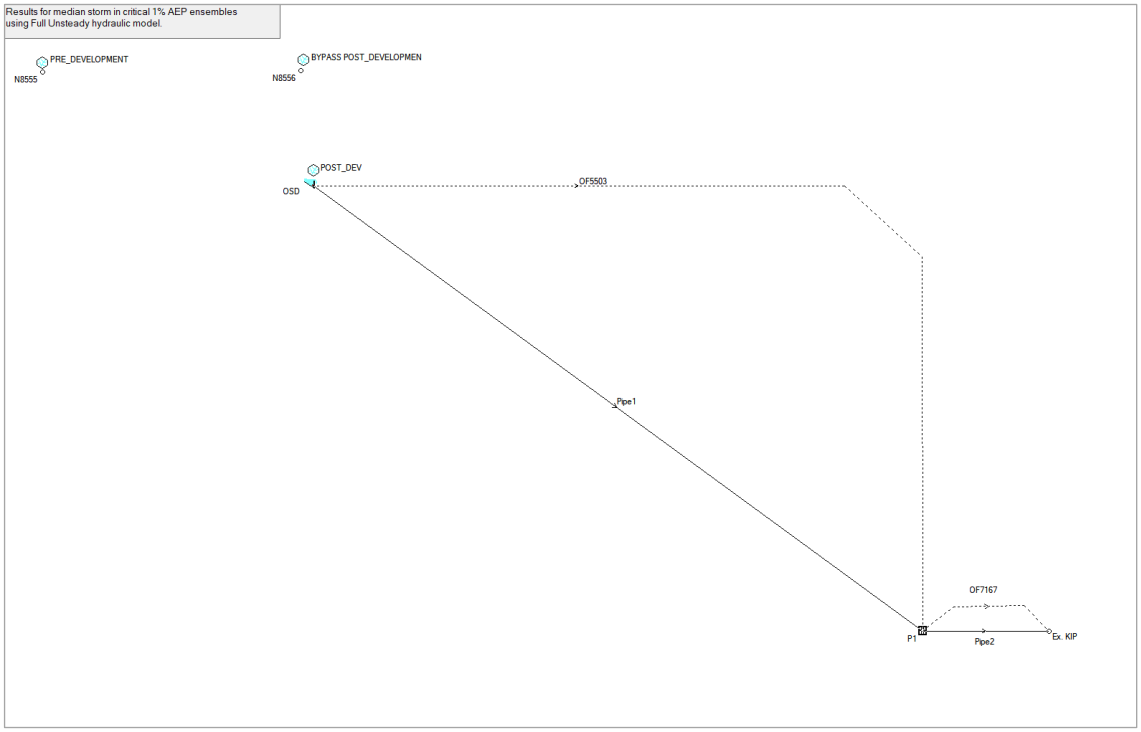

Figure 4-1: DRAINS Node Layout

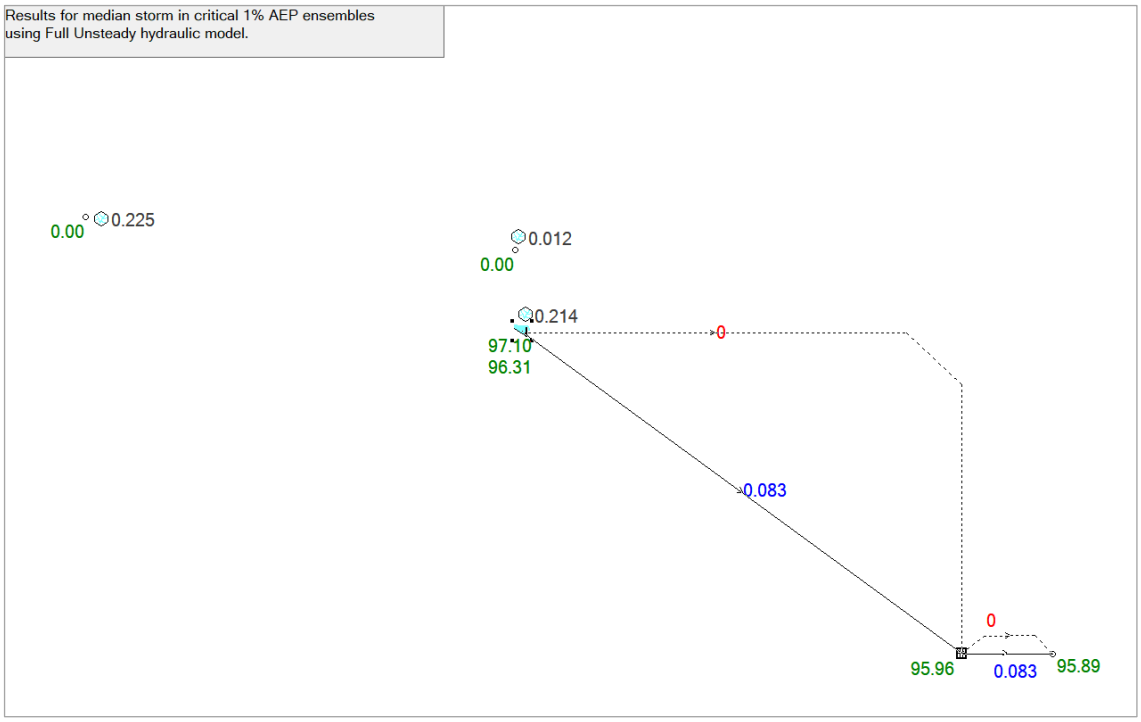

Figure 4-2: DRAINS Result 1% AEP Storm Event

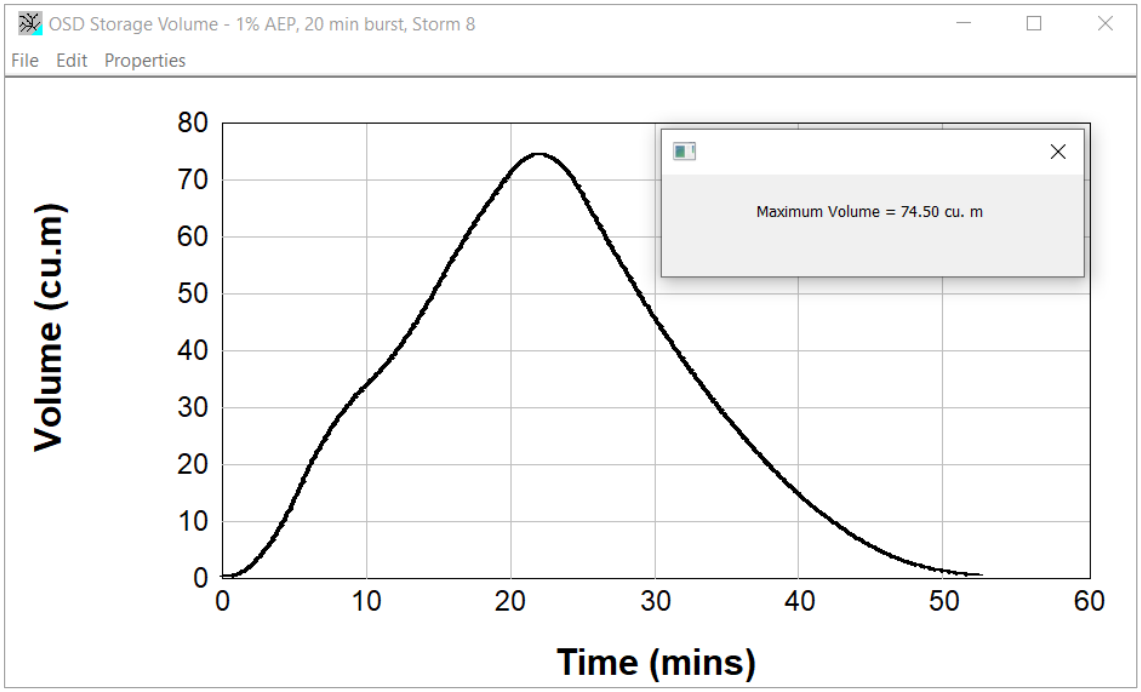

Figure 4-3: OSD Storage Graph

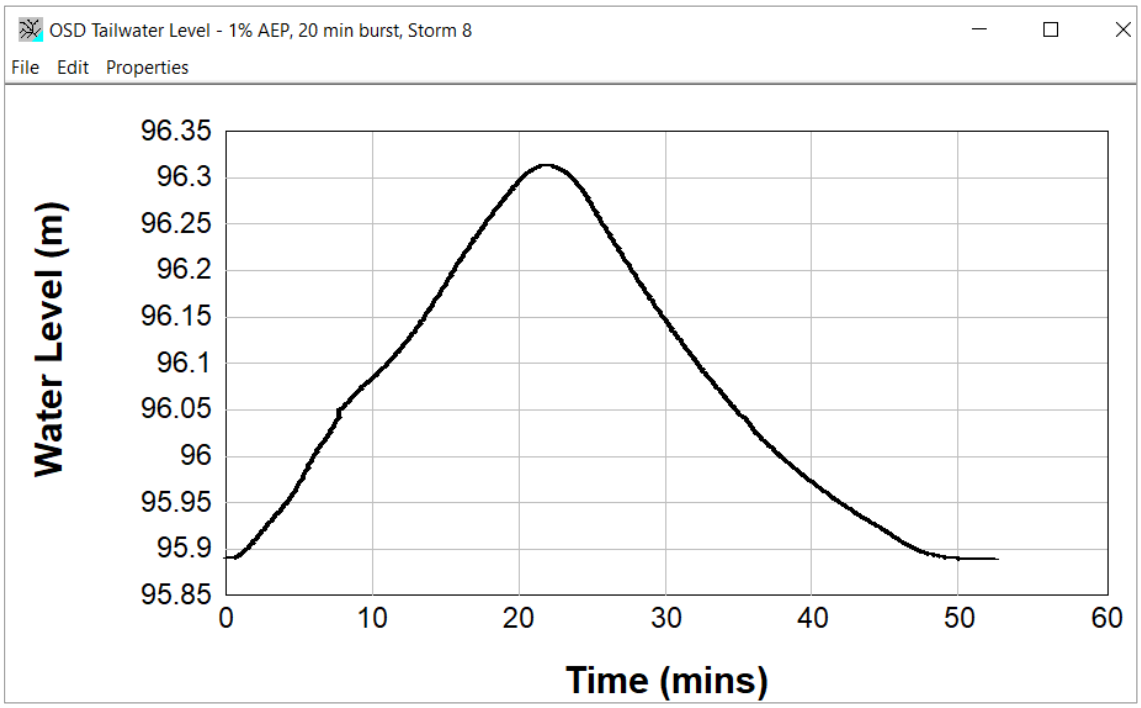

Figure 4-4: OSD Tailwater Level Graph

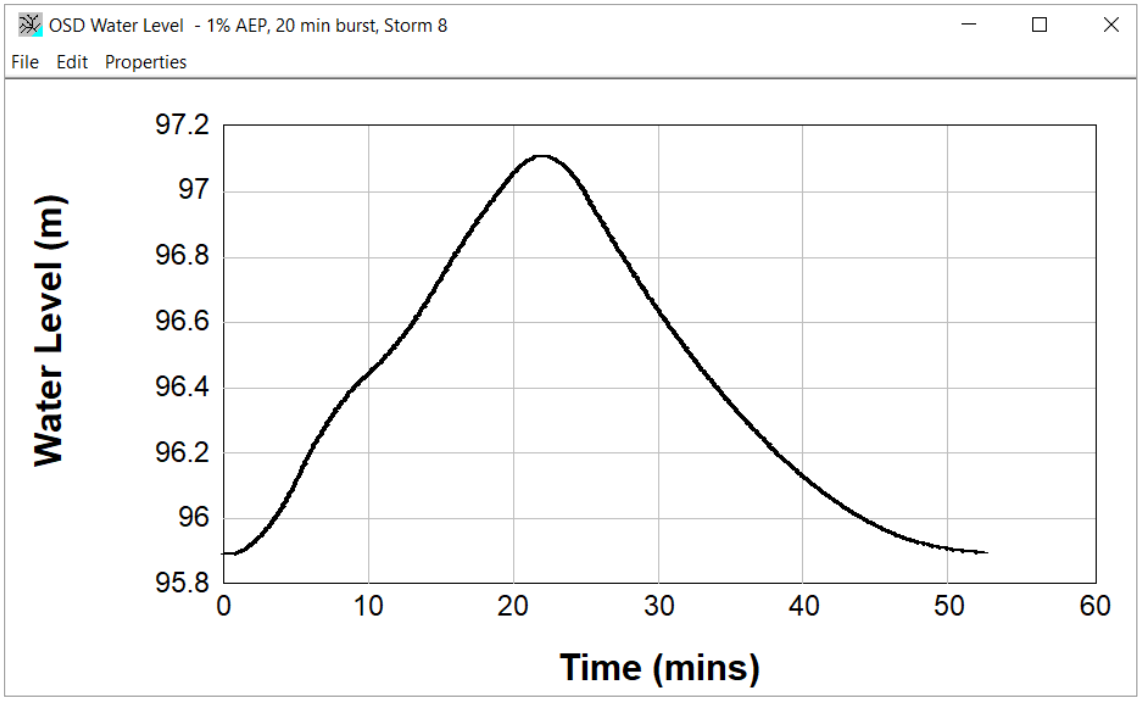

Figure 4-5: OSD Water Level Graph

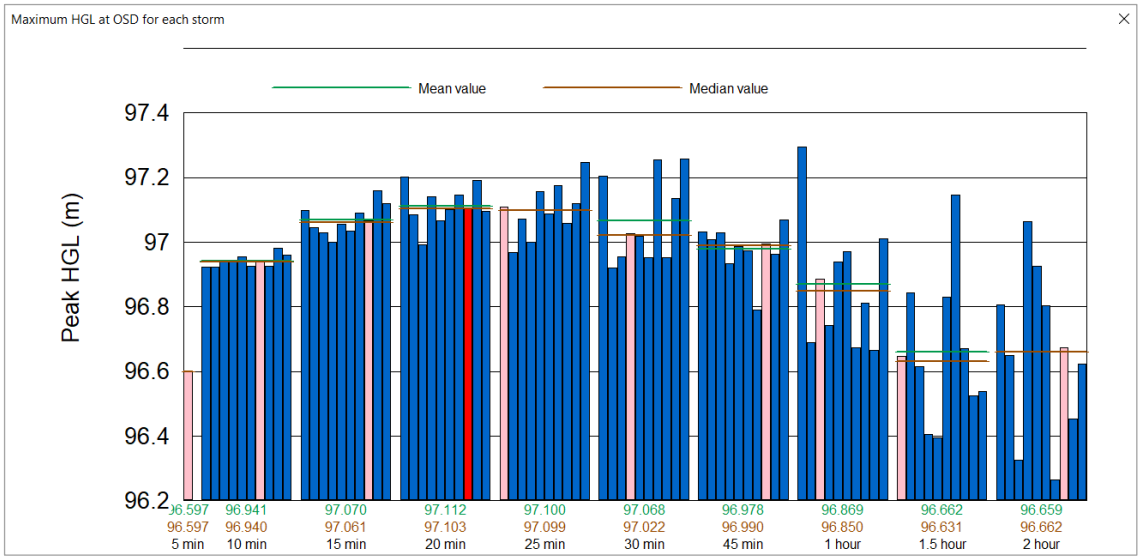

Figure 4-6: OSD Peak HGL Chart

5 Stormwater Quality Improvements

To ensure that the development improves the quality of stormwater leaving the development site. Mott MacDonald has reviewed the site, formulated a Water Sensitive Urban Design concept modelled the treatment train effectiveness, and summarised the results in the following sections:

5.1 Design Objective

According to the North Sydney Development Control Plan 2013, section 2.6.7 the following reduction targets are to be achieved for water quality:

Table 5-1: North City Sydney Reduction Targets

Pollutant	Average Annual Pollutant Load Reduction Objective
Gross Pollutant	70%
Total Suspended Solids	80%
Total Phosphate	45%
Total Nitrogen	45%

5.2 Proposed Water Quality Modelling Strategy

Modelling of the proposed development was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software. The software was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC models the total amounts of gross pollutants, phosphorus, nitrogen, and total suspended solids produced within various types of catchments. It allows the user to simulate the removal rates expected when implementing water quality treatment devices to reduce the increased gross pollutant and nutrient levels created by the proposed development.

A MUSIC modelling assessment was undertaken for the proposed development to determine the treatment measure required to achieve the pollutant reduction targets.

The following proprietary products are to be incorporated within the proposed stormwater infrastructure:

- 10 x 690 storm filter cartridges to be installed within the water quality chamber incorporated in the OSD.
- 2 x OceanGuard to be installed in level 3 podium for pervious and impervious areas, the drainage in podium shall be collected to ensure the surface runoff is being treated in OceanGuard. Architect and Hydraulic consultant to further coordinate the grading on level 3 podium to ensure the area can be directed to pits installed with OceanGuards, multiple OceanGuards may be required depending on the podium grading.
- 1 x OceanGuard to be installed within the stormwater pit on eastern side of the pedestrian ramp on the ground floor to treat surface runoff.

Refer to water quality catchment plan for areas bypassing treatment.

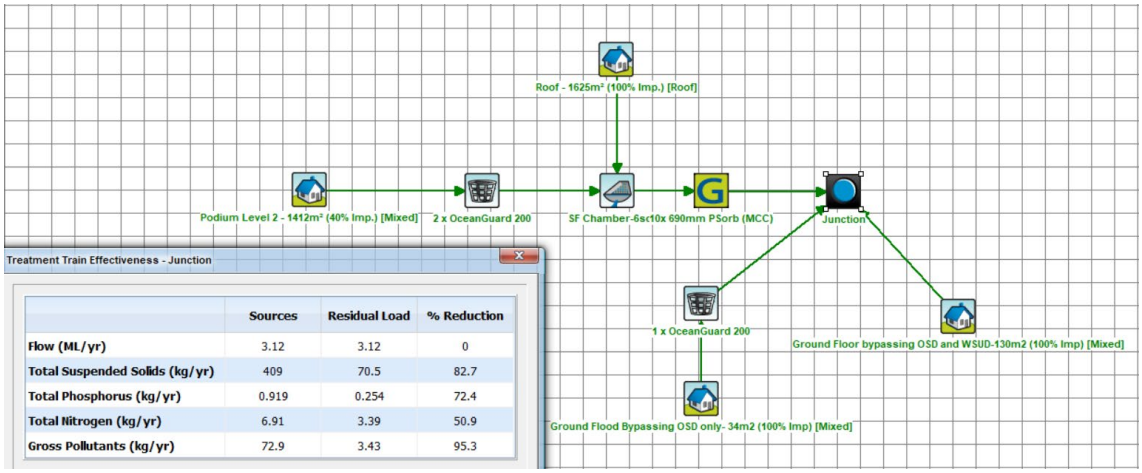

Figure 5-1: MUSIC Modelling Assessment and Results

Table 5-2: Water Quality Catchment Parameters

Catchment ID	Area (m^2)
Level 3 Podium + Roof	3037
Roof	1625
Podium	1412
Ground floor area bypassing OSD and water quality treatment	130
Ground floor area bypassing OSD only	34
Total Site Area	3201

6 Erosion and Sediment Control

The erosion and sediment control measures will be undertaken with reference to the Landcom Blue Book; Managing Urban Stormwater Soil for best practice through the construction phase to limit any sediments generated from the site from entering the existing stormwater network and creek. As such the following measures are to be undertaken as part of the proposed construction works:

- Sediment fence to be installed around the site perimeter to trap any sediment.
- Shaker grid/wash down facility to be installed at the site egress to limit any sediments from being carried outside of the construction site.
- Stockpile location to be confirmed by contractor on-site during the construction phase, preferably to be located at the high point of the site.

7 Conclusion

The objective of this stormwater management report is to provide a comprehensive and detailed overview of the proposed stormwater drainage system. It also outlines the approach taken to ensure compliance with various regulations and guidelines, including those set forth by the North Sydney Council DCP and the technical direction received from Council's senior development engineer.

As part of the hydraulic assessment for the proposed site drainage, DRAINS modelling software have been used to determine the proposed On-site Detention sizing whilst adopting the ponding level of 95.89 as a downstream tailwater level for the 1% AEP storm event to assess the backwater effect.

Furthermore, a water quality catchment plan has been produced to further explain the treated and non-treated areas, along with the achieved pollutant reduction targets in accordance with the North Sydney Council DCP tabulated in section 5.1 of this report. Water quality measures have been assessed using MUSIC software. For a more detailed understanding of the water quality treated areas, please refer to the water quality catchment plan.

Water quality measures have been assessed using MUSIC software, ensure pollutant reduction targets meet the requirements as advised by council engineer on 3rd April 2023.

In addition to the above the report further discusses the implementation of erosion and sediment control measures designed to minimise the sediment contents generated during the construction phase. These measures are aimed at collecting sediment within the site before discharge, thus proactively reducing pollutants from entering the existing council drainage system.

For a comprehensive understanding of the stormwater management plan, this report should be read in conjunction with the civil drawings set prepared by Mott MacDonald.

Appendix A – Council Email Coordination

Aladdin Tarshan

From: Zarko Cvetkovic <Zarko.Cvetkovic@northsydney.nsw.gov.au>
Sent: Monday, 3 April 2023 2:47 PM
To: Aladdin Tarshan
Cc: Harry Konsti; Sandesh Ghimire
Subject: Re: OSD Enquiry - Five Ways Triangle, Crows Nest

Hi Alladin,

I think that we have spoken last week over the phone about OSD requirements in Crows Nest area for mixed-use development. Pity that you haven't disclosed the address of the property, as I could give you more information on nearby available pipeline connections.

Please, see below general requirements required by N. S. C. for preparation of stormwater management plan:

Stormwater requirements OSD, Rainwater and Water Quality

1. What are the OSD requirements?

   *"On site detention must be provided to ensure that the maximum discharge of stormwater collected from the undeveloped site, which would occur during a 1 in 5-year storm of 1-hour duration is not exceeded. All other stormwater run-off from the site for all storms up to a 1 in 100-year storm event is to be retained on the site for gradual release to the kerb and gutter or piped drainage system (**if it is available within 50 m from the site, it would be priority**). Provision is to be made for satisfactory overland flow should a storm in excess of the above parameters occur."*

   **** We would just like to confirm that the undeveloped site means the site in its current condition.

2. What are Rainwater Reuse targets? Are there specific re-use rates to be used? What end uses does it need to be connected to?

   Council does not have specific re-use targets or re-use rates. End uses may include garden irrigation, toilets etc.
   Rainwater tanks are to be designed in accordance with Basix and Sydney Water requirements.

3. Are there Water Quality requirements applicable to this site?
   We are assuming you will be using MUSIC modelling, which is commonly used to analyse stormwater quality treatment, however North Sydney Council doesn't (unfortunately) have MUSIC inputs.
   Should you be using MUSIC modelling, the City of Sydney inputs would be very similar to North Sydney. So, there would be no harm in using the Sydney City Council MUSIC link.
   If you are using some other modelling, I can at least advise that Council has an expectation for the targets below.
   80% retention of the typical urban annual load for Total Suspended Solids (TSS)
   45% retention of the typical urban annual load for Total Phosphorus (TP)
   45% retention of the typical urban annual load for Total Nitrogen (TN)
   70% retention of the typical urban annual load for gross pollutants (litter).

Kind Regards,

Zarko Cvetkovic
Senior Development Engineer - N.S.C.

Zarko Cvetkovic
Senior Development Engineer

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Zarko.Cvetkovic@northsydney.nsw.gov.au

From: Harry Konsti <Harry.Konsti@northsydney.nsw.gov.au>
Sent: Monday, 3 April 2023 2:22 PM
To: Zarko Cvetkovic <Zarko.Cvetkovic@northsydney.nsw.gov.au>; Sandesh Ghimire <Sandesh.Ghimire@northsydney.nsw.gov.au>
Subject: Fwd: OSD Enquiry - Five Ways Triangle, Crows Nest

Hi Guys,
Sorry, but could either of you please respond to this customer.
Thanks
Harry
Get Outlook for iOS

Harry Konsti
Development Engineer

P +61 2 9936 8367
Harry.Konsti@northsydney.nsw.gov.au

From: Aladdin Tarshan <Aladdin.Tarshan@mottmac.com>
Sent: Monday, April 3, 2023 2:19:04 PM
To: Harry Konsti <Harry.Konsti@northsydney.nsw.gov.au>
Cc: Peterson Vu <Peterson.Vu@mottmac.com>
Subject: RE: OSD Enquiry - Five Ways Triangle, Crows Nest

Hello Harry,

Thank you for your reply. To provide further information about the project, please find a brief project description below:

We are undertaking a demolition and construction project for a new mixed-use development, which will comprise of:

- A total of 16 floors, including the podium
- Approximately 129 apartments
- Approximately 7,000 m^2 of non-residential GFA
- 5 basement levels
- Basements constructed up to the boundary

The project site is situated in Crows Nest and falls under the jurisdiction of the NSC. In order to develop the On-site Detention (OSD) design, we require information on Council requirements and controls relating to the Permissible Site Discharge (PSD). I would appreciate your prompt response on this matter. Thank you very much.

Kind regards,
Aladdin Tarshan
BEng(Civil) MIEAust PMP
Principal Civil Engineer

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From: Harry Konsti <Harry.Konsti@northsydney.nsw.gov.au>
Sent: Wednesday, 29 March 2023 10:24 AM
To: Peterson Vu <Peterson.Vu@mottmac.com>
Subject: OSD Enquiry

> You don't often get email from harry.konsti@northsydney.nsw.gov.au. Learn why this is important

Hi Peterson,

I refer to your enquiry regarding the OSD requirements for a project in Crows Nest.

It is not possible to advise you correctly without knowing the property address and the scope of the development.
Is it alterations and additions?
Is it demolition and construction of a new dwelling, multi storey development, mixed use development?
What other stormwater management requirements may be required?
If it's a large scale development, Council may require new pipelines and pits to be constructed in the surrounding streets.

Without having the above information (at a minimum) I cannot advise correctly.
If you can provide plans (concept plans should be sufficient) I can provide further advice.

Regards

Harry Konsti
Development Engineer

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of viruses. Virus scanning is recommended and is the responsibility of the recipient.
****

Appendix B – Civil Drawings

FIVE WAYS TRIANGLE, CROWS NEST

391-423 Pacific Hwy, 3-15 Falcon St & 8 Alexander St
Crows Nest NSW 2065

Cover Sheet

Re-Issue for Development Application
Revision Date: 30/08/2024
Revision: P5

DRAWING LIST	
DRAWING NUMBER	DRAWING TITLE
427623-003-MMD-DA-XX-DRG-C-0001	Cover Sheet
427623-003-MMD-DA-XX-DRG-C-0020	Sediment and Erosion Control Plan
427623-003-MMD-DA-XX-DRG-C-0021	Sediment and Erosion Control Details
427623-003-MMD-DA-XX-DRG-C-0030	Earthworks Cut and Fill Plan
427623-003-MMD-DA-XX-DRG-C-0035	Siteworks and Drainage Plan
427623-003-MMD-DA-XX-DRG-C-0050	Water Quality Catchment Plan
427623-003-MMD-DA-XX-DRG-C-0060	On-site Detention Section and Details
427623-003-MMD-DA-XX-DRG-C-0065	Combined Services Plan

Locality Plan

PRELIMINARY NOT FOR CONSTRUCTION

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P1	24/08/2023	DRAFT ISSUE FOR INFORMATION	AT	DF

SCALE

CLIENT
DEICORP

TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Cover Sheet

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
Revision: P5
Status: FOR APPROVAL
Security: STD
DRAWING NUMBER
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ISO A1 594 x 841mm

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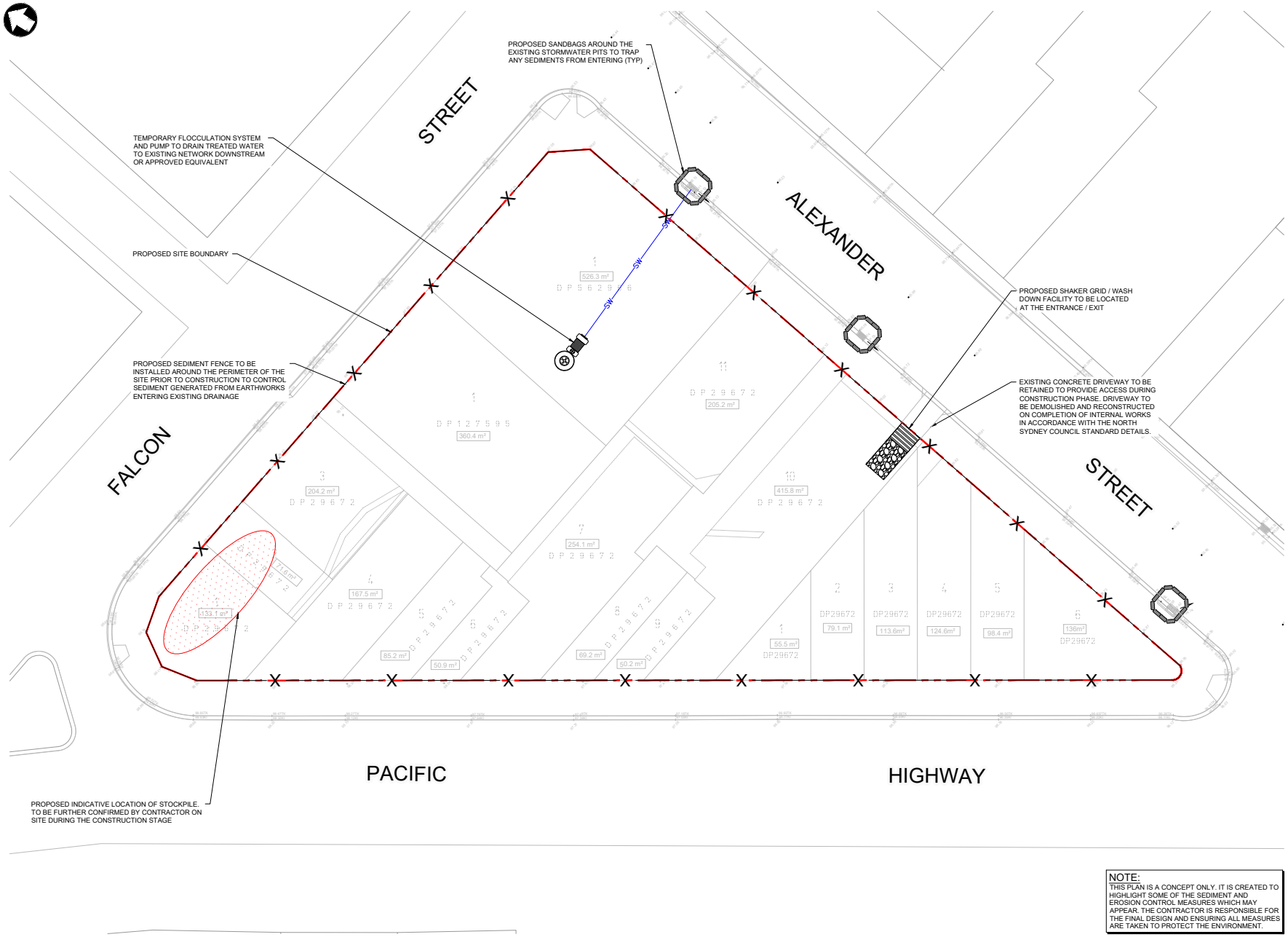

LEGEND

SEDIMENT AND EROSION PLAN

- PROPOSED SITE BOUNDARY
- CONSTRUCT TEMPORARY SEDIMENT FENCE
- INSTALL SANDBAG SEDIMENT TRAPS
- CONSTRUCT TEMPORARY STABILISED SITE ENTRY WITH SHAKER GRID
- TEMPORARY FLOCCULATION AND PUMP SYSTEM
- INDICATIVE LOCATION OF STOCKPILE
- TEMPORARY DISCHARGE PIPE

NOTES

1. CONTRACTORS TO CONFIRM PUMP-OUT FROM DEEP BASEMENT EXCAVATION.
2. UPON INSTALLATION OF NEW STORMWATER PITS, SAND BAGS ARE TO BE PLACED AROUND THE PROPOSED PITS TO PREVENT ANY SEDIMENT RUNOFF TO THE PITS.
3. EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE PUBLICATION ' URBAN STORMWATER SOILS AND CONSTRUCTION "THE BLUE BOOK" 2004 (4TH EDITION)' PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION, EXCAVATION OR CONSTRUCTION WORKS UPON THE SITE.
4. BUILDERS SHALL PROVIDE SEDIMENT FENCING MATERIAL DURING CONSTRUCTION TO THE LOW SIDE BOUNDARIES. SEDIMENT CONTROL FABRICSHALL BE AN APPROVED MATERIAL (Eg. PROFAB SILT FENCE, OR SIMILAR) STANDING MINIMUM 500mm ABOVE GROUND AND EXTENDING 200mm BELOW GROUND.
5. GRASS VERGES AND VEGETATION SHALL BE MAINTAINED AS MUCH AS PRACTICAL AND SHALL NOT BE CLEARED FROM NEIGHBORING SITES TO PROVIDE A BUFFER ZONE TO THE CONSTRUCTION SITE.
6. NO PARKING OR STOCK PILING OF MATERIALS IS PERMITTED ON THE LOWER SIDE OF THE SEDIMENT FENCE.
7. VEHICLE ACCESS SHALL BE RESTRICTED TO ONE DESIGNATED POINT AS SHOWN, AND VEHICLE CROSSINGS ARE TO BE ADEQUATELY COVERED AT ALL TIMES WITH BLUE METAL OR THE LIKE.
8. TEMPORARY CONSTRUCTION ENTRY/EXIT SHALL BE AS PER DRAWING ON DRAWING 0021. BUILDER TO ENSURE ALL DROPPABLE SOIL AND SEDIMENT IS REMOVED PRIOR TO CONSTRUCTION TRAFFIC EXITING SITE USING VEHICLE WHEEL WASH, CATTLE GRID, WHEEL SHAKER OR OTHER APPROPRIATE DEVICE. BUILDER SHALL ENSURE ALL CONSTRUCTION TRAFFIC ENTERING AND LEAVING THE SITE, DO SO, IN A FORWARD DIRECTION.
9. ALL STORMWATER INCIDENT ON THE CONSTRUCTION SITE MUST BE COLLECTED AND APPROPRIATELY DISPOSED OF IN A MANNER THAT DOES NOT INCREASE THE FLOOD RISK FOR THE CATCHMENT AREA OR DEGRADE THE QUALITY OF WATER BEING DISPOSED OF TO COUNCIL STORMWATER INFRASTRUCTURE.
10. MEASURES OUTLINED IN THE EROSION AND SEDIMENT CONTROL PLAN MUST BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING AND AFTER THE CONSTRUCTION WORKS.
11. ALL DISTURBED AREAS AND STOCKPILES TO BE STABILISED WITHIN 5 DAYS.
12. TOPSOIL TO BE STRIPPED STOCKPILED AND RE-SPREAD ON COMPLETION OF EARTHWORKS. NONE TO BE REMOVED.
13. NO DISTURBANCE OF THE SITE OTHER THAN IMMEDIATE AREA OF WORKS.

NOTE:
THIS PLAN IS A CONCEPT ONLY. IT IS CREATED TO HIGHLIGHT SOME OF THE SEDIMENT AND EROSION CONTROL MEASURES WHICH MAY APPEAR. THE CONTRACTOR IS RESPONSIBLE FOR THE FINAL DESIGN AND ENSURING ALL MEASURES ARE TAKEN TO PROTECT THE ENVIRONMENT.

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SCALE 1:200 (0, 10m, 20m)

CLIENT: DEICORP

TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Sediment and Erosion Control Plan

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
Revision: P5
Status: FOR APPROVAL
Security: STD

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Soil and Water Management Notes

General Instructions

SWM01 These plans present a conceptual soil and water management plan (SWMP) only and shows a possible way of managing soil and erosion. The contractor shall be responsible for the establishment and management of the site and preparing a detailed plan and obtaining approval from the relevant authority prior to the commencement of any works.

SWM02 This plan is to be read in conjunction with the engineering plans and any other plans, written instructions, specification or documentation that may be issued and relating to development of the subject site.

SWM03 The contractor will ensure that all soil and water management works are consistent with 'Managing Urban Stormwater - Soils and Construction' - also known as 'The Blue Book'.

SWM04 All builders and sub-contractors shall be informed of their responsibilities in minimising the potential for soil erosion and pollution to downslope lands and waterways.

Erosion Control

SWM05 Water shall be prevented from entering the permanent drainage system until sediment concentration is less then or equal to 50mg/L, ie the catchment area has been permanently landscaped and / or any likely sediment has been filtered through an approved structure.

SWM06 Any sand used in the concrete curing process (spread over the surface) will be removed as soon as possible and within 10 working days from placement.

SWM07 Acceptable receptors will be constructed for concrete and mortar slurries, paints, acid washings, light-weight waste materials and litter.

SWM08 'Sediment' fencing will be installed as indicated on the plans and at the direction of site superintendent to ensure containment of sediment. The sediment fencing will outlet or overflow under stabilised conditions into the sediment basin, to safely convey water into a suitable filtering system should the pores in the fabric block.

SWM09 Stockpiles should not be located within 5m of trees and hazard areas, including likely areas of concentrated or high velocity flows such as waterways, drainage lines, paved areas and driveways. Where they are within 5m from such areas, special sediment control measures should be taken to minimise possible pollution to downstream waters. Measures should also be applied to prevent the erosion of the stockpile.

SWM10 All cut and fill batters are to be seeded and mulched within 14 days of completion of formation.

SWM11 Any existing trees which form part of the final landscaping plan will be protected from construction activities by-

a. Protecting them with barrier fencing or similar materials installed outside the drip line,
b. Ensuring that nothing is nailed to them,
c. Prohibiting paving, grading, sediment wash or placing of stockpiles within the drip line except under the following conditions,

(i) Encroachment only occurs on one side and no closer to the trunk than either 1.5 metres or half the distance between the outer edge of the drip line and the trunk, which ever is the greater,

(ii) A drainage system that allows air and water to circulate through the root zone (e.g. a gravel bed) is placed under all fill layers of more than 300 millimetres depth

(iii) Care is taken.

SWM12 During windy weather, large disturbed unprotected areas should be kept moist (not wet) by sprinkling with water to keep dust under control.

SWM13 Temporary protection from erosive forces will be undertaken on lands where final shaping has not been completed but works are unlikely to proceed for periods of two months or more (eg. on topsoil stockpiles). This may be achieved with a vegetative cover. A recommended listing of plant species for temporary cover is -

i) autumn/winter sowing - oats/ryecorn at 20 kg/ha
- japanese millet at 10 kg/ha
ii) spring/summer sowing - japanese millet at 20 kg/ha
- oats/ryecorn at 10 kg/ha

SWM14 Diversion banks / channels will be rehabilitated as soon as possible and within 5 working days from their final shaping. Other than in the winter months, suitable materials include turf grasses such as Couch or Kikuyu. During winter, or at other times when temporary rehabilitation (more than 3 months) is required, it is suggested that hessian cloth is used but only if tacked with appropriate pegs and an anionic bitumen emulsion. Foot and vehicular traffic should be kept away from these areas.

SWM15 Undertake site development works in accordance with the engineering plans. Where possible, phase development so that land disturbance is confined to areas of workable size.

Construction Sequence

SWM16 Where practical, the soil erosion hazard on the site should be kept as low as possible. To this end, works should be undertaken in the FOLLOWING SEQUENCE -

(i) Install inlet sediment traps to all gully pits fronting the site,

(ii) Install a 1.8m chain wire fence around the boundaries and attach hessian cloth or similar to it on the windward side (ties at the top, centre and bottom and at 1m intervals or as instructed by the superintendent),

(iii) Install geofabric sediment fence and sediment traps around all permanent stormwater reticulation structures as shown on the plan,

(iv) Construct stabilised construction entrance as shown on the plan or to location as determined by superintendent,

(v) Install diversion banks along the boundary where required, rehabilitate disturbed lands downslope from the basins within 20 working days,

(vi) Ensure that the sediment basin is directed onto a turfed area and drains to a suitable location. A temporary stormwater line may be necessary to convey the flows to this location. Construct diversion channels at the boundary to drain into the sediment basin as shown on plans,

(vii) At completion stabilise site and decommission sediment basin and all erosion control devices.

SWM17 Temporary soil and water management structures will be removed only after the lands they are protecting are rehabilitated.

SWM18 Final site landscaping will be undertaken as soon as possible and within 20 working days from completion of construction activities.

Site Inspection and Maintenance

SWM19 At least weekly and after every rain fall event, the contractor will inspect the site and ensure that -

(i) Drains and all sediment control devices operate effectively and initiate repair or maintenance as required,

(ii) Receptors for concrete and mortar slurries, paints, acid washings, light-weight waste materials and litter are to be emptied as necessary. Disposal of waste shall be in a manor approved by the superintendent,

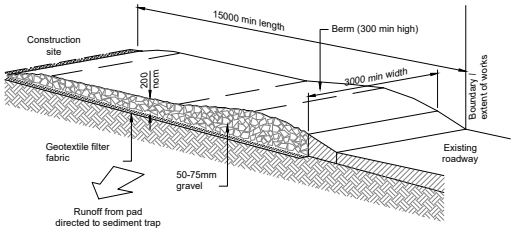
(iii) Spilled sand (or other materials) is removed from hazard areas, including likely areas of concentrated or high velocity flows such as waterways, gutters, paved areas and driveways,

(iv) Sediment is removed from basins and / or traps when less than 20m³ of trapping capacity remain per 1000m² of disturbed lands, and / or less than 500mm depth remains in the settling zone. Any collected sediment will be disposed in areas where further pollution to down slope lands and waterways is unlikely,

(v) Rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate.

SWM20 The contractor shall provide all monitoring control and testing.

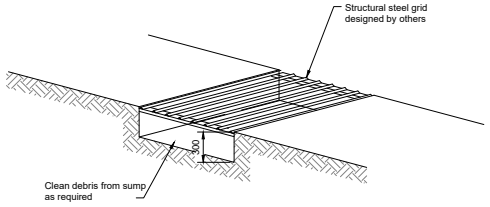
Note:
This plan is a concept only. It is created to highlight some of the sediment and erosion control measures which may appear. The contractor is responsible for the final design and ensuring all measures are taken to protect the environment.



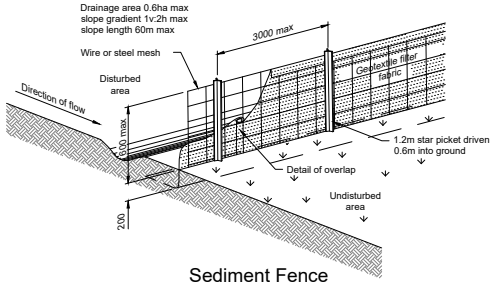
Temporary Site Entrance
NTS

Maintenance

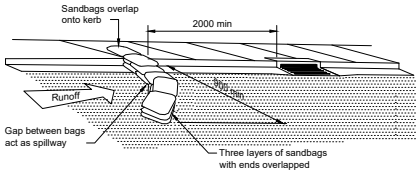
- The temporary access shall be maintained in a condition that prevents tracking or flowing of sediment onto public rights of way,
- This may require periodic top dressing with additional gravel as conditions demand and repair and/or cleanout of any measures used to trap sediment,
- All sediment spilled, dropped, washed or tracked onto public rights of way must be removed immediately.



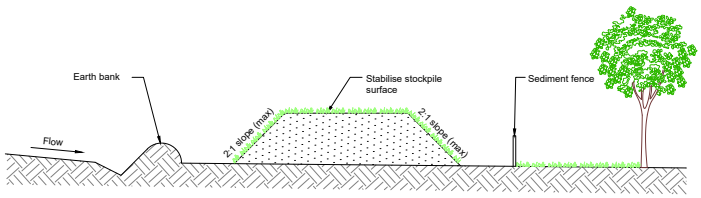
Shaker Pad
NTS



Sediment Fence
(Geotextile Filter Fabric)
NTS



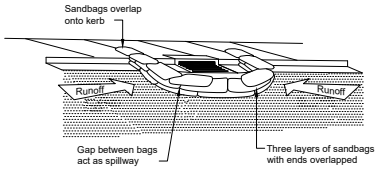
Sediment Trap for Kerb Inlet
(On Grade - Sandbag)
NTS



Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds
3. Where there is sufficient area, topsoil stockpiles shall be less than 2m in height
4. Where there are to be in place for more than 10 days, stabilise following the approved escp or swmp to reduce the c-factor to less than 0.10
5. Construct earth banks (standard drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (standard drawing 6-8) 1m to 2m downslope

Stockpiles
NTS



Sediment Trap for Kerb Inlet
(at Low Point - Sandbag)
NTS

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SCALE

CLIENT
DEICORP

TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Sediment and Erosion Control Details

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
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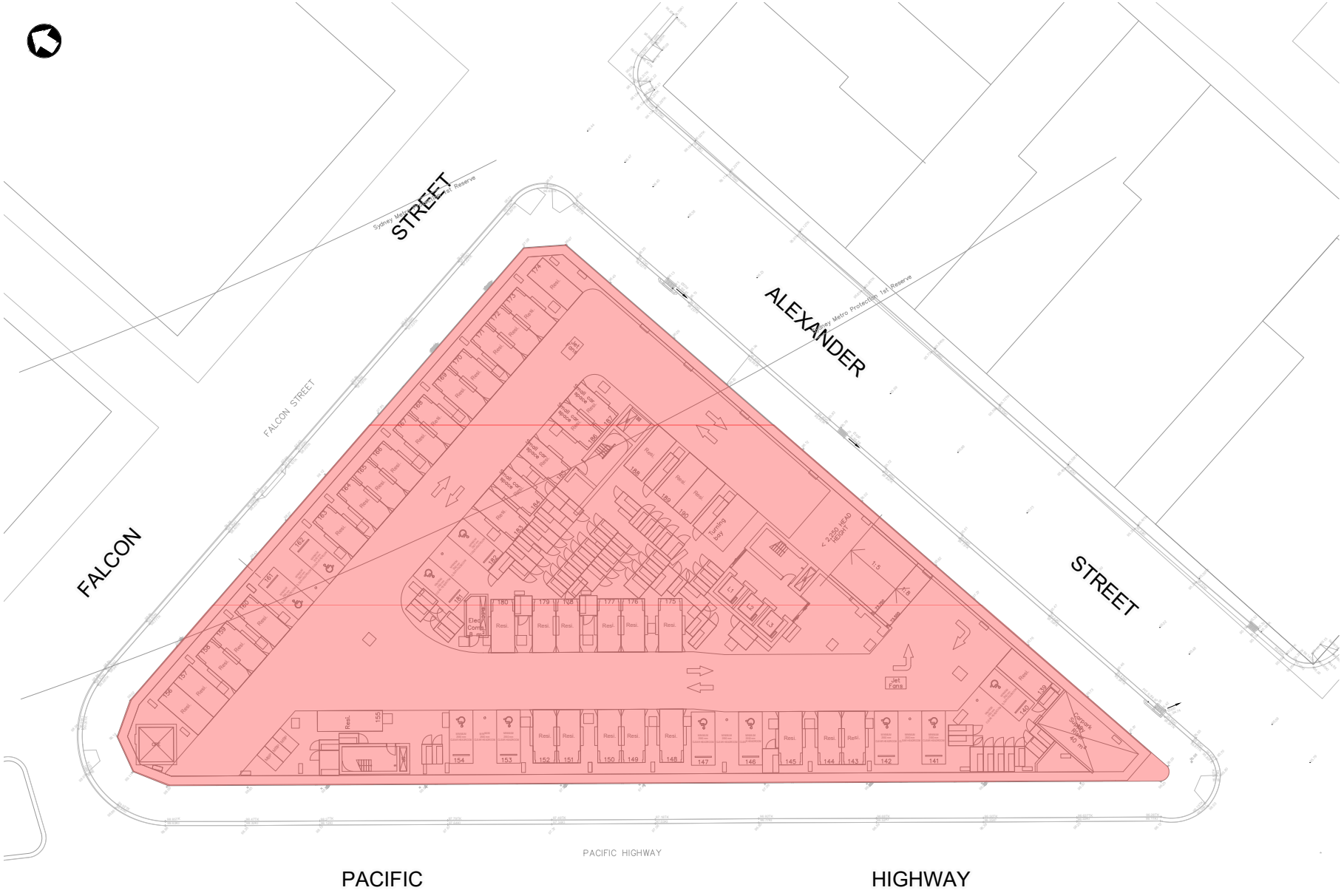

LEGEND

EARTHWORKS CUT AND FILL

- PROPOSED SITE BOUNDARY
- SURVEY
- PROPOSED AREA OF BASEMENT EXCAVATION

EARTHWORK VOLUMES

APPROXIMATE VOLUMES

- TOTAL CUT = -75,953 m^3
- TOTAL FILL = 0.000 m^3
- BALANCE = -75,953 m^3

ASSUMPTIONS

- AVERAGE EXISTING GROUND LEVEL (CALCULATED) = 97.27 mAHD
  (BASED ON SURVEY SPOT ELEVATION - NO TIN PROVIDED)
- EXCAVATION LEVEL = 72.00 mAHD
  (1.5m BELOW BASEMENT 07 ELEVATION OF RL 73.50 mAHD)
- EXCAVATION DEPTH = 97.27 - 72 = 25.27m

EARTHWORK VOLUMES

ESTIMATED VOLUMES BETWEEN EXISTING SURFACE RL 97.27 AND 1.5m BELOW PROPOSED BASEMENT LEVEL 07 RL 73.50.

- IT IS THE CONTRACTORS RESPONSIBILITY TO VERIFY ALL VOLUMES PRIOR TO CONSTRUCTION
- TOPSOIL STRIPPING HAS NOT BEEN INCLUDED WITHIN THE VOLUME CALCULATIONS
- NO ALLOWANCE HAS BEEN MADE FOR BUILDING SLABS
- NO ALLOWANCE HAS BEEN MADE FOR CONCRETE PAVEMENT
- NO ALLOWANCE HAS BEEN MADE FOR FOOTPATH PAVEMENT
- NO ALLOWANCE HAS BEEN MADE FOR RETAINING WALL FOOTINGS
- VOLUMES WITHIN STORMWATER TRENCHES HAS NOT BEEN CALCULATED
- NO BULKING FACTORS HAVE BEEN APPLIED

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SCALE 1:200 (0, 10m, 20m)

CLIENT: DEICORP

TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Earthworks Cut and Fill Plan

DRAWING INFORMATION

Drawn:	J.Garbo	Revision:	P5
Designed:	S.Saiara	Status:	FOR APPROVAL
Checked:	A.Tarshan	Security:	STD
Approved:	D.Fettell		

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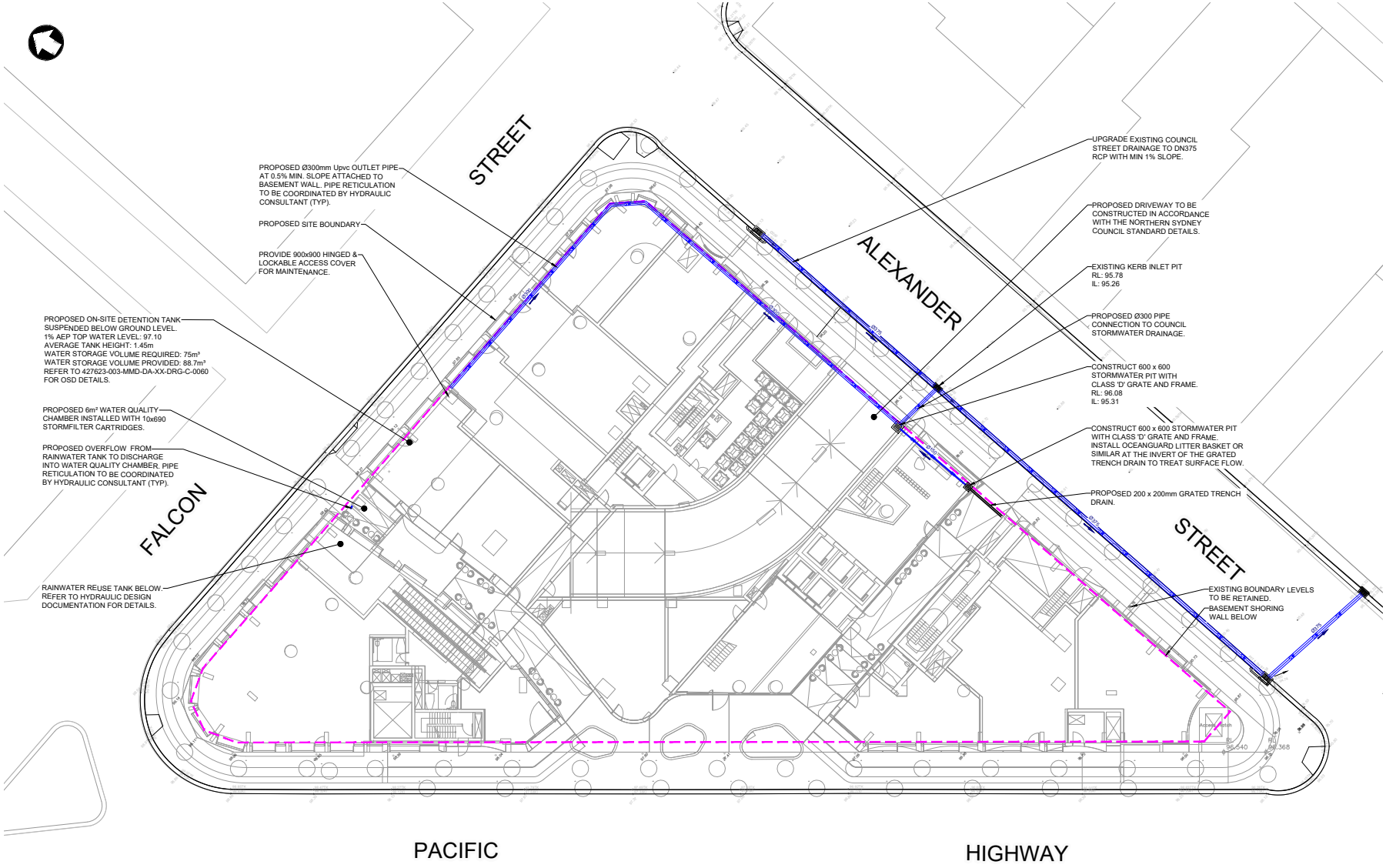

LEGEND

SITEWORKS AND DRAINAGE

- PROPOSED SITE BOUNDARY
- BASEMENT SHORING WALL
- EXISTING STORMWATER PIT
- PROPOSED STORMWATER PIT
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED TRENCH DRAIN
- PIPE DIAMETER AND FLOW DIRECTION

NOTE:
1. PERMISSIBLE SITE DISCHARGE CALCULATED TO DETAIN TO 1hr 1 IN 5 YEARS ARI STORM EVENT AS PER NORTH SYDNEY COUNCIL ENGINEER ADVICE.

	20% AEP STORM EVENT	1% AEP STORM EVENT		
CATCHMENT AREA (m^2)	PRE-DEVELOPMENT FLOW (l/s)	POST-DEVELOPMENT (l/s)	POST DEVELOPMENT BYPASS FLOW (l/s)	TOTAL POST-DEVELOPMENT FLOW (l/s)
3201	106 l/s	83	12	95
Total Catchment (m^2)	Bypassing Catchment (m^2)	Bypassing Catchment %		
3201	164	5		

NOTES:
1. ALL PROPOSED INTERNAL STORMWATER DRAINAGE DESIGN TO CATER FOR MINOR STORM EVENT OF 5% AEP.
2. SAFE OVERLAND FLOWPATH TO BE CATERED FOR MAJOR STORM OF 1% AEP.
3. ALL INTERNATL BUILDING DRAINAGE TO BE CONFIRMED BY HYDRAULIC CONSULTANTS.
4. OSD TO BE DESIGNED IN ACCORDANCE WITH THE NORTH SYDNEY GUIDELINES AND STANDARDS.
5. ALL STORMWATER DRAINAGE DETAILS ARE TO BE IN ACCORDANCE WITH THE NORTH SYDNEY CITY COUNCIL GUIDELINES AND STANDARDS.
6. DOWNSTREAM TAILWATER LEVLE FOR 1% AEP CC WATER LEVEL OF 95.89m AHD HAS BEEN ADOPTED. REFER TO STORMWATER AND FLOODING REPORT UNDERTAKEN BY MOTT MACDONALD FOR FLOOD LEVEL INFORMATION.
7. PROVIDE 'OCEANPROTECT' STORMFILTER CARTRIDGES OR SIMILAR, FOR WATER QUALTY. REFER TO MANUFACTURES DETAIL.

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SCALE 1:200 (0, 10m, 20m)

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TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Siteworks and Drainage Plan

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
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LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED ROOF LINE OVER
- CATCHMENT BYPASSING OSD AND WATER QUALITY TREATMENT
- CATCHMENT BYPASSING OSD ONLY
- ROOF AREA
- PODIUM AREA - LEVEL 3

NOTE:
1. PERMISSIBLE SITE DISCHARGE CALCULATED TO DETAIN TO 1hr 1 IN 5 YEARS ARI STORM EVENT AS PER NORTH SYDNEY COUNCIL ENGINEER ADVICE

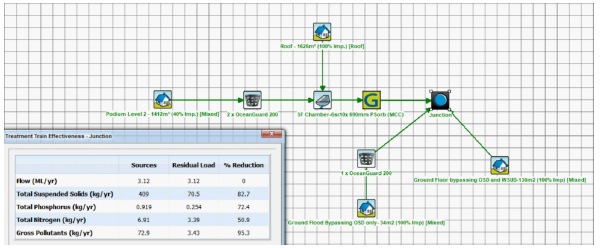
DESIGN NOTES

SITE PARAMETERS

CATCHMENT ID	AREA	UNITS
ROOF	1625	m2
PODIUM	1412	m2
AREA BYPASSING ON-SITE DETENTION AND WATER QUALITY TREATMENT	130	m2
AREA BYPASSING ON-SITE DETENTION ONLY	34	m2
TOTAL SITE AREA	3201	m2

WATER QUALITY REDUCTION TARGETS AS ADVISED BY COUNCIL ENGINEER

80% retention of the typical urban annual load for Total Suspended Solids (TSS)
45% retention of the typical urban annual load for Total Phosphorus (TP)
45% retention of the typical urban annual load for Total Nitrogen (TN)
70% retention of the typical urban annual load for gross pollutants (litter)



MUSIC MODELING ASSESSMENT RESULTS

PRELIMINARY NOT FOR CONSTRUCTION

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Rev	Date	Description	Ch'k'd	App'd
P5	30/08/2024	ISSUE FOR SSDA	AT	DF
P4	12/03/2024	RE-ISSUE FOR DEVELOPMENT APPLICATION	AT	DF
P3	17/10/2023	RE-ISSUE FOR DEVELOPMENT APPLICATION	AT	DF
P2	19/09/2023	ISSUE FOR DEVELOPMENT APPLICATION	AT	DF
P1	24/08/2023	DRAFT ISSUE FOR INFORMATION	AT	DF

SCALE
1:200 0 10m 20m

CLIENT
DEICORP

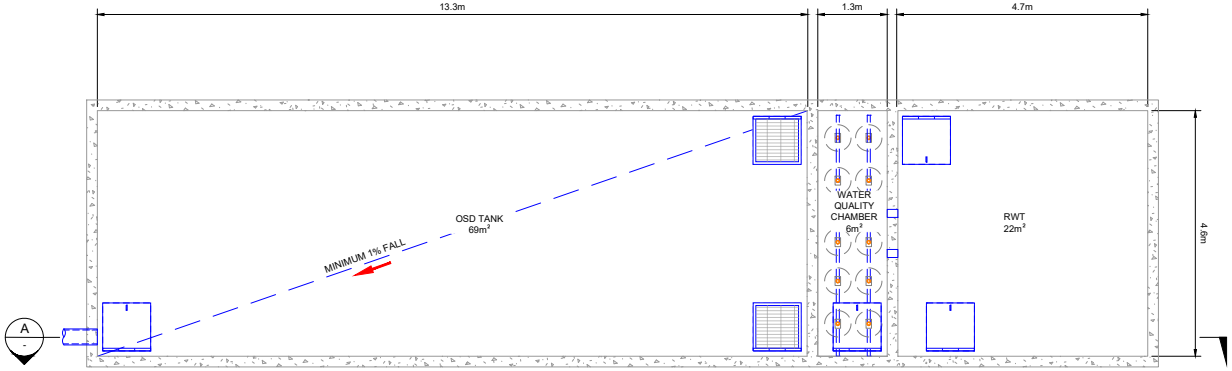
TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Water Quality Catchment Plan

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
Revision: P5
Status: FOR APPROVAL
Security: STD

DRAWING NUMBER
427623-003-MMD-DA-XX-DRG-C-0050

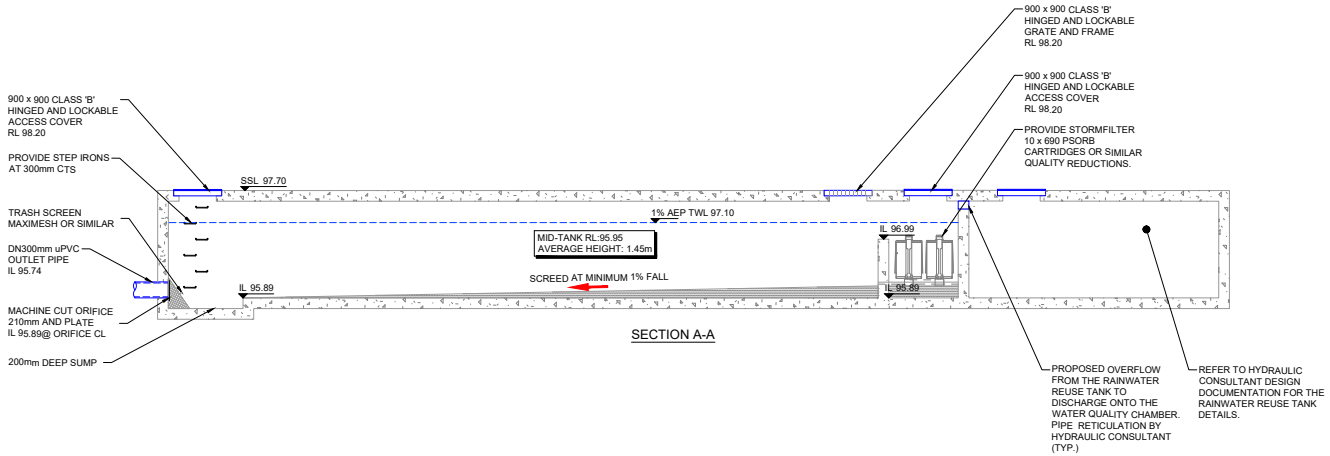
ISO A1 594 x 841mm

FILE LOCATION: C:\Users\Wu107446\Mott MacDonald\Deicorp Civil Engineering - 6. Five Ways, Crows Nest\04 Working\01 Drafting\Civil\Drawings\427623-003-MMD-DA-XX-DRG-C-0050.dwg Sep 2, 2024 - 11:36AM WU107446

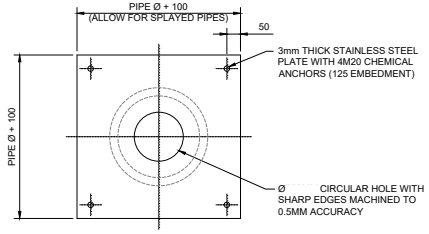


ON- SITE DETENTION
PLAN VIEW

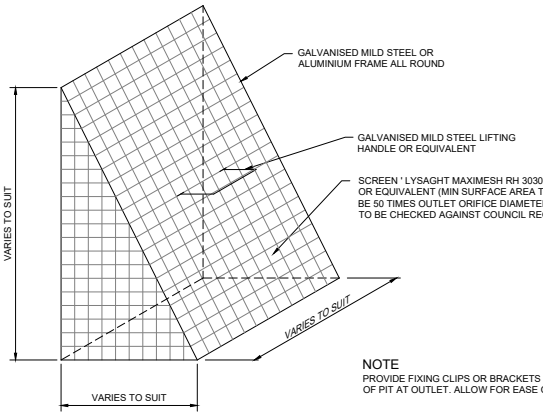
SCALE 1:50



SECTION A-A

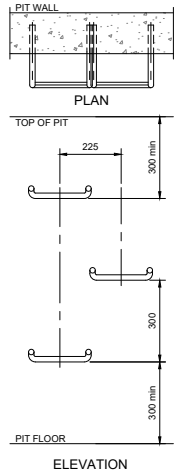


ORIFICE PLATE - TYPE A

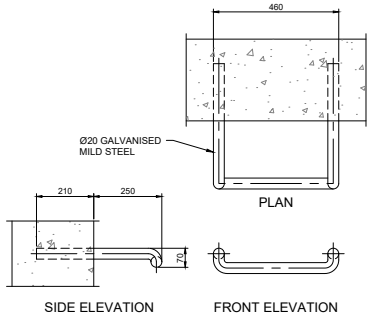


NOTE
PROVIDE FIXING CLIPS OR BRACKETS
OF PIT AT OUTLET. ALLOW FOR EASE (

TYPICAL REMOVABLE SCREEN DETAIL
NTS



STEP IRON
PLACEMENT TO PIT WALL
NTS



STEP IRON DETAIL
NTS

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SCALE 1:50 (0, 2.5m, 5m)

CLIENT: DEICORP

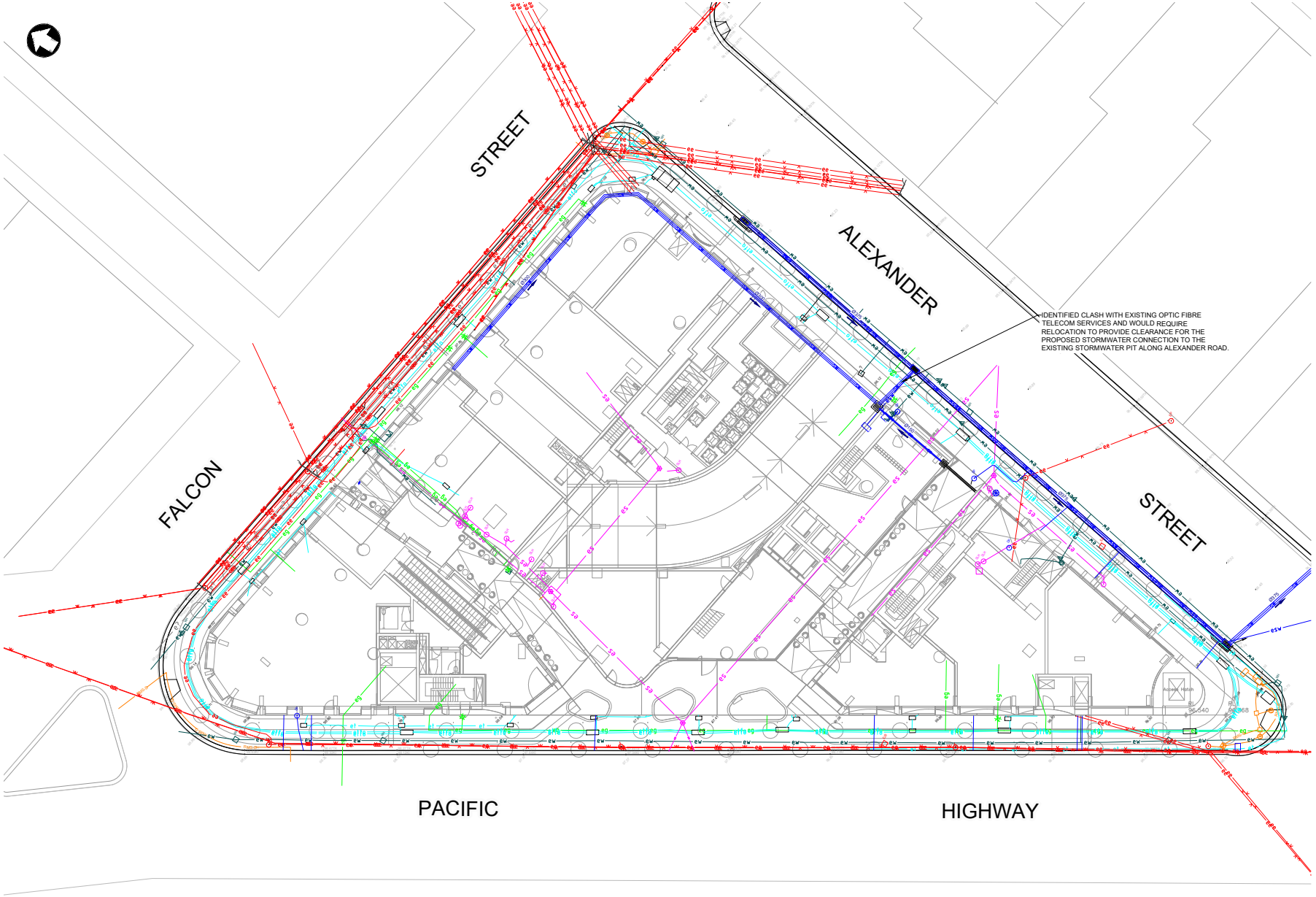
TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
On-site Detention Section and Details

DRAWING INFORMATION
Drawn: J.Garbo
Designed: S.Saiara
Checked: A.Tarshan
Approved: D.Fettell
Revision: P5
Status: FOR APPROVAL
Security: STD

DRAWING NUMBER
427623-003-MMD-DA-XX-DRG-C-0060

ISO A1 594 x 841mm

FILE LOCATION: C:\Users\Wu107446\Mott MacDonald\Deicorp Civil Engineering - 6. Five Ways, Crows Nest\04 Working\01 Drafting\Civil\Drawings\427623-003-MMD-DA-XX-DRG-C-0060.dwg Sep 2, 2024 - 11:36AM GAR99190



LEGEND

COMBINED SERVICES

- PROPOSED SITE BOUNDARY
- PROPOSED STORMWATER
- EXISTING OVERHEAD ELECTRICITY
- EXISTING ELECTRICITY
- EXISTING TELECOMMUNICATIONS
- EXISTING FIBRE OPTIC TELECOMMUNICATIONS
- EXISTING RMS TRAFFIC QLD-B
- EXISTING RMS TRAFFIC QLD-D
- EXISTING LOW PRESSURE GAS MAIN
- EXISTING SEWER MAIN
- EXISTING STORMWATER
- EXISTING WATER MAIN
- EXISTING UNIDENTIFIED SERVICE
- EXISTING ELECTRICAL CABLE JUNCTION BOX
- EXISTING ELECTRICAL POLE
- EXISTING ELECTRICAL POLE WITH LIGHT
- EXISTING TRAFFIC SIGNAL JUNCTION BOX
- EXISTING TRAFFIC CONTROL SIGNAL
- EXISTING GAS VALVE BOX
- EXISTING SEWER MANHOLE
- EXISTING SEWER LAMPHOLE
- EXISTING SEWER VENT PIPE
- EXISTING DRAINAGE MANHOLE
- EXISTING DRAINAGE DOWN PIPE
- EXISTING WATER STOP VALVE
- EXISTING WATER METER
- EXISTING WATER HYDRANT

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SCALE 1:200 (0, 10m, 20m)

CLIENT: DEICORP

TITLE
Five Ways Triangle
Crows Nest, NSW, 2065
Combined Services Plan

DRAWING INFORMATION

Drawn:	J.Garbo
Designed:	S.Saiara
Checked:	A.Tarshan
Approved:	D.Fettell
Revision:	P5
Status:	FOR APPROVAL
Security:	STD

DRAWING NUMBER
427623-003-MMD-DA-XX-DRG-C-0065

ISO A1 594 x 841mm

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