Merri Creek Sediment Project: A model for Inter-Government Solution Development

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Background

The Merri Creek, a tributary of Melbourne’s Yarra River, originates near Wallan, flowing 70km through Melbourne’s northern suburbs to its confluence near Dights Falls in Abbotsford. With a catchment of approximately 390 km², it falls within the municipal areas of Darebin, Hume, Mitchell, Moreland, Whittlesea and City of Yarra. It is a high profile waterway, supporting good remnant ecological values in its upper, and, significant recreational values in its lower reaches. Merri Creek Management Committee (MCMC) and Friends of Merri Creek both play an active role in environmental protection and advocacy.

As with other urban and peri urban waterways, Merri Creek is impacted by stormwater runoff from its catchment areas, varying in effect due to catchment activities and the level of impermeability. Merri Creek has been identified as Melbourne’s most polluted waterway (The Age, 2011), and has recently been subject to heavy rainfall driven sediment loads. This issue has also been the focus of community and media scrutiny, with articles in the Melbourne metropolitan daily newspaper (The Age) and local newspapers featuring MCMC discussing the damaging effects of stormwater inputs.

Sediment is generated through the disturbance of soils within the catchment through vegetation removal, excavation, soil importation and dumping, as well as in stream erosion caused by altered flow regimes, such as increases in flow quantity, velocity and frequency as a result of urbanisation. Sediment entering a waterway increases turbidity in the water column and deposition within the waterway and receiving waters. This can lead to reduced light availability, reduced oxygen levels, smothering of vegetation, reduced ecological values, increased blockages, expensive maintenance works and impacts on amenity and recreation values.
Stormwater runoff into waterways, containing pollutants and sediment, has been an ongoing issue in Melbourne, and there have been a number of projects undertaken in the past to find solutions. These include the Merri Creek Industrial Stormwater Program undertaken by Hume City Council and Environmental Protection Authority of Victoria (EPAV) under the Victorian Stormwater Action Plan (VSAP, 2005), Moonee Ponds Creek Litter Initiative (MW, 2003) and Building Site Management Guidelines (MW/EPA, 2006).

First hand reports indicate that a significant source of sediment in the Merri Creek is from construction activities. This is in addition to increased sediment loads resulting from the large deforestation of the Black Saturday bushfires in February 2009. Much of this fire related sediment has been managed in the short term with silt fencing and in the longer term with re-vegetation activities. These further sources, combined with ongoing, diffuse, sediment inputs attributed generally to catchment urbanisation, have led to increased public and media scrutiny.

The Merri Creek catchment is undergoing significant development, and is dominated by the Hume growth corridor within the extended urban growth boundary, which will include up to 117,000 new dwellings, housing up to 330,000 people (GAA, 2012). It is probable that land management practices associated with development and construction in the Merri Creek catchment are indicative of other urban growth areas. As such, the Merri Creek Catchment Sediment Project outcomes are applicable throughout the Melbourne region.

As the regional waterway manager, Melbourne Water aims to work with stakeholders and the community to protect our rivers and creeks from the impacts of urban development, meeting State Environment Protection Policy (Waters of Victoria) targets (EPAV, 2003) for water quality, providing native habitat and popular places to visit. A commitment to customer service and engagement are key approaches in our recently updated Strategic Direction (MW, 2012), and are crucial for tackling issues such as sediment.
management, where there are multiple responsible authorities and interested parties. In its capacity as a referral authority, Melbourne Water has an approval and surveillance role in the design and construction of land development and stormwater treatment assets undertaken by developers are part of regional drainage schemes.

As land use managers, local government plays an important role in setting conditions for and the granting of development application permits, implementation of best practice stormwater management guidelines for new residential subdivisions through Clause 56 of the Victorian Planning Provisions, and ongoing compliance activities during the construction and development of subdivisions and individual building lots.

As a regulator, EPAV is responsible for the setting of water quality policy and objectives, granting works approvals and discharge licences, undertaking monitoring and enforcement activities. EPAV works in partnership with other organisations to implement a variety of water quality protection projects, including education and advocacy.

The Project

The aim of the Merri Creek Catchment Sediment Project is, firstly, to determine the major sources of sediment pollution and assess the regulatory mechanisms and current governance practices in place to address this. It then seeks to develop and implement a practical, inter-agency, catchment based response.

Past projects undertaken, within the Merri Creek and other waterways, such as the Merri Creek Industrial Stormwater Project through Victorian Stormwater Action Program (VSAP) in 2005, have attempted to improve Stormwater quality at the catchment scale through a combination of education, regulation and enforcement. The approach of this project differs in that it brings together a range of disciplines within multiple agencies at a state and local level to design, implement and evaluate various aspects in order to improve its overall success.

It is anticipated that, as an endemic issue, approaches, solutions and activities identified through the approach will be directly transferable to the wider region.

Objectives

The Objectives of the Merri Creek Sediment Project are to:

- Confirm runoff from development and building activity as the major sources of sediment to the waterway;
- Evaluate the effectiveness of regulation and current governance practices in controlling sediment loads;
- Identify the major barriers to effective sediment control;
- Develop practical, catchment based, intergovernmental solutions; and
- Implement a pilot program, across the catchment, to reduce sediment loads from development and building activities.

Method
The Project comprises three main stages, including: a study to understand the current extent and governance of development and construction derived sediment issues, a workshop with responsible authorities to develop solutions, and the implementation of a pilot project to better manage sediment pollution within the catchment.

**Merri Creek Sediment Study**

Melbourne Water engaged Fiona Gilbert of BMT WBM to undertake a study of sediment loads derived from development and building sites within the Merri Creek Catchment, and the current state of governance to address this. This work included:

- Site assessment of 120 randomly selected building sites throughout the catchment, within the City of Darebin, City of Hume, City of Whittlesea and Mitchell Shire, taking into account general site characteristics, litter and waste management, location of stockpiles, off-site sediment movement, general site management, sediment control measures and general site condition;
- Pattern analysis of the sites assessed for total sediment runoff compared against variables such as slope, stage of construction, municipality and builder;
- Conducting a desktop review of relevant legislation, regulation and enforcement procedures at a state and local level;
- Undertaking stakeholder consultation through interviews with a range of council and EPA staff (17 in total) to ‘ground-truth’ governance arrangements and identify barriers and opportunities for effective implementation, with an emphasis on anonymity, exploration, and a nonjudgmental approach;
- Development draft recommendations for future discussion;
- Preparation of reports in November 2011, summarising the findings of the field investigations, governance review and stakeholder consultations

**Merri Creek Sediment Solutions Workshop**

Melbourne Water convened a workshop on 31 January 2012 at the Hidden Valley Country Club in Wallan, within the growth area of the catchment.

A total of 31 participants attended the workshop, representing numerous agencies (EPA Victoria, Darebin City Council, Hume City Council, Mitchell Shire Council, Moreland City Council, Whittlesea City Council and Melbourne Water) across various disciplines (Environment, Infrastructure, Planning, Compliance and Open Space).

The Workshop consisted of the following format:

- Introduction, purpose and tone of the day, being the development of meaningful solutions by engaging in honest discussion and feedback;
- Brief presentation of Merri Creek Sediment Study findings;
- Confirmation of issues identified during Merri Creek Sediment Study and plotted on a timeline, spanning Planning/PreDevelopment, Subdivision and Building activities, shown at Figures 3, 4 and 5;
- Tabling of solutions to issues identified and confirmed in previous session;
- Identify priority solutions, with a focus on collective action;
- Develop an initial plan of how identified priority solutions may be further developed and implemented;

A workshop report was prepared and distributed in March, 2012.
Follow up communication, via email and telephone conversations, with participants has been undertaken to ascertain ongoing organisational commitment and feedback from the process to date.
Merri Creek Sediment Pilot Project
At the Merri Creek Sediment Solutions Workshop, Melbourne Water made an undertaking to play an active role in facilitating future stakeholder interactions for the implementation of identified collective actions.

Follow up activities undertaken include:
- Distribution of the workshop summary report;
- Request for confirmation of organisational support through discussions with senior management and nominations for future working group representatives from workshop participants;
- Discussions with experienced people in March regarding facilitation approaches;
- Secondment of a Senior Policy Specialist to assist with the project;
- Internal discussions to determine the best path forward to achieve project aims;
- Initial discussions with the Victorian Litter Action Alliance, Yarra River and Port Phillip Plan of Action Taskforce, Municipal Association of Victoria and Clearwater to investigate alternative project delivery and communication mechanisms; and
- Follow up conversations with stakeholders to discuss any alterations to our agreed approach.

Results
Findings from the Merri Creek Catchment Building Site Sediment Investigation confirm the hypotheses that development and building activities are contributing to significant levels of sediment entering the waterway. They indicate that while sediment control policy is relatively robust, there are systematic issues with application and enforcement at numerous stages of the development life cycle. Resourcing, inadequate deterrents, organisational process and knowledge gaps are all contributing constraints to effective implementation. As one drainage engineer asserted, “nobody is getting it entirely right”.

Assessments of 120 active building sites from across the catchment identified the following:

General Site Characteristics
Information about the type of building being undertaken within the catchment, and in each municipality, is important for providing a basis for ongoing regulation and enforcement, as well as for identifying trends or specific site management requirements.

- Block Size was categorised as being either: Small (up to 450m²), medium (450-1,000m²), large (over 1,000m²) or subdivision. The majority (60%) of sites in the study represented medium blocks, followed by 27% large, 12% small and 1% identified as subdivision scale.

- Block Slope was categorised according to VSAP methodology as either: flat, medium, steeply sloped or uneven. The majority of sites in the study were flat (72%), with 21% assessed as medium, 6% as steeply sloped and 1% as uneven.

- House Type and Position were fairly consistent across the sites assessed, with 80% being the construction of a detached house, 16% being units and 3% being cleared blocks with no current construction activity. Over three quarters of buildings were located centrally on blocks.
• Construction Stage was more evenly distributed across the building sites, 11% were identified as being at slab stage, 25% at sub-frame, 28% at frame/roof, 33% at lockup and 3% where construction had not yet commenced.

Litter and Waste Management
While not directly linked to sediment runoff, site litter and waste management provide an indication of general site management practices and compliance with local laws. The majority of sites (95%) contained windblown litter, which was further broken down as: 2% showing a large amount, 12% as being very untidy, 33% as containing a moderate amount, 29% containing a few scattered pieces, 19% being generally clean and 5% of site with no litter.

Despite it being a requirement under each councils Building Code, only 74% of sites assessed had litter bins on site, there were a number of sites (46%) that had bins that were overflowing or with unsecured lids.

Location of Stockpiles
The location of stockpiles of soil and building material can have a large impact on the likelihood of runoff from the site. The majority of sites (62%) had stockpiles that were situated on site, 2% of stockpiles were located on the nature strip, 1% over the drain or road and 35% of sites did not have a stockpile present. Of those sites that had stockpiles on site, more than half were situated in a way that meant any runoff would leave the site.

Off-site Sediment Movement
Only a few (4%) of sites were observed as having a large amount of sediment leaving the site: however, 17% had a lot, 30% some, 28% small amounts, and 21% little or no sediment.

General Site Management
A number of other site management aspects have the potential to impact on site sediment conditions. Site fencing acts to help control litter movement and restrict vehicular access points, 72% of sites assessed were fenced on all sides, of those other sites, some had no fencing while others had only partial or broken fencing. Vehicular crossings can be the cause of sediment movement offsite, and this was reported to be the case at 79% of building sites assessed. Additionally, 26% of sites had evidence of site washings (generally concrete or plaster) leaving the site.

Sediment Control Measures
Best practice site management recommendations for sediment control includes measures such as: protected drains, covered stockpiles, sediment fences/barriers, stabilised vehicle access, turf strips, early downpipe connection and on site signage. These measures were generally not present on assessed sites. The most common sediment control measure in place was stabilised vehicle access on 23% of sites, followed by sediment barriers (13%), and limited examples of other methods. It is important to note that where these measure were in place, they were not always effectively applied.
Overall Site Condition
When assessed overall for site condition, the majority of sites (53%) were rated as average, followed by good (20%), fair (18%), excellent (7%) and poor (4%).

Pattern analysis was undertaken of the building site assessments detailed above to understand any particular trends in sediment runoff in relation to:

Site Slope
There was a slight correlation in this data, especially amongst those sites characterised as having small amounts and little or no sediment runoff being predominantly found amongst flat sites. Steeper sloped sites were thought to have greater potential to produce large amounts of sediment runoff.

Stage of Construction
Generally, the stage of construction and type of activities occurring at a site did not influence the level of sediment runoff.

Municipality
Sediment scores were averaged across building sites within each municipal area. While there was some variance in scores (ranging from small amounts to some sediment leaving the site), results were not considered to be significant.

Builder
There was insufficient data to provide proper analysis on specific builders, though some large differences were noted at individual sites. As such, builders were categorised as: single builders, multiple builders (larger scale, operating at more than one site), owner builders and unknown. Generally, owner builders scored best (little or none, to small amounts of sediment), followed by unknown, single builders and multiple builders (small amounts or some sediment), however, there were very few sites in the owner builder category, so this result may not be significant.

Desk Top Review of key state and local legislation and regulation identified the following:

Environment Protection Act 1970 (EPA Act)
Administered by the Environment Protection Authority of Victoria (EPAV) the EPA Act is the primary enforcement mechanism for environmental controls in Victoria. The Act contains a number of general clauses relating to discharge of waste and emissions into water that can be applied to sediment pollution. As such, it is possible to apply enforcement provisions, which may include: pollution abatement notices, significant fines and stop work powers. Significant evidence of pollution is required for enforcement activities to be carried out under this act, as they may be appealed through the court system.

Planning and Environment Act 1987 (P&E Act)
The P&E Act forms the framework for planning the use, development and protection of land in Victoria and establishes the Victoria Planning Provisions (VPP), which are the basis for all Victorian Local Government Planning Schemes. Specific clauses in the VPP that relate to stormwater management include:
- Clause 15 – Water Quality Protection
- Clause 55 – Multi lot developments
- Clause 56-07-4 – Sustainable neighbourhoods – urban runoff management objectives
• Clause 56-08-1 – Sustainable neighbourhoods – site management objectives
The P&E Act requires each municipality to take responsibility in assessing, approving and enforcing Environmental Management Plans as submitted by individual developers and builders.

**Local Government Act 1989 (LG Act)**
The LG Act confers powers to Local Government to enact local laws, which are key mechanisms for sediment control.

**State Environment Protection Policy – Waters of Victoria (SEPP)**
The SEPP is a statewide policy instrument for the protection of beneficial uses of waters. Schedule 7 of the SEPP states specific water quality objectives with regard to the Yarra River and Merri Creek catchment, and require council regulation and planning to have regard to achieving SEPP objectives.

**Water Act 1989**
The Water Act provides the legal framework for managing Victoria’s water resources. It enables Melbourne Water to act in relation to the management of waterways, drainage and stormwater (amongst other areas) in the Melbourne Region. In the case of sediment control, this is done through its activities as a Referral Authority and the setting of condition on development applications.

**Municipal Local Laws**
Local laws vary between municipalities, but commonly cover issues such as amenity, asset protection, roads, public spaces, administration and enforcement. Local laws for the four councils assessed require compliance with a Building and Works Code of Practice (Building Code), which sets out requirements for site management that relate to control of issues that cause sediment pollution. Authorised Council officers are able to undertake compliance activities, which may include issuing infringement and penalty notices (to a maximum of $4,000).

Overall the review suggests that the legislative framework is generally sufficient to provide for adequate regulation and control of sediment pollution.

Interviews conducted with stakeholders (local councils, EPAV and Melbourne Water) regarding the application of regulation identified the following key findings:

• Lack of resources for enforcement activities;
• Lack of legislative power to set meaningful penalties at a local laws level (such as fines and stop work powers);
• Enforcement under the local laws process is clear and straightforward;
• More significant penalties are available under the EP Act, however, the required standard of evidence can be difficult to meet;
• Disconnection in communication and role definition between planning, building, environment, engineering and enforcement responsibilities;
• Disconnection in communication and role definition between agencies;
• Varying commitment within agencies to sediment pollution control; and
• Low level of understanding of inter-agency roles, responsibilities and capabilities.

These issues were summaries and used to develop flowcharts shown at Figures 3, 4 and 5, as a discussion prompt for the following workshop.
The workshop aimed to build on the issues identified in the research, by bringing together the skills and experience of a multi-disciplinary, multi-agency team to engage in honest discussion and feedback to develop practical, meaningful solutions for implementation at the catchment scale.

Workshop discussions identified the following solutions and collective actions:

**Session 1: The sediment problem and solutions**

Concurrent discussions focusing on the Planning/Pre-development, Subdivision and Building stages of developments (as shown at figures 3, 4 and 5), identified a number of common themes, issues and solutions.

Planning/Pre-development
- Improvements in communication and clear referral processes between council departments.
- Improved consistency and compliance with Environmental Management Plans, Local Laws and planning condition requirements.

Subdivision
- Provision of standardised Environmental Management Plan and Site Management Plan templates to improve process consistency and efficiency.
- Strengthening of EMP requirements, including ensuring protections in place before any works commence.
- Greater resourcing for compliance and enforcement of EMPs.

Building
- Requirement to maintain or plant vegetation on lots for handover to builder.
- Greater enforcement resources and powers, including a range of alternative, non-financial penalties.
- Support for compliance staff, including stormwater training or performance bonuses.
- Greater consistency and accountability of building permit approvals.
- Clearer requirements for onsite management practices.

**Session 2: Identifying collective action**

A group discussion refined priority collective actions.

- Consistency of requirements for Planning Permits, Building Permits, EMPs and Asset Protection.
- Consistency of compliance approach.
- Development of alternative enforcement models.
- Better communication within and between agencies.
- Increased awareness of sediment issues (amongst staff, builders and the community).
- Investigate alternative development staging and construction for minimal disturbance.

**Session 3: Working together to deliver a plan**
In smaller groups, individuals fleshed out a potential delivery model. A key priority action was the formation of a Regional Working Group, made up of members of the 5 local governments within the catchment and EPAV, with facilitation by Melbourne Water, with a final structure to be decided, that would ensure commitment from all involved parties. The main function of the working group would be to:

1. Develop and implement consistent planning requirements across the region.
2. Investigate alternative compliance/enforcement models and apply them consistently across the catchment (including the potential for regional enforcement activities).
3. Develop an Education and Capacity Building program for council staff, builders and the general community.
4. Develop potential pilot projects with development industry to demonstration minimal site disturbance and alternative staging.

Discussion

There have been a number of projects undertaken in the past to find solutions to sediment runoff into waterways that have included a focus on education and enforcement activities. The Merri Creek Catchment Sediment Project offers nothing new in this respect. This project’s approach differs in the way it has sought to confirm the extent and issues associated with stormwater sediment pollution in the waterway, and engage with all stakeholders to develop a plan at a whole of catchment level.

It was presumed that the approach taken to confirm anecdotal evidence and jointly develop a plan would lead to strong collective action. The Merri Creek Catchment Sediment Study Workshop achieved a strong level of engagement and developed some clear actions to be undertaken by participant organisations; however, follow up engagement and commitment has been difficult to maintain.

There remains a heavy expectation for Melbourne Water to coordinate and lead a regional response to locally generated stormwater issues such as sediment pollution. Some potential explanations for this include, resource constraints for planning and enforcement activities and uncertainty surrounding the obligations of individual organisations and staff. However, there appears to be an underlying political reluctance, and a desire not to appear as ‘anti-development’ in a region that has been earmarked as a development hub. In this context, independent action may be perceived as particularly risky by councils who feel under pressure from the development industry and state planning institutions to enable affordable housing at an accelerated rate.

Melbourne Water’s preferred approach when engaging with local government and industry stakeholders to improve stormwater management is through capacity building activities, as a cost effective mechanism to affect behavioral change, where it does not necessarily have legislative authority. Our response to the Merri Creek Sediment Project is to leverage off previous engagement through our Living Rivers Program and development approval processes to promote leadership at a local government level by:

- Providing funding for council developed partnership projects to address issues through development of strategic processes, enforcement and communication activities, either individually or in partnership with each other;
- Investigate the integration of a Merri Creek or broader catchment sediment working group into an existing program or taskforce, such as the Victorian Litter Action Alliance or the Yarra River and Port Philip Plan of Action taskforce;
• Working with Clearwater and/or the Municipal Association of Victoria to develop clear communications about sediment issues and responsibilities; and
• Continuing to build and draw upon our strong relationships at a state and local government level to advocate improved stormwater management practices.

Melbourne Water believe that the Merri Creek Catchment Sediment Project provides an opportunity to test this as approach as a cost effective and self-sustaining solution towards stormwater sediment management by strengthening the implementation of the existing regulatory framework. The approach has the potential to be broadly applicable throughout Melbourne’s urban growth development areas, as Melbourne Water, together with EPA and local government, strive to protect all of our waterways from the damaging impacts of sediment laden runoff from building and construction activities.

![Figure 6: Keeping our Stormwater Clean: A Builder’s Guide](image_url)

**Conclusions**

A number of conclusions can be drawn from the Merri Creek Catchment Sediment Project.

There has been confirmation of anecdotal evidence that high levels of sediment entering the waterway from development and building activities are significant. Investigations carried out have also identified that these impacts are occurring across the development life cycle, and while there is some correlation between the level of sediment runoff with site slope and the type of builder, this is an issue uniformly across the catchment.

Whilst the legislation around sediment management at a state and local level is relatively robust, there are systemic issues in the application and enforcement of onsite sediment control measures due to resourcing constraints, inadequate deterrents, organisational processes, knowledge gaps, inter agency communication, and a reluctance to be seen as ‘anti-development’.
Sediment in the Merri Creek, and in waterways generally from construction sources, is an ongoing issue. Numerous organisations and partnership projects have aimed to tackle the problem, but it is difficult. Future solutions will require an innovative approach, adequate resourcing, broad engagement and a high level of commitment from multiple organisations and disciplines.

Melbourne Water will continue to work with its stakeholders to support partnership projects and advocate for better management of stormwater and sediment runoff. We will aim to do so in a way that services the needs of our customers, while, at the same time, empowering them to develop and implement effective, catchment wide solutions.
References:


Environment Protection Authority Victoria, 2003, State Environment Protection Policy (Waters of Victoria), State Government of Victoria


Melbourne Water Corporation, 2012, Setting Our Strategic Direction