Samara

FRASER RISE

HOUSING AND DESIGN GUIDELINES

SECTION 1

Guide to Approval

STEP-BY-STEP APPROVAL PROCESS

- Purchase your land.
- Design your home.
- Submit your plans to the Samara, Fraser Rise Design Review Panel.
- Receive approval from the Design Review Panel.
- Obtain building permit.
- Start construction within 12 months of settlement date.
- Complete construction within 24 months of settlement date, including the garage, driveway fencing and retaining walls.
- Complete fencing within 30 days of Certificate of Occupancy being issued.
- Complete landscaping within 6 months of the Certificate of Occupancy being issued.

SECTION 2

Overview and objectives

Welcome to 1176-1198 Taylors Road - "Samara, Fraser Rise". We are so excited that you've chosen to be part of our master planned community.

Our desire is that our community looks beautiful and feels welcoming well into the future, there are some Housing Design Guidelines to follow when planning and designing your new home. They will help protect the integrity of your investment and provide you with peace-of-mind that every house in your neighbourhood is built to the same high standards as yours, while allowing everyone flexibility to express their own individual style.

SECTION 3

Application of Guidelines and Their Use

These guidelines convey a simple set of objectives and parameters for dwelling design that also provide flexibility in selection and choice of housing.

To ensure compliance with the Samara, Fraser Rise Housing and Design Guidelines, all designs must be approved by the Design Review Panel (DRP) prior to submission for Building Permit approval.

When considering dwelling design, the DRP may exercise discretion to waive or vary a requirement where they deem it appropriate for the development. The Guidelines are subject to change by the Developer, at any time, without notice following planning approval by the associated Council. All decisions regarding the Guidelines are at the discretion of the DRP.

OBJECTIVES

To ensure the quality of housing and landscape is delivered and to maximise the estates appeal.

To encourage a strong sense of place through the protection, enhancement and interpretation of places of post-contact cultural heritage significance.

These guidelines are designed to complement the vision to achieve the developer's intention.

The following key elements are set out in the Samara, Fraser Rise Design Guidelines:

- Design Assessment Panel approval,
- Architectural attributes,
- Colours and materials,
- Landscape and fencing.

These Guidelines are to be used in association with the Plumpton PSP and may be subject to changes by Melton Shire Council.

SMALL LOT HOUSING CODE

Lots with an area less than 300m^2 are subject to the requirements of the Small Lot Housing Code (SLHC) in addition to the Guidelines in areas including landscaping, colour palette and ancillary uses subject to DRP approval. Where there is a conflict between the requirements of the Guidelines and SLHC, SLHC will take precedence except where specific lots have been identified for variation in front setbacks (see Building Setbacks).

SECTION 4

Design Assessment and Approval

Artist Impression

OVERVIEW

All homes built at Samara, Fraser Rise must be approved by the SFRDRP (Samara, Fraser Rise Design Review Panel) prior to lodging for any Building Permit or commencing any works. The SFRDRP is appointed by the developer to implement the objectives of the Housing Design Guidelines. The Design Guidelines define the criteria used to assess building plans for design approval.

Please note that any proposal or element of a proposal that meets the objectives of the Housing Design Guidelines but is not strictly in accordance with the wording of the Housing Design Guidelines, may be approved by the SFRDRP.

Approval by the SFRDRP however does not exempt the plans from any building or statutory regulations, nor infer compliance with the building regulations or other applicable statutory legislation. Separate approval must be obtained from relevant authorities.

Allowance has been made for two submissions for each design approval application. Each additional submission will incur an administration fee. New submissions for a lot that already has an approved application will incur an additional fee for each submission. No claims shall be made to the developer or their representatives with respect to the decisions made.

SUBMISSION REQUIREMENTS

All submissions for SFRDRP must include the following information:

- Site plan at 1:200, with dimensions and showing the building outline, setbacks and % value of site permeability,
- All floor plans, roof plans and elevations at 1:100, showing with dimensions, the internal layout, and any pergolas, decks, terraces, balconies, verandas, windows, doors, and other openings,
- Provide printed samples or images (swatches, colour photos, etc.) of all proposed external materials and colour selections,
- Landscape plan at 1:100, with dimensions and showing the indicative extent of all hardscape and softscape, and a planting schedule that lists all proposed species referenced on a landscape plan,
- For lots with greater than 1.5m landfall, please include at least one sectional drawing showing the extent of cut and fill and heights and materials of proposed retaining walls.

SUBMISSIONS

When you are ready to submit your application for design approval, you can lodge it to the SFRDRP.

As well as being a source of information, the SFRDRP can help owners, designers, builders and developers to lodge and keep up to date with the progress of their submission from lodgement through to approval. Generally, the SFRDRP will respond within 48hrs with an Acknowledgement of Application and have a review within 10 working days of submission, but this time may vary depending on the nature and completeness of the submission.

Lodge at:
samara@jrdapprovals.com.au

PRO-TIP

Please note that incomplete submissions are the single greatest cause of delays in obtaining design approval.

- Check that the submission includes all required information before lodging.
- Complete submissions take the least time to process, review and approve.

RE-SUBMISSIONS

Should a re-submission be required, please ensure that any alterations or changes are highlighted on the plans or in any accompanying communication. This will help to speed up the processing and assessment.

TIMING

- Construction of your home should start within 12 months of the settlement date.
- Completion of your home should occur within 24 months of settlement.
- All front gardens must be landscaped in accordance with these Guidelines (including all soft landscape, driveways, and pathways) within 6 months of issue of the Certificate of Occupancy.

OTHER APPROVALS

The requirements detailed in this document are in addition to, and not in lieu of, any other legal requirements. It is the responsibility of the owner to ensure any other approvals, authorisation permits, or other requirements are obtained and satisfied.

DEFINITIONS

For the purposes of these guidelines:

- Public Realm is any land that is within the ownership of a public body, including Council and servicing authorities,
- Primary Street Frontage is the boundary that abuts the Public Realm,
- A corner lot is any lot that has more than one boundary that abuts the Public Realm,
- On corner lots, the primary street frontage is the shorter one adjacent to the street, unless otherwise noted on the Plan of Subdivision.

SECTION 5

Land Planning

OVERVIEW

Any subdivision and/or development of land adjoining a heritage site identified under the Heritage Overlay in the Melton Planning Scheme and/or of post-contact cultural heritage significance, must have regard to the heritage significance of the site and provide a sensitive interface.

Land uses abutting retained dry stone walls should enhance public visibility of the walls. Relevant uses include open space, conservation reserve, road verge or property boundary wall. Where it has been agreed with the responsible authority that an existing dry stone wall is to be removed, land owners should consult with Council to determine whether the stone should be retained for use in repairing other walls within the PSP or landscape designs.

LOT LAYOUT

Only one dwelling is permitted per lot.
Dwellings must front or side:

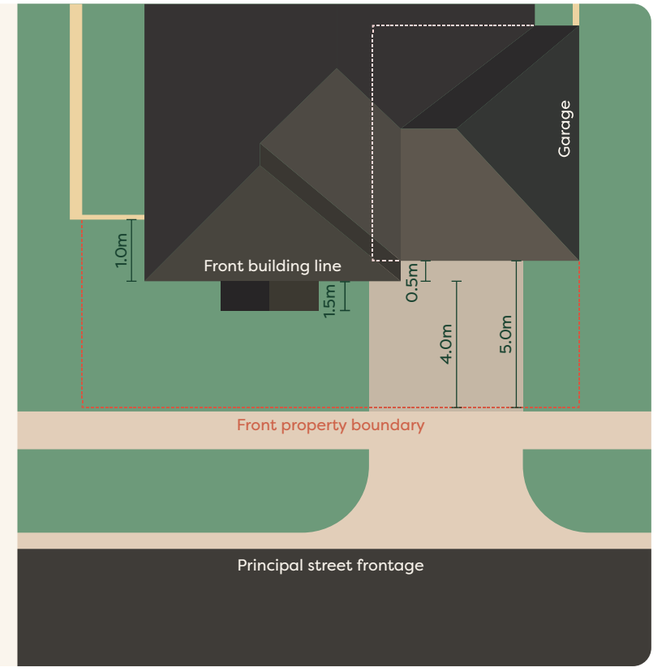
- Waterways and the open space network (including local parks and easements),
- Arterial and connector streets,
- The siding of lots to the above must be kept to a minimum.

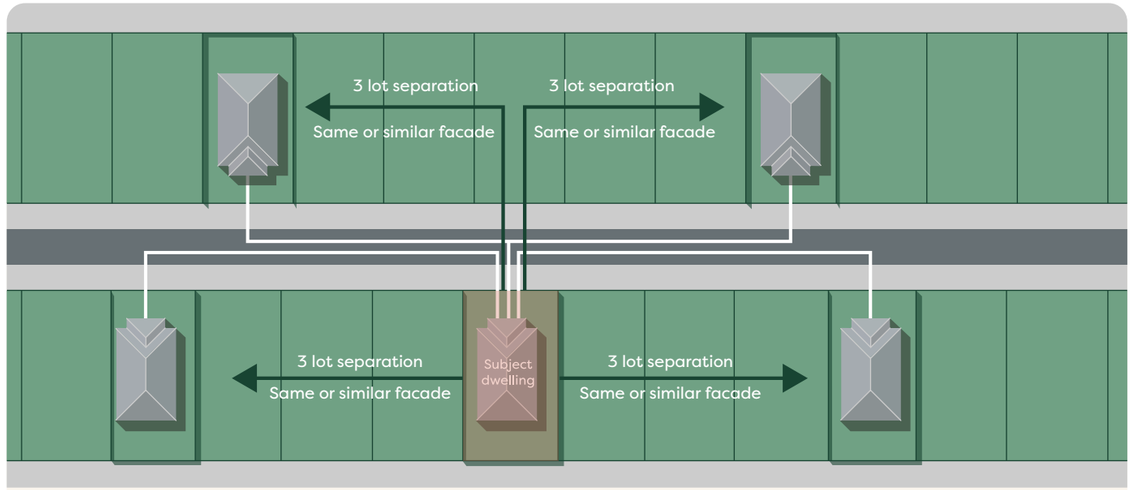
BUILDING SETBACKS

- The dwelling (front building line) must be setback a minimum of 4m from the front boundary.
- Garages accessed from the front of a lot should be set back 5m minimum from the front boundary of the lot.
- Porches, verandas, and porticos less than 4m in height may encroach up to 1.5m into the front setback.
- All dwellings with a frontage less than 20m must employ a 1m side setback on at least one side of the dwelling.
- Eaves, facias, gutters, chimneys, flue pipes, water tanks and heating or cooling or other services may encroach 0.5m into the setback around the whole dwelling excluding garage walls on the boundary.
- Dwellings on corner lots must be setback a minimum of 2m from the secondary street frontage.
- All building works must comply with the City of Melton Planning Scheme, Plumpton PSP, Victorian Building Regulations and Building Code of Australia.

GARAGE SETBACK

Where facing the secondary street frontage, the garage must be setback a minimum of 5m from the secondary street frontage. An easement running along the rear of the lot cannot be built over, and the garage may have to be setback from the rear boundary to accommodate the easement. Garages must be located adjacent to the lot boundary but are not permitted adjacent to boundaries abutting public realm.





BUILT FORM VARIETY

Similar façades will not be allowed within 3 lots of each other along both sides of the street subject to the SFRDRP.

If any two façades are deemed not to comply with this requirement, the earlier application will take precedence. Careful siting of dwellings and garages is important for the following reasons:

- Ensuring good presentation of the dwelling from the street,
- Maximising the benefits of passive solar design, promoting energy efficiency,
- Minimising overlooking,
- Respecting the amenity of neighbours.

SECTION 6

Architectural Design

Artist Impression

BUILDING HEIGHT

Maximum building heights subject to zoning requirements. Lots zoned General Residential have a maximum building height of 11m. Lots zoned as Residential Growth have a maximum building height of 13.5m.

BUILDING DESIGN

- To encourage designs that are contemporary.
- To ensure dwellings incorporate clean, simple and well-proportioned roof lines to create interest, contribute positively to the character of the street and provide good passive solar performance.
- To achieve a level of street surveillance through the encouragement of street facing windows on both primary and secondary streetscape interfaces.
- To ensure all corner lots which have any façade facing a street or other open space are designed so that all sides are articulated and well-presented when viewed from the public realm.
- To promote a considered selection of materials and colours which complement landscaping (public and private) and contribute positively to the streetscape.
- To ensure entries and/or garages facing the secondary street frontages are considered where they are located adjoining open space and linear pedestrian open space links.

CHARACTER AND VISUAL STYLE

A variety of architectural character and visual styles are encouraged.

MASSING AND ARTICULATION

Each dwelling must incorporate a front entry point that is readily visible from the primary street frontage and complementary to the overall design.

- The front entry point must take the form of a portico, porch, veranda or other feature, to the satisfaction of the FSDRP.
- Articulate building façades along both primary and secondary frontages through the use of openings, balconies, variation of materials, recessed and projected elements on ground and upper floor to reduce the overall mass of the building.
- Two storey dwellings must incorporate articulation of the front façade.
- As well as the minimum setback from the front boundary, garages should be set back from the front wall of the dwelling.
- Habitable rooms should be located on the primary façade to provide a clear façade to the primary streetscape.

PASSIVE DESIGN

- Living spaces must be located to the north of the dwelling to facilitate solar access in winter months.
- Where possible, provide adequate shading such as retractable shading devices, trees, tinted glass.
- Locate private open space on the north side of the allotment and avoid being located along a primary frontage.

Samara, Fraser Rise

ROOF DESIGN

- A variety of roofing forms and styles is encouraged.
- Articulated roof shapes are preferred.
- Innovative roof designs that incorporate some flat elements will be assessed on their design merit.
- Parapets are permitted on the front façade.
- All dwellings are required to ensure all ceiling and building heights comply with Clause 54 or 55 of the Relevant Planning Scheme.
- All roofs must incorporate a minimum eave of 450mm to the front façade. Side and rear eaves are strongly encouraged.
- Pitched roofs must be a minimum of 22 degrees.
- Stand alone skillion roofs must be a minimum of 10 degrees and 22 degrees when combined with a pitched roof.

ROOF DESIGN EXAMPLES

CORNER LOTS

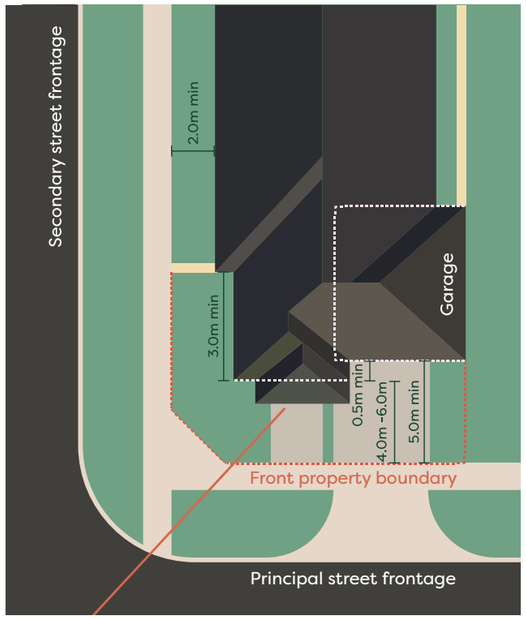
Dwellings on corner lots must include eaves to all sides facing the public realm of a minimum 450mm overhang.

In addition to the above requirements, dwellings on corner lots must address the secondary frontage by incorporating similar design features to those used on the primary frontage.

Suggested features include, but not limited to:

- Windows with matching head heights,
- Highlight materials and finishes that wrap around from the primary façade,
- Other treatments, to the satisfaction of the SFRDRP.

Corner features are encouraged to be readily visible from the public realm. Materials and articulation treatments used on a corner dwelling's front façades should continue onto other façades facing the secondary streetscape/public realm.

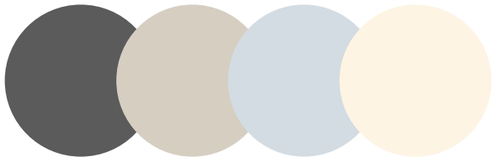


MATERIALS AND FINISHES

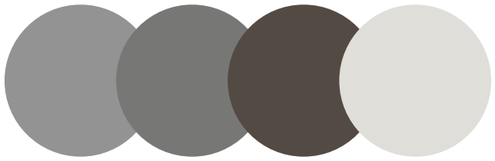
- The front façade must be finished with a mixture of at least 2 different materials/finishes. Brick, weatherboard and rendered brick are strongly encouraged. Rendered cement sheeting is not to be used on the front façade.
- Roof cladding must compliment the style of your home.
- Roof materials must be matte finish and non-reflective.
- External glazing that is visible from the public realm should not contain lead-light, stained glass, reflective glass or patterned film.
- Façade colours must be neutral. Proposed colour palette to be reviewed by the SFRDRP.
- Architectural features should be highlighted by varied colours or shades. Bright or fluorescent colours are not supported.
- Roll down security shutters must not be visible from the public realm.
- Dwelling façades must incorporate a maximum of 75% total wall coverage (excluding windows/ openings) of any one material or colour.

EXAMPLES OF ACCEPTABLE COLOUR PALETTES

Example 1

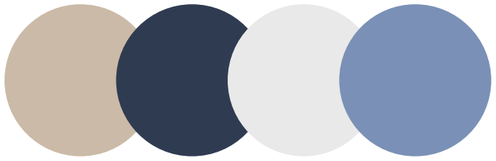


Example 2



Example 3

Example 4



CAR ACCOMMODATION

- All lots must incorporate an enclosed garage.
- Minimise the impact of garage doors and driveways to the dwelling and the street by locating vehicle access appropriately.
- Garages accessed from the primary frontage of a lot must be integrated into the overall form of the dwelling.
- Any garage on a burdened lot must be constructed a minimum of 5m from the road alignment at the front of the lot.
- Garages that are not accessed from the primary frontage may be detached.
- Lots with a width of 10m or less at the frontage must only have a single garage, where access is from the front of the lot.
- Lots with a frontage of more than 12.5m should provide a double garage. Maximum width allowable for the garage door is 5.5m.
- Triple garages are strongly discouraged. For triple garages to be considered the lot frontage must exceed 18m. The third car space must have a dedicated door and the door wall should be stepped back at least 500mm from the other front wall of the garage.
- Garage door openings on single storey homes must not exceed 40% of the width of the lot frontage.

EXAMPLES OF ACCEPTABLE FAÇADE FINISHES

SECTION 7

Additional External Elements

Artist Impression

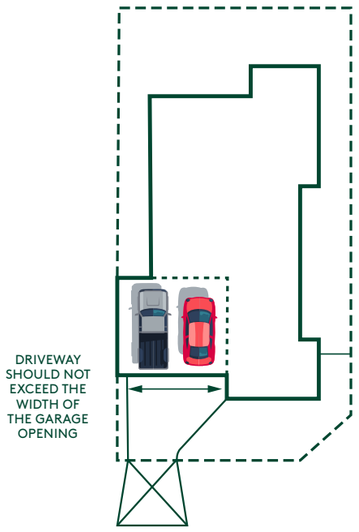
OBJECTIVES

- External elements must be used to complement the overall dwelling and design in an integrated way.
- The streetscape and neighbourhood character must be protected by ensuring all building and dwelling services are hidden from view from the public realm.

DRIVEWAYS

- Each lot must have a maximum of one cross-over per frontage.
- For corner dwellings, garages must not be located on the corner where the primary and secondary frontages meet.
- The driveway must be constructed prior to the occupancy of the dwelling.
- The driveway should not exceed the width of the garage opening.

DRIVEWAY OFFSETS AND WIDTHS



STAIRS, BALCONIES AND AWNINGS

- External stairs to upper storeys of a dwelling are discouraged. Specific dwelling designs requiring this treatment may be assessed by the SFRDRP on design merits.
- Column/post types and widths for verandas, porticoes and pergolas must be proportional to other façade elements.

WINDOW SCREENING

- Screens that have not been considered as part of the overall façade and elevations of the dwelling will not be approved.
- Window screening located on a dwellings primary or secondary frontage will not be approved. Battens in either a horizontal or vertical screen are an efficient means of screening a window. Where timber is to be used, the detailing and 'look' of the screen should complement the remainder of the dwelling.

LETTER BOXES

- The letter box must be clearly in view at the front of the property, next to the driveway or front gate, or in a similar position with the number of the property clearly displayed.
- The letter box must be positioned in a location that is clear of obstacles.
- Letter boxes should complement dwelling and landscape style and sized as per Australia Post recommendations.

LANDFORM (RETAINING WALLS)

- The maximum height of any retaining wall is generally 1m. If higher, more than one wall should be used in conjunction with graded slopes and other landscape treatment to soften the appearance of the change in levels.
- The provision of a landscaping strip of approximately 200mm in front of the retaining wall to soften the height is also encouraged.
- Retaining walls visible from the public realm must be constructed from a material and finish to complement the dwelling, to the satisfaction of the SFRDRP.

FENCING

Any fencing constructed on the lot frontage must be no greater than 1.2m in height and have a minimum of 50% transparency.

Fencing between lots (side and rear) must be provided and should be:

- Constructed with timber posts and lapped palings,
- Terminated by returning to meet the closest wall of the dwelling and a minimum of 1m behind the closest front wall of the dwelling, unless it is on the rear boundary of an adjoining lot,
- A maximum height of 1.8m above natural ground level.

CORNER FENCING

(Fencing to Public Realm Boundary other than the Frontage)

High side/rear corner fencing must be constructed with:

- Minimum 1.2m high, exposed timber posts,
- Maximum 1.8m high, lapped, and capped palings,
- 50mm bottom plinth.

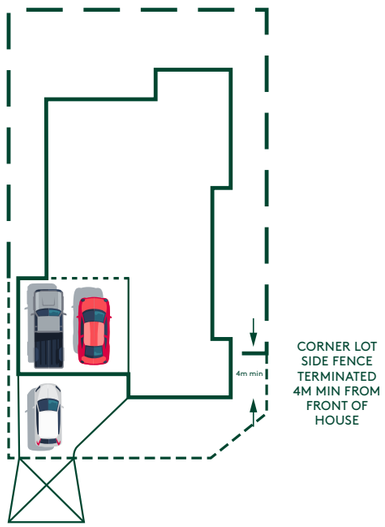
All corner lot front fencing must be:

- Terminated a minimum of 4m behind the closest front wall of the dwelling,
- Terminated by returning to meet the closest wall of the dwelling (return fence),
- High quality fencing treatments should be employed in secondary frontages.

GATES

Any gate in a fence must match or complement the fence in terms of materials and finishes.

CORNER LOT SIDE FENCE



RAINWATER TANKS

Alternative water supplies will be supplied within the development to reduce stress on the potable water reserves.

- Minimum of a 2kl rainwater tank is required on all lots greater than 300sqm.
- Rainwater tanks will be required to be connected to toilets for flushing and used for outdoor purposes such as garden irrigation.

LANDSCAPING

Landscape works are part of the design approval process. A landscape plan must be approved prior to the commencement of construction.

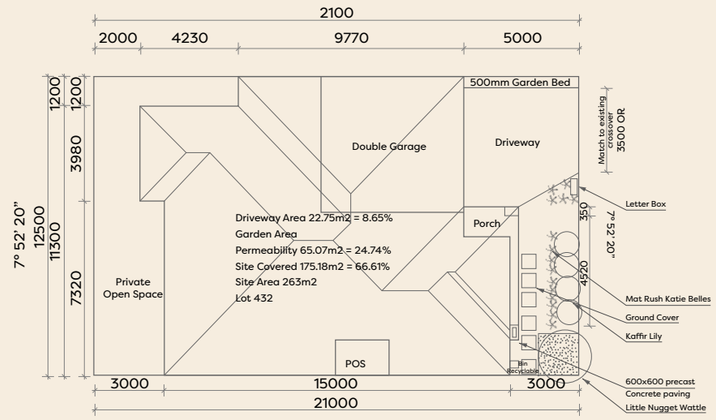
- No more than 40% of the front garden is to comprise hard paved surfaces.
- 30% of front garden area is to be soft planted garden beds.

The front garden should contain free draining surfaces such as:

- Grass,
- Garden beds containing trees, shrubs, tufting plants,
- Groundcovers,
- River pebbles or Lilydale toppings or similar,
- Turf used must be warm season variety.
- Consideration should be given to the cultivation of existing soil in the garden beds to a 200mm depth and the addition of imported topsoil and fertiliser to the garden bed.
- Garden beds must have 80mm layer of mulch.
- All garden bed areas within the front yard should be edged using brick, timber, or steel edges.
- At least one tree with a minimum installation height of 2m should be planted between the front building line and street boundary.
- Trees installed must have a minimum mature height of 4.0m. Careful consideration should be given to the tree type and location, so that the tree will not affect the foundations of the home, driveway, or relevant authority assets.
- Minimum further plantings that are encouraged in the front yard are:
  - A minimum of 5 medium to large shrubs (from 200mm pot size at installation) and;
  - A minimum of 8 smaller shrubs or ground cover plants (from 150mm pot size at installation).
- Avoid the use of prohibited weed species.
- Plant species are to be hardy, appropriate to the site and have reasonable drought tolerance.

LANDSCAPING EXAMPLE

The nature strip(s) outside the lot is/are included as part of the works required for successful completion of the landscaping. Nature strips must achieve neat and even grass coverage and any damage caused during construction of the dwelling must be rectified.



SECTION 8

Ancillary items

RECYCLED WATER

Each dwelling must incorporate plumbing that allows for connection to any future recycled water supply (if applicable to the estate).

All dwellings are to be connected to recycled water and plumbed to a front and rear outdoor tap as well as all toilets as a minimum.

FIBRE TO THE HOME

All homes will be provided with high optical fibre connection installed in accordance with the relevant preparation and installation guide.

EXTERNAL LIGHT FITTINGS

Light fittings that do not incorporate a diffuser or light shade should not be installed in any location that is visible from the public realm.

External light fittings must not result in excessive light spill.

SERVICE EQUIPMENT

Satellite dishes, antennae and external receivers should be:

- Located to the rear of the dwelling,
- Not readily visible from the public realm.

Heating and cooling units should be:

- Positioned below the ridge line,
- Positioned to the rear of the roof,
- Coloured to match the roof as far as practical.

SUSTAINABILITY

Photovoltaic cells, solar panels and the like may be located to maximise their efficiency as long as they integrate with the roof form.

Energy efficient appliances and lighting systems (such as LED lights) are encouraged.

SIGNAGE

- Signs to advertise the sale of a vacant lot are not permitted unless approved by the Developer.
- One sign only may be erected to advertise the sale of a completed dwelling.

SCREENING

Ancillary elements should be located so that they are not readily visible from the public realm. This includes items such as:

- Rubbish bin storage areas,
- Washing lines,
- Hot water systems, evaporative units, and external plumbing other than that for rainwater,
- Swimming pools and spa pumps,
- Satellite dishes and television antennae,
- Trucks, commercial vehicles exceeding 1.5 tonnes, recreational vehicles, trailers, caravans, boats, horse floats or other like vehicles should be located so that they are not readily visible from the public realm when stored on the lot;
- Detached garages, sheds or ancillary storage of boats, caravans or alike must not be visible from the public realm.

MAINTENANCE OF LOTS

The Purchaser shall not allow any rubbish including site excavations and building materials to accumulate on a lot (unless the rubbish is neatly stored in a suitably sized industrial bin or skip) or allow excessive growth of grass or weeds upon the lots.

The Purchaser shall not place any rubbish including site excavations and building materials on adjoining land, reserve or in any waterway.

CROSSOVER AND FOOTPATH PROTECTION

It is the responsibility of the landowner to ensure that any required asset protection permits are obtained prior to the commencement of building works.

STREET TREE PROTECTION

It is the responsibility of the landowner to ensure that any street trees and/or nature strips are protected during all building works.

Our Ref: *PA2022/7895/1*

23 September 2024

Hellier McFarland
1911 Malvern Road
MALVERN EAST VIC

By email: Vasili.Giannetakis@colliers.com

Dear Vasili,

PLANNING APPLICATION

No.: **PA2022/7895/1**
Land: **1176-1198 Taylors Road Fraser Rise**
LOT: 2 LP: 219656R V/F: 9987/219
Proposal: **Multi lot subdivision and creation of reserves**

I refer to the plans submitted for endorsement under condition No. 13 of the above planning permit.

We would like to advise that the plans are satisfactory to Council and have been endorsed.

A copy of the endorsed plans is enclosed.

If you have any queries regarding this matter, please contact me on 9747 7390 or JonathonC@melton.vic.gov.au.

Kind regards,

Jonathon Carter
Graduate Planner
City Growth & Development

Encl.

INTEGRATED WATER MANAGEMENT PLAN

Samara

On behalf of:
LandxWise

PEAKURBAN
Achieve more.

CITY OF MELTON

MELTON PLANNING SCHEME
This plan is endorsed as satisfying Condition 7 of
Planning Permit No. PA2022/7895/1
Pages 1 to 76

Jonathon Carter
Signature of Responsible Authority
Date 23/09/2024

REPORT REVISION: B
Report Date: June, 2024

COMMERCIAL IN CONFIDENCE

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ABN 44 615 403 506

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DOCUMENT CONTROL
REPORT REVISION

Version	Date	Details	Prepared	Checked	Approved
A	May 2022	Issue for Approval	O. Thaha	J. Barker	J. Barker
B	June 2024	Issue for Approval	V.Giannetakis	J.Barker	J.Barker
C	August 2024	Issue for Approval	V.Giannetakis	C.Cosgriff	J.Barker

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1. INTRODUCTION

PEAKURBAN was engaged to formulate an Integrated Water Management Plan for a parcel of land (referred to within this document as "the Site") located at 1176-1198 Taylors Rd, Frasers Rise, VIC, 3335, Victoria, Australia, west of Melbourne in the municipality of City of Melton Council.

The plan will lay out an integrated approach to water across the estate in compliance with City of Melton Council's drainage policies, the expectations of Melbourne Water and Greater Western Water. We propose to develop a plan that reflects the demands and needs of the Site and its surrounding environ.

The intent of the integrated plan is to tell the whole of water story within the Site, outlining options that could be incorporated and providing a recommendation regarding which will be used.

1.1. Scope of the Plan

The Site is located in Fraser Rise, east of Plumpton Rd and south of Beattys Rd and has an area of 12.00 hectares (ha). Refer to Figure 1.

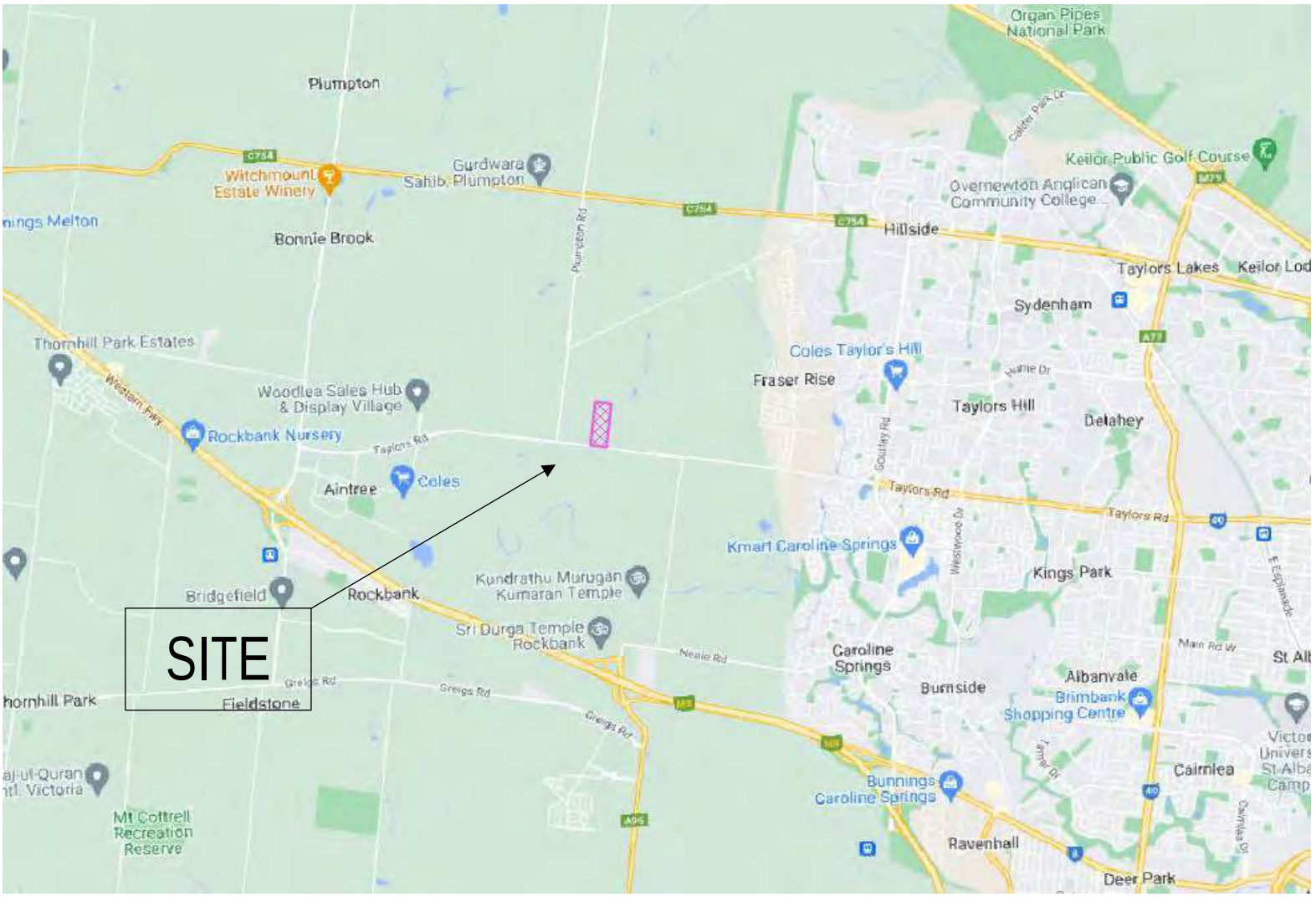


Figure 1. Site Locality

In existing conditions, the Site is substantially bare and is considered permeable with a residential dwelling and a couple of storage sheds. The Site can be considered as having two internal catchments which fall towards an existing waterway that traverses the Site, see Figure 2.

Natural topography data indicates approximately 12.5m of fall across the western catchment towards the valley, from 108m AHD at the northern boundary to 95.5m AHD and approximately 10m of fall across the eastern catchment towards the valley, from 105.5m AHD to 95.5m AHD, see Figure 2.

Excluding the creek banks and existing dam the Site has a gentle grade with an average slope of less than 2.5%, see Figure 3.

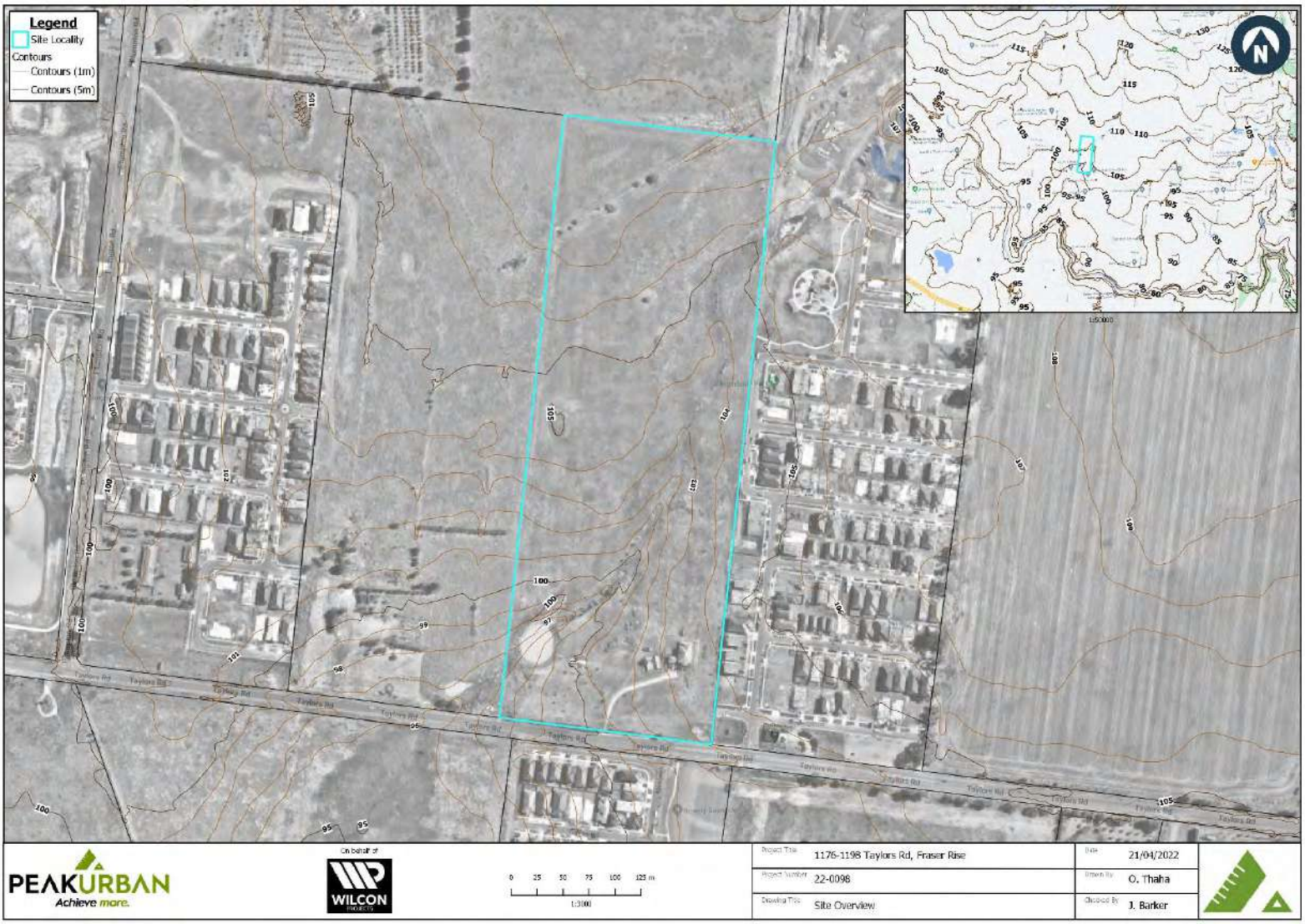


Figure 2. The Site

Figure 3. Topography

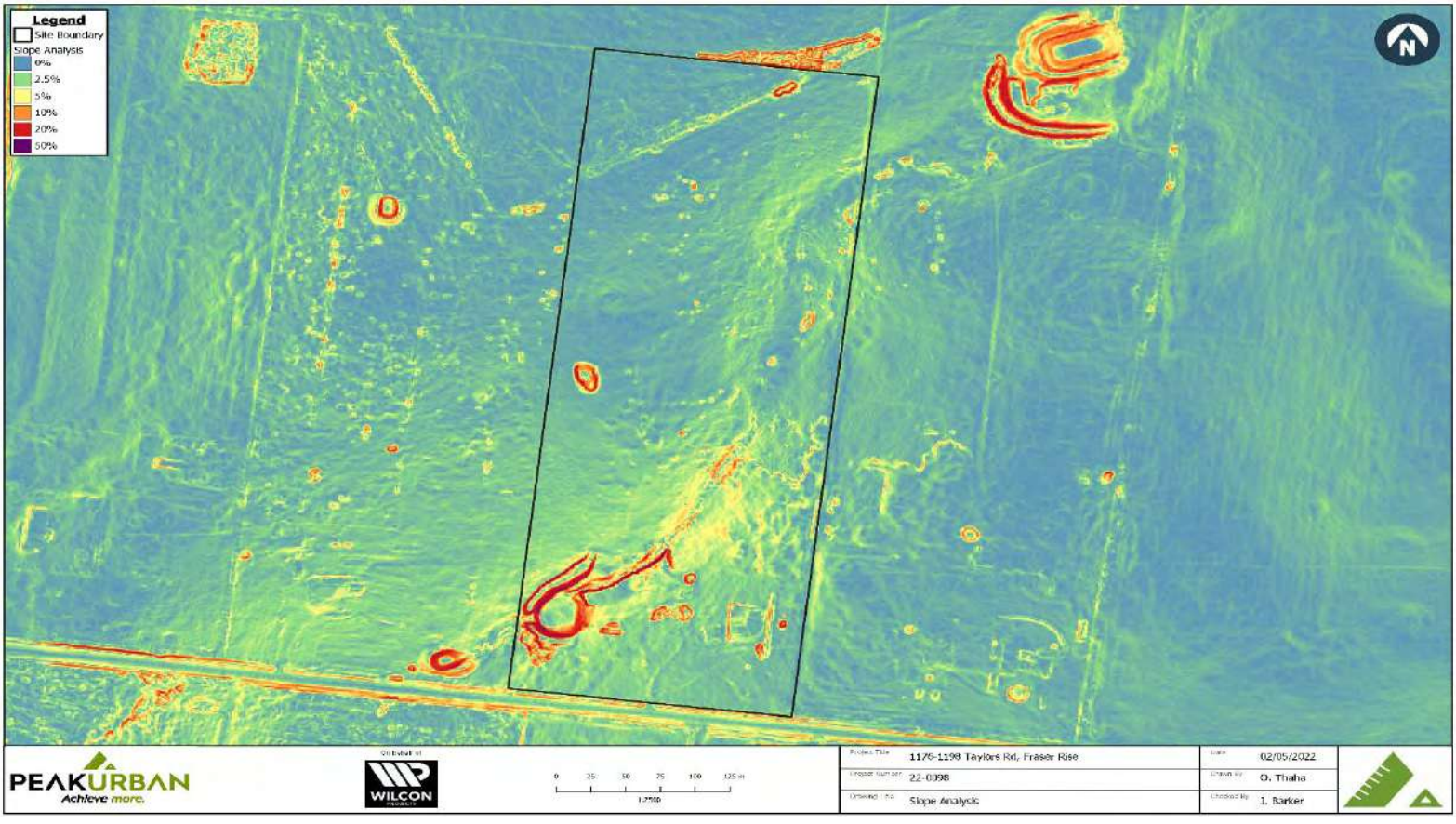


Figure 4. Slope Analysis

The Site resides within the gazetted Plumpton Precinct Structure Plan (PSP) and the Melbourne Water Olive Grove (OGDS) #4142.

1.2. Assumptions and Constraints

The Site is to comply with the gazetted Plumpton PSP, Melbourne Water's OGDS and City of Melton Council's Integrated Water Management Plans.

Based on the current draft plan the Site will yield 175 residential allotments composed of small and conventional lot housing, 3.38ha of waterway and drainage reserve, 0.49ha of arterial road widening and 0.03ha of open space reserve, see Figure 5.

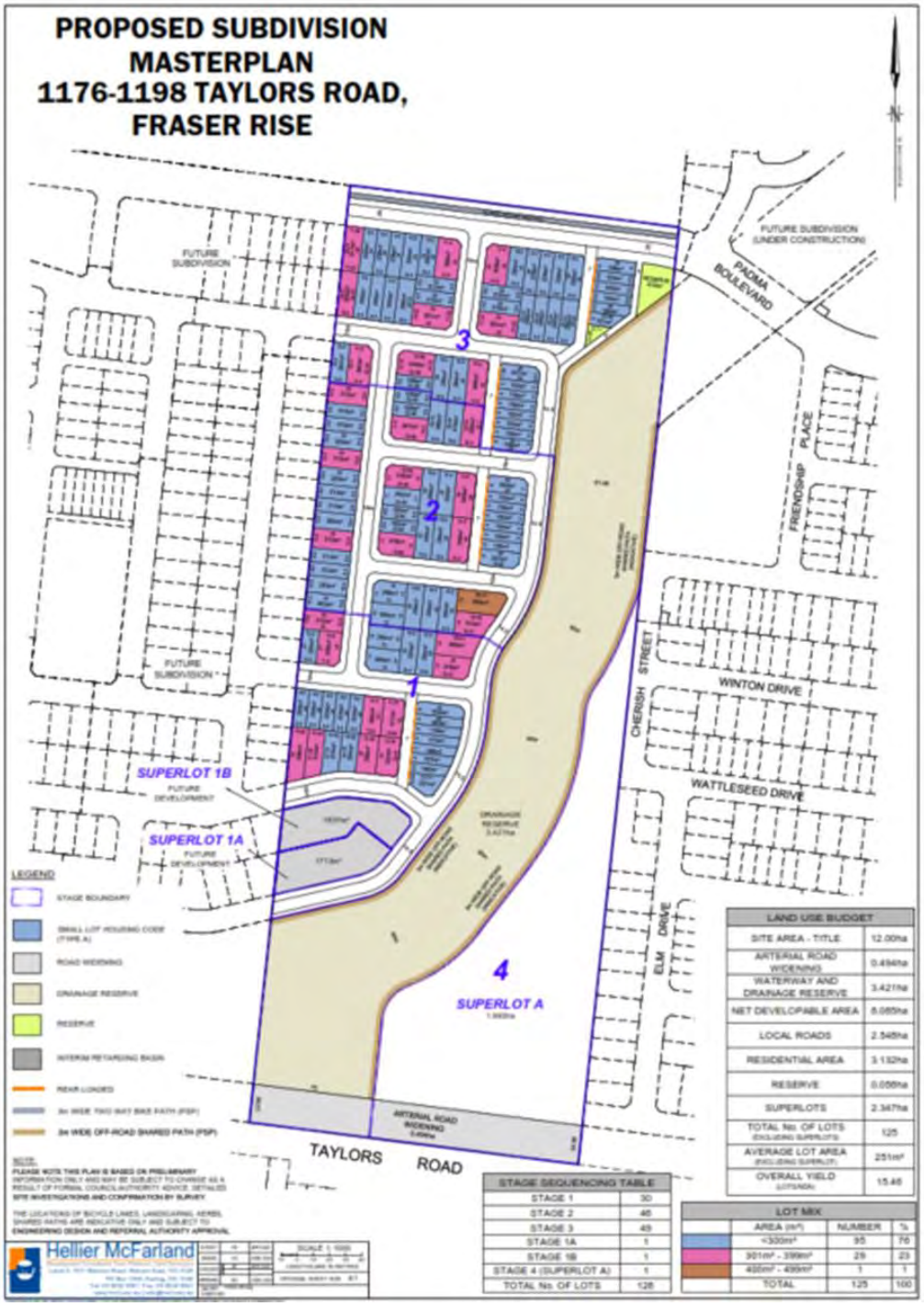


Figure 5. Proposed Development Plan

1.3. Precinct Structure Plan

The Site falls within the gazetted Plumpton PSP. Figure 6 represents the overall layout of the PSP with the Site highlighted. Figure 7 highlights the integrated water management requirements of the PSP. Table 1 provides the property specific land budget which outlines the amount of area needed to be allocated for Waterway and Drainage Reserve and Arterial Rd.

Figure 6. PSP

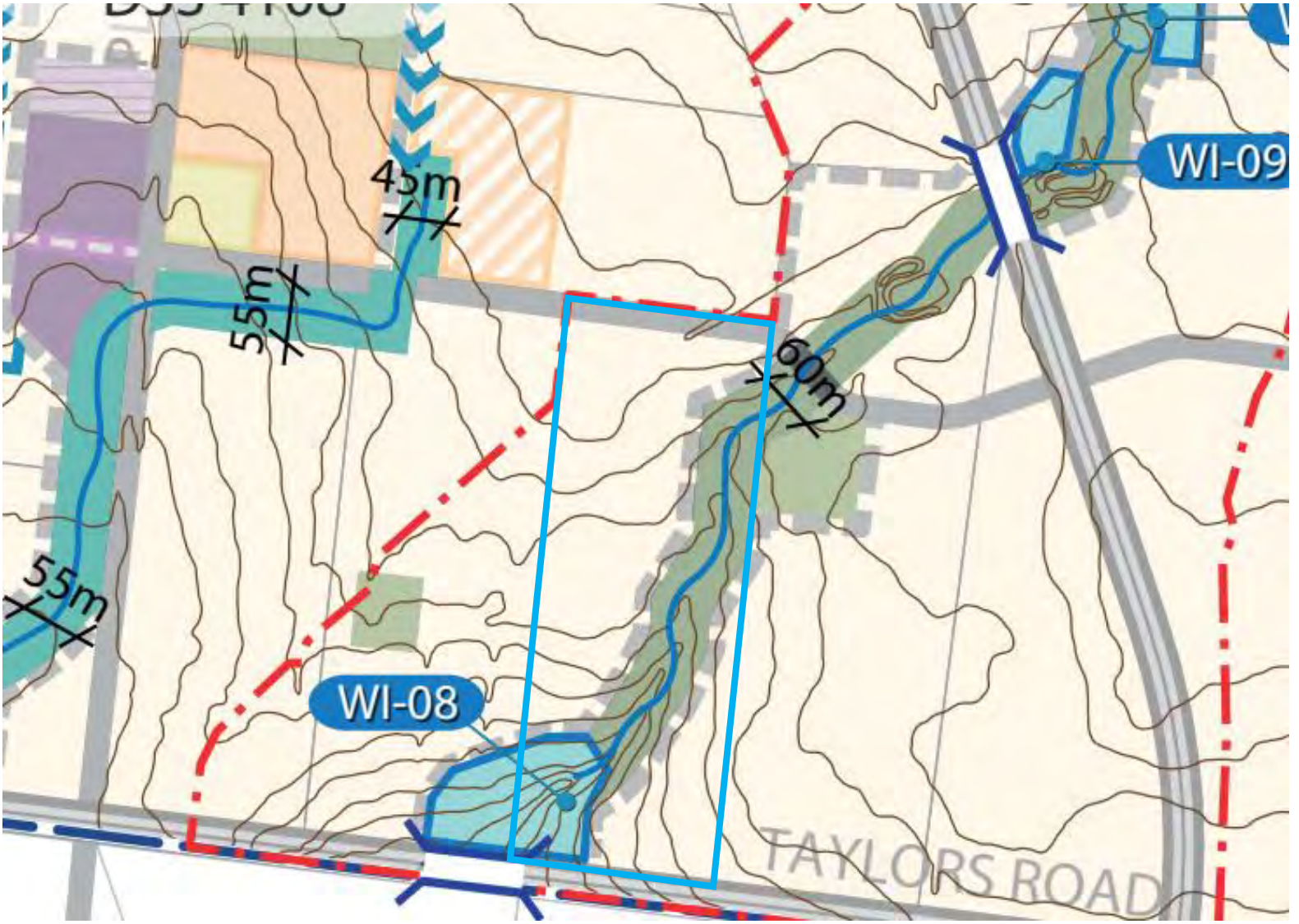


Figure 7. PSP – Integrated Water Management

Table 1. PSP – Property Specific Land Budget

PSP Property ID	Total Area (ha)	Arterial Road – New/Widening (ha)	Waterway and Drainage Reserve (ha)	Total NDA (ha)
46	12.00	0.53	3.38	8.09

2. PROJECT STAKEHOLDER VALUES

2.1. Greater Western Water Values

"Greater Western Water provides potable water, recycled water and sewerage services in Sunbury, Melton, Bacchus Marsh, the Macedon Ranges and surrounds. Typically, subdivided land in Greater Western Water's service region must be provided with reticulated potable water and sewerage services. Depending on the location of the development, these and other services may be provided on-lot independent of Greater Western Water.

Greater Western Water's Land Development Manual outlines the process and requirements for developers to build water supply and sewerage infrastructure. In addition to these

requirements, and in alignment with Precinct Structure Plan requirements, the IWM Plan will outline how the development will optimise water use efficiency both within residences and across the development broadly."

– Greater Western Water Integrated Water Management Developer Guidance

2.2. Council Requirements

City of Melton Council, as the responsible drainage Authority, has adopted guidelines setting out drainage design rules and conditions for developments within the municipality.

Council requires developers to consider on-site detention as an option for controlling the stormwater discharge increase that results from development.

Council permit conditions require adherence to Clause 56.07 of the Victorian Planning Provisions, which sets out stormwater management objectives that developments must meet. Developments are to achieve 'best practice' through a series of treatments to remove gross pollutants, sediment, nitrogen, and phosphorus before they reach waterways.

2.3. Melbourne Water Values

Waterway Values outlined in Melbourne Waters Healthy Waterways Strategy have been a pivotal focus throughout this strategy. The values presented in the strategy are categorized into four categories:

- Environmentally – Providing habitats for plants and animals and sustaining the regions native biodiversity
- Social – To meet with friends and family, exercise, connect with nature and outdoor activities
- Cultural – Create and look back on memories, ancestral history
- Economic – Provision of drinking water, irrigation for crops and hospitality purposes

To best assess and track the maintenance of these values there are a further nine key values which include:

- Amenity – Pleasantness of waterways and ability to provide restorative landscape
- Community Connection – Waterways connecting the community with nature
- Recreation - Providing a setting for active and passive recreational activities
- Birds – All types of bird species, waterbirds, raptors and bush birds
- Fish – Freshwater and estuarine species
- Frogs – Native amphibians
- Macroinvertebrates – Small but visible animals without a skeleton
- Platypus – Iconic aquatic mammal
- Vegetation – Trees, shrubs, grasses, bulrushes

In addition to the above values any other species in the area also represent an integral part of the ecosystem in which waterway management will address accordingly.

2.4. Drainage Scheme

The Drainage Schemes under Melbourne Water's authority comprises of catchment-based drainage strategies outlining the functional designs of the relevant infrastructure assets required to service urban growth.

These schemes are created to:

- Provide a safe and effective system for dealing with run-off,
- Ensure appropriate flood protection and environmental performance,

- Provide drainage services in the existing and growth areas of Melbourne,
- Protect and enhance waterways and biodiversity values.

Drainage Schemes are funded by financial contributions paid by developers when development occurs. The amount of contribution to be paid is determined by the size and by the type of development. The contributions are separated into two components: Hydraulic and Water Quality. The hydraulic component funds flood protection works, while the water quality component funds water quality treatment works and may be reduced by the developer undertaking their own on-site water quality treatment/s.

To satisfy the environmental values expected, the drainage scheme prescribes a series of treatments throughout the wider catchment area. It is expected that these assets would be designed to ensure they satisfy best practice targets set out in the Best Practice Environmental Management Guidelines (BPEMG), which are:

- 45% reduction in Total Nitrogen (TN) from typical urban loads.
- 45% reduction in Total Phosphorus (TP) from typical urban loads.
- 80% reduction in Total Suspended Solids (TSS) from typical urban loads.
- 70% reduction in Litter from typical urban loads.

2.4.1. Olive Grove - #4142

Available from Melbourne Water, the scheme map as shown in Figure 8 highlights the construction of several assets adjacent to the Site.

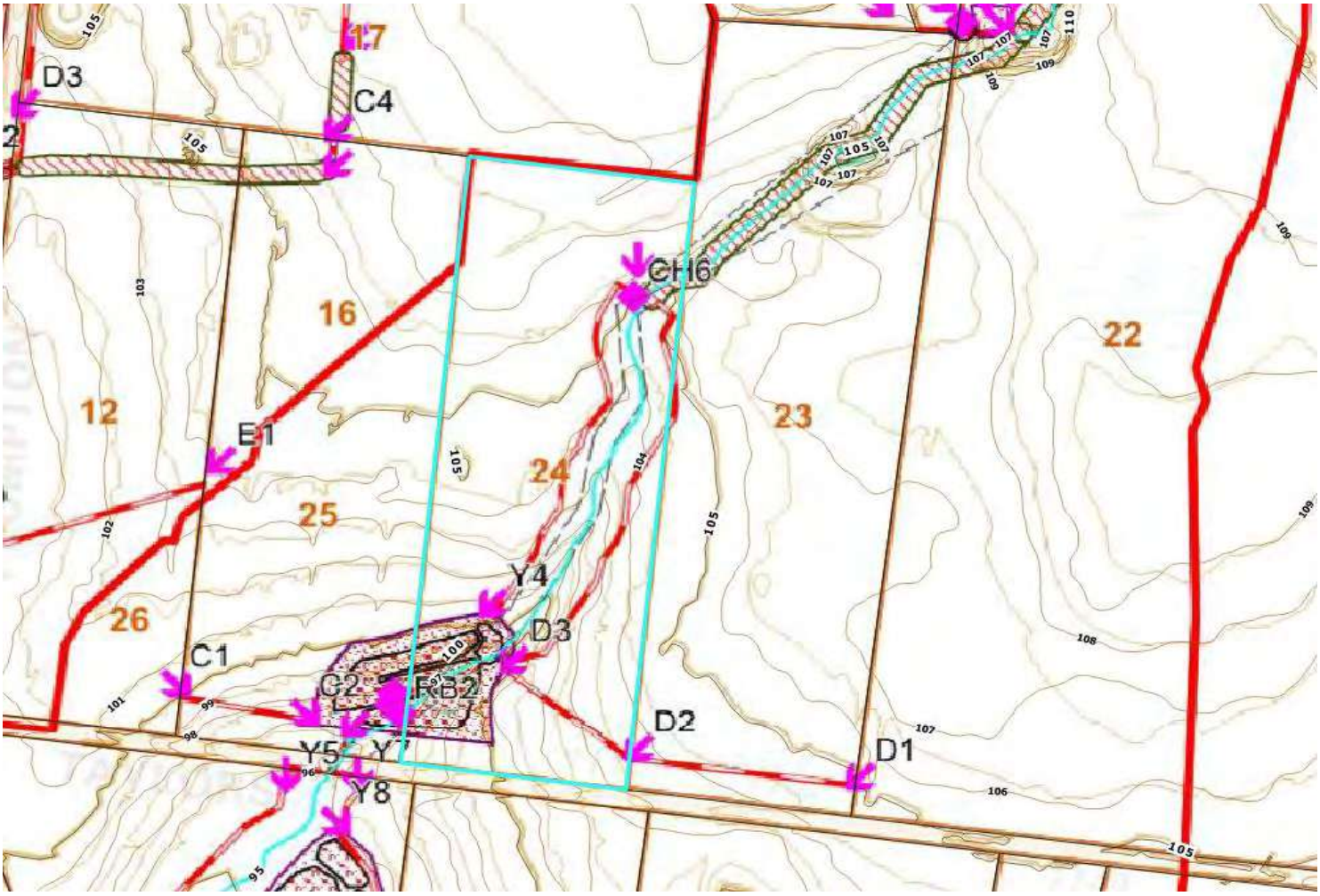


Figure 8. Drainage Scheme for the Site

The following list outlines the drainage assets associated with the Site based on the above scheme:

Table 2. Drainage Scheme Assets

Node Reference	Design AEP (%)	Approx. Length (m)	Area (ha)	Ownership/Comments
Y3>Y4	100	370	-	Melbourne Water Pipeline
RB2	1	365	1.58	Melbourne Water Retarding Basin. Design by E2 Design Lab and Taylors
RB2LA	-	395	0.86	RB2 Land Acquisition, 0.86ha reimbursable, 0.72ha within flood plain
Culv3-Y5	1	55	-	Melbourne Water Culverts
D2>D3	20	170	-	Council pipeline

Drainage contributions for the OGDS can be found on Melbourne Water's Land Development website and the rates for the hydraulic and water quality components (as of the 21st April, 2021) are as follows:

- Hydraulic - $84,938/ ha
- Water Quality – $89,158 / ha

2.5. State Government Aspirations

"Water is fundamental to our communities. We will manage water to support a healthy environment, a prosperous economy and thriving communities, now and into the future.

Water is vital. Our health and wellbeing, the social fabric of our communities, the liveability of our cities and towns, our environment and our economy all depend on access to safe, reliable and affordable water.

Victoria is a great place to live, work and visit, but we face two big challenges – climate change and population growth. Victoria is becoming warmer and drier and is now the fastest growing state in Australia. And as climate change continues to take hold, we can expect more frequent extreme weather events, such as drought and flooding.

2.5.1. Population growth

Victoria's population is projected to reach 10.1 million by mid-century. That's a lot of extra people who all need access to water.

2.5.2. Climate change

Climate change will mean Victoria becomes drier over the long-term, with more extreme events including droughts, floods and heatwaves.

2.5.3. Less water

By 2065 streamflow's to some of our catchments could reduce by around 50 per cent per year. This means less available water in our storages.

So, we're taking action now. Planning for a future with less water and preparing Victoria for the decades to come."

Water for Victoria, Water Plan, State Government of Victoria

3. STORMWATER FLOW GENERATED

The Site has two internal catchments (with both portions of the Site falling south towards the valley).

There is a 298ha external catchment due to the existing waterway conveying flows from the upstream catchment through the Site under existing conditions from the north, see Figure 9.

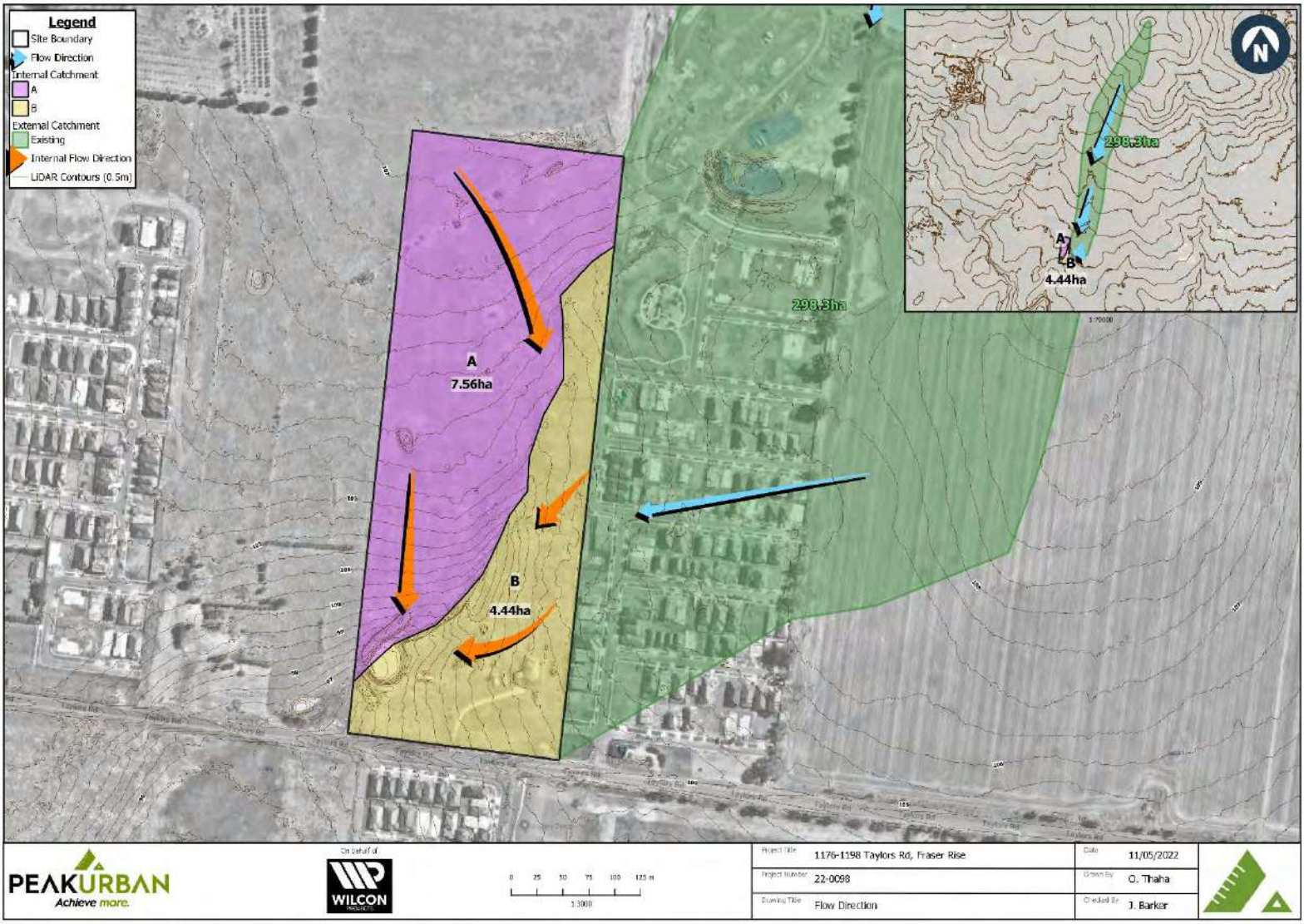


Figure 9. Flow Direction

4. STORMWATER QUANTITY

4.1. Pre-Developed / Existing Conditions

The existing Site has a substantially cleared landscape, consisting of a residential dwelling and a storage shed, see Figure 10. The Site is considered permeable with the full catchment breakdown in Table 3. Land-use fraction imperviousness values have been based on Melbourne Water MUSIC Guidelines (2018).

Figure 10. Existing Conditions

Table 3. Pre-Developed Catchment Break-Up

Catchment A		
Land Use	Fraction Impervious	Area (ha)
Rural	0.10	7.556
Total	0.10	7.556

Catchment B		
Land Use	Fraction Impervious	Area (ha)
Rural	0.10	4.387
Buildings	1.00	0.055
Total	0.11	4.442

Using the Kinematic Wave equation to determine the Time of Concentration (TC) for each storm event, the following pre-developed peak flow rates were determined using the Rational Method.

Table 4. Existing Peak Flow Rates

Catchment A						
AEP	Area	Cy	Tc	I	∑ Ae	Q
	Ha		min	mm/hr	Ha	m^3/s
63.20%	7.556	0.161	54.4	14.29	1.218	0.05
50%	7.556	0.171	50.5	17.19	1.295	0.06
20%	7.556	0.191	41.5	28.11	1.447	0.11
10%	7.556	0.202	37.1	37.13	1.523	0.16
5%	7.556	0.212	33.7	47.25	1.599	0.21
2%	7.556	0.232	30.1	62.65	1.751	0.30
1%	7.556	0.242	27.8	76.09	1.828	0.39

Catchment B						
AEP	Area	Cy	Tc	I	∑ Ae	Q
	Ha		min	mm/hr	Ha	m^3/s
63.20%	4.442	0.168	51.4	14.83	0.747	0.03
50%	4.442	0.179	47.7	17.85	0.794	0.04
20%	4.442	0.200	39.2	29.19	0.887	0.07
10%	4.442	0.210	35.0	38.54	0.934	0.10
5%	4.442	0.221	31.8	49.03	0.981	0.13
2%	4.442	0.242	28.4	64.95	1.074	0.19
1%	4.442	0.252	26.3	78.81	1.121	0.25

4.2. Developed Conditions

The Site is to be developed into a residential subdivision. The developed conditions Layout Plan is represented in Figure 11. This proposed development will increase the imperviousness of the Site resulting in higher (site derived) peak flow rates and stormwater pollutant loads.

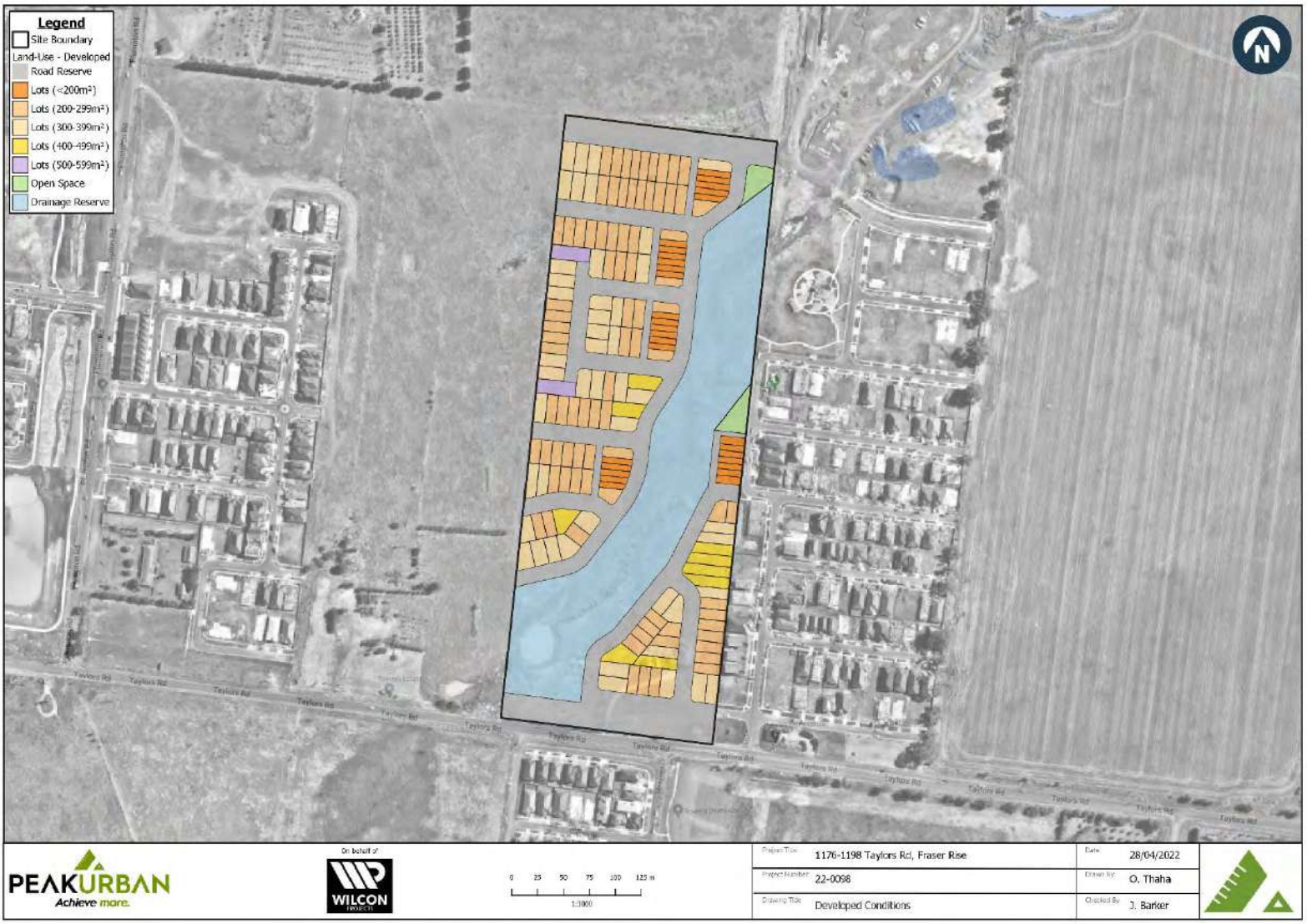


Figure 11. Developed Conditions

Fraction Impervious levels for each land-use type have been determined from Melbourne Water MUSIC Guidelines (2018), with the associated land-use break-up summarized in Table 5.

Table 5. Post-Developed Catchment Break-Up

Catchment A		
Land Use	Fraction Impervious	Area (ha)
Lots <200m²	0.90	0.368
Lots 200-299m²	0.85	1.778
Lots 300-399m²	0.80	1.186
Lots 400-499m²	0.75	0.127
Lots 500-599m²	0.70	0.106
Road Reserve	0.60	2.343
Open Space	0.10	0.072
Drainage Reserve	0.10	1.577
Total	0.60	7.556

Catchment B		
Land Use	Fraction Impervious	Area (ha)
Lots <200m²	0.90	0.109
Lots 200-299m²	0.85	0.477
Lots 300-399m²	0.80	0.396
Lots 400-499m²	0.75	0.262
Road Reserve	0.60	1.303
Open Space	0.10	0.076
Drainage Reserve	0.10	1.820
Total	0.45	4.442

A Time in Pipe Equation was used in determining the TC with the following table outlining the expectant flow rates from the Site into the existing drainage for post-developed conditions:

Table 6. Developed Peak Flow Rates

Catchment A						
AEP	Area	Cy	Tc	I	∑ Ae	Q
	Ha		min	mm/hr	Ha	m³/s
63.20%	7.556	0.471	9.6	39.91	3.562	0.39
50%	7.556	0.501	9.6	45.95	3.785	0.48
20%	7.556	0.560	9.6	66.21	4.230	0.78
10%	7.556	0.589	9.6	81.21	4.453	1.00
5%	7.556	0.619	9.6	96.91	4.676	1.26
2%	7.556	0.678	9.6	119.26	5.121	1.70
1%	7.556	0.707	9.6	137.69	5.344	2.04

Catchment B						
AEP	Area	Cy	Tc	I	∑ Ae	Q
	Ha		min	mm/hr	Ha	m³/s
63.20%	4.442	0.377	9.0	40.99	1.675	0.19
50%	4.442	0.401	9.0	47.17	1.779	0.23
20%	4.442	0.448	9.0	67.95	1.989	0.38
10%	4.442	0.471	9.0	83.32	2.093	0.48
5%	4.442	0.495	9.0	99.42	2.198	0.61
2%	4.442	0.542	9.0	122.34	2.407	0.82
1%	4.442	0.565	9.0	141.26	2.512	0.99

4.3. External Catchment

The drainage scheme highlights the external catchments that will flow through the Site in developed conditions. Major flows from the external catchment will be directed through the Site via Overland Flows, see Figure 12. Minor flows from this entire catchment will be conveyed through the Site via underground scheme drainage.

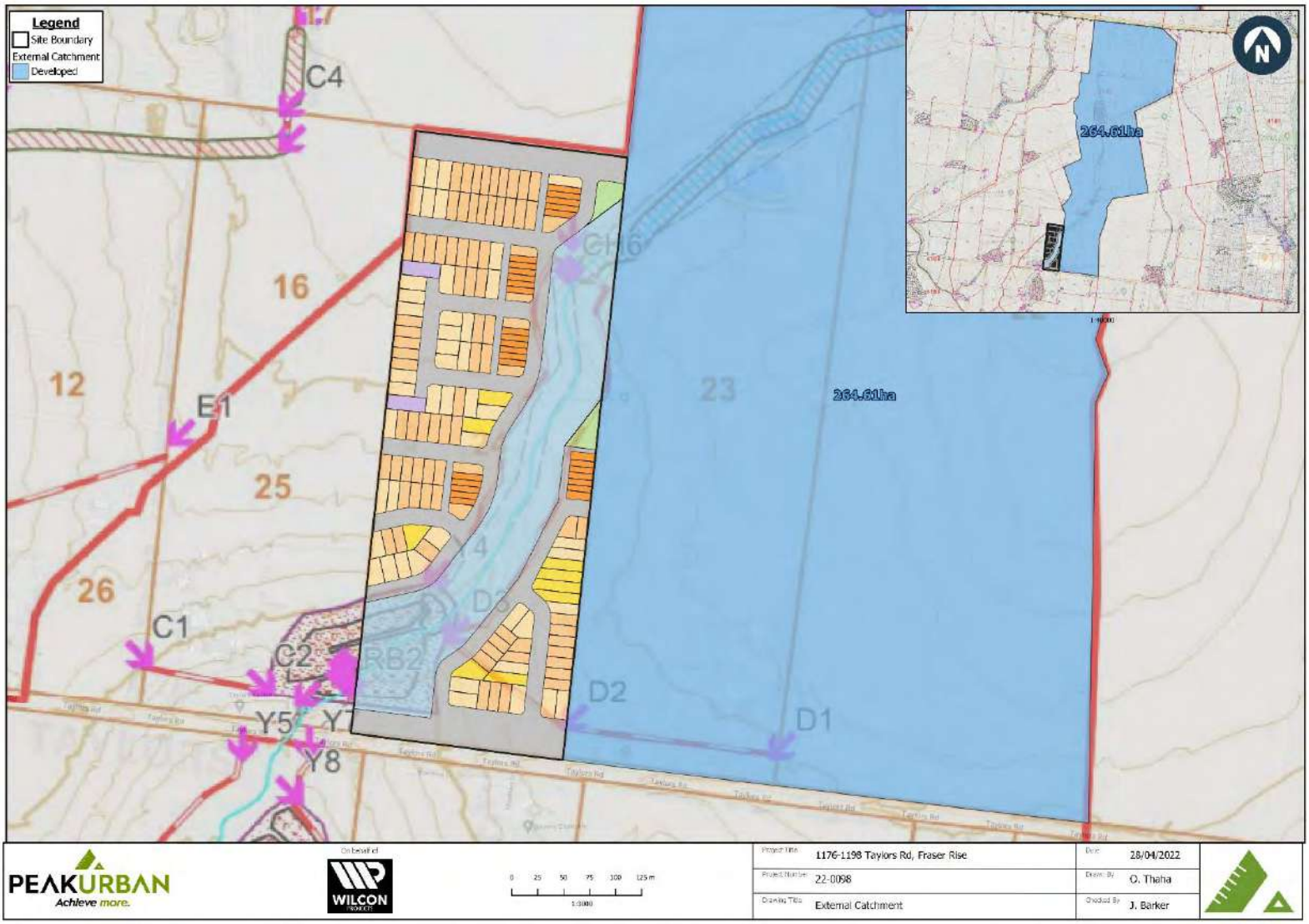


Figure 12. External Catchment

4.4. Drainage Scheme Drains

The drainage scheme for the Site provides the alignment for the required scheme drains, see Figure 8. Figure 13 indicates the proposed alignment of each scheme drain to fall within road reserves where possible.

The developer is committed to constructing all scheme drains within the bounds of the Site to the satisfaction of Council and Melbourne Water.

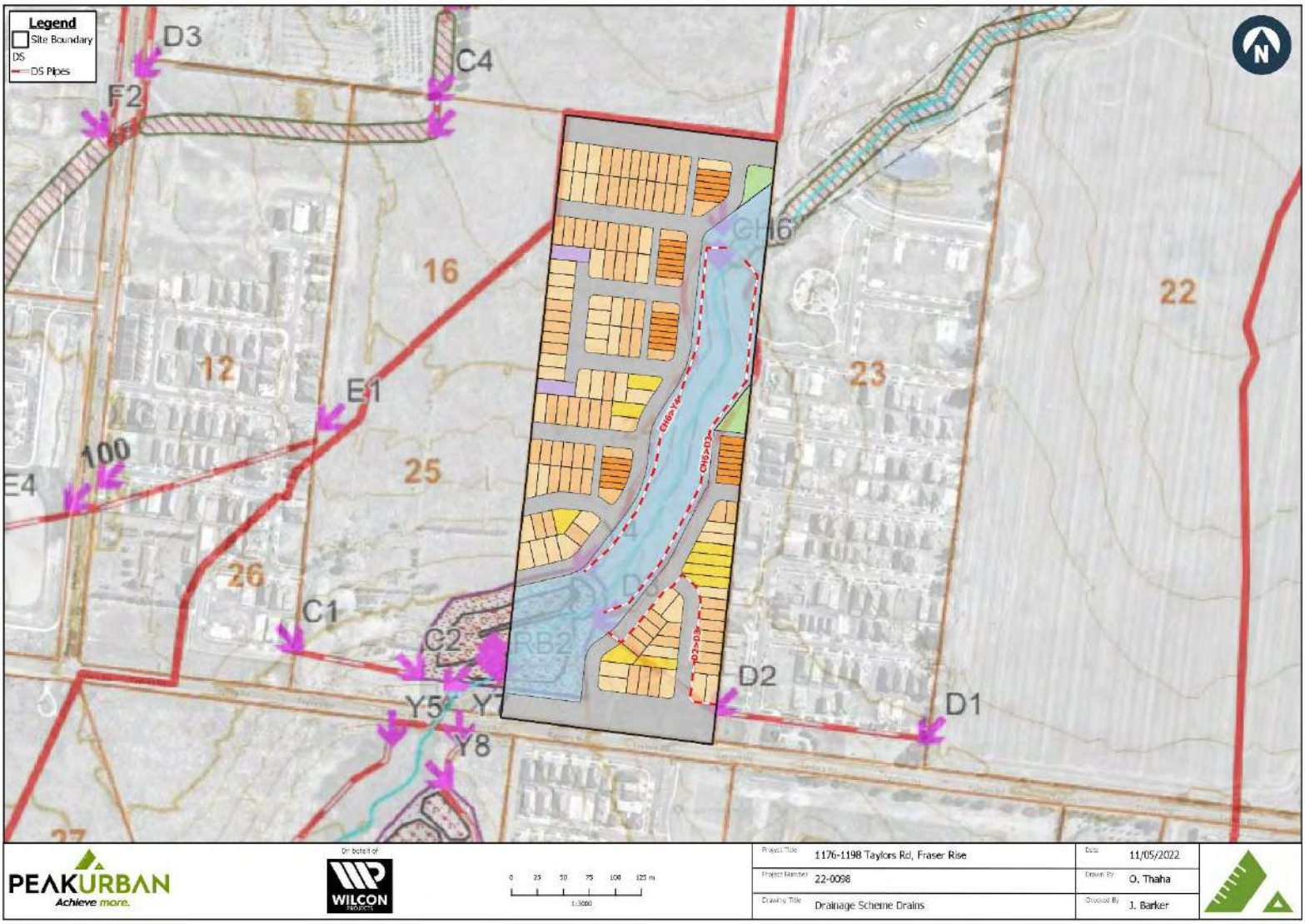


Figure 13. Proposed Drainage Scheme Drain Alignment

4.4.1. Scheme Drain Sizing

A flow calculation has been undertaken to determine the size of scheme pipe D2>D3.

Fraction Impervious levels for each land-use type have been determined from Melbourne Water MUSIC Guidelines (2018), with the associated land-use break-up summarized in Table 7 and the external catchment flowing to the pipe highlighted in Figure 13.

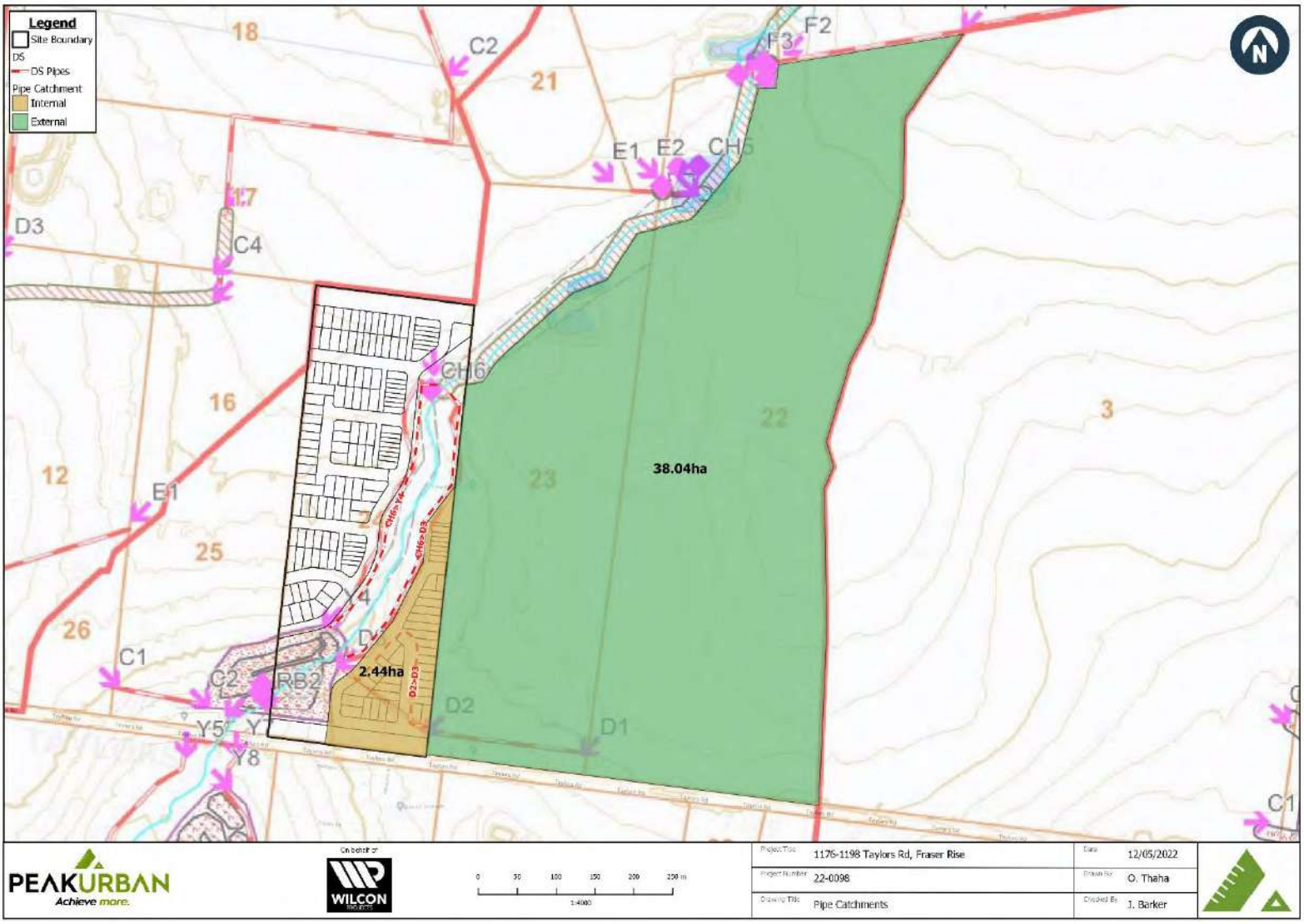


Figure 14. Pipe Catchment

Table 7. External Post-Developed Catchment Break-Up

Catchments	Fraction Impervious	Area (ha)
Internal	0.70	2.44
External	0.70	38.04
Total	0.70	40.48

A Time in Pipe calculation was used to determine the TC with the following table outlining the expectant flow rates from the external catchment into the Site, the main focus will be the 20% AEP calculation which the downstream scheme drain will cater for:

Table 8. External Developed Catchment Peak Flow Rates

Post-Developed Catchment Modelling						
AEP	Area	Cy	Tc	I	∑ Ae	Q
	Ha		min	mm/hr	Ha	m^3/s
63.20%	40.480	0.534	15.5	31.06	21.606	1.86
50%	40.480	0.567	15.5	35.79	22.956	2.28
20%	40.480	0.634	15.5	51.71	25.657	3.69
10%	40.480	0.667	15.5	63.49	27.008	4.76
5%	40.480	0.701	15.5	75.82	28.358	5.97
2%	40.480	0.767	15.5	93.32	31.059	8.05
1%	40.480	0.801	15.5	107.75	32.409	9.70

The pipe size calculation is based on the 20% AEP event for the external catchment. The size determined is Ø1200mm, see Table 9.

Table 9. Pipe Size Calculation

Pipe Type	Pipe Size (mm)	Slope	n	V (m/s)	$Q_{capacity}$ (m^3/s)	Q_{actual} (m^3/s)	Q_a/Q_c (%)
RCP	1200	1 in 87	0.013	3.690	4.173	3.685	88

4.4.2. RORB Modelling – Scheme Drain sizing

RORB modelling has not been supplied by Melbourne Water for the scheme. Scheme drain sizing for Y3>Y4 is to be determined during the detailed design phase once modelling has been received.

4.5. Minor Flows

Internal underground drainage will be designed in accordance with Council standards, which is to capture and convey up to and including the 20% AEP storm event plus any gap flow up to the 1% AEP event if it is unsafe to convey this overland along the road network.

Figure 15. Minor Flows

4.6. Overland Flows

Flows greater than the 20% AEP and up to and including the 1% AEP design event are to be conveyed through the Site utilising the road network as urbanised floodways. The road reserves will be designed in order to convey these flows whilst ensuring DEWLP's floodway safety criteria (Dmax <= 0.3m, Vmax <= 2.0m/s and VDmax <=0.3m²/s). Figure 16 highlights the proposed overland flows that will impact on the Site.

PC Convey at the critical locations was completed in order to determine the road reserve capacity. Figure 16 highlights the critical overland flow sections and contributing catchment. Table 10 summarizes the overland flow calculations undertaken.

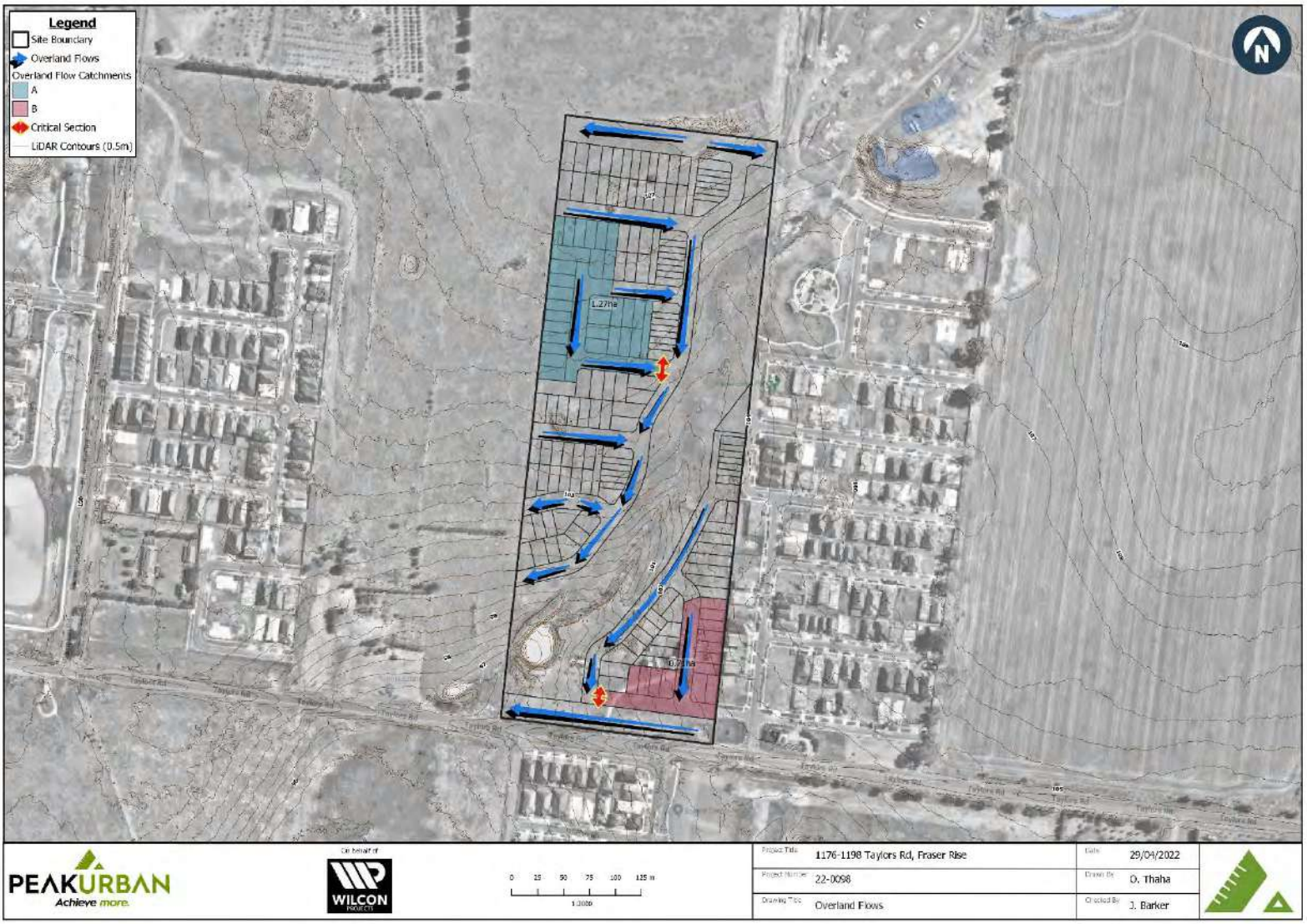


Figure 16. Overland Flows

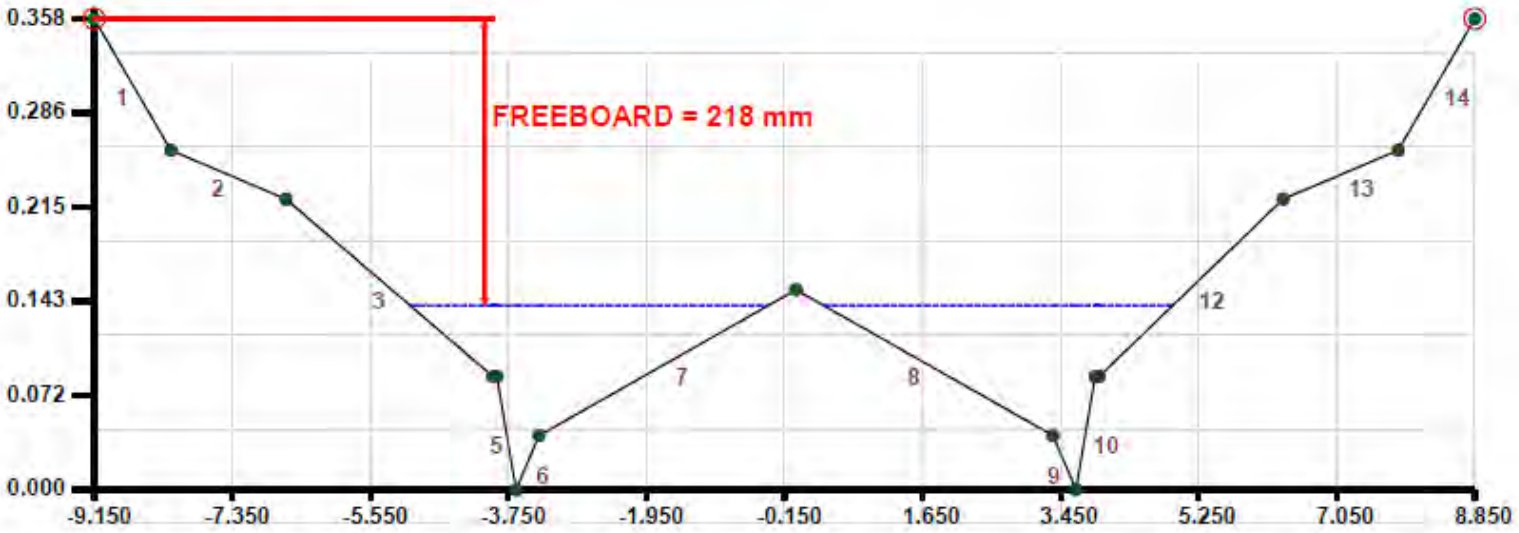
Table 10. Overland Flow Calculation

Catchment	Area (ha)	Tc (mins)	C1%	I1% (mm/hr)	Q1% (m^3/s)	C20%	I20% (mm/hr)	Q20% (m^3/s)	$Q_{overland}$
A	1.267	6.9	0.801	158.43	0.45	0.634	76.33	0.17	0.276
B	0.712	6.8	0.801	159.18	0.25	0.634	76.70	0.10	0.156

Figure 17 and Figure 18 highlight that the water surface elevation within the critical section of the Site provides sufficient freeboard. Section B utilises 1m of the property setback to achieve freeboard requirements.

PROJECT: 1176-1198 Taylors Rd - 16m Road Reserve
Print-out date: 29/04/2022 - Time: 12:26
Data File: 1176-1198 Taylors Rd - 16m Road Reserve.dat

1. CROSS-SECTION:



2. DISCHARGE INFORMATION:

100 year (1%) storm event

Total discharge = 0.28 cumecs

There is no pipe discharge
Overland / Channel / Watercourse discharge = 0.28 cumecs

3. RESULTS: Water surface elevation = 0.140 m

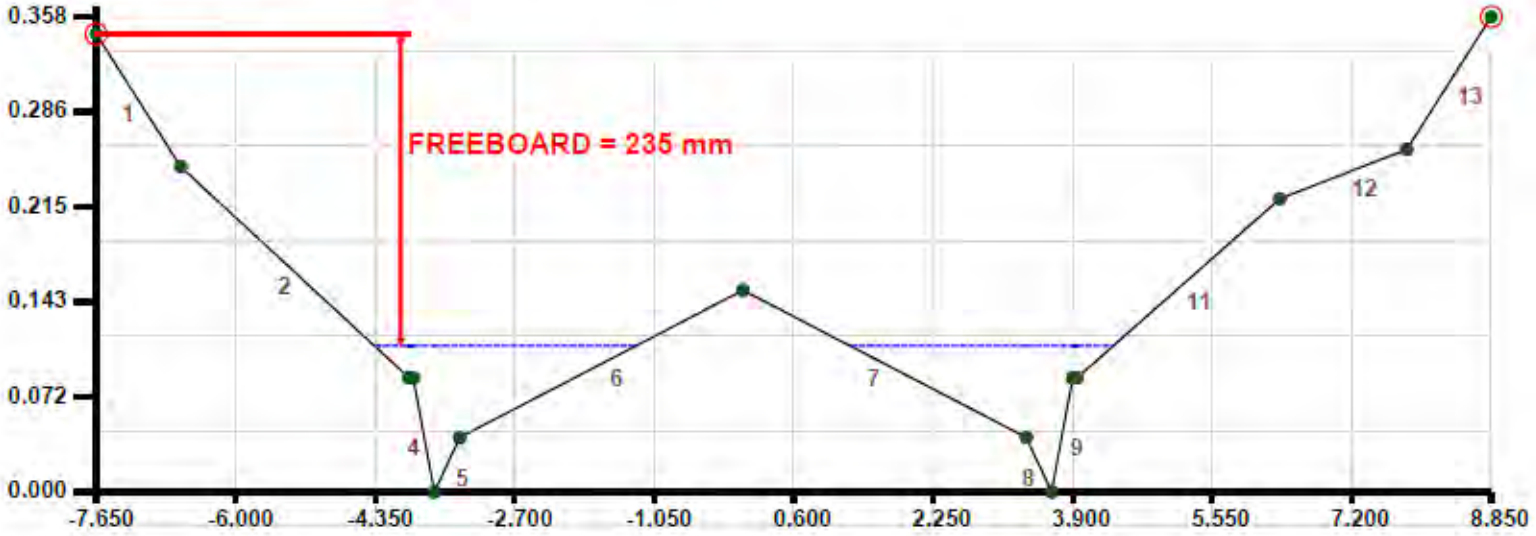
High Flow Channel grade = 1 in 120, Main Channel / Low Flow Channel grade = 1 in 120.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.285	0.000	0.285
D(Max) = Max. Depth (m):	0.000	0.140	0.000	0.140
D(Ave) = Ave. Depth (m):	0.000	0.052	0.000	0.052
V = Ave. Velocity (m/s):	0.000	0.598	0.000	0.598
D(Max) x V (cumecs/m):	0.000	0.084	0.000	0.084
D(Ave) x V (cumecs/m):	0.000	0.031	0.000	0.031
Froude Number:	0.000	0.840	0.000	N/A
Area (m^2):	0.000	0.476	0.000	0.476
Wetted Perimeter (m):	0.000	9.256	0.000	9.256
Flow Width (m):	0.000	9.216	0.000	9.216
Hydraulic Radius (m):	0.000	0.051	0.000	0.051
Composite Manning's n:	0.000	0.021	0.000	N/A
Split Flow?	-	-	-	Yes

Figure 17. Critical Section A - PC Convey Calculation

PROJECT: 1176-1198 Taylors Rd - 14.5m Road Reserve
Print-out date: 29/04/2022 - Time: 12:30
Data File: 1176-1198 Taylors Rd - 14.5m Road Reserve.dat

1. CROSS-SECTION:



2. DISCHARGE INFORMATION:

100 year (1%) storm event

Total discharge = 0.16 cumecs

There is no pipe discharge
Overland / Channel / Watercourse discharge = 0.16 cumecs

3. RESULTS: Water surface elevation = 0.110 m

High Flow Channel grade = 1 in 60, Main Channel / Low Flow Channel grade = 1 in 60.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.191	0.000	0.191
D(Max) = Max. Depth (m):	0.000	0.110	0.000	0.110
D(Ave) = Ave. Depth (m):	0.000	0.039	0.000	0.039
V = Ave. Velocity (m/s):	0.000	0.784	0.000	0.784
D(Max) x V (cumecs/m):	0.000	0.086	0.000	0.086
D(Ave) x V (cumecs/m):	0.000	0.031	0.000	0.031
Froude Number:	0.000	1.263	0.000	N/A
Area (m^2):	0.000	0.243	0.000	0.243
Wetted Perimeter (m):	0.000	6.237	0.000	6.237
Flow Width (m):	0.000	6.199	0.000	6.199
Hydraulic Radius (m):	0.000	0.039	0.000	0.039
Composite Manning's n:	0.000	0.019	0.000	N/A
Split Flow?	-	-	-	Yes

Figure 18. Critical Section B – PC Convey Calculation

4.7. Drainage Scheme Water Quantity Assets

Flows from the Site will discharge to an ultimate scheme retarding basin (RB2) which will be constructed by others at a later date. This retarding basin will service a large catchment area which includes the Site in addition to external catchments.

4.8. Waterway Corridor

An existing waterway acts upon the Site (Kororoit Creek). Existing waterways are well-defined channels which may flow permanently or only during the wetter months of the year. Existing waterways require a minimum setback width to urban development, see Figure 19.

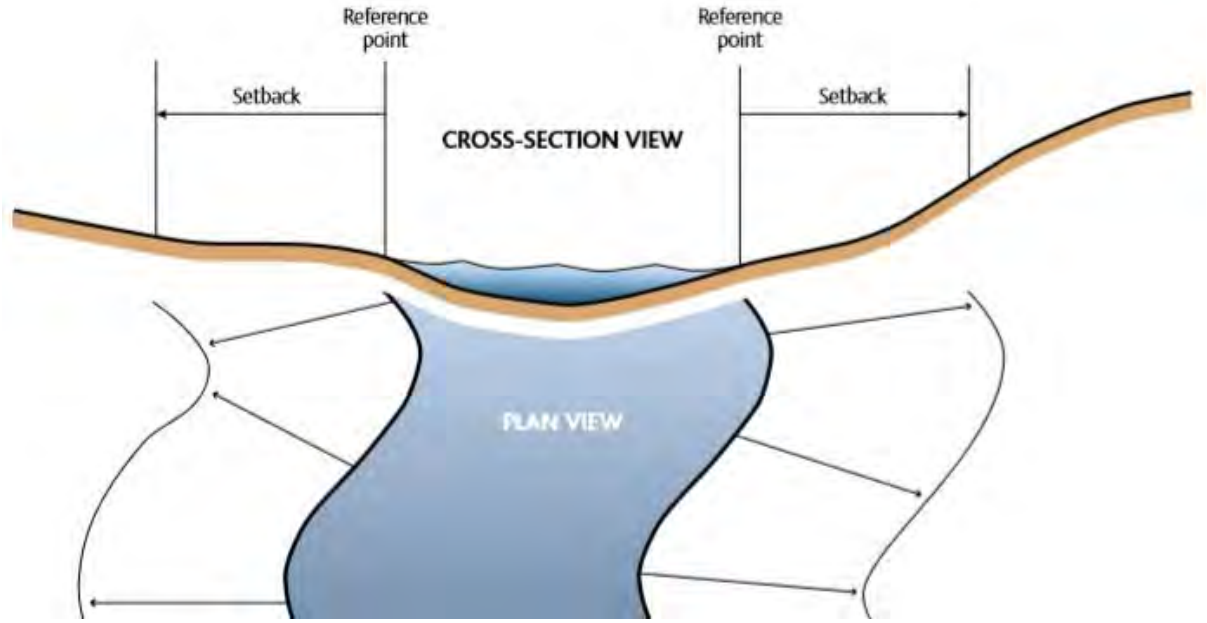


Figure 19. Waterway Setback Illustration

Minimum setback widths to development for the waterway is governed by the waterway's Strahler order.

Within waterway setbacks there are two sub-zones which have different roles in meeting the overall setback objectives and different activities and infrastructure requirements. The two zones area:

- The core riparian zone (CRZ), and
- The vegetated buffer (VB).

The core riparian zone is fully vegetated with native vegetation selected in accordance with the vegetation component of the Healthy Waterways Visions, varying from primarily trees and shrubs through to native grass cover. The CRZ includes a width for each bank along the bounds of the Site. The vegetated buffer protects the core riparian zone from edge effects. Figure 20 highlights the relationship between these sub-zones.

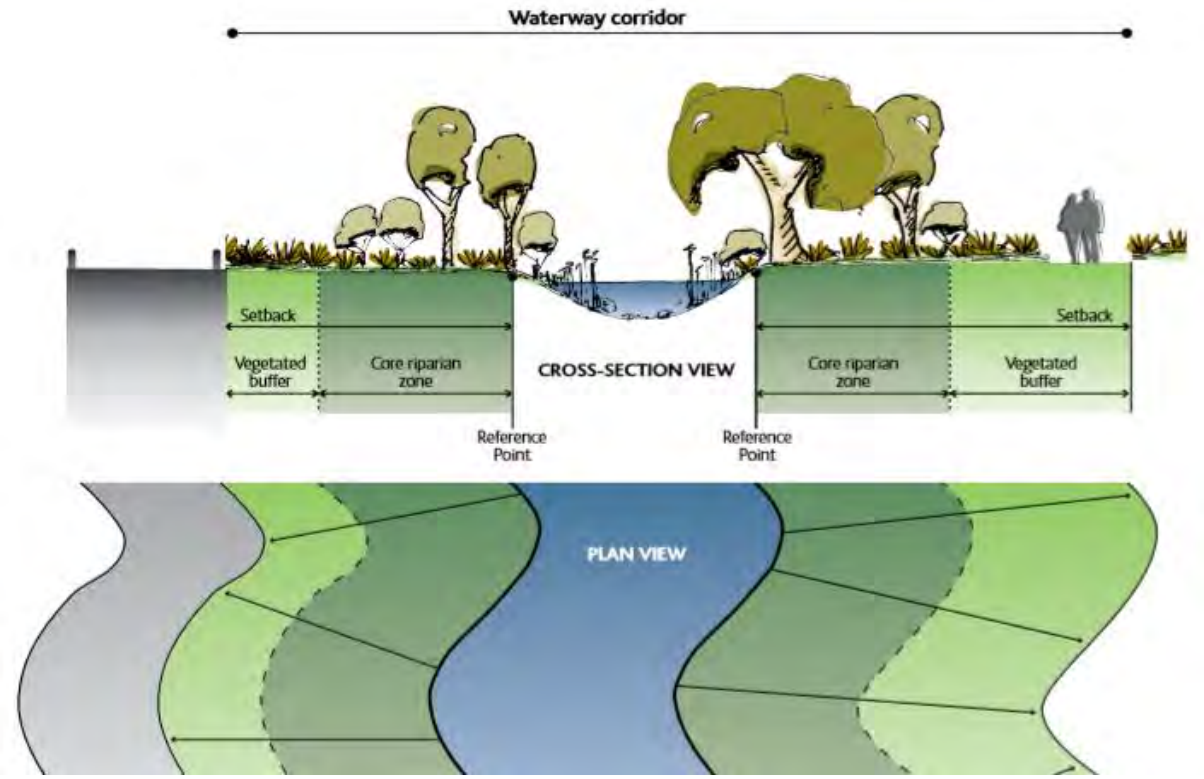


Figure 20. Waterway Setback Sub-Zone Illustration

4.8.1. RORB Modelling – 1% AEP Flood Levels

RORB modelling has not been supplied by Melbourne Water for the scheme. Flood modelling of the waterway and determination of the required corridor width is to be determined during the detailed design phase once RORB modelling has been received.

4.9. Stormwater Quality

To satisfy the environmental values expected, the OGDS prescribes a series of treatments throughout the wider catchment area. It is expected that these assets would be designed to ensure they satisfy best practice targets set out in the Best Practice Environmental Management Guidelines (BPEMG), which are:

- 45% reduction in Total Nitrogen (TN) from typical urban loads;
- 45% reduction in Total Phosphorus (TP) from typical urban loads;
- 80% reduction in Total Suspended Solids (TSS) from typical urban loads; and
- 70% reduction in Litter from typical urban loads.

4.9.1. Drainage Scheme Water Quality Assets

Melbourne Water have highlighted that the downstream ultimate asset 'RB2' is to be a retarding basin only. No water quality assets are required with treatment to be provided downstream.

Melbourne Water have not supplied a MUSIC model for the drainage scheme.

4.10. Success Statement

At a minimum, the development Site needs to:

- Safely convey the 20% AEP underground;

- Safely convey the gap flow up to the 1% AEP event using extra capacity in the pipes and overland flow-paths;
- Meet best practice environmental management guideline objectives for water quality;
- Provide an alternative water supply to dwellings; and
- Utilise stormwater at the source where possible.

5. INTEGRATED WATER MANAGEMENT CONSIDERATIONS

5.1. Project Description and Service Need

The parcel is to be developed into 175 lots as shown in Figure 5 previously. To service the 175 new homes, the estate will need to supply road and service infrastructure like water, sewer, drainage, power, telecommunications and gas. The intention of the estate is to utilise existing and future infrastructure to offset the impact of the estate from an environmental perspective.

5.1.1. Water Consumptions Demand

Plan Melbourne 2017-2050 has prepared an ultimate regional water demand expectation for the area. The regional expectations are based on future drought effects, climate change, increased water demands due to population growth and maintaining environment health.

Referring to the region of Melton (closest to Fraser Rise), it is expected to meet 'Plan Melbourne's' water demands as advised below in Figure 21. Greater Western Water Authority have endorsed these demand expectations highlighting the need for compliance.

Region	Recycled water produced	Urban stormwater [illegible]	Urban demand	Local drinking water supply annual cap	Melbourne drinking water supply annual cap
Sunbury & Diggers Rest	8,978	15,542	13,470	10,397	18,250
Gisborne	1,434	3,732	2,592		
Riddells Creek & Macedon	292	3,696	1,184		
Romsey & Lancefield	516	3,235	1,081		
Woodend	811	1,788	1,409		
Melton	14,550	24,242	29,164	10,044	
Bacchus Marsh	2,605	1,055	6,147		

Figure 21. Plan Melbourne Potable Water Demands and Relevant Cap

With the cap in mind, it is important to determine the potential annual demands of the Site on the potable supply system.

Water Appliance Stock Survey and Usage Pattern Melbourne (Smart Water Fund, 2013) provides guidance on average Melbourne household potable water consumption. Figure 22

highlights the strong linear correlation between the number of people within a household and the daily water consumption.

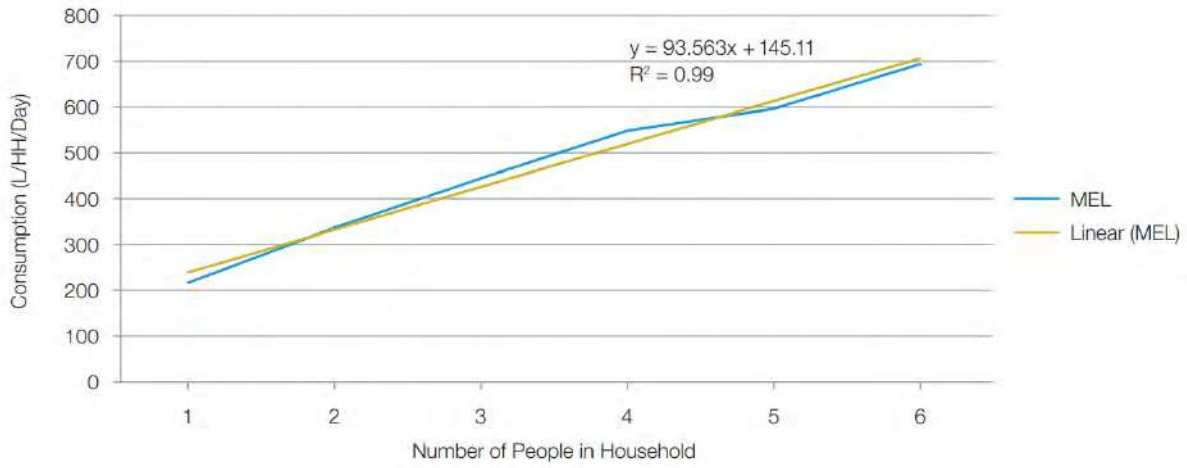


Figure 22. Average Household Water Consumption

Australian Bureau of Statistics (2016) highlights that the average people per household for Plumpton (closest to Fraser Rise) is 3. The water retailer for Fraser Rise is Greater Western Water, however as no residential end user data is available the Melbourne average of all data sources available has been utilized, see Table 11 for Potable water parameters.

Table 11. Development Site Potable Water Parameters

Parameter	Value
Project Location	Plumpton
Water Retailer	Greater Western Water
Residents per Household	3
Residential Lots	175
Consumption (L/Household/day)	426

Melbourne Residential Water End Users Study (Smart Water Fund, 2013) highlights the usage patterns for potable water for each water retailer surrounding Melbourne, represented in Figure 23. Table 12 represents the daily and annual potable water demand breakdown for each household and the Site overall. This is inclusive of residential lots only.

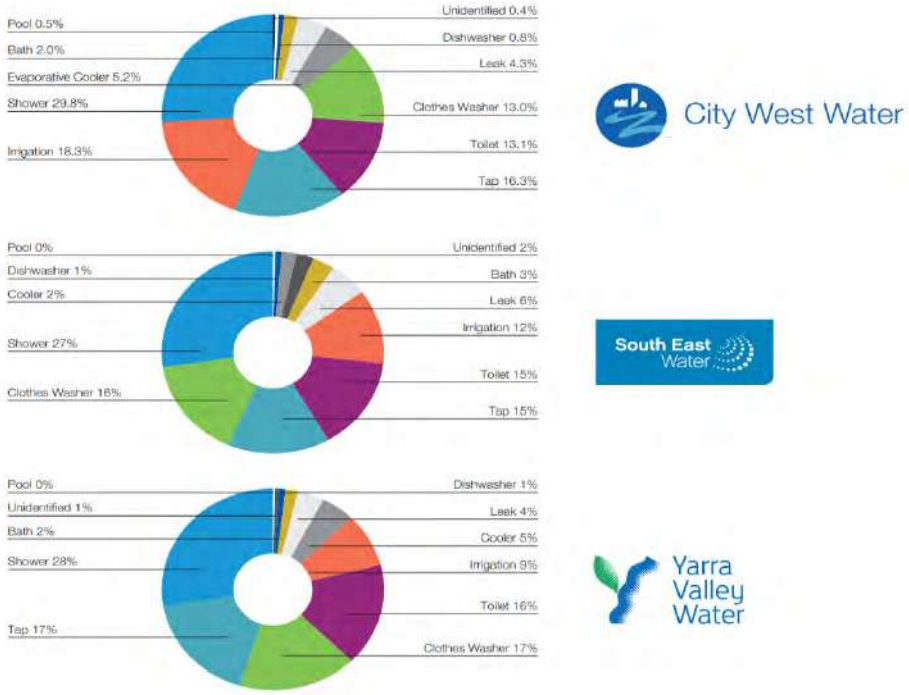


Figure 23. Residential End Use Demand Breakdown for Each Retailer

Table 12. Potable Water Demand

Household Usage	Demand Breakdown	Household Usage (L/day)	Site Usage (kL/day)	Site Usage (ML/yr)
Shower	28.3%	119	19.207	7.010
Irrigation	13.1%	55	8.901	3.249
Taps	16.1%	68	10.940	3.993
Toilet	14.7%	62	9.988	3.646
Clothes Washer	15.3%	65	10.419	3.803
Cooler	4.1%	17	2.763	1.009
Leak	4.8%	20	3.239	1.182
Bath	2.3%	10	1.585	0.579
Dishwasher	0.9%	4	0.634	0.231
Unidentified	1.1%	5	0.770	0.281
Pool	0.2%	1	0.113	0.041
Total	100%	426	68.559	25.024

5.1.2. Sewerage Services Demands

Being a residential estate, the sewer demands on the system are directly related to the water supply demands for internal usage only, with additional uses exiting through the Site as losses to groundwater and stormwater. Table 13 represents the daily and annual sewer usage for the Site.

Table 13. Site Sewer Usage

Usage	Site Usage (kL/day)	Site Usage (ML/yr)
Shower	19.207	7.010
Taps	10.940	3.993
Toilet	9.988	3.646
Clothes Washer	10.419	3.803
Bath	1.585	0.579
Dishwasher	0.634	0.231

Total	52.773	19.262

5.2. Stormwater Quality

In order to determine the required levels of water quality treatment for the Site a MUSIC model was created. Using Melbourne Water's *MUSIC Guidelines (2018)*, the Site falls within the "Melbourne Airport" Rainfall distribution as shown in Figure 24.

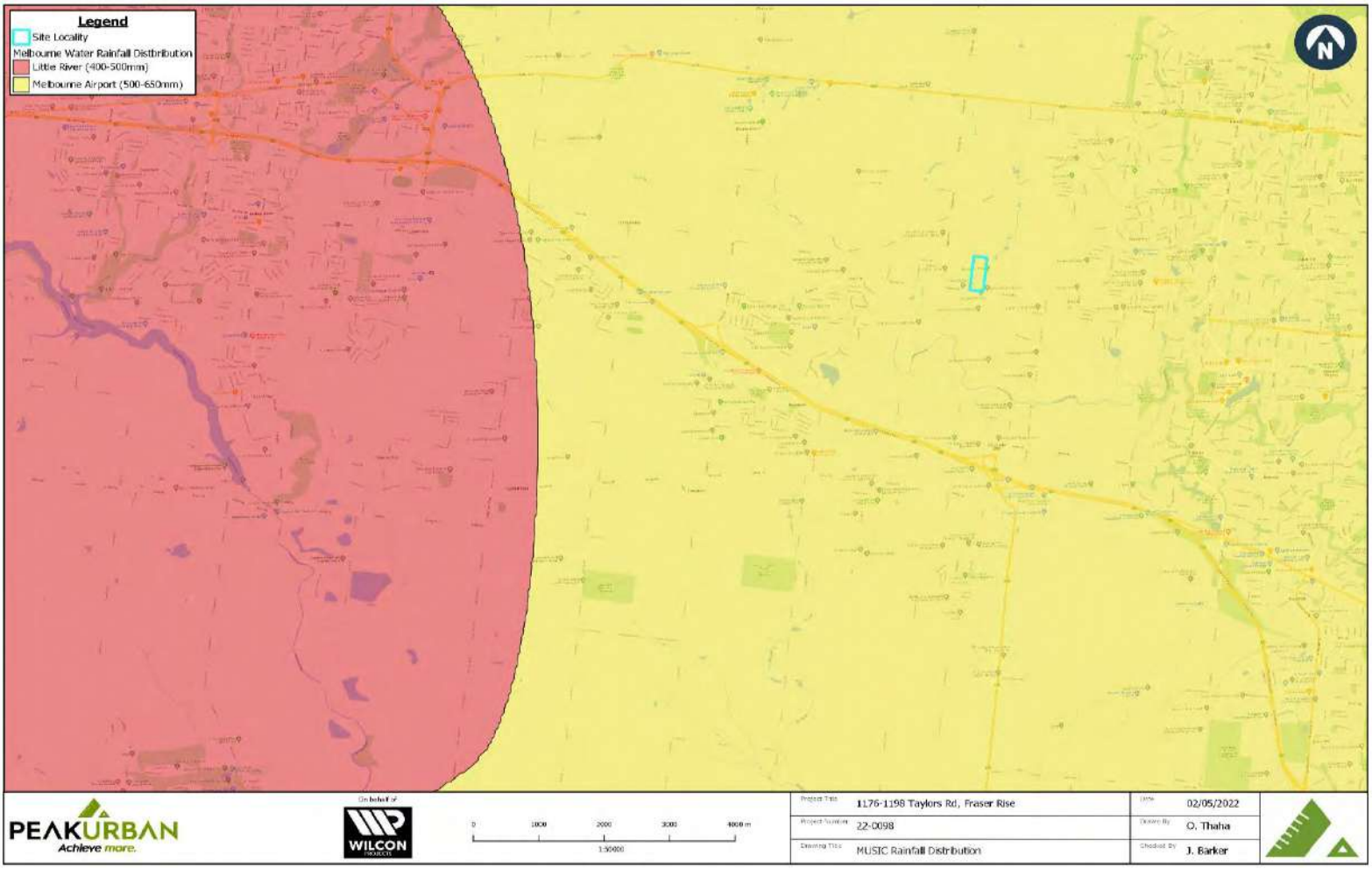


Figure 24. Melbourne Water's MUSIC Guideline Rainfall Distribution Definition for The Site

Table 14. MUSIC Model Parameters

Rainfall Parameters		Runoff Parameters	
Rainfall Station	086282 – Melbourne Airport	Soil Storage Capacity	120mm
Date	1971 - 1980	Initial Storage	30mm
Time Step	6 Minutes	Field Capacity	50mm

The Site has been broken down into various catchments in order to represent the various land-uses. Pollutant concentration data has been adjusted in accordance with MUSIC Guidelines (2018), see Table 15.

Table 15. Pollutant Concentration Data

Pollutant	Surface Type	Storm Flow	Base Flow

		Mean (log mg/L)	SD (log mg/L)	Mean (log mg/L)	SD (log mg/L)
SS	Roof	1.301	0.333	n/a	n/a
	Road & Paved	2.431	0.333	n/a	n/a
	Non-Roof & Paved	1.900	0.333	0.960	0.401
TP	Roof	-0.866	0.242	n/a	n/a
	Road & Paved	-0.301	0.242	n/a	n/a
	Non-Roof & Paved	-0.700	0.242	-0.731	0.360
TN	Roof	0.301	0.205	n/a	n/a
	Road & Paved	0.342	0.205	n/a	n/a
	Non-Roof & Paved	0.243	0.182	0.455	0.363

5.3. Pre-Developed Conditions

The pre-developed nutrient and flows expected off the Site were obtained using the MUSIC model configuration highlighted in Figure 25 using the catchment details outlined in Table 16.

Table 16. MUSIC Model Pre-Developed Catchment A Details

Catchment A	Fraction Impervious	Area (ha)
Rural	0.10	7.556

Table 17. MUSIC Model Pre-Developed Catchment B Details

Catchment B	Fraction Impervious	Area (ha)
Rural	0.10	4.387
Buildings	1.00	0.055

Figure 25. Pre-Developed MUSIC Model Configuration

The following source nutrient and flow information was generated using MUSIC for the pre-development setting (refer to Figure 26):

Treatment Train Effectiveness - Pre-Development Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	9.53	9.53	0
Total Suspended Solids (kg/yr)	1620	1620	0
Total Phosphorus (kg/yr)	4.55	4.55	0
Total Nitrogen (kg/yr)	32.4	32.4	0
Gross Pollutants (kg/yr)	230	230	0

Figure 26. Pre-Development Source Nutrients and Flow

5.4. Developed Conditions

The developed Site conditions were modelled with its variety of land-use catchments that represent the roof, road and mixed lot catchments as shown in Figure 27 below. The

catchment break-up for the post developed conditions is represented in Table 18 and Table 19.

Table 18. MUSIC Model Post-Developed Catchment A Details

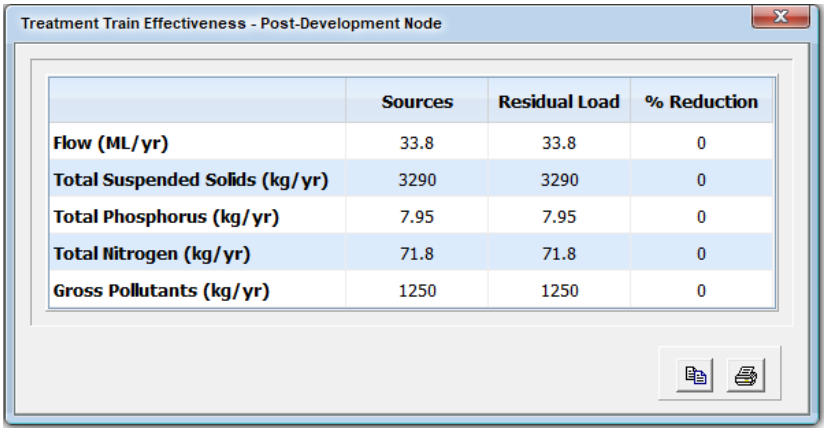
Catchment	Fraction Impervious	Area (ha)
Residential Lots	0.83	3.497
Open Space	0.10	0.072
Drainage Reserve	0.10	1.480
Road Reserve	0.60	2.524

Table 19. MUSIC Model Post-Developed Catchment B Details

Catchment	Fraction Impervious	Area (ha)
Residential Lots	0.82	1.20
Open Space	0.10	0.088
Drainage Reserve	0.10	1.854
Road Reserve	0.60	1.263

Figure 27. Post-Developed MUSIC Model Configuration

The following source nutrient and flow information was generated using MUSIC for the post-development setting (refer to Figure 28):



	Sources	Residual Load	% Reduction
Flow (ML/yr)	33.8	33.8	0
Total Suspended Solids (kg/yr)	3290	3290	0
Total Phosphorus (kg/yr)	7.95	7.95	0
Total Nitrogen (kg/yr)	71.8	71.8	0
Gross Pollutants (kg/yr)	1250	1250	0

Figure 28. Post-Development Nutrient and Flow Generation

5.5. Integrated Water Management Modelling

In accordance with the IWM framework for the Site the MUSIC catchments have been split into the following parameters:

- Lots [Roof to Tanks] - Roofed areas of all front-loaded lots that discharge to rainwater tanks for re-use. It is assumed that 70% of the roofed area will be directed to tanks.
- Lots [Remaining] – Unconnected roof areas (30%) and non-roofed areas that discharges directly to underground drainage.

The full estate was modelled in MUSIC to appreciate the impact of the integrated design features on the receiving water way. Figure 32 highlights the MUSIC model configuration and Figure 33 highlights the overall performance of the system. Rainwater tanks will be included which will reduce the increase in development runoff through diversion and re-use of the roof water prior to entering the waterway.

Council have encouraged the use of rainwater tanks within developments for any parcels over 300m². Analysis has been undertaken using MUSIC and Water Balance modelling to determine an appropriately sized tank to suit the average family of 3 people.

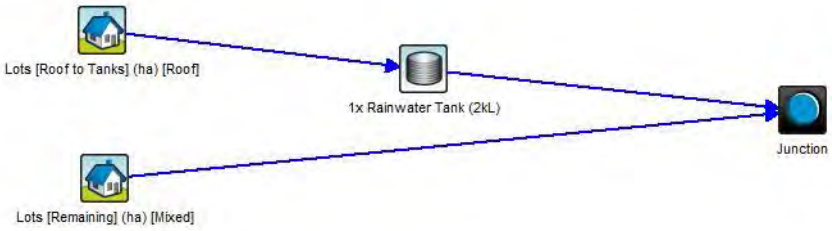


Figure 29. Rainwater Tank MUSIC Node Configuration

The passive irrigation system is modelled in MUSIC using a node configuration that's highlighted in Figure 30 with the parameters incorporated into MUSIC as a bio-retention node, as shown in Figure 31. A conservative exfiltration rate of 0.36mm/hr has been included into the node, representing exfiltration rate of heavy clay. The total treatment area considered was a 3m² area. The single tree parameters were then expanded to represent the total number of trees within the catchment.

Figure 30. Street Tree MUSIC Node Configuration

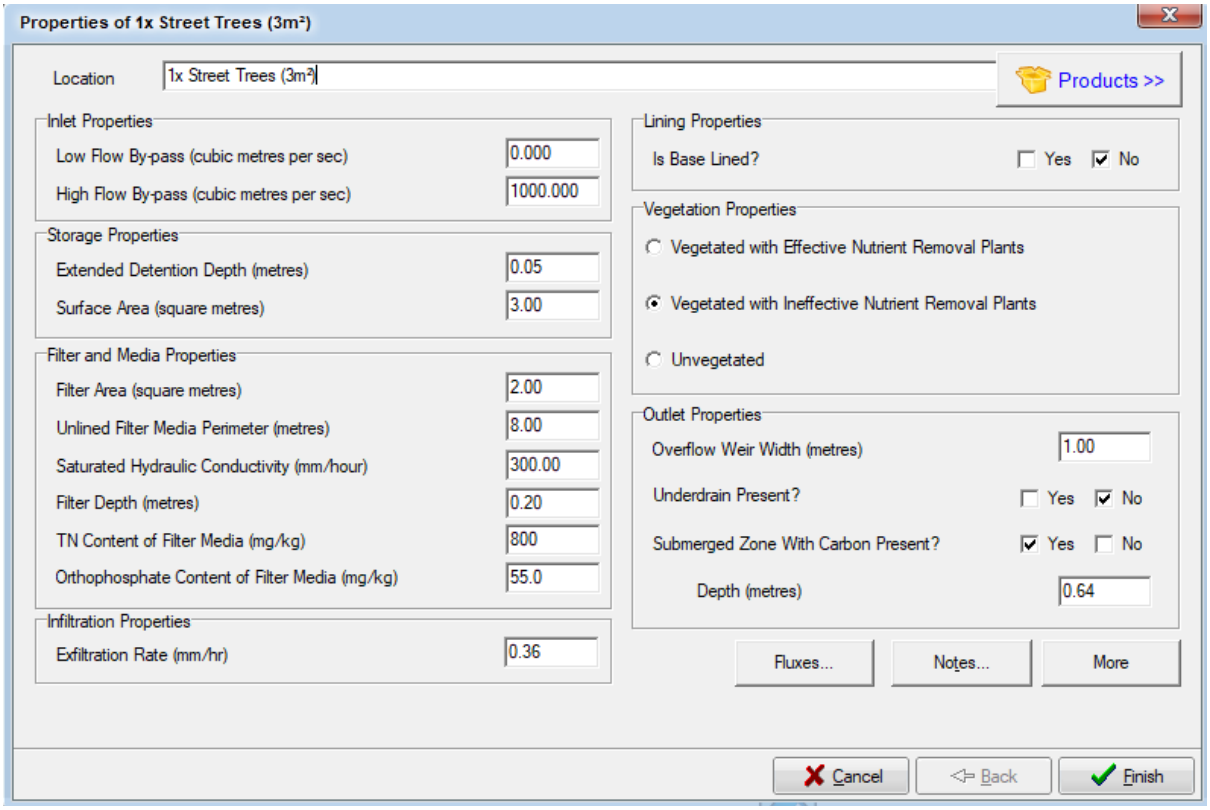


Figure 31. Street Tree MUSIC Node Parameters

The full estate was modelled in MUSIC to appreciate the impact of the integrated design features with MUSIC model catchment details presented in Table 20 and Table 21. Figure 32 highlights the MUSIC model configuration and Figure 33 highlights the overall performance of the system.

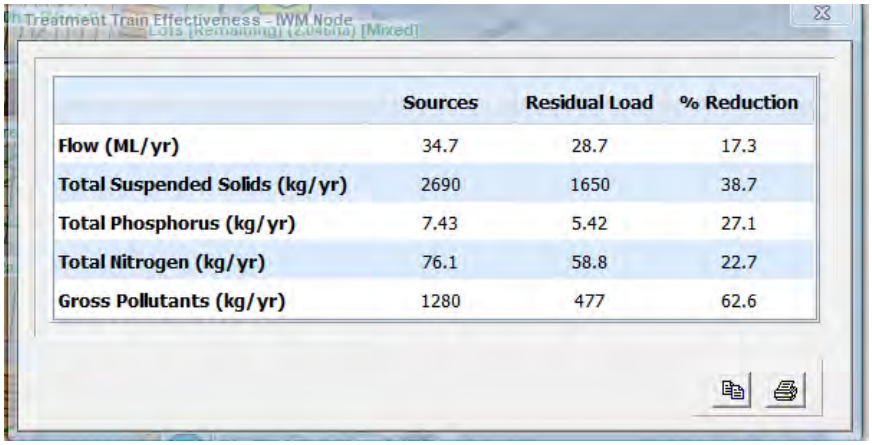
Table 20. MUSIC Model Catchment A Details

Catchment A	Fraction Impervious	Area (ha)
Lots [Roof to Tanks]	1.00	1.450
Lots [Remaining]	0.80	2.046
Open Space	0.10	0.072
Road Reserve	0.60	2.524
Drainage Reserve	0.10	1.480

Table 21. MUSIC Model Catchment B Details

Catchment B	Fraction Impervious	Area (ha)
Lots [Roof to Tanks]	1.00	0.478
Lots [Remaining]	0.77	0.731
Open Space	0.10	0.088
Road Reserve	0.60	1.263
Drainage Reserve	0.10	1.854

Figure 32. Integrated Water Management MUSIC Model Configuration



	Sources	Residual Load	% Reduction
Flow (ML/yr)	34.7	28.7	17.3
Total Suspended Solids (kg/yr)	2690	1650	38.7
Total Phosphorus (kg/yr)	7.43	5.42	27.1
Total Nitrogen (kg/yr)	76.1	58.8	22.7
Gross Pollutants (kg/yr)	1280	477	62.6

Figure 33. Integrated Water Management Treatment Train Effectiveness

The integrated management approach yields a treatment performance of 22.7% BPEMG for the development for the consideration of TN. Whilst the project is not achieving full Best Practice, the integrated assets are still providing a much-needed water quality offset to the receiving drainage scheme.

This is also a good point to highlight that when compared to the pre-development flows of 9.53ML annually, the estate will only deliver 28.7ML of water for treatment and conveyance. This is a 16% reduction in flows when compared to the more Business-as-Usual 34.7ML generated from the estate. The new stormwater initiatives are working hard to reduce the impact of the development on the environment. Couple this with the drainage scheme assets and we are certainly establishing a more robust and distributed method of stormwater control.

5.6. Implementation

Figure 34 highlights the integrated treatment scenarios to be implemented within the Site. Option A (All front-loading lots) is to include a 2kL rainwater tank for roof runoff and a street tree within the road reserve to treat road runoff. Non-roof areas will discharge directly to the drainage network.

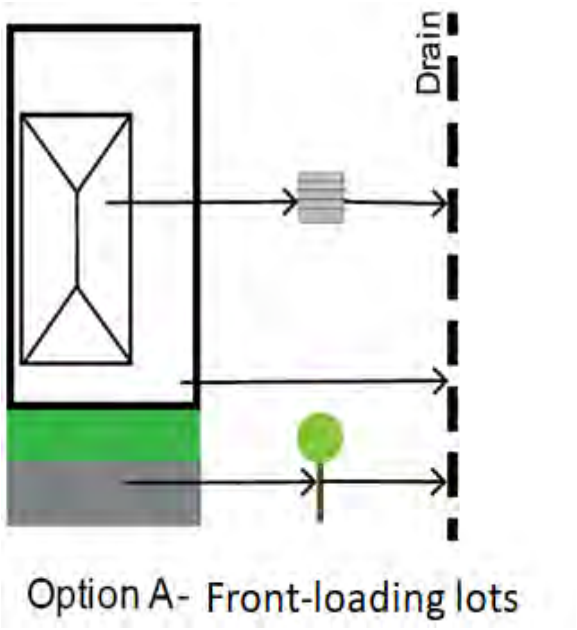


Figure 34. Integrated Treatment Scenarios

5.6.1. Impact Analysis

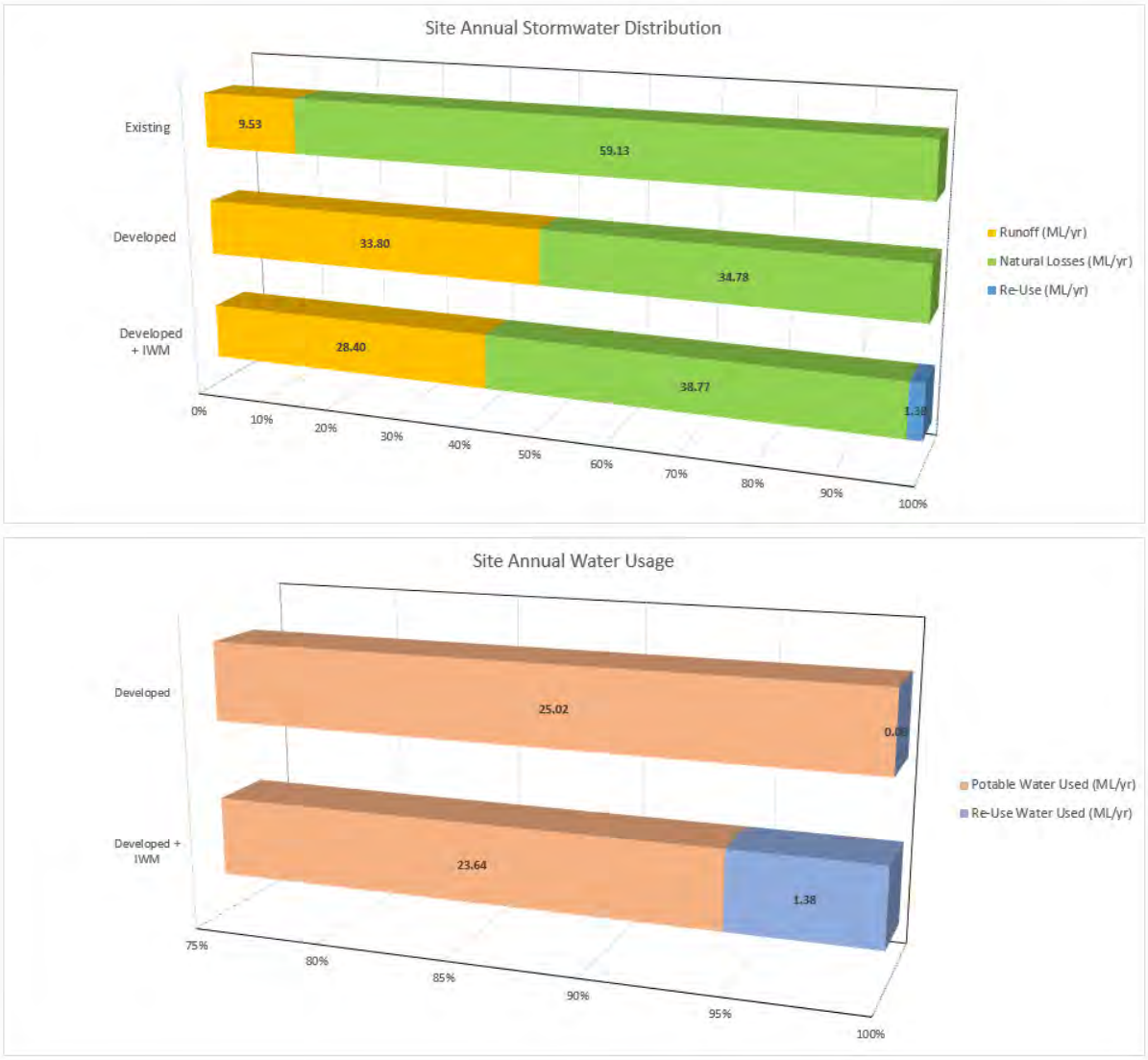


Figure 35. Integrated Approach Impact Analysis

5.6.2. Design Guidelines

The requirement for 2kL tank on all front loading lots with a minimum of 70% roof connected to the tank will be included in the design guidelines referenced in the Section 173 Agreements. Use of rainwater tanks for toilet flushing will be mandated through the design guidelines.

5.7. Servicing Plan Including Options Analysis

5.7.1. Drinking Water Supply

Greater Western Water (GWW) is the responsible Authority for provision of potable water. The subject land is currently supplied by an existing 375mm PVC main within Taylors Road.

GWW have confirmed that the proposed development can be supplied from the 375mm watermain via connection to the existing reticulated watermains within the adjoining developments as subdivision proceeds in the area.

The proposed alignment for the drinking water supply has been provided below in Figure 37.

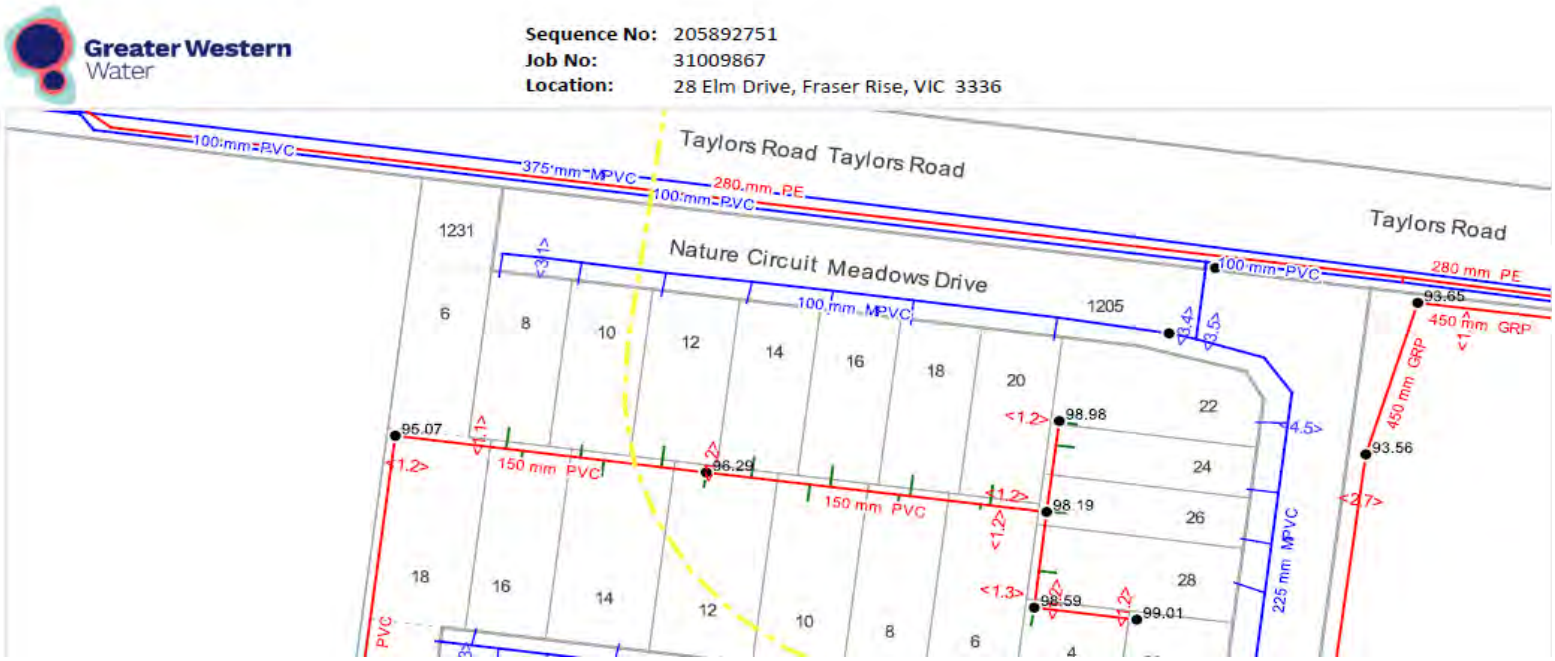


Figure 36. Drinking Water Supply Infrastructure

Figure 37. Water Supply

5.7.2. Non-Drinking Water Supply

As previously highlighted, the potential cap on the potable supply to the area has stimulated a need for alternative water supply. Greater Western Water have recently prioritised funding of key potable and drinking water assets over non-drinking water. On this basis, non-drinking water assets will not be required within the Site.

It is recommended that alterative non-drinking water options such as rainwater tanks are supported within the development, refer to Table 22 for Re-Use water demand calculations.

Table 22. Re-Use Water Demand

Household Usage	Household Usage (L/day)	Site Usage (kL/day)	Site Usage (ML/yr)
Shower	0	0.000	0.000
Irrigation	55	3.151	1.150
Taps	0	0.000	0.000
Toilet	62	3.536	1.291
Clothes Washer	0	0.000	0.000
Cooler	0	0.000	0.000
Leak	0	0.000	0.000
Bath	0	0.000	0.000

Dishwasher	0	0.000	0.000
Unidentified	0	0.000	0.000
Pool	0	0.000	0.000
Total	102	6.688	2.441

5.7.3. Rainwater Tanks Cost Benefit Analysis

Lots scale tanks of different sizes were analysed within the Water Balance modelling to determine the appropriate size tanks to reduce demand on the potable water supply and volumes received by the waterway. The different tank options that were investigated included:

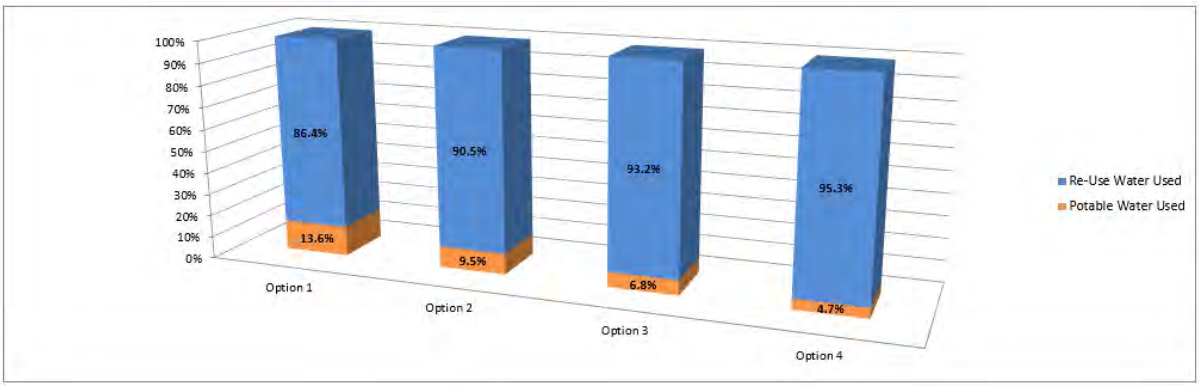
- Option 1 – 2kL Tank
- Option 2 – 3kL Tank
- Option 3 – 4kL Tank
- Option 4 – 5kL Tank

The water balance analysis determined the annual water saving for each tank system based on the demands determined in Table 22. Figure 38 highlights the 4 tank size options and their performance.

The following costs were incorporated into the cost/benefit analysis:

- Rainwater Tank (Rainwater Tanks Direct, 2018)
  - 2kL – $710
  - 3kL – $895
  - 4kL – $1,170
  - 5kL – $1,400
  - Rainwater tank pump - $599
- Potable Water (Greater Western Water, 2019)
  - Annual Water Service Charge - $234.34
  - Potable Water Cost - $1.858/kL
- Electricity Usage (Origin Energy, 2018)
  - Daily Supply Charge – 136.2 cents/day
  - Peak Electricity Cost – 34.1 cents/kWh
  - Off Peak Electricity Cost – 21.5 cents/kWh

Whilst a bigger tank provides a greater reduction in potable water for the Site its associated cost/benefit is low. The optimal tank size for implementation across this development is 2kL with tanks of larger sizes having diminishing returns.



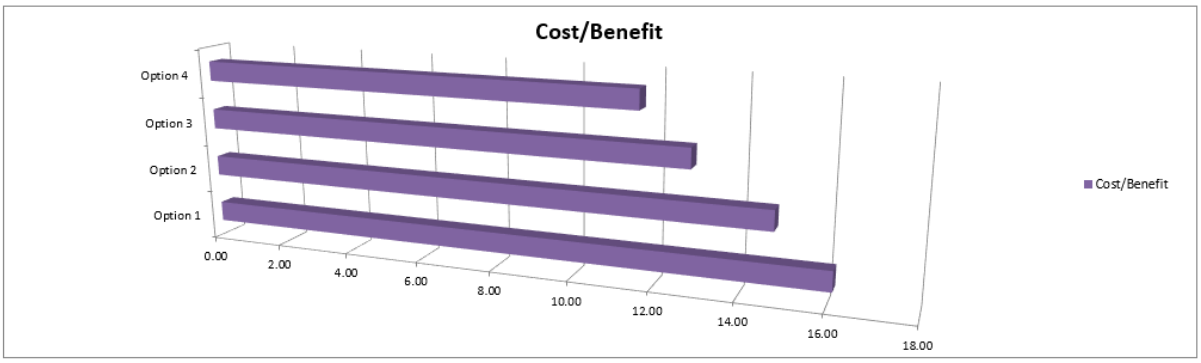


Figure 38. Water Balance Modelling -Tank Size Comparisons

The results of the Water Balancing modelling undertaken (summarized in Table 23) indicate that through implementation of the 2kL rainwater tanks:

- From the possible re-use water demand of 2.4ML/yr, 86.4% of the demand was met
- An annual potable water saving across the Site of 2.11ML/yr can be achieved
- Resulting in an 8.4% reduction in potable water supply requirements for the Site

Table 23. Re-Use Water Balance Results

Re-Use Water Used (ML/yr)	2.11
Re-Use Water Demand Achieved	86.4%
Total Site Water Demand (ML/yr)	25.02
Total Potable Water Substitute	8.4%

5.7.4. Sewerage Management

GWW is also the responsible Authority for provision of sewer services to the site. A strategy has been developed for the area and can be seen below.

The subject site sewer will fall to the existing 450mm GRP sewer main constructed to the south east of the Site by the Bowery development as shown in Figure 36 above.

The proposed alignment for the gravity sewer has been provided below in Figure 39.

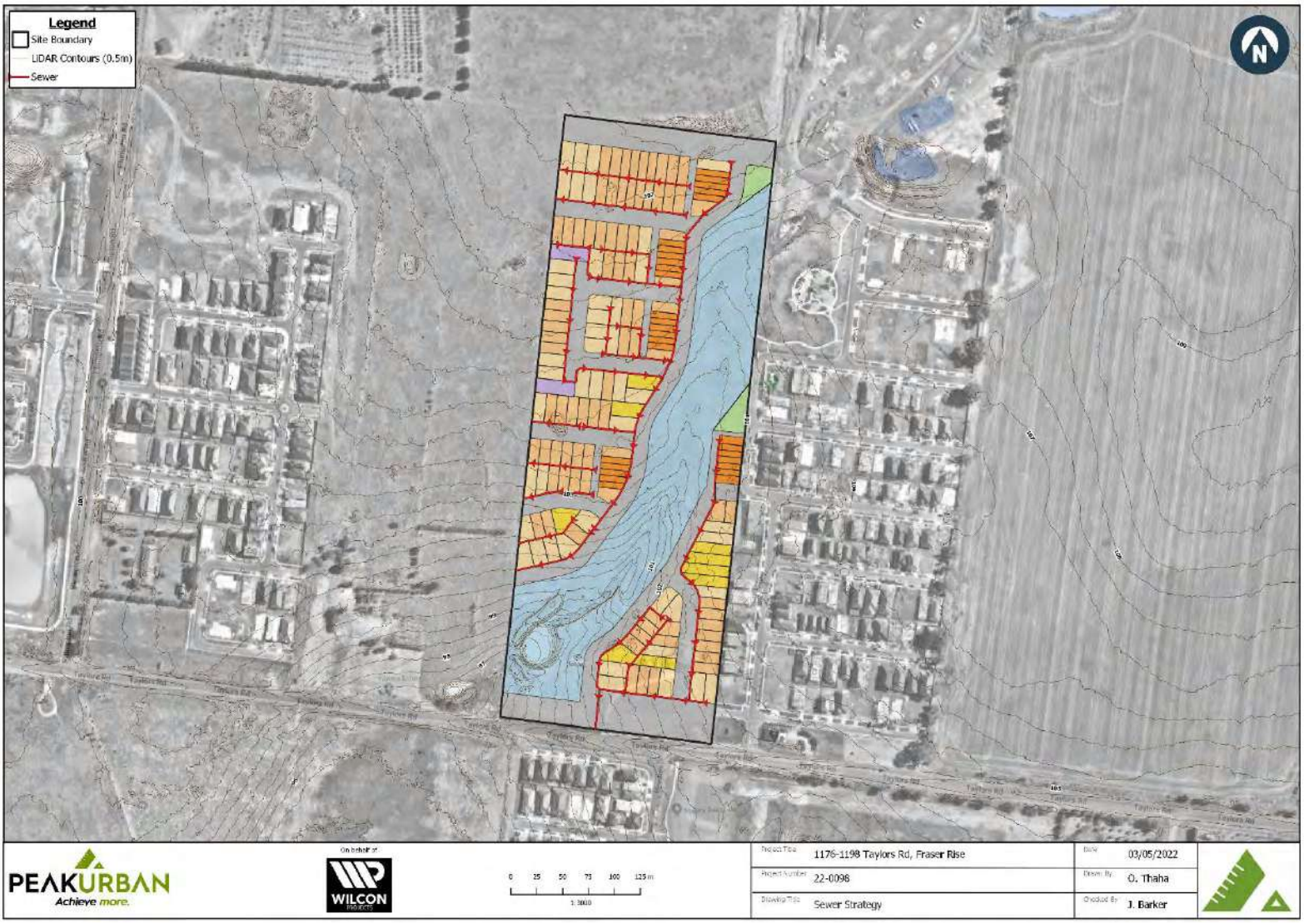


Figure 39. Proposed Site Sewer Alignment

5.8. Urban Amenity and Waterway Health Protection

Challenges such as climate change, increased urbanization, pollution and rapid population growth have been explored. In order to overcome these challenges cooperative and targeted investment is required to ensure the protection of waterways. This presents opportunities to improve upon waterway management which can be achieved by following strategies mentioned below:

- Recognising Aboriginal waterway values
- Understanding and promoting the social value of waterways
- Shared benefits to environmental, social, cultural and economic values
- Co-delivering the strategy with relevant stakeholders
- Improving sustainable stormwater management
- Waterways of the West will work with communities and traditional owners to develop recommendations

Integrated water design features have been included in this estate, aligning the objectives required by Council and Melbourne Water. These proposed assets provide benefits to the environment, household, receiving waterway and the community, which will create a more liveable, and ultimately resilient estates capable of managing climate change.

The estate was modelled in MUSIC to appreciate the reduction values of the integrated design features on the receiving waterway. Figure 32 highlights the MUSIC model configuration and Figure 33 highlights the overall performance of the system.

Rainwater tanks will be included as outlined in Section - Non-Drinking Water Supply of this document. This will reduce the increase in development runoff through diversion and re-use of the roof water prior to entering the waterway.

Council have also indicated that they require passive irrigation systems within all developments. This initiative will improve water way health by delivering much needed irrigation to the proposed trees and taking a big leap forward in greening the landscape. Providing these passive irrigation systems to the development will also add benefit to reducing the urban heat island effect.

To enable passive watering of trees, we propose to provide a gravel trench behind kerb to store stormwater. The following cross-section sketch outlines how the tree, depression and servicing infrastructure will be integrated to make this work. The final design configuration will be to the satisfaction of Council.

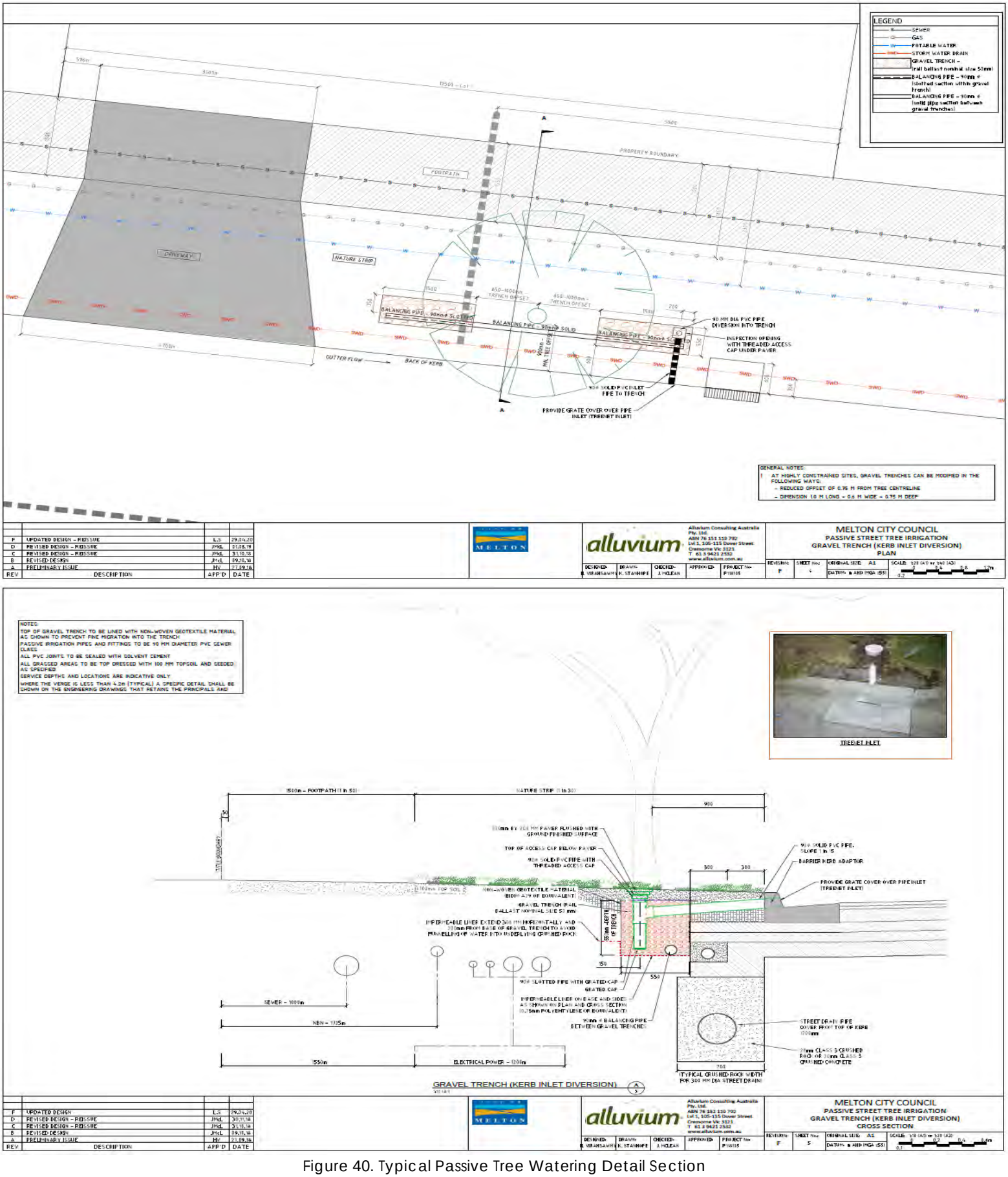


Figure 40. Typical Passive Tree Watering Detail Section

Street trees are located along the frontages of all residential lots, treating the adjacent road reserve catchment. It has been assumed that all road reserves have two-way cross falls.

6. SUMMARY

PEAKURBAN was engaged to undertake an Integrated Water Management Plan for a parcel of land located at 1176-1198 Taylors Rd, Frasers Rise, VIC, 3335, Victoria, Australia, ensuring that the estate adheres to the expectations of Council and other regulatory guidelines from a more holistic perspective.

The Site has a total area of 12.00ha with a substantially cleared landscape and is currently bare land. The Site is to be developed into 175 residential lots with the inclusion of open space reserves and a drainage reserve.

The Site is located within the City of Melton and the Olive Grove Melbourne Water Drainage Scheme (#4142). Runoff from the Site will ultimately be treated by the scheme asset RB2. This asset is partially located within the Site and will be constructed by the developer to the west at a later date.

Drainage contributions for the Site are payable to Melbourne Water and are expected to be:

- Hydraulic – $84,938
- Water Quality - $89,158

Downstream ultimate drainage scheme works are scheduled to be constructed by others at a later date, therefore interim measures are required to provide on-site detention and sediment removal for the eastern catchment of the Site. The western catchment will only be constructed once the developer to the west has completed works including the construction of the ultimate asset (RB2). Therefore interim assets will not be required for this catchment. More details to be provided in detailed design.

The developer will construct an interim detention and sediment basin to the satisfaction of Melbourne Water and Council. The retarding basin will have a peak storage volume of 813m³ and will be incorporated into the existing agricultural dam on Site. Prior to discharge into the retarding basin, sediment removal will be provided by a sediment basin with a surface treatment area of 390m². This basin will be located at the low point for the site, within the area designated as drainage reserve. Any interim drainage infrastructure required will be maintained by the developer.

The minor drainage system will be designed to convey the 20% AEP event safely below ground. Flows from storm events exceeding the 20% AEP event, and up to the 1% AEP storm event will flow overland within the proposed road network, and underground drainage to transfer larger events to the scheme outlet. A 1% AEP pipe will be designed during the detailed design phase of the project to convey major flows from a trapped low point. The developer will construct the required Q20% and Q100% scheme drainage throughout the Site to the satisfaction of Melbourne Water and Council.

All new lots will be filled to a minimum of 300mm above the 1% AEP flood level associate with RB2 or 600mm above the 1% AEP flood level associated with the waterway traversing the Site, whichever is greater. This will be confirmed during the detailed design phase of the project and once Melbourne Water's RORB modelling for the scheme has been received.

To improve waterway health, liveability and the broader community, 2kL rainwater tanks are required on all front-loading lots as well as all street trees in front of all lots are to be passively watered.

The requirement for 2kL tank on all front loading lots with a minimum of 70% roof connected to the tank will be included in the design guidelines referenced in the Section 173 Agreements. Use of rainwater tanks for toilet flushing will be mandated through the design guidelines.

Implementation of the rainwater tanks has reduced annual potable water consumption for the Site by 8.4%. Implementation of the road reserve tree pits and the rainwater tanks provides water quality treatment to 22.7% for the consideration of Nitrogen of Best Practice Environmental Guidelines.

Implementation of integrated water management philosophies has reduced the overall impact of the development of the Site on the local water way and demands on the water supply system. Pre-developed runoff for the Site was originally 9.53ML/yr. Post development conditions increases the runoff to 34.7ML/yr. Following the integrated approach outlined the post-developed runoff has decreased to 28.7ML/yr, a reduction of 16%.

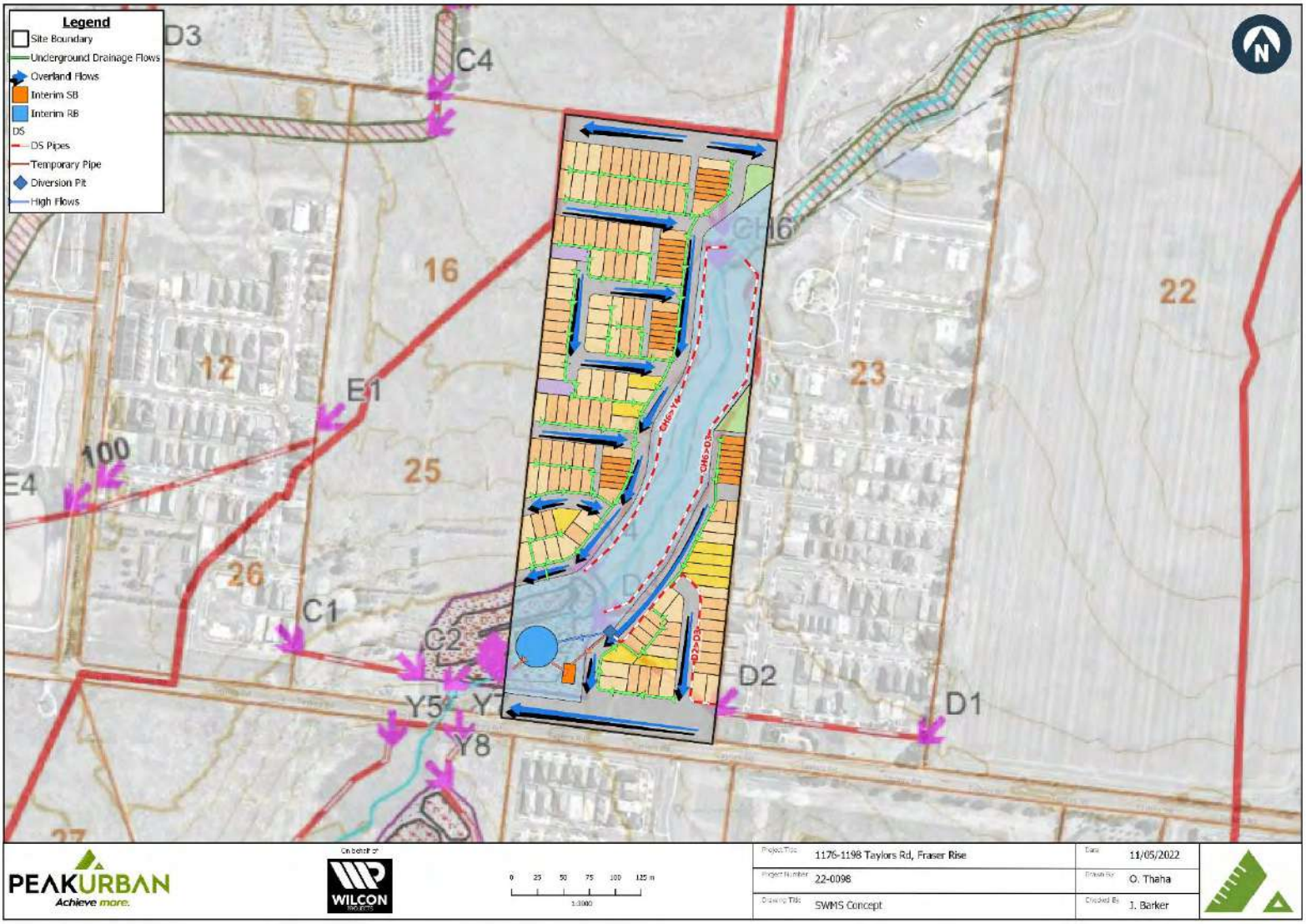


Figure 41. SWMS Concept

7. REFERENCES

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APPENDICES

Appendix A DEVELOPMENT PLAN

PROPOSED SUBDIVISION MASTERPLAN
1176-1198 TAYLORS ROAD, FRASER RISE

MGA2020 ZONE 55

FUTURE SUBDIVISION

FUTURE SUBDIVISION (UNDER CONSTRUCTION)

PADMA BOULEVARD

3m WIDE TWO WAY BIKE PATH

RESERVE 474m²

FRIENDSHIP PLACE

3m WIDE OFF-ROAD SHARED PATH (INDICATIVE)

CHERISH STREET

WINTON DRIVE

WATTLESEED DRIVE

ELM DRIVE

FUTURE SUBDIVISION

SUPERLOT 1B
FUTURE DEVELOPMENT

SUPERLOT 1A
FUTURE DEVELOPMENT

1837m²

1713m²

DRAINAGE RESERVE 3.421ha

SUPERLOT A
1.992ha

ARTERIAL ROAD WIDENING 0.494ha

TAYLORS ROAD

1

2

3

4

LEGEND

- STAGE BOUNDARY
- SMALL LOT HOUSING CODE (TYPE A)
- ROAD WIDENING
- DRAINAGE RESERVE
- RESERVE
- INTERIM RETARDING BASIN
- REAR LOADED
- 3m WIDE TWO WAY BIKE PATH (PSP)
- 3m WIDE OFF-ROAD SHARED PATH (PSP)

NOTE:

PLEASE NOTE THIS PLAN IS BASED ON PRELIMINARY INFORMATION ONLY AND MAY BE SUBJECT TO CHANGE AS A RESULT OF FORMAL COUNCIL/AUTHORITY ADVICE, DETAILED SITE INVESTIGATIONS AND CONFIRMATION BY SURVEY.

THE LOCATIONS OF BICYCLE LANES, LANDSCAPING, KERBS, SHARED PATHS ARE INDICATIVE ONLY AND SUBJECT TO ENGINEERING DESIGN AND REFERRAL AUTHORITY APPROVAL

LAND USE BUDGET	
SITE AREA - TITLE	12.00ha
ARTERIAL ROAD WIDENING	0.494ha
WATERWAY AND DRAINAGE RESERVE	3.421ha
NET DEVELOPABLE AREA	8.085ha
LOCAL ROADS	2.548ha
RESIDENTIAL AREA	3.132ha
RESERVE	0.058ha
SUPERLOTS	2.347ha
TOTAL No. OF LOTS (EXCLUDING SUPERLOTS)	125
AVERAGE LOT AREA (EXCLUDING SUPERLOT)	251m²
OVERALL YIELD (LOTS/NDA)	15.46

STAGE SEQUENCING TABLE	
STAGE 1	30
STAGE 2	46
STAGE 3	49
STAGE 1A	1
STAGE 1B	1
STAGE 4 (SUPERLOT A)	1
TOTAL No. OF LOTS	128

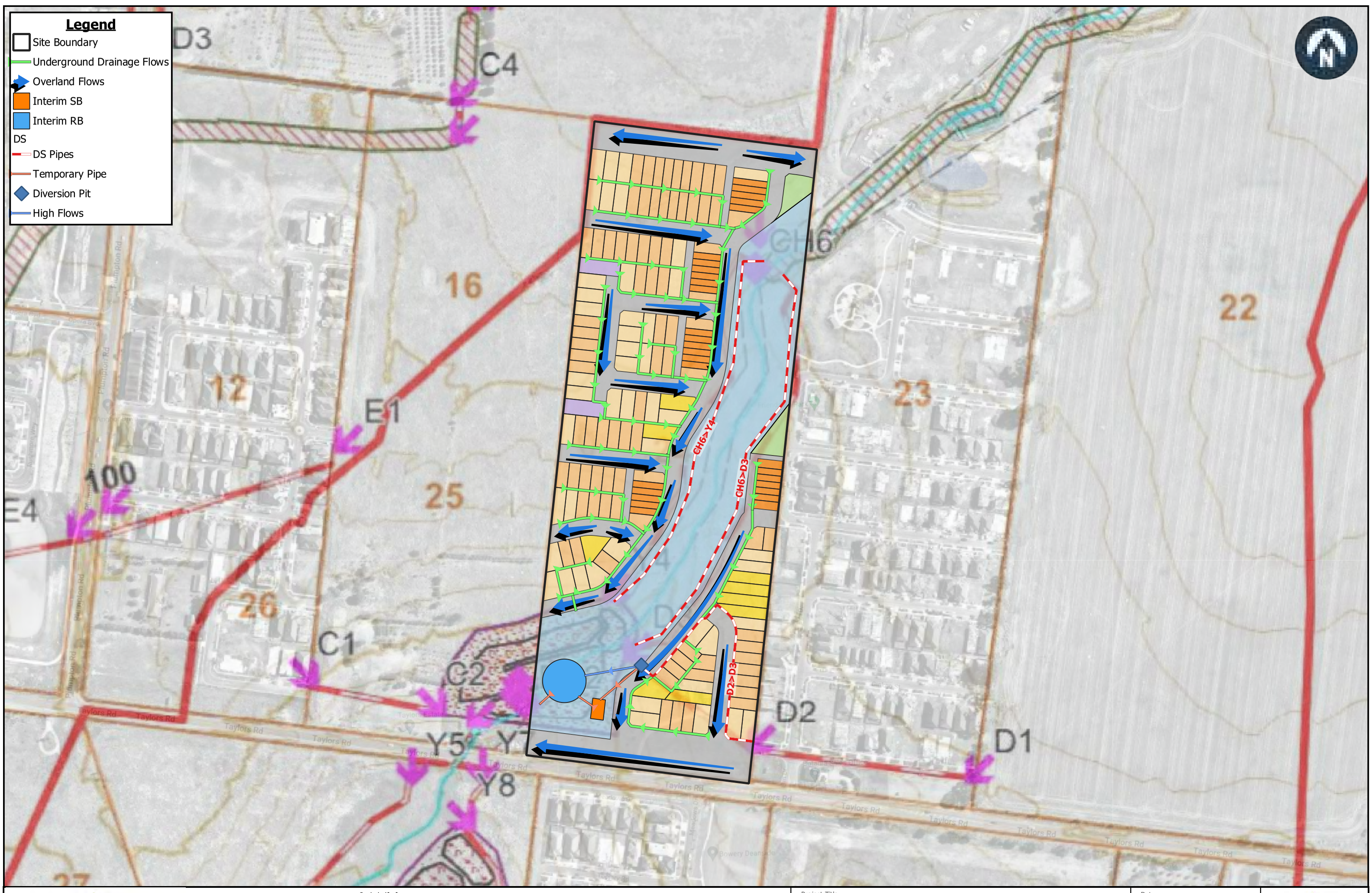
LOT MIX			
	AREA (m²)	NUMBER	%
	<300m²	95	76
	301m² - 399m²	29	23
	400m² - 499m²	1	1
	TOTAL	125	100

Hellier McFarland
Development Consultants Town Planners Land Surveyors
Level 2, 1911 Malvern Road, Malvern East, VIC 3145
PO Box 1206, Darling, VIC 3145
Tel: 03 9532 9951 Fax: 03 9532 9941
www.hmf.com.au | info@hmf.com.au

SURVEY	HS	APR 2022	SCALE 1:1000
DRAWN	CG	JUNE 2024	10 0 10 20 30 40 LENGTHS ARE IN METRES
CHECKED	AP	APR 2022	
REV	-	-	
APPROVED	MC	JUNE 2024	ORIGINAL SHEET SIZE A1

CAD REF: 13182S-3M.dwg
COMPS REF:

Appendix B SWMS CONCEPT



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On behalf of
WILCON PROJECTS

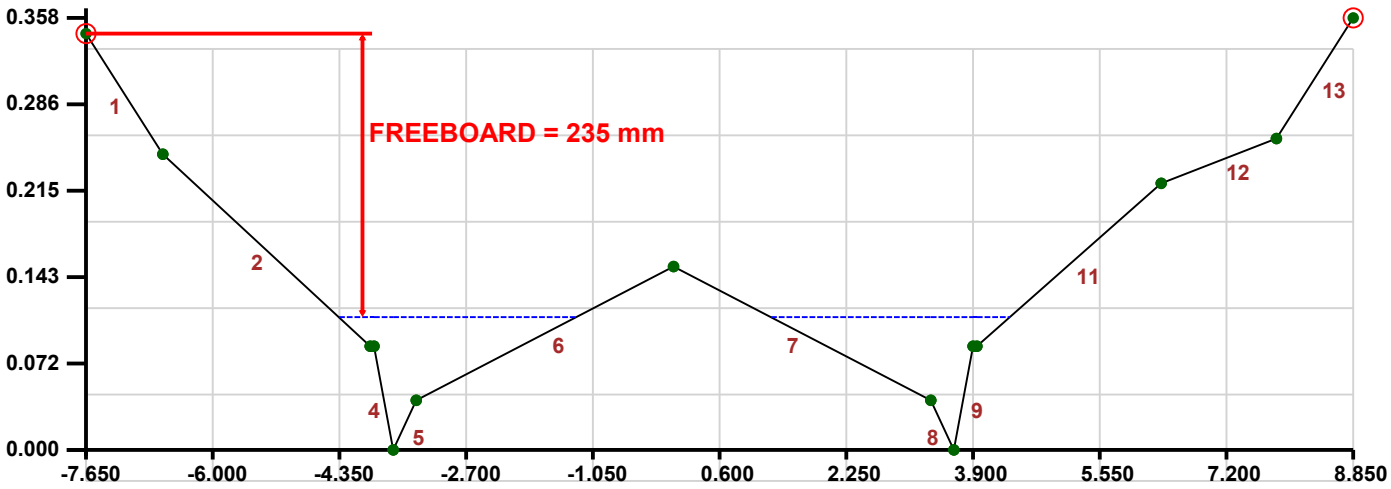
0 25 50 75 100 125 m
1:3000

Project Title	1176-1198 Taylors Rd, Fraser Rise	Date	12/05/2022
Project Number	22-0098	Drawn By	O. Thaha
Drawing Title	SWMS Concept	Checked By	J. Barker

Appendix C CALCULATIONS

PROJECT: 1176-1198 Taylors Rd - 14.5m Road Reserve
Print-out date: 29/04/2022 - Time: 12:30
Data File: 1176-1198 Taylors Rd - 14.5m Road Reserve.dat

1. CROSS-SECTION:



2. DISCHARGE INFORMATION:

100 year (1%) storm event

Total discharge = 0.16 cumecs

There is no pipe discharge
Overland / Channel / Watercourse discharge = 0.16 cumecs

3. RESULTS: Water surface elevation = 0.110 m

High Flow Channel grade = 1 in 60, Main Channel / Low Flow Channel grade = 1 in 60.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.191	0.000	0.191
D(Max) = Max. Depth (m):	0.000	0.110	0.000	0.110
D(Ave) = Ave. Depth (m):	0.000	0.039	0.000	0.039
V = Ave. Velocity (m/s):	0.000	0.784	0.000	0.784
D(Max) x V (cumecs/m):	0.000	0.086	0.000	0.086
D(Ave) x V (cumecs/m):	0.000	0.031	0.000	0.031
Froude Number:	0.000	1.263	0.000	N/A
Area (m^2):	0.000	0.243	0.000	0.243
Wetted Perimeter (m):	0.000	6.237	0.000	6.237
Flow Width (m):	0.000	6.199	0.000	6.199
Hydraulic Radius (m):	0.000	0.039	0.000	0.039
Composite Manning's n:	0.000	0.019	0.000	N/A
Split Flow?	-	-	-	Yes

4. CROSS-SECTION DATA:

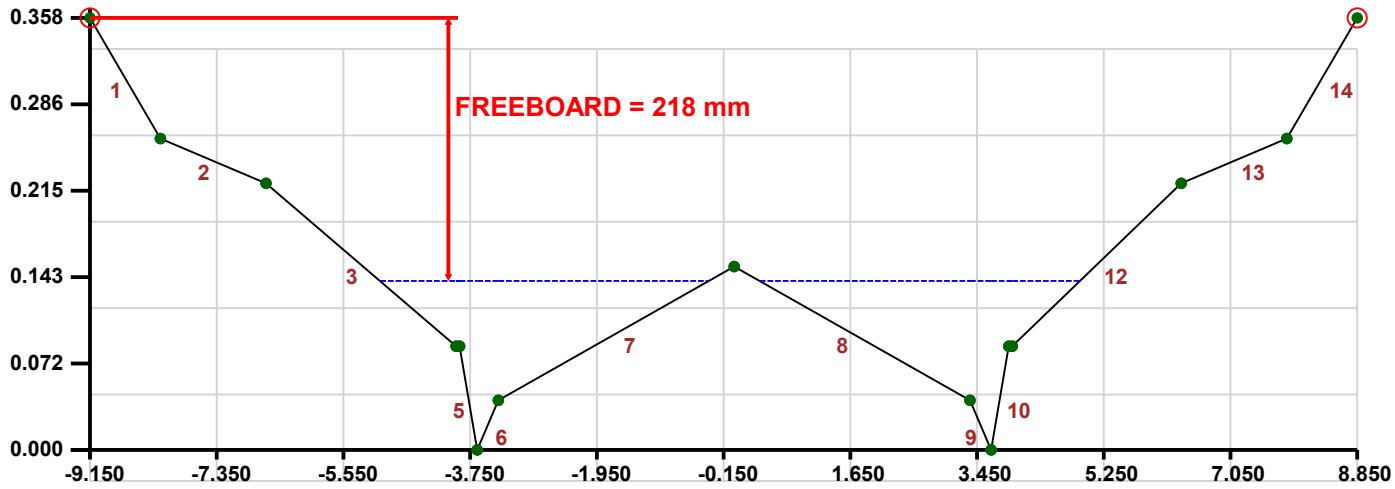
SEGMENT NO.	LEFT HAND POINT CHAINAGE (m)	LEFT HAND POINT R.L. (m)	RIGHT HAND POINT CHAINAGE (m)	RIGHT HAND POINT R.L. (m)	MANNING'S N
1	-7.650	0.345	-6.650	0.245	0.035
2	-6.650	0.245	-3.950	0.086	0.035
3	-3.950	0.086	-3.900	0.086	0.015
4	-3.900	0.086	-3.650	0.000	0.015
5	-3.650	0.000	-3.351	0.041	0.015
6	-3.351	0.041	0.000	0.152	0.015
7	0.000	0.152	3.350	0.041	0.015
8	3.350	0.041	3.650	0.000	0.015
9	3.650	0.000	3.900	0.086	0.015
10	3.900	0.086	3.950	0.086	0.015
11	3.950	0.086	6.350	0.221	0.035
12	6.350	0.221	7.850	0.258	0.015

4. CROSS-SECTION DATA: (continued)

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
13	7.850	0.258	8.850	0.358	0.015

PROJECT: 1176-1198 Taylors Rd - 16m Road Reserve
Print-out date: 29/04/2022 - Time: 12:26
Data File: 1176-1198 Taylors Rd - 16m Road Reserve.dat

1. CROSS-SECTION:



2. DISCHARGE INFORMATION:

100 year (1%) storm event

Total discharge = 0.28 cumecs

There is no pipe discharge
Overland / Channel / Watercourse discharge = 0.28 cumecs

3. RESULTS: Water surface elevation = 0.140 m

High Flow Channel grade = 1 in 120, Main Channel / Low Flow Channel grade = 1 in 120.

	LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
Discharge (cumecs):	0.000	0.285	0.000	0.285
D(Max) = Max. Depth (m):	0.000	0.140	0.000	0.140
D(Ave) = Ave. Depth (m):	0.000	0.052	0.000	0.052
V = Ave. Velocity (m/s):	0.000	0.598	0.000	0.598
D(Max) x V (cumecs/m):	0.000	0.084	0.000	0.084
D(Ave) x V (cumecs/m):	0.000	0.031	0.000	0.031
Froude Number:	0.000	0.840	0.000	N/A
Area (m^2):	0.000	0.476	0.000	0.476
Wetted Perimeter (m):	0.000	9.256	0.000	9.256
Flow Width (m):	0.000	9.216	0.000	9.216
Hydraulic Radius (m):	0.000	0.051	0.000	0.051
Composite Manning's n:	0.000	0.021	0.000	N/A
Split Flow?	-	-	-	Yes

4. CROSS-SECTION DATA:

	LEFT HAND POINT		RIGHT HAND POINT		
SEGMENT NO.	CHAINAGE (m)	R.L. (m)	CHAINAGE (m)	R.L. (m)	MANNING'S N
1	-9.150	0.358	-8.150	0.258	0.035
2	-8.150	0.258	-6.650	0.221	0.015
3	-6.650	0.221	-3.950	0.086	0.035
4	-3.950	0.086	-3.900	0.086	0.015
5	-3.900	0.086	-3.650	0.000	0.015
6	-3.650	0.000	-3.350	0.041	0.015
7	-3.350	0.041	0.000	0.152	0.015
8	0.000	0.152	3.350	0.041	0.015
9	3.350	0.041	3.650	0.000	0.015
10	3.650	0.000	3.900	0.086	0.015
11	3.900	0.086	3.950	0.086	0.015
12	3.950	0.086	6.350	0.221	0.035

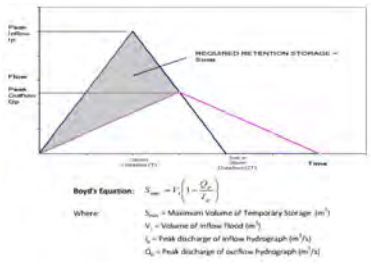
4. CROSS-SECTION DATA: (continued)

SEGMENT NO.	LEFT HAND POINT CHAINAGE (m)	LEFT HAND POINT R.L. (m)	RIGHT HAND POINT CHAINAGE (m)	RIGHT HAND POINT R.L. (m)	MANNING'S N
13	6.350	0.221	7.850	0.258	0.015
14	7.850	0.258	8.850	0.358	0.035

Project Name: 1176-1198 Taylors Rd
Project No.: 22-0098
Author: Omar Thaha
Date: 21/04/2022

Description: **Retarding Basin B**

Definitions



Input

Pre-Developed Catchment Modelling

AEP	Area Ha	Cy	Tc min	I mm/hr	∑ Ae Ha	Q m^3/s
63.20%	4.442	0.168	51.36	14.83	0.747	0.03
50%	4.442	0.179	47.69	17.85	0.794	0.04
20%	4.442	0.200	39.17	29.19	0.887	0.07
10%	4.442	0.210	35.05	38.54	0.934	0.10
5%	4.442	0.221	31.83	49.03	0.981	0.13
2%	4.442	0.242	28.45	64.95	1.074	0.19
1%	4.442	0.252	26.33	78.81	1.121	0.245

Post-Developed Catchment Modelling

AEP	Area Ha	Cy	Tc min	I mm/hr	∑ Ae Ha	Q m^3/s
63.20%	4.442	0.377	9.04	40.99	1.675	0.19
50%	4.442	0.401	9.04	47.17	1.779	0.23
20%	4.442	0.448	9.04	67.95	1.989	0.38
10%	4.442	0.471	9.04	83.32	2.093	0.48
5%	4.442	0.495	9.04	99.42	2.198	0.61
2%	4.442	0.542	9.04	122.34	2.407	0.82
1%	4.442	0.565	9.04	141.26	2.512	0.986

Storage AEP 1%
Release AEP 1%

Discharge 0.25 m^3/s

Storage Calculation

Volume Required 486.9 m^3 Okay

Dur (mins)	I (mm/hr)	C	A	Ae	I_p (m^3/s)	Q_p (m^3/s)	V_1 (m^3)	S_{max} (m^3)	Check
5.00	177.51	0.57	4.442	2.512	1.239	0.25	371.6	298.0	More Storage
6.00	166.74	0.565	4.442	2.512	1.164	0.25	418.9	330.5	More Storage
7.00	157.32	0.565	4.442	2.512	1.098	0.25	461.0	358.0	More Storage
8.00	148.98	0.565	4.442	2.512	1.040	0.25	499.0	381.2	More Storage
9.00	141.55	0.565	4.442	2.512	0.988	0.25	533.4	400.9	More Storage
10.00	134.89	0.565	4.442	2.512	0.941	0.25	564.7	417.6	More Storage
11.00	128.88	0.565	4.442	2.512	0.899	0.25	593.5	431.6	More Storage
12.00	123.43	0.565	4.442	2.512	0.861	0.25	620.1	443.5	More Storage
13.00	118.47	0.565	4.442	2.512	0.827	0.25	644.8	453.5	More Storage
14.00	113.94	0.565	4.442	2.512	0.795	0.25	667.8	461.8	More Storage
15.00	109.77	0.565	4.442	2.512	0.766	0.25	689.4	468.6	More Storage
16.00	105.93	0.565	4.442	2.512	0.739	0.25	709.6	474.1	More Storage
17.00	102.39	0.565	4.442	2.512	0.714	0.25	728.7	478.5	More Storage
18.00	99.10	0.565	4.442	2.512	0.691	0.25	746.8	481.9	More Storage
19.00	96.04	0.565	4.442	2.512	0.670	0.25	764.0	484.3	More Storage
20.00	93.19	0.565	4.442	2.512	0.650	0.25	780.3	485.9	More Storage
21.00	90.52	0.565	4.442	2.512	0.632	0.25	795.9	486.8	More Storage
22.00	88.02	0.565	4.442	2.512	0.614	0.25	810.8	486.9	Okay

Project Name: 1176-1198 Taylors Rd
Project No.: 22-0098
Author: Omar Thaha
Date: 21/04/2022

Description: **Interim Sediment Basin**

Fair and Geyer Equation – Equ 10.3 WSUD Stormwater Technical Manual (2004)

$$R = 1 - \left[1 + \frac{1}{n} \cdot \frac{v_s}{Q/A} \cdot \frac{(d_e + d_p)}{(d_e + d^*)}\right]^{-n} \qquad \lambda = 1 - 1/n; \quad n = \frac{1}{1-\lambda}$$

R = fraction of Initial Solids Removed = 80 - 90 % typ.
d_p = Depth of permanent pool
d_e = Extended detention depth above permanent pool
d^* = depth below permanent pool sufficient to retain particles (lower of 1.0m or d_p)
Q = design flow (Typically 3 month, 6 month or 1 year flow)
A = Basin Surface Area
n = turbulence parameter (see above) = 1 for significant short circuiting and turbulence; = 5 for insignificant short circuiting and turbulence
v_s = setting velocity for particles

Table 7.2 Settling velocities under ideal conditions (Maryland Department of Environment, 1987)

Classification of Particle size range	Particle diameter (µm)	Settling velocities (mm/s)
Very coarse sand	2000	200
Coarse sand	1000	100
Medium sand	500	53
Fine sand	250	26
Very fine sand	125	11
Coarse silt	62	2.3
Medium silt	31	0.66
Fine silt	16	0.18
Very fine silt	8	0.04
Clay	4	0.011

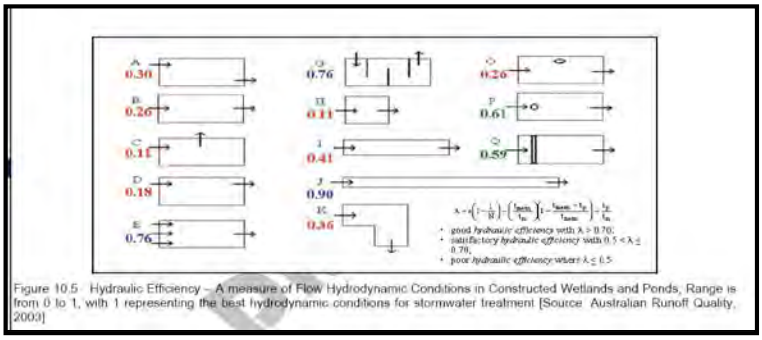


Figure 10.5 Hydraulic Efficiency – A measure of Flow Hydrodynamic Conditions in Constructed Wetlands and Ponds, Range is from 0 to 1, with 1 representing the best hydrodynamic conditions for stormwater treatment [Source Australian Runoff Quality, 2003]

Source: WSUD Engineering Procedures: Stormwater Technical Manual DRAFT 2004

Calculations

Target = very fine sand			Notes
Vs =	0.011	m/s	
d_e =	0.30	m	
d_p =	1.00	m	
d* =	1.00	m	1.0 or dp - whichever is smaller
(d_e+d_p) = (d_e+d^*)	1.0		
Q =	0.075	m^3/s	3-month
A =	219.0	m^2	NWL Surface Area
V_s = Q/A	32.12		
λ =	0.11		Pond Shape Assumption
n =	1.12		
Fraction of Initial Solids Removed			
R =	98%		
Usage	Interim		
C_a =	4.442	ha	
L_{sed} =	25	$m^3/ha/yr$	
L_{gp} =	0.4	$m^3/ha/yr$	
L_{total} =	25.4	$m^3/ha/yr$	
F_r =	1	years	
Storage Volume Required			
S_t =	110	m^3	
S_a =	111	m^3	Storage Achieved
PPvol	118	m^3	Perm Pool Volume
Frequency of Desilting			
F_o =	1.01	years	
Desilting Area			
Depth	500	mm	Max = 500mm
Area Req	221	m^2	

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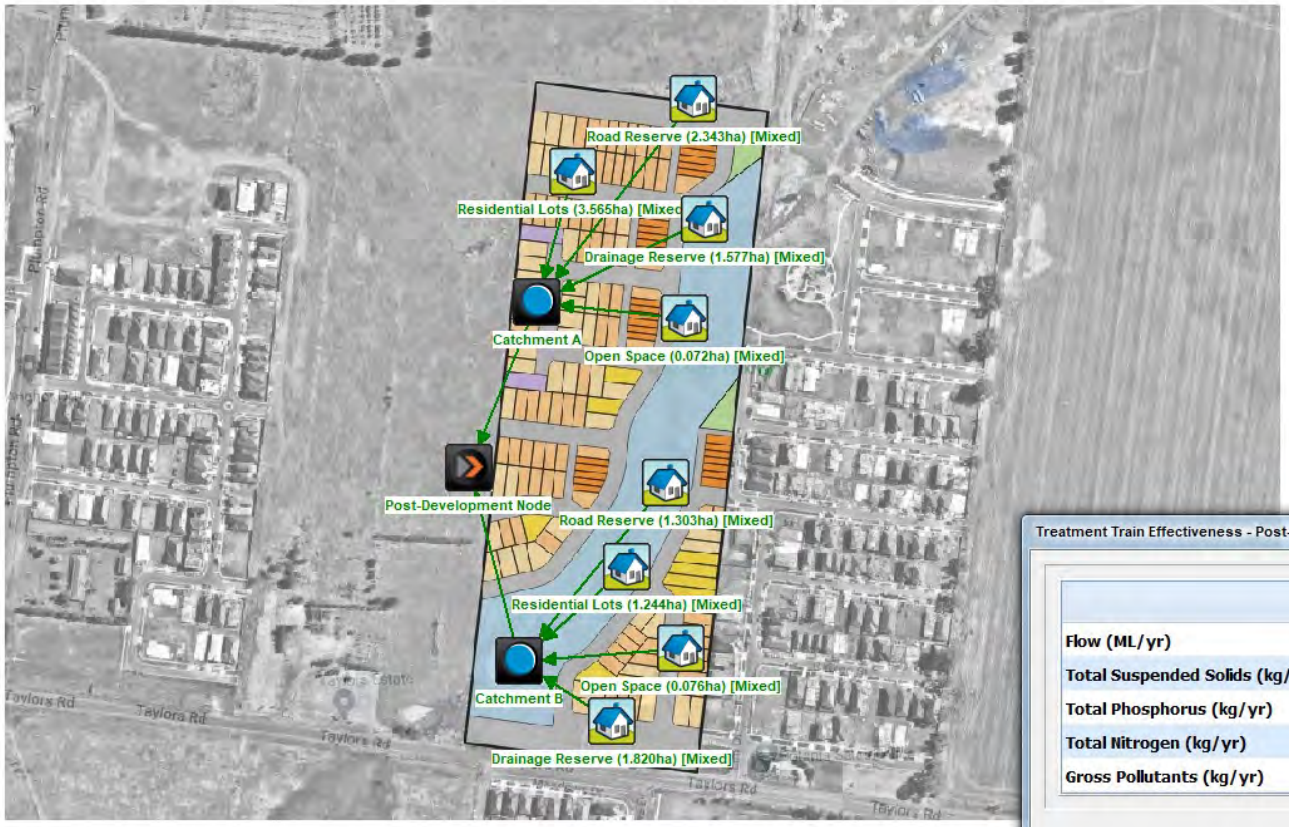
Treatment Train Effectiveness - Pre-Development Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	9.53	9.53	0
Total Suspended Solids (kg/yr)	1620	1620	0
Total Phosphorus (kg/yr)	4.52	4.52	0
Total Nitrogen (kg/yr)	32.3	32.3	0
Gross Pollutants (kg/yr)	230	230	0



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WILCON PROJECTS

Treatment Train Effectiveness - Post-Development Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	33.8	33.8	0
Total Suspended Solids (kg/yr)	3290	3290	0
Total Phosphorus (kg/yr)	7.95	7.95	0
Total Nitrogen (kg/yr)	71.8	71.8	0
Gross Pollutants (kg/yr)	1250	1250	0

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WILCON PROJECTS

Treatment Train Effectiveness - IWM Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	33.8	28.4	16
Total Suspended Solids (kg/yr)	2980	2030	31.7
Total Phosphorus (kg/yr)	7.63	5.82	23.7
Total Nitrogen (kg/yr)	73.1	58.7	19.7
Gross Pollutants (kg/yr)	1250	661	47.1

Appendix D PRE-DEVELOPMENT ADVICE AND CORRESPONDENCE

20 October 2021

Omar Mubarak Thaha
PEAKURBAN (VIC) Pty Ltd
Level 1/1-5 Nantilla Rd
Notting Hill VIC 3168

Dear Omar,

Proposal: Pre-development advice
Site location: Lot No 2, 1176-1198 TAYLORS ROAD FRASER RISE 3336

Melbourne Water reference: MWA-1219661
Date referred: 30/07/2021

Development Services Scheme: Olive Grove DSS

Thank you for your application requesting pre-development information for the above mentioned property. The following development advice is applicable to the property:

Drainage Agreement

Prior to the issue of a Statement of Compliance, the Owner must enter into and comply with an agreement with Melbourne Water Corporation, under the Water Act 1989, for the provision of drainage works and the acceptance of surface and storm water from the subject land directly or indirectly into Melbourne Water's drainage system. The agreement may include the following components.

Drainage Contributions

A drainage agreement usually includes the payment of drainage contributions, where a property is being developed. These contributions are used to recover the cost of constructing drainage works such as:

- Main drains, retarding basins, waterway improvements and flood mitigation works that will mitigate hydraulic impacts of the development/subdivision.
- Wetlands and Water Sensitive Urban Design WSUD elements to mitigate stormwater quality risks to Melbourne Water's drainage system.

The contributions are based on the increased load to the drainage system created by the development.

The site in question is located within Melbourne Water's Olive Grove DSS. Melbourne Water advises that the current residential contribution rates are:

- $139,276/Ha, comprising of a hydraulic charge of $67,950/Ha and a stormwater quality charge of $71,326/Ha

The stormwater quality charge can be reduced or removed by providing on-site

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treatment works, in-line with Melbourne Water's 'Stormwater Quality Offset Policy'. Please see the 'Stormwater Quality' section below.

It should be noted that contribution rates are subject to periodical review and hence the future contribution rate may be higher than the current rate provided here. For registered users, two months' notice of any change in rates is provided via email and on the Planning and Building page on Melbourne Water's website. Contributions payable will be calculated upon receipt of an application for *'Drainage conditions for a site'* along with a council referred/certified plan of subdivision.

Stormwater Quality SWQ

The Urban Stormwater Best Practice Environmental Management Guidelines require that runoff from all new developments (including redevelopments) are treated to comply with the following targets:

- 80% Total Suspended Solids reduction
- 45% Total Phosphorus reduction
- 45% Total Nitrogen reduction

Stormwater quality performance (targets) is assessed by using specialist software. Usually the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) is used for developments within schemes. Please refer to the end of this document for links to Melbourne Water's guidelines for the use of MUSIC.

Non-compliance with best practice objectives for stormwater quality will require the payment of a stormwater quality offset. Contributions collected for stormwater quality, can be applied for as a grant from Melbourne Water by council's to construct stormwater quality works elsewhere in the catchment.

Drainage Scheme Works

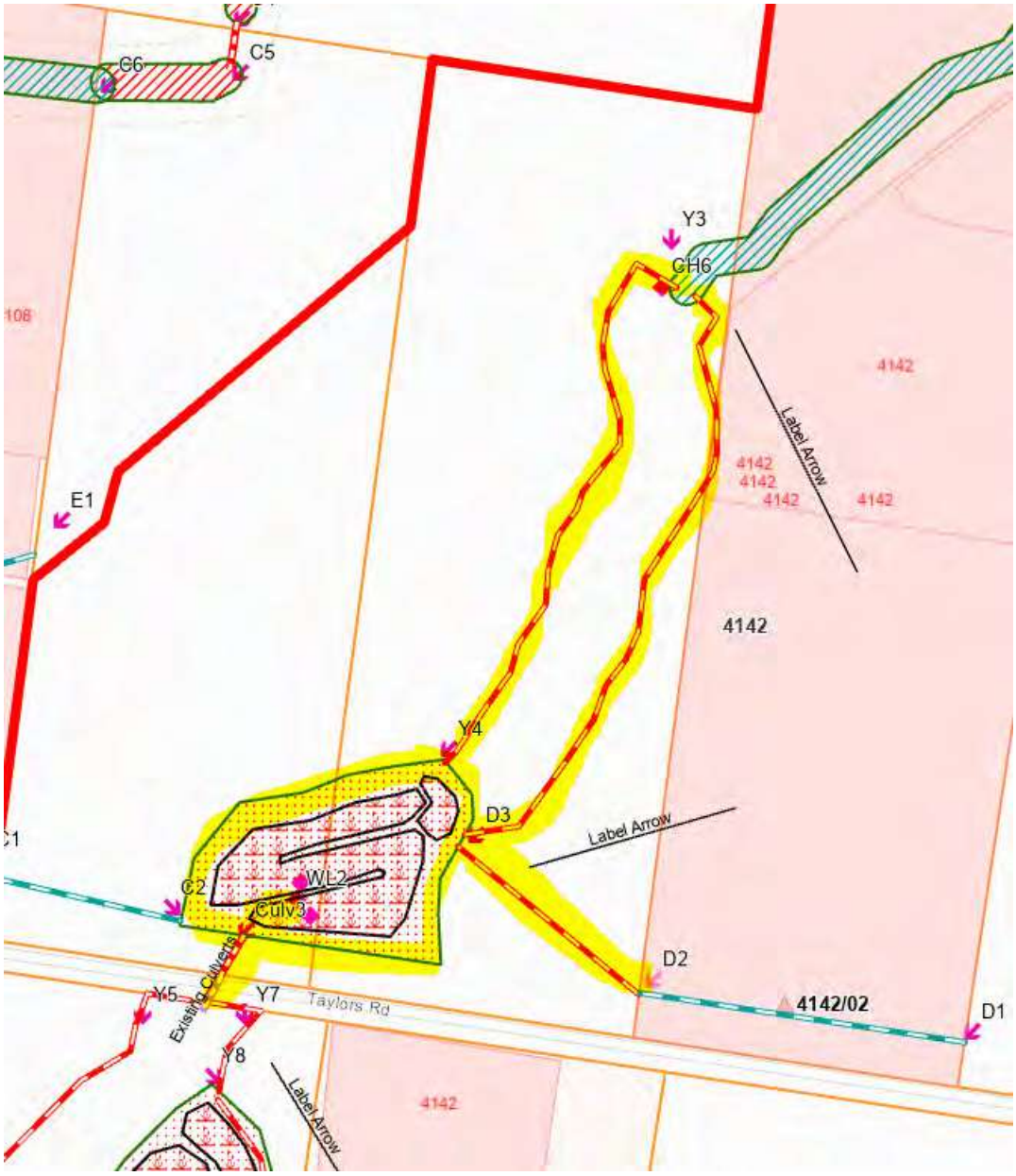
A drainage agreement usually requires the construction of permanent works in conjunction with the development as outlined by the appropriate Development Services Scheme. A review of the Olive Grove DSS, has identified that there are permanent Melbourne Water works to be constructed on this property.

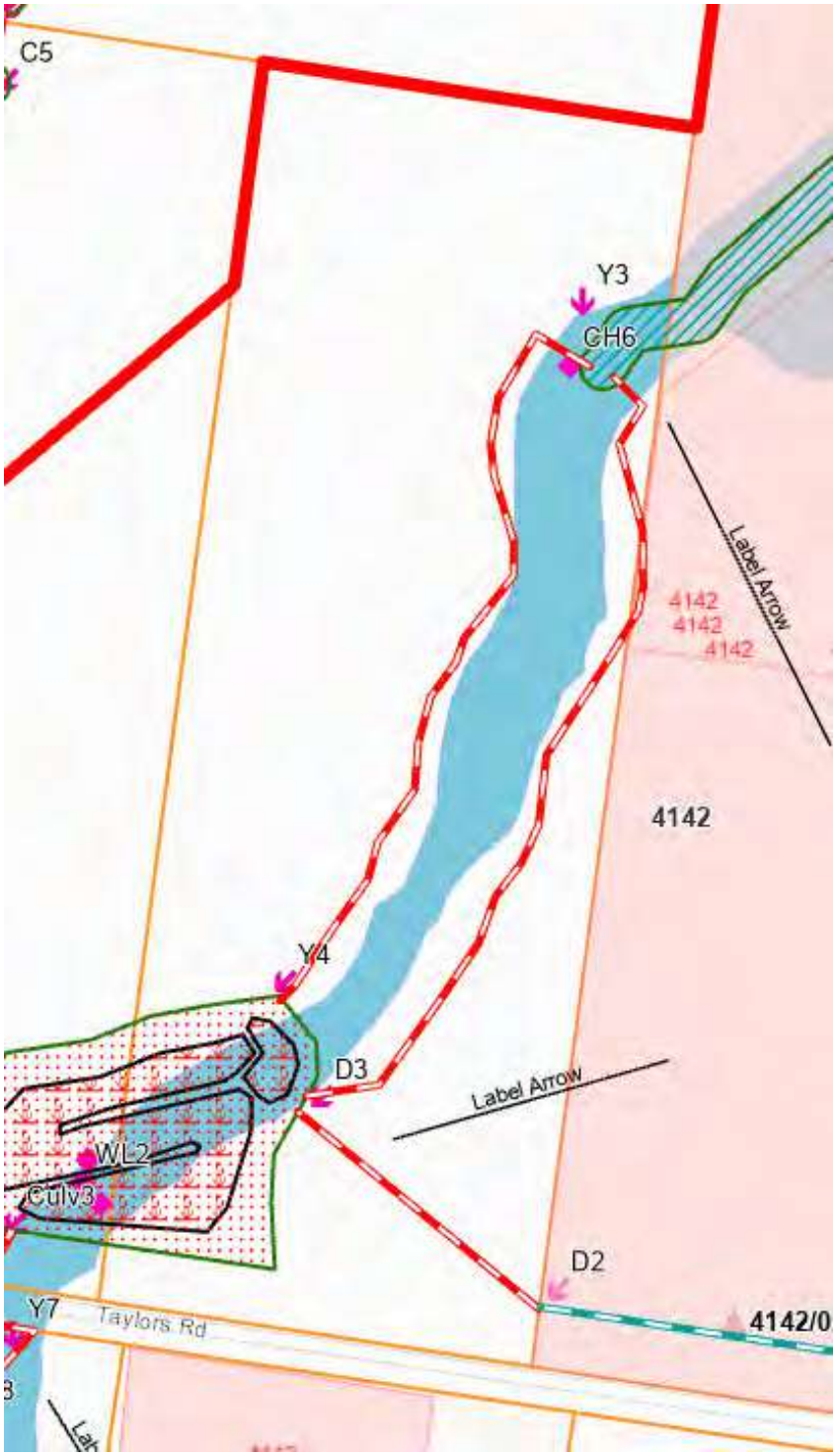
Such works may require that several land surveys be undertaken to determine the most efficient and environmentally friendly design outcomes. These may include, but are not limited to, a Flora & Fauna Assessment and an Archaeological Investigation, which would guide the most appropriate design. Design approval from Melbourne Water and any other relevant authorities will be required prior to commencement of the drainage works.

Please refer to the attached plans for a layout of the proposed works and any overland flow paths, which must be catered for by the development. The following table details the expected drainage works and design criteria for their sizing.

Node Ref.	Length(m)	Comments/Ownership
Y3-Y4	370m	100% AEP (1 year) MW pipeline
RB2	1.58ha	MW Retarding Basin. Design has been completed by E2 Design Lab and Taylors. This asset does not need to be a wetland and will now only be a retarding basin.
RB2LA	0.86ha	RB2 Land acquisition, 0.86ha as reimbursable, 0.72 ha within floodplain.
Culv3-Y5	55m	1% AEP (100 year) MW culverts

D2-D3 170m Q5 Council pipeline





Please be advised that this information may be refined and/or modified upon any application for a works or Non-works offer.

Specific Property Advice

- To achieve appropriate outfall for this development, temporary works will/may be required as part of the drainage agreement. If the development proceeds out of sequence then the developer must fund the costs of these temporary works.
- The developer must negotiate any temporary works with downstream landowner(s) to obtain a free draining outfall solution through their property/ies. Approval must be granted and forwarded to Melbourne Water before construction of the drainage works commences.
- Any connection to the Trib of Kororoit Creek will require approval from Melbourne Water, DELWP and any other relevant Authority. Any proposed works within the Conservation area will require approval from DELWP and any other relevant Authority Any proposed works, including identified Growling Grass Frog(GGF) assets, within the Conservation area will require the relevant approval from DELWP and any other relevant Authority;

- All new lots are to be filled to a minimum of either: 300m above the 1% Annual Exceedance Probability (AEP) flood level associated with an existing or proposed Melbourne Water asset or 600mm above the 1% AEP flood level associated with an existing or proposed Melbourne Water waterway, whichever is the greater.
- This site is subject to flooding, please find attached flood mapping for indicative areas of inundation.
- Melbourne Water requires evidence demonstrating that appropriate interim drainage solutions (retardation and sediment control) have been implemented to mitigate the risk to downstream landowners. Council acceptance of any temporary drainage infrastructure should be forwarded to Melbourne Water; and for any works proposed around our mains, drains and waterways, a separate application must be made direct to Melbourne Water's Asset Services Team.
- Prior to the issue of Certification of any associated Plan of Subdivision that sets the alignment and width of the future drainage reserve, Melbourne Water requires the submission of an appropriate functional design demonstrating that the waterway and waterway corridor meet the intent of the Olive Grove Development Services Scheme. The functional design submission should include cross sections and long sections of the waterway, accompanied by appropriate modelling.
- A Stormwater Management Strategy must be submitted via our website and accepted by Melbourne Water. The strategy must demonstrate the following:
    - The proposed alignment for any 1 in 5 year drainage infrastructure and any associated overland flow path directions for the 1 in 100 year ARI flood event,
    - That the lot layout adequately conveys the flows,
    - The details of the outfall/s for the development and calculations of the flows, volumes and flood levels for the 1 in 100 year ARI storm event within the property.
- Stormwater runoff from the subdivision must achieve State Environmental Protection Policy (Waters of Victoria) objectives for environmental management of stormwater as set out in the 'Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 1999'.

Overland Flow Paths

Melbourne Water expects that upon any application for certification of any subdivision plan associated with the property, due consideration must be given to the alignment of roads and reserves with any adjoining estates, to ensure continuity and provide uninterrupted conveyance of overland flows. These overland flow paths must be designed in accordance with the safety criteria outlined in the Standards and Specifications section on the Planning and Building of Melbourne Water's website.

Before starting any works, a separate application, direct to Melbourne Water, must be made for any new or modified storm water connection to Melbourne Water's drains or watercourses. Before accepting an application, evidence must be provided demonstrating that council has considered that it is not feasible to connect to the local drainage system.

Water Sensitive Urban Design WSUD

WSUD is a design process that enables localised collection and treatment of stormwater runoff. Melbourne Water acknowledges the potential for WSUD to be incorporated into the development to enable sustainable management of stormwater across the property and to compliment the social and environmental values of the area.

Melbourne Water recommends that initiatives such as sediment ponds, bio-filtration systems, grassed swales, grey water re-use, rainwater tanks and porous soils be considered in the design of the development. Stormwater runoff from paved areas can

also be a valuable resource for irrigating trees, grassed areas and landscaped garden beds.

Offer Application

Prior to any application for an offer of drainage conditions, Melbourne Water requests that you forward a drainage strategy demonstrating that the proposed drainage plan for the property coincides with the intent of Melbourne Water's Olive Grove DSS and the local Precinct Structure Plan, if relevant.

The following information should be included within the strategy:

- General site information
- Options for the proposed drainage of the property
- Consideration for Water Sensitive Urban Design

Advice Links

For further information on Melbourne Water's role in planning please refer to the following links:

- Contribution Rates: https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/drainage-schemes-and-contribution-rates-0-2

- Drainage Schemes: https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/drainage-schemes-and-contribution-rates

- Water Sensitive Urban Design- https://www.melbournewater.com.au/planning-and-building/stormwater-management/introduction-wsud

- Reducing Water Quality Contributions/Stormwater Offset Rate review - https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/drainage-schemes-and-contribution-rates-0-3

- Overland Flow Paths (These overland flow paths will need to be designed in accordance with the safety criteria outlined in the Standards and Specifications section of Melbourne Water's Planning and Building website found on https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/standards-and-specifications

- Working near or Connection to MW assets- https://www.melbournewater.com.au/planning-and-building/work-or-build-near-our-assets-or-easements

- Stormwater Quality: The Urban Stormwater Best Practice Environmental Management Guidelines require that runoff from all new developments (including redevelopments) be treated to comply with the following, 'Best Practice' standards criteria: Removal of 80% of the suspended solid annual load, 45% of total phosphorus and 45% of total nitrogen annual loads. http://www.publish.csiro.au/book/2190

Disclaimers

The feasibility information provided in this email is conceptual/indicative only and must be used in conjunction with an informed catchment analysis when undertaking the

detailed design.

Under the QA process the consultant is required to perform their own informed catchment analysis and calculations for the design of scheme assets which reflects the actual development and on ground conditions. As a part of the functional design process your calculations, assumptions, models and catchment analysis are to be submitted for our acceptance/records.

Please note that as schemes develop and Melbourne Water receives additional information, the conceptual/indicative advice you have been provided as part of the feasibility request may now be outdated. Under the QA process it is the responsibility of the consultant to certify that all information provided to Melbourne Water is correct having completed their own detailed catchment analysis.

This information is preliminary and forms no contractual agreement between your company and Melbourne Water. Melbourne Water reserves the right to alter any or all of the information provide in this letter.

For general development enquiries contact our Customer Service Centre on 131 722.

Regards,

Max Hendrikse
Urban Growth Services

Samara

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SALES WISE