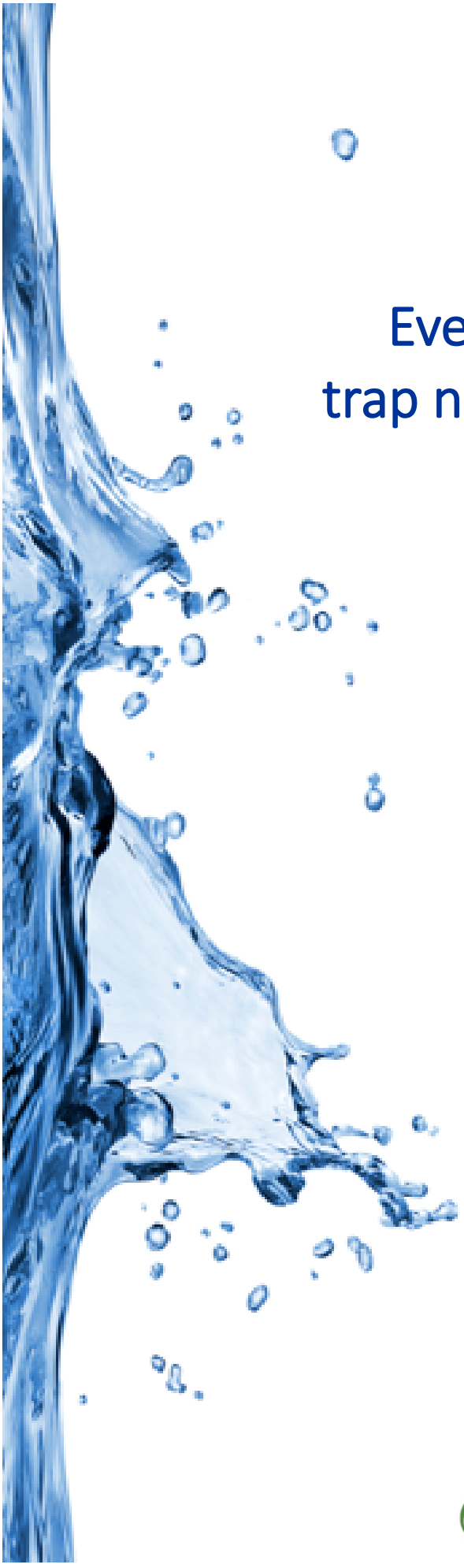

Even the humble grease trap needs to keep up with the times.

MACTRAP

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Customer : Dunkin' Donut

Challenge : Drainage from the factory lower than the sewer.

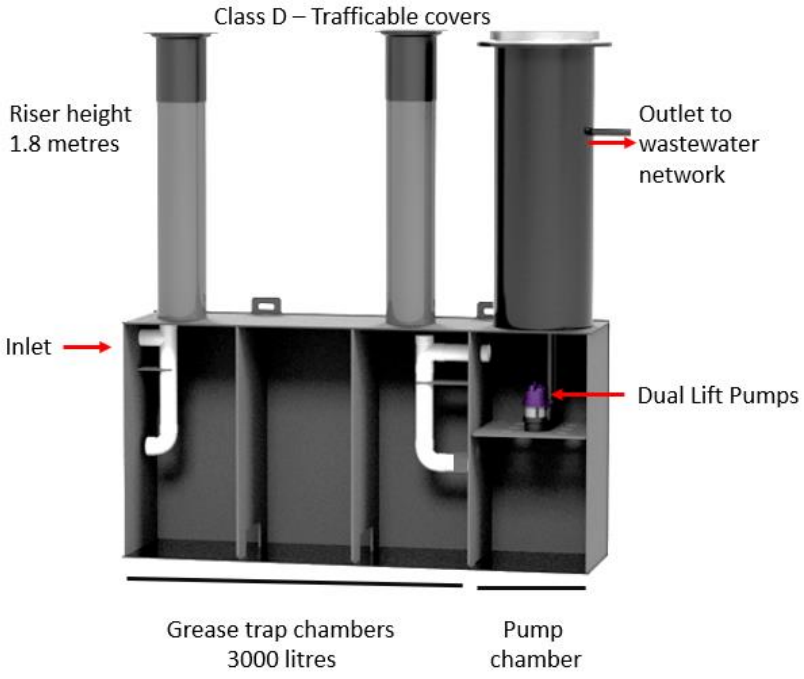
The Dunkin Donut factory in Mt Wellington makes 40,000 donuts in a single night on peak days. The bakery covers a very large area with multiple washdown floor gullies. By the time the drainage reaches the external area it is below the level of the sewer.

Principles to be applied when a pump is a requirement for a grease trap solution.

1. Use Gravity: It's better for grease traps to drain by gravity to the wastewater system
2. Pump after the trap: If the drainage fall does not permit a gravity connection, the preferred design is to drain through the grease trap to a pump well and pump to the sewer.
3. Pump before the trap: The least preferred design is to pump to the grease trap

Mactrap Recommendation

Increase the riser height and install the grease trap deeper so that the greasy wastewater can gravity flow into it. Create a pump chamber in the trap so that the treated water can be pumped to the wastewater network. Two pumps for resilience running on a duty cycle managed by a Control system.



Customer : Kawarau Bungy Centre cafe

Challenge : Kitchen lower than wastewater treatment system (OSET)

The AJ Hackett Kawarau Bungy Centre is situted on the beautiful Kawarau river and has over 500,000 visitors a year including 83% international travelers. The café provides a wonderful meeting place where customers can share their experience over lunch. Visit their site for your next adventure! https://www.bungy.co.nz/.

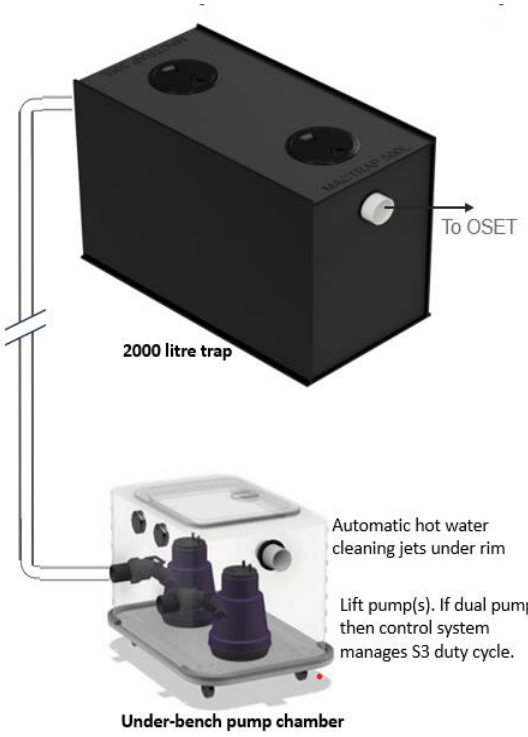
Previous grease traps had failed to effectively stop fat and grease advancing to the privately owned wastewater treatment system. The actual and potential issues caused by this failure were:

- Damage to the septic system requiring expensive repair
- Business disruption
- Risk of flooding in the café and retail space
- Potential for fines under the Environmental Protection Act

Solution- Under-bench Pump Station and custom-sized Grease Trap

2000 litre above ground grease trap

- 2000 litre above ground grease trap located 5 metres higher than the kitchen.
- Custom dimensions to fit in available space
- Odour control critical due to location immediately beside a main entrance
- Easily accessed by an extraction truck



A pump chamber with the following features located in the kitchen:

- 100 litre pump chamber
- Dual Pumps specified for 5m lift.
- Dual Pumps to mitigate risk of flooding due.
- Control system to manage pumps & hot water jets.
- Hot water jets fitted inside the rim of the chamber to clean the pumps, floats, and chamber walls.
- 40mm pressure pipe connection

Kawarau Bungy :	Geoff Wilson – Project Manager
Holmes :	Gerhard Fourie – Senior Engineer
Mactrap :	Steve Shaw – Innovation .Manufacture
Richardson Plumbing	Install & Commission

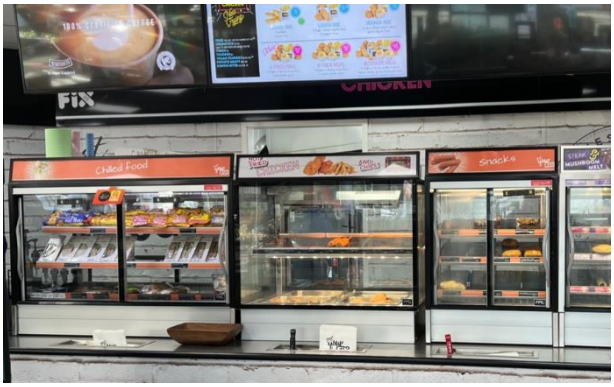
Customer : Service Station – Auckland

Challenge : Congested location means in-ground trap not possible

Service stations are adding more food items to generate revenue.

Food is prepared and/or cooked on site which means they must have a grease trap (NZBC G13).

This Auckland service station had no ability to excavate and install a traditional in-ground grease trap.



Options Considered

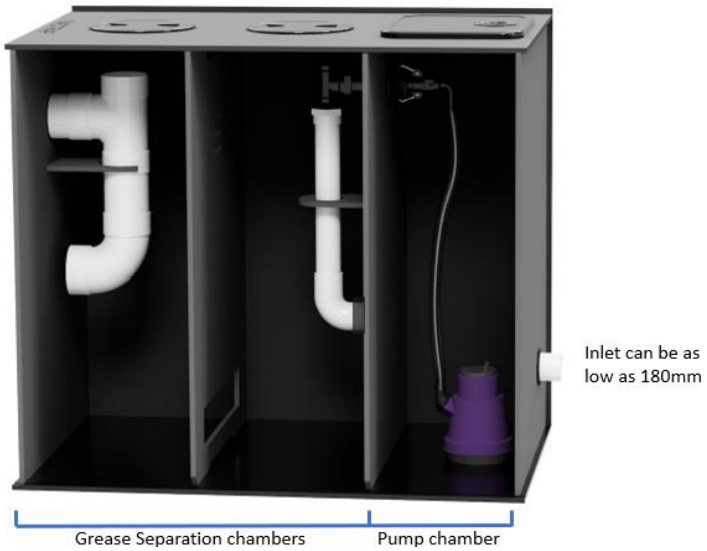
1. In-ground grease trap – excavation of ground not an option
2. Above ground grease trap – insufficient fall from kitchen to trap inlet
3. Under bench grease converter or grease removal unit- ruled out by owner due to concern that it would not receive consistent care from staff due to high turnover.
4. New low invert above ground grease trap from Mactrap:

Option selected : Low invert, above-ground grease trap with lift pump

The Mactrap standard grease trap (750 litres to 6000 litres) is transformed by utilizing the first chamber as a pump chamber. The inlet into this chamber can be as low as 180mm. The pump is activated by a float and lifts the greasy water into the two chambered grease trap.

The pump is specifically selected to reduce the emulsification impact so that separation can occur once the greasy water settles in the grease separation chambers. Dual pump option for redundancy.

The pump chamber is fitted with hot water jets that are automatically operated to prevent the build-up of fat and food sludge on the pump, the float, and the chamber walls.



Sizing the Grease Trap

The service station kitchen is simple with only the following greasy water fixtures

- 2 x medium sinks
- 1 x Combi oven
- 1 x Hand wash basin

This kitchen is required to have a passive trap with a minimum of 500 litres holding capacity.

Solution

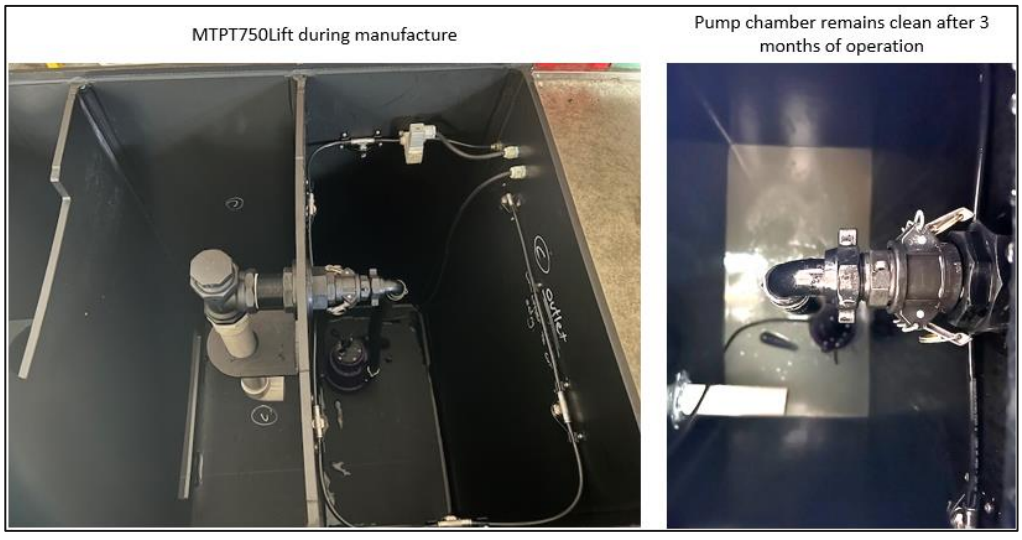
MTPT750Lift

- Pump chamber with single pump – dual pumps not requested at this site
- Grease separation chambers of 560 litres in total
- Pump chamber automatically cleaned with hot water jets
- Easy access to all chambers for servicing of pumps and extraction of contents
- Sampling point inherent in last chamber
- Rodding point inherent in first grease chamber

Advantages of this solution

- No maintenance burden on staff
- Simple gravity feed of the greasy wastewater from the sink to the trap
- Low-cost installation on existing concrete pad in the car wash/storage room
- No costly and disruptive excavation of the forecourt or surrounding area

Once installed the only responsibility left with management is have it emptied on a regular cycle as per Council's requirement and have the pump(s) checked every 12 months.



REAL WORLD : The hot water jets are keeping the pump chamber remarkably clean!

Customer : AgResearch

Challenge : Trap soil particulates before they enter wastewater network

AgResearch required a filtration system to prevent soil washed from plant roots and pots from collecting in their waste-water sump at their new shadehouse/glasshouse complex.

AgResearch, Cosgrove's and Mactrap worked together through an iterative design approach that included initial drawings, a working prototype, final design, and installation.

Solution

100-litre stainless steel, under bench trap with filtration stages that became progressively finer while still maintaining the expected discharge flow rates from the sinks.

The final filtration area utilized 3 x 100-micron filtration canisters.

Design Elements

- Filter basket 1: 2.0mm mesh on 3 sides.
- Filter Basket 2 : 0.5mm mesh on 3 sides.
- Filter manifold: 3 x 100-micron filter canisters.
- Dual drain taps to empty the tank.
- Sight glass provides visibility of sediment level.
- Inlet designed so influent will not bypass first filter basket.
- Dual Handles on filter baskets for easy lifting.
- Quick release plumbing connections and wheels to facilitate cleaning.
- Dimensions of overall tank customized to match the under-bench space available.

Sarah Jackman, Glasshouse/Shadehouse Lab manager at AgResearch provides more information about the requirement:

We are undertaking various experiments where we grow plants either as food for insect test subjects, or as the test subjects themselves.

Often, as part of the trial, we are required to extract the plant roots intact for future work/processing. Or we simply need to clean up the trial and wash the pots in preparation for reuse. While most soil should be removed before washing, a considerable amount can remain.

Our building is not connected to the local wastewater system so we collect our water in a system of sumps. The PC2 containment part of the facility must collect in a small sump, be treated, then drained to a larger sump, where it joins the wastewater from the remainder of the facility.

Any particulates (soil or otherwise) would create a sludge at the bottom of the sump, creating a possible containment hazard/breach in one area, and a mess in the other.

The filtration units allow us to prevent this situation, and the filtration trap design saves us much time and worry when it comes to cleaning the sumps out and getting them back 'online'. When the prototype was provided to me to test, my feedback was taken on board and actioned. As the person who would have the most to do with the cleaning, I felt reassured that our needs were being considered and met.

Project Team

AgResearch :	Sarah Jackman- Lab Manager (Glasshouse/Shadehouse)
Cosgroves Limited :	Allister Adams – Mechanical Engineer
Hanlon Plumbing :	Installation services
Mactrap :	Steve Shaw

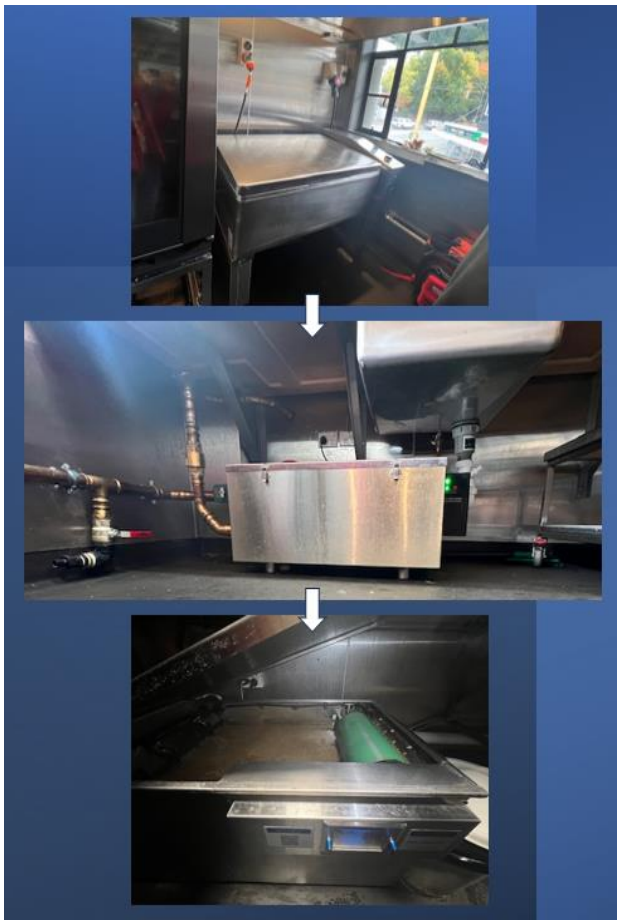
Customer : Flame Bar and Grill

Fire! South Africans are obsessed with it. You're not having a proper meal until you've lit up a few logs and singed the meat on screeching hot embers. In South Africa, a "braai", the local version of a barbecue. Flame emulates the Braai searing ribs & steak – exquisitely charred, succulent & juicy.

Challenge: Very hot greasy discharge – no access to drains – what now?

Flame recently increased capacity and efficiency in its cooking process by adding an iVario Pro XL for slow cooking large quantities of ribs before moving them onto the grills.

Several times a day the 150 litres of water in the iVario is discharged. The iVario location has no existing drainage and the discharge must be pumped up to the ceiling cavity and 10 metres horizontally to the main wash area on the other side of the kitchen.



iVario cooker

Gravity flow (3m run) from iVario cooker to pump chamber – the discharge is 90deg and copper pipes are required.

Large pump chamber/retention tank

- receives 150-litre discharge of 90deg water that is fat and sediment laden (from iVario).
- larger volume of water assists with cooling
- automatic hot water cleaning jets clear the pumps of fat and meat fibers
- dual heat-resistant lift pumps
- lift is 2.5m and horizontal run is 10m

Grease Boss G35

Super-sized under-bench grease removal unit – the G35 receives influent from the pump chamber, and from a co-located wash sink. Separation of fat & grease occurs, and it is removed automatically.

Jonathan Bisley, the owner of Flame Bar and Grill, was actively involved in the details of the Project.

The logistics and the volume of what we do is on an industrial scale compared with a typical Restaurant . We put a lot of effort into managing the quality and the volume efficiently. We worked with Steve from Mactrap developing and testing the wastewater systems and now have a solution we are very happy with. We now capture all waste solids in our wastewater and capture all cooking oils and grease before they enter the Queenstown drain network. We rarely need external contractors to clean out the system and manage in house with ease the daily maintenance .

It's the work that is critical to a good operation that people never see.

Project Team

Flame Bar and Grill :	Jonathan Bisley
Mactrap :	Steve Shaw
Advanced Plumbing :	Alex Helson

Customer : Magnus Lennie- Mitsubishi Motors Opotiki

Requirement: Preventing pollutants from uncovered wash pad entering the storm and wastewater networks.

Magnus Lennie are the Mitsubishi dealer in Opotiki and Whakatāne with a broad range of quality cars and light trucks for sale. In 2023, expansion and new development included a larger workshop area (covered) and a new external wash pad (uncovered).

The District and Regional Councils wanted to ensure

a. that contaminates such oil, grease, lubricants, grit and small metal or plastic parts didn't enter the stormwater network or the wastewater network
b. that rainwater did not flood the wastewater network

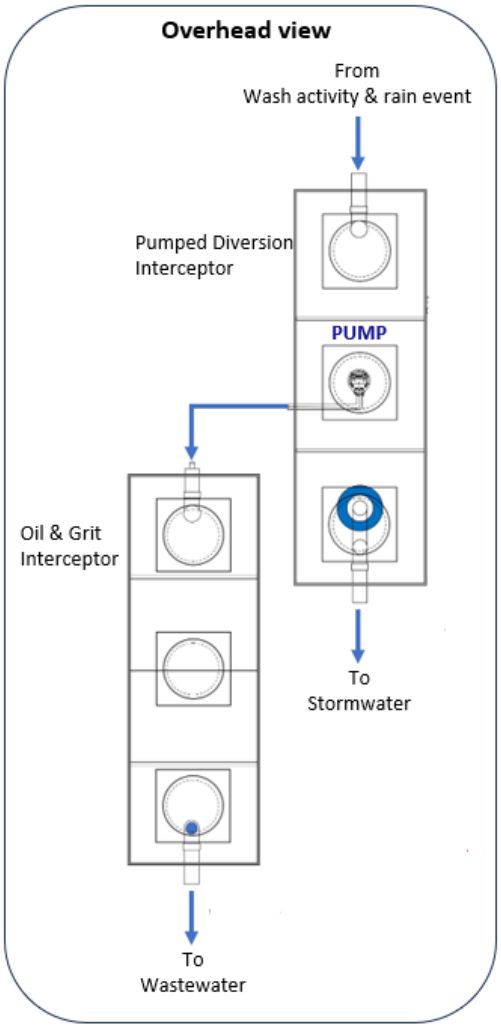
Solution: Oil & grit separator with a stormwater diversion system

DD2 and Mactrap worked closely with the Council to design an effective and easy to maintain system.

The stormwater path

The stormwater oil & grit interceptor is the default route. When a rain event starts, the pump in the "Pumped Diversion Interceptor" is activated and water is pumped to the "Oil & Grit Interceptor" which routes to the wastewater network – this is known as "first flush". Once the first flush is complete, the diversion stops, and the storm water passes through another interceptor chamber and coalescing filter to capture any residual and emulsified oil droplets.

The outlet has a self-actuated closure lock which will close if the oil in the chamber reaches a prescribed limit ensuring contaminants do not enter stormwater.

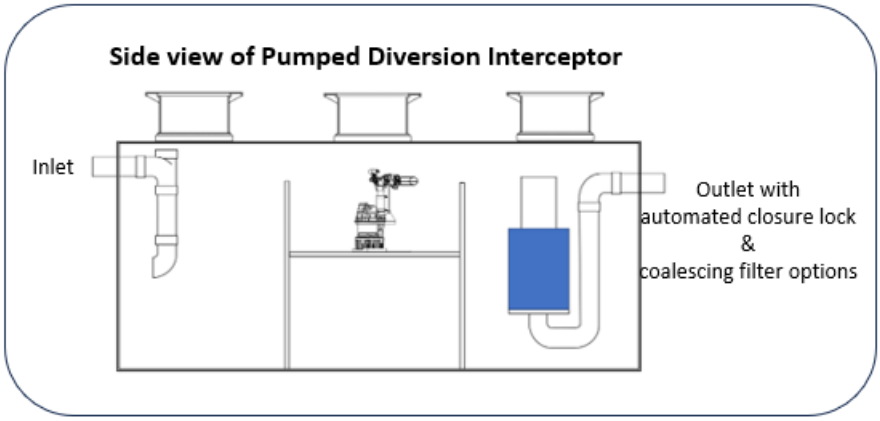


The wastewater path

When the water blaster is in use the pump in the "pumped diversion interceptor" is automatically activated and wastewater is pumped to the "fuel oil interceptor" which routes to the wastewater network. Separation occurs and oil & grit is trapped. The diversion to wastewater system will continue throughout the cleaning activity.

The fuel oil separator is also equipped with a coalescing filter to capture emulsified oil droplets.

This outlet has a self-actuated closure lock which will close if the chamber reaches a prescribed limit ensuring contaminants do not enter the stormwater system.



Advantages

- Reliability of electronically controlled diversion system
- First Flush interval programmable to suit oil/sediment load based on site knowledge
- Reliability of pumps
- Ease of maintenance of the pump (compared with some diversion valves)
- Superior protection for both networks in one installation
- *Automatic Closure lock ensures that poor management and/or delayed servicing of the interceptor does not mean oil “leaking” into the networks
- **Coalescing filters to capture emulsified oil droplets
- Cost : increased protection at circa 25 – 35% less expensive than fox diversion valve + interceptor

*The Closure Lock is an option and can be installed on the stormwater interceptor chamber and/or the wastewater interceptor chamber

** The Coalescing Filter is an option and can be installed on the stormwater interceptor chamber and/or the wastewater interceptor chamber

Outcome

Comment from DD2 and Magnus to come

DD2 :	John Hodginson
Mactrap :	Steve Shaw
Waiotahi Contractors :	Trevor Rush

Customer : Mānawa Bay- premium fashion outlet centre

Challenge: Large food court, grease trap must have remote extraction

Mānawa Bay will open in September 2024 near Auckland Airport and will offer an exciting and rewarding shopping experience with over 100 exciting retail stores. The outlet centre's park-like setting and fabulous food outlets will make it one of the leading outlet centres in Australasia.

Sustainability and Environment Responsibility

Manawa Bay is committed to sustainable building initiatives, optimising resources, reducing carbon emissions, supporting the local community and enhancing the environment.

The goal is to make a positive impact on the environment and the community and operate in a way that builds value for generations to come. The advanced capability of the Kessel Auto Mix and Pump is the only grease trap that could meet these goals in this busy demanding environment.

Managing the greasy wastewater from the large number of food tenancies in the food court had strict criteria:

- Able to meet the highest standards of protection from fat, oil and grease for the wastewater network and surrounding environment.
- No tolerance for odours during day-to-day operation
- No tolerance for odours when the contents is extracted.
- As per best practise the trap should be located as close as possible to the kitchens
- Extraction of the contents must occur from a remote location over 50m away from the trap
- The Extraction operation needed to be initiated from the remote location
- Mactrap worked with Thurston Consulting to recommended to find the best solution and the Kessel Auto Mix and Pump was selected.

Kessel NS15 Auto Mix & Pump

- Kessel NS15 grease trap – the lids are perfectly sealed and remain closed during disposal.
- The sonic sensor measures grease thickness and alerts when disposal is required.
- The access chamber for the disposal truck is 50 metres away from the restaurants.
- The automated disposal sequence is activated via the control panel.
- The shredder-mix pump system homogenises the contents of the tank.
- The contents are pumped through permanently installed pipes to the disposal vehicle.
- After disposal the trap and the disposal pipes are rinsed to remove residue.
- The trap is refilled to the appropriate level.

Thurston Consulting : Carl Burr , Senior Mechanical Engineer

Mactrap : Steve Shaw, Innovation and Manufacture

Customer : Global Defence Systems

Requirement : A robust, transportable, and fast to deploy grease trap and wastewater system for Defence Force mobile kitchen facilities.

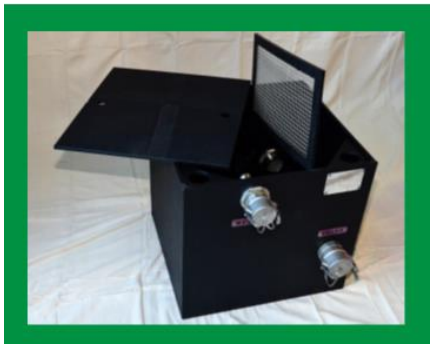
Global Defence Solutions (GDS) as a trusted sovereign provider of deployable infrastructure solution to the Australian and NZ Defence Forces, Government Organisations and the space industry.

Walkley Filtration designed the Wastewater management system to meet the needs of the mobile military kitchen. The system consists of 27 purpose-built components and ensures that fat and grease is not discharged at the deployed location.

Walkley and Mactrap collaborated to create the grease trap, collector boxes and select the appropriate pumps.

Collector boxes – capture solids from the wastewater from the kitchen

- Constructed from High Density Polyethylene (HDPE)
- 10mm mesh for solids capture
- Pump located in second chamber to move greasy water to grease trap



Custom built Gease Trap with pump chamber

- 500 litre multi chambered grease trap
- Final chamber is a pump chamber to move the treated water (free of FOG and solids) to discharge location
- Pump operates on a level switch

Customer : Laundromats (generic)

Due to increased demand for lint traps Mactrap has worked on a new design and improved sizing guide.

Lint is created by degradation over time of the items being laundered. Chemicals in the wash liquid and the mechanical action of washers gradually destroy fabrics. Captured particles include buttons, pieces of fabric, paper items and solid items left in pockets, debris, and dirt.

Lint interceptors are sized according to the number of washing machines installed which could discharge simultaneously. This peak flow is central to sizing regardless of whether the laundry is self service or a private commercial laundry.

Maximum Number of Machines	Mactrap Model	Pipework (DWV)	Length (mm)	Width (mm)	Height (mm)
3	MTFT3M[1]	75 or 100	800	450	500
6	MTFT6M	100mm	1200	520	630
10	MTFT10M	150mm	1200	645	880
15	MTFT15M	150mm	1200	806	1050
20	MTFT20M	150mm	1600	806	1050

Laundromats at hospitals and other healthcare environments must use very hot water to thermally sterilise the items. The load must be maintained at a minimum of 65°C for not less than 10 minutes, or at a minimum of 71°C for not less than 3 minutes. (AS/NZS 4146: 2000 Laundry Standard). The sizing table above is NOT for laundromat that thermally sterilise.

The maximum temperature that is permitted in wastewater networks is 40 degrees, so lint traps servicing sterilising laundromats must have sufficient size/retention to dissipate the excess heat.

Design and Sizing Considerations

- Size the trap for peak flow to prevent backflow pressure from causing the washing machines to alarm and fail.
- Progressively finer filter baskets to trap solids and then lint
- Total volume of mesh area so the water flow through the trap is not impeded by the trapped particulates (this is subject to filter cleaning routines)
- Machine effluent temperature
- Access to inlet for cleaning
- Surge bypass