



Integrated Water Management Plan

Project Name: 20-22 Atchison Street, St Leonards NSW 2065

Project Reference #131713

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Prepared For:

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1 Introduction

1.1 Purpose

This report has been prepared to support a State Significant Development Application (**SSDA**) SSD-87486461 for the site at 20-22 Atchison Street, St Leonards (**the site**).

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Housing and Infrastructure (DPHI) for assessment.

This report has been prepared in response to the requirements contained within the Secretary’s Environmental Assessment Requirements (**SEARs**) dated 9 July 2025 (SSD-87486461). Specifically, this report has been prepared to respond to the following SEARs:

Issue and Assessment Requirements	Supporting Documentation
11. Water Management <ul style="list-style-type: none"> • Detail the proposed drainage design and servicing infrastructure to be incorporated as part of the development (stormwater and wastewater). • Demonstrate how the development complies with council’s drainage requirements and identify proposed stormwater treatment and water quality management measures to minimise adverse environmental impacts. 	Integrated Water Management Plan
19. Flood Risk <ul style="list-style-type: none"> • Identify the flood planning area and level as set out in the relevant EPI and other supporting documents to determine; <ul style="list-style-type: none"> ○ The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, flood plain risk management studies and plans ○ The site access and egress routes ○ The potential effects of climate change ○ Any relevant provisions of the NSW Flood Risk Management Manual, and any other relevant guidelines • Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01. When determining the scope the category of the FIRA the requirements outlined in the FIRA guide must be considered. • Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures or Flood Emergency Response Plan). 	<u>If required:</u> Flood Impact and Risk Assessment (FIRA)

Table 1 Extract from Planning SEAR- application number SSD-87486461

1.2 Report Conditions

Meinhardt has prepared this report on the following conditions and qualifications:

- The report may only be used by the addressee for the purpose for which it was commissioned and in accordance with the corresponding Conditions of Engagement.
- The report may only be reproduced in full.
- The report shall not be considered as relieving any other party of their responsibilities, liabilities, or contractual obligations.
- The report is based on design workshops with the key project consultants for Town Planning submission.
- This document is based on information provided to Meinhardt by other parties (i.e. survey, architectural and geotechnical information). We take no responsibility and disclaim all liability in relation to the accuracy and completeness of such information, and any loss or damage that any party may suffer as a result of using or relying on such information.

2 The Site

The site occupies a strategic location in the St Leonards Crows Nest precinct and is in close proximity to the St Leonards railway station and Crows Nest Metro station and town centre.

The site is located at 20-22 Atchison Street, St Leonards. The site has a primary frontage to Atchison Street to the south, Mitchell Street to the east and Atchison Lane to the north. The site is located within the North Sydney Local Government Area (LGA) and is located approximately 4.5km north of the Sydney CBD.

The site comprises two allotments described as Lot 1 in DP740017 and Lot 120 DP564606 with a total area of 1374.4m². The site is located near the crest of a high ridgeline point, with Mitchell Street falling in elevation towards the north of the site and Atchison Street falls towards the east. The site location is outlined in Figure 1 below.

Existing development on the site includes:

- 22 Atchison Street is currently occupied by six storey commercial office building and 18-20 Atchison Street comprises a three-storey commercial building which is currently vacant. The buildings was constructed in the 1980s and has a primary frontage to Atchison Street and secondary vehicular access from Atchison Lane.
- 22 Atchison Street accommodates additional vehicular access from Mitchell Street.



Figure 1 Site Location from Nearmaps dated November 2023

3 Project Description

The application seeks development consent for an SSDA which will facilitate the redevelopment of the site for a shop top housing development using the recently introduced provisions under the Transit Oriented Development (TOD) reforms.

The project seeks consent for:

- Demolition of the existing buildings on site and tree removal.
- Construction of a 40-storey shop top housing development comprising:
 - 4-storey mixed-use (commercial, residential and retail) podium with a retail tenancy at ground level (Atchison Street frontage).
 - 36 levels of residential apartments and residential amenities within the tower.
 - Landscaping and public amenities along the Mitchell Street eastern elevation at ground level.
 - Consolidated vehicular and loading access from Atchison Lane.
 - 5 storey basement accommodating car, bicycle and motorcycle parking, storage, plant and end of trip facilities (EOTF) for the commercial component.
- Amalgamation of Lot 1 in DP740017 and Lot 120 DP564606
- 10% of residential floor space to be used for affordable housing via. monetary contribution.
- Storage areas, utilities and service provision.

Refer to Architectural Plans prepared by Cox Architecture appended to the Environmental Impact Statement.

4 Stormwater Management Framework

The following mandatory standards and regulations have been adopted:

- BCA National Construction Code 2022
- AS3500.3:2025 Plumbing and drainage, Part 3: Stormwater drainage
- Australian Rainfall & Runoff 2019

Additionally, the following guidelines have been considered as part of this report:

- North Sydney Council Development Control Plan 2013 Section 2 and 18
- Managing Urban Stormwater: Soils and construction – Volume 1 2004

As required by the North Sydney Council DCP above, the following are the objectives of stormwater management for this development.

- To mimic pre-development or natural drainage systems through the incorporation of WSUD on-site.
- To protect watersheds by minimising stormwater discharge and maximising stormwater quality.
- To minimise off-site localised flooding or stormwater inundation.

As required by the codes and standards listed above the following key minimum design standards are to be achieved.

- 5% AEP (20-year ARI) site flows shall be conveyed within the underground stormwater drainage network known as a “minor drainage system”.
- 1% AEP (100-year ARI) site flows shall be conveyed safely overland away from buildings to limit nuisance or flooding damage as part of the “major drainage system”.

5 Stormwater Management

5.1 General

The Site will require On-Site Detention in accordance with council DCP and direction and WSUD treatment to meet Best Practice Targets specified in the ESD SSDA Report by LCI Consultants for the project. Upon completion of construction, all proposed drainage infrastructure will need to be maintained in accordance with a routine maintenance schedule throughout the duration of the development's lifecycle. This will include inspection and clearing out of stormwater pits following large rain events, and quarterly.

The Stormwater Management Strategy has been developed to encompass the four key principles described below and shall be read in conjunction with the Civil Siteworks Plan:

1. Overland Flow and Flooding
2. Drainage Network Design
3. Stormwater Treatment
4. Maintenance

5.2 Overland Flow and Flooding

Due to the significant falls from south to north, there are two different Finished Floor Levels for the main building with the southern area at RL92.000 and the northern area RL93.400. Surface runoff will be directed away from the buildings and internally collected where feasible, any 1% AEP flows will easily fall towards the designated overland outlet. The ramp at the North of the site is uncovered, the trench grate capturing the flows to be sized to the 1% AEP storm event and pumped to the OSD tank. The 1% AEP flows are to be directed to surcharge pit to the North West corner of the site, with a kerb and channel to prevent overtopping to neighbouring site. The overland flow path from the surcharge pit is to Atchison Lane.

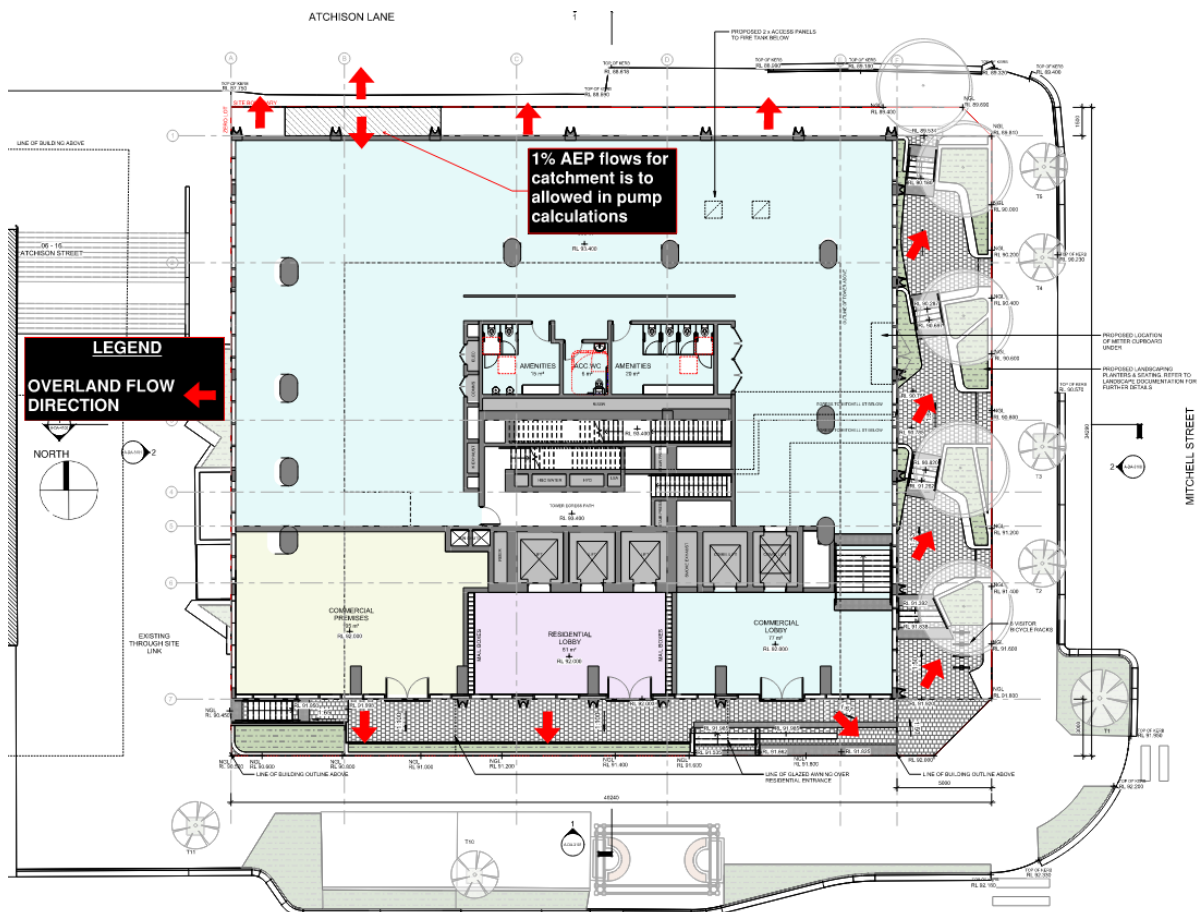


Figure 2 Anticipated overland flow path of proposed site

Based on the floodplain risk management study and plan conducted by GRC Hydro for the North Sydney Local Government Area, this site is not within a flood zone area at a Probable Maximum Flood Design Event, refer to Figure 3. This study has also taken into account Climate Change and has determined, as per Section 4.8.1 of the study, "the analysis shows that the majority of locations, depths of flooding will increase by around 0.1m, under a long term planning horizon of 2090, with a worst case greenhouse gas concentration. The relatively small magnitude of this 0.1m increase means that increased flood risk due to climate change, while significant, does not require specific risk management measures."

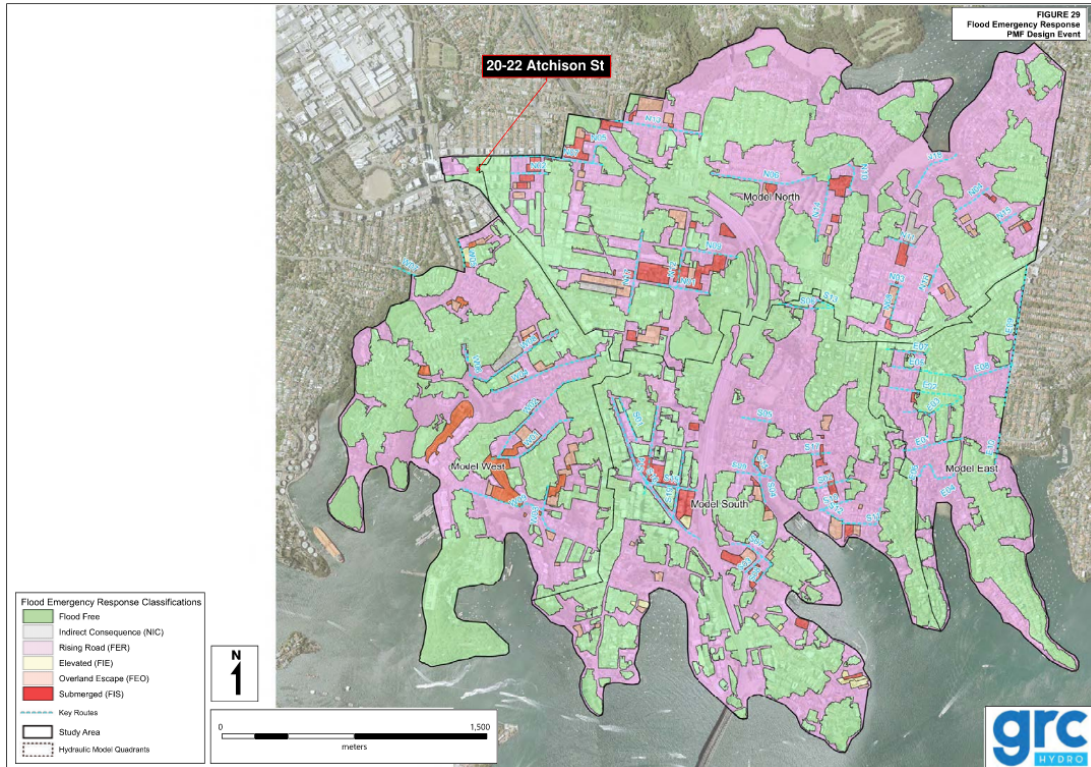


Figure 3 (Figure 29) Flood Emergency Response Probable Maximum Flood Design Event from North Sydney LGA floodplain risk management study and plan by GRC Hydro dated 10 November 2022

5.3 Existing Drainage Infrastructure

BYDA information show council pit and pipes along Atchison Street however it appears the outlet is a singular circular pipe outlet. Looking at google street view, there appears to be another 2 RHS connecting to the Kerb and channel southwest of the site and also 2 RHS outlets to the northwest of the site along Atchison Lane.

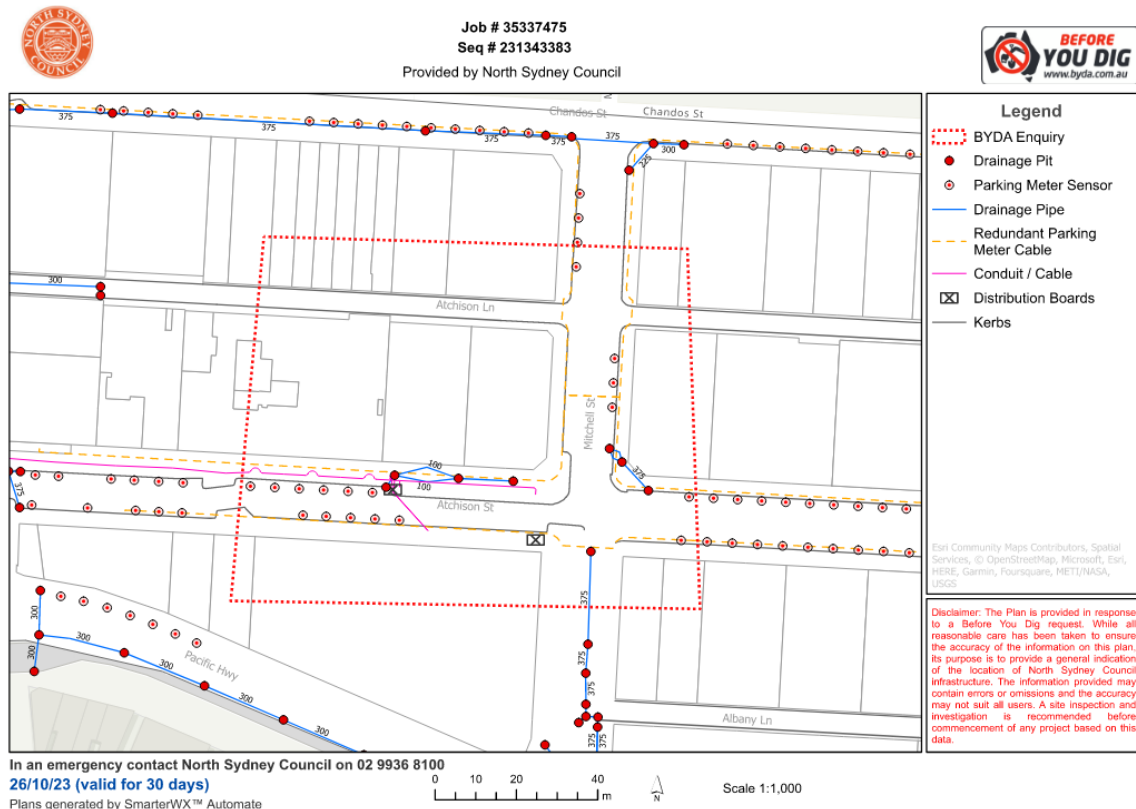


Figure 4 BYDA extract of existing stormwater assets dated 26 October 2023

5.4 Drainage Network Design

- **Stormwater Connection:** The discharge point for the site is proposed to be 2x 200X100 RHS to the kerb & gutter at Atchison Lane. This is inline with existing conditions as per section 5.3.
- **Paved Areas:** A network of interconnected grated inlets will be used to capture and convey surface runoff efficiently from paved areas like walkways and access roads towards designated detention tanks and treatment units. Paved areas should have sufficient fall to prevent ponding.
- **Stormwater Drainage Infrastructure:** This shall be designed to convey runoff generated from 5% AEP storm to the outfall location for the site as part of the 'minor drainage system'. Minimum 150mm freeboard will be maintained within grated pits and pit inlets and shall be designed with a blockage factor as required by AR&R2019, being 20% for on-grade and 50% for sag pits. Landlocked area drainage to be designed to allow 1% AEP flows. Flows exceeding the 5% AEP up to the 1% AEP as part of the 'major drainage system' shall be conveyed safely through overland flow path as shown in sketch in Section 5.2 Figure 3.

5.5 Water Quantity Assessment

On-Site Detention is required to reduce catchment flows to the required permissible site discharge (PSD) to be confirmed by Council during the SSDA process. For the purposes of this report, the PSD flows have been calculated based on council consultation through email in 2023 and existing conditions on site. An OSD size has been calculated using a DRAINS modelling using the assumed PSD flow and detention sized accordingly (refer to Appendix 8.4 for calculations and references). The OSD is proposed to be a reinforced concrete tank suspended under the ground floor with a sump at the outlet, orifice plate and trash grate and overflow measures in the form of a surcharge pit at the boundary. The discharge velocity shall not exceed the depth-velocity of 0.4m²/s as per the ARR guidelines.

5.6 Water Quality Assessment

Stormwater Treatment System: Given the nature of the multipurpose space on level 4 and ground level, there's potential for gross pollutants and litter to accumulate around these areas. To mitigate these risks and prevent pollutants from entering the drainage system and causing blockages, the following treatment is proposed:

- **Rainwater Harvesting Tanks:** The rainwater from the non-trafficable roofs of the main building will be collected to the 10kL rainwater tank and be reused through a mixture of toilet flushing (0.3kL/day) and irrigation (82.96kL/year). Retention of water will reduce the amount of water requiring to be treated.
- **GPT (Primary Treatment):** GPTs will act as primary treatment for the drainage network using proprietary products. This will capture and remove gross pollutants before they enter the drainage system. These traps can be designed as litter basket traps or other appropriate configurations based on site-specific considerations. However, GPT have limitations and may not excel at effectively removing fine particulates and dissolved pollutants which can be removed by an advanced filtration systems.
- **Psorb StormFilter Treatment Unit:** The proprietary units 490 Psorb StormFilter system will act as second line of defence in the filtration chain. It will focus on the pollutants that evade GPT. The membrane cartridges within a StormFilter treatment unit are designed to capture finer silt, organic matter, metals, dissolved substance and hydrocarbons.

This multi-step approach reduces pollutants entering waterways, improves overall water quality, mitigates flooding risks through flow control, and enhances the environment by providing a healthier ecosystem through filtration. This complies with the WSUD objectives of the project which are to Best Practice Targets:

- 85% Total Suspended Solids Reduction
- 65% Total Phosphorus Reduction
- 45% Total Nitrogen Reduction
- 90% Gross Pollutant Reduction

A MUSIC model to highlight the effectiveness of this stormwater strategy has been attached in Section 8.5.

5.7 Maintenance Plan

A Maintenance Plan shall be established to ensure regular maintenance of all stormwater infrastructure will be conducted for the lifetime of the system to ensure that the intended function, treatment, and reduction targets are maintained in accordance with North Sydney Council.

This will include routine inspections quarterly for stormwater assets, as well as after large rain events. Cleaning may be necessary and will be determined at each inspection.

The proprietary filtration units – GPT and StormFilter units – will be maintained in accordance with the manufacturer's requirements. The StormFilter may need the cartridges to be replaced generally biennially depending on the condition during inspection.

6 Erosion and Sediment Control

All erosion and sediment control measures are to be in accordance with 'Managing Urban Stormwater: Soils and construction – Volume 1' (Landcom 4th edition, 1 March 2004) commonly known as the 'Blue Book'.

Erosion and sediment control devices and procedures will be put in place during construction to ensure that stormwater runoff will be collected and diverted around the disturbed site with sediments removed prior to discharge to the existing stormwater system. The proposed controls may include:

- Silt fences at the downstream boundary of the construction zone;
- Wash down and diversions at temporary vehicle entrances/exits to the construction zone;
- Sedimentation trap/basin with outlet control and overflow;
- Diversions to prevent upstream runoff entering the construction zone; and
- Sandbag sediment traps and geotextile filters to protect existing stormwater pits and inlets.

The erosion controls and sediment collection devices will need to be modified and adjusted by the contractor to suit building work stages and programme as it progresses. All erosion and sediment control measures will be constructed in accordance with Managing Urban Stormwater: Soils and construction – Volume 1' (Landcom 4th edition, 1 March 2004) and 'Approved Methods for the Modelling and Assessment of air pollutants in NSW' (EPA). Refer to Section 8.1 for Sediment & Erosion Control Plan and details.

7 Conclusion

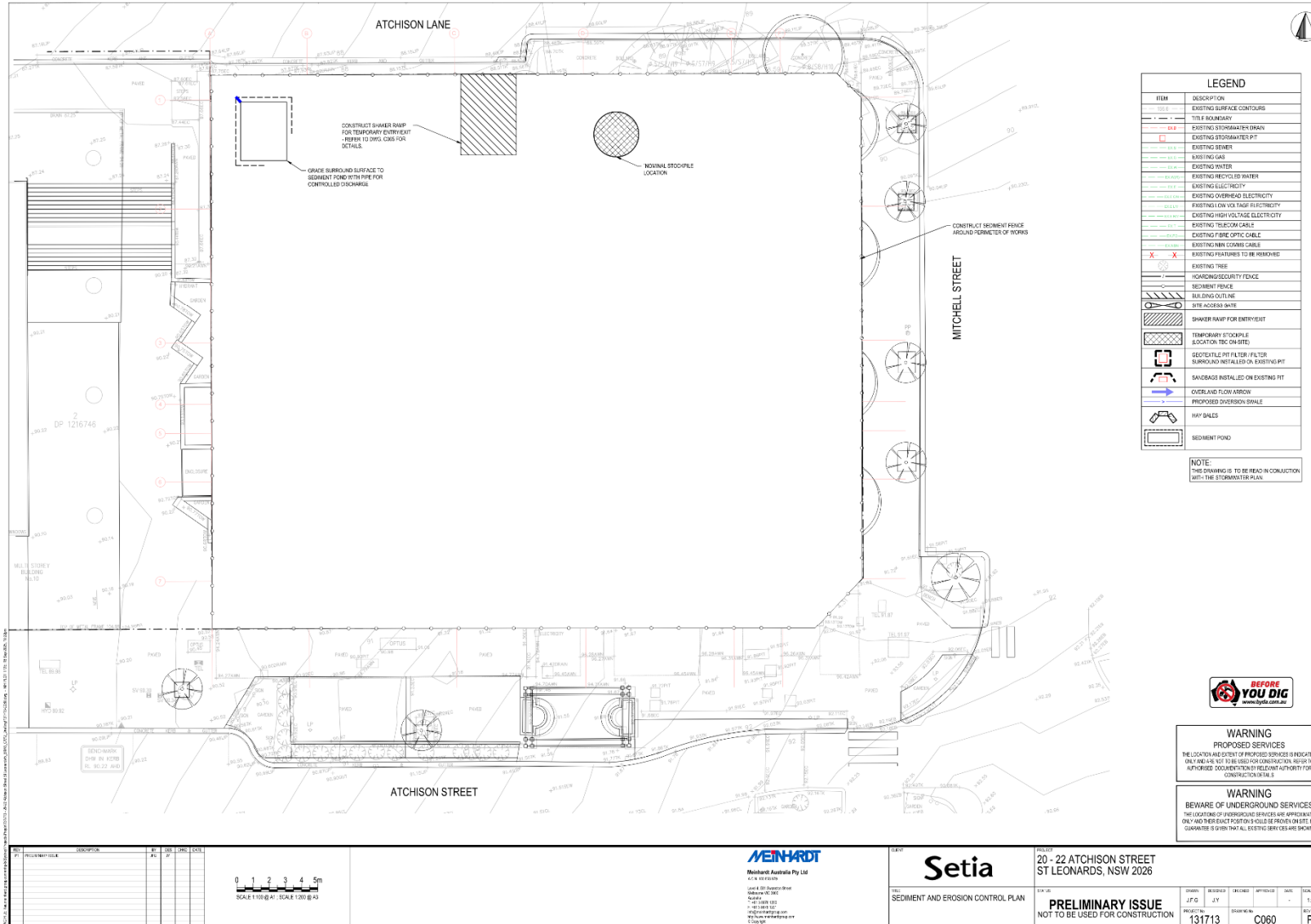
The Stormwater drainage system has been designed in accordance with relevant standards and North Sydney Council requirements, therefore SEARs requirement 11. Water Management has been addressed. As shown in the North Sydney LGA-Wide Floodplain Risk Management Study and Plan, the site is not within a flood zone area and relevant overland flow path and flood mitigation measures have been highlighted therefore SEARs requirement 19. Flood Risk has been addressed.

The recommendations outlined for this Integrated Water Management Plan are summarised as follows:

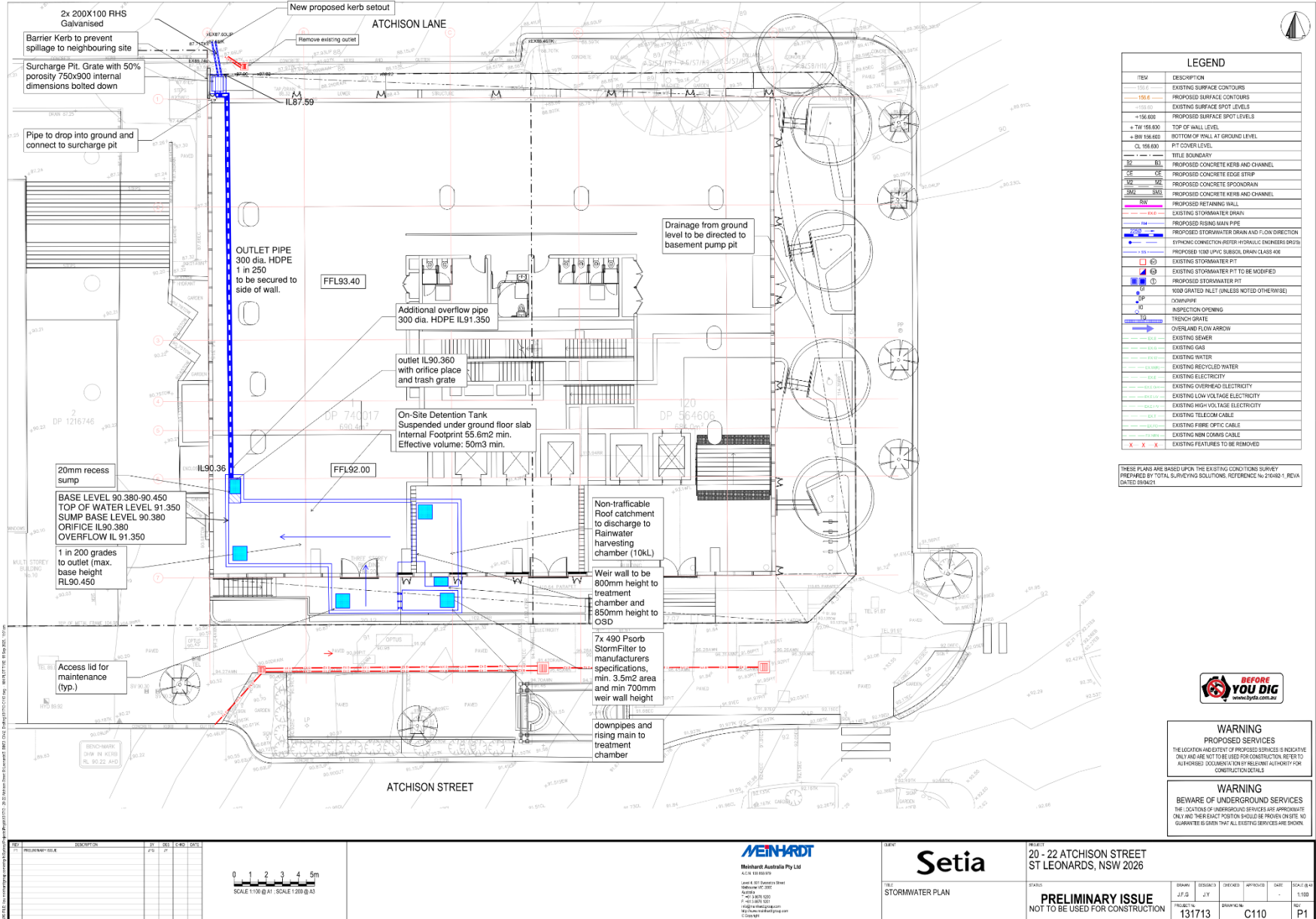
- **Stormwater connection:** There will be one point of discharge for the property and it is to connect to the 2x RHS at Atchison Lane from a grated surcharge pit.
- **Drainage Capacity:** The underground drainage infrastructure will be designed to handle storm events with a 5% Annual Exceedance Probability (20-year Average Recurrence Interval). This ensures the system can effectively manage heavy rainfall to Australian and industry standards.
- **Overland flow:** Surfaces are to be graded away from the building where possible, where unable to, drainage capturing the localised area catchments are to be designed to cater for the 1% AEP flows.
- **Detention Volume:** The 2x RHS outlets will provide the designated PSD for this site to size detention volume required which equates to approximately 50m³ to be provided through a concrete on-site detention tank.
- **WSUD treatment:** The ESD SSDS report by LCI Consultants specifies a minimum Best Practice Targets to be achieved through a 10kL rainwater harvesting tank, gross pollutant traps and proprietary treatment units.
- **Maintenance Plan:** Maintenance inspections should occur quarterly and after major storm events and subsequent cleaning should be complete as required and to manufacturers specifications.

8 Appendices

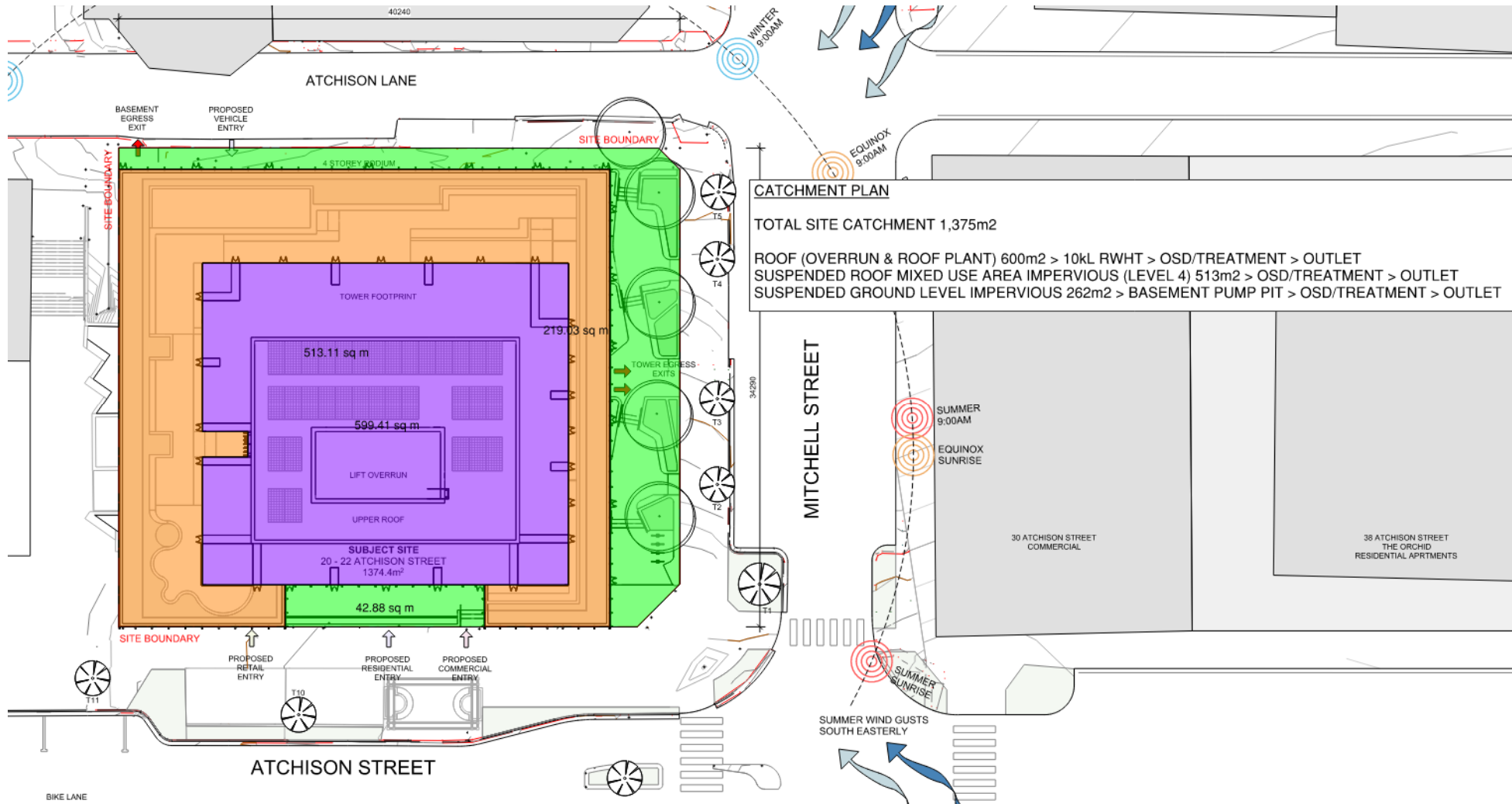
8.1 Sediment & Erosion Control Plan

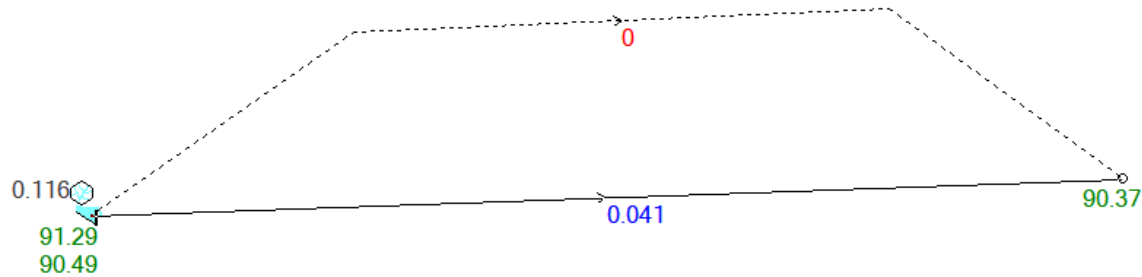


8.2 Stormwater Plan



8.3 Catchment Plan





DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Kerb & channel	90.37			0			

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
Catchments	0.116	0.116		0	5	8	0 1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P OSD	0.041	1.01	91.129	90.37	1% AEP, 25 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
			Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
Overland flow	0	0	1.479	0		0	0	0

DETENTION BASIN DETAILS

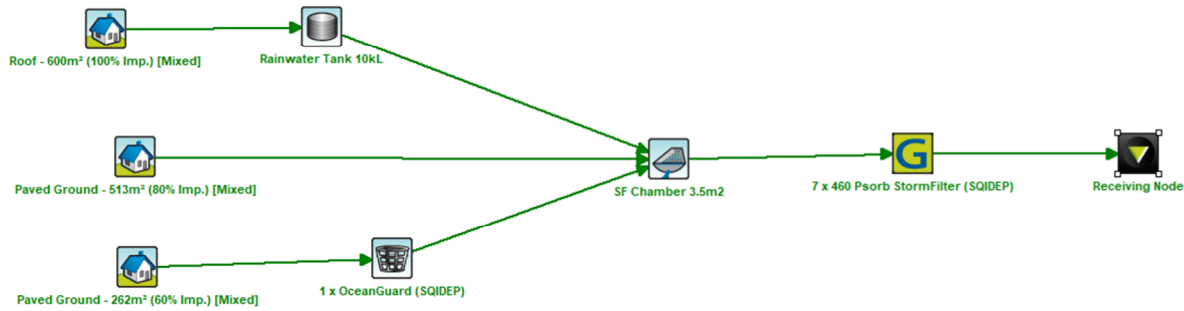
Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD1	91.29	47.1	0.041	0.041	

Run Log for DRAINS Lite v2023.11.8726.15750 - 131713 StLeonards SWD 250923

{\color{red}\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS Lite v2023.11.8726.15750 - 131713 StLeonards SWD 250923.drn run at 11:34:53 on 23/9/2025 using Watercom Drains v2023.11.8726.15750

Flows were safe in all overflow routes.

8.5 MUSIC Results



Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.5	1.33	10.9
Total Suspended Solids (kg/yr)	149	21.4	85.7
Total Phosphorus (kg/yr)	0.328	0.0723	77.9
Total Nitrogen (kg/yr)	3.26	1.16	64.4
Gross Pollutants (kg/yr)	36.8	0	100