

Technical Memo

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Subject/Title	Stormwater Management Strategy – Preliminary Concept		
Project Name	BIFT Master Plan	Project Number	30041930
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Prepared for	Beveridge Property Management Services		

1 Purpose

This technical memo describes the proposed high-level concept stormwater management strategy for BIFT site.

2 Project Site

The site (orange boundary) drains generally in two separate directions with the north and east portions (blue shade) directly discharging into Merri Creek and the south-western portion discharging towards the existing North East Railway corridor. The south-west portion (green shade) is covered within Melbourne Water’s Beveridge East Development Services Scheme (DSS).

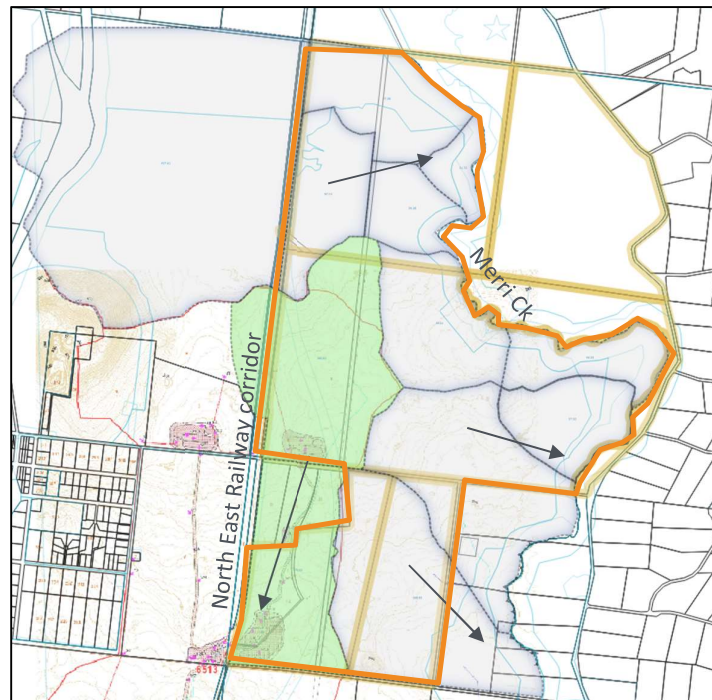


Figure 2-1 Site Boundary and Catchment Directions

3 Overall Strategy

The stormwater management strategy envisaged for the project site involves two strategies:

1. For the south-western portion, the strategy is to follow the MW DSS.
2. For the eastern and northern catchment, the strategy is to provide consolidated end of catchment treatment and retardation prior to discharging to Merri Creek whilst ensuring the floodplain requirement is not in conflict with the future development.

4 Beveridge East DSS

The DSS sets the drainage masterplan for a catchment to facilitate urban development in greenfield areas. The purpose of the DSS is to identify the infrastructure required to service the larger catchment as a whole rather than per property boundary.

The stormwater infrastructure identified within the project site includes the following:

- Two retarding basins and wetlands co-located within the same footprint
- A new constructed waterway connecting the two basins
- Scheme pipe from the railway reserve to connect the upstream catchment into the retarding basin

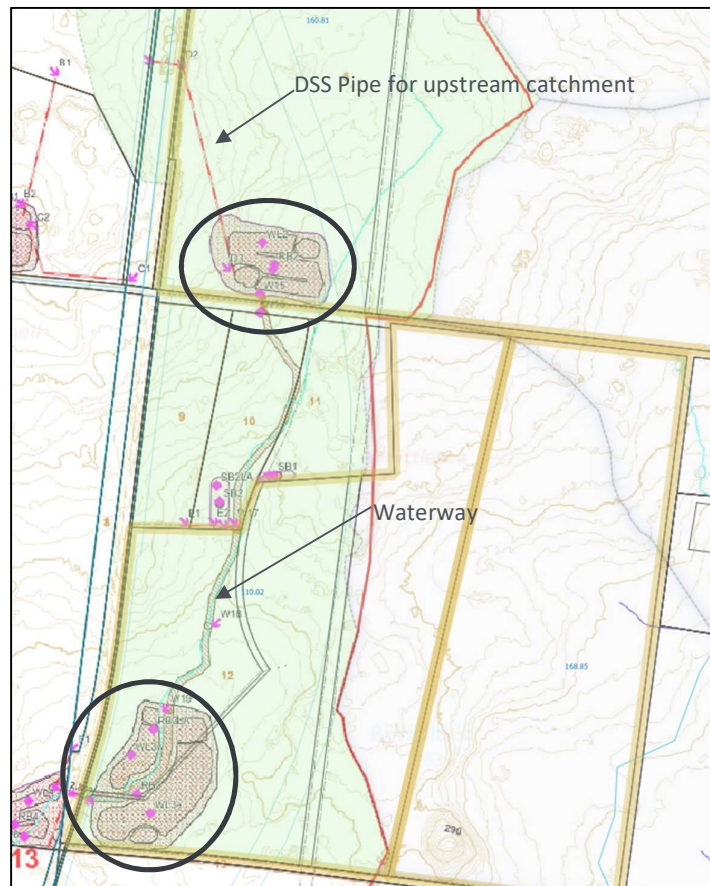


Figure 4-1 DSS works within the site boundary

The DSS has taken into consideration the requirements of each property within the wider Beveridge East DSS catchment to meet the flood protection requirements and stormwater quality treatment performance.

The BIFT development is proposed to be consistent with the DSS strategy. This approach is standard for urban development in greenfield areas to obtain support from the drainage authorities.

Appendix B shows the Beveridge East DSS at the time of writing this memo.

4.1 Contribution to DSS

As part of the development of the site, consultation with Melbourne Water (as the drainage authority) is required at the early stages of master planning. Subsequent to the preliminary concept design, formal agreement of the drainage works to be constructed will be required to proceed with the next stage of development approvals.

Consistent with the DSS process, Melbourne Water may potentially require the developer to construct the DSS works within the site, as part of the development staging. Melbourne Water would then reimburse the developer for the cost to build the infrastructure works envisaged in the DSS.

In addition, the developer will be required to pay contributions to Melbourne Water's DSS. This contribution is used to fund the stormwater infrastructure within the DSS catchment.

It is recommended that the drainage authority be consulted at the early stage of development.

4.2 Impact to Development Layout

The DSS strategy has been incorporated to the development layout master plan. The future Melbourne Water retarding basin/wetland and 40m wide waterway have been reshaped to suit the development and road layout. Appendix A shows the proposed drainage strategy layout for BIFT.

The DSS works covers the development area immediately east of the existing railway reserve and the new rail terminal area.

The DSS drainage works within the BIFT site will likely include the construction of:

Table 4-1 DSS works within BIFT development

Drainage and water quality works	Description	DSS Ref #
Melbourne Water Retarding basin and wetland	Located adjacent of OMR reserve and Beveridge Road	RB2/WL2
Major Culverts	Under Beveridge Road as an outlet for the RB	W15-W16
Stormwater Pipe	Provide outlet for upstream catchment area west of the railway line	D2-D3
Temporary stormwater pipe	Through existing drainage easement (subject to landowner consent and drainage authority approvals)	

Drainage and water quality works	Description	DSS Ref #
Melbourne Water Retarding basin and wetland	At the southern outlet of the project site adjacent to the railway reserve	RB3/WL3
Constructed waterway	40m reserve to connect the north and southern RB/WL	W17-W18-W19
Major culvert	To provide outlet under the railway reserve	

Refer to Figure 4-2 for the DSS works.

4.2.1 Stormwater connection through adjacent property

Directly downstream of DSS RB2 at Beveridge Road, a pipe is proposed to be constructed within the existing drainage easement which traverses the adjacent property outside the subject site. This pipe is required to provide drainage connection from the upstream catchment north of Beveridge Road to the catchment outlet to the south. It is anticipated that this pipe would be required when Stage 1 development commence.

Should the adjacent property decide to develop in the future, the pipe can be removed and replaced with the DSS waterway subject to MW requirements. These matters are subject to discussions with Melbourne Water as part of the development process.

4.2.2 Other authority works

The internal drainage pipes will be designed in accordance with the relevant Council Standards. Each lot will be provided with a discharge point to connect into the retarding basin/wetland.

In addition, two culverts are potentially required to go under the OMR reserve and gas main connecting into the retarding basin/wetland as per the drainage concept plan. Further discussions with the relevant stakeholders will be required to confirm this assumption.

For the purposes of the overland flow paths, it has been assumed that the future OMR would be constructed at separate grade and go over Beveridge Road. Hence culverts will be necessary to convey the flows from east to west. The future retarding basin downstream would be excavated to daylight the culverts.

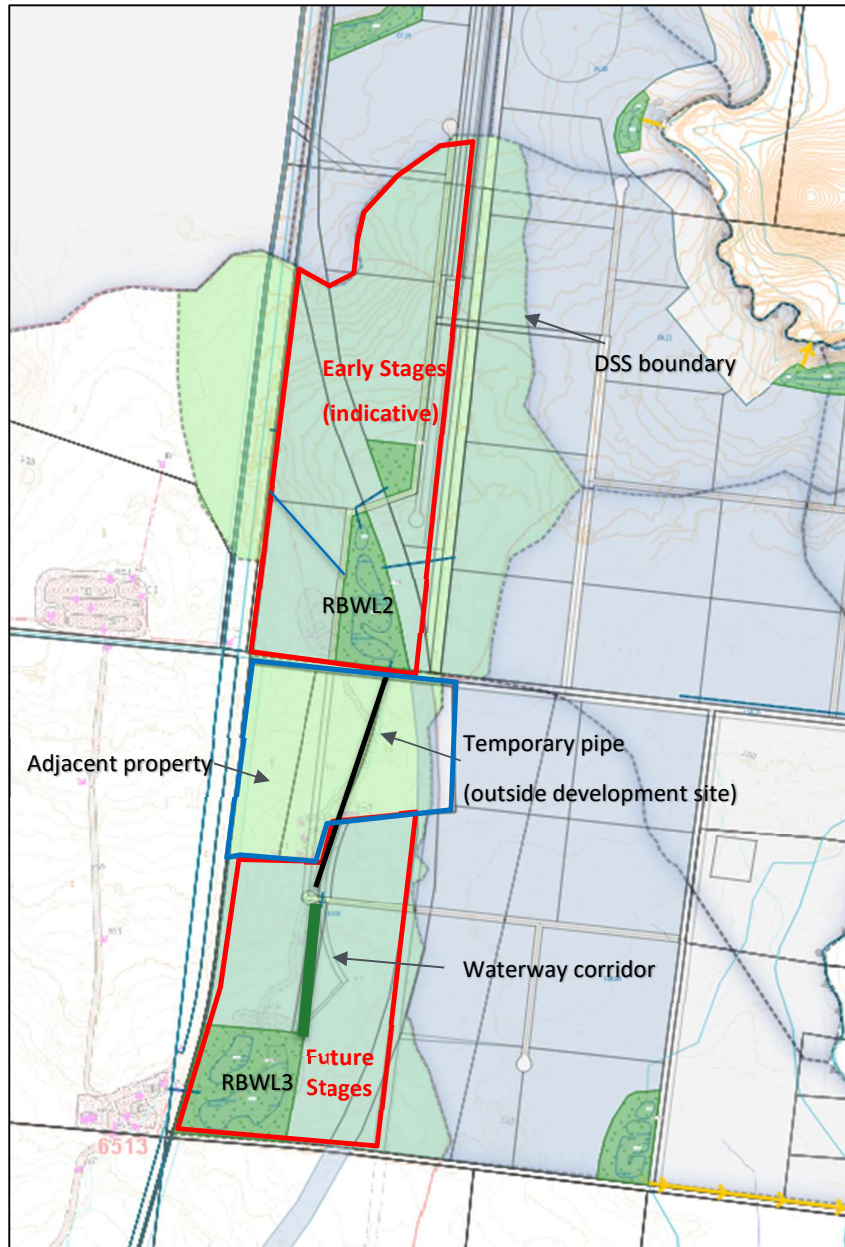


Figure 4-2 DSS covering proposed development

5 North East Catchment

The remaining catchment of the site drains directly into Merri Creek and its tributary in an easterly and northerly directions.

No DSS is currently implemented for this portion of the site. In the absence of a formal DSS at this time, the strategy for this area is to provide consolidated end of catchment treatment and retardation prior to discharging to Merri Creek whilst ensuring the future development is not in conflict with the floodplain requirements.

5.1 Drainage

The internal minor drainage systems are to be designed to capture the 10% AEP design storm event in accordance with Council standards. The conveyance of this flow is proposed to be achieved via underground pipes, capture pits and overland flow paths. The alignment of the pipes will follow the internal road layout as per development guidelines. Each lot will be provided with a legal point of discharge.

For the major flood events, the road reserve and drainage easements will be utilised as overland flow paths to convey the 'gap' flows as per standard practice.

With the combination of the internal drainage, road reserves and drainage easements, the drainage system will be designed to provide protection for the 1% AEP flood event. Lot floor levels will be provided with appropriate freeboard. Regrading of some of the lots will be required to meet drainage requirements.

To meet the peak flow retardation requirements, retarding basins are proposed at each catchment outfalls. These works will consist of a combination of excavation and embankments with associated pipe outlets and pit structures.

5.2 Stormwater Quality

5.2.1 Layout Concept

Each of the retarding basins will also incorporate stormwater wetland treatment systems within the basin to meet the requirements for treatment to best practice prior to discharging to Merri Creek. The proposed location of the retarding basins/wetlands are shown in Appendix A. There are in total nine retarding basin/wetland systems identified in the drainage concept plan with six located outside the DSS. The proposed systems have been consolidated as much as the topography can allow.

For the catchment draining east, the works are proposed to be located within the future grassland reserve of Merri Creek abutting the development area. The only exception is the catchment to the south-west which is proposed on the upstream side of Julian Road. To the north, one retarding basin/wetland is proposed adjacent of Hearn's Swamp.

The layout of the stormwater infrastructure has been devised with the aim to consolidate and minimise as much as possible the assets required to be maintained and operated. The benefit of a centralised system is it eliminates the requirement for each development lot to provide separate treatment and retardation systems. Subject to acceptance from the drainage authority, the maintenance of the assets would be the responsibility of Melbourne Water or Council.

5.2.2 Preliminary Wetland Sizing

The preliminary ultimate works footprints are shown conceptually in the subdivisional layout plan and Appendix A. Further design work is required to confirm the exact position. The footprint provided is deemed to provide sufficient level of detail at this stage of master planning.

Approximate footprint areas are detailed in Table 5-1 below. The corresponding retarding basin and wetland systems ID are also shown in Appendix A.

A preliminary MUSIC model has been created to provide some level of confidence on the footprint required for each wetland to meet Best Practice targets, in accordance with Melbourne Water's wetland design manual.

Table 5-1 Retarding basin and wetland area (preliminary)

RB/WL ID	Catchment Area (ha)	Footprint Area (ha)
1	17	0.6
2	61	2.2
3 (DSS)	168	7.9
4	50	3.5
5 (DSS)	109	12.7
6	36	1.3
9	124	5.9
10	133	4.5
11	28	2

5.2.3 Waterway Amenity

The location of the wetland system provides opportunity to enhance the Merri Creek waterway corridor by providing fauna habitat and natural amenity features for the community.

In the vicinity of Hearnies Swamp, a constructed wetland will additionally provide a buffer between Hearnies Swamp and the development area.

5.2.4 Consultation with relevant authorities

Further consultation with the relevant authorities (such as DELWP, Melbourne Water and/or VPA) is required to obtain in principle agreement to the proposed stormwater infrastructure works across the project site and within the adjacent Merri Creek future reserve.

5.3 Merri Creek Floodplain

The development layout has been designed to be sympathetic to the existing floodplain constraints to the north and east which is subject to significant flooding from Merri Creek.

All the proposed basins and wetland systems are intended to be outside the Merri Creek floodplain to ensure they do not impact on the flood behaviour and they function as intended.

The alignment of the railway works will result in minor encroachment on the floodplain to the north. To offset the loss in flood storage, minor cutting would be required in the vicinity of the works to meet Melbourne Water's no net loss in flood storage requirements. The extent of the earthworks is minor, and it is expected to be resolved within the project boundary.

A request for flood information from Melbourne Water in relation to the Merri Creek flood levels was initiated. Initial advice from Melbourne Water indicates that an updated catchment wide study is currently being undertaken and can be provided once complete.

The catchment study will provide an up to date flood levels that can be used for design purposes. The flood levels are not expected to change significantly from the initial flood level assumptions used in the BIFT master planning. The updated flood information will be considered in the functional stages of the development.

5.3.1 Railway Works

The new railway works will require the existing culverts under the existing railway to be extended to the full width of the new railway embankment. The existing culvert is sized approximately 14m wide.

Additional culverts under the new rail tracks are also required on the downstream section to prevent blockage of flood flow. See Figure 5-1 below.

As previously mentioned, minor cut fill balance of earthworks will be required to offset the embankment fill in the floodplain. In addition, minor channelizing works is required between the two culverts to realign the existing low flow channel. The final configuration of the works within the floodplain will be subject to Melbourne Water approval.

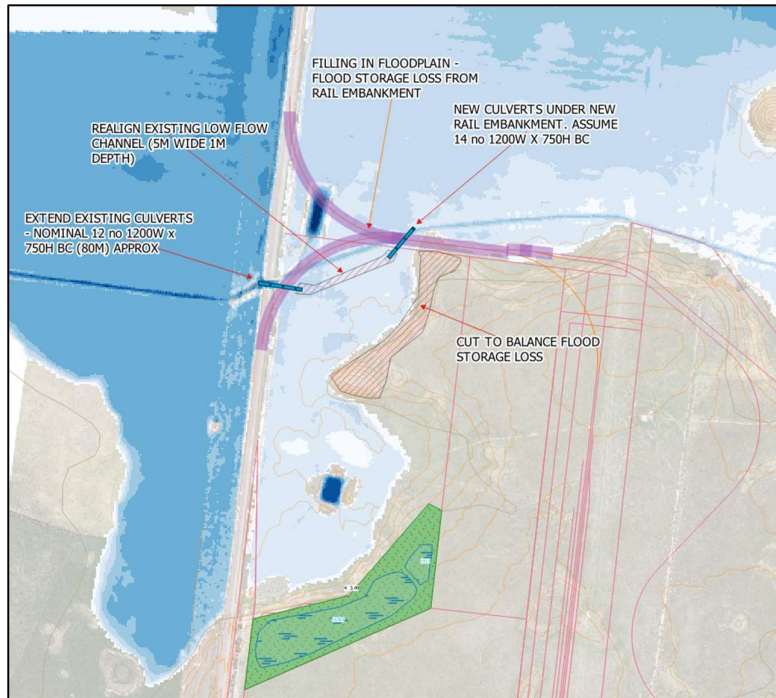


Figure 5-1 Railway works

Further flood modelling may be required to demonstrate that the proposed railway works will not adversely impact existing properties or the flooding behaviour of this area.

6 Summary of Strategy and Recommendations

The preliminary drainage strategy consists of two main catchments being the South West catchment covered by the Beveridge East DSS and the North East catchment draining into Merri Creek.

The strategy is as follows:

1. For the south-western portion, the strategy is to follow the Melbourne Water Beveridge East DSS.
2. For the eastern and northern catchment, the strategy is to provide consolidated end of catchment treatment and retardation prior to discharging to Merri Creek whilst ensuring the floodplain requirement is not in conflict with the future development.

The development layout has taken into consideration the stormwater management requirements of the development site and this is shown conceptually in Appendix A.

This memo has described the high-level asset requirements to manage and mitigate the impacts of the development.

The following is a summary of recommendations and important consideration identified in the preliminary Stormwater Management Strategy applicable to BIFT to date.

- **It is recommended that the drainage authority is consulted at the early stage of development to seek in principle support to the Preliminary Stormwater Management Strategy and seek comments applicable to the Project site.**
- **It is recommended that consultation with relevant authorities, which may include Melbourne Water, Local Council, DELWP and other government departments, be undertaken to seek and obtain in principle agreement to the proposed works within the Merri Creek floodplain and future reserve.**