Eastern Creek Speedway

Operational Environmental Management Plan

Appendix H: Water Quality Operation Monitoring Program

Document Control

Project No: 0214

Project: Eastern Creek Speedway

Client: Speedway Promotions

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Revision History

Revision	Date	Details	Approved by
v1	15/11/2021	Draft 1	A. Reisch
v2	16/11/2021	Final 1	A. Reisch

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1 Introduction

1.1 Overview

A State Significant Infrastructure (**SSI 10048**) proposal for the Sydney International Speedway (now referred to as the Eastern Creek Speedway – the **Speedway**) was approved by the NSW Minister for Planning & Public Spaces in the *SSI 00048 Notice of Decision* December 2020 (the **Speedway Approval**).

The former Sydney Speedway site, located on Government-owned land at Clyde, was required to house the future stabling and maintenance facilities for the Sydney Metro West project. As such, the new Speedway is being constructed by Sydney Metro and Western Sydney Parklands Trust (the **Proponents**) on land owned by Western Sydney Parklands Trust (**WSPT**) within the Eastern Creek Motor Sports Precinct (**MS Precinct**) east of Ferrers Road, Eastern Creek (the **Site**).

Full details of the Speedway development are provided in the Sydney International Speedway Environmental Impact Statement 2020, prepared by the NSW Government and Sydney Metro (**Speedway EIS**).

1.2 Surface Water Monitoring Conditions

In accordance with the *SSI 00048 Instrument of Approval* December 2020 issued by the NSW Minister for Planning & Public Spaces (the **Speedway Conditions**), an Operational Water Quality Monitoring Program (**WQ OMP**) has been developed to provide for ongoing monitoring of the surface water generated by the Site, and moreover to ensure that surface water discharged from the Site does not exceed the pollutant reduction target criteria detailed in Table 2 of *Part J: Water Sensitive Urban Design and Integrated Water Cycle Management* of the Blacktown Development Control Plan 2015 (**WSUD Guidelines**).

The Speedway Conditions and Speedway Commitments, as detailed in Table 5-1 of the Sydney International Speedway Amendment Report 2020 (**Speedway Amendment Report**) prepared by the NSW Department of Planning, Industry & Environment (**DPIE**) that the WQ OMP specifically responds to are detailed in Table 1, along with a reference to the section of the WQ OMP where a more detailed response is provided.

Table 1: Relevant Operational Monitoring Program Conditions and Commitments

Condition or Commitment #	Relevant Speedway Condition/Commitment	WQ MP Section
Speedway Condition A1	*The Proponent must carry out the SSI in accordance with the terms of this approval and generally in accordance with the:* *a) Sydney International Speedway – Environmental Impact Statement Volume 1 & 2 (the EIS) (dated August 2020);* *b) Sydney International Speedway – Submissions Report (the Submissions Report, dated November 2020); and* *c) Sydney International Speedway – Amendment Report (the AR, dated November 2020).*	Section 1.4
Speedway Commitment SWW6	***Surface Water Discharge*** *Water treatment infrastructure would be designed to include appropriate water quality measures so that surface water runoff is treated taking into consideration the pollutant reduction target criteria taken from Table 2 of Part J: Water Sensitive Urban Design and Integrated Water Cycle Management of the Blacktown Development Control Plan 2015. to a level that is compliant with the ANZECC/ARMCANZ (2000) and ANZG (2018) default guidelines for 95 per cent species protection.*	Section 4
Speedway Commitment SWW7	***Water Quality Monitoring*** *An operational surface water monitoring program would be implemented to observe any changes in surface water quality that may be attributable to the project and inform appropriate management responses. The monitoring program would be developed and implemented to align with the preconstruction and construction monitoring described in SSW5.*	Section 5

1.3 Consultation

The Water Quality Monitoring Program for the construction of the Speedway (**WQ CMP**) was developed further to consultation with the NSW Environment Protection Authority (**EPA**) and Blacktown City Council (**BCC**) in response to Speedway Commitment SWW5. With reference to Speedway Commitment SWW7, the WQ OMP has been *developed and implemented to align with the preconstruction and construction monitoring described in SSW5*, i.e. it essentially provides for a continuation of the protocols of the WQ CMP, and as such the advice from both the EPA and BCC remain unchanged, and have been equally incorporated into the operational WQ OMP.

1.4 Reference Documents

1.4.1 Speedway Approval

Numerous planning reports were prepared to assess the Speedway as part of the Speedway EIS process; in this regard, the WQ OMP specifically references the following reports:

- *Sydney International Speedway Environmental Impact Statement 2020, prepared by the NSW Government and Sydney Metro* (**Speedway EIS**);

- *Sydney International Speedway Submissions Report 2020, prepared by the NSW Government and Sydney Metro* (**Speedway Submissions Report**);
- *Sydney International Speedway SSI Amendment Report 2020*, prepared by DPIE (**Speedway Amendment Report**);
- *SSI 00048 Notice of Decision* 2021 issued by the Minister for Planning & Public Spaces (**Speedway Approval**); and
- *SSI 00048 Instrument of Approval* 2020 issued by the NSW Minister for Planning & Public Spaces (the **Speedway Conditions**)

1.4.2 Additional Documents

In preparing the SWMP, the following key documents have been referenced:

- *Blacktown Development Control Plan 2015* (**BCC DCP**);
- *Protection of the Environment Operations Act 1997* (**PEO Act**);
- *Water NSW Act 2004* (**Water Act**);
- *The Australian Government Department of Agriculture's National Water Quality Management Strategy 2018,* prepared by the Australian Department of Agriculture and Water Resources, **ANWQS**); and
- *State Environmental Planning Policy (Western Sydney Parklands) 2009* (**SEPP WSP**).

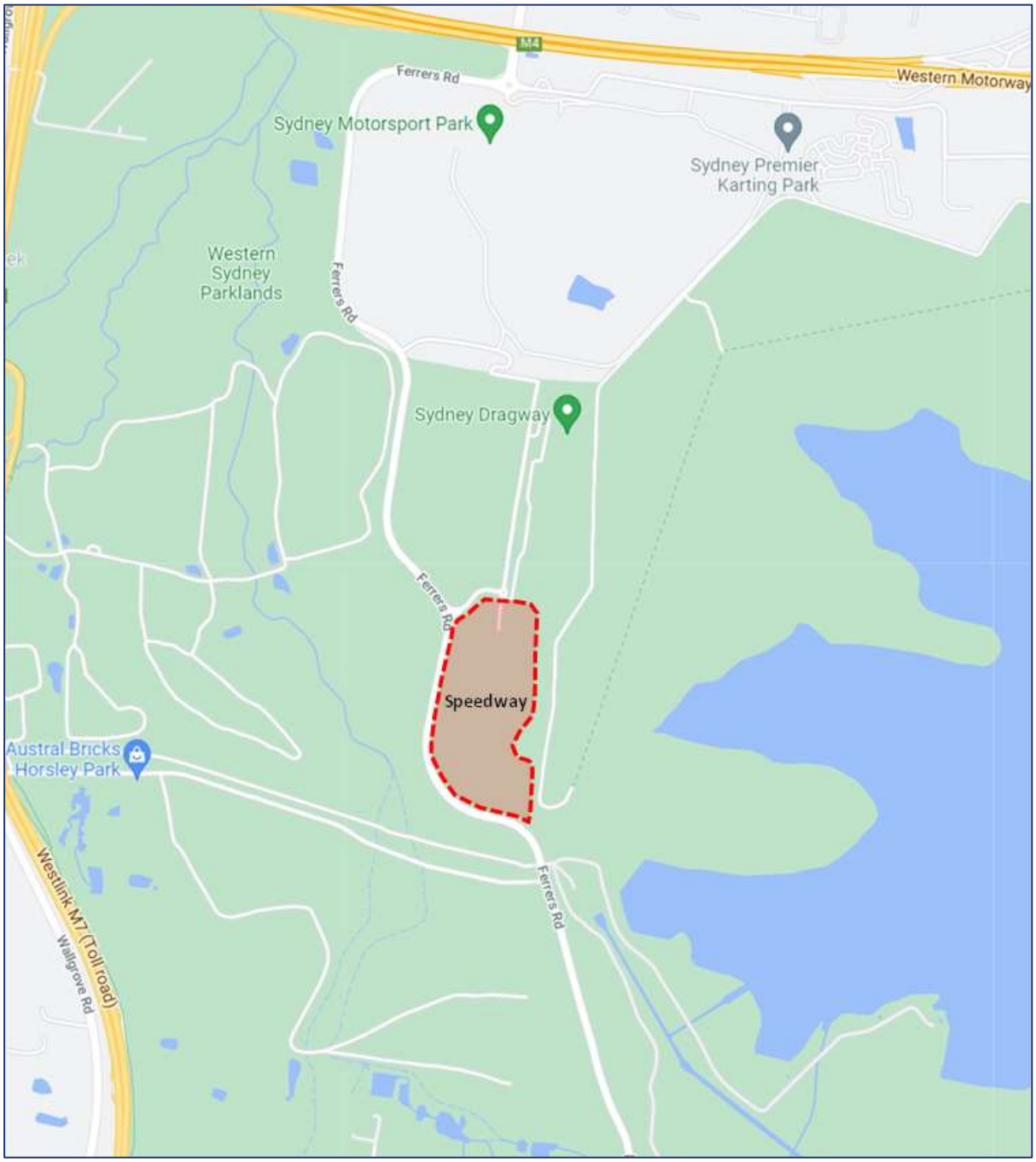
Additional guidelines and policies referenced in the WQ OMP are detailed in Section 3.3.

2 The Speedway

2.1 Site Location

The Speedway is located on land east of Fullers Road, and immediately north of the Warragamba Pipeline. The Speedway is shown in its local context in Figure 1.

Figure 1: Site Location



2.2 The Speedway

The accordance with the Speedway Approval, the Speedway will provide:

- A world-class clay-based racetrack for speedway cars including sprintcars, wingless sprints, Midgets, V8 Dirt Modifieds and Formula 500 cars;
- A new grandstand and terraced seating accommodating up to 7,000 spectators;
- Public amenities, corporate boxes, food, beverage and merchandise outlets;
- Dedicated on-site parking for Speedway competitors and spectators in accordance with a Reciprocal Car Parking Agreement with the operators of the Sydney Dragway (the **Dragway**);
- A dedicated competitor **Pit Area** to service the speedway, including workshops, garages and trackside support areas;
- Significant operational support infrastructure, including a comprehensive stormwater management system.

2.3 Speedway Operations

It is anticipated that the construction of the Speedway will be completed in mid-late November 2021, and that initial track testing will commence in mid-late December 2021, with competitive races to commence in January 2022.

The Speedway Approval allows the Speedway to be operational year-round, though most Speedway Events are to be held during the typical speedway racing season (September to May). On average, it is expected that the Speedway will host:

- 10 Major Events per year, attracting approximately 4,000 to 6,000 spectators;
- 30 – 35 Average Events per year, attracting approximately up to 3,000 spectators;
- 10 Minor Events per year, attracting approximately up to 1,500 spectators; and
- Practice sessions, typically for competitors and teams, across the year.

2.4 Parking

The total number of parking spaces to be provided for Speedway competitors, and for Speedway and Dragway spectators, is detailed in Table 2. The Speedway and Dragway operators have entered into a Reciprocal Car Parking Agreement which permits the sharing of the Speedway and Dragway parking areas between both the Speedway and the Dragway for major and other events as necessary.

Table 2: Speedway and Dragway Car Parks

Car parking area	Competitor parking spaces	Spectator parking spaces
A	-	600
B	150	-
C	-	460
D	-	1760
Total car parking spaces	150	2820

Source: Speedway EIS

2.5 Speedway Water Management Support Infrastructure

2.5.1 Stormwater Management

A pit and pipe system has been installed across the Site to collect and transport stormwater run-off into stormwater drains; water will then flow to on-site detention tanks (see also Section 2.5.2) located across the Site before being treated in accordance with WSUD Guidelines pollutant reduction targets. Stormwater run-off will ultimately be discharged into the existing culverts underneath Ferrers Road and from there flow into local waterways.

The stormwater drainage system has been designed to provide capacity to convey stormwater flows from the broader Speedway and Dragway sites during a 100 year average recurrence interval storm event to the stormwater drainage system.

Further details of the stormwater system are provided in a 2021 Memo prepared by Turnbull Engineering, *PSC No. 00013/11814 – Speedway Water Quality Update* (**Stormwater Memo**) which is attached as Appendix A.

2.5.2 On-site Water Detention

On-site detention storage tanks are located in the car park areas, beneath the racetrack and beneath the terraced seating areas; these provide adequate system capacities and mitigate potential flood impacts and increases in stormwater discharge from the Site.

In addition to the on-site detention tanks, three rainwater harvesting tanks are provided across the main Speedway Site, with a combined capacity of approximately 200 cubic metres. The rainwater tanks would collect surface run-off and run-off from the grandstand roof for non-potable uses within the Site, including:

- Irrigating the track during a race event;
- Flushing toilets and for use within the garbage room of the grandstand facility; and
- Hose taps and at washdown areas across the project site.

2.5.3 Waste Water Management

Waste water includes a combination of discharge from amenity buildings, trade waste and grease waste. The plumbing system will convey the flow of waste water from the Site via gravity feed to the existing Dragway connection to the Sydney Water sewer main for discharge via Brabham Drive.

All trade and grease waste discharges will be pre-treated prior to entering Sydney Water's sewer main. Trade waste includes liquid discharges from racetrack facilities including wash down areas, pit facilities, waste management areas, loading docks and garage workshop areas, while grease waste includes liquid discharges from retail areas with hot food cooking operations and bin wash areas.

These systems have been designed and will operate in accordance with Sydney Water's trade waste policy requirements.

3 Relevant Legislation

3.1 Environmental Planning & Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (**EP&A Act**) and the Environmental Planning and Assessment Regulation 2000 (**EP&A Regulation**) are the primary pieces of legislation regulating land use planning and development assessment in NSW. This legislation is supported by a range of environmental planning instruments including State environmental planning policies (**SEPP**s) and local environmental plans (**LEP**s).

3.2 NSW Environmental Planning Instruments

Further to the above, Section 5.22 of the EP&A Act provides that environmental planning instruments (such as LEPs and SEPPs) do not, with some exceptions, apply to SSI projects. Notwithstanding, key environmental planning instruments that have been considered for consistency with the operation of the Speedway are detailed in sections below.

3.2.1 Protection of the Environment Operations Act 1997

Section 120 of the Protection of the Environment Operations Act 1997 (**PEO Act**) prohibits the pollution of waters.

Potential pollution of waters was assessed in Chapter 13 and Chapter 15 of the Speedway EIS in regard to soils and surface water, and groundwater and geology respectively. These assessments determined that the risks associated with water quality can be appropriately managed by the Site's stormwater system and supporting infrastructure, and by appropriate ongoing monitoring and maintenance (see also Section 0).

3.2.2 Water NSW Act 2004

The Warragamba Pipelines infrastructure are classified as Controlled Areas under the Water NSW Act 2004 (**Water Act**). Given the location of this infrastructure immediately south of the Site, the potential to impact the pipeline was assessed in Chapter 19 (Hazards) of the Speedway EIS; these assessments determined that the operation of the Speedway would have no impact on this infrastructure.

3.2.3 Water NSW Regulation 2013

Water NSW Regulation 2013 (**Water Regulation**) provides for regulatory powers to manage pollution activities that impact water quality, including those specifically relating to Special Areas and Controlled Areas. The potential impact of Speedway operations on these Special Areas and Controlled Areas were assessed in Chapter 13 of the Speedway EIS, and determined that waste can be appropriately managed by the Site's stormwater system and supporting infrastructure, and by appropriate ongoing monitoring and maintenance (see also Section 0).

3.3 Additional Legislative Considerations

Additional guidelines and policies referenced in the assessment of water quality are detailed in Table 13-2 of the Speedway EIS, which is reproduced below.

Table 3: Surface Water Guidelines and Policies

Guideline/policy name	Overview of guideline and where guideline has been used
Guidelines for Development Adjacent to the Upper Canal and Warragamba Pipelines (Water NSW, 2018).	In consideration of the potential water quality risks to the Warragamba Pipelines, including erosion and sedimentation.
Neutral or Beneficial Effect on Water Quality Assessment Guidelines (Sydney Catchment Authority, 2015)	To inform the Neutral of Beneficial Impact Assessment required under Clause 13 of the State Environmental Planning Policy (Western Sydney Parklands) 2009. The project is not within the Sydney Drinking Water Catchment Area as defined in the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*, therefore a Neutral of Beneficial Effect (NorBE) water quality assessment using the NorBE tool is not required. However, development consent cannot be granted for development in the Western Sydney Parklands unless the consent authority is satisfied that the development 'will have a neutral or beneficial impact on the quality of the water in the bulk water supply infrastructure'. While the NorBE test does not apply, it has been used to inform a qualitative assessment to demonstrate that the project will have a neutral impact on water quality in the bulk water infrastructure. The NorBE assessment is detailed in Section 13.7.2.
Using MUSIC in Sydney Drinking Catchment guidelines (Water NSW, 2019)	To determine typical stormwater run-off concentrations for the Neutral of Beneficial Impact Assessment. Stormwater management and water quality control assessment has been carried out as per the guidelines.
Australian and New Zealand Water Quality Guidelines (ANZG, 2018)	The recommended ANZG guideline values for water quality have been used to describe and assess the existing water quality of the receiving environments of the project, the potential impacts of the project on water quality, and the development of the mitigation measures for the project.
Australian Drinking Water Guidelines (NHMRC, 2011)	The primary guidance document on drinking water quality in Australia has been used to describe the existing water quality of Prospect Reservoir, and considered as part of the water quality impact assessment and development of the mitigation measures for the project.
NSW Water Quality and River Flow Objectives (DECCW, 2006), and the *Healthy Rivers Commission Inquiry* (HRC, 1998)	These guidelines provide the agreed environmental values and long term goals for surface water in NSW and have been used to consider the environmental values for the project and to describe existing water quality. At the time that the Water Quality Objectives were approved for catchments across NSW (September 1999), the Hawkesbury-Nepean catchment was subject to an independent inquiry by the Healthy Rivers Commission (HRC) (HRC, 1998). The HRC inquiry into the Hawkesbury-Nepean system determined water quality objectives which recognised the communities 'environmental values' and uses of the waterways. These water quality objectives were agreed to by the NSW Government through a statement of Joint Intent in 2001. The Healthy Rivers Commission (HRC) guidelines are relevant to the project as they establish environmental values for different regions of the Hawkesbury-Nepean River Catchment, within which the project is located. The HRC water quality objectives have been adopted as the relevant water quality objectives for the project, however the associated water quality criteria for protection of these values will be adopted from the ANZG (2018) Water Quality Guidelines, as these were established more recently than the HRC guidelines. As such, the ANZG (2018) water quality guideline values take precedence for assessment of the existing water quality of the receiving environments.
Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013)	In identification of the sensitive receivers for the project.
Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (Department of Environment and Conservation, 2004)	To determine the water quality monitoring program for the project.
Acid Sulfate Soils Assessment Guidelines (Ahern et al, 1998)	Used to develop mitigation and management measures associated with the exposure of acid sulfate soils on the project site.

Source: Speedway EIS

4 Water Quality Management Infrastructure

4.1 Water Quality Risks

Potential risks to water quality during operation of the Speedway are associated with run-off of pollutants from impervious surfaces (e.g. the grandstands and car parks); and pollution associated with the use of vehicles at the Site, including spectator and competitor vehicles, refuelling operations, accidental spills and/or major vehicle incidents on the racetrack. Potential water quality impacts associated with these activities may include:

- An increase in surface water run-off which contains pollutants from vehicles (for example fuel spillage, tyre wear, vehicle incidents etc) being discharged to nearby watercourses;
- An increase in the pollution load of road run-off being discharged to nearby watercourses due to an increase in traffic associated with the project
- Changes to current hydrological regimes.

These risks were also identified in the Environmental Risk Analysis provided in Section 24 of the Speedway EIS, as reproduced in Table 4.

Table 4: Speedway Operation Risk Register

Potential impact	Initial risk rating (unmitigated)			Effect of proposed mitigation measures	Residual risk rating (with mitigation)		
	Consequence	Likelihood	Risk rating		Consequence	Likelihood	Risk rating
Soils and surface water quality							
Operation							
Potential for water quality impacts on nearby watercourses due to runoff of pollutants from new impervious surfaces and pollution associated with the use of vehicles, including increased vehicular traffic, refuelling, accidental spills or major vehicle incidents on the racetrack.	Moderate	Unlikely	Medium	Water treatment infrastructure would be designed so that surface water runoff/waste water is treated to a level that is compliant with the ANZECC/ARMCANZ (2000) and ANZG (2018) default guidelines for 95 per cent species protection, reducing the consequence of potential water quality impacts.	Minor	Unlikely	Low
Potential change in surface water flows across the project site, potentially resulting in an increased volume of stormwater being discharged from the project with potential impacts on scour and waterways downstream.	Moderate	Likely	Medium	Provision of a stormwater drainage system that would have the capacity to convey stormwater flows from the entire project site to the on-site detention storage tanks during a 100 year average recurrence interval (ARI) rainfall event, would reduce the likelihood and consequence of potential impacts.	Minor	Unlikely	Low
Flooding and hydrology							
Operation							
Potential increase of rainfall runoff being directed to Eastern Creek due to an increase in impervious surfaces and changes to subcatchment boundaries within the project site, increasing existing flood risk.	Moderate	Likely	Medium	Stormwater infrastructure including onsite detention tanks would be sized to provide adequate system capacities and mitigate increases in stormwater discharge from the project site, reducing the likelihood and consequence of potential flooding impacts.	Minor	Unlikely	Low
Climate change adaptation							
Operation							
Increased ambient temperatures and heatwaves could result in peaks in electrical network demand and increased power transmission outages.	Major	Unlikely	High	Solar lighting backed up by batteries and diesel generators would be provided for car parks. The project site would be connected to the electrical grid with further opportunities investigated for additional solar power. These measures would reduce the consequence of potential impacts.	Minor	Unlikely	Low
Lower annual average rainfall, increased rainfall intensity and surface water flooding could result in breaches in water quality controls and potential impacts to adjacent waterways.	Major	Unlikely	High	The design includes rainwater storage tanks which would provide a source of water for maintenance of the clay track, and onsite detention tanks to control the flow of water through the project site and have been sized to account for future climate scenarios. Water treatment devices would be incorporated into the downstream discharge point to meet agreed water quality targets prior to discharge from the project site, reducing the consequence of impacts.	Minor	Unlikely	Low

Source: Speedway EIS

4.2 Water Quality Criteria

With reference to the WSUD guidelines, Table 5 outlines the required percentage reductions in annual average loads of pollutants further to Speedway operations.

Table 5: Operational Pollutant Reduction Targets

Pollutant	Post Development Pollutant Reduction Targets (percentage of post development annual average load)
Gross Pollutants (GP)	90
Total Suspended Solids (TSS)	85
Total Phosphorous (TP)	65
Total Nitrogen (TN)	45
Total Hydrocarbons	90

Source: WSUD Guidelines

4.3 Water Quality Management Infrastructure

As discussed in Section 2.5, significant water quality management infrastructure has been built into the Site so as to achieve the pollutant reduction targets detailed in Table 5. The key pieces of this water quality management infrastructure are detailed in sections below.

4.3.1 OceanGuard

OceanGuard is a gully pit basket designed to capture pollutants that runs into stormwater drains. The system uses filtration bag liners that are designed to remove gross pollutants, total suspended solids and attached pollutants; baskets holding these bags are provided in all inlet pits within the Speedway drainage network, and will act as an initial water quality treatment measure. A total of 92 Ocean Guards are provided across the Site.

4.3.2 StormFilter

StormFilter provides the second stage of water treatment. StormFilter is a stormwater treatment system that uses media-filled cartridges to absorb and retain pollutants from stormwater run-off; these cartridges are stored in an underground chamber which stormwater enters from an upstream pit, and is treated through a patented passive filtration system.

The Speedway drainage network incorporate StormFilter chambers at various outlet locations around the Site to ensure that any discharged water meets the WSUD Guidelines' pollutant reduction targets; a total of 246 StormFilter cartridges are provided across the Site.

4.3.3 Surface Water Management Infrastructure Assessment

With reference to the Stormwater Memo, MUSIC modelling of the Site's water quality management infrastructure determined that the system – supplemented by the reuse of rainwater and the separation of waste water – significantly improves the quality of water being discharged from the Site, and moreover meets the WSUD pollutant reduction targets.

5 Water Quality Monitoring

5.1 Monitoring Process

In accordance with the Speedway Conditions and Speedway Commitments, the Proponent will implement a WQ OMP for the life of the Speedway operations, or until so advised by the Planning Secretary.

As detailed in Speedway Commitment SWW7, the monitoring program has been *developed and implemented to align with the preconstruction and construction monitoring described in SSW5*, i.e. the WQ CMP. In this regard, the methodology employed in the WQ OMPs prepared by Aberfeldie during the construction of the Speedway has been adopted for the WQ OMP, noting again that the methodology for this monitoring was discussed and agreed with the EPA and BCC.

A copy of the most recent Quarterly Environmental Monitoring Report July 2021 (**QEM Report**) containing the WQ CMP is provided as Appendix B.

5.1.1 WQ OMP Requirements

The WQ OMP will be implemented to monitor the impacts on water quality resources as well as the effectiveness of the mitigation measures built into the design of the Speedway. While the Speedway EIS does not identify any direct impacts to waterways, there is the potential for indirect impacts to surrounding habitats from erosion and contaminated surface water run-off from the Site, particularly further to the sealing of all car parks across the broader Speedway and Dragway sites.

The analytes for inclusion of the WQ OMP will include as a minimum:

- Total Suspended Sediment (TSS);
- Turbidity (NTU);
- pH;
- Electrical Conductivity (EC);
- Total Phosphorus (TP);
- Total Nitrogen (TN); and
- Chlorophyll-a.

5.1.2 Water Quality Monitoring Location

While Eastern Creek is the closest body of water to the Site, much of the creek is significantly overgrown and highly inaccessible. As such, the WQ CMP water quality monitoring location agreed with the EPA and BCC was selected as the point nearest to Eastern Creek that is accessible from the Site boundary. This location is shown in the Table 4 of the QEM Report, and reproduced below.

Table 6: Water Quality Monitoring Location

Sample Location: -33.822, 150.866
Date: first week of the month (or following a rain event)

Pictures of Sampling location GPS below:

Pictures of creek section containing the sampling location below:

Pictures of Specific Sampling site below:

Source: QEM Report

5.1.3 Baseline Data

Following a rain event and prior to the start of construction of the Speedway in January 2021, water samples were taken at the water quality monitoring location; the data collected from these samples is summarised in Table 5 of the QEM Report (reproduced below), noting that this data provides the most appropriate **Baseline Water Quality** data for reference in future WQ OMPs.

Table 7: Baseline Water Quality Data

Parameter	Unit Measured	7/01/2021 (Baseline Data)
Chlorophyll-a	ug/L	<5
Conductivity	uS/cm (at 25ºC)	450
Dissolved Oxygen	mg/L	9
Nitrate and Nitrite	mg/L	<0.05
pH	pH Units	8
Phosphate (Total)	mg/L	0.05
Total Kjeldahl Nitrogen	mg/L	0.3
Total Nitrogen	mg/L	0.3
TSS	mg/L	4.7
Turbidity	NTU	6.5
Arsenic	mg/L	0.002
Cadmium	mg/L	<0.002
Chromium	mg/L	<0.003
Copper	mg/L	0.002
Lead	mg/L	<0.001
Mercury	mg/L	<0.0001
Nickel	mg/L	<0.004
Zinc	mg/L	<0.005

Source: QEM Report

5.1.4 Water Quality Monitoring Program Assessment

The WQ OMP will provide for water sampling and testing in an identical manner to that detailed in the QEM Report. As part of the testing and assessment component of the WQ OMP, an appropriately qualified consultant would also assess background water/weather conditions that may have affected the results of the sampling, such as the level of water, recent rain events and the level of rainfall in the area.

Further to these considerations, the consultant will provide an assessment of the quality of the sampled water with the Baseline Water Quality data.

5.2 Water Quality Mitigation Measures

As discussed, the Speedway EIS concludes that the significant water quality management infrastructure provided across the Site is more than capable of ensuring that any water discharged from the Site will meet the pollutant reduction targets established in the WSUD Guidelines. However, should the WQ OMP determine that the quality of water being discharged does not meet these targets, it is anticipated that the following mitigation measures would be implemented:

- A second round of sampling and testing after the initial finding that water quality targets are not being met to confirm the initial results;
- A review of Speedway and Dragway operational Incident Reports to determine any possible sources of pollutants;
- Revisions to the operations of the Speedway and Dragway to further reduce the potential of water contamination (as required);
- Inspections of the 3 key water quality management systems to ensure that they are operating in accordance with their design specifications and compatibility;
- A comprehensive inspection of the water quality management infrastructure across the Site, and appropriate maintenance/repairs or the like as required (see also Section 0); and
- Retesting of water quality to ensure that the mitigation measures have appropriately worked so that water discharge meets the WSUD Guidelines' pollutant reduction targets.

5.3 Monitoring Schedule

During the construction of the Speedway, water quality monitoring was undertaken every 3 months, and it is recommended that the operational WQ OMP also be undertaken every 3 months for the first year of Speedway operations, and then every 6 months through the second year of Speedway operations. A determination in regard to the schedule of the WQ OMP after this time will be made in consultation with the EPA, BCC and the Planning Secretary.

5.4 Maintenance

In order to ensure that the water quality management infrastructure continues to reduce pollutants in accordance with the WSUD Guidelines, the Proponent will undertake maintenance of this infrastructure through the life of Speedway operations via a suitably qualified maintenance provider.

While the maintenance provider will be appointment once Speedway operations – and moreover Speedway Events – commence, it is anticipated that the maintenance schedule will be in accordance with the OceanGuard and StormFilter maintenance guidelines prepared by Ocean Protect (provided in Appendix C). These guidelines suggest the following maintenance schedule:

- **OceanGuard: Serviced every 2 – 6 months** (depending of storm conditions), including:
  - Visual inspections of each pit and insert components;
  - Removal of accumulated sediment and pollutants;
  - Replacement of insert components as required; and
  - Removal of waste materials at an approved waste disposal site.
- **StormFilter: 6 Month inspection** (depending of storm conditions), including:
  - Visual inspection and evaluation of the StormFilter cartridges and chamber; and
  - Removal of larger gross pollutants;
- **StormFilter: 12 Month service** (depending of storm conditions), including:
  - Evaluation of StormFilter cartridge components and media;
  - Removal of accumulated sediment from StormFilter chamber;
  - Washdown of StormFilter chamber;
  - Cartridge replacement as required; and
  - Removal of waste materials at an approved waste disposal site.

Appendix A

PSC No. 00013/11814 – Speedway Water Quality Update

TURNBULL ENGINEERING

Document Title	Design Memorandum
Intended Recipient	Sydney Metro
Document Number	TEJ0198-MEM-0111
Document Revision	A
Prepared by:	Alan Thim
Date	15 January 2021

1. Introduction

1.1. Background

To satisfy the Ministers Conditions of Approval and Blacktown City Council, Turnbull Engineering has investigated and designed a system to improve the water quality of the drainage network.

This report documents the outcomes of that investigation and implementation.

1.2. Project Objective

The project objectives are to:

- Investigate the appropriate water quality treatment train methods
- Undertake MUSIC modelling to assess the treatment train effectiveness
- Comply with Blacktown City Council water quality targets
- Update drainage design to include the assessed water quality controls

2. Water Quality Devices

2.1. OceanGuard

OceanGuard is a gully pit basket design to capture pollution that runs into stormwater drains. The system uses filtration bag liners that are designed to remove gross pollutants, total suspended solids and attached pollutants. These baskets will be placed in all inlet pits within the Speedway drainage network and will act as an initial water quality treatment measure before entering the next stage of the treatment train.

2.2. StormFilter

The StormFilter is the second stage of the treatment train. It is a stormwater treatment system that uses media-filled cartridges to absorb and retain pollutants from stormwater runoff. These cartridges are stored in an underground manhole where stormwater inlets from an upstream pit and is treated through the patented passive filtration system. The Speedway drainage network will incorporate these StormFilter chambers at various outlet locations around the site as a second and final way to improve water quality.

3. Design Criteria

3.1. Council Water Quality Targets

As per Blacktown City Council's WSUD guidelines, the following table outlines the required percentage reductions in post development annual average load of pollutants:

Pollutant	Post Development Pollutant Reduction Targets (percentage of post development annual average load)
Gross Pollutants (GP)	90
Total Suspended Solids (TSS)	85
Total Phosphorous (TP)	65
Total Nitrogen (TN)	45
Total Hydrocarbons	90

Table 1. Required percentage reductions in post development annual average load of pollutants (Source: BCC WSUD Developer Handbook 2020)

The assessment of the effectiveness of the water quality treatment train focused on its ability to treat TSS, TP & TN.

4. MUSIC Assessment

4.1. Introduction

To assess the effectiveness of the proposed treatment train, a MUSIC model was developed.

4.2. MUSIC parameters

The development of the MUSIC model utilised the various treatment nodes available in the program's feature, MUSIC-link. Blacktown City Council has worked closely with the developers of MUSIC to establish various treatment nodes that they have deemed suitable for use with the LGA. This ensures that the analysis performed in MUSIC aligns with the requirements of Blacktown City Council.

Furthermore, the MUSIC model requires input from site specific scenarios such as catchment areas and pavement imperviousness. Speedway site contains a mixture of pavement types where imperviousness varies. As such, the MUSIC model has been split up to capture known pervious and impervious areas. The separation of areas is imperative to determine how much of the stormwater runoff in the catchment area enters the treatment train.

4.3. Model Schematisation

The MUSIC model schematisation is shown below in Figure 1. The schematisation is reflective of the Speedway drainage network.

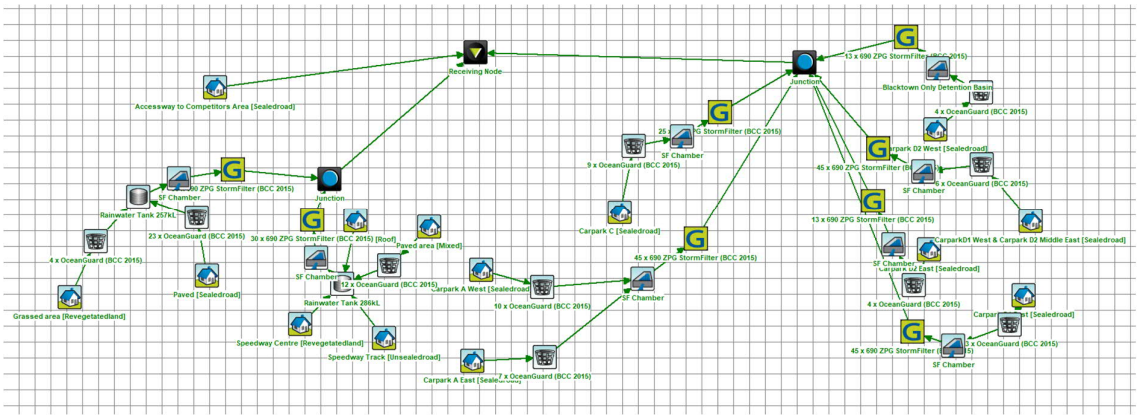


Figure 1 – MUSIC model schematisation

5. Results

The proposed water quality control measures include 92 OceanGuards and 246 StormFilter cartridges, supplemented by rainwater reuse.

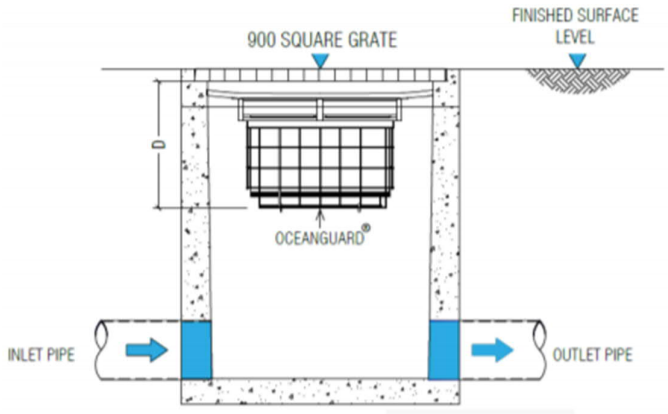
Since MUSIC is running on stochastically generated EMC's, the results of one run will vary from another. The below table shows the average results over 10 runs:

Pollutant Reduction Target	Average Percent Reduction	BCC Pollutant Reduction Targets
Total Suspended Solids (TSS)	87.52	85
Total Phosphorous (TP)	68.17	65
Total Nitrogen (TN)	46.2	45

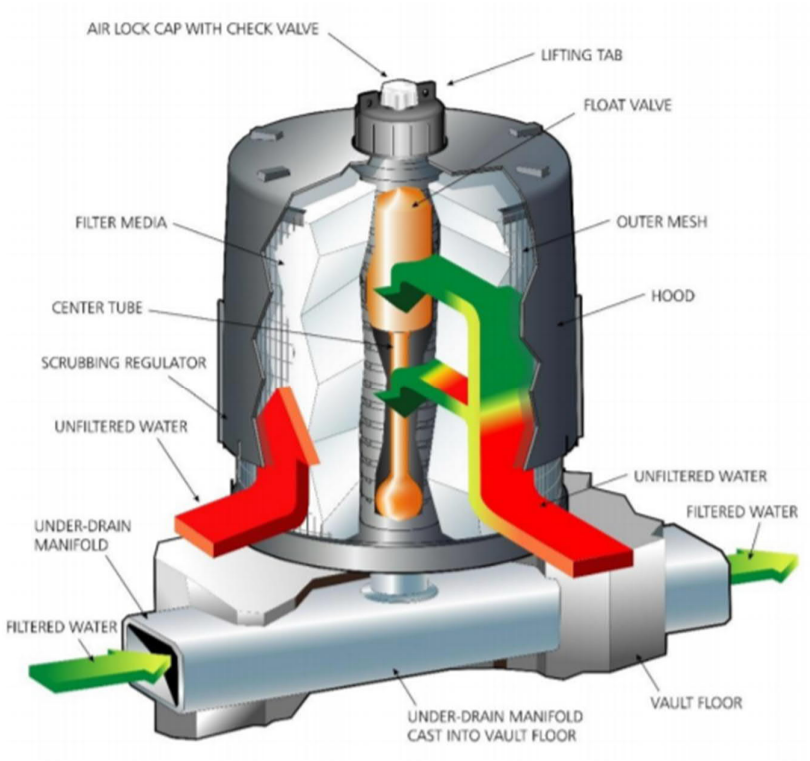
6. Conclusion

The study has reviewed the hydraulic function of the implementation of 92 OceanGuards and 246 StormFilter cartridges using MUSIC to assess the effectiveness of these products in improving water quality of the drainage network. The assessment has found that the implementation of these products does improve the networks water quality and meets Blacktown City Council's water quality targets.

Appendix A OceanGuard



Appendix B StormFilter



Appendix B

Sydney International Speedway

Sydney Metro West Contract No. 00013/11864

Quarterly Environmental Monitoring Report July 2021

ABERGELDIE
COMPLEX INFRASTRUCTURE
Abergeldie Contractors Pty Ltd
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SYDNEY INTERNATIONAL SPEEDWAY
Sydney Metro West

CONTRACT No. 00013/11864

Quarterly Environmental Monitoring Report

14 July 2021

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4	Matthew Marrinan	Senior Manager Environment, Sydney Metro

GLOSSARY / ABBREVIATIONS

Abbreviations	Expanded text
AQMP	Air Quality Management Plan
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
EPA	NSW Environment Protection Authority
PM2.5	Particulate Matter (PM). PM 2.5 describes inhalable particles, with diameters that are generally 2.5 micrometers and smaller
PM10	Particulate Matter (PM). PM 10 describes inhalable particles, with diameters that are generally 10 micrometers and smaller
Roads and Maritime	Roads and Maritime Services (now part of Transport for NSW)
SM	Sydney Metro
SWMP	Soil and Water Management Plan
TfNSW	Transport for NSW
ug/m3	Concentration of Particulate Matter measured in micrograms per cubic meter of air

2 INTRODUCTION

2.1 CONTEXT

This Quarterly Environmental Monitoring Report has been prepared to meet the environmental monitoring requirements of the Sydney International Speedway's Conditions of Approval (CoA), specifically CoA C13 that states *"The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program".*

Construction Monitoring Programs have been prepared for the following:

1. Dust
2. Water Quality

These monitoring programs are further detailed in the Construction Air Quality Management Sub Plan (AQMP) and the Construction Soil and Surface Water Management Sub Plan (SWMP) as part of the Construction Environmental Management Plan for the Project.

2.2 PROJECT BACKGROUND

As reported in the Constructability Report (Sydney Metro, 2020), in December 2019, the NSW Government announced the relocation of Speedway racing to Western Sydney Parklands' Precinct 5: Eastern Creek MotorSports. The Speedway will be an exciting addition to the existing motorsport precinct, creating a true Motorplex for the New South Wales motorsport racing community.

The new Sydney International Speedway will provide the community and racing supporters a unique sporting facility that would cater for local, regional, national, and international racing events while continuing to support the growth of Speedway racing in NSW.

Sydney Metro will construct the new Speedway on land owned and managed by Western Sydney Parklands Trust. The construction of the Sydney International Speedway will comprise enabling and temporary works, earthworks and land forming activities, construction of project infrastructure, environmental management measures, utility works, landscaping and finishing works.

Both dedicated and overflow parking will be provided on site, to accommodate vehicles from both the new Speedway and the other motor sports facilities within the precinct.

The new Sydney International Speedway must be completed by the commencement of the Speedway racing season in September 2021.

The detailed design of the Sydney International Speedway has been undertaken by Sydney Metro's Designers and is to be based on international best practice.

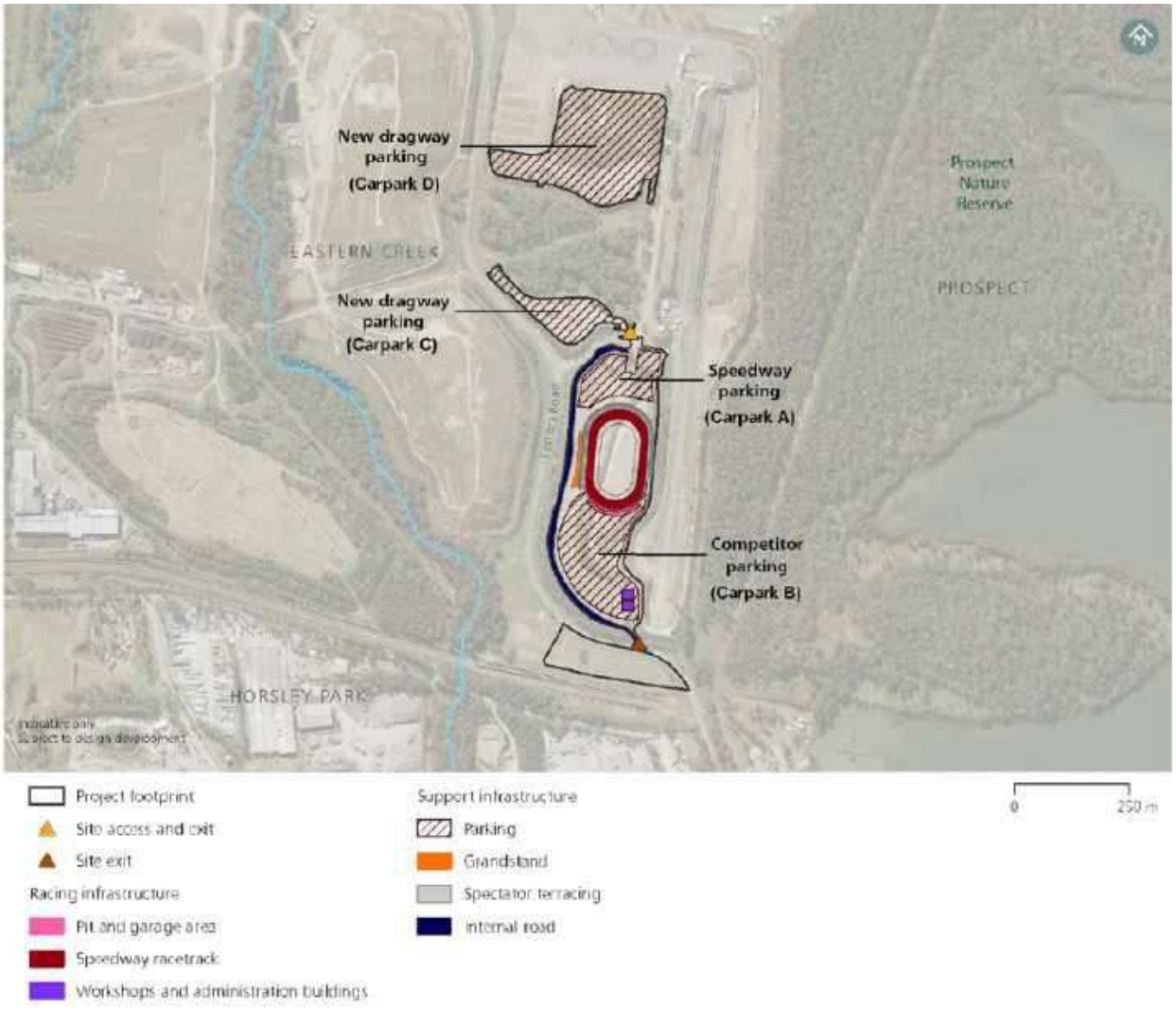


Figure 1 Project location and approximate boundary and areas of work (source Jacobs Sydney International Speedway Technical Paper: Transport, Traffic and Parking)

2.3 OBJECTIVES

The objectives of the Quarterly Environmental Monitoring report are to:

- Meet the environmental monitoring and reporting requirements of the Project's Conditions of Approval.
- Meet the environmental monitoring and reporting requirements of the Construction Air Quality Monitoring Program and the Construction Water Quality Monitoring Program.
- Assess an analyse the environmental monitoring data for the site against the baseline criteria.
- Identify any on-site or off-site impacts associated with the construction of the Project.
- Document monitoring results in a Quarterly Environmental Monitoring Report.

3 AIR QUALITY MONITORING

3.1 AIR QUALITY MONITORING PROGRAM REQUIREMENTS

The Construction Air Quality Management Sub Plan (AQMP) details the Air Quality Construction Monitoring Program. This program states the following:

- Four permanent dust monitoring stations would be installed, including three across the Project Site and one at the Sydney Dragway (locations of monitors are shown in Figure 2).
- The stations would measure dust in real time to inform thresholds for safe operational dust levels at the Sydney Dragway and to monitor dust levels during construction of the project.
- A meteorological station would be set up on-site to inform the dust monitoring program.

Figure 2 Air Quality Monitoring Stations (Pink) and Meteorological Station (Yellow)

3.2 MONITORING PARAMETERS

The parameters that are monitored and the set trigger levels are shown in (Table 1). Monitoring data is managed by the Environment team daily to ensure relevant data is being obtained and no damage has occurred to the equipment. Trigger levels are set to the daily values so that immediate potential impact can be managed.

Table 1 Adopted Air Quality Conditions and Trigger Values

Pollutant	Averaging Time	Adopted Value	Trigger Level 1 (µg/m^3) 80%	Trigger Level 2 (µg/m^3) 90%
Particulate Matter as PM10	24 hour	50 µg/m^3	40 µg/m^3	45 µg/m^3
Particulate Matter as PM2.5	24 hour	25 µg/m^3	20 µg/m^3	22 µg/m^3

3.3 BASELINE DATA

Baseline data is discussed in the Air Quality Management Sub Plan and the Project has adopted the EPA's criteria for best practice air quality assessment for 24 hour averaged PM10 and PM2.5 concentrations as shown in Table 2

Table 2 Adopted Background Air Quality Conditions

Pollutant	Averaging Time	Adopted Value
Particulate Matter as PM10	24 hour	50 µg/m^3
	Annual	25 µg/m^3
Particulate Matter as PM2.5	24 hour	25 µg/m^3
	Annual	8 µg/m^3
Particulate Matter as TSP	Annual	90 µg/m^3
Deposited Dust	Annual	1.7 g/m^2/month

3.4 QUARTERLY MONITORING DATA

Monthly dust totals collected from the monitoring stations around the site between January 2021 and March 2021 are shown in

Table 3. Further discussion and daily average graphs regarding the monitoring data is shown below.

Table 3 Monthly Dust Totals January 2021 to March 2021

Dust Gauge Location	January 2021		February 2021		March 2021	
	PM2.5 (ug/m^3)	PM10 (ug/m^3)	PM2.5 (ug/m^3)	PM10 (ug/m^3)	PM2.5 (ug/m^3)	PM10 (ug/m^3)
Northern Carpark	145	170	97	113	117	142
Southern Monitor	88	114	83	104	83	107
Ticket Box	88	111	102	130	90	116
Eastern Drag Track	55	74	51	70	55	66
Dragway Start Line (installed 16th Dec)	124	148	103	124	123	143
EPA Prospect Air Quality	176	569	144	482	163	549

Dust Monitoring Data Collected January 2021

One event (shown in red on Figure 3 and Figure 4 below) was recorded on the Northern Carpark monitor which exceeded the allowable threshold set for the project. This event occurred during the Sydney Dragway Summernats event between the 8th – 10th January and, on investigation, was shown to be as a result of activities associated with the event, at a time when the Project was not working in the area.

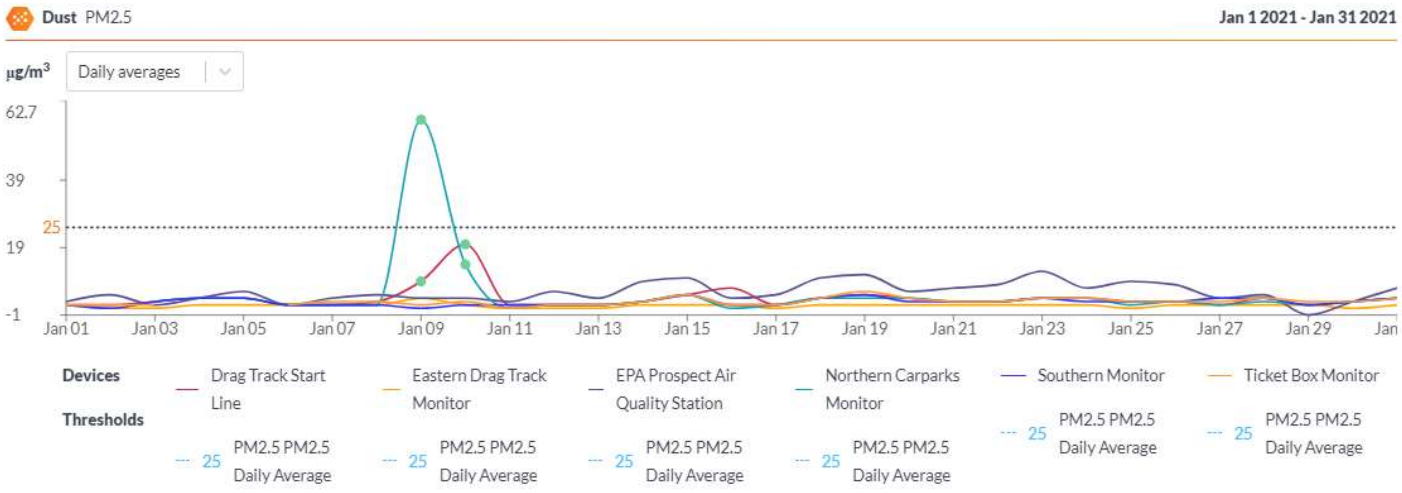


Figure 3 PM2.5 Air Quality Monitoring results – January 2021

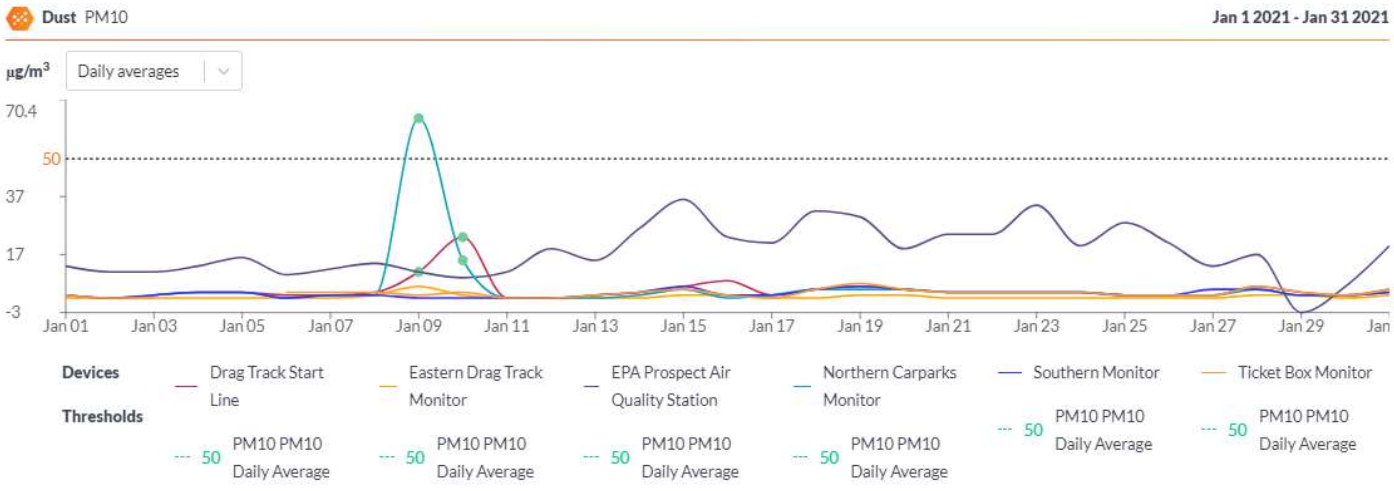


Figure 4 PM10 Air Quality Monitoring results – January 2021

Dust Monitoring Data Collected February 2021

February dust monitoring shows monthly dust totals decreasing in comparison to previous months for most monitors. There was one occurrence of construction activity exceeding the allowable threshold. Other exceedances in the threshold were caused by Dragway activity.

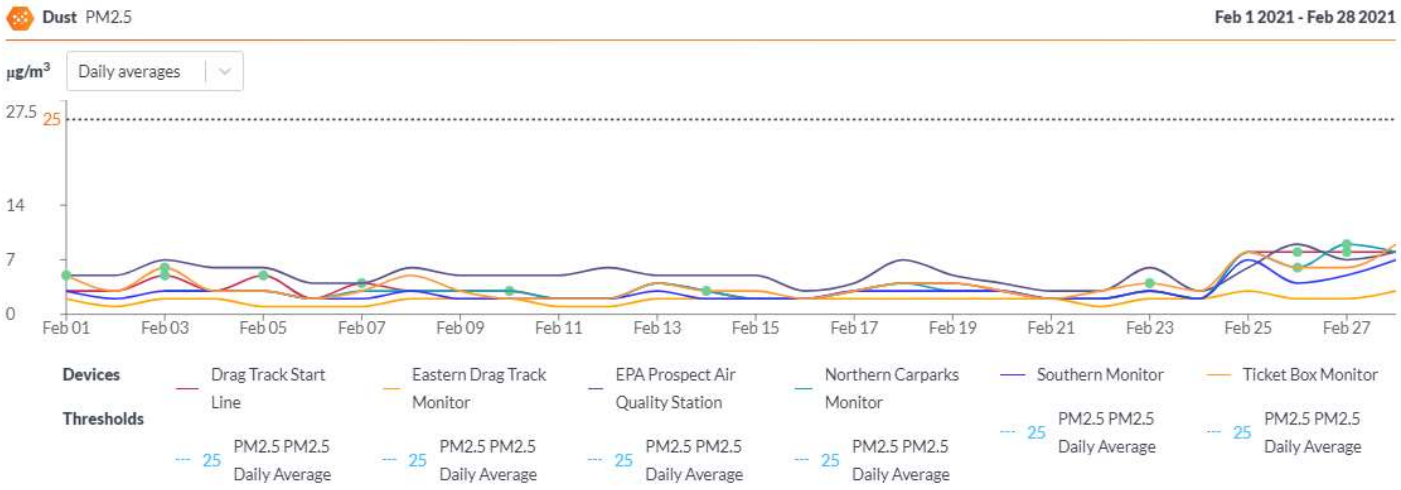


Figure 5 PM2.5 Air Quality Monitoring results – February 2021

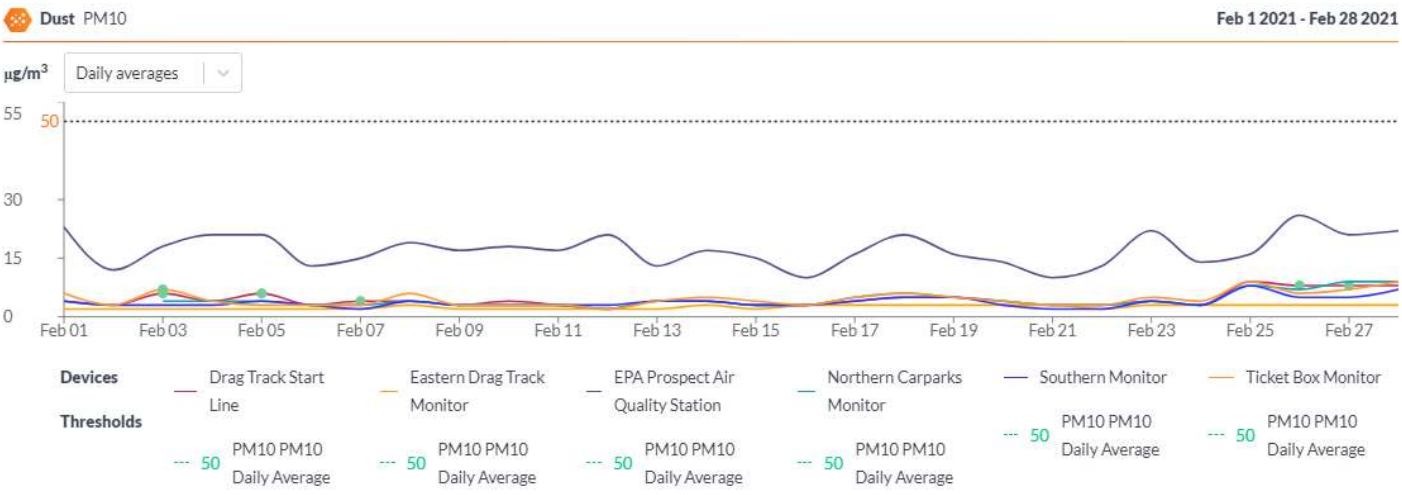


Figure 6 PM10 Air Quality Monitoring results – February 2021

Dust Monitoring Data Collected March 2021

The northern monitor became damaged after a rain event and gave faulty readings over a 4-day period before being replaced (18th-22nd), these values were not included in the monthly total and instead an average across the monitors was used.

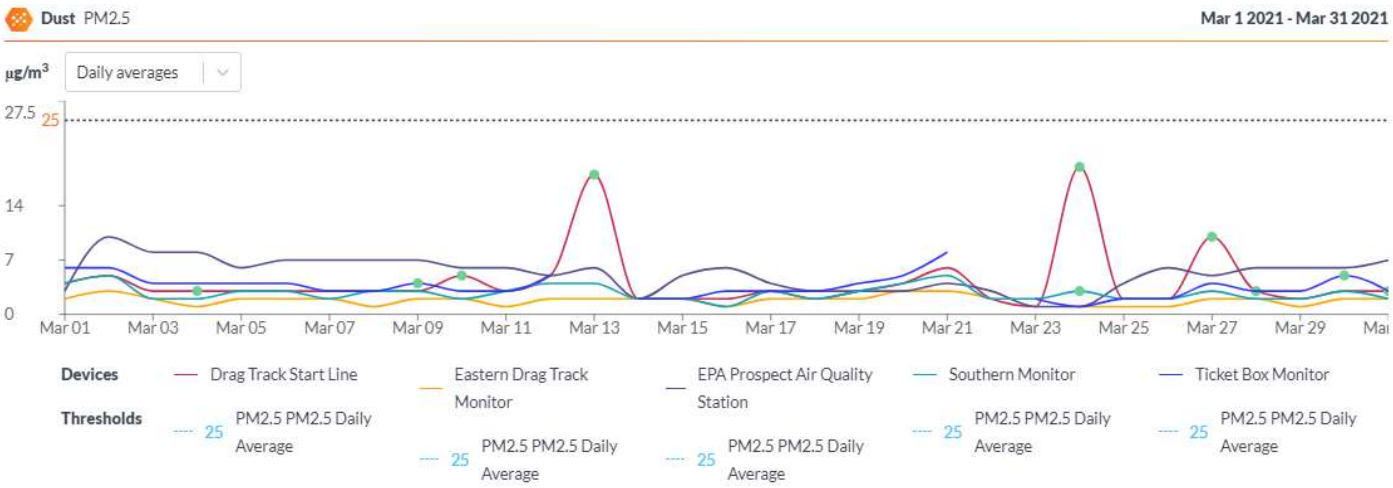


Figure 7 PM2.5 Air Quality Monitoring results – March 2021

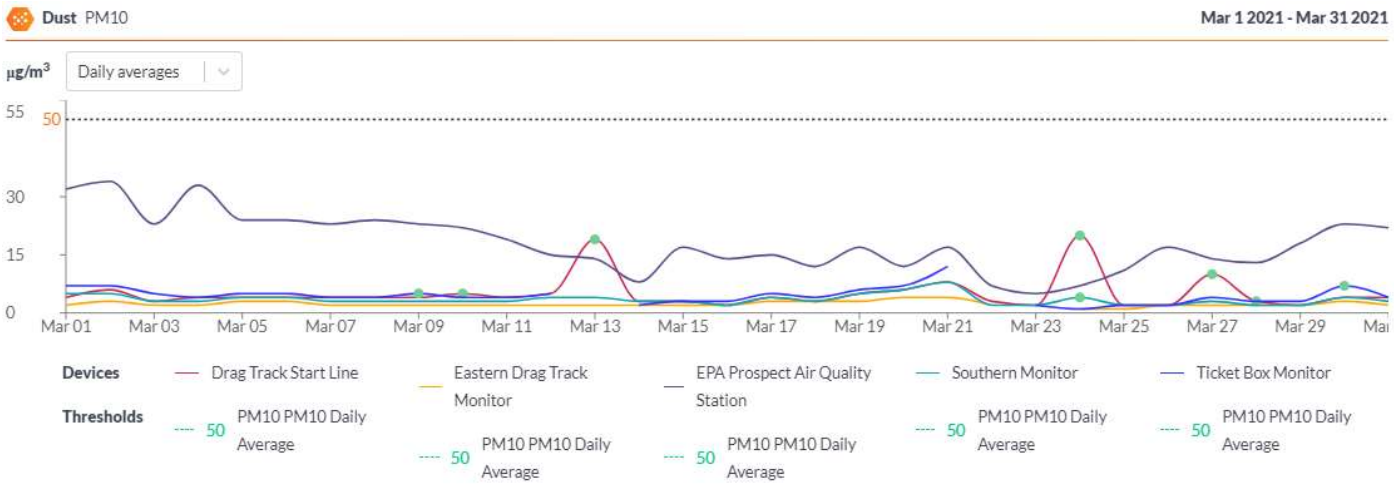


Figure 8 PM10 Air Quality Monitoring results – March 2021

4 WATER QUALITY MONITORING

4.1 WATER QUALITY MONITORING PROGRAM REQUIREMENTS

The Soil and Water Quality Management Sub Plan (SWMP) details the requirements of the Water Quality Monitoring Program. The program is being implemented to monitor impacts on surface water quality resources as well as the effectiveness of the mitigation measures applied as part of the works. Environmental approval documentation does not identify any direct impacts to waterways, however there is potential for indirect impacts to surrounding habitats from erosion and contaminated runoff from the project.

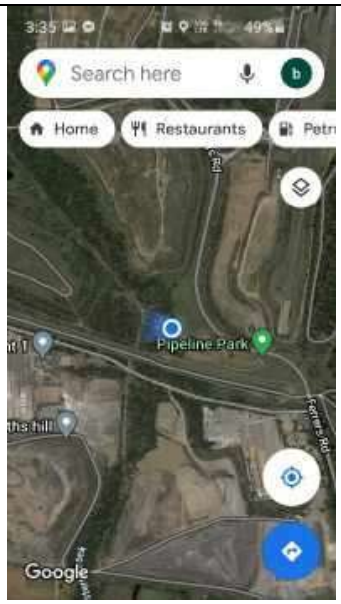
The analytes for inclusion of the Water Quality Monitoring Program include:

- Total Suspended Sediment (TSS)
- Turbidity (NTU)
- pH
- Electrical Conductivity (EC)
- Total Phosphorus (TP)
- Total Nitrogen (TN)
- Chlorophyll-a

Eastern Creek is the closest water body to the site, however with much of this creek being overgrown and running through neighbouring properties, it is highly inaccessible. The water quality monitoring location was selected to pick up the closest point of Eastern Creek that is accessible from the site boundary.

Table 4 details the water quality monitoring location for the Project.

Table 4 Water Quality Monitoring Location

Sample Location: -33.822, 150.866 Date: first week of the month (or following a rain event)
Pictures of Sampling location GPS below:
 
Pictures of creek section containing the sampling location below:
 
Pictures of Specific Sampling site below:
 

4.2 MONITORING PARAMETERS AND BASELINE DATA

Samples were collected at the water quality monitoring point (

Table 4) following a rain event and prior to the start of construction on 7 January 2021. This data will provide the basis for an ongoing monthly sampling regime. Table 5 details the data collected.

Table 5 Baseline Water Quality Monitoring Data

Parameter	Unit Measured	7/01/2021 (Baseline Data)
Chlorophyll-a	ug/L	<5
Conductivity	uS/cm (at 25°C)	450
Dissolved Oxygen	mg/L	9
Nitrate and Nitrite	mg/L	<0.05
pH	pH Units	8
Phosphate (Total)	mg/L	0.05
Total Kjeldahl Nitrogen	mg/L	0.3
Total Nitrogen	mg/L	0.3
TSS	mg/L	4.7
Turbidity	NTU	6.5
Arsenic	mg/L	0.002
Cadmium	mg/L	<0.002
Chromium	mg/L	<0.003
Copper	mg/L	0.002
Lead	mg/L	<0.001
Mercury	mg/L	<0.0001
Nickel	mg/L	<0.004
Zinc	mg/L	<0.005

4.3 QUARTERLY MONITORING DATA

Water quality monitoring data collected between January 2021 and April 2021 is shown in
Table 6. Further discussion regarding the monitoring data is shown below.

Table 6 Water Quality Monitoring Data

Parameter	Unit Measured	7/01/2021 (Baseline Data)	28/01/2021	15/03/2021
Chlorophyll-a	ug/L	<5	35	<5
Conductivity	uS/cm (at 25°C)	450	770	340
Dissolved Oxygen	mg/L	9	0.3	8.5
Nitrate and Nitrite	mg/L	<0.05	<0.05	<0.05
pH	pH Units	8	7.2	7.4
Phosphate (Total)	mg/L	0.05	<0.005	<0.05
Total Kjeldahl Nitrogen	mg/L	0.3	4.4	0.3
Total Nitrogen	mg/L	0.3	4.4	0.3
TSS	mg/L	4.7	17	40
Turbidity	NTU	6.5	12	2
Arsenic	mg/L	0.002	0.005	0.003
Cadmium	mg/L	<0.002	<0.0002	<0.0002
Chromium	mg/L	<0.003	0.001	0.01
Copper	mg/L	0.002	0.002	0.012
Lead	mg/L	<0.001	<0.001	0.011
Mercury	mg/L	<0.0001	<0.0001	<0.0001
Nickel	mg/L	<0.004	0.003	0.006
Zinc	mg/L	<0.005	0.006	0.033

It should be noted that the water body was stagnant during water quality monitoring undertaken on 28 January 2021. This is a possible explanation of the high Total Nitrogen values received during this monitoring period. Monitoring undertaken on 15 March 2021 was completed following numerous days of rainfall, this is an explanation of the high TSS values received during this monitoring period.

Rainfall data is collected from the Prospect Dam Bureau of Meteorology (BoM) Weather Station. Data for the months of January to April 2021 are shown in

Table 7.

Table 7 Prospect Dam BoM Weather Station Data January 2021 to April 2021

Month	Total Rainfall (mm)
January 2021	58
February 2021	148
March 2021	339
April 2021	21

4 CONCLUSIONS

This Quarterly Environmental Monitoring Report has been prepared to meet the environmental monitoring requirements of the Sydney International Speedway's Conditions of Approval (CoA), specifically CoA C13 that states *"The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program".*

A summary of the monitoring data concludes the following:

1. In general, dust levels from the site are compliant with the adopted background conditions.

2. Where dust levels exceed the adopted background conditions, this can be explained by one off events such as drag racing and back burning events not related to the construction works for the Project.

3. Water quality monitoring data is comparable to baseline data collected prior to construction activities commencing on site.

4. Where water quality parameters differ from baseline data, this can be explained by events unrelated to the construction activities occurring on site. For example, high TSS readings following a period of heavy rainfall.

Appendix C

OceanGuard and StormFilter Maintenance Guidelines

OCEAN PROTECT

StormFilter

Operations & Maintenance Manual

Table of Contents

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the StormFilter as recommended by the manufacturer.

The StormFilter is designed and sized to meet stringent regulatory requirements. It removes the most challenging target pollutants (including fine solids, soluble heavy metals, oil, and soluble nutrients) using a variety of media. For more than two decades, StormFilter has helped clients meet their regulatory needs and, through ongoing product enhancements, the design continues to be refined for ease of use and improved performance.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the StormFilter.

Health and Safety

Access to a StormFilter unit requires removing heavy access covers/grates, and it is necessary to enter into a confined space. Pollutants collected by the StormFilter will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your StormFilter require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the StormFilter, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

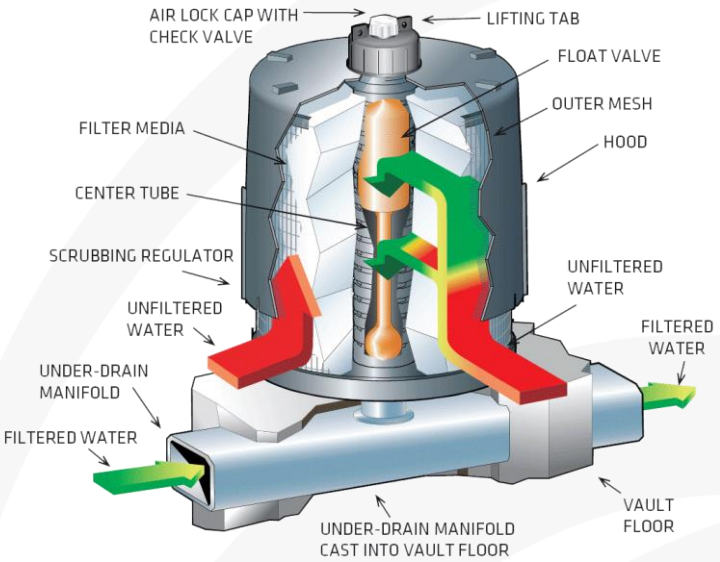
- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of StormFilter maintenance can be performed from surface level, there will be a need to enter the StormFilter system (confined space) during a major service. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it Work?

Stormwater enters the cartridge chamber, passes through the filtration media and begins filling the cartridge center tube. When water reaches the top of the cartridge the float valve opens and filtered water is allowed to drain at the designed flow rate. Simultaneously, a one-way check valve closes activating a siphon that draws stormwater evenly throughout the filter media and into the center tube. Treated stormwater is then able to discharge out of the system through the underdrain manifold pipework.



As the rain event subsides, the water level outside the cartridge drops and approaches the bottom of the hood, air rushes through the scrubbing regulators releasing the water column and breaking the siphon. The turbulent bubbling action agitates the surface of the cartridge promoting trapped sediment to drop to the chamber floor. After a rain event, the chamber is able to drain dry by way of an imperfect seal at the base of the float valve.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the StormFilter requires an inspection every 6 months with a minor service at 12 months. Additionally, as the StormFilter cartridges capture pollutants the media will eventually become occluded and require replacement (expected media life is 1-3 years).

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the StormFilter.

	Description of Typical Activities	Frequency
Inspection	Visual Inspection of cartridges & chamber Remove larger gross pollutants Perform minimal rectification works (if required)	Every 6 Months
Minor Service	Evaluation of cartridges and media Removal of accumulated sediment (if required) Wash-down of StormFilter chamber (if required)	Every 12 Months
Major Service	Replacement of StormFilter cartridge media	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Inspection

The purpose of the inspecting the StormFilter system is to assess the condition of the StormFilter chamber and cartridges. When inspecting the chamber, particular attention should be taken to ensure all cartridges are firmly connected to the connectors. It is also an optimal opportunity to remove larger gross pollutants and inspect the outlet side of the StormFilter weir.

Minor Service

This service is designed to ensure the ongoing operational effectiveness of the StormFilter system, whilst assessing the condition of the cartridge media.

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. Evaluate StormFilter cartridge media (if exhausted schedule major service within 6 months)
4. Measure and record the level of accumulated sediment in the chamber
   (if sediment depth is less than 100 mm skip to step 9)
5. Remove StormFilter cartridges from the chamber
6. Use vacuum unit to removed accumulated sediment and pollutants in the chamber
7. Use high pressure water to clean StormFilter chamber
8. Re-install StormFilter cartridges
9. Replace access cover(s)

Major Service (Filter Cartridge Replacement)

For the StormFilter system a major service is reactionary process based on the outcomes from the minor service, specifically the evaluation of the cartridge media.

Trigger Event	Maintenance Action
Cartridge media is exhausted[1]	Replace StormFilter cartridge media[2]

[1] Multiple assessment methods are available, contact Ocean Protect for assistance
[2] Replacement filter media and components are available for purchase from Ocean Protect.

This service is designed to return the StormFilter device back to optimal operating performance

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. By first removing the head cap, remove each individual cartridge hood to allow access to the exhausted media.
4. Utilise a vacuum unit to remove exhausted media from each cartridge
5. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
6. Use high pressure water to clean StormFilter chamber
7. Inspect each empty StormFilter cartridges for any damage, rectify damage as required
8. Re-fill each cartridge with media in line with project specifications
9. Re-install replenished StormFilter cartridges
10. Replace access cover(s)

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the StormFilter unit should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess them for contamination, depending on the type of spill event it may be necessary to replace the filtration media.

Blockages

In the unlikely event that flooding occurs upstream of the StormFilter system the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
2. Inspect the StormFilter unit checking the underdrain manifold as well as both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the StormFilter after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the StormFilter must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter media has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our StormFilter system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement media for cartridges.

For more information please visit www.OceanProtect.com.au

OCEAN PROTECT

OceanGuard™

Operations & Maintenance Manual

Table of Contents

Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes as recommended by the manufacturer.

The OceanGuard technology is a gully pit basket designed to fit within new and existing gully pits to remove pollution from stormwater runoff. The system has a choice of Filtration liners, designed to remove gross pollutants, total suspended solids and attached pollutants as either a standalone technology or as part of a treatment train with our StormFilter or Jellyfish Filtration products. OceanGuard pit baskets are highly effective, easy to install and simple to maintain.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the OceanGuard.

Health and Safety

Access to pits containing an OceanGuard typically requires removing (heavy) access covers/grates, but typically it is not necessary to enter into a confined space. Pollutants collected by the OceanGuard will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or sharp objects such as broken glass and syringes. For these reasons, there should be no primary contact with the waste collect and all aspects of maintaining and cleaning your OceanGuard require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel, as a result it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the OceanGuard pit insert, precautions should be taken in order to minimise (or when possible prevent) contact with sediment and other captured pollutants by maintenance personnel. In order to achieve this the following personal protective equipment (PPE) is recommended:

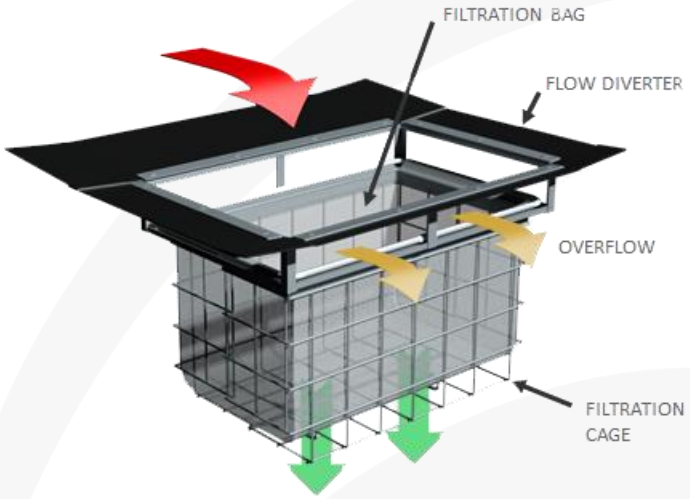
- Puncture resistant gloves
- Steel capped safety boots,
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

The OceanGuard pit insert is designed to be maintained from surface level, without the need to enter the pit. However depending on the installation configuration, location and site specific maintenance requirements it may be necessary to enter a confined space occasionally. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry.

How does it Work?

OceanGuard is designed to intercept stormwater as it enters the stormwater pits throughout a site. The OceanGuard has diversion panels that sit flush with the pit walls, this ensures that as stormwater enters at the top of the pit it is directed to the middle of the insert where the Filtration bag is situated. The filtration bag allows for screening to occur removing 100% of pollutants greater than the opening of the filtration material (200micron, 1600micron bags available).



During larger rain events the large flows overflow slots in the flow diverter of the OceanGuard ensure that the conveyance of stormwater is not impeded thus eliminating the potential for surface flooding. As the flow subsides, the captured pollutants are held in the OceanGuard Filtration bag dry. The waste then starts to dry which reduces the magnitude of organic material decomposition transitioning between maintenance intervals.

Maintenance Procedures

To ensure that each OceanGuard pit insert achieves optimal performance, it is advisable that regular maintenance is performed. Typically the OceanGuard requires 2-4 minor services annually, pending the outcome of these inspections additional maintenance servicing may be required.

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the OceanGuard.

	Description of Typical Activities	Frequency
Minor Service	Filter bag inspection and evaluation Removal of capture pollutants Disposal of material	2-4 Times Annually
Major Service	Filter Bag Replacement Support frame rectification	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to return the OceanGuard device back to optimal operating performance. This type of service can be undertaken either by hand or with the assistance of a Vacuum unit.

Hand Maintenance

1. Establish a safe working area around the pit insert
2. Remove access cover/grate
3. Use two lifting hooks to remove the filtration bag
4. Empty the contents of the filtration bag into a disposal container
5. Inspect and evaluate the filtration bag
6. Inspect and evaluate remaining OceanGuard components (i.e. flow diverter, filtration cage and supporting frame)
7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
8. Re-install filtration bag and replace access cover/grate

Vacuum Maintenance

1. Establish a safe working area around the pit insert
2. Remove access cover/grate
3. Vacuum captured pollutants from the filtration bag
4. Remove filtration bag
5. Inspect and evaluate the filtration bag
6. Inspect and evaluate remaining OceanGuard components (i.e. flow diverter, filtration cage and supporting frame)
7. Rejuvenate filtration bag by removing pollutant build up with a stiff brush, additionally the filtration bag can be washed using high pressure water
8. Re-install filtration bag and replace access cover/grate

Major Service (Filter Bag Replacement)

For the OceanGuard system, a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event from Minor Service	Maintenance Action
Filtration bag inspection reveals damage	Replace the filtration bag[1]
Component inspection reveals damage	Perform rectification works and if necessary replace components[1]

[1] Replacement filtration bags and components are available for purchase from Ocean Protect.

Additional Reasons of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, all OceanGuard pits that potentially received flow should be inspected and cleaned. Specifically all captured pollutants from within the filtration bag should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. All filtration bags should be rejuvenated (replaced if required) and re-installed.

Blockages

The OceanGuards internal high flow bypass functionality is designed to minimise the potential of blockages/flooding. In the unlikely event that flooding occurs around the stormwater pit the following steps should be undertaken to assist in diagnosing the issue and implementing the appropriate response.

1. Inspect the OceanGuard flow diverter, ensuring that they are free of debris and pollutants
2. Perform a minor service on the OceanGuard
3. Remove the OceanGuard insert to access the pit and inspect both the inlet and outlet pipes, ensuring they are free of debris and pollutants

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the OceanGuard pit insert after a major storm event. The inspection should focus on checking for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants disposed.

Disposal of Waste Materials

The accumulated pollutants found in the OceanGuard must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filtration bag has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our OceanGuard system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement filter bags.

For more information please visit www.OceanProtect.com.au