Moorebank Precinct East – Stage 2 WSUD Independent Audit

Report Prepared for:
Department of Planning & Infrastructure and Environment

September, 2023
Project No. 255

Prepared by:
Sustainability Workshop Ltd

Head Office
4 Park Avenue
Blackheath
NSW 2785
mark@sustainabilityworkshop.com
T +61 2 47878428
www.sustainabilityworkshop.com

Document Information

Project title	Moorebank Precinct East – Condition of Consent 51 – Independent Audit	
Document title	Moorebank Precinct East Stage 2 – WSUD – 2023 Independent Audit Report	Project number 255
Description		
Client Contact	Mark Howley	

	Name	Signature	Issue:	Date
Prepared by	Mark Liebman		C	12/10/23
Checked by				
Issued by	Mark Liebman			
Filename	S:\Projects\255 MPE WSUD Audit CoC 51\Audit 2023 August\Report\2023 Audit Report - MPE - COC51 - WSUD v3 ML_MH.docx			

Document History

	Issue A		Issue B		Issue C	
Issue to:	Date	No. Copies	Date	No. Copies	Date	No. Copies
Mark Howley	15/09/2022	PDF				
Mark Howley			12/10/2023	PDF		
Mark Howley					12/10/23	PDF

Commercial in Confidence

Disclaimer

EXECUTIVE SUMMARY

Sustainability Workshop Ltd was engaged to carry out an independent audit of the operation of the water quality management elements of Moorebank Precinct East Stage 2 which currently includes Warehouses 1,3,4, 5 and IMEX.

Moorebank Precinct East Stage 2 was approved under State Significant Development (SSD) 7628. Therefore this audit was carried out pursuant to SSD 7628, condition of consent (CoC) C51 which requires the independent auditor to:

1) Verify the condition of the treatment systems
2) Verify and document that the systems are working as intended
3) Verify the systems have been cleaned adequately
4) Verify there is no excessive build up of material
5) Identify any rectification issues required for the systems to adequately perform its intended function.

A site meeting followed by an inspection of the stormwater assets included in the scope of the audit was undertaken on the 9th August, 2023.

Prior to the site meeting a link to applicable maintenance records was provided. Additional records were subsequently requested and promptly provided.

The audit finds that:

1) In general, the WSUD infrastructure is being diligently maintained in accordance with CoC51.
2) The condition of the systems are generally good with clear evidence of rectification works undertaken where there was active erosion. This especially relevant given the very rainfall depths experienced in the last 2 years. The high rainfall and effort by Apical has also seen excellent vegetation growth within OSD 1 which is now well established and likely to be performing as a best practice.
3) It is very likely that the constructed elements of the system are working as intended to deliver best practice WSUD.
4) The systems are being cleaned and maintained so they remain functional, and the maintainer has a good understanding of the systems.
5) No excessive build-up of material is evident.
6) The site continues to be in a state of flux with OSD 10 (swale alongside Moorebank Avenue) being removed, Warehouses (WH) 6 and 7 being constructed during this last audit period. This impacts on the OSD and water quality basins (OSD 2) to the south of the precinct which are being operated as a sediment basin. The water quality pond adjacent to OSD 2 and which is served by GPT 5 has shown some signs of algal growth – possibly associated with construction of WH6 and WH7.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1. Project Overview

Sustainability Workshop was engaged to carry out an independent audit of Moorebank Precinct East Stage 2 Water Sensitive urban Design. Approval for works was issued under State Significant Development (SSD) 7628.

Completed works include Area 1 and 2 (warehouses 1,3,4,5) and IMEX

Warehouses 6,7 are close to completion with an aerial image indicating that nearly all surrounding pavements are finished, and the main structures are complete. Future Warehouse 2 remains as a series of 5 smaller warehouses referred to as Warehouses 50-54.

The project is a large transport and industrial land development located east of the Georges River. Moorebank Precinct West is under construction and not part of the scope of work.

This Audit report focuses only on stormwater quality infrastructure and the operation and maintenance thereof.

From a stormwater quality perspective, large industrial areas shed high volumes of stormwater. The stormwater can be contaminated with various pollutants in both particulate and dissolved forms, notably Zinc from roofs.

The design development process responded to several consent conditions which required that the proponent comply with what is commonly termed "best practice" stormwater management. That is, assuming that stormwater treatment assets were designed and constructed to best practice then it would be reasonable to expect a best practice outcome.

That outcome is defined in terms of pollutant removal fractions for total suspended solids, total phosphorus and total nitrogen. An approved stormwater system was modelled using MUSIC which is a widely adopted water quality model, design drawings prepared and approved and construction of various elements serving the warehouses undertaken.

While water quality monitoring has been undertaken to assess impacts on receiving waters it is noted that it is not appropriate to rely on that water quality data to assess if the stormwater treatment systems are performing to the standard required. The reasons for this are complex but in brief, the treatment targets required are load based targets and talk of average annual load retention while the monitoring undertaken provides a snap shot in time of only one very small part of the whole average annual load. It is instead deemed appropriate to rely on the condition assessment of the stormwater treatment assets, together with other evidence, such as maintenance log books and defects works to form an opinion of the performance of the system. In summary, we are relying on the best practice nature of stormwater management systems to indicate best practice performance.

On practical completion, built assets are handed over to the site manager which is Knight Frank. Knight Frank has engaged a Contractor, MID Plumbing to both help identify defects during a defects liability period (and to carry out rectification works where approved) as well as to undertake routine maintenance of the stormwater assets.

A stormwater infrastructure operation and maintenance plan (SIOMP), was required and approved by DPIE and prepared by the proponent, SIMTA. The SIOMP identified the routine and non-routine maintenance activities required for the various stormwater assets including water quality assets such as CDS gross pollutant traps and bioretention basins.

We note that maintenance log books have been prepared to align with the specific actions included in the SIOMP.

We note that water quality systems generally take time to commission and establish. This is mostly true of vegetated systems which take at least 1 year to see plants widely established. OSD1 which is large bioretention basin is now well established and has good vegetative coverage.

This report makes a low cost recommendation to protect the vegetation in OSD 1 ahead of impending high temperatures and low rainfall associated with El Nino conditions.

1.2. Approval Requirements

SSD 7628 condition of consent (CoC) C51 requires an annual independent audit.

1.3. Audit Team

The audit of the water quality elements of the MPE Stage 2 site was undertaken by Mark Liebman, CPEng, MIEAust. Mark has over 20 years water quality management experience. He co-authored the design guides, notably the Blacktown City Council Water Sensitive Urban Design Standard Drawings which were used as reference guides for the design of the MPE Stage 2 site.

Mark is also an independent evaluator used by Stormwater Australia to assess the water quality performance of stormwater treatment devices against the newly released stormwater quality improvement device evaluation protocol (SQIDEP). Mark has also undertaken numerous evaluations of stormwater quality improvement devices for Blacktown Council which are relied on by numerous other Council's including Liverpool City Council.

Mark is suitably qualified and has demonstrable experience in WSUD.

1.4. Audit Objectives

The audit objective is to satisfy State Significant Development, condition of consent C51

1.5. Audit Scope

Moorebank Precinct East Stage 2 was approved under State Significant Development (SSD) 7628. Sustainability Workshop was engaged to carry out an audit of the Area 1, 2 and IMEX operations.

The scope of this report therefore includes Moorebank Precinct East Stage 2 (Area 1 and 2) works. This includes the four warehouses (WH 1, 3, 4 ,5) and IMEX.

Condition C51 specifically requires the independent auditor to:

1) Verify the condition of the treatment systems

2) Verify and document that the systems are working as intended
3) Verify the systems have been cleaned adequately
4) Verify there is no excessive build up of material
5) Identify any rectification issues required for the systems to adequately perform its intended function.

2.0 AUDIT METHODOLOGY

2.1. Audit Process

The Independent Audit was conducted in a manner consistent with AS/NZS ISO 19011.2019 – Guidelines for Auditing Management Systems and the methodology set out in the Department's IAPAR. An overview of the audit activities, as specified in AS/NZS ISO 19011, is presented in Figure 1.

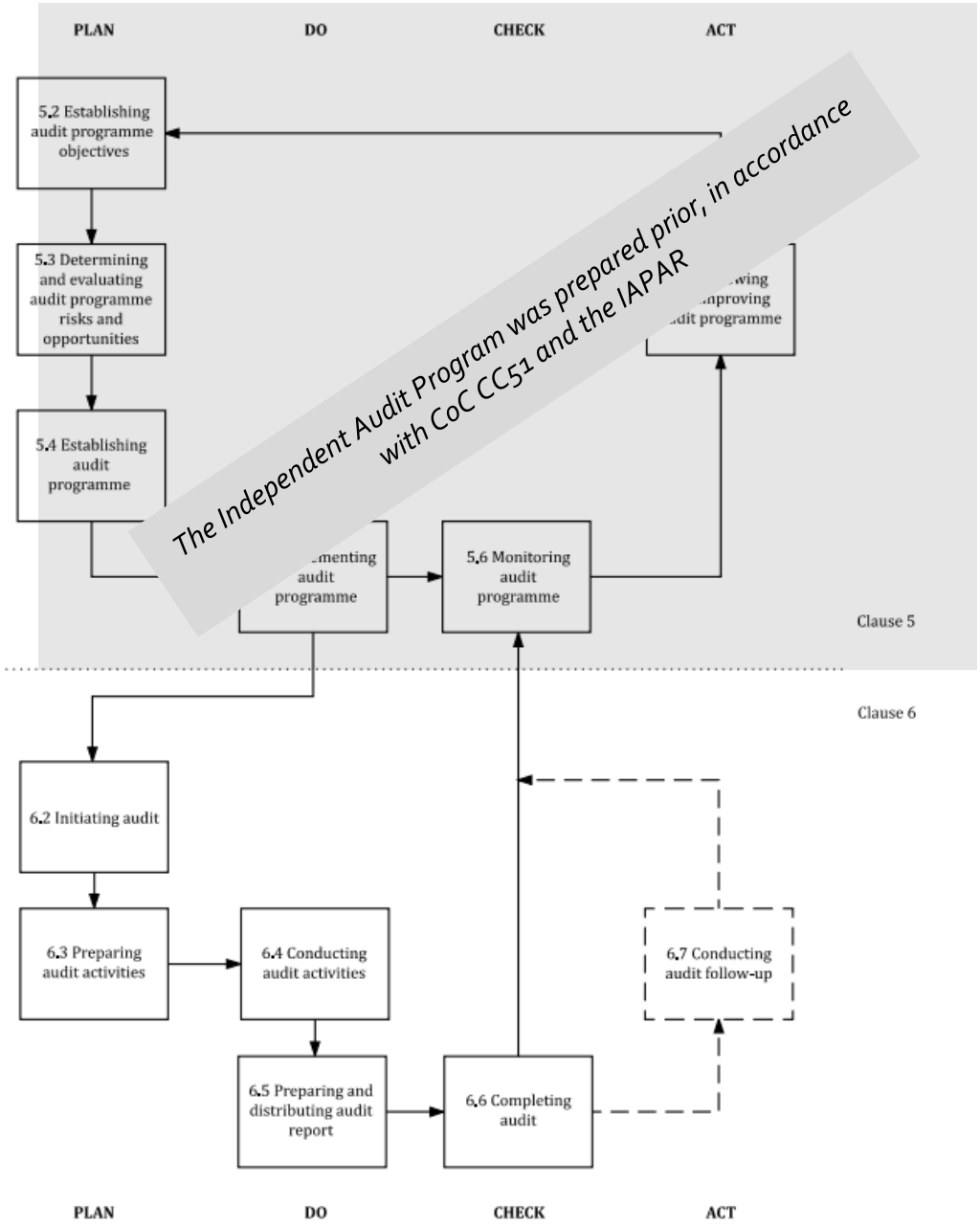

Figure 1 Audit activities overview (modified from AS/NZS ISO 19011). Subclause numbering refers to the relevant subclauses in the Standard.

2.2. Audit Process Detail

2.2.1. Initiation and Scope Development

Prior to the audit we confirmed the scope of the audit and inspected the site to gauge the level of complexity of the audit.

2.2.2. Preparation

Prior to the audit a number of documents were reviewed including:

- *Moorebank Precinct West - Stage 2 Proposal Environmental Impact Statement – (SSD16-7628),* Arcadis, October 2016 (the EIS) – notably Appendix P.
- *PREC-QPMS-EN-PLN-0006 SIOMP_Rev 8_clean_compiledSSD7628 Consolidated Consent on the NSW Major Projects Planning Portal.*

2.2.3. Site Personnel involvement

The on-site audit activities took place on 9 August 2023. The following personnel took part in the audit:

- Mark Liebman – WSUD Auditor – Sustainability Workshop
- Mark Cugola – Director – MID Plumbing with an ecologist from Apical (Daniel Anderson)
- Michael Beresford – Facilities Manager – Knight Frank
- Mark Howley – Senior Project Manager - Tactical

2.2.4. Meetings

The on-site audit activities took place on 9th August, 2023.

2.2.5. Interviews

A brief formal interview was undertaken on the 9th August, 2023 with Mark Cugola from MID Plumbing.

2.2.6. Site Inspection

A site inspection was undertaken on the 9th August, 2023 following the audit meeting. The site inspection involved:

1) Viewing CDS locations
2) Viewing OSD 9
3) Viewing OSD Basin 1 which is a combined OSD and bioretention system.
4) Viewing OSD 10 which is now deleted as a result of Moorebank Avenue diversion works
5) Inspecting Swales 1 to 4.

2.2.7. Document Review

Following the site inspection, a number of documents have been reviewed including:

- *Moorebank Precinct West - Stage 2 Proposal Environmental Impact Statement – (SSD16-7628),* Arcadis, October 2016 (the EIS) – notably Appendix P.
- *Stormwater Infrastructure Operation and maintenance plan, Moorebank Logistics Park – East Precinct, Moorebank Intermodal Terminal Alliance, 26/3/2020q – Rev 7.*
- *SSD7628 Consolidated Consent on the NSW Major Projects Planning Portal.*
- *Stormwater Management Plan SSD 7628 by Costin Roe, Rev A, dated 12 Sept 2018.*
- *Various Work as Executed Drawing Sheets including but not limited PIWE – ARC – CV – DWG – 11202 – H, DWG 11527.*
- *Basis of Design Report -Precinct Infrastructure Works East (PIWE) Package 1A, 19 July 2018.*
- *Maintenance log books prepared by MID Plumbing dated: October 2022, April 2023, January 2023, and July 2023.*
- *Rainwater Tank 2 yearly cleaning photographic evidence*
- *Morebank SIOMP Water quality reports prepared by Apical dated October 2022 and April 2023.*

2.2.8. General Audit Findings

Independent Audit findings were based on verifiable evidence. The evidence included:

- relevant records, documents and reports
- interviews of relevant site personnel
- photographs
- figures and plans; and
- site inspections of relevant locations, activities and processes.

2.2.9. Compliance Evaluation

The Auditor determined the compliance status of each compliance requirement in the Audit Table, using the descriptors from Table 2 of the IAPAR, being:

- **Compliant** – The Auditor has collected sufficient verifiable evidence to demonstrate that all elements of the requirement have been complied with within the scope of the audit.
- **Non-compliant** – The Auditor has determined that one or more specific elements of the conditions or requirements have not been complied with within the scope of the audit.

- **Not triggered** – A requirement has an activation or timing trigger that has not been met at the time when the audit is undertaken, therefore an assessment of compliance is not relevant.

Observations and notes may also be made to provide context, identify opportunities for improvement or highlight positive initiatives.

2.2.10. Completing the Audit

The Independent Audit Report was distributed to the proponent to check factual matters and for input into actions in response to findings (where relevant). The Auditor retained the right to make findings or recommendations based on the facts presented.

3.0 FINDINGS

3.1. Documents Audited

The SIOMP defines various maintenance actions and their associated frequencies. These have been documented in various tables in the SIOMP.

Each of these actions has been copied into a corresponding maintenance action within the maintenance logbooks which are completed and submitted quarterly by MID Plumbing in accordance with the quarterly reporting requirements of the SIOMP.

The maintenance log books have been audited for completeness by both verifying that all activities noted in the SIOMP have been correctly translated into the maintenance log books and then by verifying that all activities scheduled have been completed according to the log book.

3.2. Evidence Sighted

Difference sources of evidence have been sighted including:

1) Completed maintenance log books.
2) Evidence of contractor engagement viewed within the log books from photos included within them.
3) Evidence of contractor engagement to carry out CDS maintenance from photos included in the log books and also separately via evidence of a contractor receipt.
4) Evidence of contractor maintenance reported within the log books for the bioretention basin including quotes for rectification works.
5) Visual inspections undertaken during the site – notably OSD Basin 1 which is the combined bioretention and OSD basin, OSD 9, Swales 1 to 4.

At no time were any confined spaces entered. It is noted the CDS units are defined as confined spaces. The lids of the CDS units was not lifted and so the internal condition of the units cold not be determined during this audit. However clear photographic evidence was provided of the units under maintenance by TDK using eductor/combi trucks.

3.1. Compliance with Audit Objectives

CoC C51 requires the independent auditor too:

1) Verify the condition of the treatment systems within the scope
2) Verify and document that the systems are working as intended
3) Verify the systems have been cleaned adequately
4) Verify there is no excessive build up of material

Table 1 to 4 summarise the audit findings with respect to each of these requirements.

Table 1 Verification of the condition of the treatment systems within the scope

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	The condition of OSD 1 was found to be good. Plants were now well established. Additional plants had been planted to replace lost planting. Weed removal had taken place. There was no litter debris within the basin. Jute mesh had been placed around batter slopes which have not been planted. Minimal sediment was present on the surface of the basin. The inverted Reln trench at the entry to the basin was removed and replaced with some coir fibre logs and jute matting.
CDS units	Condition 51 requires the condition of the water quality management infrastructure assets to be determined. In order for this to be determined inspection of open CDS units needs to be undertaken. We note that MID Plumbing or their sub-contractor has undertaken a defects assessment of the CDS units during the audit period and therefore undertaken a condition assessment. We note there was not an opportunity for the independent auditor to assess the condition of the CDS units. It has been reported that 29 tonnes of waste was removed and disposed from all GPTs. A defect on GPT 3 (screen slightly detached) was recorded. MID has recommend increasing cleaning frequency to twice per annum due to a substantial increase in waste stored and removed form the devices. It is the professional opinion of the auditor that GPT 2 and 4 had nominally 200mm of solids in the base which is not excessive. However GPT 1 and 3 reportedly had over 700mm of solids in the base which is significant. The depth of the sump of each GPT is not known and should be recorded. It is recommended that the GPTs are inspected at least every 6 months to determine the depth of sediment in the base and if this exceeds the depth of the sump and begins to occlude the screens which could then export sediment that that becomes a logical trigger for maintenance. The CDS unit which serves OSD 2 adjacent WH7 is known to be drowned by the basin and can't be maintained or the condition verified without draining the water quality pond its connected to. It is critical this is rectified following completion of WH6 and 7 and sealing of the disturbed areas whereupon the final water quality configuration can be constructed.
Grass Swales	The condition of the grass swales observed was reasonable with evidence of erosion being rectified at several locations following minor erosion. The erosion had resulted in the deposition of eroded material into the swales which had prevented them from draining. This material was removed during the audit period and the swales reinstated.
Litter baskets	Evidence from the log books shows that litter baskets are being actively maintained and replaced when required.
Rainwater Tanks	Evidence of rainwater tanks being maintained and their condition assessed was provided.
First flush devices and filters	Evidence of the condition of first flush filters being maintained was provided. Those that were maintained appear to be in good order.

Table 2 Verify and Document the System is Working as intended

Asset Type	Details of item

OSD Basin 1 **Combined bioretention and OSD Basin**	It appears that the bioretention basin is working as intended however without comprehensive water quality monitoring this statement is based on the performance of a best management practice device. That is, it is well designed and well built and maintained and therefore is most likely to working as intended. We observe that the discharge channel downstream of the basin shows no evidence of sediment deposition and no litter. We conclude that in all probability the basin is working as intended.
CDS Units	A total of 29 tonnes of material was removed form the units and they are working as intended. Improved inspection will
Grass Swales	The grass swales are not technically part of the water quality management system on the site however they are included in the SIOMP and they will influence water quality. While there is currently evidence of minor scour of the swales, because there is very little to no grass cover we conclude the swales are unlikely to be positively contributing to water quality and are at risk of contributing negatively to water quality in the future if they are not adequately covered with grass.

Table 3 Verification the Systems have been cleaned adequately

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	We verify that OSD Basin 1 to have been thoroughly cleaned.
CDS Units & Litter baskets	Based on the maintenance log books together with additional evidence that the CDS units have been cleaned adequately as required by the SIOMP. Litter baskets were maintained during the audit period as required.
Grass Swales	We verify the swales were generally free from litter, debris and sediment and had been cleaned adequately. Some litter present had been deposited recently.

Table 4 Verification there is no excessive build up of material within the systems

Asset Type	Details of item
OSD Basin 1 **Combined bioretention and OSD Basin**	We verify that there is no excessive build up of material within the systems.
CDS Units	We verify that there is no excessive build up of material within the systems
GrassSwales	We verify that there is no excessive build up of material within the systems

3.2. Non-compliance, Observations and Actions

No non-compliances were detected.

This section including Table 5, presents observations from the Independent Audit. Actions are also presented in the table.

Table 5 Condition of consent C51 Audit findings and actions

Type	Details of item	Proposed or completed action	By whom and by when	Status
Observation	It became evident from the site inspection that hares were living within the bio basin.	Inspect for damage caused by hares either through burrowing or through predating vegetation.	Maintenance Contractor during each quarterly inspection.	
Observation	Conditions of consent B46 requires that all permanent infrastructure to be constructed in accordance with the approved Stormwater Management Plan. The approved plan requires that bioretention cells are not to be larger than 1,000m². OSD Basin 1 includes a cell which is approximately 1,200 m². It is noted the reason that cells are limited to 1,000 m² is for ease of maintenance and in this instance the bioretention basin is clearly being maintained without difficulty. Furthermore, it is not clear if OSD 1 is "permanent" given that warehouse 2 has not been developed.	This basin is to be left in its current state until such time as Warehouse 2 is developed. When warehouse 2 is developed it may be necessary to increase the size of the basin at which point the basin can be split into two or more cells as proposed by Costin Roe and approved by DPIE.	Tactical, pior to construction of Warehouse 2 is to ensure that design plans for the permanent configuration of OSD 1 result in bioretention cells not larger than 1,000m².	

3.3. Rectification Measures

Appendix A includes a number of site photos with specific recommended rectification measures.

The following section also describes more general rectification measures for each of the observed assets. We note we were unable to observe CDS units and so can't recommend any rectification measures beyond those already identified by MID Plumbing. We do note it is essential that defects identified by MID Plumbing are repaired prior to the next reporting quarter and that evidence of such should be included in the next relevant report.

3.3.1. CDS Maintenance Frequency

Currently the CDS units are cleaned once per year. It is recommended that CDS units are inspected twice per year and if the build up of sediment exceeds 50% of the sump depth then that should trigger a maintenance event whereby the units are cleaned out. This will prevent excessive build up and keep the units functioning as intended.

1)

3.3.2. CDS Units – Maintenance Reporting

CDS unit reporting in the log books was detailed and provided useful information.

We request the sump depths to be recorded.

3.3.3. Bioretention basin (OSD 1)

The following rectification measures are recommended for the bioretention basin within OSD 1:

1) Vegetate the batters with a mix of small shrubs and drought tolerant plants such as Lomandra. This will help to shade the bioretention system through summer as well as supress weeds. It is preferable to have a well-established vegetative cover rather than continuously spraying the basin batters with glyphosate which is toxic to macroinvertebrates and aquatic fauna and which will ultimately impact on water quality.
2) At very low cost, LOGOS would be able to place a small weir inside the OSD 1 outlet pit. This would raise the water level in the bioretention basin by nominally 200mm. This would aid in plant survival during extreme summer heat and drought. Given there has been good investment in getting the vegetation to achieve good coverage, this low cost action would then protect the investment in vegetation in the basin.
3) Monitor the effectiveness of the revised in let to the basin.

3.3.4. Grass Swales

The following comments apply equally to the grass swale to the rear of the Picolo Me café as well as to the swale on the eastern boundary of the site.

When on site we observed very poor grass growth, despite record rainfall and little to no vegetative cover on both of these swales. We understand both swales have been hydromulched once after hand over. We suspect this is caused by a lack of topsoils and very poor growing conditions. We recommend that both swales have an appropriate soil growing media applied (mature compost) and are then hydromulched and irrigated until established. Spring would be an ideal time to do this. They would need to be protected from erosion by use of a jute matt.

As a result of poor cover, costs have been incurred in repairing erosion hot spots.

An agronomist or horticulturalist may need to be consulted and existing site soils tested to confirm this prior to action.

4.0 CONCLUSIONS

We conclude that the development is, in all probability, complying with COC C51 and that the constructed stormwater systems are working as intended and are being maintained and cleaned. They are free from excessive build-up of material.

One observation has been made during this audit though we find no evidence of non compliance with COC C51.

A number of rectification measures have been included in this report and Sustainability Workshop would be happy to discuss these further. The recommendations are largely based on the assumption that a reduce life cycle cost is an operational objective.

We commend LOGOS, Tactical, MID Plumbing and Knight Frank for their on-going work in establishing the site in accordance with stormwater quality best practice management.

The vegetative coverage in OSD 1 is one of the best examples in western Sydney and we commend MID Plumbing and Apical for their care and work.

Appendix A
Site Inspection Photos

Photo	Description
	OSD 1 bioretention basin showing much improved plant growth throughout whole basin, denuded batters

	Photo showing some litter present prior to discharge into Swale 1. This is from an untreated part of the existing developme nt which is yet to be developed.

	Swale adjacent to the OSD 1 in good condition – following maintenance and removal of weeds. Typha is healthy and frogs were present in the swale.

	Photo showing upside down reln arch system replaced with coir rolls. Photo also shows headwall has been repaired and stabilised since last audit.