



# **SPECIFICATION**

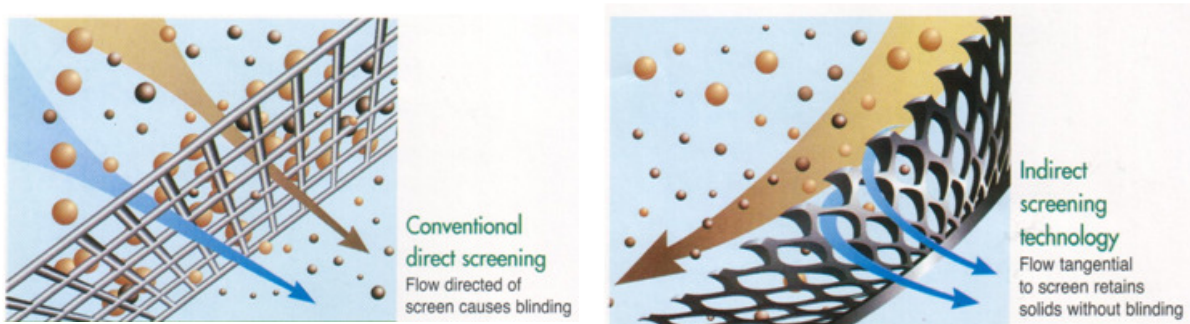
**FOR**

# **CONTINUOUS DEFLECTIVE SEPARATION ( CDS )**



## 1.0 Introduction to CDS Technology

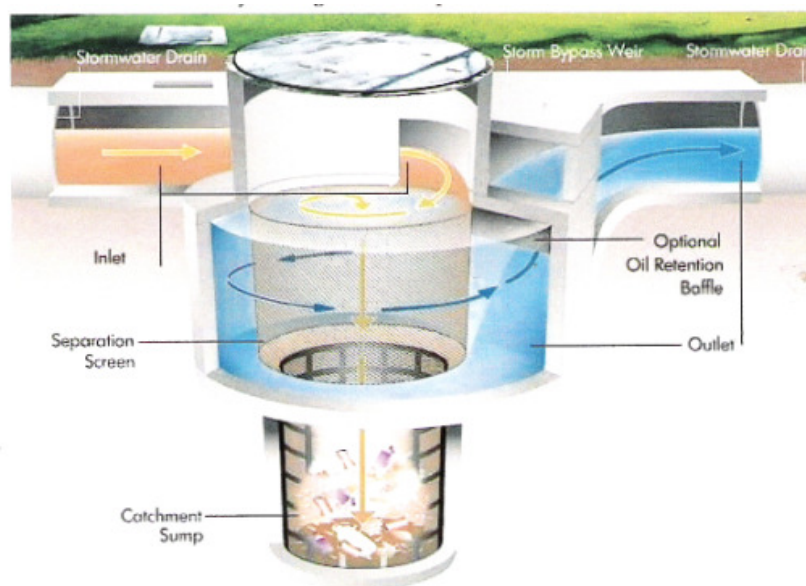
Continuous Deflective Separation (CDS) is an innovative screening technology for the separation of solids from liquid streams. Unlike direct screening, which operates by impinging particles in the flow directly onto the screen, CDS utilizes the principle of indirect screening where the particles are carried by the flow across the face of the screen (Fig. 1). This, in conjunction with hydraulic balancing across the screen, delivers a process capable of removing solids from high flows of water and wastewater.



**Figure 1 - Illustration of direct (top) and indirect (bottom) Screening**

The technology utilizes a cylindrical screen with tangential inlet for the fluid above the screen and a sump below the screen. The tangentially introduced flow rotates inside the screen, keeping the screen surface free of solids while a small proportion of the fluid passes through each of the apertures in the screen. Solids are retained inside the screen on the rotating column of fluid if neutral density, sink into the sump of settleable, or float to the surface of the fluid in the unit.

Characteristics of the technology include non-blinding operation, high loading rates (up to 32 m<sup>3</sup>/s), capture performance that is independent of flowrate, and low operation and maintenance requirements.



**Figure 2 - Illustration of CDS System**

## 2.0 Product Specification

### 2.1 Performance

The Pollutant Capture Rates:

	Description	CDS Target Capture
a.	Gross Pollutants (>5mm)	99%
b.	Coarse Sediment (0.125)	95%
c.	Floatable Pollutants	99%
d.	Total Solid Suspension (TSS)	70%
e.	Free Oils & Grease in Spill Situation	95%
f.	Total Phosphate	>20%

The above pollutant capture rates must be verified by independent parties with Authority in Hydraulic Design.

*\*Note : To achieve 80% TSS removal as required by Green Building Index, a bigger CDS size is necessary to increase the retention time.*

### 2.2 Features

- **Full bypass flow capacity.**
  - No flooding upstream of CDS
- **Guaranteed Non-blocking**
  - No premature bypass of pollutant
- **Off-line pollutant storage**
  - No loss of captured pollutant
- **“Self-cleaning” screen**
  - Continuous operation and lower maintenance costs
- **Durable material construction**
  - Precast Concrete/Stainless Steel Choice of Lids – including trafficable
- **Storage of settled pollutants off-line and out of flow path.**
  - Pollutants remain captured and screening area is free of pollutants



## **2.3 General Specification**

1. Self-cleansing and non-blocking screen throughout the storm event.
2. Removals by lift basket
3. Frequency of maintenance is for 6 times/year based on 2m<sup>3</sup>/ha/year
4. The CDS shall be able to function for multiple flow events and pollutants captured during previous events shall not be allowed to escape from the CDS under the present event. (Offline devices are preferred to online devices).
5. The CDS shall not be allowed to be partially or totally blocked/clogged by pollutants.
6. Pollutants shall not be stored in the screening or treatment zone.
7. The treatable flow rate at ARI 3 months shall remain constant throughout the storm event and thus, there shall be no reduction on the separation screen area.
8. The separation screen of the CDS shall be non-blocking throughout the storm event.
9. The CDS shall have an overflow mechanism or structure to allow stormwater to overflow without causing upstream flooding.
10. The CDS must present minimum visual impact as typically installed underground.
11. The CDS unit with submerged screen must also retain oil.
12. The CDS unit must either present minimal maintenance requirement by lift basket, vacuum suction or grab.
13. The pollutant must be stored in a separate sump. It is preferred to have this submerged, to minimize pollutants contact with the air (creating odors) and to prevent crows, rats, vermin and insects from reaching the pollution which can present a health hazard.
14. The CDS must be supplied and delivered on site in precast concrete form where installation on site can be carried out quickly with and where concrete has already achieved its functional strength or in pre-assembled FRP.
15. The screen material must be made out of 316 stainless steel which can withstand heavily polluted storm water from causing corrosion. Plastic is not acceptable.
16. The CDS shall be designed to comply a minimum storage based on a frequency of maintenance of once in every two (2) months at estimated loading of 2m<sup>3</sup>/ha/year from the catchment area. Contractor shall engage a P.E to submit calculation with endorsement based on the wording as per sample attached. The same P.E should also later on endorse the as-built drawing with wording as per sample attached.



17. CDS unit shall have buffer plate or floating oil pillow which circulates and remove oil by absorption and each oil pillow will be able to absorb min. 7.0 litre of oil. For 1m dia. Screen 1 no. will be provided and 2 m dia screen 4 no. to be provided. Oil pillow will be removed and replenished in each clean out operation

### **Oil and Grease Skimmers (Optional)**

1. Oil skimmer of the following specification shall be provided to JPS and the oil skimmer is portable and the skimmed oil is directly discharged to a 45 gallon oil drum. A trolley is also provided to cast away the oil drum.
2. The Belt Mob Oil Skimmers are designed specifically for wash tank and machine tool applications. However, they are ideal for the removal of hydrocarbons from coolants, wash water, or any small area where contaminants accumulate.
3. A continuous loop of specially designed 2" Belt Mop (BM-2) is propelled from the unit, across the contaminated surface, and drawn back into skimmer where the recovered product is extracted from the mop.
4. The two gear driven rollers inside the skimmer provide the means of oil extraction the mop propulsion and aside from the 115V drive motor, are virtually the only moving parts in the unit.
5. For drainage of recovered product, these units come with a standard 1 1/2" male NPT fitting. However, due to their modular design, the skimmers can be fitted to any number of custom configurations.
6. The oil skimmer utilizes a single speed drive and simple ON/OFF design. It comes standard with a variable speed controller which allows for infinite adjustment of the mop speed to achieve optimum purity of the recovered product. The oil skimmer is supplied with 5' and 10' of BM-2 respectively but other lengths can be requested.

<b>Oil Skimmer Specification</b>	
Dimensions	7" x 9" x 6"
Weight	8 lbs
Power Requirement	115VAC
Recovery Element	BM-2
Max. Element Length	10ft
Max. Mop Speed	3 ft/min
Max. Recovery	5 gal/hr
Construction Materials:	
<i>Housing</i>	T-304 Stainless
<i>Rollers</i>	Buna-N
<i>Belt Mop</i>	Polypropylene



## **2.4 Life Expectancy**

> 50 Years

## **2.5 Maintenance**

CDS Units are claimed to be the easiest, fastest and safest proprietary filtration devices to clean on a repetitive maintenance plan. The large surface opening allows for complete access from the surface to the pollution stored in the Unit. The “self cleaning” screen should never need cleaning or backwashing to free debris that would normally be stuck in a traditional screen.

CDS Units are quite adaptable to many ways of cleaning, such as:

- Suction - Standard method of cleaning CDSs
- Grab / clamshell - Using a clamshell type grab bucket
- Installed Basket - Simply lift out pollutant with a crane

*Note : Please refer to drawings for details.*

## **2.6 Safety**

- Below ground operation
- No moving parts
- Entry not required for regular cleaning
- Large opening for pollutant removal.

# EcoClean CDS Unit Selection

The table below provides a general guideline only for sizing a CDS unit. EcoClean have a team of staff of experienced engineers who can design a system specific to your requirements.

## Industrial

The CDS technology has been of great use to the industrial sector. The indirect screening provides a non-blinding separation system for a number of processes. CDS has been involved in separating pollutants from cooling liquids, sediments from site runoff and washdown facilities.

## Fine Solids Separation

CDS Technologies has developed a high rate process for the removal of suspended solids from sewage. It achieves a stream that is highly amendable to disinfection for the treatment of sewer overflows. It is suitable for reuse in many applications, especially ideal for feeding to biological processes with low particle BOD<sub>5</sub>, COD levels.

## Sewer Overflows

Sewer overflows have polluted waterways around the world. CDS has developed a product that removes gross solids from sewer overflow locations. The gross solids are separated and returned to the sewage systems and the screened fluid is then diverted into the overflow line.

### EcoClean CDS Units : KEY CHARACTERISTICS

CDS Model No	+Catchment Area (ha)	*Pollutant Storage M <sup>3</sup>	Underground Footprint m	Ground Level Footprint Diameter m
F0506	≤ 1	0.50	1.0 x 1.0	0.9
P0708	≤ 3.5	1.80	1.5 x 1.5	1.3
F0908	≤ 5	2.65	1.5 x 1.5	1.3
F0912	≤ 6	2.95	1.5 x 1.5	1.3
P1009	≤ 7	3.35	2.0 x 2.0	1.3
P1012	≤ 7.5	3.60	2.0 x 2.0	1.3
P1015	≤ 8	3.80	2.0 x 2.0	1.3
F1512	≤ 15	7.10	2.6 x 2.6	2.3
F1518	≤ 17	8.10	2.6 x 2.6	2.3
P2018	≤ 40	19.00	3.5 x 3.5	2.3
P2028	≤ 45	21.50	3.5 x 3.5	2.3
P3018	≤ 60	28.50	6.5 x 6.5	3.5
P3024	≤ 65	32.75	6.5 x 6.5	3.5
P3030	≤ 75	37.00	6.5 x 6.5	3.5
C4527	≤ 120	58.50	8.0 x 8.0	5.0
TWIN	≤ 500	variable	variable	variable

#### NOTES :

1 – CDS Model Selection Table shall only be used for initial sizing. Actual CDS model shall be determined by detailed engineering. Please check with EcoClean Technology Sdn Bhd for your specific needs.

2 – Twin precast unit combination can be used to treat larger flows – detail on request

#### LEGEND

P- Precast Concrete

F- Fibreglass

C- Cast-in-Place

+ Estimated based on wet pollutant loads of 2m<sup>3</sup>/ha/yr

\* Based on vacuum suction

**P2018** IS A **P**recast unit with screen diameter **2000**mm and height **1800**mm

**F0912** is a **F**ibreglass unit with screen diameter **900**mm and height **1200**mm

#### Other Specific Applications ( details on request )

- > CDS Surface / Rainwater filtration unit
- > CDS Sewer overflow unit (CSO)
- > CDS Stainless steel or FRP industrial separator
- > CDS Sewer mining process for reuse water
- > CDS Smart water (Class A re-use water)
- > CDS filternator media filtration system
- > CDS Hybrid Advanced Immobilised Cell Reactor Technology (India) for stormwater / Wastewater Treatment.
- > EcoClean Ausdrain Stormwater System for rainwater harvesting, re-use, infiltration, on site detention and bio-remediation.
- > EcoClean oil and grease trap.
- > EcoSac wastewater primary screening
- > Vacuum fluid evacuation system

Tajuk: Kerja Merekabentuk, Membekal dan Memasang "Gross Pollutant Trap" jenis CDS untuk ....

No. Sebutharga :

Bil.	Perihal barang-barang/perkhidmatan dan Syarat-syarat khas	Unit Ukuran	Kuantiti/ Kekerapan	Kadar (RM)	Jumlah (RM)
Untuk diisi oleh Jabatan				Untuk diisi oleh Penyebuthara	
1	<b>PRELIMINARIES</b>				
1.1	<b>MOBILISATION</b> Allow a sum of meeting all requirements, risks, liabilities and obligation.	L/S			
1.2	Provide photographs before, during and upon completion of works (at least 30 pcs).	L/S			
1.3	<b>INSURANCE</b>				
1.3.1	Allow for the provision of all insurances including insurances against injuries to persons and damage to property, insurance of works etc.	L/S			
1.3.2	Allow for the provision of all insurance for foreign workers, and SOSCO in the Regulation or By Laws	L/S			
1.4	<b>SURVEYS</b> Allow for all necessary surveys for setting out and construction of the works.	L/S			
1.5	<b>AS-BUILT DRAWINGS</b> Provide and submit to the Engineers the as-built drawings upon completion of works. As-built survey is to be carried out by licensed surveyor.	L/S			
1.6	<b>TEMPORARY WORKS</b> Provide general mobilization, demobilization and including shoring, cofferdam, bunds, drainage outlet, pumps etc to maintain the works free of water and prevent earth slips and provide safety during the course of construction of works, all framing, platforms, timber supports etc and all other works necessary to form and construct permanent works, including maintenance dismantling, resurface premix, reconstruct flex slabs and clearing away on completion for all works.	L/S			





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Bil.	Perihal barang-barang/perkhidmatan dan Syarat-syarat khas	Unit Ukuran	Kuantiti/ Kekerapan	Kadar (RM)	Jumlah (RM)																		
2	<p>To design, supply and deliver GPT Type "Ecoclean Greywater Treatment Plant " in accordance to Manual Saliran Mesra Alam "MASMA" inclusive of all necessary structures and accessories to the following requirements :-</p> <p>2.1 The pollutant capture rates:-</p> <table border="1" data-bbox="539 485 1036 720"> <tr> <td>a.</td> <td>Gross Pollutants (&gt;5mm)</td> <td>99%</td> </tr> <tr> <td>b.</td> <td>Coarse Sediment (&gt;0.125)</td> <td>95%</td> </tr> <tr> <td>c.</td> <td>Floatable Pollutants</td> <td>99%</td> </tr> <tr> <td>d.</td> <td>Total Solid Suspension (TSS)</td> <td>70%</td> </tr> <tr> <td>e.</td> <td>Free Oils &amp; Grease in Spill Situation</td> <td>95%</td> </tr> <tr> <td>f.</td> <td>Total Phosphate</td> <td>&gt;20%</td> </tr> </table> <p>The above pollutant capture rates must be verified by independent parties with Authority in Hydraulic Design.</p> <p>2.2 The GPT shall be able to function for multiple flow events and pollutants captured during previous events shall not be allowed to escape from the GPT under the present event. (Offline devices are preferred to online devices).</p> <p>2.3 The GPT shall not be allowed to be partially or toally blocked/clogged by pollutants.</p> <p>2.4 Pollutants shall not be stored in the screening or treatment zone.</p> <p>2.5 The treatable flow rate at ARI 3 months shall remain constant throughout the storm event and thus, there shall be no reduction on the separation screen area.</p> <p>2.6 The separation screen of the GPT shal be non-blocking throughout the storm event.</p> <p>2.7 The GPT shall have an overflow mechanism or structure to allow stormwater to overflow without causing upstream flooding.</p> <p>2.8 The GPT must present minimum visual impact as typically installec underground.</p> <p>2.9 The GPT unit with submerged screen must also retain oil.</p> <p>2.10 The GPT unit must either present minimal maintenance requirement by lift basket, vacuum suction or grab</p> <p>2.11 The pollutant must be stored in a separate sump. It is preferred to have this submerged, to minimize pollutants contact with the air (creating odors) and to prevent crows, rats, vermin and insects from reaching the pollution which can present a health hazard.</p> <p>2.12 The GPT must be supplied and delivered on site in precast concrete form where installation on site can be carried quickly with and where concrete has already achieved its functional strength or in pre-assembled FRP.</p> <p>2.13 The screen material must be made out of 316 stainless steel which car withstand heavily polluted stormwater from causing corrosion. Plastic is not acceptable.</p>	a.	Gross Pollutants (>5mm)	99%	b.	Coarse Sediment (>0.125)	95%	c.	Floatable Pollutants	99%	d.	Total Solid Suspension (TSS)	70%	e.	Free Oils & Grease in Spill Situation	95%	f.	Total Phosphate	>20%	No.			
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3	To install and construct & complete GPT Type "CDS" or equivalent, main and supplementary structures and accessories including all temporary strutting, excavation and removal of access excavated earth, backfill and aggregate, insitu reinforced concrete where necessary and join to existing drain section to manufacturer's specification and reinstatement of existing landscape to original condition.	no.			
4.	To undertake monthly monitoring and maintenance of GPT for 2 year period either using Lift Basket Method or Vacuum Education.				
		<b>Jumlah (RM)</b>			

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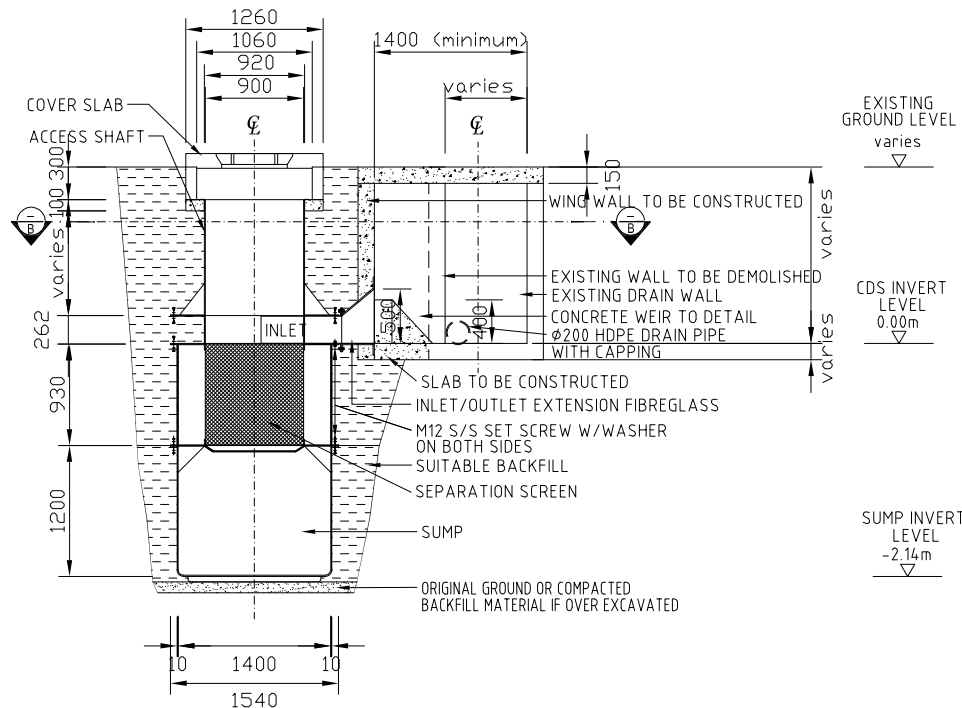
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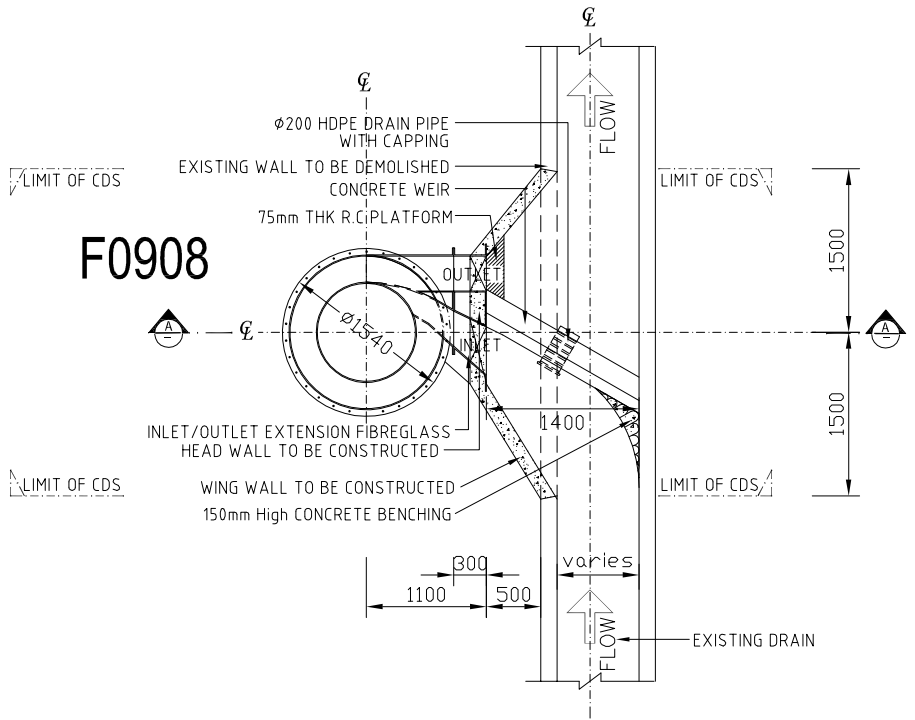
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Project			
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Job No :			
Dwg No :	ECT/STD/F0908/SEC/01	REV	0



SECTION A-A



PLAN - SECTION B-B

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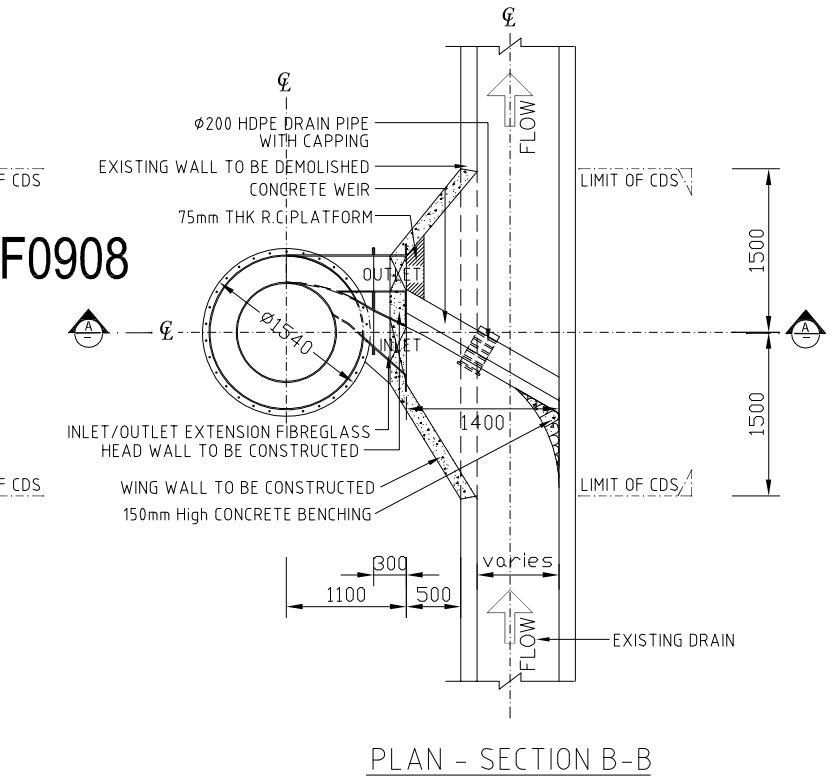
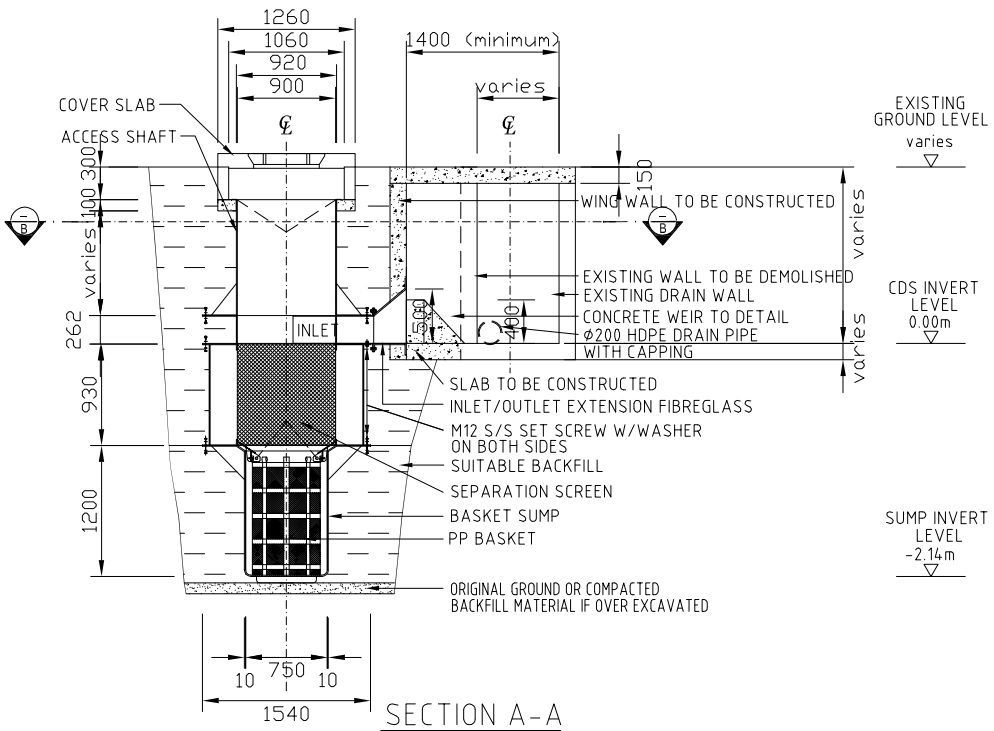
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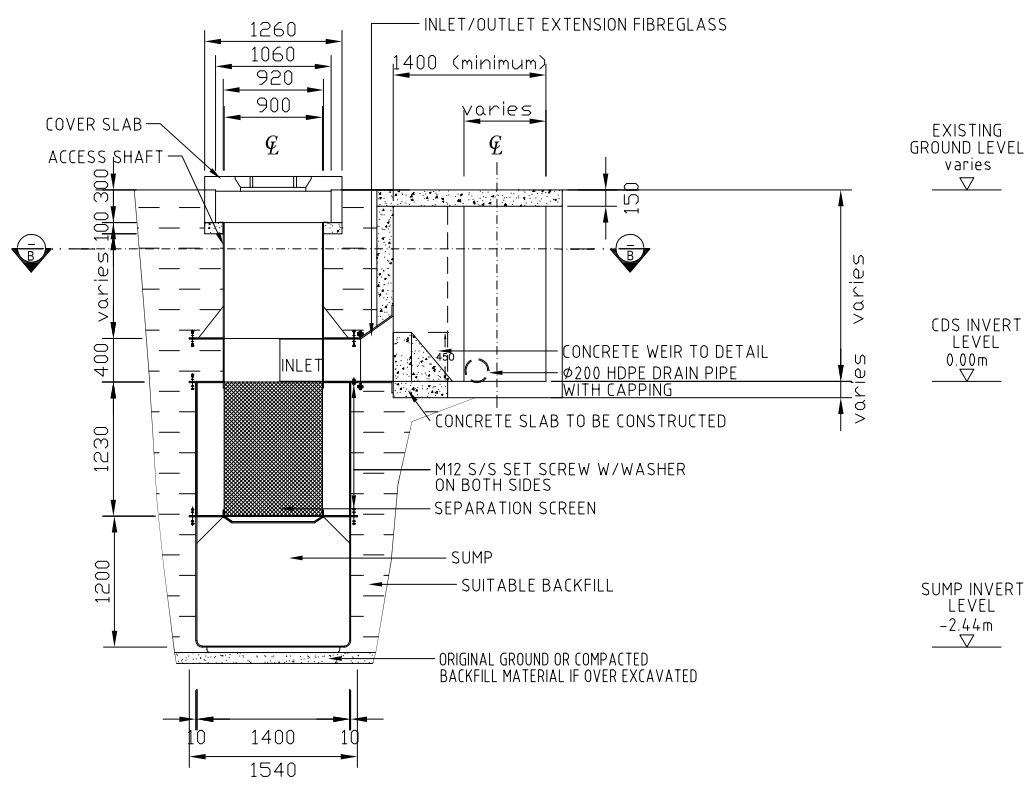
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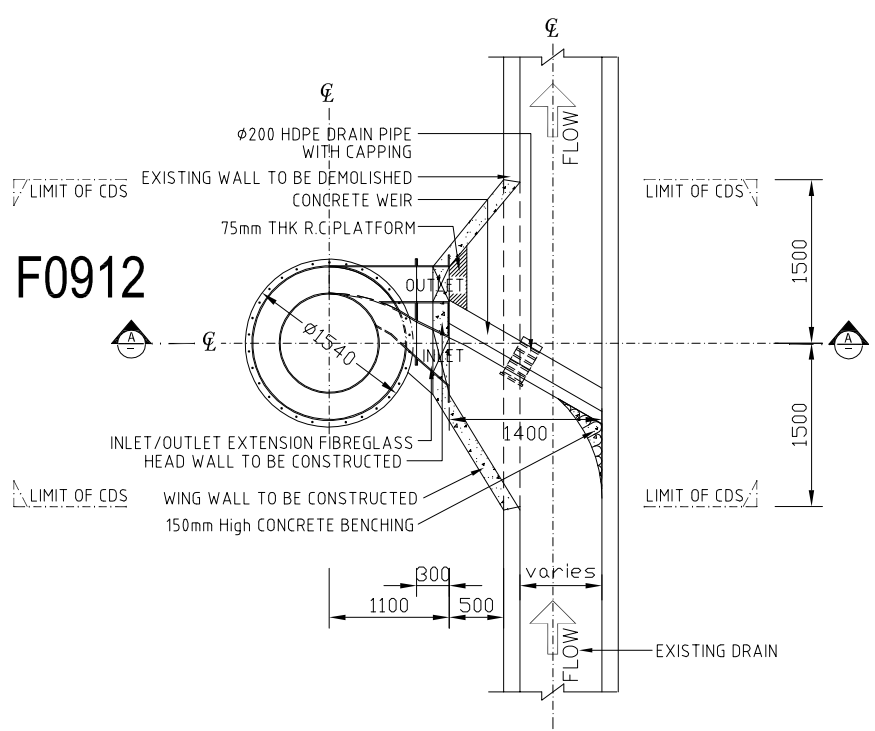
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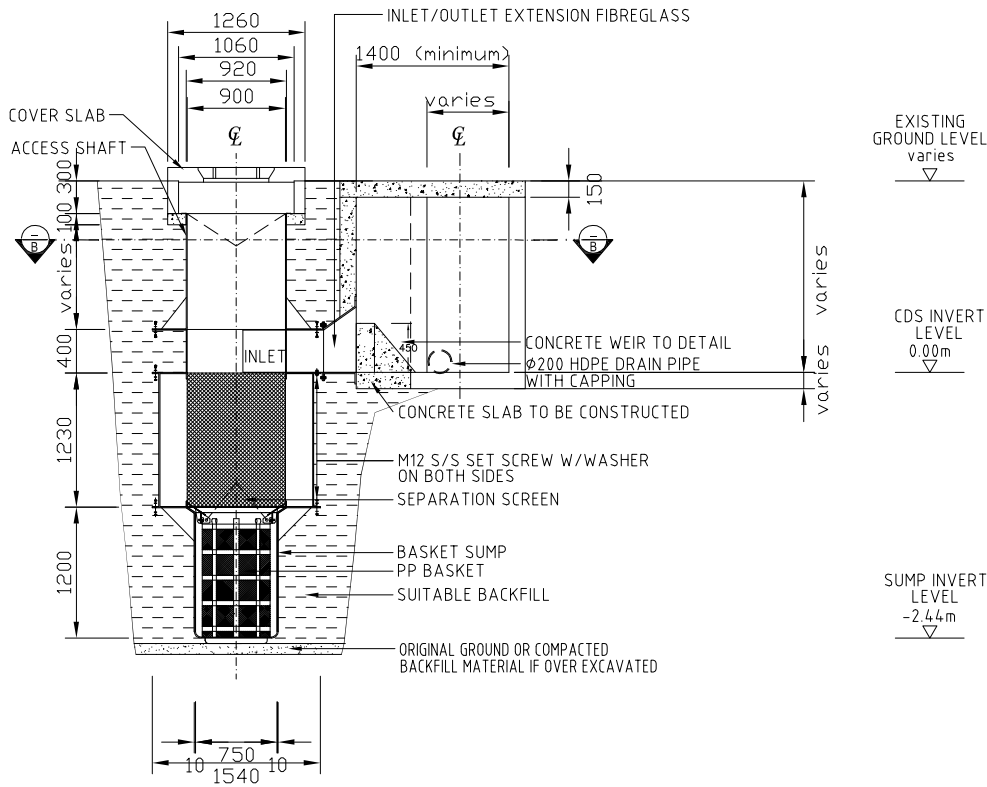
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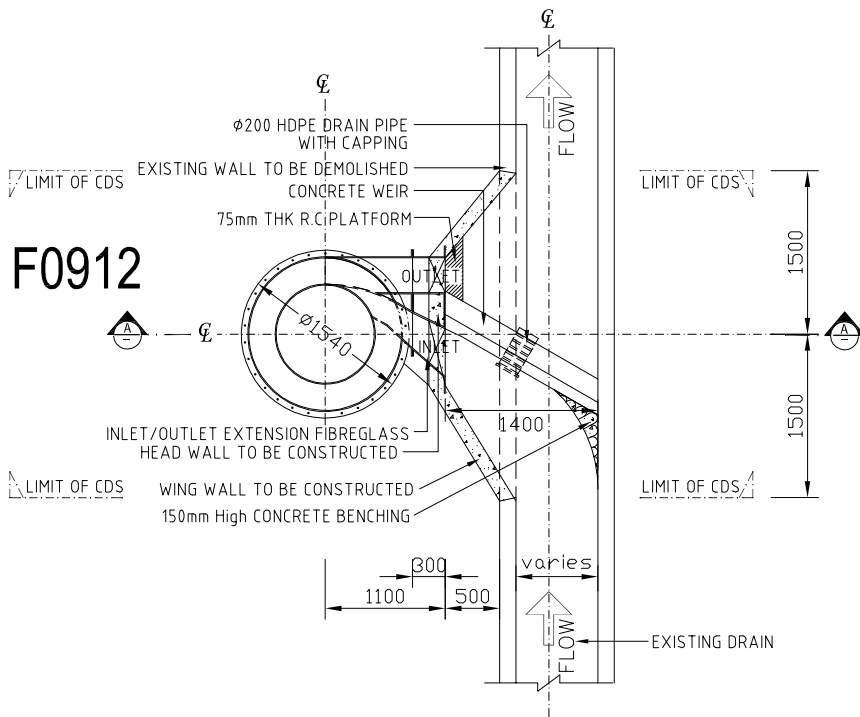
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CDS INVERT LEVEL 0.00m	
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SUBJECT	
DRG NO.	REFERENCE DRAWINGS

REV	DATE	DESCRIPTION	CH	AP

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PROJECT:

TITLE	CDS UNIT PLAN AND SECTIONS - F0912 (BASKET)		
Project			
Unit In :	mm	SCALE :	1:25
Job No :			
Dwg No :	ECT/STD/F0912/SEC/01	REV	0

STANDARD DRAWING