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CIVIL ENGINEERING REPORT
SSD 17161650

WAREHOUSES 2 AND 3
HORSLEY DV. BUSINESS PARK ST2
WETHERILL PARK NSW

Prepared For:
Charter Hall Holdings Pty Ltd
GPO Box 2704
SYDNEY NSW 2000

Prepared by:
Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

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	Name	**Signature**
Prepared by	Mitchell Cross & Mark Wilson	MC MW
Checked by	Mark Wilson	MW
Issued by	Mark Wilson	MW
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1 INTRODUCTION

1.1 Introduction

Costin Roe Consulting Pty Ltd has been commissioned by Charter Hall Holdings Pty Ltd to prepare this Engineering Report in support of a proposed development application for a State Significant Development, SSD 17161650 for two warehouses on the two remaining lots in the *Horsley Drive Business Park Stage 2*.

The proposed development will be located on the northern portion of the Horsley Drive Business Park Stage 2 (HDBP S2) approved as SSD-7664 and subsequent SSD-7664 Mod1.

SSD 7664 was approved by The NSW Department of Planning & Environment (DPE) for development on 9 November 2017. A modification to the approved Masterplan (Mod1) was submitted in January 2020 by Charter Hall to facilitate a specific user on the southern development lots, and to enable a more functional intersections with the estate access road which is in the form of a roundabout located at the junction of Cowpasture Road and Trivet Street. The SSD 7664 Mod1 was approved on 10 August 2020 and is currently being constructed. We also note that a sperate approval for development of a customer fulfilment centre for Coles was also approved on the southern portion of the estate as SSD-10404. The fulfilment centre is also currently being constructed.

1.2 Scope and Project Description

The site is located on the western side of Cowpasture Road and Trivet Street, in the suburb of Wetherill Park, NSW, and on the northern side of the HDBP S2 access road. The proposed development involves construction of two warehouse distribution facilities.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Earthworks & Retaining Walls;
- Stormwater Management including stormwater quantity and quality;
- Ecologically Sustainable Development (ESD); and
- Erosion & Sediment Control.

The engineering objectives for the development are to create a site which, based considers the proposed Masterplan Layout and SSD requirements, responds to the topography and site constraints, meets flood planning requirements and to provide an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design consistent with and exceeding the requirements of council's adopted stormwater management policy and water quality objectives.

A set of drawings have been prepared to show the proposed civil and stormwater management concept for the proposed industrial development. These drawings are for development approval only and subject to change during detail design. Assessment of flooding has also been completed by councils nominated flooding consultants as part of the development approval documentation.

The consent authority is The DPIE as the proposal considered a State Significant Development (SSD). However as the subject site is located within Fairfield City Council (FCC) local government area, the engineering and policy requirements of FCC have also been considered in the design and FCC has been consulted in the civil engineering design of the site.

The projects Planning Secretary's Environmental Assessment Requirements (SEAR's) and associated agency responses for SSD 17161650 were provided on 27 April 2021. **Section 9** of this report provides specific responses to SEAR's *Soil and Water*, and associated agency items. It is noted that the majority of items raised in the SEARs and associated agency letters have been managed and addressed via works and approved assessments already undertaken as part of the approved SSD 7664 and associated SSD 7664 Mod1 development infrastructure works which are currently being constructed.

2 SITE CHARACTERISTICS

2.1 Location

The HDBP S2 estate is located on the western side of Cowpasture Road & Trivet Street in the suburb of Wetherill Park. The proposal site is located on the northern portion of the HDBP S2 development area, as shown in **Figure 2.1.**

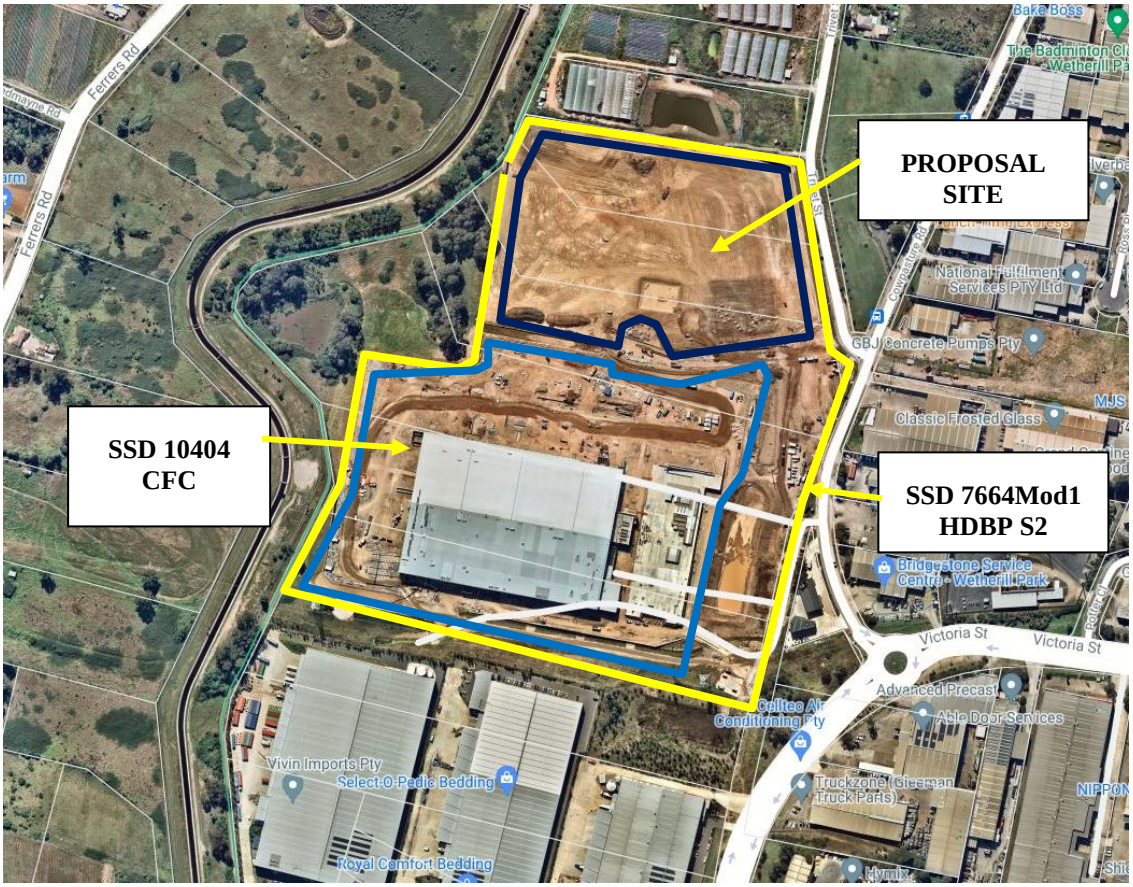


Figure 2.1 Locality Plan

The HDBP S2 site encompasses an area of 16.5 Ha and is comprised of Lots 18 to 22 of DP 13961 and is currently being constructed. An automated facility (approved per SSD 10404) is also currently being constructed within the southern portion of the HDBP S2 and comprises an area of approximately 8.8 Ha.

The HDBP S2 Estate is bounded by leasehold urban farmland land to the north, Cowpasture Road on the east, *The Horsley Drive Business Park Stage 1* to the south and a Sydney Water supply canal and urban farmland land to the west.

The land on the eastern side of Cowpasture Road comprises industrial development known as the Wetherill Park Industrial Area.

Infrastructure works and earthworks are currently being completed as part of the SSD 7664 Mod1 approvals for the HDBP S2 Estate, as described in **Section 2.3** of this report.

The following descriptions of pre-SSD7664 Mod1 works are provided for information purposes only:

- The land use on the site is previously urban farmland and rural residential.
- No formal drainage systems or significant development were present on the land. Several natural gullies and overland flow paths were present on the site as were four residential dwellings which are proposed to be removed as part of the works. As the contributing catchment to these gullys were relatively small, they generally had little to no baseflow, only have flows during wet weather or during storm events. Two small dams were present within the gully from the north.
- No mapped waterways were identified on the site. Confirmation of ecological significance of the existing gullies and overland flow paths were confirmed in the ecological assessment by Ecoplanning Pty Ltd, as contained in the development SSD7664 EIS.
- Previous survey information shows that the land falls from the north and north-west to the east and south-east corner of the site. The highest level on the site, at RL 77.0m AHD, is located at the north-east corner of the site and the lowest level is RL 57.5m AHD at the south-east corner. The low point of the property coincides with a culvert which connects the drainage paths to a trunk drainage culvert at the junction of Cowpasture Road and Victoria Road. This culvert is an asset of Fairfield City Council and collects stormwater flows from the site and downstream Wetherill Park Industrial Area.
- The grades over the site vary between 12.5% in the northern upstream parts of the site to 3% in the lower, downstream locations.
- Three dams were present on the site with the largest covering a combined area of approximately 0.25 Ha.

2.2 Proposed Development

The proposed construction works for this submission comprises construction of two warehouse facilities for speculative tenants.

The development comprises the following elements:

- Two steel framed warehouse buildings of 14,803m2 and 9,720m2 on Lots 2 and 3 respectively;
- Ancillary office space on the south-east corner of each of the warehouse buildings;
- At grade car parking on the southern side of both buildings with access from the estate road cul-de-sac;
- Truck circulation and loading areas on the eastern building facades;
- Fire brigade access around the full perimeter of each building and development site; and
- Stormwater drainage and flood management systems completed in accordance with the Business Park Stormwater Management Strategy approved under SSD 7664 Mod1.

Refer to **Figure 2.2** for the proposed site layout as produced by Watch This Space Architects.

Figure 2.2. Proposed Development Layout

2.3 HDBP S2 Development (SSD7664 & Mod1)

As noted earlier in this report, an approval for development was granted by DPE for SSD7664 on 9 November 2017. A subsequent Modification (Mod1) was approved on 10 August 2020, to enable a change in Masterplan layout relating to the revised site intersections, and to facilitate the current SSDA HDBP CFC development. A brief discussion of the Mod1 development is provided for information.

The proposed development on the estate, as per SSD7664 Mod 1, involves subdivision of the land and infrastructure works to facilitate future industrial warehouse and distribution type developments. The subdivision layout includes for 3 development lots, public road reserve and a drainage reserve over a total area of approximately 16.5 Ha.

Estate infrastructure works, currently being constructed, include the following elements:

- Earthworks and retaining walls to facilitate flat pads for future warehouse/ distribution type building development;
- External roadworks and a local subdivision access road;
- Attenuation and diversion of upstream drainage from the north, west and north-west around and through the estate;

- Internal and external Infrastructure works including stormwater, energy, telecommunications, water supply and sewer;
- Construction of stormwater management measures including provision of stormwater pollutant removal devices and bio-retention systems. Also the provision of an estate level detention basin; and
- Provision of drainage connections and servicing of individual development lots.

The proposed subdivision layout is shown in **Figure 2.3**.

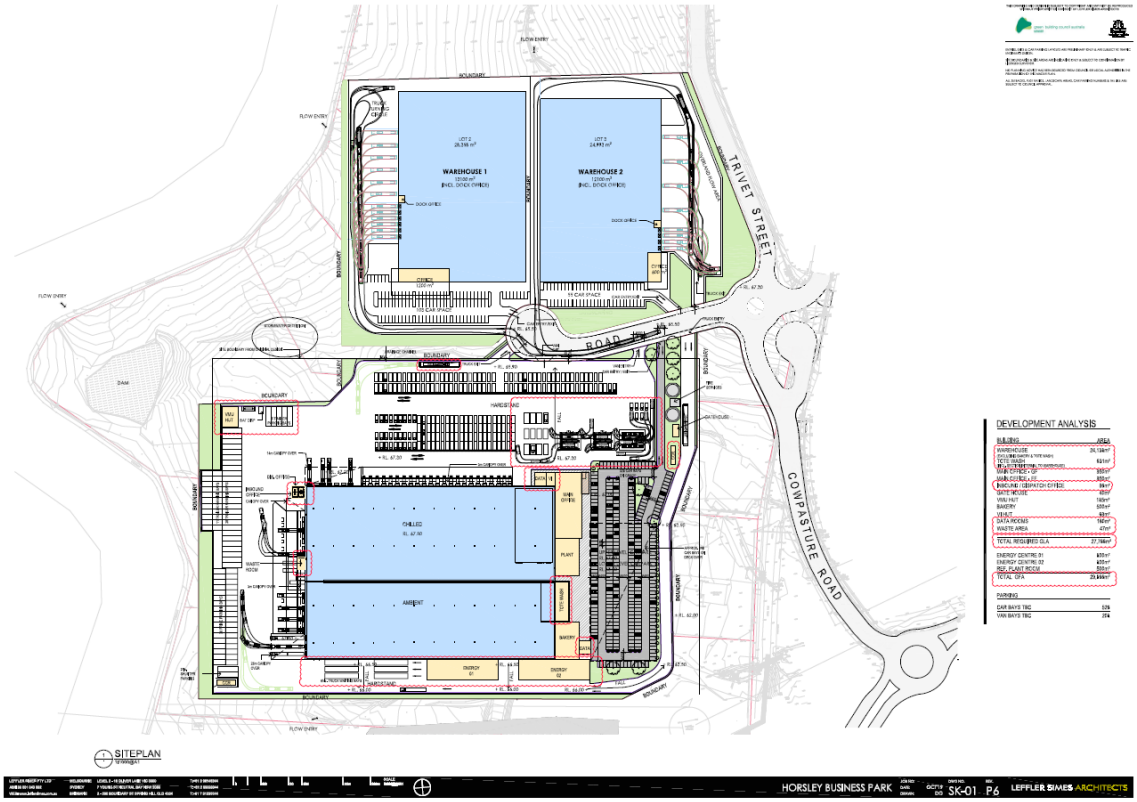


Figure 2.3. SSD7664 Mod1 Masterplan Layout

3 SITE WORKS

3.1 Geotechnical and Geological Profile

The site is located within an area typified by gently undulating regional topography consistent with Bringelly Shale Landscapes. Geotechnical investigations over the site have been made by Ground Technologies and confirmation of the geological profile has been made (Report Ref: GTE914-R001). Reference the Penrith 1:100,000 Geological Series Sheet indicates the site is underlain by shale, fine grained sandstone and laminate of the Bringelly Shale formation. This is generally consistent with the findings of geotechnical investigations made as part of the Horsley Drive Business Park Stage 1 Estate to the south of the current proposal.

The shale bedrock is overlain by residual clay soils in the range of 1.5 to 3m in depth, and above this topsoil in the 100mm to 400mm range. Engineering properties of the residual clay soils are that they will be moderately reactive, highly plastic subsoils with low permeability.

3.2 Bulk Earthworks

Extensive earthworks have been undertaken under the SSD7764 and SSD7764 Mod1 approvals for the HDBP S2. Minor trimming earthworks only will be required as part of the current application development works. These works would include final trimming and shaping of the site to suit the detailed architectural site layout, final pavement and coordination of subgrade levels with slab profiles and grading to suit drainage requirements.

Details of earthworks would be provided during detail design/ construction certificate stages of the development. Detailed assessment of the earthworks level will be completed during detailed design stage and some adjustment to the final pad and building floor levels (within +/-500mm) may be required subject to final geotechnical testing, topsoil assessments and bulking/compaction allowances.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 7** of this report.

3.3 Groundwater

The Ground Technologies investigation, completed for the original SSD7664 assessment, identified groundwater seepage in two locations over the site. The first of these was (TS2) identified as a perched water table at 0.3m below existing ground level. This perched water table is associated with existing dam overflow path and alluvium. The second location identified (TS18) is at 4.5m below ground level and identified as seepage. This coincides with the central gully and is located toward the low point of the site and this area will be within fill zones, with 2 to 3 meters of fill expected in these areas.

The impact on the overall groundwater system was reviewed and confirmed acceptable in SSD7664 and SSD 7664 Mod1. Impact as a result of the currently proposed trimming earthworks over the site is expected to be negligible. The identified water tables are within areas of fill. Groundwater has not been identified in cut areas and overall earthworks are

consistent with industrial cut and fill depths, and the works completed on the adjacent Stage 1 of the Horsley Drive Business Park development site.

The effect on impact is considered to meet the requirements of the SEARS and initial responses by the NSW DPI.

3.4 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 9**.

It is noted that there are no substantial batters proposed for the development, with the majority of batter construction being completed in the estate works under SSD 7664.

3.5 Supervision of Earthworks

All geotechnical testing and inspections performed during the earthworks operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-1996.

4 STORMWATER MANAGEMENT

4.1 Hydrologic Modelling and Analysis

4.1.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Fairfield City Council and accepted engineering practice.

Runoff from buildings will generally be designed in accordance with *AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.*

Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (2019 Edition), (AR&R).

Storm events for the 2 to 100 Year ARI events have been assessed.

4.1.2 Minor/ Major System Design

In accordance with FCC Engineering Guide for Development and generally accepted engineering practice, and the approved SSD7664 drainage system, the piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure for flows above the capacity of the piped system.

Where overland flow paths have not been available, the in-ground systems have been sized to accommodate the 1 in 100 year ARI flow, and allowing for 50% blockage of the inlet structure and pipe/culvert structure proposed to convey the flow.

4.1.3 Rainfall Data

Rainfall intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 5 to 100 Year ARI events, was taken from The Bureau of Meteorology Online IFD Tool.

4.1.4 Runoff Models

In accordance with the recommendations and standards of Fairfield City Council, the calculation of the runoff from storms of the design ARI has been calculated with the catchment modelling software DRAINS.

The design parameters for the DRAINS model are to be based on the recommendations as defined by council and parameters for the area and are as follows:

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	
	Inlet Pit Capacity		

Table 4.1. DRAINS Parameters

4.2 Hydraulics

4.2.1 General Requirements

Hydraulic calculations for the estate works have been carried out utilising DRAINS modelling software, see **Appendix C**. The hydraulic calculations for the individual lots will be carried out by DRAINS during the detail design stage. These calculations ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

4.2.2 Pit Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground/ grate level, for the peak runoff from the Minor System runoff.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 300mm below the finished floor level of the building/ development pads.

4.2.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.2.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.2.5 Overland Flow

Dedicated flow paths have been designed to convey all storms up to and including the 100-year ARI. These flow paths will convey stormwater from the site to the estate road system and to Estate Detention Basins.

4.3 Site Drainage

4.3.1 Pre-HDBP S2 & HDBP S2 Site Drainage

The pre-HDBP S2 site is undeveloped rural land with undulating topography which slopes from the north and west to the south/southeast corner of the site. Four upstream gullies currently drain through the site. These gullies only contain flow during wet or storm periods and, as the catchment sizes are relatively small do not contain baseflow.

The existing gullies, now integrated into the HDBP S2 drainage system, drain to a series of culverts (three 900mm R.C.P. culverts) located at the intersection of Cowpasture Road and Victoria Street. Catchment C2 is part of a greater catchment of approximately 83.6 Ha which drains to this point. The greater catchment comprises agricultural land and Parkland Trust land.

A detention basin (Stage 1 - Basin 2) constructed as part of Stage 1 of the Horsley Drive Business Park is located to the south-east of the property. This basin attenuates stormwater from the newly constructed estate and discharges to the council trunk drainage system located to the north of the facility.

The currently under construction stormwater system for the HDBP S2 estate development includes a major/ minor system which conveys surface water from the proposed development lots via in-ground drainage system to the estate infrastructure and combined water quality/ detention basin in the south-east corner of the site.

- Stormwater flows from upstream gullies will be conveyed through the site via inter-allotment drainage lines, size to accommodate the 1 in 100-year ARI event, and allowing for 50% blockage of the pits and pipes. Given the proposed development will result in removal of existing dams, it is proposed that reconstruction of one dam to the north, retention of one of the dams on the west of the property and a new detention system on the western side of the proposed development area. The proposed basin to the north of Lot 18 will include both passive and active storage

and result in reducing the post development flows by approximately one-third of the existing;

- Water quality and quantity for the development site stormwater will be managed by a combined bio-retention and detention basin located adjacent to the site discharge point at the south-eastern quadrant of the development site.
- Water quantity from upstream catchments will also be managed by two proposed basins located upstream of the development lots on the north and west of the development. These basins are also expected to provide passive water storage and active storage for attenuation of stormwater over the development sites which will be lost by the removal of existing dams which are within the development footprint. Runoff from all upstream catchments will bypass development lot drainage systems.

4.3.2 Proposed Site Drainage

The proposed stormwater system for the current proposal is to consist of a major/ minor system which conveys surface water from the proposed development lots to in-ground drainage connection points to the estate infrastructure and combined water quality/ detention basin in the north-west corner of the site.

A summary of the main stormwater management measures is provided as follows:

- In-ground drainage system designed to accommodate the 1 in 20 year ARI storm event.
- Overland flow paths to convey the 1 in 100-year ARI storm event from the proposed development site to the Estate Basin (located on the east of the development site).
- Vortech style gross pollutant trap located prior to discharge to the estate infrastructure on the east of the development site, as required of the estate stormwater management system;
- Discharge of stormwater to estate infrastructure and estate stormwater management basin to the east of the development site; and
- Rainwater reuse in accordance with the estate development.

Further discussion on the *Stormwater Management Strategy* is provided in **Section 5** and **Section 6** of this report. It is noted that key water quantity and quality management measures are provided via estate management systems.

Reference to drawings **Co11492.19-DA41** shows the proposed drainage layout.

4.4 External Catchments and Flooding

4.4.1 Introduction

The estate is located within Fairfield City Council and has been identified in their *Wetherill Park Overland Flood Study 2013*, as being affected by overland flow (the council report will be referred to as the *Overland Flow Study* from hereon). The *Overland Flow Study* was prepared by Council with the assistance of Cardno Consulting Engineers.

As part of the SSD7664-Mod1 SEARS, an assessment of the potential for flooding on the south-west side of the intersection of Cowpasture Road and Victoria Street was required for the pre and post development conditions. The requirements for the flood assessment was consulted with Fairfield City Council during a pre-development meeting dated 10 August 2016, subsequent meeting (1 March 2017) and ongoing consultation in April and May 2017 for the original SSD 7664 consultation. Cardno completed the flood modelling approved in the original SSD 7664 development and updated modelling for the SSD-7664 Mod1 development was completed by *Catchment Simulation Solutions*. This followed consultation with Fairfield City Council in December 2019 and January 2020 and using a Council Preferred Consultant for the works (noting Cardno was not available to complete the updated modelling).

We provide this summary of the flood modelling completed, as approved, for completeness of the document, as discussed in **Section 1.3** of this report, the storage, flow conveyance and attenuation measures for the current submission remain generally consistent for this project and the approved SSD-7664 Mod1.

4.4.2 Background

A pre-development flood model (which includes The Horsley Drive Business Park Stage 1 Development) has been compared with the civil engineering design completed by Costin Roe Consulting to ensure that the objectives of Councils stormwater and flood management requirements have been met and that the development does not result in any impact on upstream, downstream or adjacent properties.

We provide a summary and confirmation of the key outcomes of the *Catchment Simulation Solutions* modelling output in the following sections of this engineering report

The site, in its undeveloped state (prior to the SSD-7664 Mod1 construction), was affected by overland flows from the north, west and south as set out in SSD-7664 Mod1. The upstream catchments and provision for management of these flow paths has been accommodated for as part of the estate works and designs which are currently being constructed.

The flow paths on the east and south of the site do not impact the site and are not required to be considered in the Warehouse 2 & 3 design or EIS. The flow path from to the north of the site requires consideration in the design of the development. The trunk drainage lines and emergency flow path has been maintained in the design. The building development allows for conveyance of flow via the inground network (sized to the 1% AEP flow with 50% blockage) and emergency flow (in case of system blockage or design rainfall greater than capacity) on the north, north-east and east of Warehouse 3. This is consistent the approved estate system and flood modelling included for the estate currently being constructed as approved under SSD-7664 Mod1.

The building is noted to be clear of any flow paths and achieves flood immunity to all overland flow paths and the downstream estate detention basin (to the east of the development). The proposed development does not change any of the previously modelled, assessed and approved flood impacts.

It is noted that an inter-allotment drainage line (which caters for the 1 in 100 year ARI flow), and an emergency overland flow path is located on the north and north-east of the site. This conveys the upstream catchment around the site to council infrastructure (noting the inter-allotment line bypasses estate treatment systems). Otherwise all flood planning requirements set as part of the SSD 7664 and SSD 7664 Mod1 have been met.

4.4.3 Methodology

Catchment Simulation Solutions have reproduced the existing flood model locally in the area of the proposed development, including the Horsley Drive Business Park Stage 1 construction as a pre-development condition. The flood model comprises a two-dimensional hydrodynamic flood model based on the Tuflow modelling engine. The flood model used in Fairfield City Council flood studies as referenced above uses rain-on-grid hydrology.

Catchment Simulation Solutions was supplied with a three-dimension digital terrain model of the proposed civil engineering design, and the proposed in-ground drainage system for use in their post developed flood assessment.

Pre and post developed flood scenarios have been compared to confirm the effect of the development on the existing flooding known to occur at the intersection of Cowpasture Road and Victoria Street. The post development scenario includes the current submission for Stage 2 of the Horsley Drive Business Park, but also includes the recently constructed Stage 1 development configuration as requested by council.

4.4.4 Pre-Existing Flood Scenario

The pre-existing flood scenario shows overland flow from four sources as described in **Section 4.4.2** of this report. The flood assessment shows these flow paths converging at the intersection of Cowpasture Road and Victoria Street with 1% AEP flood depths of 0.3-0.5m across Cowpasture Road. **Figure 4.2** shows the pre-development flood levels for the 5% AEP (1 in 20 year ARI) event and **Figure 4.3** shows the flood output for the 1% AEP event.

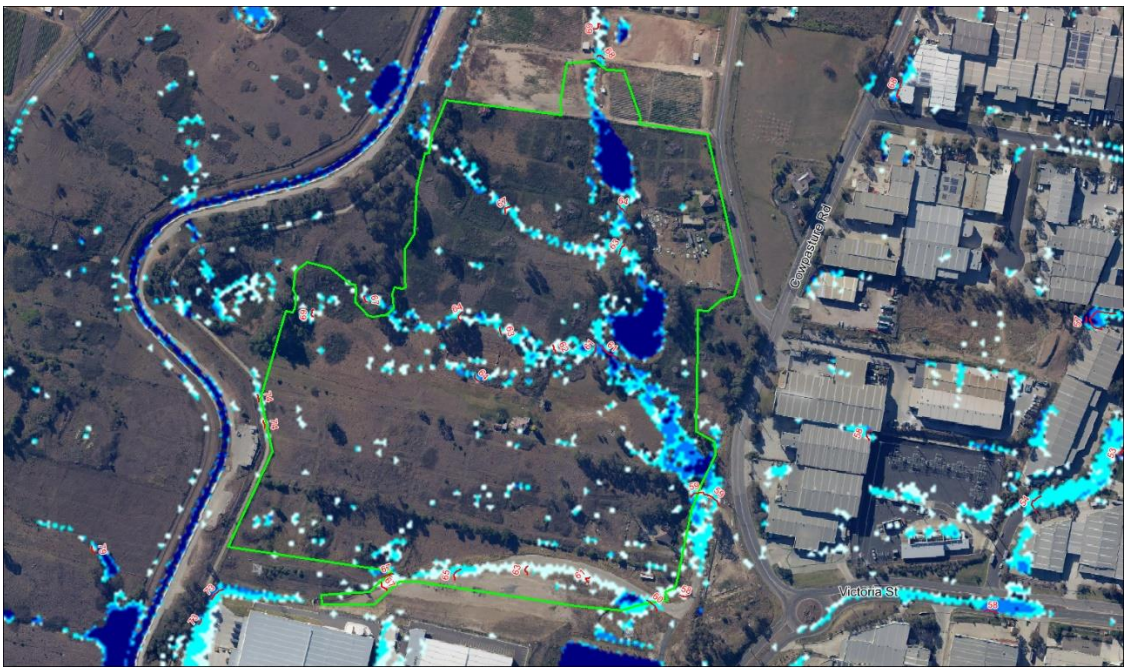


Figure 4.2 Flood Depth Output – 5% AEP (1 in 20-year ARI), Pre-Development

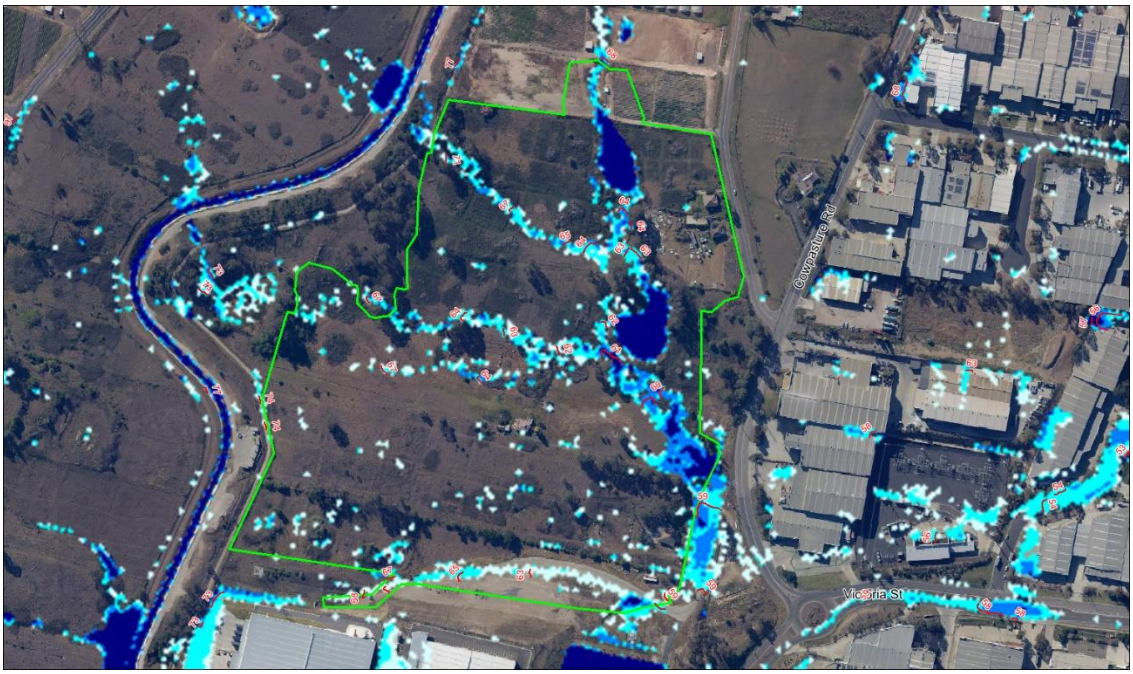


Figure 4.3 Flood Depth Output – 1% AEP (1 in 100-year ARI), Pre-Development

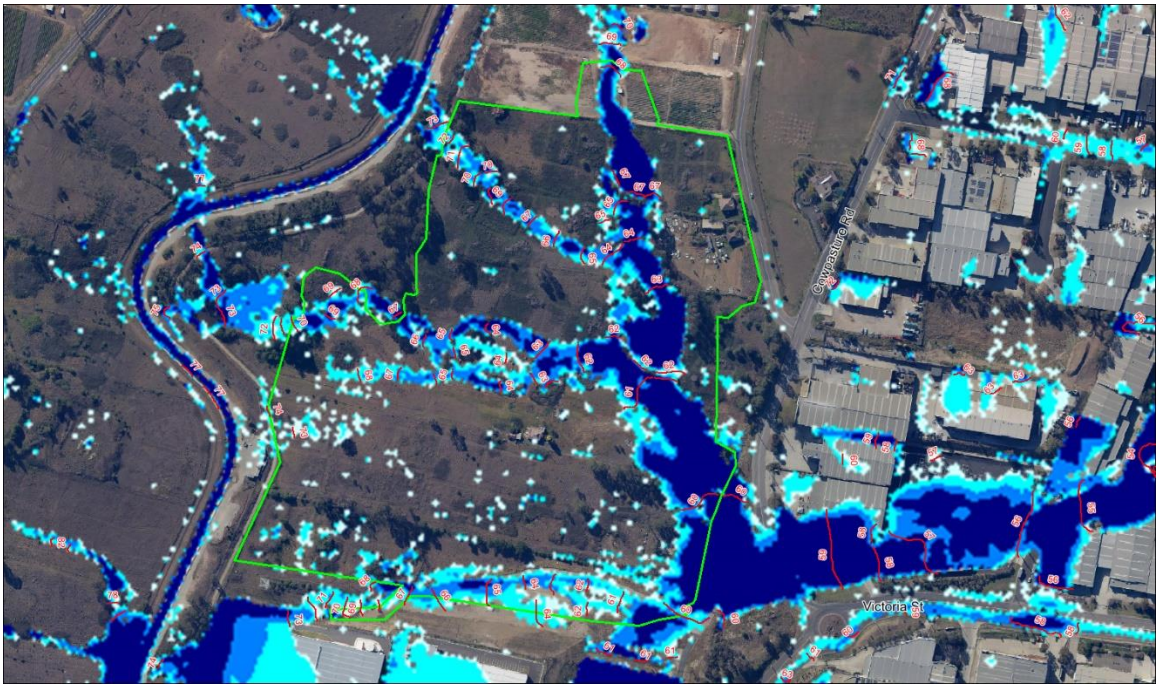


Figure 4.4 Flood Depth Output - PMF, Pre-Development

4.4.5 Developed Estate Flooding

The developed flood scenario shows management of the four overland flow paths and site measures, as designed, including the estate detention basin, new dam and storage areas, and erosion control measures. It is noted that as the development sites are not yet defined, the surface which represents the developed site as used in the flood modelling is based on flat pads with cut off drains to convey overland flow in the required direction of flow and to suit the overall management strategy for the estate.

The flood assessment shows the system is able to convey the existing overland flow paths through the site, and that the development sites are above the 1% AEP flood. It is noted that the emergency overland flow path provided from the northern basin is not activated in the 1% or 0.2% AEP events, however is activated in the PMF. This shows that overland flow will only occur in very infrequent or blockage events.

The results shows that flood depths and velocities, at the intersection of Cowpasture Road and Victoria Street, have been reduced.

Figure 4.5 to 4.7 shows the post-development flood levels for the 5% AEP, 1% AEP events and PMF event.

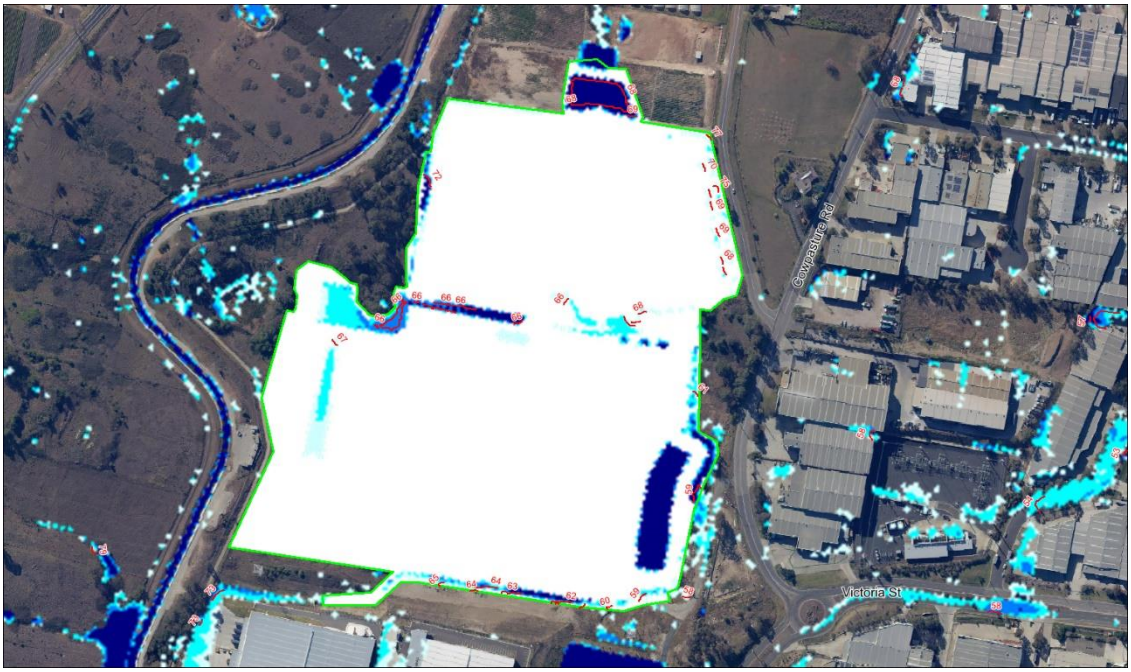


Figure 4.5 Flood Depth Output – 5% AEP, Post Developed

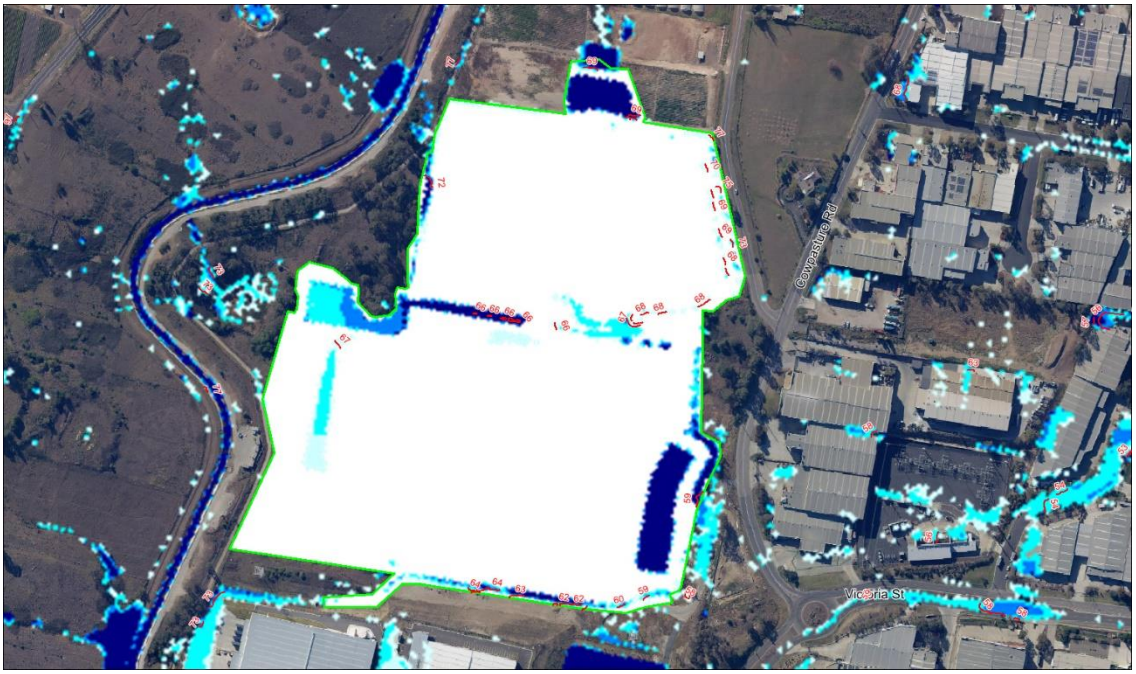


Figure 4.6 Flood Depth Output – 1% AEP, Post Developed

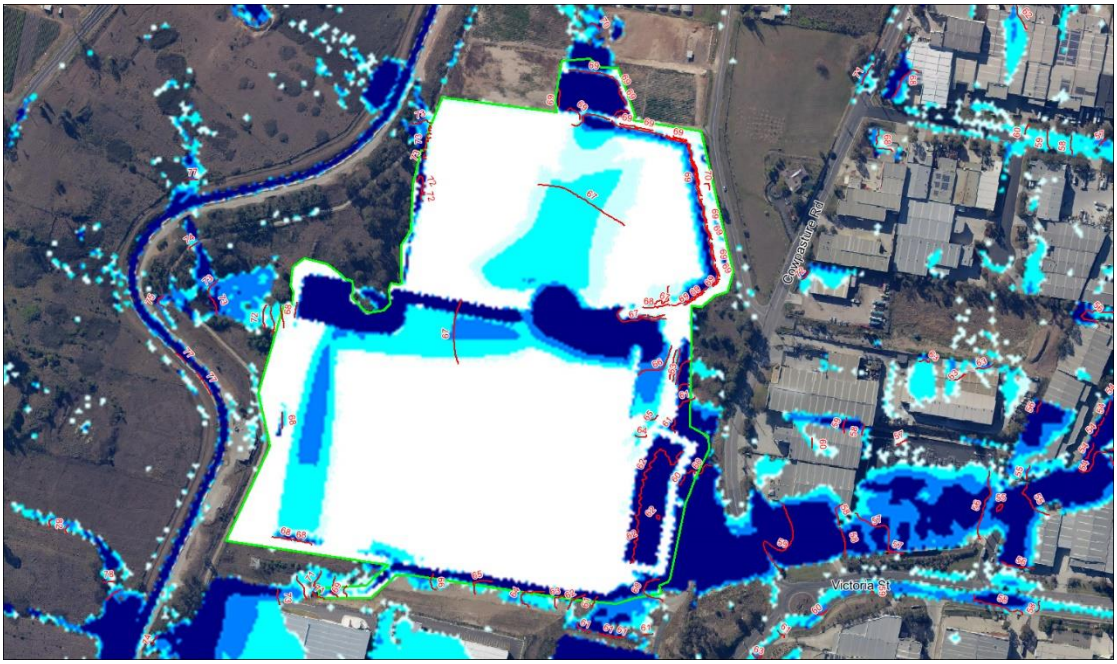


Figure 4.7 Flood Depth Output - PMF, Post Developed

4.4.6 Comparison of Pre and Post Development Conditions

Figure 4.8 shows flood difference (or afflux) for the 1 in 100-year ARI flood scenario.

The development can be seen to have an overall improvement in flood conditions downstream of the development as a result of the attenuation measures proposed in the stormwater management system of the development site. This improvement has been shown in both flood depth output figures and afflux figures for the site.

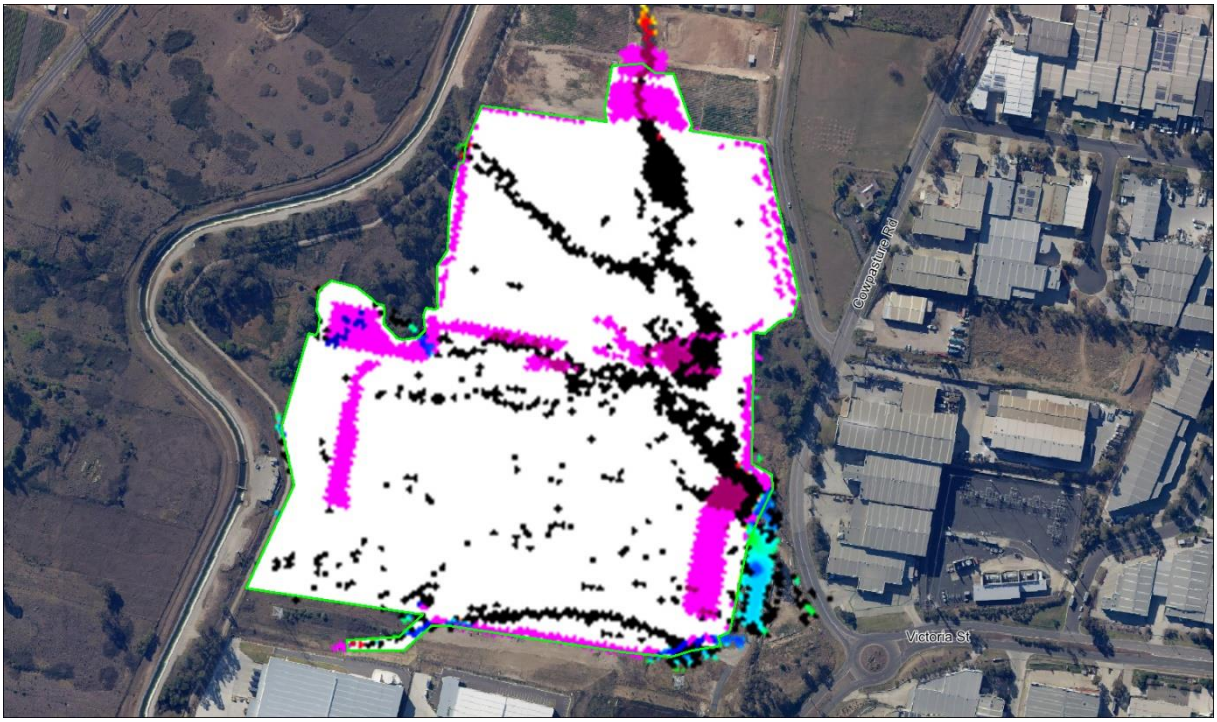


Figure 4.8 Flood Afflux – 1 in 100 year

4.4.7 Flooding Assessment Conclusion

A flood assessment (based on the SSD7664 Masterplan) was undertaken by Fairfield City Council preferred flood modellers, *Catchment Simulation Solutions*. The assessment utilised Cardno's existing flood model, to then compare the post development flood scenario and to confirm the effect of the development on flooding.

The assessment shows that the proposed design allows for the conveyance of the existing flow paths, from the north and west of the development site, through the development areas to the low point and council trunk drainage system at the intersection of Cowpasture Road and Victoria Street.

The flood assessment shows that a reduction in flood depth across Cowpasture Road and Victoria Street will occur as a result of the proposed development site and stormwater management measures included within the design of the site. The management measures which have been proposed include attenuation of the proposed site drainage, and new dam and attenuation storage to three of the four upstream overland flow paths which will be conveyed through the development site.

The assessment also confirms that building pads will be free of flooding from the existing flow paths allowing for a minimum freeboard to the 1% AEP flood level of 500mm. The final building arrangements and adopted floor levels will be defined in future separate building development applications and will be required to be sited in accordance with the flood assessment completed as part of the estate development approval documents.

The approved assessment confirms that the proposed development meets councils flooding policy and the NSW Floodplain Manual recommendations. We confirm that no upstream, downstream or adjacent properties are adversely affected as a result of the development. We confirm that the proposed development has shown an improvement in flooding conditions with attenuation being performed on site which results in a reduction of flood depths across Cowpasture Road at its intersection of Cowpasture Road and Victoria Street.

The storages, flow conveyance and attenuation requirements throughout the development, as included in the approved SSD-7664 Mod1, have been maintained for the current Warehouse 2 and 3 project, and the previously approved modelling (which confirms acceptable flood management has been provided for the development) remains consistent in the current application.

5 WATER QUANTITY MANAGEMENT

Fairfield City Council limits the runoff discharged from private property into the underground piped drainage system. As part of the approved HDBP S2 Estate Stormwater Management Strategy for the SSD7664 and SSD7664_Mod1 development, On-site Detention (OSD) sizing has been designed and approved for the whole estate (including the current HDBP CFC development site) as per *Section 4.2* of Fairfield City Councils *Stormwater Management Policy 2017* for an urban area:

> *The maximum Permissible Site Discharges (PSD) need to be satisfied by the OSD:*
>
> - *The maximum PSD for the 9 hour 100 year ARI storm event is to be 140 l/s/ha; and*
> - *The maximum PSD for the 5, 15, 30, 60, 180 and 540-minute duration storms for the post-development 5 & 100 year ARI storm events is to be limited to the pre-development site discharge.*

The modelling has shown that, with the provision of a storage volume of 5,000m^3, at a maximum depth of 1.5m, that stormwater flows from the HDBP S2 Estate will be attenuated to predevelopment flows. Detention storage will be fully active and will be provided as above ground basins in open space and conservation areas. The proposed detention basin meets the policy requirements of Fairfield City Council and is consistent with the constructed basin in the Horsley Drive Business Park Stage 1 development.

Attenuation of the overland flow from the northern and western catchments described in the earlier sections of this report have been made to maximise attenuation during storm events, and to ensure that the effect of the removal of pre-existing dams are mitigated.

As all stormwater quantity measures are provided as part of the Estate Management Measures, no additional stormwater quantity management measures are necessary for individual development lots and as such none are proposed or required for this development site.

6 STORMWATER QUALITY, HARVESTING & MAINTENANCE

6.1 Stormwater Quality

There is a need to provide design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by FFCC.

As part of the SSD 7664 design process FCC requested that the pollution reduction targets nominated in Table 2-2 of the *Georges River Estuary Coastal Zone Management Plan – July 2013* be adopted for the estate and to be performed on a catchment wide basis. Council now has their *Stormwater Management Policy 2017* document in place which sets out requirements for WSUD and treatment objectives. It is noted that councils 2017 policy requirements (*Stormwater Management Policy 2017, Section 6.2, Table 7*) have slightly lower treatment objectives than those nominated in the *Georges River Estuary Coastal Zone Management Plan – July 2013* and approved SSD. We confirm the higher treatment objectives as listed below have been maintained per the approved SSD.

These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	90%
Free Oil and Grease	90%

It is noted that the required pollution reduction rates are consistent with those adopted for the adjacent *Horsley Drive Business Park Stage 1* development and generally considered best practice stormwater pollution reductions.

Development lots, verges and road areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area. The STM's for the development shall be based on a treatment train approach to ensure that all of the objectives above are met.

Components of the treatment train for the estate development are as follows:

- Treatment of gross pollutants will need to be provided on each development lot prior to discharging into the estate stormwater system. Site STM's will need to meet minimum removal rates of 80% of GP's, 70% of TSS, 15% of TP, 0% of TN and 60% of TH.
  Treatment of runoff in this manner is required for pre-treatment of stormwater from development sites prior to discharge into the infrastructure drainage system. This will help to ensure that the estate system is free from gross pollutants and coarse sediments and to reduce the potential for early onset sedimentation of the estate bio-retention basin.

STM's for development site are to be specified based on individual use on each development lot. Typical examples of acceptable site STM's include end-of-line gross pollutants traps (GPT's) such as Ecosol RSF4000, Rocla CDS, Humeceptor and at source methods such as pit inserts equivalent to Stormwater360 Enviropods;

- Tertiary treatment of suspended solids, gross pollutants, hydrocarbons and nutrients is to be performed via a 1200 m^2 bio-retention system. The proposed bio-retention system is to be provided within a combined bio-retention and detention basin and will form an overall estate level treatment system;
- It is noted that stormwater from the upstream catchments will bypass treatment systems and are not included in the modelling; and
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the rainwater tank. Given however that building layouts are not yet defined, allowance for rainwater tank within the MUSIC model has not been made. This can be included in future development applications and engineering designs as necessary for the individual building applications.

To ensure compliance of site pre-treatment, it is proposed to provide a vortech type GPT prior to discharge to the estate infrastructure system. For this development the proposed system is the Oceansave system. Refer to drawing **Co11492.19-DA41 & DA42** for location and details.

6.2 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for future development lots within this development with re-use for non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the non-potable water demand for the individual future developments in the range of 50-80%.

In general terms the rainwater harvesting systems will be in-line tanks for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

Rainwater falling on roofs is soft, clear and generally low in microbial and chemical contamination. Any contamination of rainwater generally occurs during collection and storage. The use of simple and cost effective rainwater collection and treatment systems ensures reliable operation and water quality for non-potable use. The proposed rainwater treatment will be a first flush diverter in accordance with council engineering guidelines.

Indoor and outdoor water demand and rainwater tanks sizing will be based on individual site requirements and form part of separate future development applications over these development lots in accordance with Fairfield Council requirements and the targets nominated above. A nominal tank size of 20kL has been nominated on the development drawings however this is subject to detailed analysis during construction certificate stage by the Hydraulic Engineering Consultant.

6.3 Maintenance and Monitoring

It is important that each component of the stormwater system and water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared and included as **Appendix B** to assist in the effective operation and maintenance of the various water quality components.

Inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.

7 SOIL AND WATER MANAGEMENT PLAN

7.1 Soil and Water Management General

Section 1 provides a summary of the construction works for the Proposal. While all construction activities have the potential to impact on water quality, the key activities are:

- Erosion and sediment control installation.
- Grading of existing earthworks to suit building layout, drainage layout and pavements.
- Stormwater and drainage works.
- Service installation works.
- Building construction works.

Without any mitigation measures and during typical construction activities, site runoff would be expected to convey a significant sediment load. A *Soil and Water Management Plan* (SWMP) and *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004)*.

In accordance with the principles included in the Blue Book, a number of controls have been incorporated into a preliminary ESCP (refer to accompanying Drawings in **Appendix A**) and draft SWMP in **Appendix C**.

The sections below outline the proposed controls for management of erosion and sedimentation during construction of the Proposal.

7.2 Typical Management Measures

Sediment Basins

Sediment basins have been sized (based on 5 day 85th percentile rainfall) and located to ensure sediment concentrations in site runoff are within acceptable limits. Preliminary basin sizes have been calculated in accordance with the Blue Book and are based on 'Type F' soils. These soils are fine grained and require a relatively long residence time to allow settling.

Sediment basins for 'Type F' soils are typically wet basins which are pumped out following a rainfall event when suspended solids concentrations of less than 50 mg/L have been achieved.

Sediment Fences

Sediment fences are located around the perimeter of the site to ensure no untreated runoff leaves the site. They have also been located around the existing drainage channels to minimise sediment migration into waterways and sediment basins.

Stabilised Site Access

For the proposal, stabilised site access is proposed at one location at the entry to the works area. This will limit the risk of sediment being transported onto public roads.

7.3 Other Management Measures

Other management measures that will be employed are expected to include:

- Minimising the extent of disturbed areas across the site at any one time.
- Progressive stabilisation of disturbed areas or previously completed earthworks to suit the proposal once trimming works are complete.
- Regular monitoring and implementation of remedial works to maintain the efficiency of all controls.

It is noted that the controls included in the preliminary ESCP are expected to be reviewed and updated as the design, staging and construction methodology is further developed for the Proposal.

9 SEAR's AND AGENCY RESPONSE ITEMS

This section of the report covers items relating to the Planning SEAR's, dated 27 April 2021, and associated agency responses for SSD 17161650.

We provide specific responses to SEAR's *Soil and Water,* and from relevant agencies.

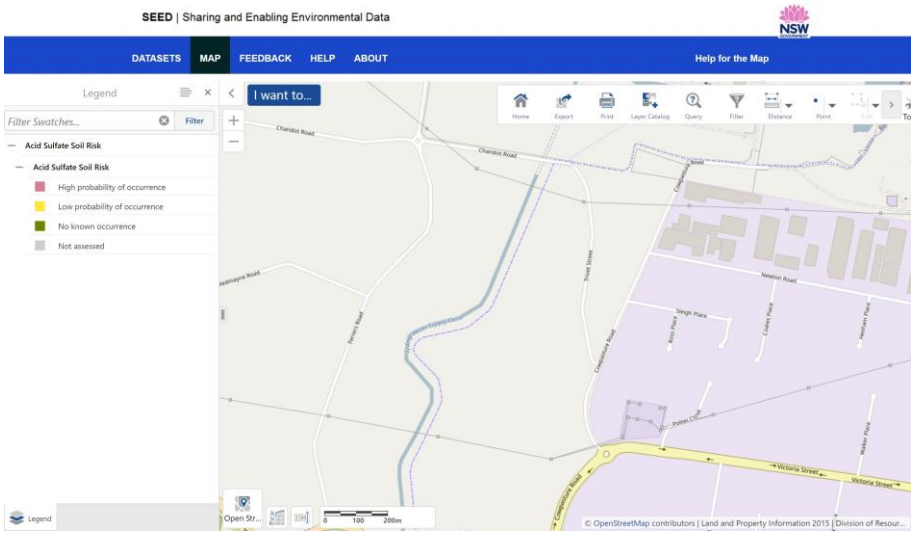
It is noted that the majority of items raised in the SEARs and associated agency letters will be managed and addressed via works and approved assessments already undertaken as part of the approved SSD 7664 and associated SSD 7664 Mod1 development infrastructure works.

Further reference to the EIS should be made for confirmation of how the SEAR's have been addressed for non-civil engineering related items.

No.	***Item & Response***
SEARS Soils and Water	
Item 7a	*An assessment of the potential surface water impacts associated with the development.* Response Management of surface water has been completed via a stormwater management system comprising inground drainage and overland flow path. Management systems are described in **Sections 4, 5** & **6** of this report. The proposed surface grading and drainage layout is included in drawings found within **Appendix A**. We note that no waterways or riparian corridors are located within proximity to the development site. Drainage and infrastructure requirements, including management of water quality and quantity have been completed in accordance with the approved SSD-7664 Mod1 management strategy.
Item 7b	*A detailed site water balance including a description of the water demands and breakdown of water supplies* Response We confirm that water usage is consistent with industrial developments typical of the area and approved under the parent estate SSD-7664/ SSD-7664 Mod1 development. Water use will be required for toilet flushing, hand washing, employee showers, van washing, tote washing and irrigation with supply being made from Sydney Water. Water demand will be supplemented by rainwater harvesting with proposed reduction in non-potable demands as per the approved Horsley Drive Business Park Estate Stormwater Management Strategy (SSD-7664, and SSD-7664 Mod1), Fairfield City Council and the NSW Department of Environment and Conservation

No.	*Item & Response*
	document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand.
Item 7c	*Details of stormwater/wastewater management system including the capacity of onsite detention system, and measures to treat, reuse or dispose of water.* Response Detailed drawings, **Co11492.19-DA41** to **DA42**, showing the proposed surface and stormwater management systems for the development have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 5** and **6** of this Engineering Report respectively. Proposed stormwater management systems are consistent with the overall HDBP S2 strategy set out in the parent SSD-7664 estate approval and subsequent SSD-7664 Mod 1 approval, noting that an estate water quantity management basin manages detention requirements for individual development sites. The estate basin also completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems. Reuse of roofwater is also proposed to reduce the demand on non-potable water including toilet flushing and irrigation.
Item 7d	*Description of the measures to minimise water use* Response Refer to response *Item 7b*.
	Detailed flooding assessment Response Reference to **Section 4.4** of this report should be made in relation to flood modelling and flood management requirements. The site falls within the HDBP S2 Masterplan extent approved under SSD-7664 and subsequent SSD-7664 Mod 1. As part of the approved SSD-7664, infrastructure works are proposed, including major cut to fill earthworks and trunk drainage infrastructure, to facilitate industrial development of the land and provide flood free development sites. A detailed flood assessment has been completed as part of the SSD-7664 and SSD-7664 Mod 1 approvals. The flood and overland flow assessment confirms flood prone land, flood planning levels, overland

No.	*Item & Response*
	flow paths, effect of development on flood conditions and effect of flooding on the development. Based on SSD 7664 Mod 1 and the assessment completed as part of the Masterplan application submission, the project is clear of any overland flow paths, trunk drainage infrastructure and achieves flood immunity to any adjacent overland flow paths. The development will not impact on, nor be impacted by, flooding or overland flow paths, or the previously approved flood outcomes. Based on the above, a site-specific flood assessment is not required or proposed to be undertaken for the development. Refer SSD 7664 Mod 1 documents.
	Description of proposed erosion and sediment controls during construction; <u>Response</u> An Erosion and Sediment Control Plan has been prepared in accordance with Fairfield Council requirements and *Managing Urban Stormwater, Soils and Construction "The Blue Book"* (Landcom 1998). The proposed erosion sediment controls are consistent with the overall estate masterplan strategy set out and approved under SSD 7664, and also consistent with recently submitted SSD 7664 Mod1. Refer to **Section 7** and **Appendix C** of this *Engineering Report* for *Soil and Water Management* requirements and associated Erosion and Sediment Control drawings included in **Appendix A**.
	Characterisation of water quality at the point of discharge against relevant water quality criteria. <u>Response</u> Requirements of water quality management have been discussed in **Section 6** of this Engineering Report. The estate basin completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems.
	Characterisation of the nature and extent of any contamination on the site and surrounding area. <u>Response</u> Refer to contamination assessment.
DPIE Water and Soils	

No.	***Item & Response***
Item 6	*The EIS must map the following features relevant to water and soils including:*
Item 6 *a)*	*Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).* <u>Response</u> Review of the NSW Acid Sulfate mapping shows the site to be clear of any areas with risk of *Acid Sulfate Soils – refer excerpt below.* 
Item 6 *b)*	*Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).* <u>Response</u> No defined watercourses, wetlands or riparian land are within the development area. As such no watercourses, wetlands or riparian land will be affected by the proposed development. Assessments relating to these items are not relevant to the project.
Item 6 *c)*	*Wetlands as described in s4.2 of the Biodiversity Assessment Method.* <u>Response</u> No defined wetlands are within the development area. As such no wetlands will be affected by the proposed development. Assessments relating to this item is not relevant to the project.
Item 6 *d)*	*Groundwater.* <u>Response</u>

No.	*Item & Response*
	Earthworks have been completed as part of SSD-7664 and SSD-7664 Mod 1 to facilitate industrial development and any assessments relating to groundwater would be covered under the parent estate development approval. Minor trimming and shaping only is required for the current project being assessed, hence there would be negligible change or effect on groundwater associated with this project assessment. An assessment of groundwater is not relevant or proposed as part of the project.
Item 6 *e)*	*Groundwater dependent ecosystems* <u>Response</u> Earthworks are proposed as part of SSD-7664 and SSD-7664 Mod 1 to facilitate industrial development and any assessments relating to groundwater would be covered under the parent estate development approval. Minor trimming and shaping only is required for the project being assessed, hence there would be negligible change or effect on groundwater associated with this project assessment. An assessment of groundwater ecosystems is not relevant or proposed as part of the project.
Item 6 *f)*	*Proposed intake and discharge locations.* <u>Response</u> Intake locations are not relevant to this industrial building development. Assessments as such are not required for this project. Discharge of stormwater is proposed from the site into drainage infrastructure (including detention basin and bio-retention basin) provided as part of SSD-7664 and SSD-7664 Mod1.
Item 7	*The EIS must describe background conditions for any water resource likely to be affected by the development, including:*
Item 7 *a)*	*Existing surface and groundwater.* <u>Response</u>

No.	*Item & Response*
	Detailed drawings, **Co11492.19-DA41** to **DA42**, showing the proposed surface water and stormwater management systems for the development have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 5** and **6** of this Engineering Report respectively. Proposed stormwater management systems are consistent with the overall HDBP S2 strategy set out in the parent SSD 7664 estate approval and subsequent Mod 1 approval, noting that an estate water quantity management basin manages detention requirements for individual development sites. The estate basin also completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems. In relation to groundwater, earthworks are currently being constructed as part of SSD 7664 and SSD 7664 Mod 1 to facilitate industrial development and any assessments relating to groundwater would be covered under the parent estate development approval. Minor trimming and shaping of ground only is required for the current project being assessed, hence there would be negligible change or effect on groundwater associated with this project assessment. An assessment of groundwater is not relevant or proposed as part of the project.
Item 7 *b)*	*Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations*. <u>Response</u> Detailed drawings, **Co11492.19-DA41** to **DA42**, showing the proposed surface and stormwater management systems for the development have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 5** and **6** of this Engineering Report respectively. Proposed stormwater management systems are consistent with the overall HDBP S2 strategy set out in the parent SSD 7664 estate approval and subsequent Mod 1 approval, noting that an estate water quantity management basin manages detention requirements for individual development sites. The estate basin also completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems.

No.	*Item & Response*
	In relation to groundwater, minor trimming and shaping of ground levels only are required for the project being assessed. Hence there would be negligible change or effect on groundwater associated with this project assessment. An assessment of groundwater is not relevant or proposed as part of the project.
Item 7 *c)*	*Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.* <u>Response</u> A water quality strategy, which matches and exceeds Fairfield Council LGA Stormwater Quality Objectives and meets NSW Government and best practice outcomes has been completed. The strategy and site-specific water quality requirements have been completed in accordance with SSD 7664 and SSD 7664 Mod1. Pollution reduction targets nominated in Table 2-2 of the *Georges River Estuary Coastal Zone Management Plan – July 2013* have been adopted for the estate (per SSD 7664) and to be performed on a catchment wide basis. The adopted pollution reduction targets exceed those set out in Council's *Stormwater Management Policy 2017* document. The adopted water quality targets for the estate are as follows (and also in Section 6 of this report) and are presented in terms of annual percentage pollutant reductions on a developed catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45% Total Hydrocarbons 90% Free Oil and Grease 90% In order for the Project to meet the overall stormwater management objectives, a GPT or other acceptable primary water quality improvement device is required prior to discharge from the site to estate infrastructure drainage systems. Refer **Section 6** of this report and drawings, **Co11492.19-DA41** to **DA42.**

No.	*Item & Response*
Item 7 *d)*	*Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.* Response Relevant stormwater quality pollution reduction objectives for an industrial development have been adopted for the project. These are based on reduction targets nominated in Table 2-2 of the *Georges River Estuary Coastal Zone Management Plan – July 2013,* as discussed and agreed with Council and DPIE as part of the SSD7664 consultation process.
Item 7 *e)*	*Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-andpublications/publications-search/risk-based-framework-for-considering-waterwayhealth-outcomes-in-strategic-land-use-planning* Response The project falls within the HDBP S2 estate approved under SSD7664 and SSD 7664 Mod1. Stormwater management systems have been designed in accordance with the approved estate management plan, which considers water quality and water quantity discharge. Waterway health and potential risks have been completed in accordance with the accepted water quality and quantity benchmarks as set out in the SSD 7664 approval and Mod 1 application. It is noted that discharge from the site, and HDBP S2 Estate is made directly to constructed drainage infrastructure (comprising existing large diameter pipe work, reinforced concrete box culverts and concrete lined open channels) and the existing Wetherill Park Industrial Area for a distance of approximately 3.5km downstream of the development site. Also, it is noted that no waterways have been identified on the property. Assessments relating to waterways are not considered required for this development site.
Item 8	*The EIS must assess the impact of the development on hydrology, including:*
Item 8 *a)*	*Water balance including quantity, quality and source.* Response We confirm that water usage is consistent with industrial developments typical of the area. Water use will be for toilet flushing, hand washing,

No.	*Item & Response*
	employee showers, van washing, tote washing and irrigation with supply being made from Sydney Water. Water demand will be supplemented by rainwater harvesting with proposed reduction in non-potable demands as per the approved Horsley Drive Business Park Estate Stormwater Management Strategy , Fairfield City Council and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand.
Item 8 *b)*	*Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.* Response The HDBP CFC project forms part of the overall HDBP S2 approved under SSD7664 and SSD 7664 Mod1. Stormwater management systems have been designed in accordance with the approved estate management plan, which considers water quality and water quantity discharge assessed and approved as being acceptable outcomes for the heavily urbanised receiving downstream system. It is noted that discharge from the site, and HDBP S2 Estate, is made directly to constructed drainage infrastructure (comprising existing large diameter pipe work, reinforced concrete box culverts and concrete lined open channels) and the existing Wetherill Park Industrial Area. These constructed systems extend for a distance of approximately 3.5km downstream of the development site before joining the upper reach of Prospect Creek and has a contributing catchment in excess of 650 Ha. Given the stormwater management measures proposed for the site and HDBP S2 Estate (as approved under SSD 7664), and the site comprising only 2% of the total contributing catchment, the effect of the development on any downstream rivers, wetlands, estuaries, marine waters and floodplain areas is considered to be negligible. The negligible impact noted (in relation to downstream rivers, wetlands, estuaries, marine waters and floodplain areas) and reasons outlined above, would extend to water-dependent fauna and flora (per Item 8(c) below), impacts on natural processes (per item 8 (d) below).
Item 8 *c)*	*Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.* Response Refer Item 8(b) above.
Item 8 *d)*	*Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).*

No.	*Item & Response*
	Response Refer Item 8(b) above.
Item 8 *e)*	*Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.* Response No changes to environmental water availability are proposed as part of the project.
Item 8 *f)*	*Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.* Response During construction an Erosion and Sediment Control program is proposed to be implemented. An Erosion and Sediment Control Plan has been prepared in accordance with Fairfield Council requirements and *Managing Urban Stormwater, Soils and Construction "The Blue Book"* (Landcom 1998). The proposed erosion sediment controls are consistent with the overall estate masterplan strategy set out and approved under SSD 7664, and also consistent with recently submitted SSD 7664 Mod1. Refer to **Section 7** of this *Engineering Report* for *Soil and Water Management* requirements and associated Erosion and Sediment Control drawings included in **Appendix A**. Detailed drawings, **Co11492.19-DA41** to **DA42**, showing the proposed surface and stormwater management systems for the development during the operational phase have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 5** and **6** of this Engineering Report respectively. Proposed stormwater management systems are consistent with the overall HDBP S2 strategy set out in the parent SSD 7664 estate approval and subsequent Mod 1 application, noting that an estate water quantity management basin manages detention requirements for individual development sites. The estate basin also completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems. Reuse of roofwater is also proposed to reduce the demand on non-potable water including toilet flushing and irrigation.
Item 8	*Identification of proposed monitoring of hydrological attributes.*

No.	*Item & Response*
g)	Response Monitoring of water quality is not required or proposed for the HDBP S2 Estate (per SSD 7664), and also not proposed for the current project.
DPIE Flooding and coastal hazards	
Item 9	*The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:*
Item 9 *a)*	*Flood prone land.* Response Reference to **Section 4.4** of this report should be made in relation to flood modelling and flood management requirements. The site falls within the HDBP S2 Masterplan extent approved under SSD-7664 and subsequent SSD-7664 Mod 1. As part of the approved SSD-7664, infrastructure works are proposed, including major cut to fill earthworks and trunk drainage infrastructure, to facilitate industrial development of the land and provide flood free development sites. A detailed flood assessment has been completed as part of the SSD-7664 and SSD-7664 Mod 1 approvals. The flood and overland flow assessment confirms flood prone land, flood planning levels, overland flow paths, effect of development on flood conditions and effect of flooding on the development. Based on SSD 7664 Mod 1 and the assessment completed as part of the Masterplan application submission, the project is clear of any overland flow paths, trunk drainage infrastructure and achieves flood immunity to any adjacent overland flow paths. The development will not impact on, nor be impacted by, flooding or overland flow paths, or the previously approved flood outcomes. Based on the above, a site-specific flood assessment is not required or proposed to be undertaken for the development. Refer SSD 7664 Mod 1 documents.
Item 9 *b)*	*Flood planning area, the area below the flood planning level.* Response Refer Item 9(a) response.
Item 9 *c)*	*Hydraulic categorisation (floodways and flood storage areas)* Response Refer Item 9(a) response.

No.	*Item & Response*
Item 9 *d)*	*Flood Hazard.* Response Refer Item 9(a) response.
Item 10	*The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.* Response Refer Item 9(a) response.
Item 11	*The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:*
Item 11 *a)*	*Current flood behaviour for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.* Response Refer Item 9(a) response.
Item 12	*Modelling in the EIS must consider and document:*
Item 12 *a)*	*Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.* Response Refer Item 9(a) response. It is noted that the flood modelling has been completed utilising existing council flood study and completed by a consultant from a pre-approved list provided by Council.
Item 12 *b)*	*The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood.* Response Refer Item 9(a) response.
Item 12	*Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This*

No.	*Item & Response*
c)	*may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories* Response Refer Item 9(a) response.
Item 12 *d)*	*Relevant provisions of the NSW Floodplain Development Manual 2005* Response Refer Item 9(a) response.
Item 13	*The EIS must assess the impacts on the proposed development on flood behaviour, including:*
Item 13 *a)*	*Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.* Response Refer Item 9(a) response.
Item 13 *b)*	*Consistency with Council floodplain risk management plans.* Response Refer Item 9(a) response.
Item 13 *c)*	*Consistency with any Rural Floodplain Management Plans.* Response Refer Item 9(a) response.
Item 13 *d)*	*Compatibility with the flood hazard of the land.* Response Refer Item 9(a) response.
Item 13 *e)*	*Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.* Response Refer Item 9(a) response.
Item 13 *f)*	*Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.* Response Refer Item 9(a) response.

No.	*Item & Response*
Item 13 g)	*Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.* Response Refer Item 9(a) response. It is further noted that the downstream receiving waters are substantially urbanised for a distance of greater than 3.5km and a large contributing urbanised catchment. Refer to **Item 8(b)** response for further substantiation. As such, effect on erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses would be very low to negligible.
Item 13 h)	*Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSWSES and Council.* Response The proposed project will not impact on emergency management arrangements for flooding. The assessment completed as part of SSD 7664 shows a slight reduction in flood levels within Cowpasture Road during the 1% AEP storm event, hence overall a minor improvement in flood conditions would be realised.
Item 13 i)	*Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.* Response The project is noted to be clear of 1% AEP and PMF flooding from surrounding overland flow paths. On-site refuge is available for the site. Flood Risk and safety is noted to be addressed as part of the overall SSD7664 HDBP S2 Estate.
Item 13 j)	*Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.* Response Refer Item 17(i) response.
Item 13 k)	*Any impacts the development may have on the social and economic costs to the community as consequence of flooding.*

No.	*Item & Response*
	Response The proposed project will not impact on the flood conditions confirmed in the assessment completed as part of SSD 7664. The SSD7664 assessment shows a slight reduction in flood levels within Cowpasture Road during the 1% AEP storm event, hence overall a minor improvement in flood conditions would be realised, and as such a minor improvement in relation to social and economic costs would also be realised.
WaterNSW letter dated 16 April 2021	
Soil and Water	*Surface water is currently conveyed through a series of flumes and culverts across the corridor and then flows onto the subject site. The EIS should demonstrate how stormwater systems for the development will be designed to accommodate and not impede any upstream flows from systems that convey stormwater across, along or under the Upper Canal. The stormwater management system should ensure it makes allowance for all flow emanating from land to the west of the Upper Canal as well as from the corridor itself, and all stormwater structures associated with the development should be kept within the development site.* Response The site falls within the HDBP S2 Masterplan extent approved under SSD 7664 and currently under assessment SSD 7664 Mod 1. As part of the approved SSD 7664 and Mod1, infrastructure works are proposed, including major cut to fill earthworks and trunk drainage infrastructure, to facilitate industrial development of the land and provide flood free development sites. A detailed surface water assessment (including hydrological, hydraulic and a detailed flood assessment) has been completed as part of the SSD 7664 and SSD 7664 Mod 1 approvals. The design and assessments for the SSD 7664 including management of the upstream flows described by WaterNSW above. This assessment shows that flow paths are catered for and not impeded, and that there would be no affect on the WaterNSW Canal as part of the overall SSD 7664 development. The stormwater design for the project is noted to be completed based on stormwater management strategy assessed and approved for the SSD7664 and per the under assessment SSD 7664 Mod 1. The site is noted to be clear of any overland flow paths, trunk drainage infrastructure and achieves flood immunity to any adjacent overland flow paths. The development will not impact on, nor be impacted by, flooding or overland flow paths.

No.	*Item & Response*
	Based on the above, requirements pertaining to conveyance of overland flows and the WaterNSW Canal are considered to be met.
Erosion and Sediment Control Plans	*Erosion and Sediment control plans – the EIS should consider any impacts from sediment or polluted run-off, and airborne dust emissions on the quality of the water in the Upper Canal. This should include mitigation measures for the prevention of impacts on the corridor and the open waters of the Upper Canal.* Response During construction an Erosion and Sediment Control program is proposed to be implemented. An Erosion and Sediment Control Plan has been prepared in accordance with Fairfield Council requirements and *Managing Urban Stormwater, Soils and Construction "The Blue Book"* (Landcom 1998). The proposed erosion sediment controls are consistent with the overall estate masterplan strategy set out and approved under SSD 7664, and also consistent with recently submitted SSD 7664 Mod1. Refer to **Section 7** of this *Engineering Report* for *Soil and Water Management* requirements and associated Erosion and Sediment Control drawings included in **Appendix A**.
Earthworks *Item 1*	*The EIS should detail the measures being taken to prevent any impacts on the Upper Canal corridor from any earthworks occurring adjacent to the boundary.* Response During construction an Erosion and Sediment Control program is proposed to be implemented. An Erosion and Sediment Control Plan has been prepared in accordance with Fairfield Council requirements and *Managing Urban Stormwater, Soils and Construction "The Blue Book"* (Landcom 1998). The proposed erosion sediment controls are consistent with the overall estate masterplan strategy set out and approved under SSD 7664, and also consistent with recently submitted SSD 7664 Mod1. Refer to **Section 7** of this *Engineering Report* for *Soil and Water Management* requirements and associated Erosion and Sediment Control drawings included in **Appendix A**.
Item 2	*The EIS should outline plans for any retaining walls or similar structures where they would be installed along the boundary with the Upper Canal for WaterNSW assessment.* Response Details of proposed walls are provided as part of the SSD7664 mod1 application. The HDBP CFC project does not propose any walls in proximity to WaterNSW boundaries.

No.	*Item & Response*
Fairfield City Council letter dated 20 April 2021	
Flooding Comments *Item 1*	*The application must include an assessment of the impact of flooding on the proposed development for the full range of flood events up to the probable maximum flood event. The assessment must include dam break assessment of the basin directly upstream of site.* <u>Response</u> The site falls within the HDBP S2 Masterplan extent approved under SSD 7664 and subsequent SSD 7664 Mod 1. As part of the approved SSD 7664, infrastructure works are proposed, including major cut to fill earthworks and trunk drainage infrastructure, to facilitate industrial development of the land and provide flood free development sites. A detailed flood assessment has been completed as part of the SSD 7664 and SSD 7664 Mod 1 approvals. The flood and overland flow assessment confirms flood prone land, flood planning levels, overland flow paths, effect of development on flood conditions and effect of flooding on the development. Based on SSD 7664 Mod 1 and the assessment completed as part of the Masterplan application submission, the project is clear of any overland flow paths, trunk drainage infrastructure and achieves flood immunity to any adjacent overland flow paths. The development will not impact on, nor be impacted by, flooding or overland flow paths. Based on the above, a site-specific flood assessment is not required or proposed to be undertaken for the development. Refer SSD 7664 Mod 1 documents.
Item 2	*The application must include an assessment of the impact to flood behaviour by the proposed development for the full range of flood events up tot the probable maximum flood and any required mitigation measures to meet chapter 11 of the Fairfield City Wide DCP 2013.* <u>Response</u> Refer *Flooding Comments Item 1* response.
Item 3	*The application must include details of the surface and stormwater management system including the required on-site detention measures to meet the FCC Stormwater Management Policy (2017). Details of the Water Sensitive Urban Design measures to be implemented to meet the FCC Stormwater Management Policy must be provided.*

No.	*Item & Response*
	Response Detailed drawings, **Co11492.19-DA41** to **DA42**, showing the proposed surface and stormwater management systems for the development during the operational phase have been included in **Appendix A**. Requirements for water quantity management, and water quality management have been discussed in **Sections 5** and **6** of this Engineering Report respectively. Proposed stormwater management systems are consistent with the overall HDBP S2 strategy set out in the parent SSD 7664 estate approval and subsequent Mod 1 application, noting that an estate water quantity management basin manages detention requirements for individual development sites. The estate basin also completes all tertiary water quality management requirements, with individual sites requiring primary water quality management systems in the form of GPT's or similar systems. Reuse of roofwater is also proposed to reduce the demand on non-potable water including toilet flushing and irrigation.
Development Detail Comments *Item 3a*	*Cut and fill batters shall not exceed a slope of 1:4 and retaining walls if proposed shall be stepped down with landscaping provided in between level changes.* Response A cut and fill plan will be submitted as part of future detail design over the site. Cut to fill is considered minor over the site with low height retaining walls required at certain locations. This is to be confirmed during detailed design.

10 CONCLUSION

This Civil Engineering Details Report has been prepared to support the SSD17161650 development application for a two warehouse distribution centres, within the SSD7664 Mod1 approved industrial estate, 'Horsley Drive Business Park Stage 2' at Cowpasture Road, Wetherill Park.

A civil engineering and infrastructure strategy for the site has been developed which provides a best fit solution within the constraints of the proposed Horsley Drive Business Park Estate and the Stormwater Management Strategy approved under SSD 7664 Mod1. The proposed engineering strategy for this development has been completed consistent with the approved Business Park development.

During construction stage, Erosion and Sediment Control Measures are proposed for the site to ensure that all receiving waters are protected from undue pollution and sediment laden stormwater runoff. The site-specific strategy has been completed in conjunction with the broader strategy for the Horsley Drive Business Park Estate included in SSD 7764. The strategy comprises erosion control measures consistent with Fairfield City Council Policy and the Landcom document Managing Urban Stormwater, Soils and Construction (1998). Provided measures include sediment basins, diversion drains, batter control and site construction entries.

During operational phase the stormwater quality will be performed by a treatment train approach of primary treatment of hardstand and other paved surfaces prior to tertiary treatment within bio-retention systems provided in The Business Park Stage 2 Stormwater Management Basins. Stormwater quantity management (detention) will also be provided at an estate level within the Business Park Stage 2 Stormwater Management Basins.

It is recommended that the management strategies mentioned in this report be incorporated into the future detailed design. Detailed design may result in changes to the concept however design criteria will be followed.

It is recommended the management strategies (consistent with those already approved under SSD7664) in this report be approved and incorporated into the future detailed design.

11 REFERENCES

- Fairfield City Council Development Control Plan.
- Fairfield City Council Stormwater Management Plan 2017.
- Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);
- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);
- WSUD: Basic Procedures for 'Source Control of Stormwater', John R Argue, 2008.
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

12 GLOSSARY

Afflux	The rise in water level upstream of a hydraulic structure such as a bridge or culvert, caused by losses incurred from the hydraulic structure. The change in flood surface or depth as a result in a modification or change to the hydraulic flood model scenario.
Australian Height Datum (AHD)	National survey datum corresponding approximately to mean sea level.
Annual Exceedance Probability (AEP)	The chance of a flood of a given size or larger occurring in any one year, generally expressed as percentage probability. For example, a 100 year ARI flood is a 1% AEP flood. An important implication is that when a 1% AEP flood occurs, there is still a 1% probability that it could occur the following year.
Average Recurrence Interval (ARI)	Is statistically the long term average number of years between the occurrence of a flood as big as, or larger than the selected flood event. An ARI is the reciprocal of the AEP.
Catchment	The catchment at a particular point is the area of land which drains to that point.
Depth to velocity value (DV)	A ratio of flow depth and velocity used as a measure of safety for pedestrians and vehicles subject to flood water. Normally a maximum DV of 0.4 is recommended for pedestrian safety and 0.6 for vehicles.
Design floor level	The minimum (lowest) floor level specified for a building.
Design flood	A hypothetical flood representing a specific likelihood of occurrence (for example the 100 year or 1% probability flood). The design flood may comprise two or more single source dominated floods.
Development	Existing or proposed works which may or may not impact upon flooding. Typical works are filling of land, and the construction of roads, floodways and buildings.
Discharge	The rate of flow of water measured in terms of volume over time. It is not the velocity of flow which is a measure of how fast the water is moving rather than how much is moving. Discharge and flow are interchangeable.
Digital Terrain Model (DTM)	A three-dimensional model of the ground surface that can be represented as a series of grids with each cell representing an

	elevation (DEM) or a series of interconnected triangles with elevations (TIN).
Effective warning time	The available time that a community has from receiving a flood warning to when the flood reaches their location.
First Flush	The initial surface runoff of a rainstorm. During this phase, water pollution in areas with high proportions of impervious surfaces is typically more concentrated compared to the remainder of the storm.
Flood	Above average river, creek, channel or other flows which overtop banks and inundate floodplains or urban areas.
Flood awareness	An appreciation of the likely threats and consequences of flooding and an understanding of any flood warning and evacuation procedures. Communities with a high degree of flood awareness respond to flood warnings promptly and efficiently, greatly reducing the potential for damage and loss of life and limb. Communities with a low degree of flood awareness may not fully appreciate the importance of flood warnings and flood preparedness and consequently suffer greater personal and economic losses.
Flood behaviour	The pattern / characteristics / nature of a flood.
Flooding	The State Emergency Service uses the following definitions in flood warnings: *Minor flooding:* causes inconvenience such as closing of minor roads and the submergence of low level bridges *Moderate flooding*: low-lying areas inundated requiring removal of stock and/or evacuation of some houses. Main traffic bridges may be covered. *Major flooding*: extensive rural areas are flooded with properties, villages and towns isolated and/or appreciable urban areas are flooded.
Flood frequency analysis	An analysis of historical flood records to determine estimates of design flood flows.
Flood fringe	Land which may be affected by flooding but is not designated as a floodway or flood storage.
Flood hazard	The potential threat to property or persons due to flooding.

Flood level	The height or elevation of flood waters relative to a datum (typically the Australian Height Datum). Also referred to as "stage".
Flood liable land	Land inundated up to the probable maximum flood – flood prone land.
Floodplain	Land adjacent to a river or creek which is inundated by floods up to the probable maximum flood that is designated as flood prone land.
Flood Planning Levels (FPL)	Are the combinations of flood levels and freeboards selected for planning purposes to account for uncertainty in the estimate of the flood level.
Flood proofing	Measures taken to improve or modify the design, construction and alteration of buildings to minimise or eliminate flood damages and threats to life and limb.
Floodplain Management	The coordinated management of activities which occur on flood liable land.
Floodplain Management Manual	A document by the NSW Government (2001) that provides a guideline for the management of flood liable land. This document describes the process of a floodplain risk management study.
Flood source	The source of the flood waters.
Floodplain Management	A set of conditions and policies which define the benchmark from standard which floodplain management options are compared and assessed.
Flood standard	The flood selected for planning and floodplain management activities. The flood may be an historical or design flood. It should be based on an understanding of the flood behaviour and the associated flood hazard. It should also take into account social, economic and ecological considerations.
Flood storages	Floodplain areas which are important for the temporary storage of flood waters during a flood.
Floodways	Those areas of the floodplain where a significant discharge of flow occurs during floods. They are often aligned with naturally defined channels or overland flow paths. Floodways are areas that, even if they are partially blocked, would cause significant redistribution of flood flows, or a significant increase in flood levels.

Freeboard	A factor of safety usually expressed as a height above the flood standard. Freeboard tends to compensate for the factors such as wave action, localised hydraulic effects, uncertainties in the hydrology, uncertainties in the flood modelling and uncertainties in the design flood levels.
Geographical Information System (GIS)	A form of computer software developed for mapping applications and data storage. Useful for generating terrain models and processing data for input into flood estimation models.
High hazard	Danger to life and limb; evacuation difficult; potential for structural damage, high social disruption and economic losses. High hazard areas are those areas subject to a combination of flood depth and flow velocity that are deemed to cause the above issues to persons or property.
Historical flood	A flood which has actually occurred – Flood of Record.
Hydraulic	The term given to the study of water flow.
Hydrograph	A graph showing how flow rate changes with time.
Hydrology	The term given to the study of the rain-runoff process in catchments.
Low hazard	Flood depths and velocities are sufficiently low that people and their possessions can be evacuated.
Map Grid of Australia (MGA)	A national coordinate system used for the mapping of features on a representation of the earth's surface. Based on the geographic coordinate system 'Geodetic Datum of Australia 1994'.
Peak flood level, flow or velocity	The maximum flood level, flow or velocity occurring during a flood event.
MUSIC	Acronym for Model for Urban Stormwater Improvement Conceptualisation. A computer model which is used to simulate rainfall runoff, associated pollutants within the runoff and expected treatment of the pollutants using different treatment measures.
Probable Maximum Flood (PMF)	An extreme flood deemed to be the maximum statistical flood likely to occur at a particular location.

Probable Maximum Precipitation (PMP)	The greatest statistical depth of rainfall for a given duration meteorologically possible over a particular location. Used to estimate the probable maximum flood.
Probability	A statistical measure of the likely frequency or occurrence of flooding.
Riparian Zone	Areas that are located adjacent to watercourses. Their definition is vague and can be characterised by landform, vegetation, legislation or their function.
Runoff	The amount of rainfall from a catchment which actually ends up as flowing water in the river of creek.
Stage	Equivalent to water level above a specific datum- see flood level.
Treatment train	A term used to describe a series of water quality measures which act in conjunction with one another to provide a combined water quality outcome.
Triangular Irregular Network (TIN)	A mass of interconnected triangles used to model three-dimensional surfaces such as the ground (see DTM) and the surface of a flood.
Velocity	The speed at which the flood waters are moving. Typically, modelled velocities in a river or creek are quoted as the depth and width averaged velocity, i.e. the average velocity across the whole river or creek section

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

BUILDING 2 & 3 SSD 17161650
HDBP STAGE 2
COWPASTURE ROAD, WETHERILL PARK NSW

DRAWING LIST:

DRAWING NO.	DRAWING TITLE
C011492.19-DA10	DRAWING LIST & GENERAL NOTES
C011492.19-DA20	EROSION & SEDIMENT CONTROL PLAN
C011492.19-DA25	EROSION & SEDIMENT CONTROL DETAILS
C011492.19-DA40	DRAWING KEY PLAN
C011492.19-DA41	CONCEPT STORMWATER PLAN - SHEET 1
C011492.19-DA42	CONCEPT STORMWATER PLAN - SHEET 2
C011492.19-DA45	CONCEPT STORMWATER DETAILS-SHEET 1
C011492.19-DA51	FINISHED LEVELS PLAN-SHEET 1
C011492.19-DA52	FINISHED LEVELS PLAN-SHEET 2
C011492.19-DA53	TYPICAL SECTIONS

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.

G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE.
ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT.
REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

EROSION CONTROL NOTES :

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED
ESCP / SWMP.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

SURVEY NOTE:

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 160136A_02 BY MONTEATH & POWYS SURVEYORS 12.10.16 COORDINATES BASED ON MGA COORDINATES AS NOMINATED ON SURVEY DRAWING.

LOCALITY PLAN
NOT TO SCALE

FOR DEVELOPMENT APPLICATION

ISSUE	DATE	AMENDMENTS
A	09.08.21	ISSUED FOR DEVELOPMENT APPLICATION

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

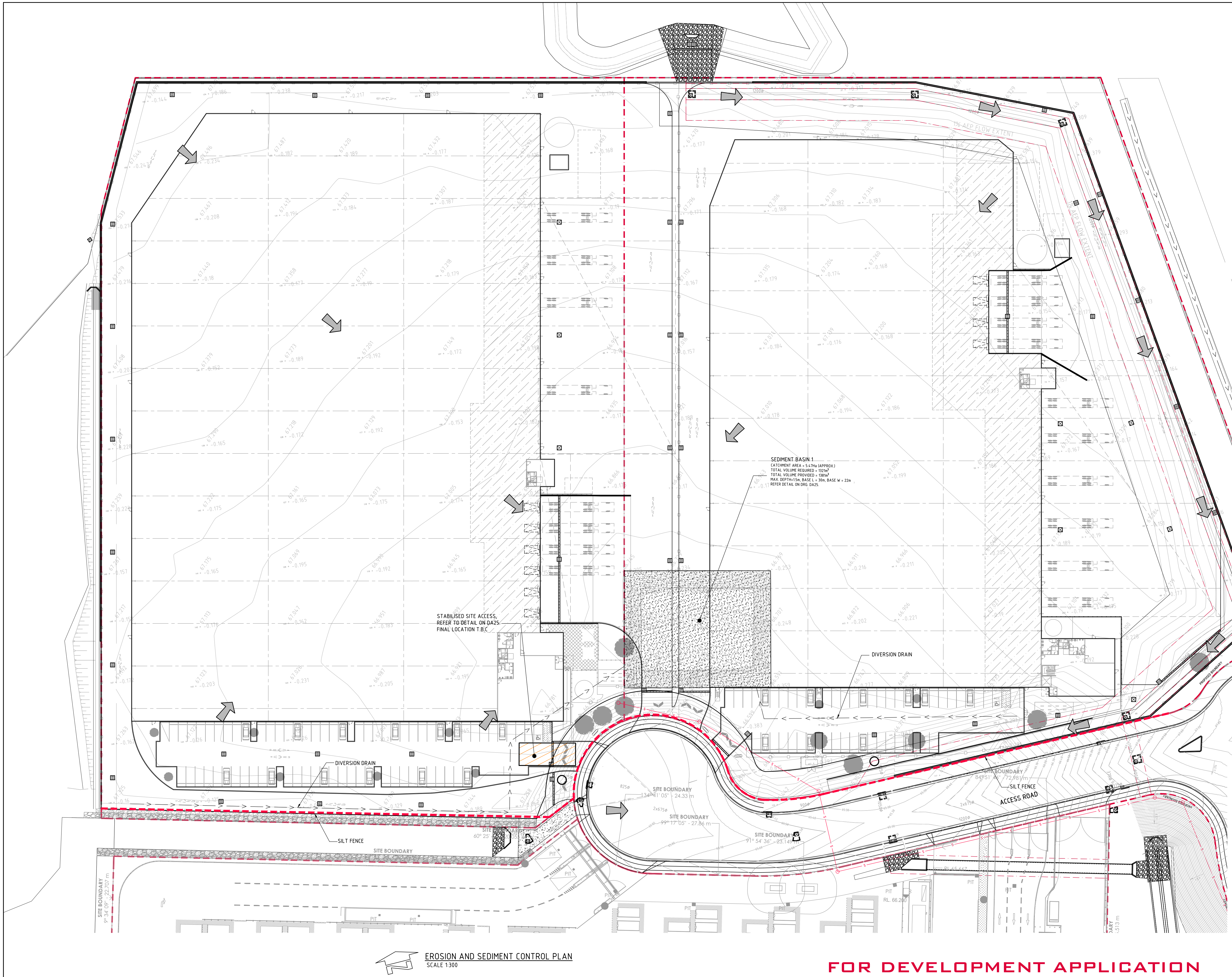
PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	C011492.19- DA10

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: DRAWING LIST & GENERAL NOTES
DRAWING No: C011492.19- DA10
ISSUE: A



EROSION AND SEDIMENT CONTROL PLAN

SCALE 1:300

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING CO11492.19-DA25.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 19.3 Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:

1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SOIL TYPE ASSESSED FROM GEOTECHNICAL REPORT PROVIDED BY JK GEOTECHNICS TITLED 33158ANRPT2 REV 1 DATED 02.06.20.

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS. TYPICAL (N.S.O.P.)

- DENOTES DIRECTION OF OVERLAND FLOW
- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- DENOTES DIVERSION DRAIN
- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- FINISHED PAVEMENT CONTOUR (MAJOR) 1.00m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.25m INTERVALS

3m 0 5 10 15 20 25 30m

SCALE 1:300 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

ISSUE	AMENDMENTS	DATE
A	ISSUED FOR DEVELOPMENT APPLICATION	09.08.21

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA20

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

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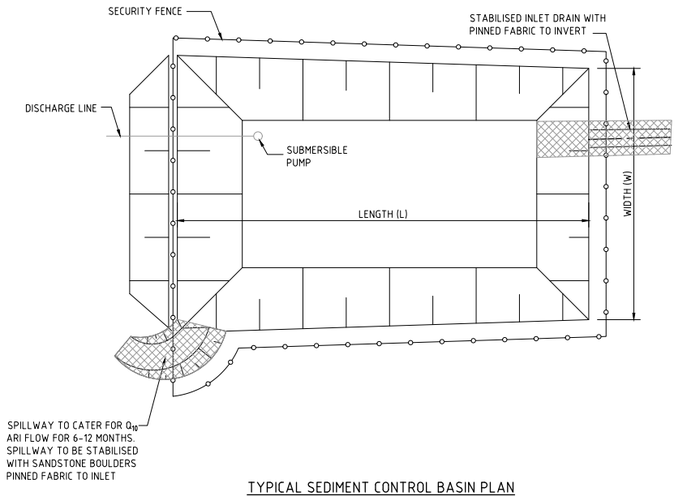
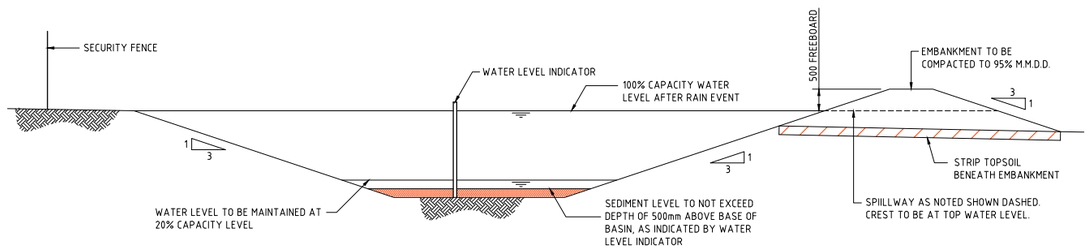
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

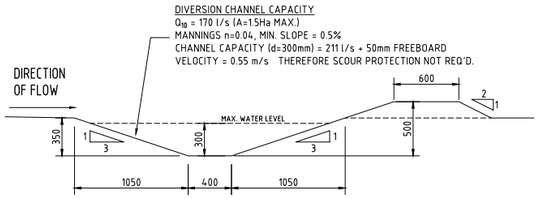
DRAWING No: Co11492.19-DA20 ISSUE: A



TYPICAL SEDIMENT CONTROL BASIN PLAN
SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION
SCALE 1:50

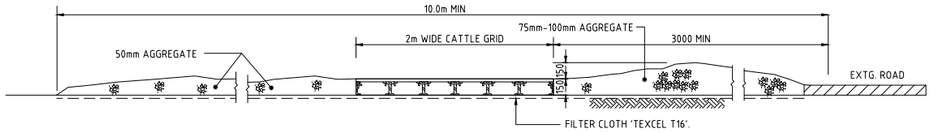


DIVERSION DRAIN TYPE 1 SECTION -2500 WIDE
SCALE 1:20

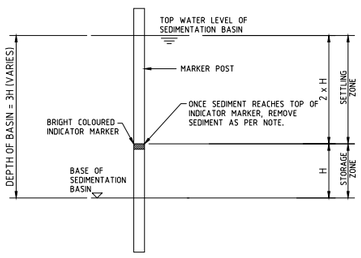
TEMPORARILY PROTECT THE SWALE FROM EROSION DURING CONSTRUCTION.

TEMPORARY DIVERSION DRAINS & EARTHEN CLEAN WATER DIVERSION DRAINS SHALL BE STABILISED BY:

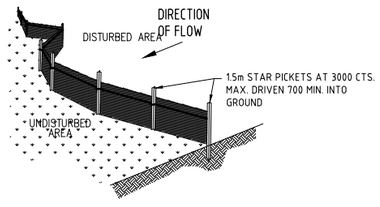
a. TURF REINFORCEMENT; OR
b. GEOFABRIC LINER; OR
c. POLYMER HYDRAULIC SOIL STABILISER. DOSAGE TO BE TO MANUFACTURER'S SPECIFICATION FOR FLOW RATES NOMINATED. DOSAGE SHALL BE SUCH THAT C=0.05.



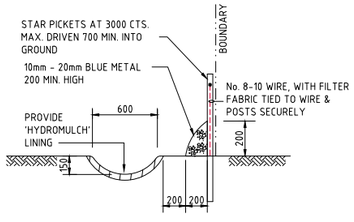
SECTION 1:20 (1 / -) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'



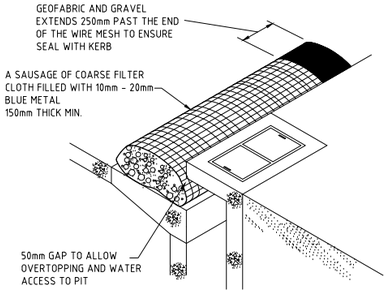
SEDIMENT STORAGE MARKER
SCALE 1:20



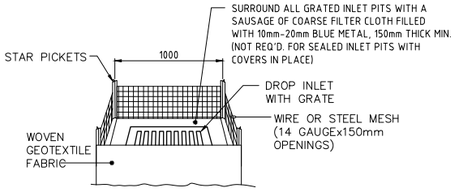
TYPICAL SILT FENCE DETAIL
N.T.S.
PROVIDE 1m RETURNS AT 30m INTERVALS.
TYPICAL



TYPICAL OPEN DRAIN & SILT FENCE
SCALE 1:20

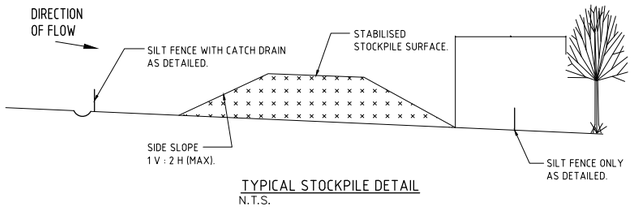


KERB INLET PIT CONTROL
N.T.S



GRATED INLET PIT FILTER DETAIL
N.T.S

NOTE:- ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



TYPICAL STOCKPILE DETAIL
N.T.S.

STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, SUITABLY STABILISE OR COVER THE STOCKPILES.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.

NOTES:

ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

200mm 0 500 1000 1500 2000mm
1:20 AT A0 SIZE PLOT
500mm 0 1 2 3 4 5m
1:50 AT A0 SIZE PLOT
2m 0 5 10 15 20 25m
1:250 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	09.08.21	A
AMENDMENTS	DATE	ISSUE

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA25

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au

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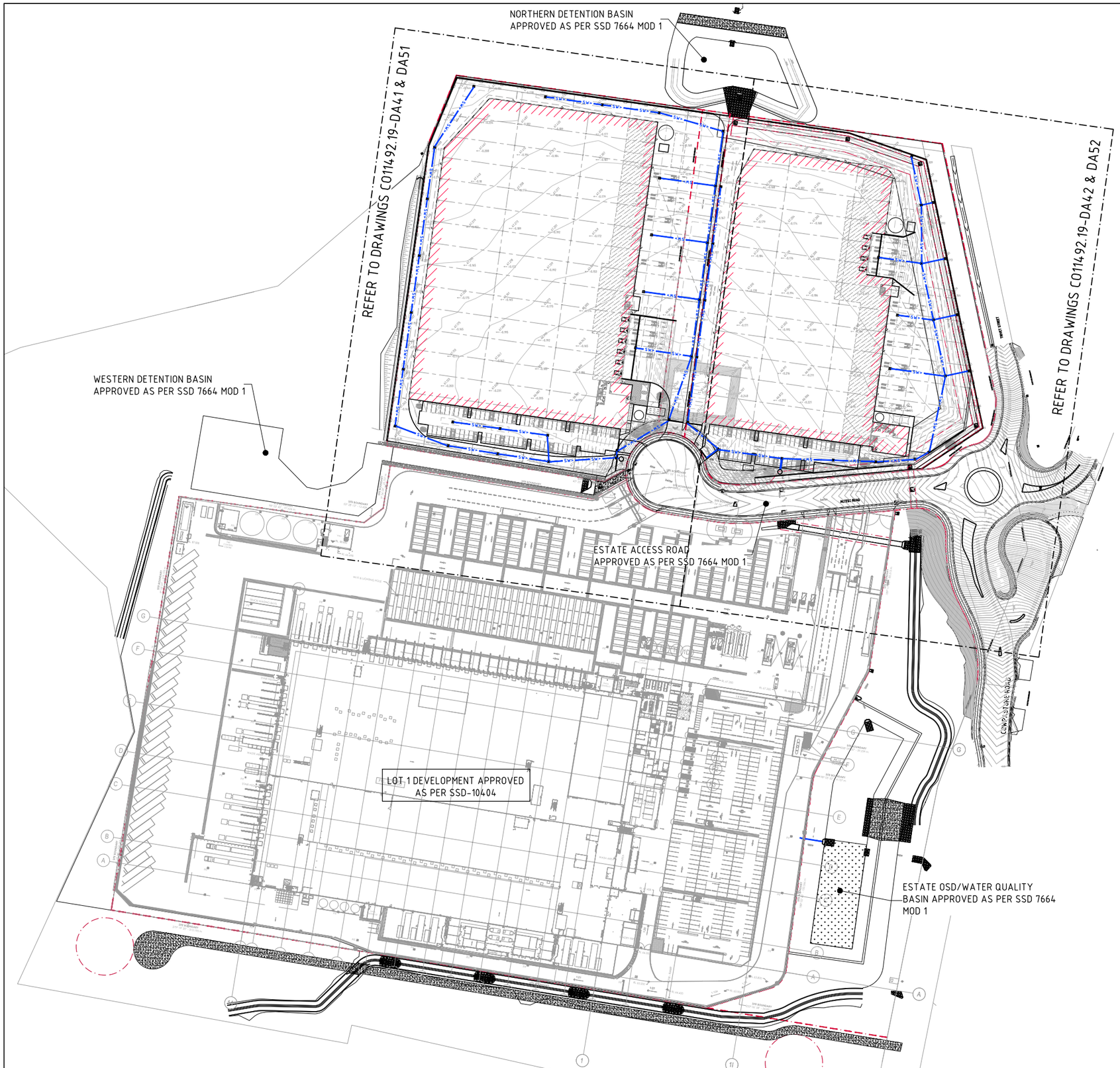
DRAWING TITLE: EROSION & SEDIMENT CONTROL DETAILS

DRAWING No: Co11492.19- DA25 | ISSUE: A



DRAWING KEY PLAN
SCALE 1:750

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS .
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 32 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
13. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
14. ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
15. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
16. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
17. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
18. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
19. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

FINISHED LEVELS PLAN NOTES :

1. LEVELS DATUM IS A.H.D.
2. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
3. THE MAJOR CONTOUR INTERVAL IS 0.5m
4. THE MINOR CONTOUR INTERVAL IS 0.1m.
5. MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
6. MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
7. MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN
8. PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEDE 1:20 (5%).
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
10. ALL BATTER SLOPES WITH GRADES AT OR EXCEDING 1V:6H ARE TO BE TURFED IMMEDIATELY, OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.

FOR DEVELOPMENT APPLICATION

6m 0 15 30 45 60 75m
SCALE 1:750 AT A0 SIZE PLOT

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.08.21	B
FOR INFORMATION	04.06.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	C01492.19-DA40

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au

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DRAWING TITLE: DRAWING KEY PLAN

DRAWING No: C01492.19- DA40 ISSUE: B

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY AWJ CIVIL DATED 19.05.21.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- DRAINAGE LINE
- ESTATE DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- SUBSOIL LINE
- OVERLAND FLOW PATH
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

SITE BOUNDARY
° 34' 09" 22.707 m

SITE BOUNDARY

PROPOSED BUILDING
FFL 67.65
+/-500mm

ABOVE GROUND RAINWATER TANK. SIZE T.B.C

GROSS POLLUTANT TRAP OCEAN PROTECT OCEANSAVE 1515 UNIT OR APPROVED EQUIVALENT BY THE ENGINEER

EXISTING KERB INLET PIT TO BE CONVERTED TO GRATED PIT IN DRIVE CROSSING. PROVIDE DISHED GRATE TO MATCH DRIVEWAY PROFILE

DISCHARGE TO 825ø STUB. I.L 63.65

EXISTING BOUNDARY

PROPOSED BOUNDARY

SITE BOUNDARY

BREAKLINE - REFER TO DRAWING DA42 FOR CONTINUATION

CONCEPT STORMWATER PLAN - SHEET 1
SCALE 1:250

FOR DEVELOPMENT APPLICATION

2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE PLOT

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.08.21	C
REVISED OFFICE LAYOUT	10.06.21	B
FOR INFORMATION	04.06.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 8251-7699 Fax: (02) 8041-3731
email: mail@costinroe.com.au

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DRAWING TITLE: CONCEPT STORMWATER PLAN SHEET 1

DRAWING No: Co11492.19- DA41 ISSUE: C

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY AWJ CIVIL DATED 19.05.21.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- DRAINAGE LINE
- ESTATE DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- SUBSOIL LINE
- OVERLAND FLOW PATH
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

BREAKLINE - REFER TO DRAWING DA41 FOR CONTINUATION

PROPOSED BUILDING
FFL 67.65
+/-500mm

EXISTING BASIN OVERFLOW TO BE MAINTAINED AND FLOW PATH TO REMAIN AS PER ESTATE DESIGN

GROSS POLLUTANT TRAP
OCEAN PROTECT OCEANSAVE
1515 UNIT OR APPROVED
EQUIVALENT BY THE ENGINEER

DISCHARGE TO 825Ø
STUB I.L 62.75

ABOVE GROUND RAINWATER
TANK. SIZE T.B.C

EXISTING OVERLAND FLOW
PATH TO BE MAINTAINED AS
PER ESTATE DESIGN

EXISTING OVERLAND FLOW
PATH TO BE MAINTAINED AS
PER ESTATE DESIGN

ACCESS ROAD

SITE BOUNDARY

PROPOSED BOUNDARY

EXISTING BOUNDARY

TRIVET STREET

CONCEPT STORMWATER PLAN - SHEET 2
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	09.08.21	B
FOR INFORMATION	04.06.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 6 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9254-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au

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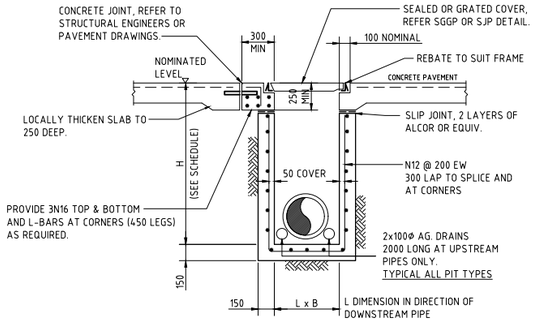
DRAWING TITLE: CONCEPT STORMWATER PLAN SHEET 2

DRAWING No: Co11492.19- DA42

ISSUE: B

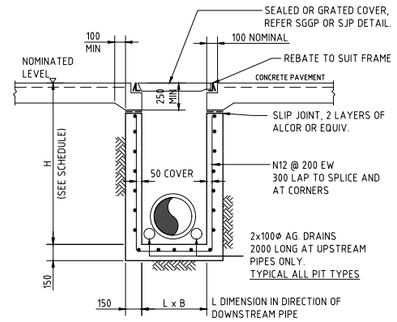


SECTION

SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)

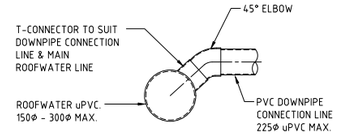


SECTION

SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)

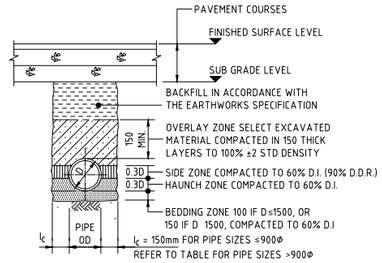


DOWN PIPE CONNECTION TO uPVC PIPE

1. PROPRIETARY T-PIECE CONNECTORS SHALL BE USED TO WHERE DIRECT CONNECTIONS ARE REQUIRED TO uPVC PIPES .
2. ALL JOINTS TO BE SEALED WITH SOLVENT WELDED JOINTS.
3. THE PVC PIPE SHALL NOT PROTUDE BEYOND THE INNER SURFACE OF THE STORMWATER PIPE.

DOWNPIPE CONNECTION DETAILS

SCALE 1:20



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

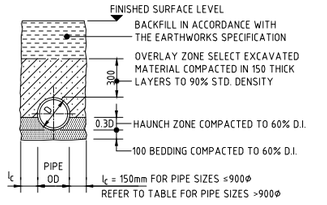
SCALE 1:20

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900Φ	150
1050Φ	175
1200Φ	200
1350Φ	225
1500Φ	250
1650Φ	275
1800Φ	300

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 50
0.60	50 TO 15
0.075	25 TO 0

SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

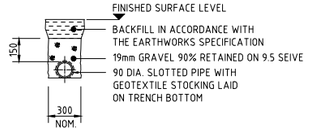


TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

SCALE 1:20

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900Φ	150
1050Φ	175
1200Φ	200
1350Φ	225
1500Φ	250
1650Φ	275
1800Φ	300



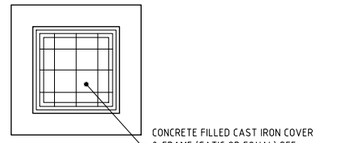
SUPPORT TO AGRICULTURAL DRAIN

SCALE 1:20

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

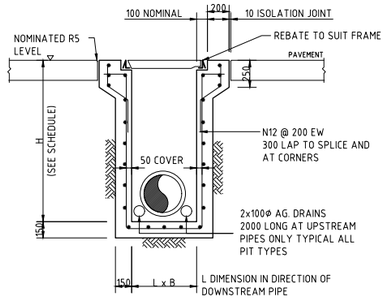
PIPE LAYING DETAILS

1:20



PLAN

1:20



SECTION

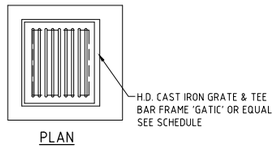
SCALE 1:20

SEALED PIT - SP

CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX SIZE)	CEMENT TYPE	ADMIXTURE	f'c (MPa)
PIT	80	20	GP	NIL	32

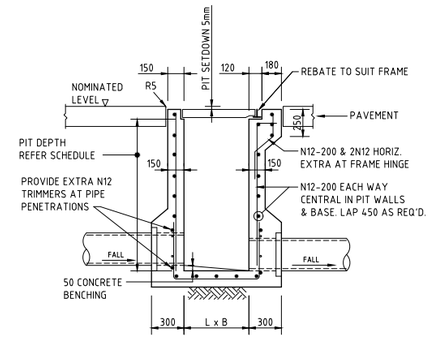
PIT NOTES:

1. WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
2. SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
3. ALL REINFORCING TO HAVE 50 MIN. CLEAR CONCRETE COVER.
4. FOR PITS DEEPER THAN 1000mm CLIMB RAILS SHALL BE PROVIDED.
5. ALL CONCRETE PITS GREATER THEN 3m DEEP SHALL HAVE WALL AND BASE THICKNESS INCREASED TO 200mm



PLAN

SCALE 1:20



SEE SCHEDULE

L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

SECTION

SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

ISSUED FOR DEVELOPMENT APPLICATION	09.08.21	A
AMENDMENTS	DATE	ISSUE

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA45

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-5721
email: mail@costinroe.com.au

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: CONCEPT STROMWATER DETAILS

DRAWING No: Co11492.19- DA45 | ISSUE: A

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY AWJ CIVIL DATED 19.05.21.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- •50.10 – FINISHED PAVEMENT SPOT HEIGHT

SITE BOUNDARY

° 34' 09" - 22.707 m

EXISTING BOULDER WALL IN FILL. MAX HEIGHT 2.4m.

EXISTING RETAINING WALL IN CUT. MAX HEIGHT 7.4m.

PROPOSED BUILDING
FFL 67.65
+/-500mm

PRE-CAST PANELS TO RETAIN 1.2m MAX

ABOVE GROUND RAINWATER TANK. SIZE T.B.C

RECESSED DOCK 1300 DEEP

PROVIDE NEW INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL REQUIREMENTS. ALIGN AND MATCH LEVELS TO COUNCIL BASIN ACCESS DRIVE CROSSING

PROVIDE NEW INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL REQUIREMENTS.

EXISTING BOUNDARY

PROPOSED BOUNDARY

SITE BOUNDARY

PIT

BREAKLINE - REFER TO DRAWING DA52 FOR CONTINUATION

FINISHED LEVELS PLAN - SHEET 1
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
FOR DEVELOPMENT APPLICATION	09.08.21	B
FOR INFORMATION	04.06.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA51

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9254-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au ©

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DRAWING TITLE: FINISHED LEVELS PLAN SHEET 1

DRAWING No: Co11492.19- DA51 | ISSUE: B

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY AWJ CIVIL DATED 19.05.21.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- •50.10 – FINISHED PAVEMENT SPOT HEIGHT

BREAKLINE - REFER TO DRAWING DA41 FOR CONTINUATION

PROVIDE NEW INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL REQUIREMENTS.

PRE-CAST PANELS TO RETAIN 1.2m MAX

START RETAINING WALL

RETAINING WALL IN FILL MAX HEIGHT 2.0m

END RETAINING WALL

PROPOSED BUILDING FFL 67.65 +/-500mm

ABOVE GROUND RAINWATER TANK. SIZE T.B.C

RECESSED DOCK 1300 DEEP

EXISTING BASIN OVERFLOW TO BE MAINTAINED AND FLOW PATH TO REMAIN AS PER ESTATE DESIGN

EXISTING RETAINING WALL IN CUT. MAX HEIGHT 6.4m. SITE BELOW TRIVET STREET

EXISTING 10m LANDSCAPE SETBACK TO REMAIN

EXISTING OVERLAND FLOW PATH TO BE MAINTAINED AS PER ESTATE DESIGN

ACCESS ROAD

TRIVET STREET

SITE BOUNDARY

PROPOSED BOUNDARY

EXISTING BOUNDARY

FINISHED LEVELS PLAN - SHEET 2
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE PLOT

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
FOR DEVELOPMENT APPLICATION	09.08.21	B
FOR INFORMATION	04.06.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA52

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au

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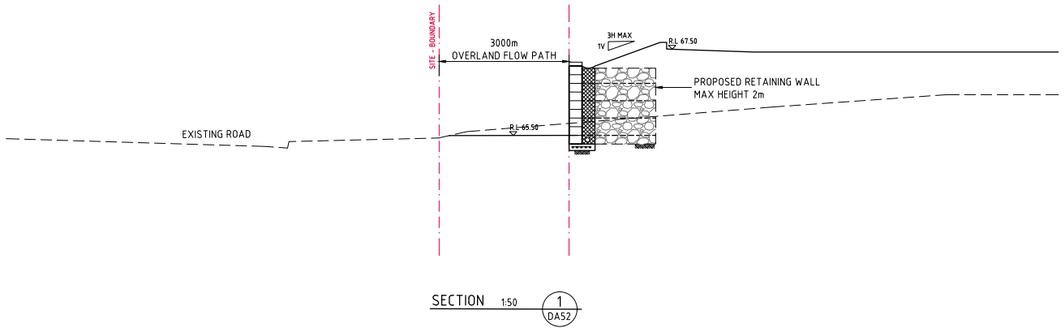
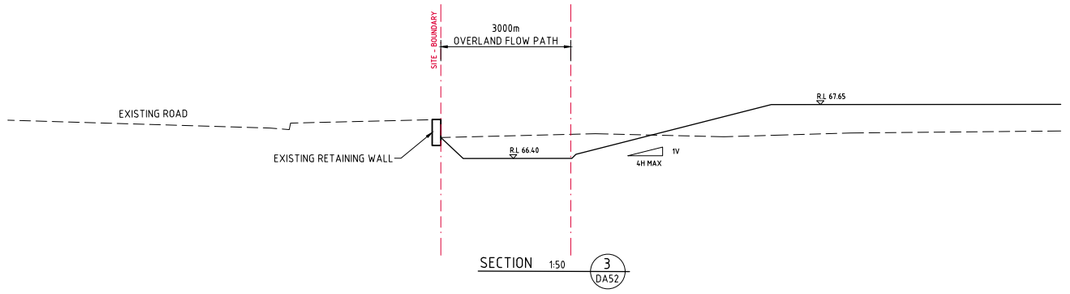
DRAWING TITLE: FINISHED LEVELS PLAN SHEET 2

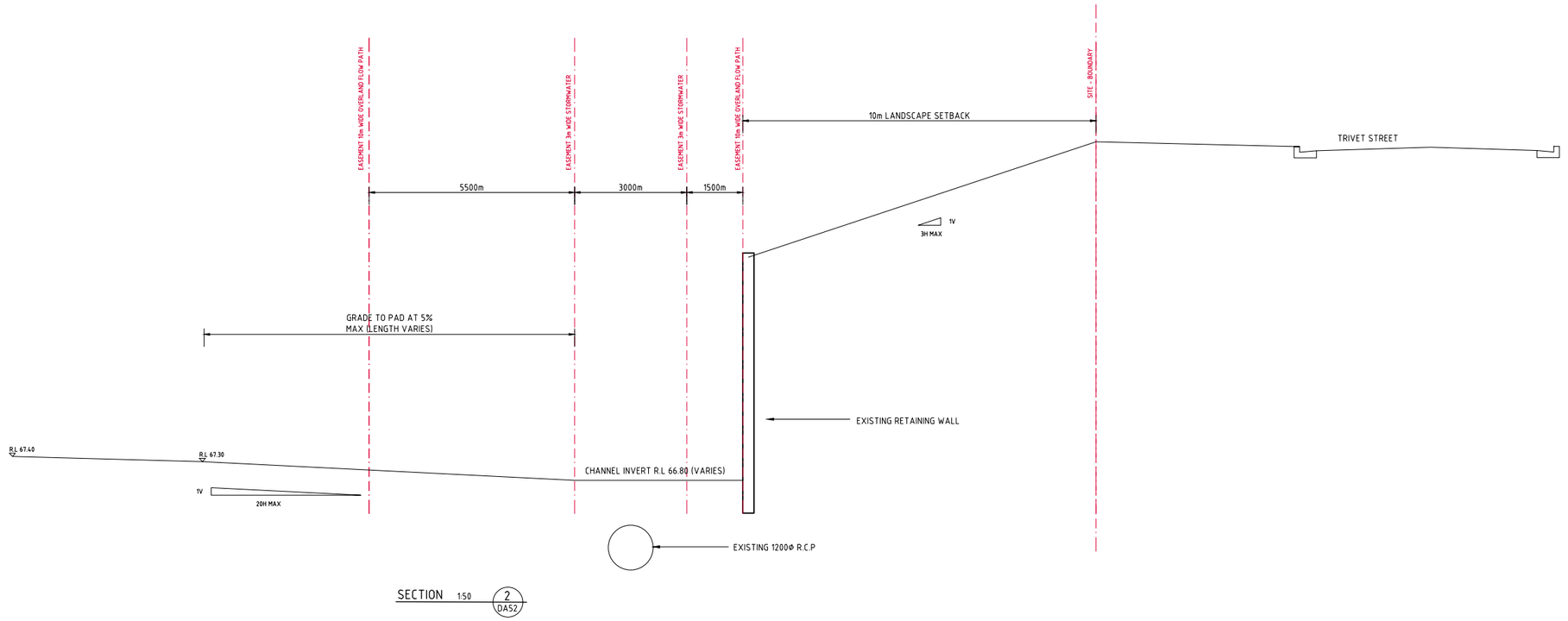
DRAWING No: Co11492.19- DA52 ISSUE: B



SECTION 1:50 1 DA52



SECTION 1:50 3 DA52



SECTION 1:50 2 DA52

FOR DEVELOPMENT APPLICATION

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE PLOT

AMENDMENTS	DATE	ISSUE
FOR DEVELOPMENT APPLICATION	09.08.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: HORSLEY DRIVE BUSINESS PARK
LOT 2&3 DEVELOPMENT
COWPASTURE ROAD, WETHERILL PARK, NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
M.C	M.C	JUN 21	M.W	A0	AS SHOWN	Co11492.19-DA53

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 8251-7699 Fax: (02) 8041-3721
email: mail@costinroe.com.au

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DRAWING TITLE: TYPICAL SECTIONS

DRAWING No: Co11492.19-DA53 ISSUE: A

Appendix B

DRAFT STORMWATER MAINTENANCE PLAN

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
RAINWATER TANKS			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
GROSS POLLUTANT TRAP			
Refer to manufacturer's guidelines	Annually/ after major storm.	Maintenance Contractor	Refer to manufacturer's guidelines
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.

Appendix C

DRAFT EROSION AND SEDIMENT CONTROL PLAN & EROSION CONTROL CHECK SHEET

C.1 Introduction

An erosion and sediment control plan (ESCP) is shown on drawing **Co11429.19-DA20** with details on **DA25**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

C.2 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in *Managing Urban Stormwater, Soils and Construction (1998) "The Blue Book"* and Penrith City Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

C.3 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in Table C.1.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table C.1 Limitations to access

C.4 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

C.5 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.
2. Sediment fences will:
   a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
   b) Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and
   c) Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year t_c discharge.
3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

C.6 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

C.7 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:
   - At least weekly.
   - Immediately before site closure.
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

The self-audit will include:

- Recording the condition of every sediment control device
- Recording maintenance requirements (if any) for each sediment control device

- Recording the volumes of sediment removed from sediment retention systems, where applicable
- Recording the site where sediment is disposed
- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:
   - The plan is being implemented correctly
   - Repairs are undertaken as required
   - Essential modifications are made to the plan if and when necessary

   The report shall carry a certificate that works have been carried out in accordance with the plan.
3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,
   - No low points exist that can overtop in a large storm event
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them
   b) Degradable products to ensure they are replaced as required, and
   c) Sediment removal, to ensure the design capacity or less remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

EROSION AND SEDIMENT CONTROL

WEEKLY SITE INSPECTION SHEET

LOCATION . . . . . .

INSPECTION OFFICER . . . . . **DATE** . . . . . .

SIGNATURE . . . . . .

Legend: □ OK □ Not OK N/A Not applicable

Item	Consideration	Assessment
1	Public roadways clear of sediment.	. . . . .
2	Entry/exit pads clear of excessive sediment deposition.	. . . . .
3	Entry/exit pads have adequate void spacing to trap sediment.	. . . . .
4	The construction site is clear of litter and unconfined rubbish.	. . . . .
5	Adequate stockpiles of emergency ESC materials exist on site.	. . . . .
6	Site dust is being adequately controlled.	. . . . .
7	Appropriate drainage and sediment controls have been installed prior to new areas being cleared or disturbed.	. . . . .
8	Up-slope "clean" water is being appropriately diverted around/through the site.	. . . . .
9	Drainage lines are free of soil scour and sediment deposition.	. . . . .
10	No areas of exposed soil are in need of erosion control.	. . . . .
11	Earth batters are free of "rill" erosion.	. . . . .
12	Erosion control mulch is not being displaced by wind or water.	. . . . .
13	Long-term soil stockpiles are protected from wind, rain and stormwater flow with appropriate drainage and erosion controls.	. . . . .
14	Sediment fences are free from damage.	. . . . .
15	Sediment-laden stormwater is not simply flowing "around" the sediment fences or other sediment traps.	. . . . .
16	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	. . . . .
17	All sediment traps are free of excessive sediment deposition.	. . . . .
18	The settled sediment layer within a sediment basin is clearly visible through the supernatant prior to discharge such water.	. . . . .
19	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
20	All soil surfaces are being appropriately prepared (i.e. pH, nutrients, roughness and density) prior to revegetation.	. . . . .
21	Stabilised surfaces have a minimum 70% soil coverage.	. . . . .
22	The site is adequately prepared for imminent storms.	. . . . .
23	All ESC measures are in proper working order.	. . . . .