

# Memo

To:	Phil Jaggard, Mark Iszard	Job No:	31559.2000
From:	Peter Norfolk & Tim Fisher	Date:	06 November 2019
Subject:	Stormwater Management for Drury South Phase 2		

## 1 Introduction

The Drury South Precinct Stormwater Management Plan identifies centralised treatment wetlands as the Best Practicable Option on the basis that the proposed wetland sites in the 100 year floodplain could achieve both stormwater treatment and flood storage (for events >10 year ARI flood). This approach has been utilised for Phase 1 of the development and the wetland for that is now well into construction. However since the time the SMP for Drury was prepared a number of key premises have changed that could affect the ability to apply this approach for Phase 2 of the development, namely:

- Supporting Growth Alliance (SGA) now propose to establish a corridor for Mill Road that could pass directly through the proposed wetland site.
- Notwithstanding the establishment of Mill Road, land ownership of the proposed wetland site has not yet been resolved by Drury South (DSL) and some uncertainty still remains around timeframes and the viability of a transfer in ownership and hence the control of the site for the purposes of a stormwater treatment wetland.
- Development and construction of Phase 2 of the Drury South Industrial Area is to be staged as dictated by market demand with the early sites in the east adjacent to the quarry (furthest from the wetland/Hingaia Stream). A decentralised stormwater solution provides flexibility to provide treatment in parallel with the development of lots for Phase 2 and is therefore a more cost effective solution as it does not require a large initial capital outlay.
- Recent discussions with iwi have highlighted their strong support and preference for a decentralised approach for ongoing development

DSL have requested that Tonkin + Taylor (T+T) investigate alternative stormwater management approaches to overcome the constraints set out above while still meeting the stormwater outcomes required by the SMP. This memo sets out the proposed alternative stormwater management approach, utilising a decentralised solution, for consideration by Healthy Waters. It is noted that decentralised stormwater treatment solutions are commonly utilised in Auckland and have already been applied on the Drury site for the main spine road into the development. They are also the recommended approach outlined in the Auckland Unitary Plan.

## 2 Provision for alternative approaches

A network discharge consent (NDC) for the Drury South Industrial Precinct was granted on 2 July 2018 (Application number DIS60313540). Table 1 of the NDC outlines the required stormwater management outcomes (refer Condition 5) including the requirement for centralised treatment wetlands.

Condition 6 of the NDC states that *“In the event that alternative stormwater management is proposed which is not specified in Table 1, but which meets the outcomes within the Drury South Precinct Stormwater Management Plan and can be demonstrated to be the Best Practicable Option, the applicant shall seek certification of the approach from the Team Leader Compliance Monitoring South”*. Condition 6 was included in the consent by Auckland Council and DSL in anticipation of potential change to the stormwater management approach to changing operational circumstances over the long construction timeframe of the project.

The key outcomes from the SMP relating to stormwater management in the Industrial Precinct are:

- The creation of developable land for industrial and residential land use to support future population growth in Auckland.
- An integrated stormwater management approach that mitigates the impact of land use change from agricultural use to urban through protecting main stream corridors and mimicking natural stormwater treatment systems.
- Provision of a “green corridor” for stormwater management that provides multiple functions including flood management, water quality treatment, hydrological mitigation for stream protection as well as public amenity.
- Minimise changes to upstream or downstream flood water levels, while ensuring any development is located outside the 100 year ARI modified floodplain.
- The Industrial Precinct mitigates adverse effects on surface or groundwater quality from stormwater runoff using a “treatment train” approach and provide hydrological mitigation (retention and detention).
- Safe conveyance of stormwater runoff to the receiving environment(s) via a reticulated stormwater network and overland flowpaths.

The following subsections outline the proposed alternative stormwater management approach to meet the outcomes of the Drury South Precinct Stormwater Management Plan.

The Auckland Unitary Plan policy E1.3.10 supports decentralised stormwater management as proposed by the alternative approach in this memo. It also requires consideration of the practicalities of development. Policy E1.3.10 requires an integrated stormwater management approach having regard to:

*a) the nature and scale of the development and practical and cost considerations.....*

*b) the location, design, capacity, intensity and integration of sites/development (b) and infrastructure, including roads.....*

*e) the use and enhancement of natural hydrological features and green infrastructure for stormwater management where practicable.*

### 3 Proposed alternative stormwater management approach

#### 3.1 Approach summary

The proposed alternative stormwater management approach to meet the SMP requires are summarised below:

- Provide at-source water quality treatment of runoff from all public roads.
- Provide water quality treatment of runoff from all hard stand areas on private lots.
- Roof areas constructed using inert building materials will not require water quality treatment. Inert building materials are those which do not have an exposed surface made from contaminants of concern to water quality (i.e. zinc, copper, and lead).

- Minimising or mitigating changes in hydrology by providing 'hydrological mitigation' in accordance with Table E10.6.3.1.1 of the Auckland Unitary Plan. This requires retention (volume reduction) and detention (temporary storage) for all impervious surfaces on private lots and public roads. Exceptions for providing retention can be made in cases where soil infiltration rates preclude disposal to groundwater and rainwater reuse is not possible.

The proposed alternative stormwater management treatment train for the Industrial Precinct is summarised schematically in Figure 1 below and is discussed in more detail in the subsections that follow.

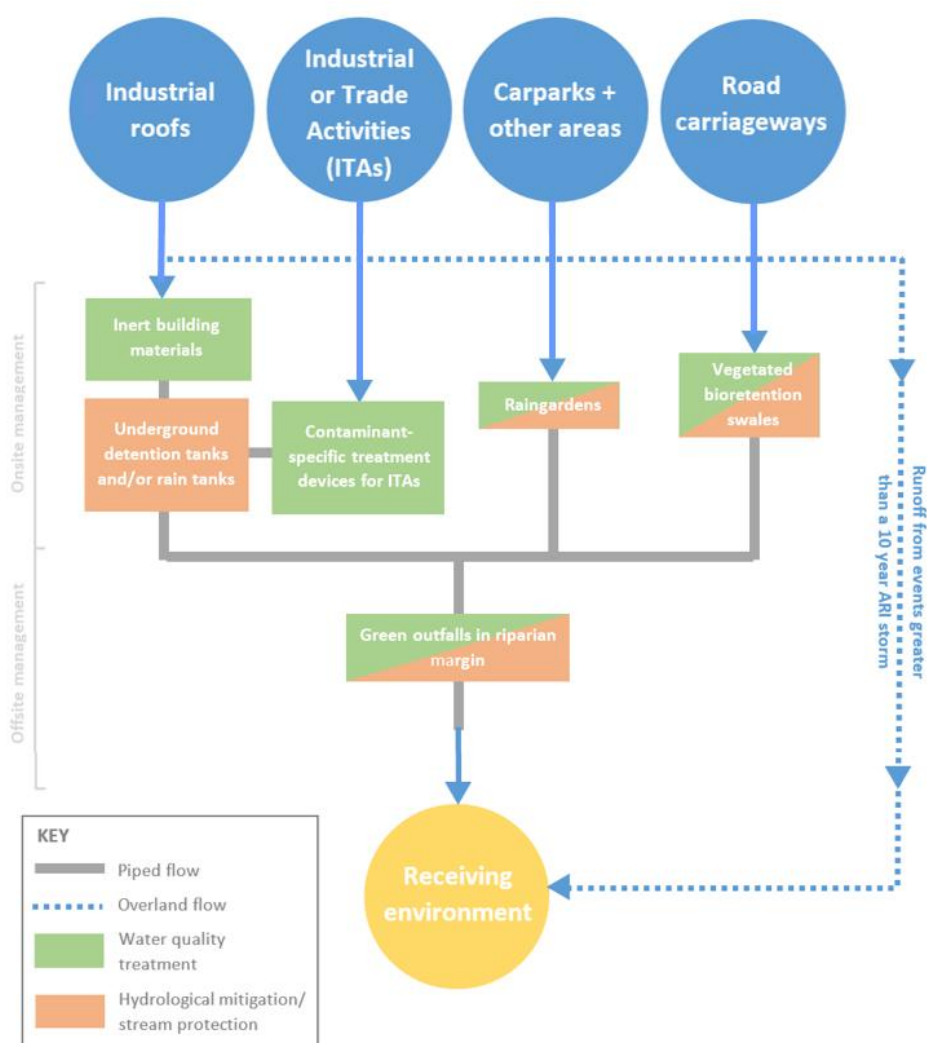


Figure 1: Proposed treatment train for Phase 2 of the Industrial Precinct

### 3.2 Private lots

While the proposed layout of the private lots is unknown at this stage, for the purposes of stormwater management the impervious areas of the lots can be categorised as roof areas and non-roof impervious areas such as carparks and hardstand areas. To meet the outcomes of the Drury South SMP any carpark or hardstand areas will require water quality treatment and hydrological mitigation (detention and retention). Roof areas will require hydrological mitigation but would not require water quality treatment if constructed using inert building materials.

It is proposed that stormwater runoff for carpark or hardstand areas is directed to raingardens to provide both water quality treatment and hydrological mitigation functions (refer to Figures 1 and

2). It would also be possible to only target water quality treatment for the carparks/hardstand areas in raingardens and provide the hydrological mitigation function in an underground detention tank downstream of the raingarden to reduce the footprint of stormwater management devices on private lots. For lots that have particularly large hardstand areas where dispersed raingardens are not possible an alternative approach, such as underground detention tanks with proprietary treatment devices, may need to be considered. Similarly, hardstand areas that have high contaminant loads, especially sediment and debris, will need special consideration.



Figure 2: Example of a raingarden in a carpark application

There are a range of proprietary treatment devices that could also be utilised by private lot owners to treat stormwater runoff including those provided by Stormwater360, which include media filters, oil and water separators and gross pollutant traps. See Figure 4 below for examples.

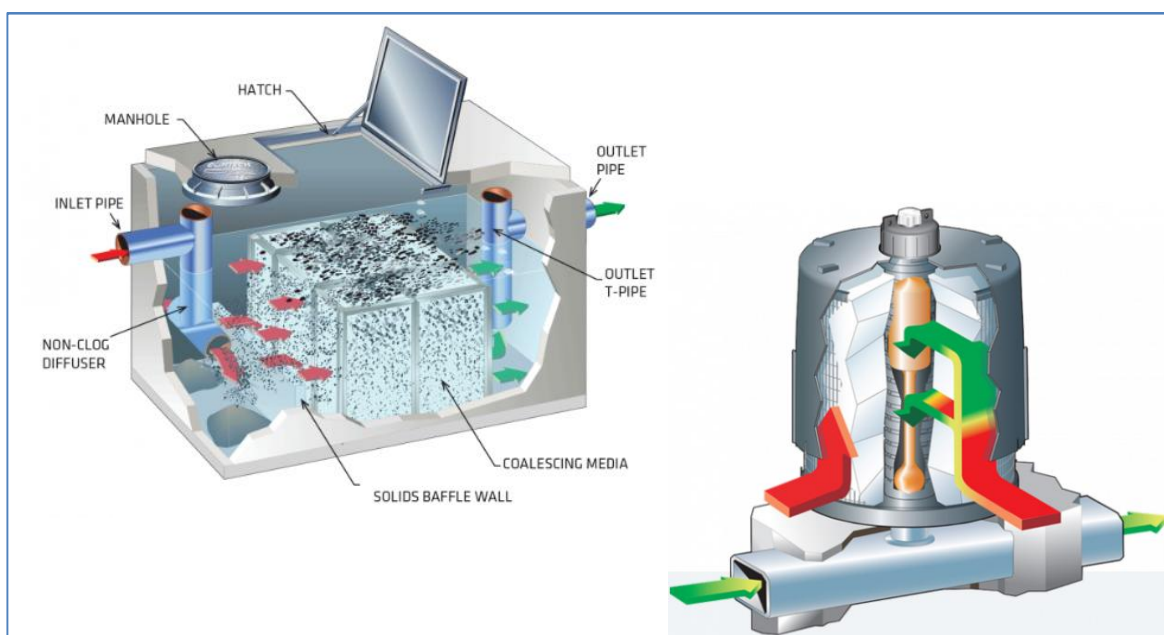


Figure 4: Stormwater360 Examples - Oil-Water separator and Stormfilter



For inert roof areas hydrological mitigation could be provided using above ground rain tanks or underground detention tanks. Underground detention tanks are generally able to be located under trafficable areas with sufficient cover (refer Figure 4). Retention can be achieved using these devices where there is a demand for water reuse. In other cases the retention volume will need to be added to the required detention volume.



*Figure 4: Installation of a large underground stormwater detention facility using a matrix of modular plastic cells that could be used on private lots*

Some lot owners in the industrial precinct will also be required to implement specialised stormwater management for Industrial and Trade Activities (ITAs), which is unchanged from the current approach.

### 3.3 Public road corridors

To meet the outcomes of the Drury South SMP all roads will require water quality treatment and hydrological mitigation (detention and retention). It is proposed that these stormwater functions are provided for roads using roadside bioretention swales (refer Figure 5 schematic). These devices would be owned and maintained by Auckland Transport. Similar to raingardens, bioretention swales can be integrated into existing landscaping requirements and provide treatment close to source. This solution has already been utilised on the project for the main (Maketu Rd) road into the area from the Ramarama Interchange offramp. This solution was recommended by Iwi during consultation and subsequently adopted by DSL.



Figure 5: Schematic of bioretention swale (source: Auckland Council GD01)

### 3.4 Additional Downstream Treatment

The treatment-at-source options outlined above treat the stormwater runoff at or close to the point it is generated. It then enters the conveyance network where it is collected and transported to the discharge point. Drury South already utilises green outfalls for all stormwater discharges to the local streams. Green outfalls provide better amenity and reduce the impact of the discharge on the receiving stream. They typically comprise a riprap section, about 10m long, which is used to reduce the velocity of the discharge, and then a planted channel section, approximately 10-20m long, that provides some further treatment before the discharge enters the stream (refer Figure 6).

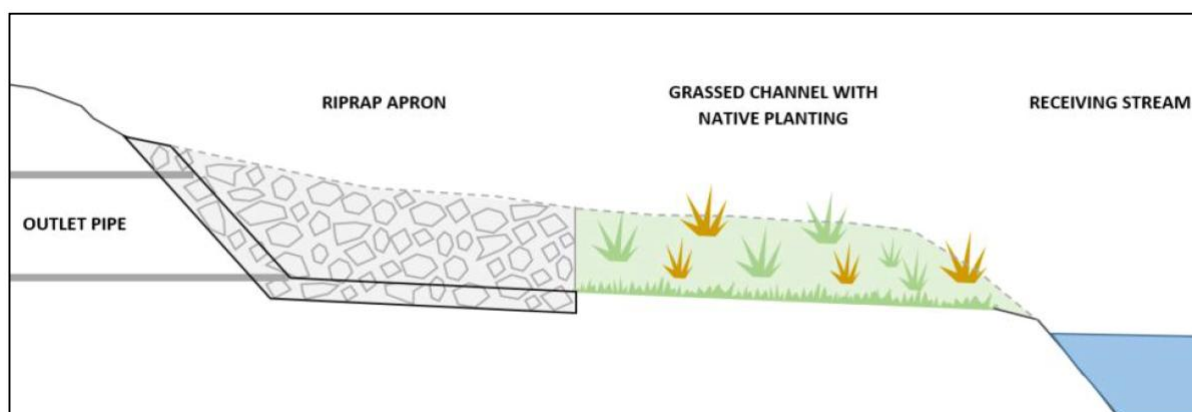


Figure 6: Schematic of green outfall

For the phase 2 discharge it is proposed to significantly enhance this green outfall approach to provide an additional level of treatment before the discharge enters the stream. This will be achieved by providing a much larger and longer planted channel section compared to the standard green outfalls. In addition, the riprap apron section is likely to be replaced with a forebay to receive the initial pipe network outlet flows and reduce their velocity before discharging those flows into the channel. Figure 7 below shows the conceptualised design for this proposed “super green outfall”.





Figure 7 – “Super Green Outfall” shown adjacent to outfall from Wetland 1

Points to note:

- The super green outfall is shown located adjacent to Wetland 1 covering part of the land that was to be used for Wetland 2. The final location and configuration may change and will be finalised as part of detailed design of phase 2 of the project.
- Comparison with the green outfall associated with Wetland 1, which can be seen in the figure, demonstrates how much larger the new channel will be – of the order of 10 times longer and much wider to allow greater contact with vegetation before entering the stream.

### 3.5 Assessment of best practicable option

Table 3.1 below summarises the potential advantages and disadvantages of a decentralised approach like the one presented in this section when compared to a centralised approach such as a wetland at the bottom of the catchment. The assessment supports the decentralised approach as the best practicable option based on our current understanding of the site.

Table 3.1: Potential advantages and disadvantages of a decentralised approach

Potential advantages	Potential disadvantages
<ul style="list-style-type: none"> <li>• Contaminants are treated close to source.</li> <li>• Treatment is dispersed so if one device fails the whole system is not compromised.</li> <li>• If it is possible for the base of raingardens and bioretention swales to remain unlined then</li> </ul>	<ul style="list-style-type: none"> <li>• Ensuring ongoing performance and maintenance of devices in private ownership has been a historical challenge with low impact design practices.</li> </ul>

<p>there is potential to achieve some retention via infiltration.</p> <ul style="list-style-type: none"> <li>• Devices such as raingardens are often able to be integrated into existing landscaping requirements.</li> <li>• Allows flexibility in how development is staged based on market demand.</li> <li>• Is generally supported by iwi as the preferred treatment approach</li> <li>• Independent of Mill Road alignment decision</li> <li>• Development is no longer dependent on land ownership, where land purchase has been unsuccessful so far</li> </ul>	<ul style="list-style-type: none"> <li>• Increased cost of private stormwater network/treatment for lot purchasers.</li> <li>• Potentially less useable land for lot purchasers.</li> </ul>
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The key potential disadvantage of a decentralised approach is the ability of Healthy Waters to ensure stormwater management outcomes are met when the maintenance responsibility for decentralised devices sits with private landowners. We believe this can be addressed by ensuring Lot owners are made aware of their responsibilities to undertake regular maintenance of devices on their land such as raingardens using suitably trained contractors and professionals to ensure adequate ongoing device performance. Given that many lot owners in the industrial precinct will also be required to implement specialised stormwater management for Industrial and Trade Activities (ITAs) it is likely they will incorporate these requirements into those management practices and thereby adequately mitigate this risk. Furthermore, the requirement for planted zones along the road frontage of the lots will likely mean that at least a portion of all rain gardens will be located along the edge of the road corridor meaning they can be inspected relatively easily.

## 4 Summary

The Drury South Precinct Stormwater Management Plan identified centralised treatment wetlands as the Best Practicable Option on the basis that the proposed wetland sits in the 100 year floodplain could achieve both stormwater treatment and flood storage (for events >10 year ARI flood). This approach has been utilised for Phase 1 of the development and the wetland for that is now well into construction.

Since the time the SMP for Drury was prepared a number of key premises have changed that could affect the ability to utilise this approach for Phase 2 of the development, the primary issue being that the land for the wetland may not be available. Drury South Ltd. (DSL) have therefore requested that Tonkin + Taylor (T+T) investigate alternative stormwater management approaches to that stated in the SMP in light of those developments.

A network discharge consent (NDC) for the Drury South Industrial Precinct, based on the SMP, was granted on 2 July 2018 which included the requirement for a centralised treatment solution. That consent allows for alternative stormwater management solution to be proposed if they meet the outcomes within the Drury South Precinct Stormwater Management Plan and be demonstrated to be the Best Practicable Option. Under those conditions the applicant can seek certification for that alternative approach.

We believe a decentralised, treatment-at-source, solution can be implemented that will meet the outcomes of the Precinct Stormwater Management Plan and has some potential benefits with regards to water quality and quantity management over the centralised wetland approach (e.g. treatment close to source, increased potential for infiltration etc.). Given these factors, and the potential lack of availability of the land for a centralised wetland, the proposed decentralised approach is the best practicable option for the development. On that basis DSL will seek



certification for this alternative approach and request Healthy Waters consideration of that when that submission is made.

11-Nov-19

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