'ONE RACEWAY'
SITE & FACILITY UPGRADE DEVELOPMENT

LOT 1 DP823905

4770 BRAIDWOOD ROAD

TIRRANNAVILLE. NSW. 2580

<u>WATER CYCLE MANAGEMENT STUDY</u>

Prepared by SOWDES
28 August 2024

A: PO BOX 619 GOULBURN. NSW. 2580 | M: 0428 863 401 | E: sowdes@sowdes.com

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Water Cycle Management Study

Introduction.

SOWDES has been commissioned by the operators of the 'One Raceway' motorsport facility located at 4770 Braidwood Road, Tirrannaville to assess the 'neutral or beneficial effect' of existing and proposed site and facility upgrades on water quality as required by *State Environmental Planning Policy (Biodiversity and Conservation)* 2011 – Part 6.5 - *Sydney Drinking Water Catchment*.

Part 6.61 of the SEPP states that *'a consent authority must not grant consent under Part 4 of the EPA Act unless it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality'*.

Part 6.64 within the SEPP states:

1. *Development consent must not be granted to development on land in the Sydney Drinking Water Catchment unless the consent authority has obtained the concurrence of the Regulatory Authority.*
2. *For the Act, section 3.18(3), the Regulatory Authority must consider the following matters in deciding whether to grant concurrence—*
   (a) the NorBE Guideline,
   (b) whether the development will have a neutral or beneficial effect on water quality.

The development is classified as a 'Tourist / recreation / religion / education establishment or facility' within the WaterNSW *Development Classes and Module Groupings* system which is a Module Group 5 development. The WaterNSW publication titled "*Developments in the Drinking Water Catchment - Water Quality Information Requirements"* classifies Module Group 5 developments as highly complex or non-standard development that are the highest risk to water quality.

Information required by WaterNSW to assess the development proposal should be presented as a *Water Cycle Management Study* (WCMS) and include the following as a minimum:

- a clear outline of the development proposal, including a detailed site plan that identifies all site constraints.
- a copy of the Statement of Environmental Effects (SOEE) (if applicable)
- a summary and location of water quality control measures

Specific information requirements in the WCMS should include:

- stormwater quality modelling – using the software program "MUSIC" by eWater if the impervious area is greater than 2500m²
- a conceptual soil and water management plan
- development specific pollutant assessment requirements.
- An assessment of the proposed development against WaterNSW listed Current Recommended Practice guidelines as appropriate and applicable to the development.

Current Recommended Practices (CRP) identified by WaterNSW relevant to this development are:

- Using MUSIC in Sydney's Drinking Water Catchment (2019),
- Managing Urban Stormwater: Soils and Construction, Volume 1 - 4th Edition (2004),

It is noted that there are no specific Current Recommended Practises from WaterNSW related to motorsport facilities.

In addition to addressing the information requirements of the *State Environmental Planning Policy (Biodiversity and Conservation)* 2011 – Part 6.5 - *Sydney Drinking Water Catchment* this report and its recommendations have been compiled with reference to, and consideration of the Goulburn Mulwaree Council Development Control Plan (2009 - as amended).

Where practical and appropriate, the recommendations, constraints and conditions from the above listed reports and documents have taken precedence in the modelling and design process such that any water quality issues, environmental concerns and matters pertaining to industry best practice guidelines have been addressed.

The proponents have been involved throughout the modelling, design and recommendation process by contributing to the information source and providing general commentary on the overall system outcomes.

Subject to some minor amendments to the existing site drainage system it is considered that the existing and proposed site and facility upgrades will be able to satisfy the requirements of the Neutral or Beneficial Effect on water quality as required under the '*State Environmental Planning Policy (Biodiversity and Conservation) 2021 – Part 6.5, Sydney Drinking Water Catchment'.*

Paul Johnson

Paul Johnson (JP)
Bachelor Science Agriculture/Irrigation (CSU)
Graduate Diploma Bush Fire Protection (UWS)
FPAA Member – Level 3 BPAD-27823
Graduate Certificate Engineering – Water (UTS)
Professional Engineer (Civil) – Engineers Australia (MIEAust - NER)
Registered Design Practitioner (Drainage) NSW Fair Trading – DEP0002293
Registered Consulting Arborist (Arboriculture Australia)
Qualified Tree Risk Assessor (International Society of Arboriculture)
28 August 2024

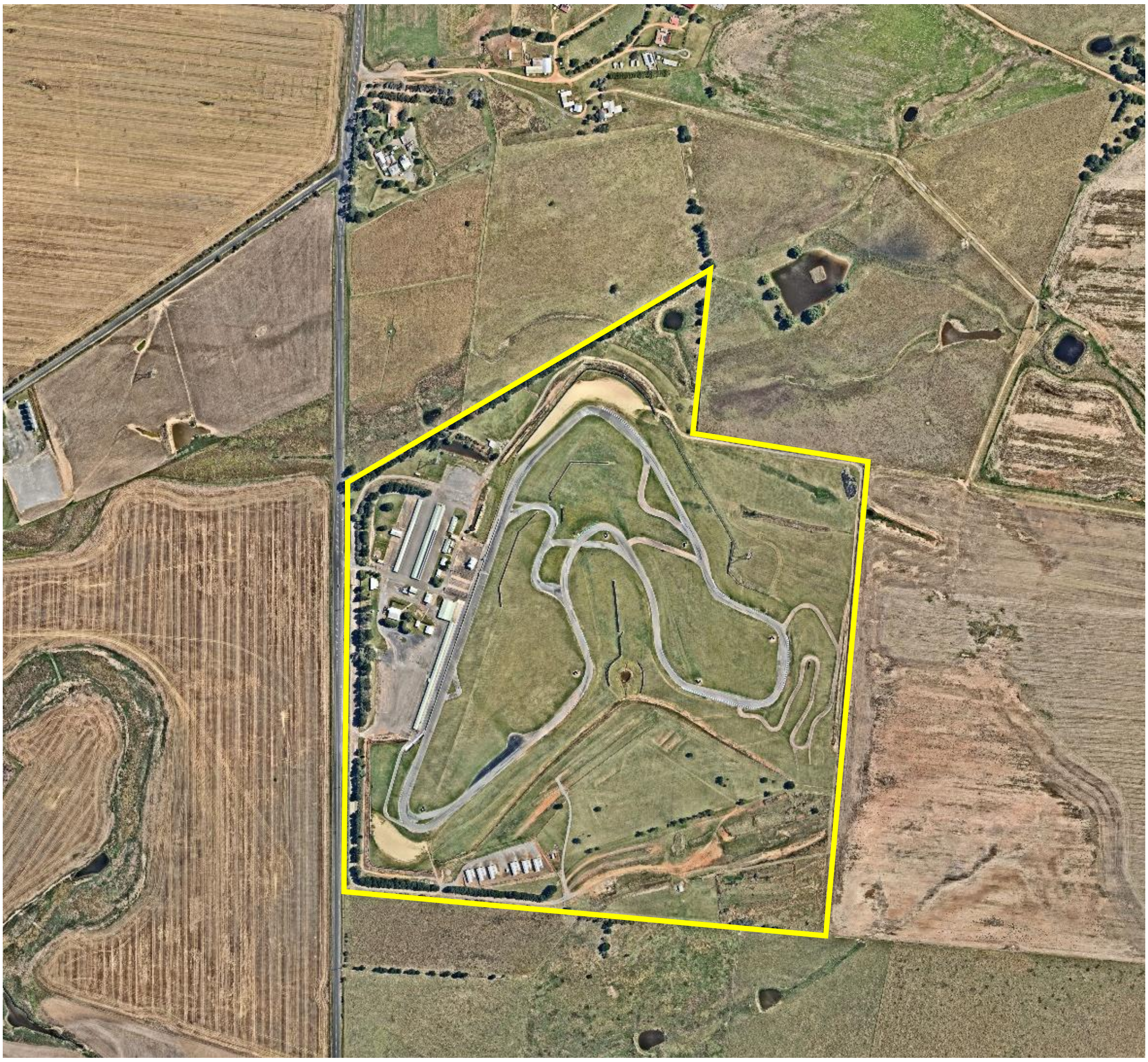


Figure 1.1 – Aerial image of the development site (March 2023) showing the property boundary in yellow and the surrounding agricultural lands on all aspects. The site is bordered by the Braidwood Road traffic corridor along the western boundary.

1. DEVELOPMENT DETAILS		
#	***DESCRIPTION***	***DETAIL***
1.1	Property details	The proposed development involves a single portion of land identified as Lot 1 DP832905
1.2	Address	4770 Braidwood Road, Tirrannaville. 2580
1.3	Land zoning	RU1 – 'Primary Production' - Goulburn Mulwaree Council Local Environmental Plan (2009), Land Zone Map 001
1.4	Development	The development site - formerly known as Wakefield Park Raceway (1994 – 2022) is a privately owned motorsport facility that provides both race car, production car, and motorcycle racing events for the general public to attend, as well as driver training sessions and vehicle testing opportunities.
1.5		Racing activities ceased on the site in August 2022 when the Benalla Auto Club as operators of Wakefield Park determined that recent Court imposed operational restrictions and constraints rendered the venture financially unviable, and subsequently sold the site to the present owners in May 2023.
1.6		The site which is bordered by the Braidwood Road traffic corridor along the western boundary and agricultural lands to the north, east, and south is an irregular shaped parcel of land that comprises approximately 52.60 hectares.
1.7		Within the development site at the end of the Wakefield Park tenure is the main racetrack with smaller hill climb track, an established race control and participant pit precinct, 6 short-stay accommodation cabins, a managers cottage, spectator parking areas, and minor drainage works.
1.8		The development submission is for the approval of certain earthworks and stormwater drainage measures undertaken on the site to manage and improve surface water runoff that in turn provides a safer operating environment for the owners of the facility and the racing participants.
1.9		Separate earthworks have been undertaken within two locations on the site to create earthen barriers to attenuate noise generated from motorsport activities, and these invariably also have an impact on surface water drainage and water quality considerations.
1.10		Certain elements of the site works being assessed within the Water Cycle Management Study are deemed by the operators as complying with existing development consent conditions, however other aspects of the site works would be outside these approvals.
1.11		The Water Cycle Management Study does not differentiate between approved or unapproved works and therefore assesses the entire site in a wholistic manner.

2. EXISTING SITE CONDITIONS (AS AT MAY 2023)

#	DESCRIPTION	DETAIL
2.1	Access	The development site is accessed from the Braidwood Road traffic corridor with a single access located approximately 100 metres from the northwestern corner of the holding.
2.2		Once off Braidwood Road there is a tee-intersection that junctions off to both the north and south, or vehicles can drive straight ahead and into the main race control precinct.
2.3		The northern leg of the tee-intersection provides an alternate access route to the race control precinct and associated car park area, whilst the southern leg of the tee-intersection directs traffic to the short-stay accommodation cabins located at the southern end of the site, or further to the east along the southern boundary where there is a large car park area for spectator viewing.
2.4	Slope / topography	The development site has a general fall from the southeast toward the north-northwest at variable grades with the exception of a small triangular portion of land comprising 2.18 hectares in the extreme southeast corner that sits on the southern side of a shallow ridge which falls toward the south.
2.5		The main body of the site that falls toward the north-northwest is essentially divided into two distinct surface grade regimes; the southeastern third of the site between the short stay accommodation cabins and the northeast corner has an average grade of 5° to 10°, whilst most of the track infield area below a small central dam and land around the race control precinct has a general grade of less than 5°.
2.6		Within the race control precinct, the terrain is modified with a bitumen sealed finish that has a general fall from the south toward the north at grades of less than 3°.
2.7		Two earthen banks located on the northwestern and southwestern ends of the racetrack (known as ‘Turn 1’ and ‘Turn 10’ respectively) are formed as wide berms that vary between 500mm and 1.0 metre above the height of the natural surface level within the adjoining track infield area.
2.8		The two earthen banks which are lined on the inside with old tyres act as barriers to overland flows and following large rain events causes race events to be delayed or cancelled due to the ponding of water over the track and the safety runoff areas.
2.9		The western perimeter of the site between the southwest corner and the entrance is formed with an earth bank that is designed to prevent some of the surface water runoff directly leaving the site and potentially impacting traffic along Braidwood Road although there are a few gaps in the bank.

2.10		Within and around the main racetrack are several safety barriers that are formed from old car tyres that on average are stacked 5 to 6 high on top of each other and end-on-end to form continuous walls.
2.11		Two of the safety barriers; one adjacent to the northeast straight below the hill climb track, and the other in an 'L' shape around the southeastern portion of the track are also used as pseudo retaining walls to force a break in the natural slope of the terrain with the surface level on the outer side of the walls stepped-up by a height equal to the top row of tyres.
2.12		Within the southeast corner of the site immediately below the ridge that divides the terrain is an old gravel 'borrow' pit that has been re-purposed to also form part of the main car park area for spectators.
2.13		The car park site is elevated well above the racetrack which provides good viewing for race events, and between the car park area and the racetrack is an old gravel straight approximately 250 metres in length that was used as a 'tractor-pull' run.
2.14	Vegetation	The vegetation formations throughout the site are dominated by open expanses of grasslands, particularly within the inner track area and surrounding outer perimeter which forms part of the safety runoff areas.
2.15		The open grasslands around the racetrack which are regularly mowed or slashed allows for spectator viewing of the entire track from several dedicated vantage points.
2.16		The entire length of the northern boundary is lined with a relatively continuous row of radiata pine trees, whilst the western aspect of the race control precinct through to the southeastern aspect of the short-stay accommodation cabins are also bordered with a row of radiata pine trees – however there are gaps between some of the trees for egress purposes or where trees have died and been removed over time.
2.17		The rows of trees are intended to provide a break from the prevailing westerly and southerly winds, and to provide a visual screening between the racetrack activities and the passing traffic along Braidwood Road, and possibly to also provide a small degree of noise attenuation.
2.18		The earthen bank that is formed along the western boundary is set to a mix of 3 to 4 metres tall woody shrub species that also create a visual barrier for the passing traffic along Braidwood Road.
2.19		Within the race control precinct there are numerous garages, office facilities, and officials buildings that are surrounded by a mix of grass areas and garden beds for general amenity.

2.20	Stormwater and surface water drainage	Software modelling for overland flows in the 1% AEP rain event using 2013 LiDAR terrain data highlights that the development site is burdened by overland flows that are generated within adjoining properties to the northeast, east, and southeast with the upstream catchment area that drains through the site comprising approximately 194 hectares of cropped and grazed agricultural lands.
2.21		The site is mapped with three drainage lines flowing in an east to west alignment that are restricted to the northeast and northern corners which receive the bulk of the overland flows; however, these mapped drainage lines don't accurately reflect the actual flow of surface water within and through the site.
2.22		In the far northern corner of the property is a moderate sized dam that sits to the north and slightly away from the junction of the three mapped drainage lines, however the dam receives partial inflows from the convergence of these drainage lines through a narrow channel in addition to overflows from a dam in the neighbouring property to the east.
2.23		The continued flow of water through the northern portion of the site and the overflow from the northern dam sweeps around the rear of the shallow mound on the northwestern portion of the track ('Turn 1') and then exits the property along the northern boundary where it turns to the southwest along a defined drainage depression and eventually crosses the Braidwood Road traffic corridor via a 3 metre wide and 900mm high concrete box culvert that is located approximately 45 metres from the northwest corner of the development property.
2.24		The overland flow model for the 1% AEP rain event also highlights the general flow of surface water throughout the remainder of the development site and it is particularly noted that the two earthen mounds on the northwest and southwest corners of the track ('Turn 1' and 'Turn 10') significantly restrict the flow of water from the infield area with ponding extending back across the safety runoff areas and parts of the track.
2.25		It is further noted within the modelling that overland flows through the central portion of the track whilst not necessarily deep are relatively broad and have a general flow in a southeast to northwest pattern that continues across the race control precinct and eventually discharges across the Braidwood Road traffic corridor in several locations in an uncontrolled manner.
2.26		Surface water runoff from within the development site is largely directed across and through the site via the natural shape and slope of the terrain.

2.27		Within the northeast portion of the holding around the base of a support tower associated with high-voltage power lines that run across the northern third of the site there is a meandering swale that intercepts and directs surface water runoff from the east away from the racetrack and toward the northern corner behind 'Turn 1'.
2.28		Several other swales are formed within the track infield area to help disperse runoff over a broad area and away from the edges of the racetrack formation, however this general flow contributes the runoff that potentially crosses Braidwood Road.
2.29		Toward the centre of the infield area is a small dam (surface area of 580m²) that collects surface water runoff from a pair of poorly formed swales that are constructed along the base of the 'L' shaped retaining walls referenced in Item 2.11.
2.30		The outlet of the dam is governed by a sluice valve with extended handle that can be opened and closed to regulate the volume of water within, however it is unclear if the retained water was ever used for other applications around the track as there was no evidence of any discharge infrastructure.
2.31		The swales along the base of the 'L' shaped retaining walls are highly scoured and eroded which has resulted in sediment accumulation in the base of the central dam.
2.32		Within the race control precinct there is a total of 21 roofed structures that have a combined surface area of 6,560m², however not all of them are directly connected to an existing rainwater tank for harvesting and reuse purposes.
2.33		The rainwater tank that services the race control precinct is an inground concrete tank with a nominal capacity of 170,000 litres which is located on the northern side of the main access gate with the overflow pipe directed to a drainage channel that is approximately 35 metres downslope and to the north of the tank.
2.34		Retained water within the tank is used to meet the potable demands for the various buildings and amenities within the race control precinct including a food kiosk and the managers cottage which is located on the southern side of the main gate, along with general cleaning and other external applications.
2.35		Stormwater runoff from the roofed areas within the race control precinct that don't drain to the rainwater tank and the surrounding bitumen hardstand area are generally directed via surface grading and a basic network of 'pits and pipes' to a small dam that is located 75 metres downslope and to the north of the precinct.

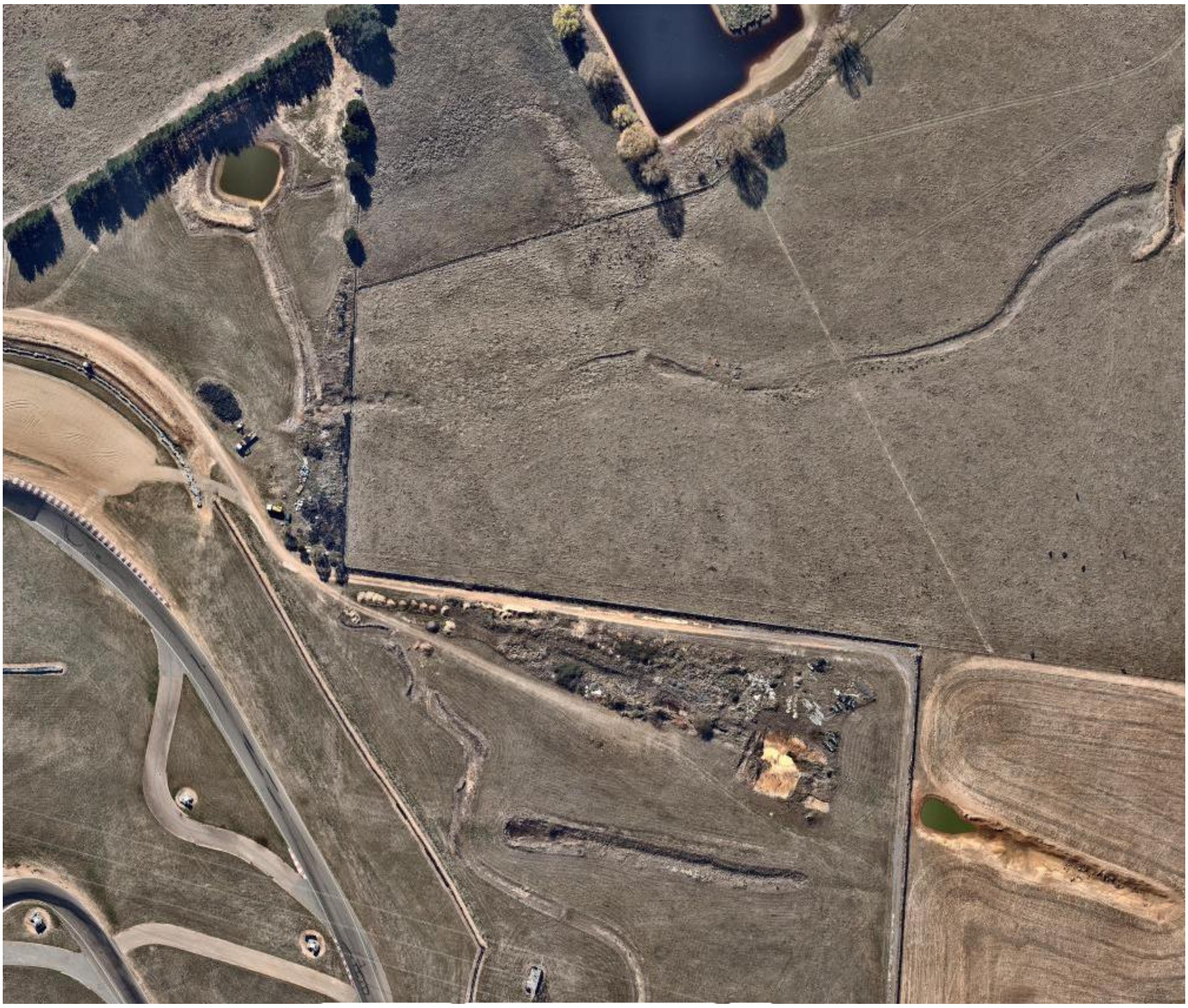
2.36		The dam has a surface area of 1,100m² and water from the dam can be reused for some external applications such as yard taps and irrigation around the race control precinct – although it does not appear to have been used for some time as the infrastructure associated with the reuse capability is disconnected.
2.37		Rainwater runoff from the roofed area of the short-stay accommodation cabins in the southern portion of the site are directed to two 110,000 litre inground concrete water tanks located to the south of the cabin with retained water used to service the potable demands of the cabins and some external watering around the cabin precinct – including water to a small toilet block adjacent to the spectator car park area.
2.38		Data from the 1% AEP overland flow model is used to define the different drainage regimes and catchment areas that are subsequently used to create the pre-development characteristics in the water quality assessment.
2.39	Constraints and other considerations	The site is burdened by high-voltage power transmission lines that traverse the northern third in an east-southeast to west-northwest alignment with two support towers inside the holding
2.40		One of the towers is located approximately 150 metres from both the eastern and northern boundaries, and the other is located adjacent to the small dam that is to the north of the race control precinct.
2.41		There have been no formal motorsport events or ancillary training / corporate days conducted on the site for the past few years as Court imposed restrictions on the number of days when different types of events could be conducted, and noise abatement measures effectively made the continued operations of the site economically unviable for the previous site operators.
2.42		The site was effectively closed in August 2022 and thereafter was only in basic caretaker mode until May 2023, unfortunately during that time little to no maintenance work was being undertaken and invasive weeds species such as African lovegrass and various tussock grasses were allowed to propagate within the open grass areas that form the infield and track surrounds.
2.43		Of particular note was the use of the northern and northeastern corners of the site for the storage of old cars and bulky items, and the dumping of car tyres, metal, and general rubbish within the drainage lines and channels that formed part of the terrain.
2.44		Historic aerial imagery of the site between 2014 and 2022 highlights how the corners were used over that time (and prior) for the storage and disposal of materials, and how toward the end of 2019 soil and re-grassing was used as a fill and capping to effectively camouflage the issues.

2.45		Filling of the drainage lines within the northeast corner of the site with rubbish and soil has invariably changed the natural flow of surface water across the site, and also resulted in a continuing source of ground and surface water pollution.
2.46		Remediation of this part of the site has been undertaken by the present owners which is discussed in more detail in the next section of this document, and images for the period 2014 to 2022 from *Nearmaps* is presented at the end of this section for reference purposes.
2.47		The upstream external catchment area to the northeast, east, and southeast of the site that drains through the northern portion of the development property forms part of viable rural lands that are actively cropped and grazed and therefore are a source of potential contamination in the form of sediment laden stormwater that fills the dam in the northern corner.
2.48		Additional contaminants such as animal waste and agricultural fertilisers and sprays used within the adjoining propeties are also potentially caught-up in stormwater runoff that drains through the site, and this is an important consideration for the management and operation of the site as a motorsport facility – details of which will also be discussed within the next section of this document.
2.49		The development site is not serviced by a Council maintained gravity sewer system thereby all human waste from the amenities and cottages within the site is collected, treated, and discharged onsite with the only exception being the removal of effluent by an accredited contractor if and when portable toilets are used for the larger race events.
2.50		Details of the wastewater management systems used on the site are addressed in Section 8 of this document.
2.51		Refer to the accompanying plan titled 'Pre-Development Site and Stormwater Drainage Details' - Ref: 0041224-S101-A for details of the various surface water catchment areas and stormwater drainage systems that are known to or are believed to have existed on the site prior to May 2023.
2.52		Refer to the accompanying plan titled '1% AEP Overland Flow Details for the Pre-Development Site' - Ref: 0041224-S102-A for the results of the pre-development overland flow model referenced throughout this section.

AERIAL IMAGES OF THE NORTHERN PORTION OF THE SITE 2014 - 2023

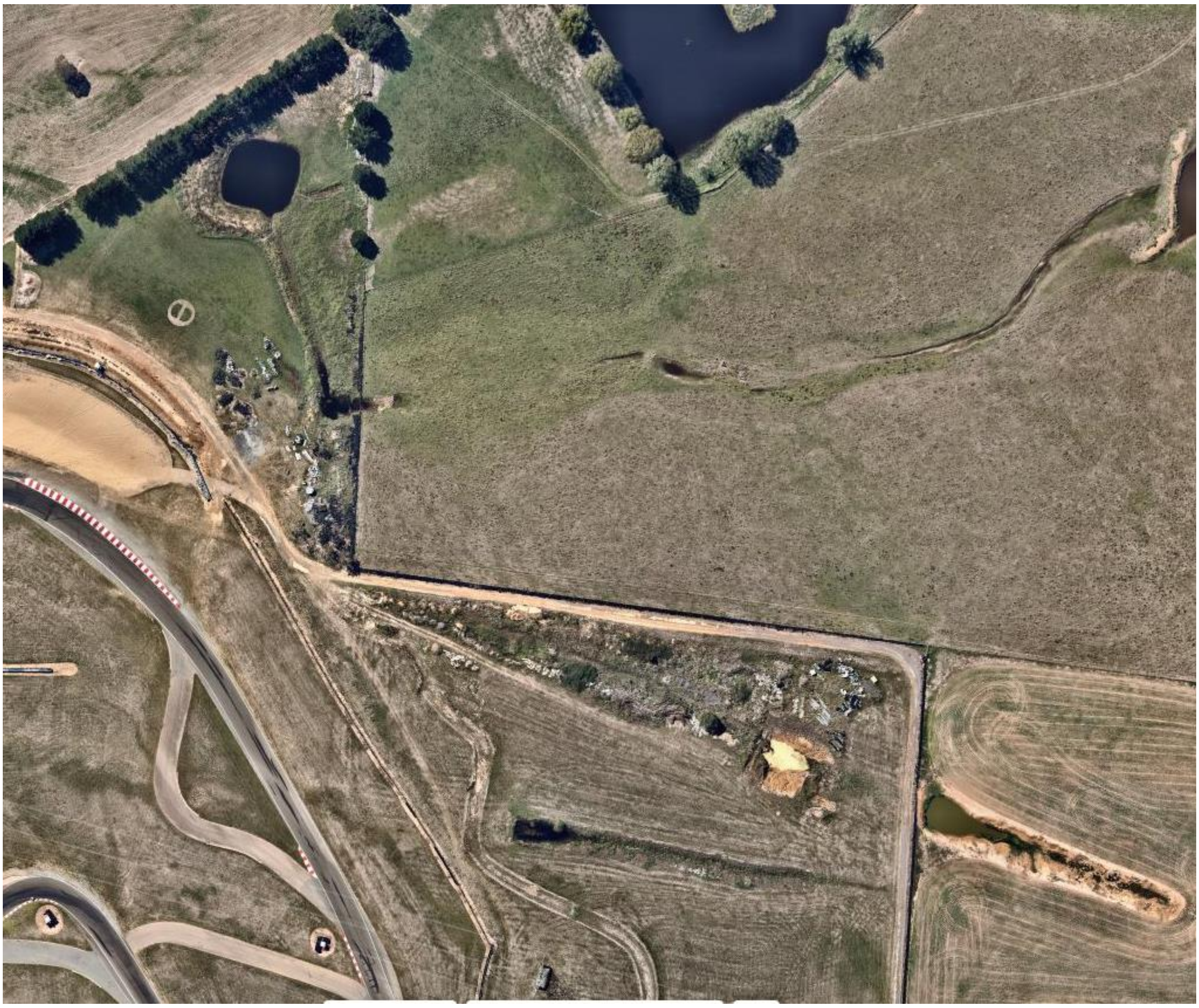
Source: Nearmaps 2014

Source: Nearmaps 2015

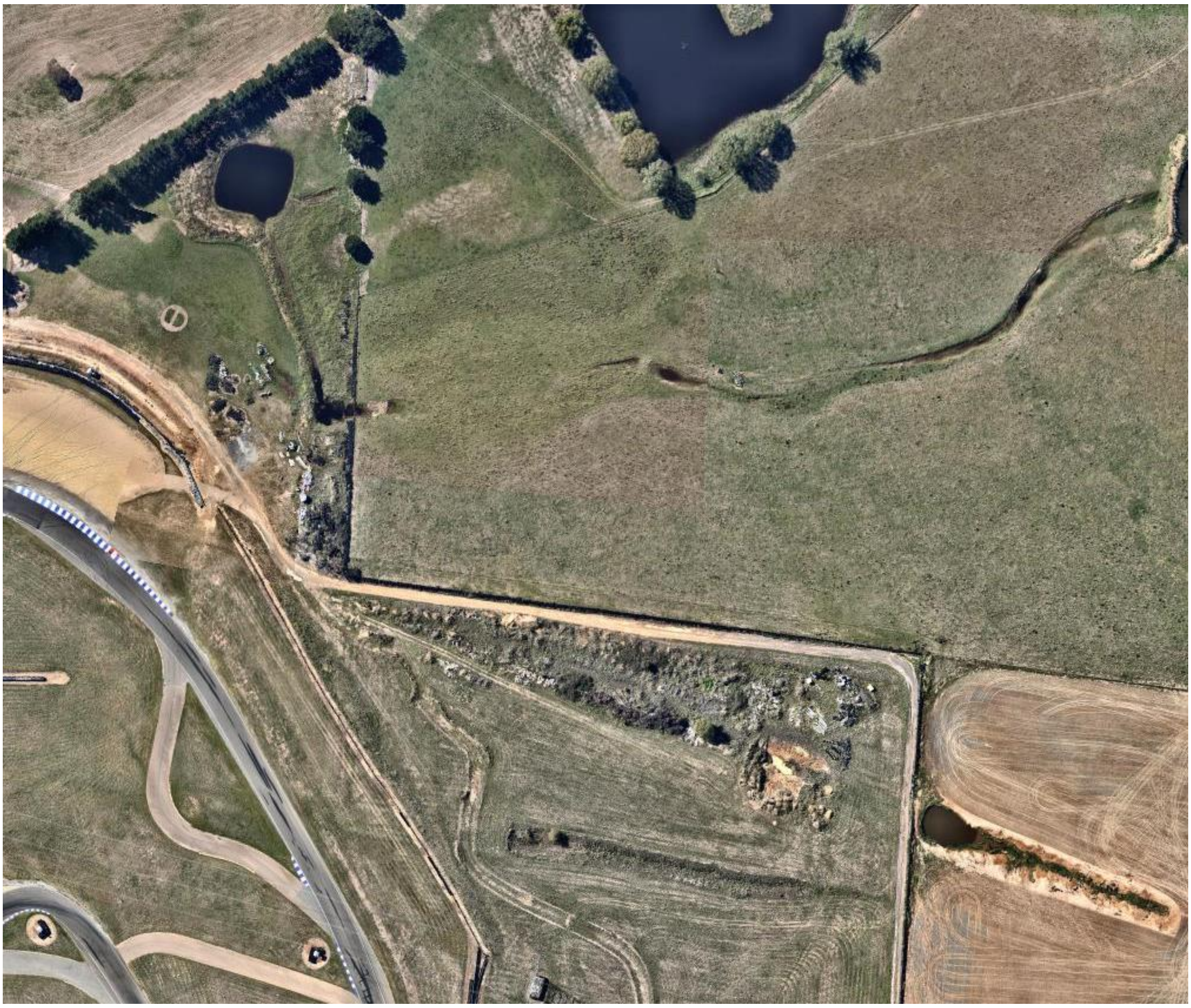


Source: Nearmaps 2016

Source: Nearmaps 2017



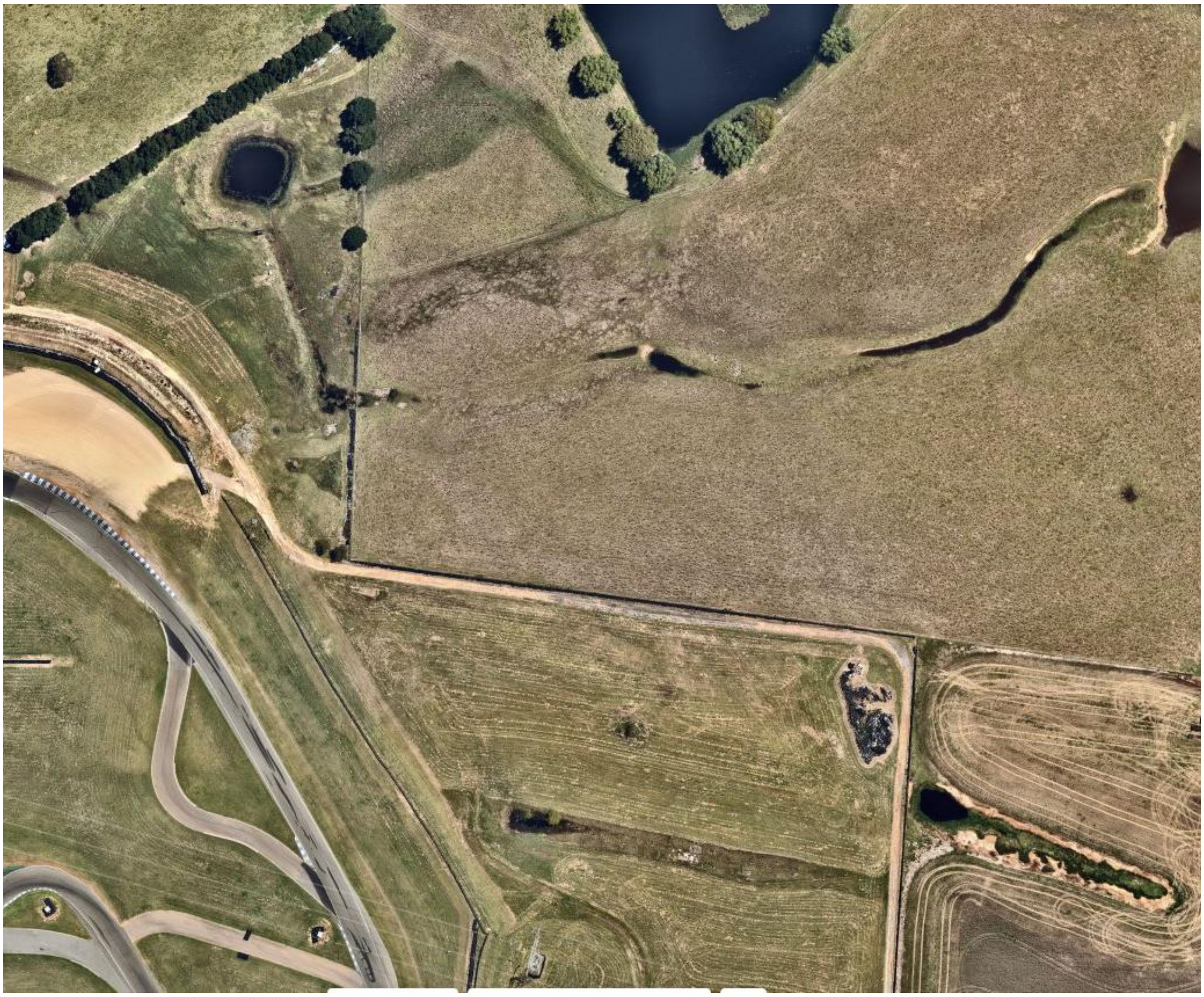
Source: Nearmaps 2018



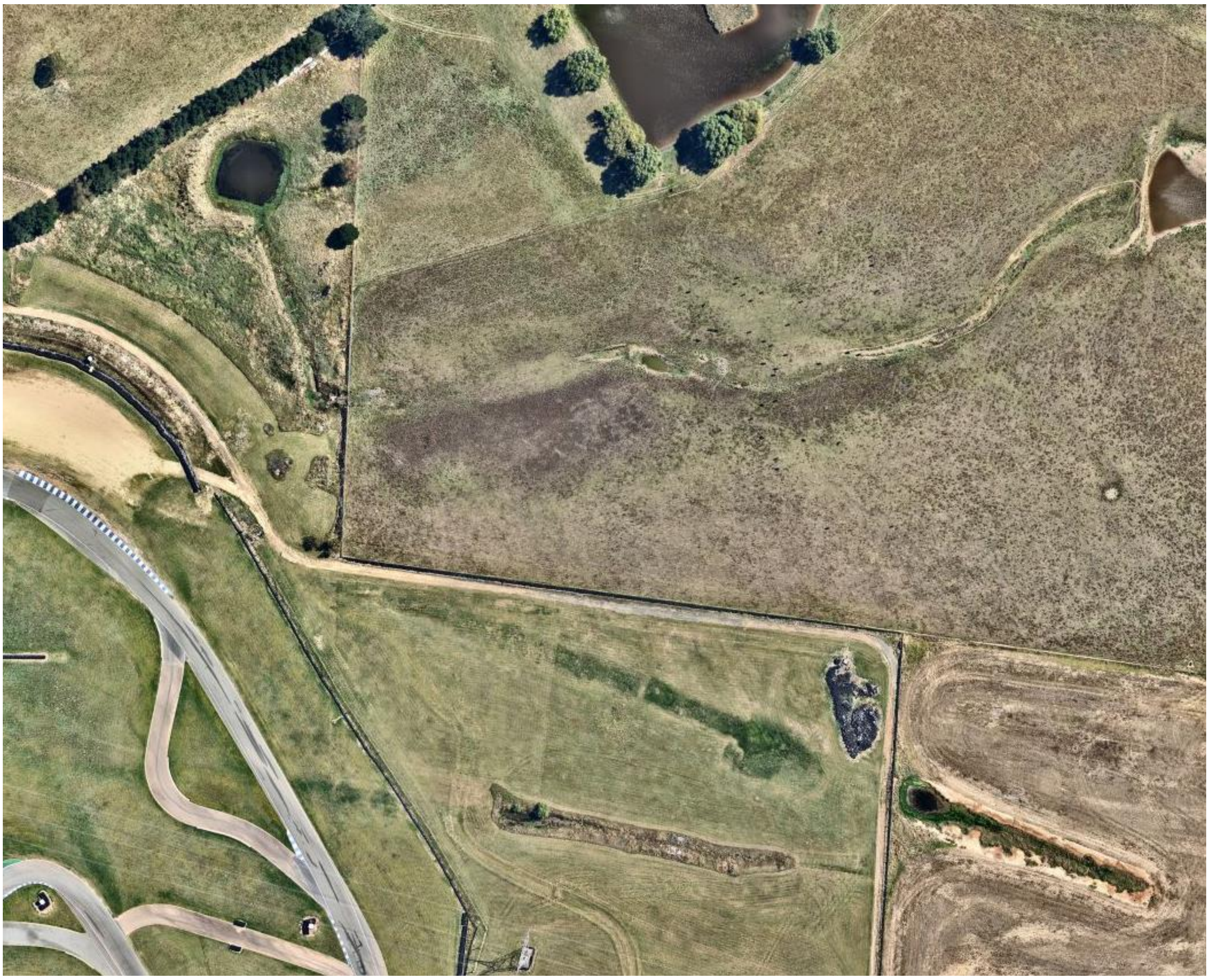
Source: Nearmaps 2019

Source: Nearmaps 2020

Source: Nearmaps 2021



Source: Nearmaps 2022



Source: Nearmaps 2023

3. CURRENT SITE CONDITIONS (POST MAY 2023)

#	DESCRIPTION	DETAIL
3.1	Noise attenuation barriers	The present owners of the development site took possession of the property in May 2023 and since then have been gradually transforming the site and facilities to meet the requirements and standards of current industry guidelines and expectations.
3.2		To address neighbouring property owner complaints and issues associated with noise emanating from the site during certain race events large earthen barriers have been formed on the northwestern and southwestern corners of the track area ('Turn 1' and 'Turn 10'), and these are deemed to be complaint with and part of the original development consent as they replace the original earth banks that were in the same locations.
3.3		The barriers are constructed from material that has been sourced on site and stand on average between 5 and 6 metres above the surface level of the track area below – slightly higher to natural surface level on the outside of the barriers.
3.4		For stability and durability, the earthen barriers are quite wide across the base with a flattened top to an average width of 4 metres to allow vehicle access for maintenance purposes.
3.5		The side walls of the barriers have been lined with a jute mesh material to help stabilise the batters whilst vegetation cover is allowed to establish.
3.6		The formation of the earthen barriers however added to the previous surface water drainage problems where overland flows were being restricted along the base of the barriers and water was therefore ponding across the safety run-off areas and the main track.
3.7	Stormwater drainage and management improvements	During later part of 2023 the site was hit with a storm event that generated enough surface water runoff that water flowed out of the property along the western boundary to the south of the main entrance and continued across Braidwood Road with the depth of water estimated to be at least 100mm.
3.8		This rain event along with the internal drainage issues prompted the owners to invest in substantial drainage improvements.
3.9		To alleviate the surface water drainage issues created by the noise attenuation barriers and generally a stormwater drainage system was designed in consultation with SOWDES and installed throughout the track infield area and extended out to the race control precinct and beyond to natural points of discharge.
3.10		The track infield drainage works include a network of 'pits and pipes' ranging is size from 225mm to 450mm in strategic locations to collect surface water via a combination of natural flow paths, grass-lined swales, and subsurface drainage pipes.

3.11		The discharge of stormwater from the track infield area is distributed into essentially the same catchment areas as the existing catchments with the exception that the pit and pipe systems allow for better management of runoff – particularly in the early part of the design rain events to avoid accumulated flow exiting the western boundary and burdening the Braidwood Road traffic corridor.
3.12		Most of the surface water runoff from the infield area is directed to the dam in the northern corner of the site behind 'Turn 1', or into the smaller dam to the north of the race control precinct.
3.13		As new pipes were being installed through the race control precinct some of the existing stormwater pipes and downpipes that were not previously connected to any system were also captured.
3.14		The western half of the southern boundary below the short-stay accommodation cabins and western boundary from the southwest corner to the end of the earth bank short of the entrance are now formed with wide drainage swales that included under-drain pipes and rock lining across the surface.
3.15		The under-drain pipes which range in size from 300mm to 600mm are extended all the way to the northwest corner of the site and this is coupled with grated inlet pits at regular intervals to facilitate grade changes and junction points for other incoming drainage pipes from within the race control precinct.
3.16		The end of the western drainage system extends for a short distance into the adjoining property to the north (which is also owned by the One Raceway owners), and the pipe is finished with a concrete headwall and rock mattress to prevent scouring around the outlet.
3.17		The rocks that line the drainage swales and the discharge outlet were sourced from the old 'borrow' pit in the southeast corner of the site and vary in average size from 150mm to 300mm which help to slow the velocity of water and dissipate the energy associated with the peak flows.
3.18		The old 'borrow' pit was scraped and graded to produce a levelled platform for car parking purposes with the crushed rocks used entirely throughout the site for stabilisation works.
3.19		Material used in the construction of the noise attenuation barriers on the northwestern and southwestern track turns was largely taken from the old 'borrow' pit located in the southeastern corner of the site, enlarging the dam in the northern corner, and from an excavation pit that was created in the northeast corner of the site where the old rubbish pits were located and buried.

3.20		A slight realignment of water and enlarging the existing dam in the northern corner of the site was required to provide better management of surface water entering the site from the eastern aspect to improve stabilisation and prevent potential washout around the base of the noise attenuation barrier around 'Turn 1'
3.21		By enlarging the dam and raising the height of the western wall the outflows are still able to drain to the downstream drainage corridor to the west via a 375mm diameter outlet pipe, however the high-level overflow weir is located on the northern end of the dam and therefore further away from the base of the noise attenuation barrier.
3.22		Excess material from the northern dam enlargement that was not used in the construction of the dam was used in the formation of the noise attenuation barriers.
3.23		To access clean material from the northeastern pit the old rubbish which is referenced in Items 2.43 to 2.46 had to first be removed which involved the transport of excavated rubbish to an offsite facility which came at considerable expense (receipts are available to view to verify the nature of material removed)
3.24		The volume of material removed from the northeastern pit has resulted in a basin being formed where two of the original drainage depressions that ran through the site were filled.
3.25		The basin is now re-purposed as a detention basin with a 150mm diameter low-level outlet pipe installed under a formed basin wall on the western end that can be opened and closed as required to manage water through that portion of the site, and the overflow drains into the northern dam via a rock-lined swale.
3.26		The 'northeast basin' as it will be referred to throughout the remainder of this document presently has an overland flow catchment area of approximately 4.446 hectares that drains into it however the basin provides an opportunity to better manage a larger area of surface water runoff through and within the site.
3.27		Through a simple change to the existing infield stormwater drainage system between the central dam and one of the stormwater drainage pits it is possible to direct as much as 16.937 hectares of surface water runoff from within the site into the northeast basin.
3.28		The benefit of redirecting the larger area of runoff is that it would reduce the load on the stormwater drainage system that runs through the central portion of the site and through the race control precinct by an equivalent amount and therefore reduce the flows through the small dam to the north of the race control precinct, and in turn this would reduce the potential for stormwater to exit the site and burden Braidwood Road.

3.29		A further benefit of using the northeast basin as a detention pond is that it provides a significant improvement in water quality as 'water' will be an important and valuable commodity for the safe operation and management of the site.
3.30		The grass surroundings around the inner and outer track areas form part of the safety runoff areas for cars and bikes and therefore need to be maintained with a viable and even ground cover - hence clean irrigation water will be required.
3.31		Without the northeast basin being available the only other significant source of water for large area irrigation purposes would be the dam in the northern corner, and although it has been enlarged there is a real potential for the water quality within the dam to be compromised and contaminated by the land-use activities in the rural holdings to the east as previously referenced in Items 2.47 and 2.48.
3.32		Water retained within the northeast basin would be sourced from surface water runoff generated within the development site and therefore is less likely to be subjected to the various sources of potential contamination thereby being better suited for irrigation purposes.
3.33		The site operators have indicated that irrigation of the track infield areas will initially be undertaken using a portable diesel pump with a long hose travelling irrigator.
3.34		Some of the bitumen surface finish within the race control precinct – particularly behind and around the southern set of race garages was in poor condition upon acquisition of the site with potholes and large areas where the surface had been broken and reduced to gravel – presumably in part due to poor drainage
3.35		The owners have removed the old surface and replaced it with a dual-purpose concrete pad that falls away from the footprint of the garages and slopes to the west.
3.36		The concrete pad has a surface area of approximately 1.3 hectares and will predominantly be used on race days for participants to park their cars and transport vehicles, however the pad can also be used for driver training purposes with specific end-users such as emergency services agencies in mind.
3.37		The outer western edge of the concrete pad has been finished with a 150mm high straight-back kerb to capture surface water runoff and direct it to a small dam that has been constructed slightly to the west of the pad.
3.38		The 'driver training' dam has an estimated volume of 230m³ and the water within the dam can be reused to wet the concrete pad on driver training days to create wet weather driving conditions.

3.39		The water level within the 'driver training' dam can be regulated through a 100mm low-level outlet pipe that is fitted with a gate valve which discharges into a grated junction pit that in turn is connected to the stormwater drainage line that runs along the western boundary of the site.
3.40		If the water level within the driver training dam exceeds the capacity of the dam then a 2 metre wide weir above the low-level outlet pipe will direct the overflows into the same grated stormwater pit below.
3.41		The small dam to the north of the race control precinct and the central dam within the track infield have both been de-silted and slightly reshaped to remove some wash-out areas and provide better stabilisation around the inner batters, and as a consequence the surface areas and permanent storage volumes are marginally larger.
3.42		The dam to the north of the race control precinct has also been upgraded by removing a high-level 150mm outlet pipe and replacing it with a rock-lined overflow weir that drains into an existing dam within the adjoining property to the north that is also owned by the development site owners.
3.43		The 'race precinct' dam is simply a junction point for several stormwater pipes and some surface water to drain into prior to discharging off the site with no specific reuse plans however it is proposed that a transfer line will be installed between it and the 'driver training' dam as a top-up option for the 'driver training' dam during dry periods.
3.45		The installation of subsurface drainage pipes within the infield area and the formation of grass-lined diversions swales was an important undertaking for the operation of the site as the start / finish straight in front of the race control precinct and the inner track area opposite 'Turn 1' was constantly water-logged after rain events due to the amount of upslope area generating surface water runoff.
3.46		A network of 100mm diameter 'socked and slotted' subsurface drainage pipes are installed around the perimeters of the track in low-lying areas to improve groundwater drainage with the outlets discharging into some of the recently installed stormwater pits, whilst the diversion swales help to push some of the upslope runoff away from the track
3.47		As a management and operational tool for track use the ability to resume events after moderate to large rain events is critical to avoid potential postponement or cancellations hence the installation of the subsurface drain system and swales around the track helps facilitate this capacity.

3.48		It was also important for the track drainage system to be installed and function efficiently as the track has recently been modified with a few slight changes to its physical shape, but more so because the entire surface has been replaced and re-coated with a more durable and even finish.
3.49		The final improvement to stormwater management of significant note is the installation of two new rainwater tanks in the southeast corner of the property – on the eastern end of the spectator car park area.
3.50		Both tanks are above-ground metal structures with one tank having a nominal capacity of 360,000 litres and the other 48,000 litres, and both are linked to each other at the base.
3.51		Water to the larger tank is transferred from the inground concrete water tank located within the race control precinct with the water from the tank fed back via gravity to the race control precinct to provide potable water to all the buildings including the managers cottage, the toilet and bathroom facilities, and all external water applications.
3.52		Water to the smaller metal tank is transferred from the two inground concrete water tanks located to the south of the short-stay accommodation cabins and this is also recirculated via gravity back to the cabins and toilet facilities that are to the south of the spectator car park area.
3.53		The transfer of water to the two new metal tanks is managed automatically through a combination of float controls and pressure switches that activate at predetermined levels within the two metal tanks at the top of the site.
3.54		Other minor works have been undertaken across the site to improve drainage and overland flows generally, but these are essentially comprised of reshaping, trimming, and redefining swales and drainage corridors, or improving the connection of roofed areas within the race control precinct to a stormwater drainage system.
3.55		Some of the connecting carriageways within the track area have been removed, as has the hill climb track to the east.
3.56		Four small roofed structures within the race control precinct plus the original race control tower have been decommissioned as they were not suitable for future operations on the site.
3.57		Refer to the accompanying plans titled 'Post-Development Site and Stormwater Drainage Details' - Ref: 0041224-S103-A, and 'Proposed Stormwater Drainage Measures' - Ref: 0041224-S104-A for a recent aerial image of the site taken by the owners using a drone that highlights the majority of site changes and recommendations detailed in this section.

4. WATER QUALITY ('MUSIC') MODELLING			
#	***DESCRIPTION***	***DETAIL***	
4.1	Model Version	6.3.0	
4.2	Rainfall data	Goulburn geographical region – pluviograph data at 6 minute time steps from 1st January 1995 to 31st December 1999	
4.3	Reduction targets	Total Suspended Solids	≥10%
		Total Phosphorus	≥10%
		Total Nitrogen	≥10%
		Cumulative frequency of reductions	≥98%
4.4	Modelling assumptions / settings	The current site conditions that have been detailed in the previous sections provide the basis for the water quality assessment with two separate models prepared; one for the site and catchment area calculations as they are at the date of preparing the Water Cycle Management Study, and the other including the minor undertakings to amend the area of catchment draining into the 'northeast' detention basin.	
4.5		Each catchment area in the pre-development and post-development conditions which reflect the catchment areas in the accompanying plans titled 'Pre-Development Site and Stormwater Drainage Details' - Ref: 0041224-S101-A, 'Post-Development Site and Stormwater Drainage Details' - Ref: 0041224-S103-A, and 'Proposed Stormwater Drainage Measures' - Ref: 0041224-S104-A have been subdivided into either sealed or unsealed roadways and paths, roofs, or 'vacant' surface types.	
4.6		The 'vacant' surface areas are parts of the individual catchment that have no specific structures or roadways, but they may have areas of consolidation or be subjected to day-to-day activities and therefore the percentage of imperviousness in all instances has been modelled as 10%.	
4.7		The 'vacant' source node has the pollutant concentrations for 'rural residential' as this is probably the best available option to describe the modified nature of the land-use.	
4.8		The 'roof' catchment areas have been separated into those that do and those that do not drain into a rainwater tank, and the reuse of water from the tanks is based on estimated participant and visitor numbers and other general uses across the different development scenarios.	
4.9		The daily water reuse figures used in the post-development models are closely aligned to the estimated number of people that are likely to use the site on a peak usage day which ties into the information that is presented in the accompanying Wastewater Management Assessment report.	

4.10		The modifications to the dam in the northern corner of the site have not been included within the water quality modelling for either stage of development as the dam was existing and it is therefore difficult to substantiate or proportion any direct water quality benefit for the development site.
4.11		Under the pre-development land-use the northern corner of the site was largely retained as grassland despite also being used for the storage of old cars and bulky materials, and therefore the impact on water quality was generally low.
4.12		However, because the northern dam receives most of the inflows from the external catchment to the east it has been assumed that any water quality benefit for the site – particularly in the post-development conditions would be very small, although there is likely to be some benefit for the small catchment that drains to this area.
4.13		Also as noted previously, the quality of water from the eastern catchment can be compromised or contaminated due to the cropping and general farming activities that are undertaken in the neighbouring holdings, therefore ongoing management of the northern dams will be difficult to control hence not including it within the context of the water quality assessment can be substantiated.
4.14		The two models have assumed that in the post-development state the 'northeast' detention basin is retained and operative with the low-level outlet pipe closed.
4.15		The 'northeast' detention basin has been modelled with an annualised average reuse of 1 megalitre per year which is for irrigation of the infield track and surrounds – an area of approximately 28 hectares.
4.16		The annualised reuse has been distributed on a monthly basis and equates to an average irrigation depth of 75mm per m^2 per week – this figure would fluctuate with seasonal demands.
4.17		Under the 'current' site conditions with 4.446 hectares of land draining into the basin the required irrigation demands would be met in 47% of occasions, however if the recommendation to redirect a larger portion of the site (16.937 hectares) to drain into the basin is adopted then that figure would increase to 87%.
4.18		Environmental flows through to the northern corner of the site are still maintained with the overflow from the basin being directed into the northern dam via a broad rock-lined swale with battered side walls that will slow the velocity of the water and help to dissipate concentrated flows, and thereby reduce the potential for scouring and erosion.

4.19		The average size of the rocks varies between 150mm and 400mm, and where the overflow swale crosses an access carriageway that runs around the perimeter fenceline there are two 750mm concrete pipes below.
4.20		The overflow swale between the northeast detention basin and the northern dam has not been included within the modelling assumptions although there would be some additional water quality benefits associated with the flow of water along the swale.
4.23		The 'driver training' dam to the west of the race control precinct has been allocated an annualised daily reuse of 1,000 litres which is associated with the use of the concrete pad as a driver training facility under 'wet weather' conditions.
4.24		Whilst the driver training component of the development may only occur on an irregular basis, in the absence of any other information the reuse volume is based on one day per week where the surface area of 1.30 hectares would receive approximately 75mm of water via perimeter sprinklers which equates to 975 litres - this has been rounded up to 1,000 litres.
4.25		In the pre-development model there has been no allocation for the reuse of water within the 'race precinct' dam as early site inspections indicate that any infrastructure that may have been associated with pumping of water from the dam was decommissioned some time ago.
4.26		Similarly in the post-development models, there has been no allowance for the reuse of water from the 'race precinct' dam although there is an option to transfer water to the 'driver training' dam if required.
4.27		The small dam in the centre of the track area has not been included in the water quality modelling for pre-development or post-development as there is no evidence of water reuse prior to 2023, and there is no infrastructure for pumping associated with dam presently.
4.28		The centre dam will however form an important role in stormwater management if the recommendation to redirect the larger catchment area to the northeast detention basin is adopted.
4.29		Surface water runoff from the sealed and unsealed roads and pathways in both models - including pre-development and post-development scenarios, has been treated by a buffer strip along the edges of the formations that are assumed to be equal to 5% of the contributing catchment area in size and with an effective treatment of 50% of the catchment area.

4.30		Whilst surface water runoff from most of the roads, paths, carriageways, and car park areas – and in particular the racetrack surface will extend beyond the extents of the pre-treating buffer strip to surrounding grasslands the models have not assumed any additional water quality treatments.
4.31		The reason that additional treatment is not included is due to the fact that there are no formal swales formed along the edges of these surfaces and therefore ongoing maintenance and management in accordance with an Operational Environmental Management Plan would be difficult to implement.
4.32		There is also a safety factor consideration in relation to the racetrack area as the 'safety runoff areas' are required to have a constant slope or grade across the surface immediately adjacent to the edge of the formation for the protection of the cars and motorcycle riders, and swales do not satisfy this requirement.
4.33		There is one small exception to this within the post-development models related to the roadway along the western boundary of the site where the recently formed rock-lined swale is located.
4.34		The swale has modelled within the post-development conditions as a gross pollutant trap as surface water will flow directly into the swale and therefore be filtered of coarse sediments and other gross pollutants.
4.35		The treatment values and reductions for the gross pollutant trap node are in accordance with the Water NSW printed guidelines.
4.36		It is noted that the defined and modelled catchment areas will vary between the pre-development and post-development scenarios due to the inclusion of the stormwater drainage systems and the regarding of the site associated with the noise attenuation barriers and basin works.
4.37		The physical area calculations and surface finishes will vary between scenarios however the same overall site area of 50.421 hectares is consistent in all pre-development and post-development models.
4.38		Whilst the site is divided into several different catchment areas in both the pre-development and post-development models the included areas all drain to a single receiving point in the form of a defined drainage depression located just outside the northwest corner of the property that crosses the Braidwood Road traffic corridor, and this is highlighted in the 1% AEP overland flow study results.

4.39		The small area of 2.018 hectares in the southeastern corner of the site that drains to the south is excluded from the modelling calculations as there is no change within this area, and it drains to a different downstream receiving node.
4.40		The development site is a complex entity to definitively represent within the modelling constraints however it is believed that the water quality assessment undertaken and presented in this submission is a very close reflection of the movement, conveyance, and distribution of water within and from the site.
4.41		Table 4.3 on the following page provides the breakdown of surface types and areas within each defined catchment noting that the pre-development details are the same for both models, it is just a slight variation in post-development catchment calculations that changes.
4.42		The numbers in the left-hand column of Table 4.3 correlate to catchment areas in the respective site plans.
4.43		Finally, it is noted that additional water quality treatment will be provided to the surface water runoff from the track and other hardstand areas via grass swales and detention measures that are not specifically shown in the models, however these improvements should still be considered as beneficial elements in the overall assessment of the development site.

Table 4.1. Base flow pollutant concentrations used in the pre-development and post development models.

Concentration (mg/L-log$_{10}$)						
	Suspended solids		**Phosphorus**		**Nitrogen**	
Surface type	mean	std. dev	mean	std. dev	mean	std. dev
Sealed roads	1.20	0.17	-0.85	0.19	0.11	0.12
Unsealed roads	1.20	0.17	-0.85	0.19	0.11	0.12
Roof	1.20	0.17	-0.85	0.19	0.11	0.12
Rural residential	1.15	0.17	-1.22	0.19	-0.05	0.12

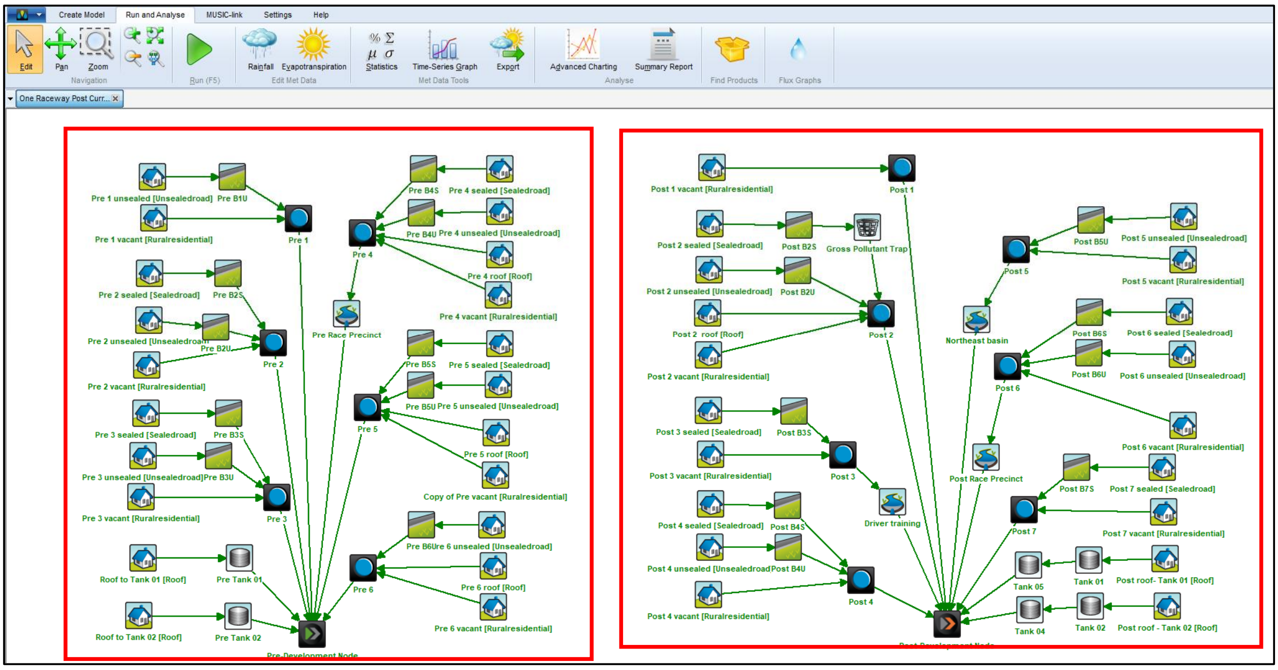
Table 4.2. Storm flow pollutant concentrations used in the pre-development and post development models.

Concentration (mg/L-log$_{10}$)						
	Suspended solids		**Phosphorus**		**Nitrogen**	
Surface type	mean	std. dev	mean	std. dev	mean	std. dev
Sealed roads	2.43	0.32	-0.30	0.25	0.34	0.19
Unsealed roads	3.00	0.32	-0.30	0.25	0.34	0.19
Roof	1.30	0.32	-0.89	0.25	0.30	0.19
Rural residential	1.95	0.32	-0.66	0.25	0.30	0.19

Table 4.3. Summary of the different surface types used in the pre-development and post-development conditions and the associated pollutant parameter within the *MUSIC* model – areas are m².

Catchment details		Sealed road 100% impervious	Unsealed road 50% impervious	Roof to tank 100% impervious	Roof to drain 100% impervious	Vacant (rural residential) 10% impervious
Pre-Development						
1	Northern dam	-	2,880	-	-	26,460
2	Northeast corner	1,370	2,680	-	-	52,580
3	Turn 1	13,690	5,590	-	-	62,470
4	Race control precinct	26,560	26,180	1,990	250	159,160
5	Southwest corner	24,760	15,450	2,220	1,250	62,590
6	Northwest corner	-	3,960	130	720	11,350
		66,380	**56,660**	**4,340**	**2,220**	**374,610**
		504,210				
Post-Development Current						
1	Northern corner	-	-	-	-	10,690
2	Western aspect	17,470	3,300	2,360	170	31,670
3	Driver training	10,770	-	-	-	1,780
4	Northern dam	3,440	1,580	-	-	30,560
5	Northeast basin	-	1,730	-	-	42,730
6	Race control precinct	64,530	22,070	3,840	-	245,530
7	Turn 1	7,360	-	-	-	2,630
		103,570	**28,680**	**6,200**	**170**	**365,590**
		504,210				
Catchment details **Post-Development Proposed**		Sealed road 100% impervious	Unsealed road 50% impervious	Roof to tank 100% impervious	Roof to drain 100% impervious	Vacant (rural residential) 10% impervious
1	Northern corner	-	-	-	-	10,690
2	Western aspect	17,470	3,300	2,360	170	31,670
3	Driver training	10,770	-	-	-	1,780
4	Northern dam	3,440	1,580	-	-	30,560
5	Northeast basin	3,880	23,150	-	-	142,340
6	Race control precinct	60,650	650	3,840	-	145,290
7	Turn 1	7,360	-	-	-	2,630
		103,570	**28,680**	**6,200**	**170**	**365,590**
		504,210				

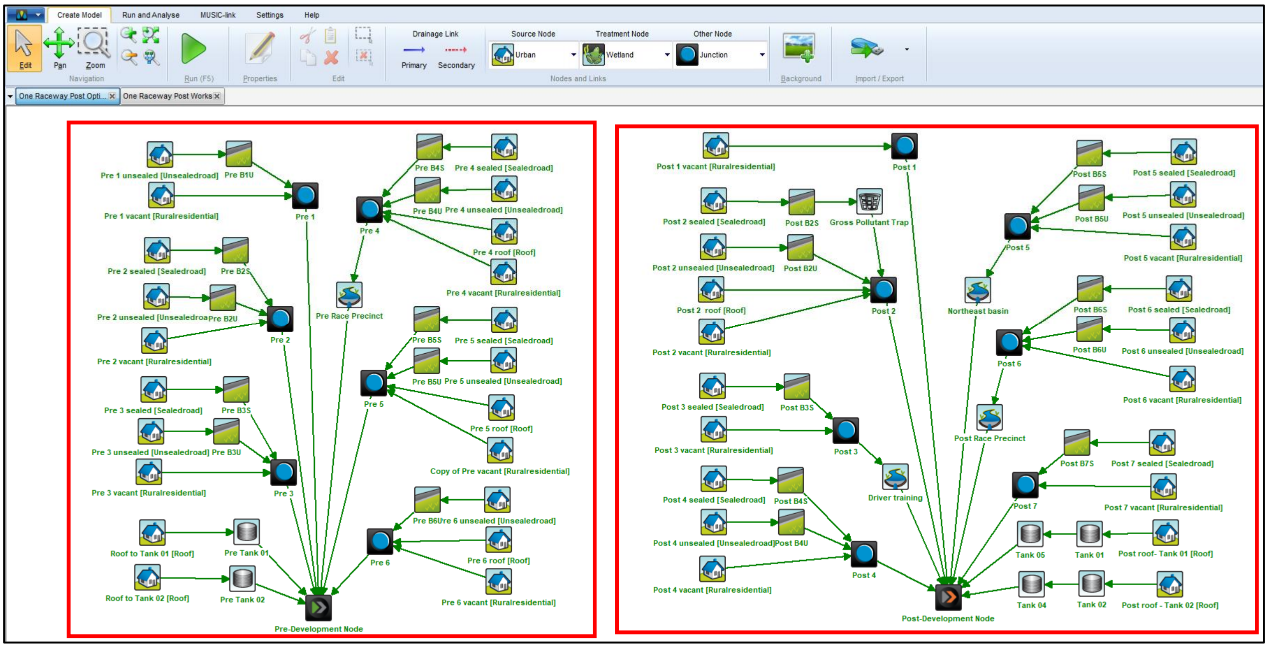
**** There has been a change in total roof area between pre-development and post-development calculations due to the removal of five structures comprising a combined area of 290m² and the addition of a 100m² roof over a temporary race control structure located adjacent to the medical building – number '13' in the plans.**



Pre-development

Post-development

Figure 4.1. Layout of the source, treatment and receiving nodes in the *MUSIC* model for the current site conditions.



Pre-development

Post-development

Figure 4.2. Layout of the source, treatment and receiving nodes in the *MUSIC* model for the proposed amendments.

5. The Results.

The water quality modelling results are measured on two scales; the reduction of pollutant loads in the post-development results compared to the pre-development loading values by 10% for suspended solids, phosphorus and nitrogen, and a reduction in the post-development pollutant concentrations compared to the pre-development concentration levels between the 50th and 98th frequency percentiles when runoff occurs. The first of these measures are summarised in Tables 5.1 and 5.2 which demonstrates that the residual pollutant concentrations between the pre-development and post-development stages for the current site conditions achieved the required reductions for total suspended solids however there is an actual increase in the concentration loads for total phosphorus and total nitrogen. Where the proposed stormwater drainage changes in relation to the 'northeast' detention basin are included all three pollutants are reduced - albeit however the total phosphorus and total nitrogen residual concentrations are less than the target reductions of 10%. It is also noted that the 10% target reduction in pollutant concentrations is to account for some variability and uncertainty within the modelling process, however any reduction in residual concentrations in the post-development scenario is still a 'beneficial' outcome.

In relation to achieving the objectives of the NorBE (Neutral or Beneficial Effect) criteria it can be surmised that the current site conditions fail to meet the necessary targets, however with a slight amendment to the stormwater drainage measures associated with the 'northeast' detention basin as detailed in the assessment the site can achieve a 'beneficial' outcome. In relation to the model results, there is a slight variation in the pre-development model pollutant concentration levels in the two Tables which is associated with the stochastic generation at the start of the model run which means the software selects a random start date within the range of available data each time the model is run therefore the rainfall and evaporation patterns will vary slightly.

Table 5.1. Comparison of the residual pre-development and post development pollutant concentrations for the current site conditions

	Annual pollutant loading (kg/year)		
	TSS	TP	TN
Pre-development loading	25300	33.0	203
Post development loading	20600	34.9	206
Reduction %	18.58	+5.76	+1.48
	✓	☒	☒

Table 5.2. Comparison of the residual pre-development and post development pollutant concentrations for the proposed 'northeast' detention basin stormwater drainage amendments.

	Annual pollutant loading (kg/year)		
	TSS	TP	TN
Pre-development loading	25500	32.9	201
Post development loading	18300	32.1	189
Reduction %	28.24	2.43	5.97
	✓	✓	✓

The second of these measures is the reduction in pollutant concentration in the post-development case compared to the pre-development concentration between the 50th and 98th frequency percentiles when runoff occurs. The following images for the 'current site' model (Figures 5.1 to 5.3) and the 'Option 2' model (Figures 5.3 to 5.5) provide a summary of the pre-development and post-development cumulative frequency outcomes.

A comparison of the cumulative frequency charts for each pollutant in both models shows that they are essentially identical in shape with some very minor improvements between the post-development results in the 'Option 2' model compared to the 'current site' model. In both instances and across all three pollutant types the post-development frequency percentiles are just below or mimic the pre-development values for the cumulative frequency ranges less than 90% to 95% and it is not until the higher end of the frequency curves that there is any continued improvement in the post-development concentration levels.

It is noted that where the post-development pollutant concentrations are less than the pre-development levels the concentration values are much less than the mean and within plus or minus 1 standard deviation for the land-use types of 'All Rural' and Commercial' as determined by HP Duncan ('Urban Stormwater Quality: A Statistical Overview' – Catchment Hydrology CRC, 1999) which was the basis for the background pollutant concentrations used in the *MUSIC* model. In the study undertaken by HP Duncan the mean concentration value and standard deviations for the three different pollutant types for 'All Rural' and 'Commercial' are summarised in the below Table. In the right-hand column of the Table is the highest post-development pollutant concentration values for each pollutant where it is less than the pre-development values and it will be seen that the results are within the critical ranges determined in the Duncan studies. Whilst the cumulative frequency results for the post-development models do not strictly meet the NorBE criteria it can be concluded that for the higher frequency of events there is an improvement in the concentration levels. The land-use types of 'All Rural' and 'Commercial' have been selected as this best represents the nature of the development site.

	Mean (mg/L)	+1 standard deviation (mg/L)	-1 standard deviation (mg/L)	Post-development concentration (mg/L)
All Rural				
Total suspended solids	110	400	30	90
Total phosphorus	0.22	0.7	0.065	0.2
Total nitrogen	2.25	3.75	1.4	1.5
Commercial				
Total suspended solids	140	350	50	90
Total phosphorus	0.33	0.8	0.15	0.2
Total nitrogen	2.05	5.5	0.7	1.5

In the following images the pre-development concentrations are shown in red and the post-development concentrations are shown in blue.

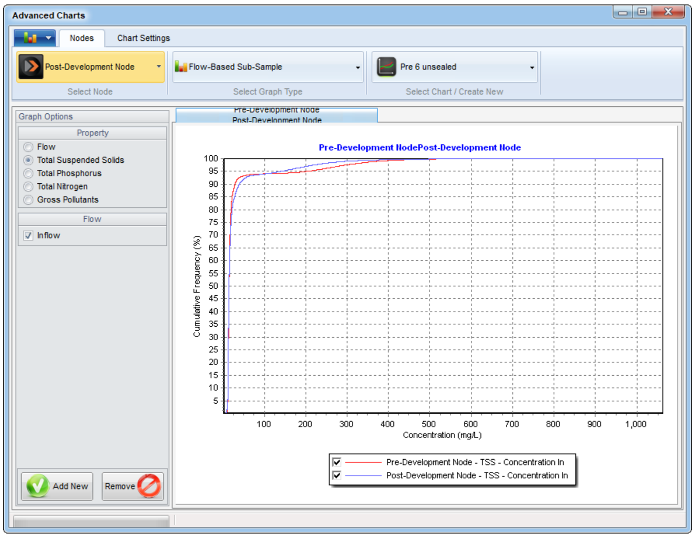


Figure 5.1. Pre-development and post-development outcomes for the current site - total suspended solids.

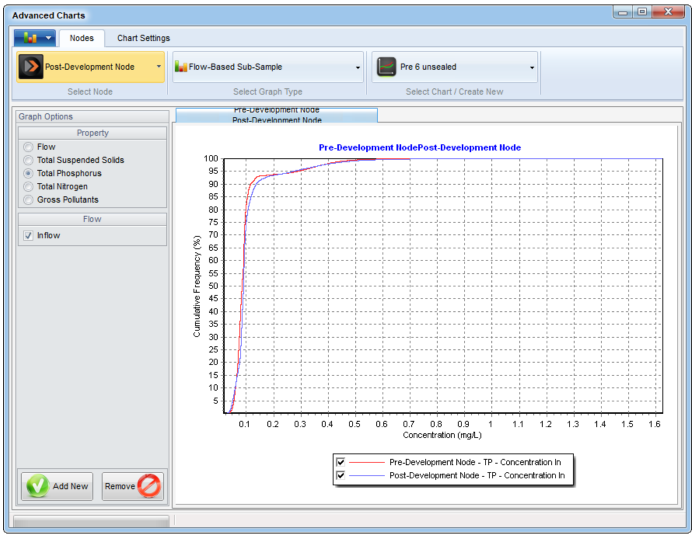


Figure 5.2. Pre-development and post-development outcomes for the current site - total phosphorus

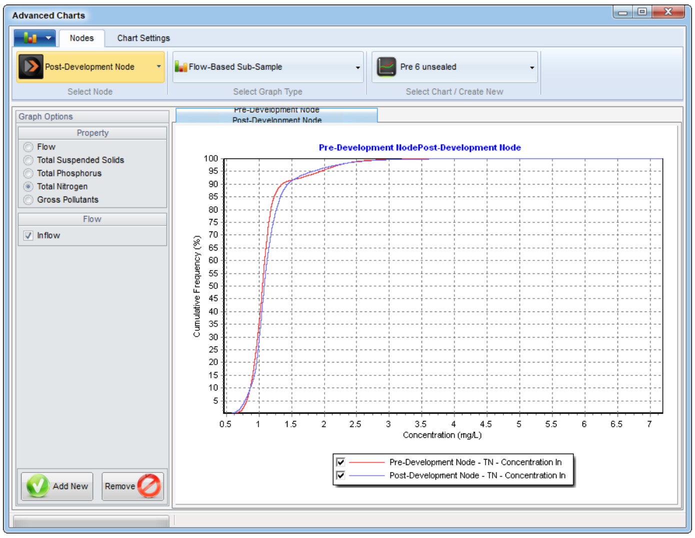


Figure 5.3. Pre-development and post-development outcomes for the current site - total nitrogen

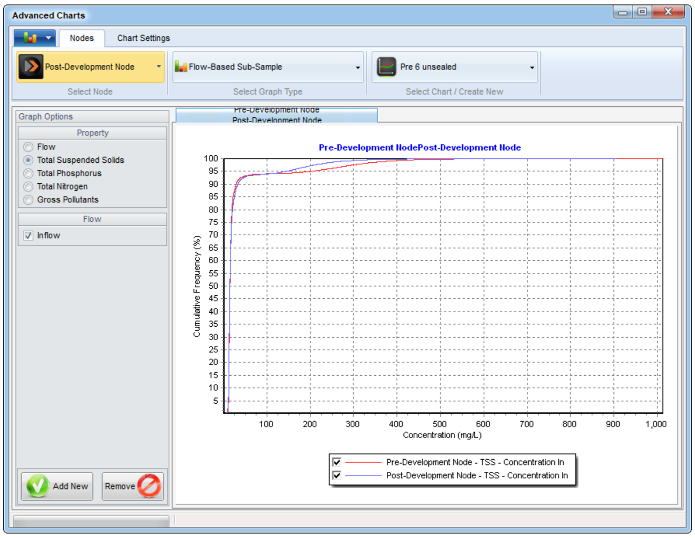


Figure 5.4. Pre-development and post-development outcomes for Option 2 amendments - total suspended solids.

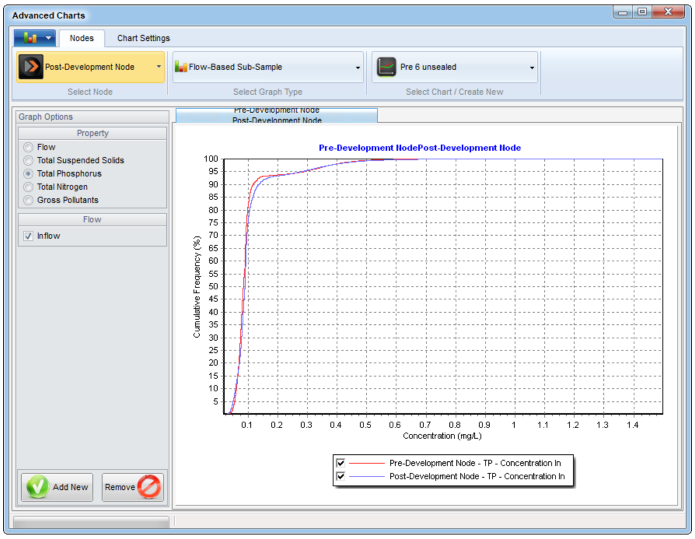


Figure 5.5. Pre-development and post-development outcomes for Option 2 amendments - total phosphorus

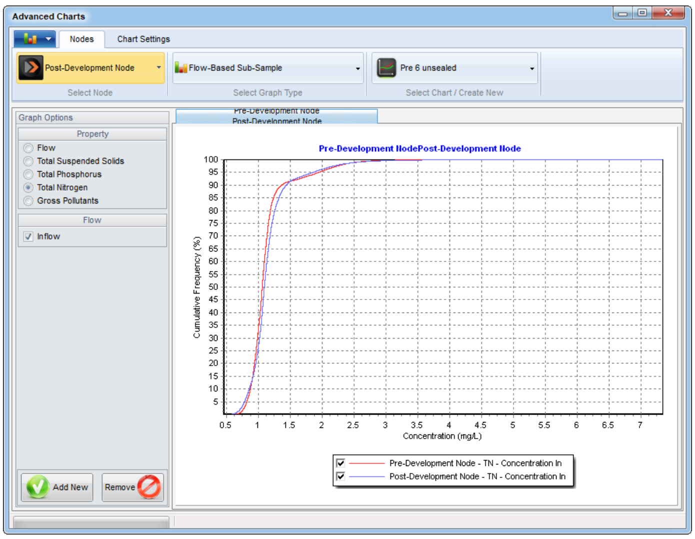
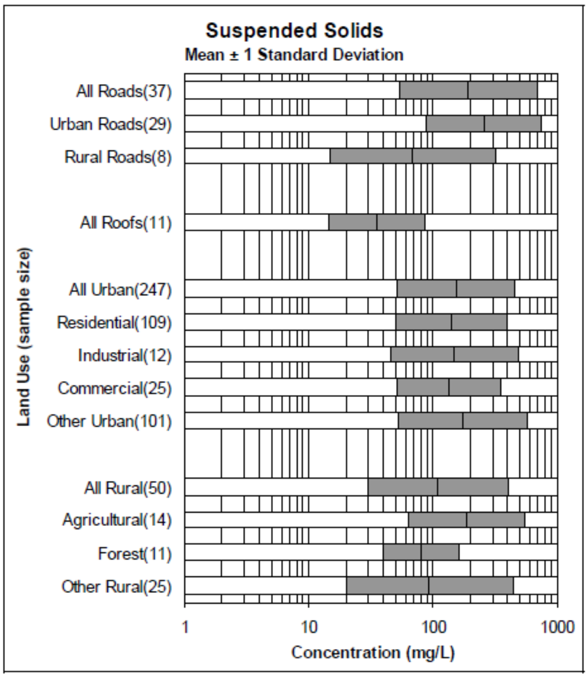
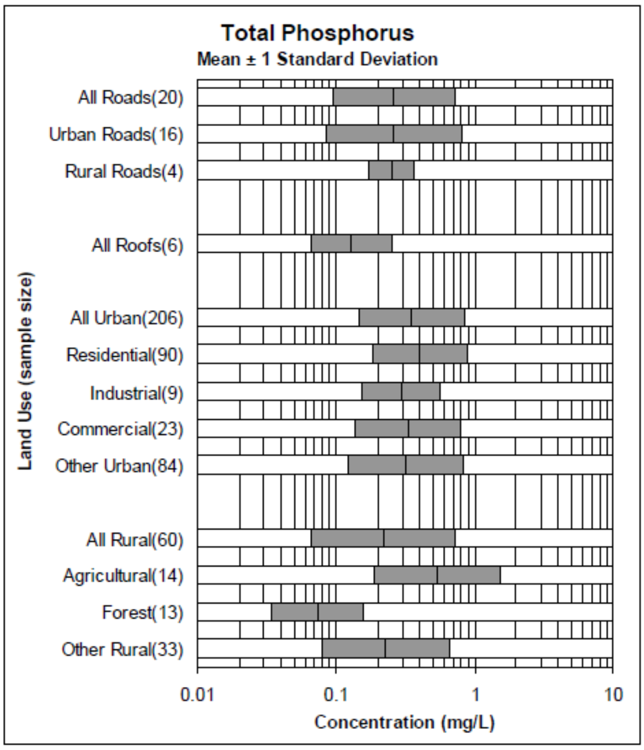
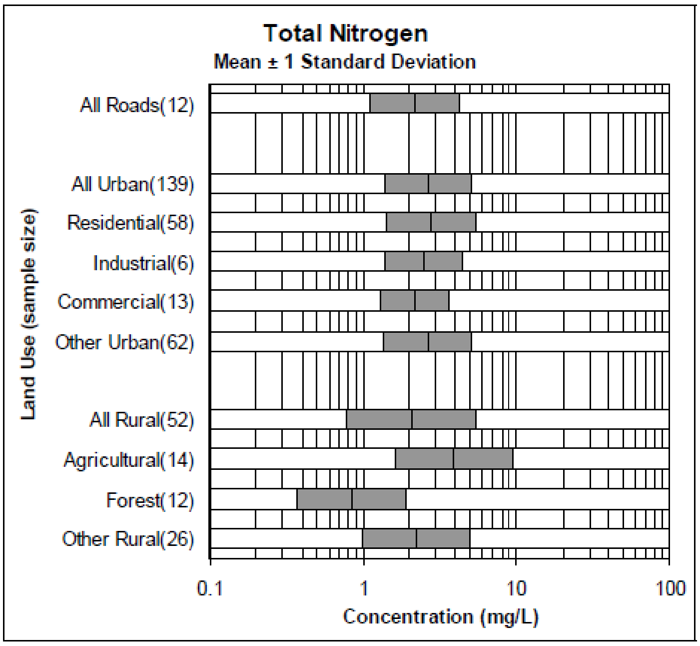


Figure 5.6. Pre-development and post-development outcomes for Option 2 amendments - total nitrogen



Mean and standard deviation concentration levels for the target pollutant types of total suspended solids, total phosphorus, and total nitrogen as determined by HP Duncan ('Urban Stormwater Quality: A Statistical Overview' – Catchment Hydrology CRC, 1999). The land-use types of 'All Rural' and 'Commercial' have been used in the cumulative frequency result assessment.





6. Conclusion.

The site and facility upgrades within the development property are well-advanced and close to practical completion and therefore the various stormwater collection, conveyance, and treatment measures referenced within this assessment are effectively in place and functional. As a means of ensuring the long-term viability and efficacy of the constructed stormwater treatment measures an 'Operational Environmental Management Plan' (OEMP) aimed at producing effective understanding and maintenance of the individual stormwater quality improvement devices (SQID's) should be prepared prior to issuing any final occupancy or operational certification. The OEMP's should be prepared in association with a 'works as executed' site plan showing the type, location and dimensions of all stormwater treatment devices discussed in this document. In particular , it is a requirement that a copy of the OEMP be retained on site for reference and use as part of a regular maintenance program, and for information for remedial actions in the event of component or system failure.

Details of the stormwater conveyance and water quality treatment measures discussed within this report are based on the site conditions that were evident during several visits that were conducted over a period of eight months. The proponents have been consulted throughout the report delivery process and have constantly provided information and feedback with respect to the proposed and existing stormwater conveyance and treatment measures, and the viability and practicality of other options when presented to them. Whilst the works undertaken on the site must address the relevant operating conditions, engineering standards, guidelines, and planning provisions it is important to also consider the safety requirements and overall functionality of the site as a motorsport facility that is an integral and important to both the local community and local businesses, and the greater motorsport community.

Whilst the process for undertaking the site improvements and upgrades commenced with relatively humble intentions it has grown organically over the past several months due to the cumulative effect of the site improvements to the point where it has continued at without all the necessary approvals and documented designs in place, however the final outcomes are able to satisfy the 'Neutral or Beneficial Effect' water quality objectives as defined by Water NSW and the Goulburn Mulwaree Council.

The stormwater quality objectives are one of several design elements to be considered within the scope of the development with the ensuing sections addressing the erosion and sediment control measures also required to be undertaken, and a detailed assessment of the wastewater management system that operates on the site.

Paul Johnson
Bachelor Science Agriculture/Irrigation (CSU)
Graduate Diploma Bush Fire Protection (UWS)
Graduate Certificate Engineering – Water (UTS)
Professional Engineer (Civil) – Engineers Australia (MIEAust - NER)
Registered Design Practitioner (Drainage) NSW Fair Trading – DEP0002293

28th August 2024

7. Erosion and Sediment Control Measures.

The following erosion and sediment control measures are recommended for the duration of works on the site and are to read in conjunction with the 'Blue Book' (Landcom 2004) and the accompanying 'Erosion and Sediment Control Plan' – Ref: 0041224-E101-A.

1. Until re-vegetation has achieved an effective cover of at least 80% across the site and where not already existing line the lower perimeter fences along the northeastern, northern, and northwestern boundaries with a sediment control fence in accordance with Standard Drawing SD6-8. The installation of the fences is intended to stop the migration of sediment entrapped in surface water runoff from exiting the site and fouling the natural waterways and drainage lines
2. Form a stabilised access in accordance with Standard Drawing SD6-14 on the northern entry road and maintain until all earthworks, associated heavy machinery, and trucks have finished on the site. The stabilised access is intended to prevent sediment and contaminants that may be attached to tyres and vehicles from being the exported offsite and onto the Braidwood Road and adjoining drainage systems. To the extent possible and practical direct all traffic into and out of the site through the northern entry road to ensure that the majority of traffic is forced to travel over the stabilised access.
3. Until all works and surface finishes are completed the site is to have straw bales available at the front entrances for placement across the entranceways when rain events that create runoff are occurring. It will be the responsibility of the site manager to ensure that the straw bales are deployed across the entrance roadways when rains occur. The straw bales are intended to allow surface water to runoff the site but at the same time trap and sediment or other contaminants for leaving the site. At the completion of the rain events any filtered material accumulated around the straw bales is to be manually collected and deposited to soil heap within the site.
4. The high-level outlet pipe within the northern dam and the outlet pipe for the stormwater drainage line along the western boundary that discharges into the land holding to the north are to be checked to ensure that the outlets are stabilised with a rock mattress that is at least equal to the requirements of Standard Drawing SD5-8. If the rock mattresses are less than the requirements of SD5-8 then appropriate measures will need to be undertaken to rectify the outlet area. This is to ensure that scouring and erosion does not occur around the outlet point in large rain events.
5. Any stormwater pits that have grated lids and are within an area where earthworks and/or surface finishes are yet to be completed are to be protected from sediment laden stormwater ingress by placing filter screens around the pits in accordance with Standard Drawing SD6-12. The filter screens are to be retained in place until the works are completed and any re-vegetation requirements achieve an effective cover of at least 80%.
6. The upslope aspect of any dam or basin that is yet to achieve an effective vegetation cover of at least 80% is to have sediment control fences installed around the upslope side/s of the dam or basin to prevent sediment being washed into the system during rain events. The sediment control measures are to be retained until re-vegetation has achieved an effective cover of at least 80% - some de-silting of the dams and basins may be required.

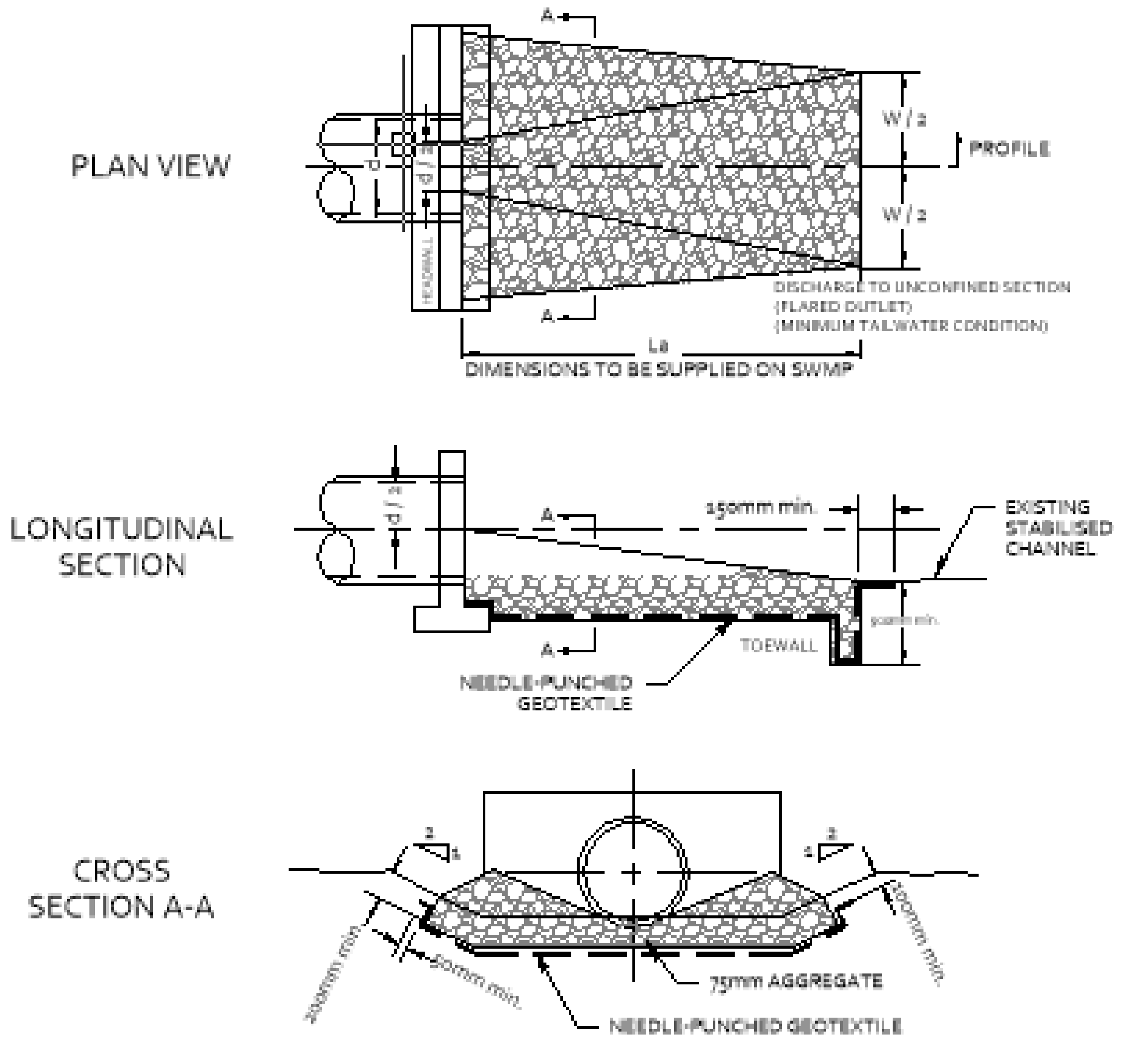
7. The dams and basins within the site will potentially be subjected to high sediment loadings from rain events during an initial settling period and until re-vegetation has had time to establish and be effective and therefore the quality of water within the basins will need to be monitored and managed prior to use and/or discharge. It is a requirement that the quality of water within the dams and basins is checked regularly for clarity and is managed in accordance with Section 6.3 of the 'Blue Book' Volume 1 (2004), in particular the requirement to provide a 5-day rainfall depth settling zone. Retained water within the dams and basins can be reused within the site to help irrigate vegetated areas however the quality of the water must meet the requirements and turbidity levels as stipulated in the 'Blue Book' prior to use. Flocculation and other treatment measures may be required prior to the use of retained water. All testing and treatment measures are to be recorded in a logbook and retained onsite for quality assurance and compliance purposes.
8. Any areas within the track infield or surrounding grounds that are subjected to erosion or scouring whilst re-vegetation is occurring are to be regarded and filled back to the design levels and grades to prevent any further exacerbation of the problem. The site manager will be responsible for the ongoing monitoring of the affected areas and will need to undertake additional stabilisation measures if the problem continues.
9. All stormwater pits and outlet pipes are to be regularly inspected for sediment accumulation and cleaned immediately if sediment is present.

Post construction phase:

10. Retain all sediment control measures and monitor the re-vegetation establishment rate until an effective cover of approximately 80% is achieved across the entire site to reduce the potential for erosion and sediment transfer off the site.
11. Check the condition of all erosion and sediment control measures during the site settling and establishment phase and reinstate / repair any measures that are removed or compromised
12. Check the condition of all headwalls, junction and inlet pits, and outlet protection zones and reinstate to the finished conditions if and as required, including the removal of any excess sediment that may accumulate during the site settling phase.
13. Once the vegetation cover has achieved the desired minimum cover of at least 80% remove all sediment and erosion control measures to avoid them becoming dilapidated and eventually contributing to future drainage and erosion problems.

General comments:

14. Check the condition of all sediment control works at least weekly and after rain events and rectify as necessary. Maintain a logbook for all erosion and sediment control measures.
15. All sediment control fence and barriers to be in accordance with Landcom Standard Drawing SD6-8
16. Protect all pits and pipe inlets in accordance with Standard Drawing SD6-12
17. Establish and maintain a stabilised site access in accordance with Landcom Standard Drawing SD6-14.
18. Maintain and operate all dams and basins in accordance with Section 6.3 of the 'Blue Book' and monitor / treat the quality of water reused or discharged from the site.



CONSTRUCTION NOTES:

1. COMPACT THE SUBGRADE FILL TO THE DENSITY OF THE SURROUNDING UNDISTURBED MATERIAL.

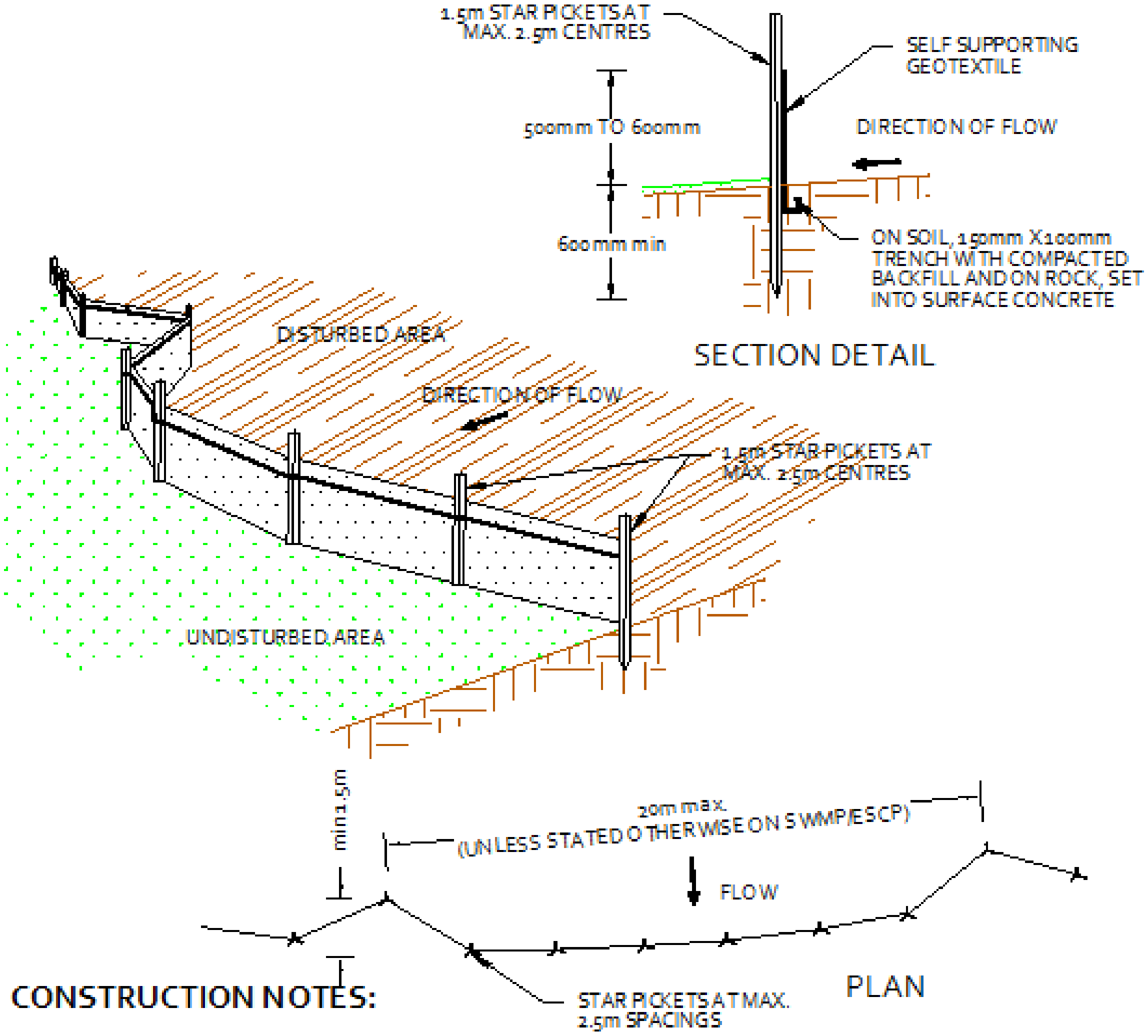
2. PREPARE A SMOOTH, EVEN FOUNDATION FOR THE STRUCTURE THAT WILL ENSURE THAT THE NEEDLE-PUNCHED GEOTEXTILE DOES NOT SUSTAIN SERIOUS DAMAGE WHEN COVERED WITH ROCK.

3. SHOULD ANY MINOR DAMAGE TO THE GEOTEXTILE OCCUR, REPAIR IT BEFORE SPREADING ANY AGGREGATE. FOR REPAIRS, PATCH ONE PIECE OF FABRIC OVER THE DAMAGE, MAKING SURE THAT ALL JOINTS AND PATCHES OVERLAP MORE THAN 300mm.

4. LAY ROCK FOLLOWING THE DRAWING, ACCORDING TO TABLE 5.2 OF LANDCOM (2004) AND WITH A MINIMUM DIAMETER OF 75mm.

5. ENSURE THAT ANY CONCRETE OR RIPRAP USED FOR THE ENERGY DISSIPATER OR THE OUTLET PROTECTION CONFORMS TO THE GRADING LIMITS SPECIFIED ON THE SWMP.

ENERGY DISSIPATER SD 5-8



CONSTRUCTION NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10 YEAR EVENT.

2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.

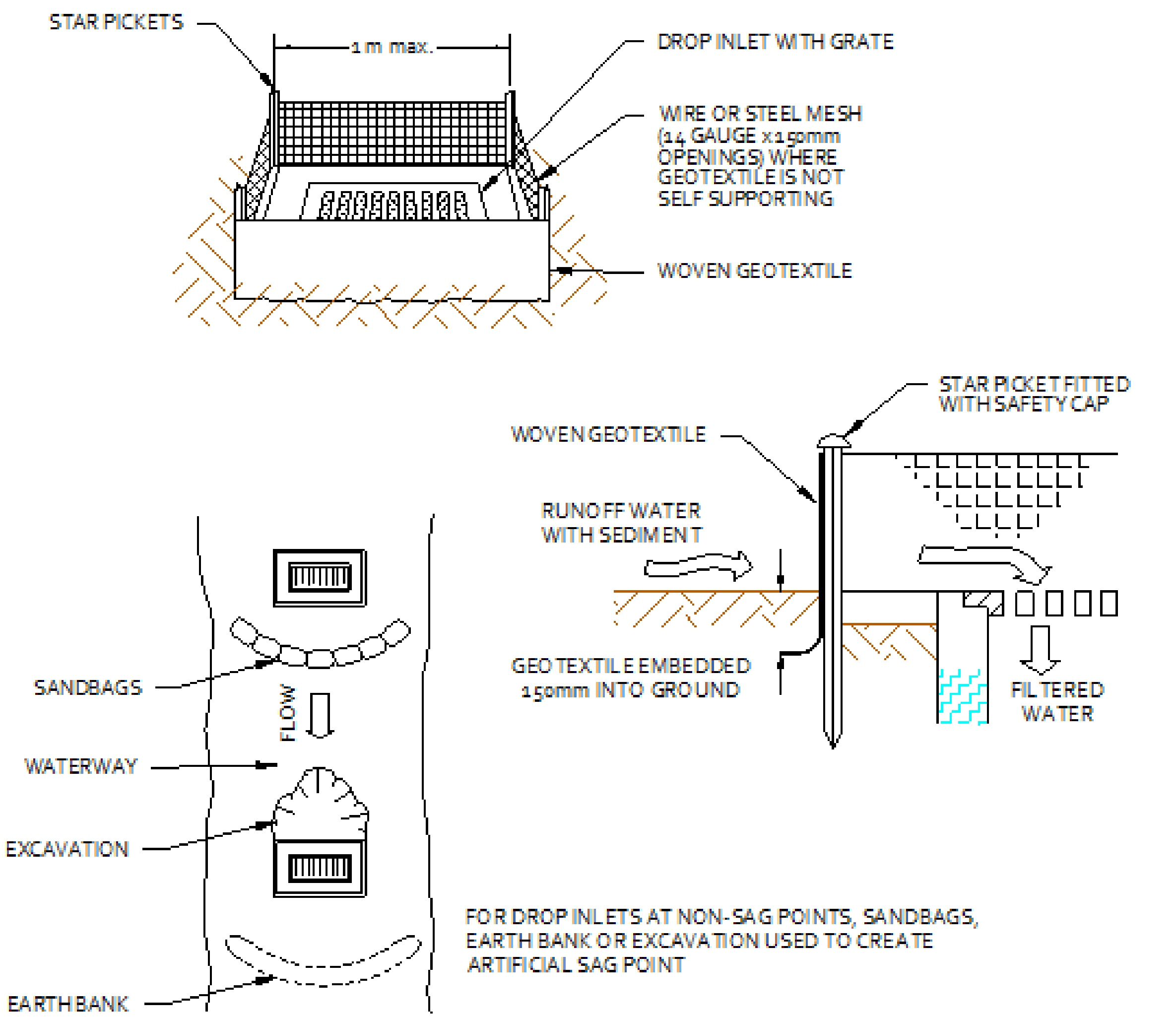
3. DRIVE 1.5 METER LONG STAR PICKETS INTO GROUND AT 2.5 METER INTERVALS (max) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.

4. FIX SELF SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.

5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE — SD 6-8



CONSTRUCTION NOTES:

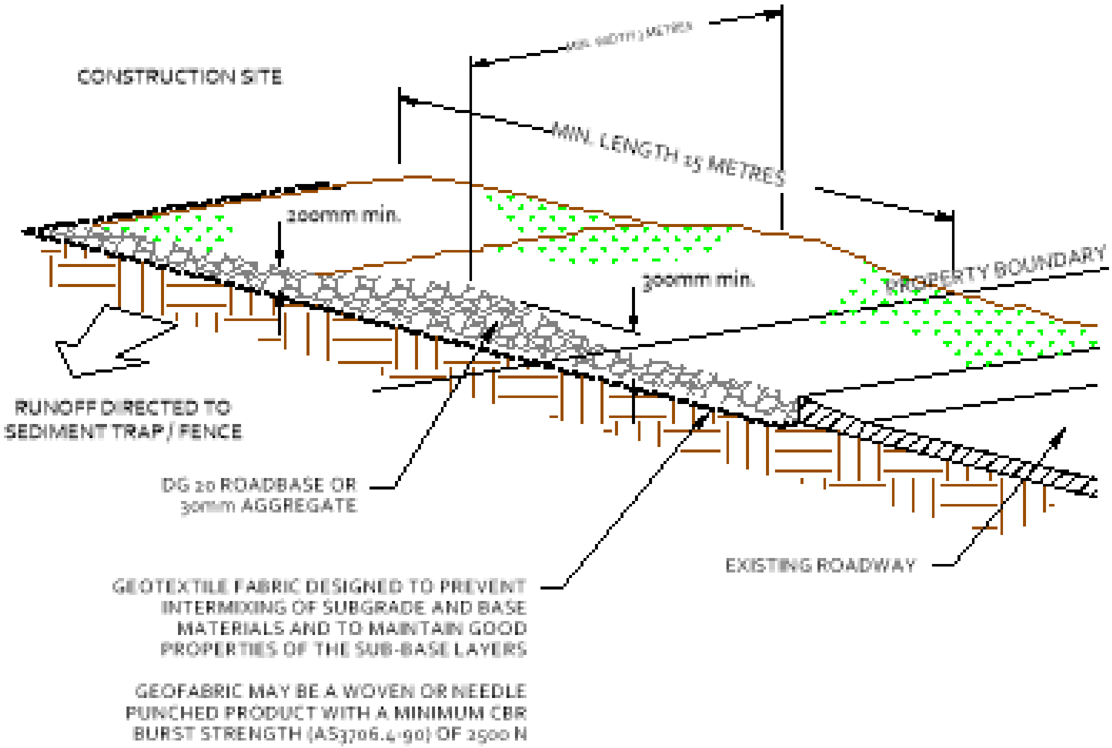
1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.

2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES

3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING

4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER SD 6-12



CONSTRUCTION NOTES:

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.

2. COVER THE AREA WITH NEEDLE PUNCHED GEOTEXTILE.

3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.

4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.

5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE

STABILISED SITE ACCESS SD 6-14

8. WASTEWATER MANAGEMENT ASSESSMENT

#	DESCRIPTION	DETAIL
8.1	Existing facilities as at May 2023	The development site is serviced by several wastewater management systems that are distributed around the race control precinct and the short-stay accommodation cabins on the southern end of the racetrack.
8.2		The managers cottage located on the right-hand side of the main entrance is serviced by a concrete septic with a nominal volume of 2,050 litres.
8.3		The septic tank is understood to have drained into an absorption trench approximately 20 metres in length located at the rear of the cottage.
8.4		Amongst all the buildings within the race control precinct is two separate toilet blocks (each male and female) which are identified as buildings '12' and '19' in the accompanying 'Wastewater Management Assessment and Infrastructure Plan' – Ref: 0041224-W101-A, and a café building which is labelled '18' in the same plan.
8.5		All three buildings drain the sewage waste to the rear of the main office – numbered '16' in the plan where there is a pre-treatment balance tank and a domestic rated AWTS system.
8.6		The AWTS system (brand undetermined) is comprised of two tanks, the first being an aerobic storage tank and the other the main treatment unit.
8.7		Due to the relatively flat nature of the terrain around the race control precinct the pre-treatment balance tank is installed with a sectional riser to lower the invert level of the inlet connection with a cutter pump transferring the waste to the AWTS.
8.8		Secondary treated effluent from the AWTS unit is transferred under pump pressure via a 32Ø PN12.5 PE poly pipe to the effluent treatment system located at the southern end of the site on the lower side of the short-stay accommodation units.
8.9		The short-stay accommodation cabins which each have six-bedrooms are serviced by a commercial sized secondary treatment system comprising a 30,000 litre pre-treatment balance tank with dual cutter pumps, two domestic rated Envirocycle AWTS units working parallel to each other, and a collection / transfer tank with a nominal capacity of 10,000 litres.
8.10		The treated effluent from the collection / transfer tank is pumped approximately 440 metres to the east of the cabins where there is a small detention pond located at the crest of the ridge above the spectator car park, area and then it is pumped to surface irrigation within a dedicated and fenced disposal area.

8.11		The detention pond has a nominal storage capacity of 30,000 litres and effluent is transferred to the irrigation disposal area via a dedicated pump that is activated by float controls.
8.12		The irrigation disposal system is divided into four separate distribution zones with the application of treated effluent through each zone rotated automatically via a manually operated sequencing valve (cam driven by water pressure).
8.13		The fenced irrigation disposal area comprises 1.45 hectares which falls toward the south and away from the main body of the site, however once the required buffer setback distances are factored into the operation of the system (calculated as 6 metres on all aspects) the available area for irrigation purposes is approximately 1 hectare.
8.14		According to obtained schematic details which show the concept design of the existing wastewater management system the irrigation disposal bed was to be 'terraced and mounded' to help prevent excess surface water / effluent runoff – refer to the attachment at the end of this section for details.
8.15		A small toilet block to the south of the spectator car park area which is generally only used during race events is serviced by a 2,050 litre concrete septic tank with narrow 20 metre long absorption trench slightly downslope of the tank.
8.16	Upgraded facilities – post May 2023	Upon possession of the site the owners undertook an extensive review of the existing water distribution and wastewater management systems to assess their suitability for the operation of the facility going forward.
8.17		Subsequently to that review and upon consultation with local plumbing contractors the owners commissioned significant improvements to the existing water supply arrangements, amenities, and effluent management infrastructure to cater for the distribution of people throughout the site once the facility is re-opened.
8.18		The improvements are largely associated with the increased number of toilet facilities for both abled and disabled persons, and the distribution of those facilities throughout the site.
8.19		The general layout, treatment, and distribution of effluent within the site is effectively the same as the 'existing' facilities, however the improvements now provide better management, control, water use, and monitoring capacity.
8.20		The outflow of primary treated effluent from the septic tank servicing the managers cottage to the absorption trench has been decommissioned with a macerator pump installed on the outlet side of the tank which transfers the effluent to the AWTS treatment system located at the rear of the main office.

8.21		Two additional toilet blocks with separate male and female amenities have been installed at the northern end of the race control precinct and at the southern end of the pit-straight garages adjacent to 'Turn 10'.
8.22		Sewage from each of the two new toilets blocks drains into a collection well with macerator pump that transfers the waste via a 32Ø PN12.5 PE poly pipe back to the AWTS treatment system located at the rear of the main office.
8.23		Two new disabled person toilets are to be installed on the western aspect of the existing toilet block '19' with the waste from it to be connected into the existing gravity sewer line that also drains into the AWTS treatment system located at the rear of the main office.
8.24		A small shower and toilet facility has been installed at the rear of the medical building (building '14' in the accompanying plan) which drains to the AWTS treatment system at the rear of the main office via a gravity sewer line.
8.25		The AWTS treatment system at the rear of the main office has been upgraded to include a new *BioSeptic S5000* - 5,000 litre per day AWTS treatment unit which is collecting all the treated effluent from the existing domestic rated AWTS system.
8.26		All treated effluent from the race control precinct is transferred via pump pressure from the *BioSeptic S5000* system through a 63Ø PN12.5 PE poly pipe that runs around the western and southern aspects of the site to the irrigation detention pond and disposal field located to the south of the spectator car park area.
8.27		Within this transfer line is the capacity through isolation control valves to discharge the treated effluent into the existing AWTS system that services the short-stay accommodation cabins.
8.28		Conversely, it would also be possible to transfer effluent from the AWTS system servicing the short-stay accommodation cabins to the *BioSeptic S5000* unit if there was a technical problem or malfunction in that system.
8.29		The septic system servicing the toilet block at the spectator car park area in the south of the site has been upgraded by decommissioning the absorption trench and installing a domestic rated AWTS unit downgrade of the tank with the treated effluent transferred a short distance to the irrigation detention pond and irrigation disposal area.
8.30		Other significant changes to the existing wastewater management systems and amenities generally is that all tapware and toilet cisterns have been or are in the process of being retro-fitted to water saving fixtures which was not necessarily the case previously due to the age of the items.

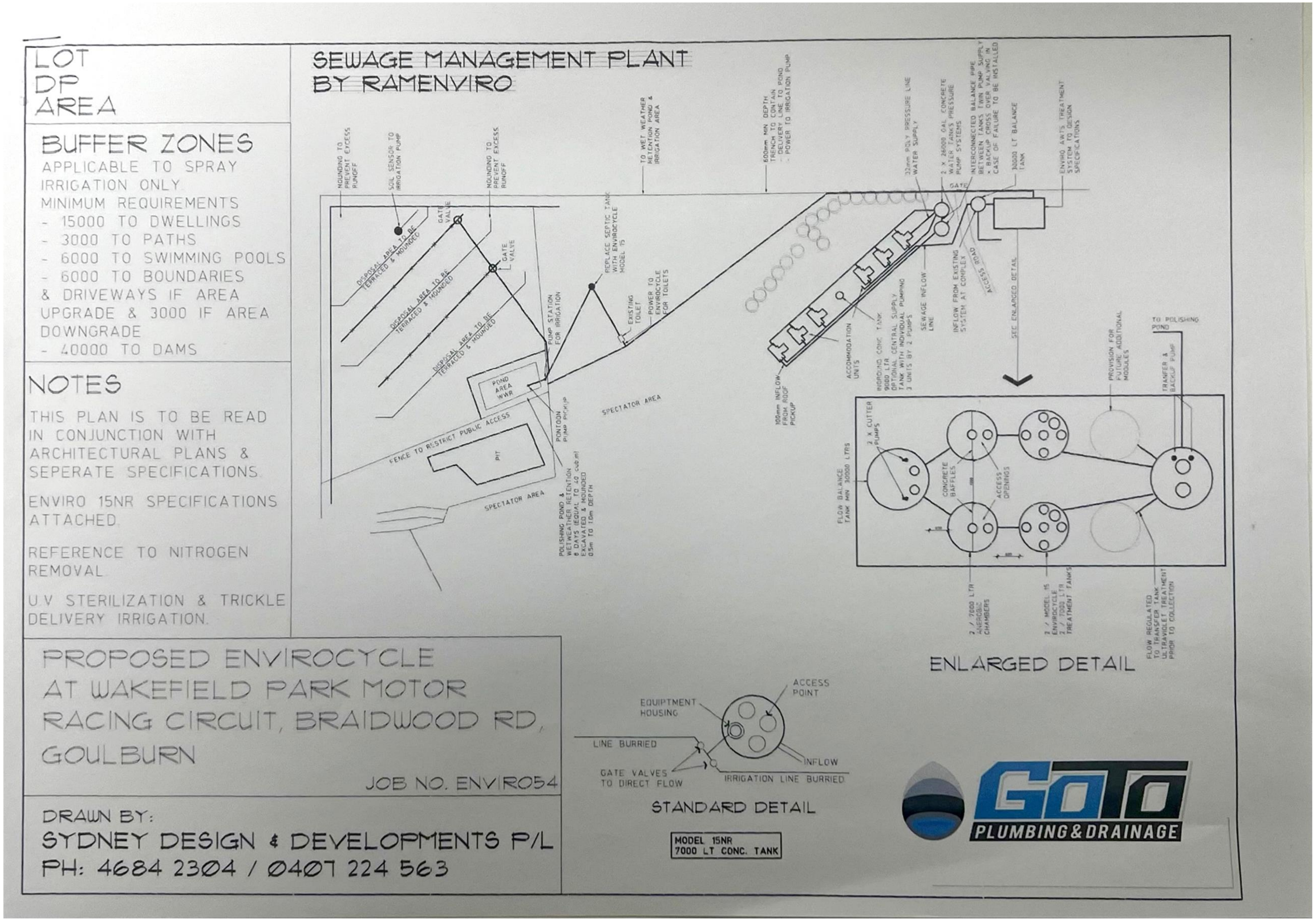
8.31		Greater management of water and future maintenance of all fixtures and fittings has been significantly improved by installing control and isolation valves to all feed lines within the water supply distribution network.
8.32	Daily effluent loading	The facility operators have provided some estimated 'guidance' figures for the anticipated number of staff, participants, and spectators that are likely to be on the site for different types of events, and the frequency of different events which would be in accordance with the Court determined operating controls.
8.33		Due to the commercial nature of the development facility and in the absence of any other formal data the daily effluent loading values for the race-related activities are based on the publication from the NSW Health Department titled '*Septic Tank and Collection Well Accreditation Guideline'* (December 2001) which provides values for a range of non-standard development types.
8.34		Daily loading values for the short-stay accommodation cabins which can be quantified as a type of 'dwelling' are based on the Water NSW guideline titled '*Designing and Installing Onsite Wastewater Systems'* (February 2023).
8.35		The following figures are the estimated maximum number of persons on a daily basis and would be subject to variations under different event types and weather / seasonal conditions: 1. Staff (permanent) – Monday to Sunday = 20 2. Staff (casual) – Weekends = 10 3. Event participants – Monday to Sunday = 200 4. Spectators – normal / smaller events = 200 5. Spectators – large / special events = 1000 6. Cabins – Monday to Sunday = 3 cabins per week
8.36	**1.**	The number of staff is an estimation for the busier weekdays and events and covers management, race officials, administration, maintenance, and general duties personnel, and also allows for a small number of short-stay contractors that may undertake specialised service and maintenance work.
8.37		Effluent loading values for the category of persons is based on the category type – 'Factories and Offices' with wastes of WC, urinal, basin, shower, and kitchen which is 45 litres per person per day (rounded up), and this equates to a total of 900 litres per day.
8.38	**2.**	Casual staff is a provision for race-day volunteers to assist with entry control, spectator direction and supervision, and other general race-day duties.
8.39		The category type of 'Factories and Offices' is still used however the wastes are limited to WC, urinal, basin, and kitchen which yields 30 litres per person per day which is 300 litres per day.

8.40	**3.**	Event participants is inclusive of actual participants and support staff and covers normal weekday activities such as test drives, driver training, special and corporate days, and this would also include any food or refreshment contractors engaged for the day.
8.41		The classification of category type is based on 'Recreation Grounds' with wastes of WC, urinal, and basin which is 3 litres per person, plus an additional 2 litres per person for 'kitchen' which equates to 5 litres per person per day.
8.42		Based on a potential of 200 persons for these event days the loading would be 1,000 litres per day.
8.43	**4.**	Spectator numbers for the normal / smaller events is estimated to be 200 per day and these would be distributed around the race control precinct and the spectator car park area to the south.
8.44		The loading values are the same for the event participants in '3' and therefore would equate to 1,000 litres per day.
8.45	**5.**	Spectator numbers for the larger / special events covers the production car, race car, and motorbike events and are generally limited to a Friday to Sunday period, and to specific number per year.
8.46		The loading values are the same for the event participants in '3' and therefore would equate to 5,000 litres per day.
8.47	**6.**	The short-stay accommodation cabins each comprise 6-bedrooms with full bathroom, laundering, and kitchen facilities.
8.48		The cabins will be available for accommodation by prior booking so the numbers can be regulated, however it is anticipated that on an average basis the likely occupancy rate will be in the order of 3 cabins for two days of each week.
8.49		As there is a potential for higher occupancy associated with the larger race events the loading values have assumed that four cabins will be occupied with all 6-bedrooms being used at the rate of 200 litres per bedroom for the first four bedrooms and 100 litres for each additional bedroom which equates to 1,000 litres per cabin per day - a total of 4,000 litres.
8.50	Potential effluent loading	By adding the maximum loading values in the above classifications together there is a potential under the extreme of events to generate approximately 12,200 litres of effluent per day – however the likelihood of achieving this volume would be very small as the assumed values are very conservative by being at the high end of the loading scales, and it is purely speculative at this stage as to the numbers that will actually be at the site for each type of event.

8.51		The distribution of effluent drainage and volumes over the site is difficult to estimate but if it is assumed that the loading from Sources 1 to 4 were confined to the race control precinct and the balance to the southern end of the site then the effluent distribution would be in the order of 3,200 litres to the effluent treatment system behind the main office and the balance of 9,000 litres treatment system at the short-stay accommodation cabins.
8.52		The 3,200 litre per day loading at the race control precinct would be within the treatment capacity of the *BioSeptic S5000* treatment unit and therefore no alterations would be required.
8.53		The 9,000 litre per day loading at the southern end of the site would be managed through the pre-treatment balance tank associated with the effluent treatment system which has a nominal capacity of 30,000 litres, and dosing to the downgrade AWTS units which each have a treatment capacity of 1,500 litres per day** can be regulated through the current float and timer controls (** the 1,500 litre per day treatment capacity is based on present day accreditation criteria however the Envirocycle units were likely to have been rated at 2,000 litres per day at the time of their original installation).
8.54		The transfer of treated effluent between the two effluent systems and the irrigation detention pond can be performed at the daily rate equivalent to the treatment capacity of the individual systems (5,000 litres and 3,000 litres respectively), and irrigation applications can be controlled by timers and float switches attached to the irrigation pump system.
8.55		Assuming a maximum loading of 12,000 litres per day was to occur over two consecutive days (weekend activities) then there is sufficient capacity in the irrigation detention pond (~30m³) to hold the two days of maximum loading plus ensuing days of normal loading with regular daily irrigation disposal.
8.56		The soils within the irrigation disposal area are assessed as being a moderately structured clay loam with an irrigation loading rate for secondary treated effluent of 3.6mm per day
8.57		Using a nitrogen balance equation as the worst-case loading conditions each irrigation zone that covers an area of approximately 2,000m² can receive up to 4,000 litres per day (4,000 litres requires an area of 1,825m²).
8.58		Assuming a full loading of 12,000 litres per day (rounded down) it would be possible (although unnecessary) to distribute the entire load over the available irrigation disposal area within one full cycle of the four available irrigation zones.

8.59		To avoid over-dosing the available irrigation areas it will be a site management requirement after large event days that the treated effluent is gradually applied to the irrigation disposal area during the following week to avoid creating effluent runoff.
8.60		It will also be a requirement that the weather forecast for the ensuing days is also monitored to schedule effluent irrigation outside of any predicted large rain events.
8.61		Operation of the two effluent treatment systems and the irrigation disposal system will be subject to some trial-and-error assessments during the early phases of the site's re-opening with amendments made as necessary to manage the collection, treatment, and discharge of effluent on the site.
8.62		The existing distribution and manifold system including the surface irrigation sprinklers will need to be checked regularly as part of the site's management program to ensure that all valves, controls, and sensory equipment is operating property, and to monitor for any leaks, broken outlets, or excessive runoff within the irrigation disposal area.
8.63		If it is found that the number of persons on the site for the larger events exceeds the estimated numbers presented in the assessment and that the current effluent management systems cannot adequately handle the peak loads then consideration will need to be given to either regulating the number of people on the site, or the introduction of portable toilet blocks with pump-out by accredited contractors to cover the additional loading.
8.64	Kitchen facilities	It is noted that the facility operators intend to engage caterers to undertake the preparation, delivery, and sale of food at the various events through both the existing café within the race control precinct and mobile vendors within the spectator viewing areas to the south for the larger events.
8.65		All food will be prepared offsite by the individual caterers with all cleaning of servery trays, pots, utensils, and the like also be the responsibility of the individual caterers.
8.66		Caterers using the café building within the race control precinct will be able to use the existing kitchen, display, and heating facilities, and they will be responsible for cleaning those areas at the end of each day.
8.67		It is not the intention of the operators the employ full-time staff for food preparation and sale purposes as it is not part of their core business, and the site is not licenced to serve alcohol.
8.68	Constraints.	The effluent disposal area is located on the southern side of the ridge that runs diagonally across the southern portion of the site with a defined drainage depression located in the neighbouring property to the south that runs northeast to southwest

8.69		The nearest part of the irrigation disposal area to the drainage corridor to the south after buffer setbacks are calculated is 45 metres which satisfies the minimum separation distance requirement of 40 metres.
8.70		As a precautionary measure, and if not already in place, a small earthen mound shall be formed approximately 8 to 10 metres upslope of the southern boundary and run for the full length of the irrigation area plus a short return of 2 metres up the slope at each end to prevent direct surface water / effluent irrigation runoff from the disposal area discharging into the neighbouring property.
8.71		A search of the Water NSW Groundwater Bore Register indicates that there are no registered groundwater bores within 500 metres of the lowest elevation within the irrigation disposal area.



Copy of original design for the effluent treatment and disposal system at the southern end of the site that services the short-stay accommodation cabins (date unknown).

S5000 AWTS with Equalisation Tank

TECHNICAL DATA SHEET

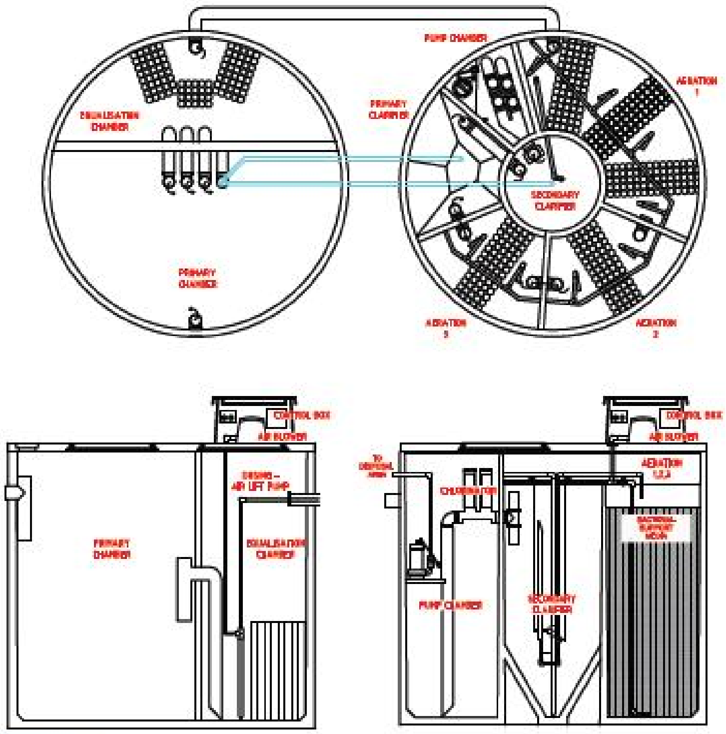
- The S5000 Aerated Wastewater Treatment System (AWTS) turns wastewater into clear, odourless, water for pumped disposal to vegetation for transpiration to the atmosphere.
- Reliable, high quality, Australian designed and built, all concrete treatment system.
- Particularly suited for commercial premises with dynamic flows.
- Dynamic flows are retained in the equalization chamber and pulse dosed into the treatment process. This prevents overloading and ensures consistent maximum treatment.
- It is a modular unit, allowing the treatment system to be expanded if required.

SPECIFICATIONS

COMPONENT	DESCRIPTION
Septic tank	Septic chamber 4600L. Equalisation chamber 2350L
Dosing air lift pump	1 x 80l/min diaphragm air blower 240vac
Treatment tank	70250L consisting of: Three discrete aeration chambers – 2174L, 1081L 1200L
Aeration	1 x 200l/min diaphragm air blower 240vac 170 - 190 watts 10 air diffusers
Bacterial support media	2.163m^3 providing 437m^2 of surface area
Clarifiers	Primary clarifier Surface area 0.727m^2 Secondary clarifier surface area 0.50m^2 Waste activated sludge recycled to the septic tank
Disposal/transfer pump	Drainer type. 240vac, 7 amps, 0.75kW
Control box	Plugs into a 3 pin outlet - 10 amps circuit

FEATURES

- ☑ 30 Year Warranty - concrete components
- ☑ 2 Year Conditional Warranty - Pumps and Blowers
- ☑ Alarm System
- ☑ Chlorine Disinfection
- ☑ 1st Year Servicing, if required
- ☑ Includes Basic disposal/ Irrigation System
- ☑ Disposal pumps to match application
- ☑ Suits New and Existing Premises
- ☑ Environmentally Friendly

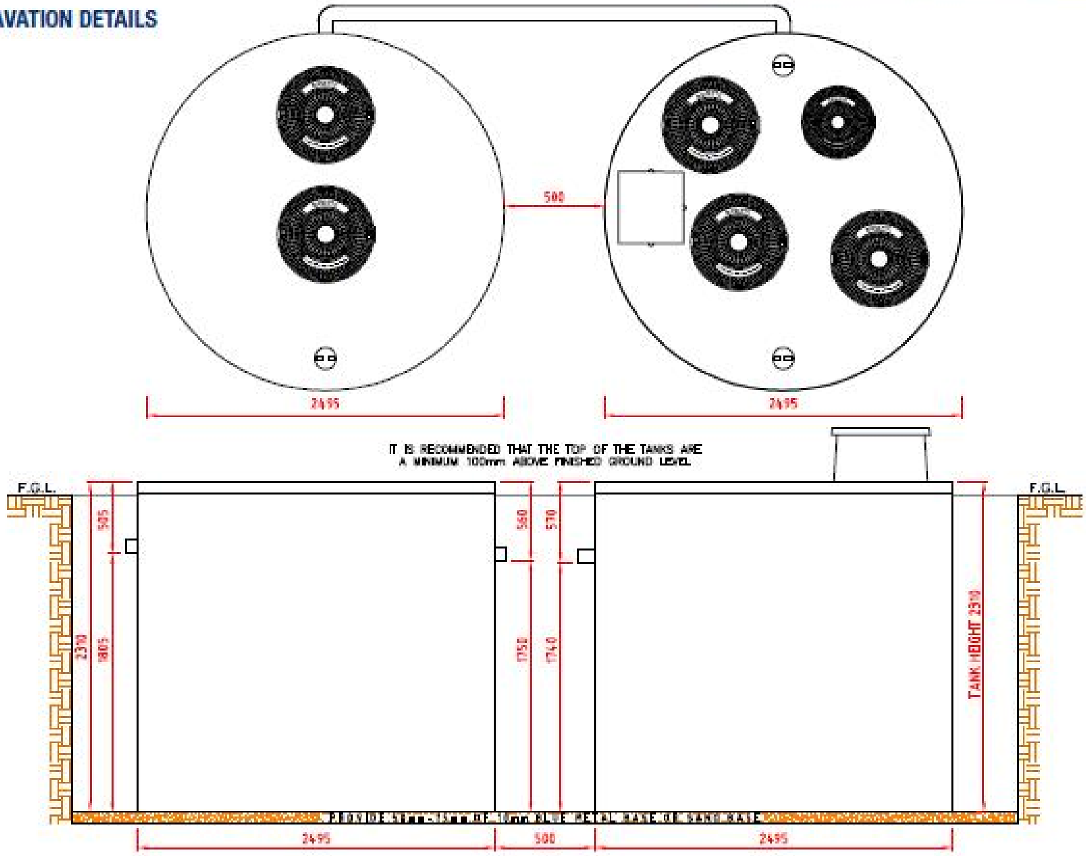


67 Smeaton Grange Road, Smeaton Grange, NSW, 2567
PO BOX 3250, Narellan, NSW, 2567
P: 1300 658 111 | E: reception@bioseptic.com.au
www.bioseptic.com.au | ABN 95 056 461 226

BIOSeptic
The Ultimate Sewage System

S5000 AWTS with Equalisation Tank

EXCAVATION DETAILS



The S5000 was tested at the Jimboomba AWTS National test site and accredited to the Advanced Secondary Level of AS1546.3:2017. It achieved excellent results:

PARAMETER		AVERAGE CONCENTRATIONS	COMPLIANCE
Biochemical Oxygen Demand	BOD_5	1.37mg/L	100%
Suspended Solids	SS	3.07mg/L	100%
Pathogen Indicators	E. coli	0.37c.f.u/ 100mL	100%

TREATMENT CAPACITY

Treatment capacity varies with influent strength and flow pattern. BioSeptic can assist with designing the best system for any application.

OTHER BIOSEPTIC SEWAGE SYSTEMS

DOMESTIC MODELS	TANKS	TREATMENT CAPACITY FOR *BALANCED DOMESTIC INFLUENT*	USE
S-TEN	1	1500L/day	Single dwelling – 10 persons
Performa	2	1500L/day	Single dwelling – 10 persons
S2500	2	2500L/day	Larger dwelling
Commercial models			
S3500	2	3500L/day	Commercial premises
S5000	**2**	**5000L/day**	**Commercial premises**

67 Smeaton Grange Road, Smeaton Grange, NSW, 2567
PO BOX 3250, Narellan, NSW, 2567
P: 1300 658 111 | **E:** reception@bioseptic.com.au
www.bioseptic.com.au | **ABN** 95 056 461 226

BIOSeptic
The Ultimate Sewage System