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# SURFACE WATER MANAGEMENT PLAN

Mooretown Phase 2

Fingal County Council

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APPENDICES

Appendix A – Site Plan Layout (25051-AKM-XXXX-XX-DR-C01-501001)

Appendix B – Settlement Tank Specification

## 1.0 Introduction

This Surface Water Management Plan has been prepared by AKM Design Group for Fingal County Council. This plan forms part of a comprehensive suite of environmental controls within the Construction Environmental Management Plan (CEMP) for the proposed residential development on Mooretown.

### 1.1 Context

This report sets out to demonstrate how pollution of watercourses during and after the construction phase will be prevented and/or mitigated in accordance with IFI Publication 2016 "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.

### 1.2 Site Location and Description

The proposed development comprises a residential scheme on lands at Mooretown, Swords, Dublin.



Figure 1: Site Layout showing the development

### **1.3 Proposed Development**

The proposed development consists of 360 no. residential units; a mix of houses, own-door duplexes, and apartments arranged in urban blocks ranging from 2- to 5-storeys, at a net density of 41 dwellings per hectare. A 2-storey crèche of c. 670 sq.m is proposed at the centre of the site. Supporting infrastructure proposed includes 580 no. car parking spaces (resident and visitor), 1,009 no. cycle parking spaces, public open space, communal amenity space, pedestrian and cycle links, hard and soft landscaping, connections to all utilities, and all associated and enabling site works.

### **1.4 Surface Water Impacts**

Surface water run-off from surface construction activities has the potential to become contaminated. The main contaminants arising from construction activities include:

- Suspended solids: arising from ground disturbance and excavation.
- Hydrocarbons: accidental spillage from construction plant and storage depots.
- Faecal coliforms: contamination from coliforms can arise if there is inadequate containment and treatment of onsite toilet and washing facilities; and
- Concrete/cementitious products: arising from construction materials.

These pollutants pose a temporary risk to surface water quality for the duration of the project if not properly contained and managed.

### **1.5 Proposed Construction Works**

The overall proposed development generally consists of the following works:

- Site preparation.
- Erection of security fencing/perimeter fencing.
- Setting up a secure site compound including wash down area.
- Site clearance including topsoil stripping.
- Construction of infrastructure including roads, drainage, and services.
- Construction of residential units.
- Reinstatement landscaping.

## 2.0 Mitigation Measures

The surface water from the subject site will outfall into the neighbouring / existing drainage networks. The following Mitigation Measures are to address potential impacts on water quality and are required to protect any ultimate outfall of the proposed sites surface water. All works will be undertaken with reference to the following guidelines:

- CIRIA C532: Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (Masters-Williams et al., 2001).
- CIRIA C692: Environmental Good Practice on Site, (Audus et al., 2010)
- BPGCS005: Oil Storage Guidelines.
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Technical Guidance (Murnane et al., 2006a).
- CIRIA C648: Control of Water Pollution from Linear Construction Projects: Site Guide (Murnane et al., 2006a).
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).
- Guidelines for Planning Authorities – Architectural Heritage Protection – Guidance on Part I of the Planning and Development Act 2000. (Part 2, Chapter 7) and ICOMOS Principles.

The mitigation schedule presented within Table 1 summarises measures that will be undertaken in order to reduce impacts on ecological receptors within the zone of influence of the proposed development.

No.	Risk	Possible Impact	Mitigation	Result of Mitigation
1	Hydrocarbons from the car parking area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Designated parking at least 50m from any watercourse.	Ensures no soil disturbance or hydrocarbons leak near the aquatic zone
2	Pollutants from site compound areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The site compound will be located at least 50m from any watercourse.	Prevents pollution of the aquatic zone from toxic pollutants

3	Pollutants from material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Fuels, oils, greases, and other potentially polluting chemicals will be stored in bunded compounds at the Contractor's compound or at a location at least 50m from any body of water. Bunds are to be provided with a 110% capacity of the storage container. Spill kits will be always kept on site and all staff trained in their appropriate use. Method statements for dealing with accidental spillages will be provided to the Contractor for review by the Employer's Representative.	Prevents contamination of aquatic zone by toxic pollutants
4	Concrete/ cementitious materials entering the watercourse from washdown	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	A designated wash-down area within the Contractor's compound will be used for cleaning any equipment or plant, with the safe disposal of any contaminated water.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off-site
5	Concrete/ cementitious materials entering the watercourse from concrete pours.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Pouring of cementitious materials will be carried out in the dry.	Prevents contamination of aquatic zone by suspended solids or pollutants, ensures invasive species material is not transported off-site
6	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Spill kits will contain 10 hr terrestrial oil booms (80mm diameter x 1000mm) and a plastic sheet, upon which contaminated soil can be placed to prevent leaching to groundwater	Prevents contamination of aquatic zone by petrochemicals	Leaching of contaminated soil into groundwater.
7	Pollutants from equipment storage/ refuelling area entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	Any refuelling and maintenance of equipment will be done at designated bunded areas with full attendance of plant operative(s) within contained areas at least 50m from any watercourse	Prevents contamination of aquatic zone by petrochemicals
8	Runoff from exposed work areas and excavated material storage areas entering the watercourse.	Water quality impacts Reduction in habitat quality Mortality of aquatic key ecological receptors/qualifying interests	The Contractor is to prepare a site plan showing the location of all surface water drainage lines and proposed discharge points to the sewer. The plan will include the location of all surface water protection measures, including monitoring points and treatment facilities.	Prevents contamination of aquatic zone by suspended solids or pollutants.

Table 1 - Schedule of Surface Water Mitigation Measures

### **3. Construction Stage**

The construction program and duration are between 24 and 36 months once construction has begun.

The proposed potential pollution mitigation measures outlined below will be implemented in accordance with 'CIRIA C532 – Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors' – CIRIA-2001.

#### **3.1 Roles and Responsibilities**

##### **3.1.1 Main Contractor**

The main Contractor will be responsible for implementing the project Construction Surface Water Management Plan (CSWMP) during the construction phase. The appointed person from the Main Contractors team will be appropriately trained and assigned by the authority to instruct all site personnel to comply with the specific provisions of the CSWMP. At the operational level, a designated person from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the operations stated in the CSWMP are performed on an ongoing basis.

Copies of the Construction Surface Water Management Plan will be made available to all relevant personnel on-site. All site personnel and sub-contractors will be instructed about the objectives of the CSWMP and informed of the responsibilities which fall upon them because of its provisions.

The responsibilities of the appointed person will be as follows:

- Updating the CSWMP as necessary to reflect activities on site.
- Advise site management (including, but not limited to, the site Construction Manager) on environmental matters.
- Ensure pre-construction checks for protected species, if any, are undertaken.
- Review the method statement of the sub-contractors to ensure that it incorporates all aspects of CSWMP.
- Provide toolbox talks and other training and ensure understanding by all involved of all mitigation measures.
- Assess the effectiveness of mitigation, check the weather forecast and site conditions where trigger levels are required.
- Ensure adherence to the specific measures listed in the Planning Conditions.
- Advise upon the production of written statements and site environmental rules and on the arrangements to bring these to the attention of the workforce.
- Investigate incidents of significant, potential, or actual environmental damage, ensure corrective actions are carried out and recommend means to prevent recurrence.
- Be responsible for maintaining all environmental-related documentation.
- Ensure the plant suggested is environmentally suited to the task in hand.

### **3.1.2 Monitoring**

The Developer and their consultants will be monitoring the site operations as the works progress and ensuring the necessary measures are put in place for the management of surface water which are deemed effective.

The following is a list of inspections and monitoring to be carried out during the works relating to surface water management. The developers site team including Project Manager, Foreman and Environmental Clerk of Works/ Engineer will carry out these inspections:

- Inspect the Principal Control Measures outlined in this plan on a weekly basis.
- Inspect surface water treatment measures (ponds, tanks, sandbags, etc.) on a daily basis
- Daily visual inspection of all discharges of measures implemented within the site daily including excavation, deposition, pumping out or concreting works are on-going in the vicinity
- Visual inspections of the adjacent stream will be carried out and observed on a regular basis. The visual inspection will be carried out by the Project Manager or Foreman, who is aware of the importance of the sensitive nature of the receiving watercourses.
- Wheel wash facilities shall be inspected on a weekly basis
- Borrow Pits shall be inspected daily while in operation and on a weekly basis thereafter.
- Material Deposition Areas shall be inspected daily while in operation and on a weekly basis thereafter.
- Stockpiles shall be monitored daily while being filled or emptied and otherwise on a weekly basis.
- Concrete operations shall be supervised and designated concrete washing out facilities shall be inspected on a daily basis
- Site Compounds shall be inspected on a weekly basis

## **3.2 Pre-Construction Pan**

### **3.2.1 Designated Storage Area & Site Compound**

A site compound(s) including offices and welfare facilities will be set up by the developer / main contractor in locations to be decided within the subject site. The main contractor will be required to schedule delivery of materials daily. The main contractor will be required to provide a site compound on the site for the secure storage of materials. Measures will be implemented throughout the construction stage to prevent contamination of the soil and surrounding watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

### **3.3 Construction Plan**

#### **3.3.1 Vehicle Washdown**

Where possible, and subject to license, the permanent connection to the public foul sewer will be used temporarily for the construction phase. Vehicle wash-down water will discharge directly, via suitable pollution control and attenuation, to the foul sewer system. If this connection is not permitted, then wastewater generated will be required to be stored for collection and treatment off-site at a suitable waste disposal facility.

#### **3.3.2 Surface Water Run-off**

On-site treatment measures will be installed to treat surface water run-off from the site prior to discharge to the receiving surface water sewer. This treatment will be achieved by the construction of settlement tanks/ponds, in conjunction with the installation of proprietary surface water treatment systems including class 1 full retention petrol interceptors, and spill protection control measures. Settlement tanks/ponds will be sized to deal with surface run-off and any groundwater encountered.

## **4. Operational Stage**

The design of the surface water network is detailed in the infrastructural report. The main items of relevance to this report are outlined in the following sections.

### **4.1 SuDS**

Sustainable Drainage System (SuDS) are a collection of water management practices that aim to align modern drainage systems with natural water processes. SuDS facilities are designed to prevent pollution of streams and rivers and to slow down runoff from sites, therefore helping to prevent downstream flooding and improve water quality. This closely mimics natural catchment behaviour where rainfall either infiltrates through the soil or runs off slowly over the ground surface to the nearest watercourse. This is known as the “treatment train” approach. SuDS devices should be placed at source, site, and regional levels. SuDS can also provide amenity benefits to local communities and benefits for biodiversity simultaneously.

In the following sections of the surface water chapter, it will be outlined in detail how SuDS devices have been utilized and incorporated as an integral part of the overall plan for the proposed development, and how their inclusion will mitigate the risk of localised and downstream flooding, while also promoting residential amenity and biodiversity.

### **4.2 Proposed Surface Water Network and SuDS Strategy**

The surface water from the subject site will be collected through a series of bio retention tree pits / swales and land drains. These will all be connected to the surface water drainage network and discharged to the existing surface water network.

The preliminary Surface Water strategy, SuDS strategy, and outfall arrangements are in line with Fingal County Council requirements.

It is proposed to incorporate a Storm Water Management Plan through the use of various SuDS techniques to treat and minimise surface water runoff from the site. The methodology involved in developing a Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GSDS) and in the SuDS Manual. Based on three key elements – Water Quantity, Water Quality and Amenity – the targets of the SuDS train concept have been implemented in the design, providing SuDS devices for each of the following:

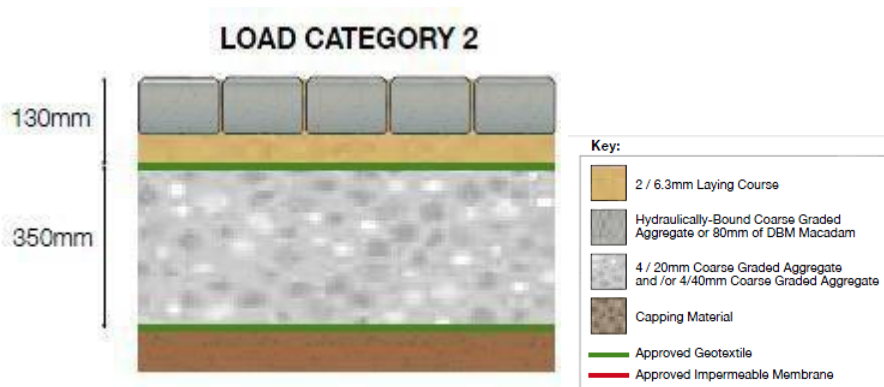
- Source Control
- Site Control
- Regional Control

#### 4.2.1 Source Control

##### Permeable Paving:

It is proposed to introduce permeable paving at all private driveways and parking courts throughout the development. Downpipes from the front of the houses and apartments will drain to filter drains beneath the permeable paving to facilitate maximum infiltration of surface water from driveways and roof areas.

The goal of permeable paving is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable paving has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.



##### Bio Retention Tree pits / Raingarden Areas:

We have tree pits / rain garden planter areas where possible. The areas are designed to store the run-off from site for storm events. Each tree pit / planter will be fitted with weep holes to act as an overflow and to provide a connection back into the main surface water network drainage.

**Swale & underground tanks:**

It is proposed to drain the surface water run-off from a portion of the roads and footpaths into Swale & underground tanks located at various locations across the site. The swale treats the surface water run-off and acts as a form of attenuation during storm events. The Swale & underground tanks have been designed to store the 1:100 year storm event +20% for climate change, with an overflow pipe connecting back into the main surface water network.

Swales are grassed channels proposed to run parallel and adjacent to selected roads throughout the site. Rainfall from the road surface will be directed to gaps in the road kerbing and will flow to the swales. The swales will be linked back to the drainage network to prevent flooding in extreme weather events, where the volume of rainfall exceeds the percolation capacity of the swales.

Grassed swales enhance surface water runoff quality as they slow down water flow, allowing suspended particles to filter and settle out of suspension.

**4.2.2 Site Control****Bio-retention Systems (Treepits)**

Bio-retention tree pits/ areas are provided within site for site control.

**Detention Basin**

A detention basin and tanks have been provided within phase 1 to provide for attenuation of surface water. The basin can be utilized during regular weather conditions for other purposes and will only fill with water during extreme rainfall events. Detention basins are engineered depressions in the ground and are typical seeded with grass and may also be suitable for planting. Detention basins may be further utilised as recreational/play areas, an option which has been utilised in the proposals for this project.

**4.2.3 Regional Control****Flow Control:**

Several flow control devices (Hydrobrake or similar approved) are provided across the site.

**Petrol interceptor:**

A Class 1 petrol interceptor will be provided before the surface water outfalls to the adjacent surface water network.

## 5. Complaints and Records

Where there are complaints, albeit from an external source or from FCC, relating to any surface water management issue, these will be treated by the developer in a constructive and cooperative manner to resolve. The specific procedures will include (but not be limited to):

- Inspection of the location from which the complaint originated.
- Comparison of the measured levels with limiting criteria.
- Identification of engineering control or management procedure (if appropriate) to be adopted to reduce the levels at the complainant location.

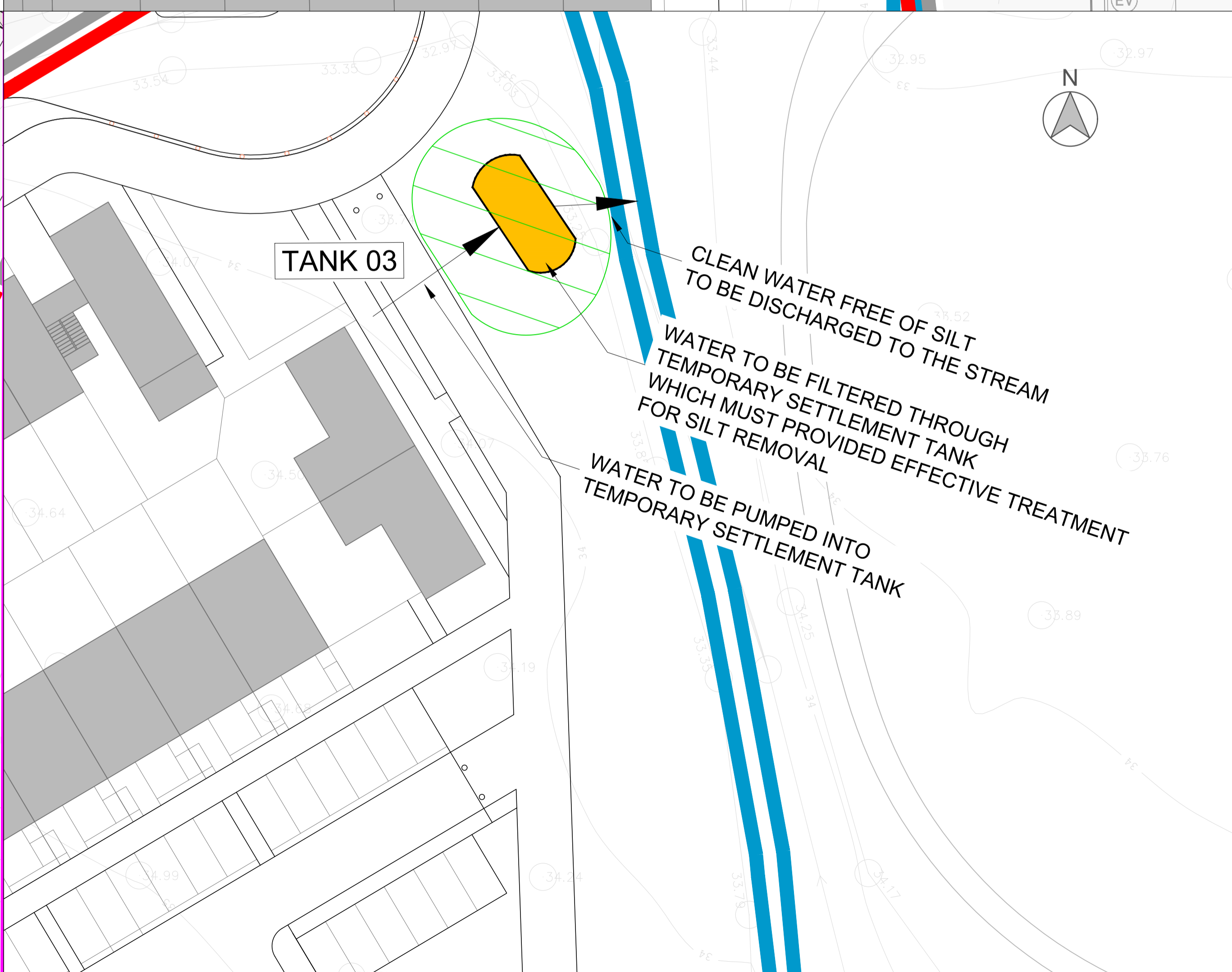
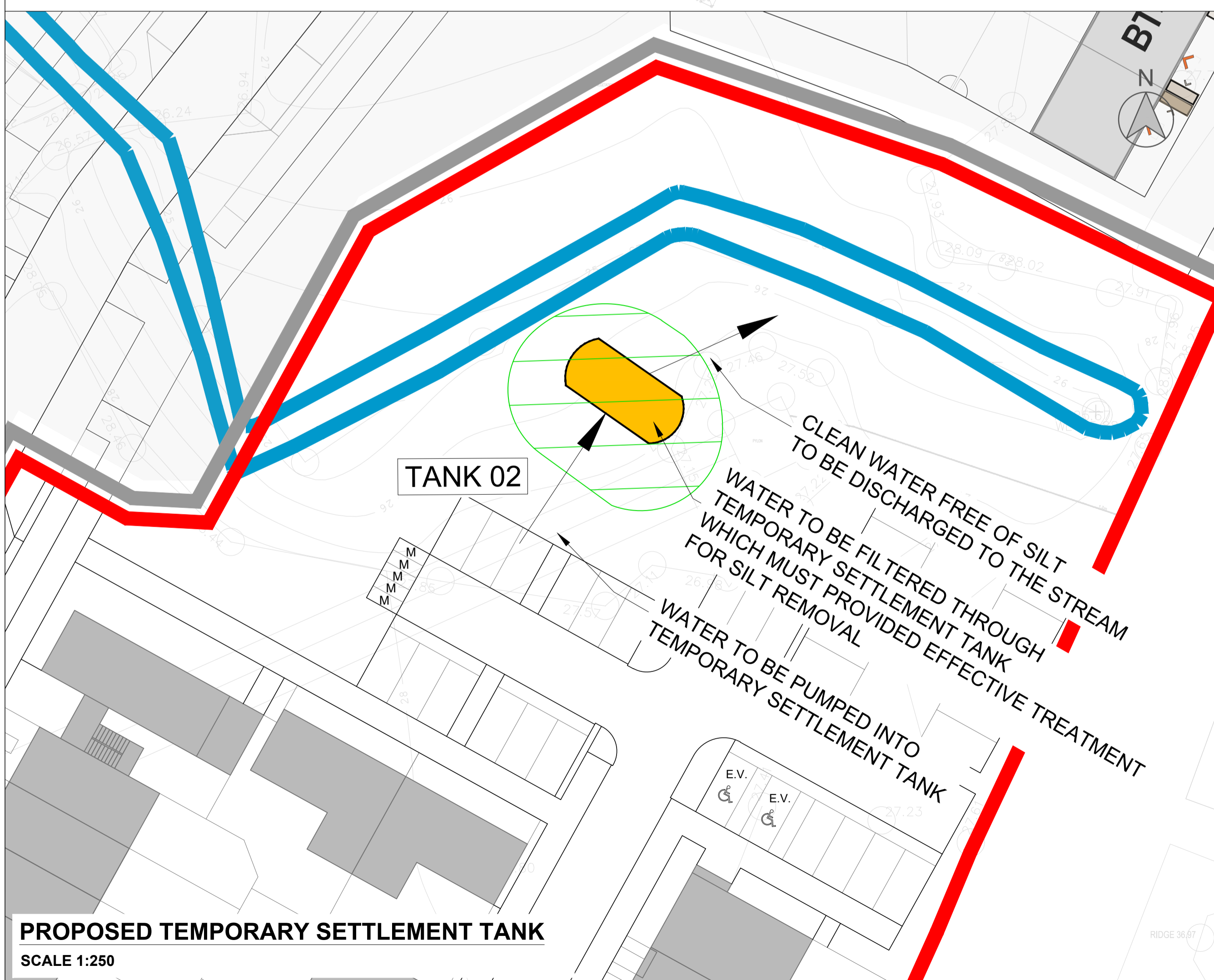
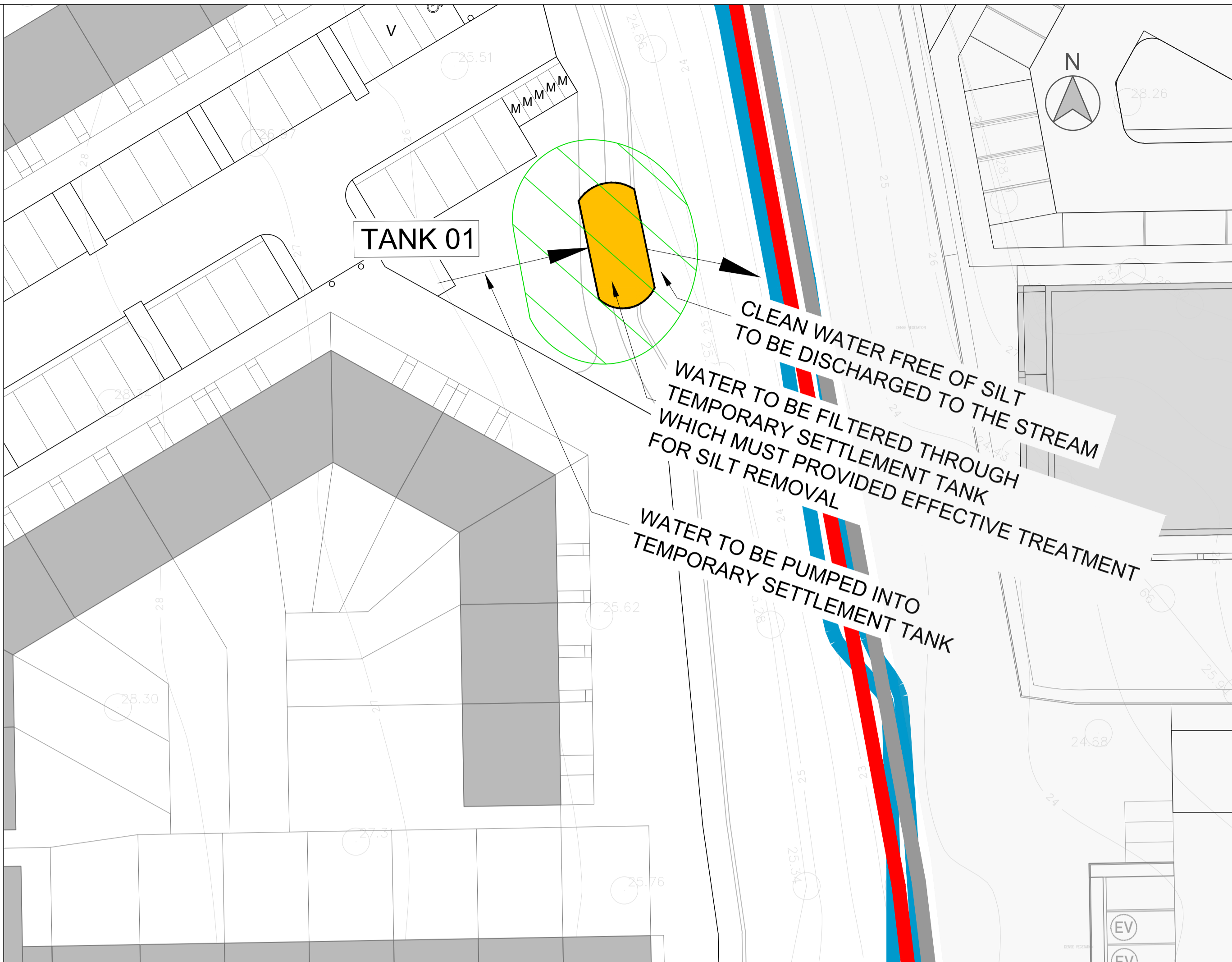
Each complaint will be thoroughly investigated, and appropriate remedial action carried out promptly.

Where corrective measures have been taken, the complainant will be updated by the developer of the corrective action implemented.

All records and documents associated with monitoring of the Works will be retained by the developer.

Information retained will include:

- All monitoring data collected, including data files, and calculations used in processing the data
- Maintenance schedules and records for the maintenance of the instrumentation and the monitoring system including calibration certificates.
- Records of systems checks and testing and commissioning carried out.



**NOTES**

**SETTLEMENT TANK**

1. ALL GROUND WATER OR RUNOFF WATER SHOULD BE PUMPED INTO SETTLEMENT TANK PRIOR TO DISCHARGING INTO THE WATER COURSE
2. THE TEMPORARY SETTLEMENT TANK CAN BE PLACED AT ANY CONVENIENT LOCATION ON-SITE, PROVIDED THAT IT IS INSTALLED AS SPECIFIED IN NOTE 1

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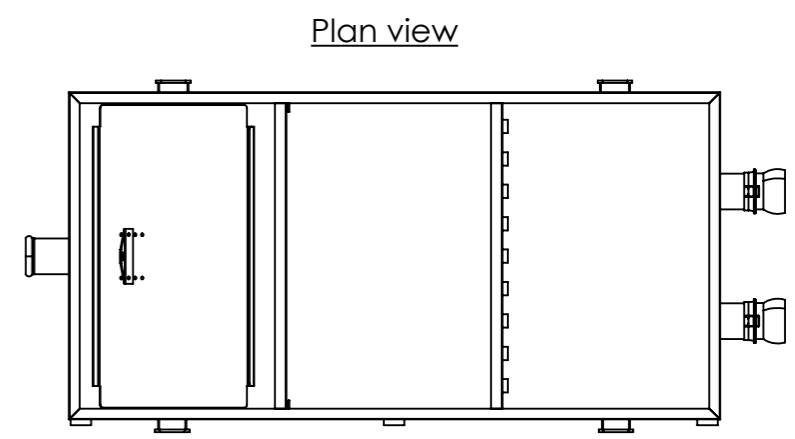
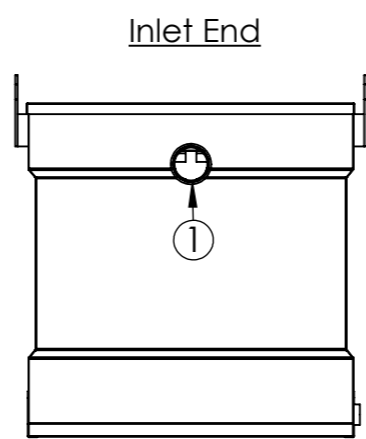
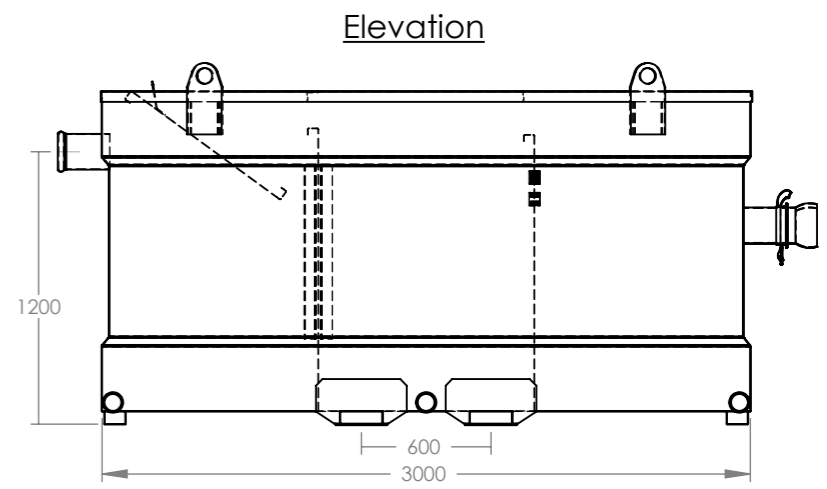
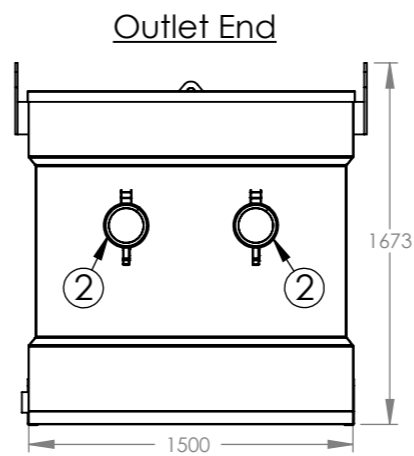
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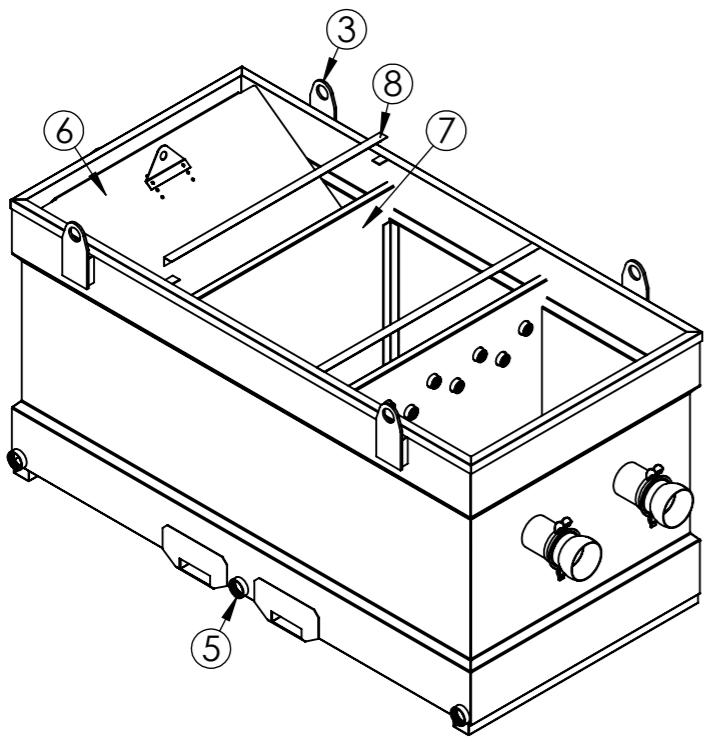
DRAWING TITLE:  
PROPOSED TEMPORARY SETTLEMENT TANK

CLIENT:  
FINGAL COUNTY COUNCIL

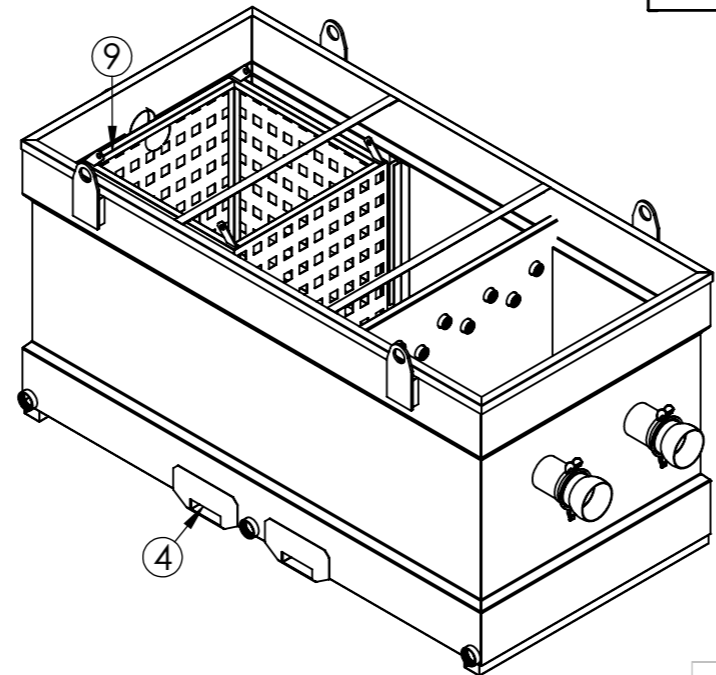
Balloon Defintions	
Number	Purpose
1	6" Inlet
2	6" Outlet
3	Lifting points [Empty only]
4	Fork truck lifting points
5	3" Base outlets
6	Removable rear baffle
7	Removable center baffle
8	Removable bracing bar
9	Filter bag containment cage



Configuration one



Configuration two



UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
TOLERANCES:  
LINEAR: ±1mm  
ANGULAR: ±1°

DEBURR AND  
BREAK SHARP  
EDGES

MATERIAL:  
2mm M/S

FINISH: REVISION SCALE: DO NOT SCALE DRAWING SHEET 1 OF 1 A3

CAPACITIES			TITLE:	
OUTER TANK	INNER TANK		SETs	
Max Ltrs: 6810	Max Ltrs: N/A			
DRAWN	NAME	SIGNATURE	DATE	STYLE:
	Bryn		28/07/16	Special
				DWG NO.
				AS_008



Sykes offer a range of settlement tanks to be used on to the discharge side of any pumpset. The tanks are specially designed to prevent silt and fines being discharged into the water course or drains. Each tank is provided with a series of weir plates, Bauer quick release couplings, lifting eyes and drain plugs.

**DUBLIN**  
01 4010088

**CARLOW**  
05991 33690

**CORK**  
025-87850

**GALWAY**  
091-790806

**LIMERICK**  
061-388737