CM Environmental Services
Waste Water Specialists
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Installation Guide

SHORE Alpha (5pe) to SHORE 250 (250pe)

INTRODUCTION

Thank you for choosing our Shore Sewage Treatment System. CM Enviromental has designed and built this Shore system, using our knowledge of what the installer and customer requires from a treatment system: reliability & efficiency. We pride ourselves on being a UK based manufacturing company.

From a health and safety perspective, we thoroughly advise you read this manual before working on the plant. Your knowledge will also ensure that the plant is installed to the recommended requirements, which in turn will ensure that your plant runs without any hassle.

Before, during or after installation, we are always on hand to help. Please do ring the office on 01156 848356 and we will do all we can to advise.

CONTENTS

SECTION 1: HEALTH & SAFETY

United Kingdom Health and Safety at Work Act 1974
Section 6a of this act requires manufacturers to advise their customers on the safety and the handling precautions to be observed when installing, operating, maintaining and servicing their products.

The user's attention is drawn to the following:
1. It is essential all customers read the relevant sections of this manual prior to working with the equipment.
2. Standard expected safety precautions must be taken and appropriate procedures observed to avoid accidents.
3. Any installations must be carried out only by suitably trained/qualified personnel.

CM is always available on 01156 848356 if you are concerned about any health & safety aspect, or if you are seeking information about the product or installation. You could also visit our website or social media pages to find lots of useful infoormation.

HEALTH

We have included the below for your information but it is the entirely the customer's responsibility to ensure that all necessary protective clothing/equipment (PPE) is available to any workers on site.

LEPTOSPIROSIS

Two types of Leptospirosis affect people in the UK.
Weil's disease. This is a serious infection that is transmitted to humans by contact with soil, water or sewage which has been contaminated with urine from infected rats.
Hardjo type Leptospirosis which is transmitted from cattle to humans.
What are the symptoms?
Both diseases start with a flu like illness with a persistent and severe headache, muscle pains and vomiting. Jaundice appears about the fourth day of the illness.

SECTION 1: HEALTH & SAFETY

HOW MIGHT I CATCH IT?

The bacteria can enter your body through cuts and scratches and through the lining of the mouth, throat and eyes.

HOW CAN I PREVENT IT?

After having worked in sewage or anything contaminated with sewage, wash your hands and forearms thoroughly with soap and water. If your clothes or boots are contaminated with sewage, wash thoroughly after handling them. Take immediate action to wash thoroughly any cut, scratch or abrasion of the skin immediately. Apply antiseptic to the wound, cover with cotton wool or gauze, and protect with a waterproof plaster.
DO NOT handle food, drink or smoking materials without first washing your hands.
If you contract the symptoms described after coming into contact with sewage, report to your doctor immediately and advise them of the circumstances.

SAFETY

DO NOT enter any of the below ground compartments of the Sewage treatment plant. Sewage gases are potentially explosive and toxic.

The equipment MUST be electrically isolated at the fuse box from which the blower power supply is derived, before carrying out any maintenance work.

DO NOT leave manholes or covers open for any longer than needed. Temporary barriers and warning signs should be erected around any open covers or man-ways where necessary.

SECTION 2: PLANT DESCRIPTION & PROCESS

Our Shore range of treatment plants are a "one tank structure made up of three chambers: a primary settlement, a biological filtration chamber and a final settlement zone. The systems are designed to handle a population of between 4 and 250 people based on British Waters Loads & Flows.

As long as the Shore system is treated the way we advise in this manual it will work efficiently for many years.

The plant will have been sized at quotation stage based on the loads and flows outlined by you as the customer. In order to ensure the system functions with no trouble for many years, we would recommend guaranteeing the following:

DO NOT allow surface/storm water to enter the system
DO NOT exceed the maximum design loading of the plant (the volume loadings the tank is designed for.)
DO NOT allow large quantities of chemicals such as: water softener regenerant, disinfectants, bleach, strong acids or alkalis, oil and grease, pesticides or photographic chemicals to enter the system.
DO NOT allow high volume discharges such as from swimming pools, hot tubs or jacuzzis to enter the system.
DO NOT use chemical or biological emulsifiers in grease traps.

If you have any doubt about a particular substance or the capacity of the treatment plant, please contact the Customer Service Department at CM for further advice on 01156 848356

Scope of Supply

If you order a Shore system it should come with:
The Shore unit itself
An enclosure containing an alarmed air blower/compressor unit c/w alarm
5m of airline to feed from the unit to the air blower
Any extras you specified on order: pumped outlet, invert riser, high level alarm etc
If you find upon delivery you are missing any items, please inform CM immediately 01156 848356.

SECTION 2: PLANT DESCRIPTION & PROCESS

The unit itself is a single tank structure (with the three chambers explained above) with everything needed for the biological treatment process to take place, once a functioning compressor is in place.

The tank itself is made of PPC Sheeting, reinforced with box section and heat welded with PPC and is supplied as standard in black. It is a 12mm thick panel. The material is impervious to water and sewage, and the reinforced material ensures its durability. The tank is provided with a manhole cover providing access to all parts of the unit (the number of manhole covers will be determined by the size of the unit.)

The biological filtration chamber (the centre chamber) is filled with plastic pieces of filter media. The amount of media required for the purification process to take place, has been calculated to suit the loads outlined for the site. The media provides a large surface area for bacteria to grow, which is needed for the purification process to take place.

CONTINUOUS RECYCLING

An air diffuser is installed into the submerged filter bed(s) and is located underneath the filter bed(s) this is connected to the external air supply (blower) by UPVC pipework. The recycling pipework is a UPVC pipe running from the bottom of the final settlement chamber to the top of the primary settlement tank. The pipework has a tapping at its top where tubing is inserted down the UPVC pipe which is connected to the blower.

BLOWER

The blower is mounted along with its associated electrical controls inside a weatherproof housing or kiosk dependent upon the plant size you are installing. The electrical controls include an isolator and a loss of air audible alarm and a double socket.

NOTE :
CM operate a policy of continuous product and process development and reserve the right to change specifications without prior notification.

SECTION 3: INSTALLATION INSTRUCTIONS

CM advises you read Section 1, regarding Health & Safety before attempting any work on the Shore system.

If the system is to be in storage for any time, all accesses must be covered to avoid rainwater gathering in the plant.

IMPORTANT
The siting of a treatment plant must be agreed with the Building Regulation department of the local authority prior to installation. Similarly, the discharge from a treatment plant will be subject to a Consent to Discharge approval or adhere to 'the binding rules' from the Environment Agency. Any permits must be obtained before installation. Consideration must also be given to the need for access for desludging the unit by tanker.

These instructions are intended to be guidance. CM can accept no responsibility for incorrect offloading or installation.

The contractor is responsible for offloading all items of equipment with due regard to the following:
DO NOT use wire ropes or chains.
DO NOT lift the plant if it has any water in it.
DO NOT pierce the tank with sharp objects in any way.
DO check the item to ensure it includes all of the parts ordered.

SECTION 3: INSTALLATION INSTRUCTIONS

The unit is provided with lifting slings on the outside of the tank. These are not intended for transportation of the units. Ensure to sling from the base and that the slinging angle does not exceed 60° at the hook in order to eliminate excessive compressive loads on the side of the unit. An equal triangle is required for lifting.

When working in deep excavation, make sure that all necessary safety precautions are taken to ensure the stability of the excavation and provide safe working conditions for site personnel. The only time anyone needs to be working at the bottom of the excavation is when levelling the base and ensuring that the first backfill is correctly placed.

An inspection chamber should always be installed upstream of the main plant. The installation should be carried out in accordance with the requirements of the Construction and Building regulations.

CM can make recommendations for the strength and thickness of the concrete, but ultimately it is the responsibility of the installer to judge this based on the ground conditions of the individual site, taking into account the buoyancy of the unit when being desludged, external forces exerted by the water table, backfill, traffic loading, etc.
If you are installing at an invert level in excess of 1.2m deep, a structural engineer must be consulted to design the correct concrete base , surround and cover slab to support the tank in the sites ground conditions.

PLEASE NOTE: Our tanks are liners, and a concrete surround is essential!!

During the course of the installation, the following minimum equipment will be required:

- Normal construction equipment and plant.
- Concrete to C20N and semi dry to 30mm slump.
- An adequate supply of water to fill the unit at the same rate as backfilling
- Dewatering equipment as necessary.
- Set of lifting straps of correct length and adequate SWL.

Please Note : The foul drain to the treatment plant MUST have a traditional soil/vent pipe at the head of the drain run. Air admittance valves, tile or ridge vents are NOT acceptable. If the treatment plant is to be installed in a trafficked area specific guidance should be sought from a structural engineer.

TANK INSTALLATION STEPS:

- Excavate to the tank dimensions allowing a minimum clearance of 150mm between the unit and the excavation sides. Excavate to the appropriate depth for the installation ie. depth of the unit plus 150mm minimum concrete thickness (actual thickness to suit ground conditions as explained above).
- Lay and level the concrete base for the tank to a minimum of 150mm thickness.
- Lift the tank into position using slings, taking care not to damage any external flanges or pipework. Nestle the tank into the concrete base.
- Ensure correct orientation of the inlet and outlet pipework.
- Check that the tank is level in all directions.

SECTION 3: INSTALLATION INSTRUCTIONS

- Commence backfilling with concrete in 500mm lifts, and at the same time, fill each tank compartment with water starting with the media bay section, then moving the water supply into the other chambers through the access lids, ensuring that the progressive concrete and water levels are approximately equal (never exceed a difference of 200mm max). The concrete must be evenly distributed around the unit, ensuring spigot connections are not covered at this stage.

Never partly or wholly fill the tank with water before surrounding it in concrete.
Note: DO NOT use vibrating pokers to compact the concrete.

1. Gradient of 1:70.
2. Continue placing the concrete in 500mm lifts, terminating at the shoulder of the unit. Allow an initial set of the concrete between lifts and wait at least 24 hours for the concrete to harden.

Ensure a cable duct is laid underground from the airline connection on the neck of the treatment plant to the desired position of the Blower unit. This is for the airline only and is to ensure complete protection of the airline. There are NO electrical components within the treatment plant unless you have requested the option of a pumped outlet.

ELECTRICAL INSTALLATION STEPS:

In order that you achieve a safe and cost effective installation, it is not possible to state a specific installation configuration that would suit all sites. The selection of current protection devices must remain the responsibility of the installer. It is imperative that electrical installation of this equipment is entrusted to a competent electrician.

The blower unit can be positioned wherever is most convenient bearing in mind the need to get a power supply to it and the airline from it to the treatment plant.

In the height of summer the compressors can become very hot as they are a continuously running motor and where possible, installing in the shade is the most ideal position. If this is not possible, additional venting of the kiosk or blower housing should be installed.

If a pumped discharge has been requested on the treatment plant, the cable from the pump can be fed back up the airline duct to the blower unit within which is the electrical connection for the pump. Most pumps come complete with 10 meters of cable. The blower unit is supplied with 5 meters of airline as standard.
The airline duct MUST be sealed with expanding foam when installation is complete.

When installing the electrical supply to the blower unit, the following points should be considered:

- The supply to the unit should be by means of a dedicated circuit with isolation and protection devices consistent with the requirements for fixed equipment and in accordance with the latest regulations of the Institute of Electrical Engineers.

SECTION 4: PLANT START UP/SHUTDOWN PROCEDURE

START UP OF THE PLANT:

- Fill the plant with clean water until there is a discharge from the outlet.
- Connect the airline from the blower unit to the receiving hose-tail outside the neck of the treatment plant and ensure the connections are airtight. The airline needs to be free of any kinks or bends and installed inside a ducting.
- Check the blower ventilation is unobstructed. Turn on the main power supply to the blower unit.
- Turn the socket inside the blower housing to the on position. This will start the blower running. It will take a minute or so for the pressure to build up in the system depending on the distance of the blower from the treatment plant.
- Check that bubbles are breaking the surface in the filter media section of the treatment plant.
- If a discharge pump is fitted check for operation.
- Fit the manhole cover.

Once all of this is completed, the unit is running. Please be reminded though, that the treatment plant process requires the growth of micro-organisms on the filter media, which can take up to six weeks in winter because the temperature is not ideal. The treatment of the sewage will be incomplete until the biomass is fully developed. During this time do not allow any strong cleaning agents or bleaches to enter the system.

SHUTDOWN OF THE PLANT:

If flow is absent from the plant for a short time, it will not have a significant impact on the running of the plant. But if the plant were to have significantly reduced flow, or no flow at all, for more than 3-4 months we would recommend shutting down the plant, using the following instructions:

- Desludge the primary and humus tank compartments in accordance with the instructions in the Maintenance, section 6 of this manual.
- Refill the plant with clean water.
- Fit the manhole cover and lock if necessary.
- Stop the blower by turning the socket to off.
- Switch off the power supply to the blower enclosure.

SECTION 5: MAINTENANCE

OWNER RESPONSIBILITY

Once operational, the owner of the treatment plant is entirely responsible for the maintenance and upkeep required in order to adhere to the binding rules outlined by the Environment Agency, which are in place to maintain the Discharge Consent Standards.

A service contract is recommended, but this does not transfer responsibility for general maintenance of the plant. Drainage fields and the emptying of primary tanks remain the responsibility of the treatment plant owner. If when checked by the owner, the plant does not appear to be operating as it should, please firstly refer to Section 6.

If the plant appears not to be operating correctly, refer to the Fault Finding, section 6 of this manual or contact CM for advice on 01156 848356.

SECTION 5: MAINTENANCE

MAINTENANCE SCHEDULE

WEEKLY

Check the operation of the blower. If the blower has failed for any reason other than a mains power failure the alarm will be sounding, or a warning beacon will be flashing.

MONTHLY

Carry out the weekly check plus:

- A visual check that the diffusers are functioning (bubbles are rising in the Biological zone-the second chamber).
- Check the recycle flow into the inlet zone; Look at the liquor being returned, it should run clear by the end of its cycle.
- Check the inlet and outlet zones, for attenuation, are clear of debris (carefully and safely remove any obstructions with a net)
- Check the blower ventilation is not blocked if applicable.
- Check the biomass growth on the filter media. The biomass should be a light brown colour, not white or grey. The odour in the plant should be 'earthy'. There should not be a noticeable 'rotten eggs' smell.
- Check the final effluent. If this is cloudy or contains many suspended articles, then the final settlement is likely to require desludging.

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3/6 MONTHLY/ANNUALLY

Our service department CM Environmental offer a service contract to undertake the following. Please contact us on 01156 848356 for a quotation.

The below is point 11 of the Environment Agencies 'General Binding Rules for small sewage discharges' SSDS (January 2015). The general binding rules are for small sewage discharges and along with the other rules, the below is a requirement that needs to be adhered too. For larger discharges or where a Bespoke or Standard permit is in place, a management system is also a requirement:

11	X	X	Maintenance must be undertaken by someone who is competent.

CM have trained competent engineers to carry out your servicing for you, a full report is also provided on completion for your records and samples taken where necessary. If you would like to carry out these checks yourself, please carry out the weekly and monthly checks plus:

- Check the primary settlement tank with a probe , the top floating crust blanket should not exceed 200mm thick, arrange desludge if required.
- Depending on the size of your plant we recommend you organize the desludge of the primary and final tank every 3 - 12 months. This should be done by an experienced local waste disposal tankering company. Again CM can organize this for you if you would prefer.
- Inform the tanker company that the tanker suction hose should be carefully lowered into the primary and final chambers ensuring all settled sludge is removed.

SECTION 5: MAINTENANCE

- After desludging, it is essential that the unit is filled up with water. This can be done by using a hosepipe or by running several taps in the household(s).
- Remove air filter from the blower unit (remove top cover to access filter), clean and replace.
- Check recycle flow is operational. (please see monthly checks)
- Checked pumped outlet for running amps of pump.
- Ensure the aeration process is operating correctly and biomass has the correct bacterial growth. (please see monthly checks)

SECTION 6: FAULT FINDING

THE BLOWER IS NOT RUNNING

	Possible Cause	Remedy
1	Power Supply has tripped	Switch off the power and reset. Once power is switched back on, it should start automatically. If it doesn't, switch off the power supply and call an electrician, on 3 phase supply check correct rotation.
2	Power Cut	Once the power is restored the system will restart automatically. It' s only if power was cut for a significant length of time you
3	Blower running intermittently	Possible overheating in the enclosure, which would cause the high temperature to trip the power until cool. Check the air ducts are clear to ensure they are not causing overheating.

AIR BUBBLES ARE NOT RISING FROM THE DIFFUSER

	Possible Cause	Remedy
1	Blower is not running	Refer to above 'Blower is not running'
2	Blower is running	Check all valves open, and all air lines are not broken or leaking.

THERE IS NO RECIRCULATION FLOW FROM THE HUMUS TANK COMPARTMENT

	Possible Cause	Remedy
1	Blower fault	Refer to above 'Blower is not running'
2	Pipework for recirculation is blocked	Use a wooden pole to agitate any sludge which has settled around the bottom of the pipe. If there is a substantial level of sludge, then desludge the final settlement described in the Maintenance Schedule, section 5 of this manual.

SECTION 7: SHORE PACKAGE SEWAGE TREATMENT PLANT

ALL SURFACE WATER MUST BE EXCLUDED – NO WASTE DISPOSAL UNITS IN USE
AN EFFECTIVE GREASE TRAP MUST BE INSTALLED ON ANY COMMERCIAL KITCHEN DRAINS eg.: HOTELS / RESTAURANTS

The "SHORE" treatment plant is of unitank design and incorporates Primary Settlement (PST) Biological Treatment (Biozone), and Final Settlement (FST) within the same structure, allowing delivery to site as a complete unit to provide for a simple and straightforward installation. No other tanks are required except for larger applications (over 300 p.e.) where a modular system is provided or where additional treatment may be required to achieve more stringent effluent quality standards or where effluent re-use is proposed.
The "SHORE" Treatment plant has been designed to optimize the aesthetic qualities of the final installation by ensuring that there is minimum visual impact.

PRIMARY SETTLEMENT TANK

The primary settlement tank is a two stage tank designed to maximize the removal of gross and suspended solids prior to transfer of the settled effluent to the biozone for treatment. The primary settlement tank also incorporates for a sludge storage volume (based on full load) depending on the desludge periods as identified for individual applications.

BIOZONE

The biological treatment phase utilizes BAF technology (biological aerated filter) which incorporates two proven principles of biological process in the form of a fixed film reactor for process stability and a suspended floc dispersed growth system for high transfer rates and operational control, to ensure a stable treatment process which is largely unaffected by shock loads.

The process incorporates a submerged, high rate, plastic media on which a fixed film of biomass is grown. This film takes nutrition from the incoming settled effluent and is provided with oxygen by means of a small blower unit which aerates the media through HDPE membrane diffusers to provide fine bubble aeration.

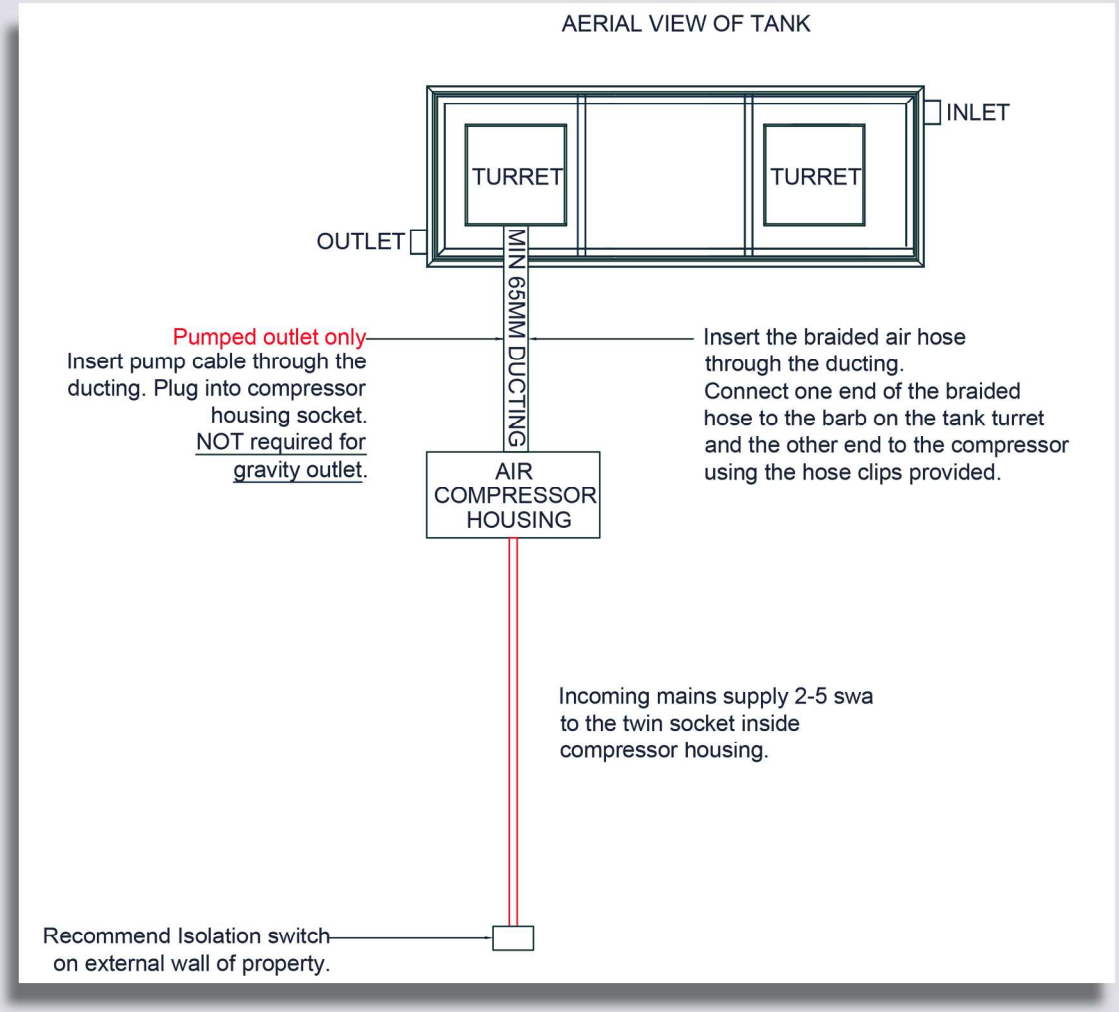
The action of the fine bubble aeration is carefully controlled to provide optimum oxygen transfer rates and provide a scouring action to slough off excess biomass to keep the thickness of the fixed biological film at optimum levels, thereby preventing the production of anaerobic bacteria and ensuring maximum process efficiency. The fact that the media remains submerged allows for an element of suspended floc dispersed growth which basically means that there will be biomass which is "unfixed" to the media but achieves treatment through suspended aeration.

The treatment plant incorporates a two stage process as standard that allows for constant mixing of incoming settled effluent to provide optimum treatment stability and to avoid any short-circuiting." The use of a two stage biozone ensures a high degree of process efficiency to not only reduce B.O.D. levels to that required, but will also achieve reductions in ammoniacal nitrogen in excess of standard requirements.

FINAL SETTLEMENT TANK

The final settlement tank is designed to ensure relevant surface areas and rise rates are achieved to provide maximum settlement of any suspended solids prior to discharge.
The SHORE system also incorporates a continuous and automatic humus sludge return system to return humus sludge from both the final settlement tank, back to the primary settlement tank.
Additionally this system also provides for continuous recycling of treated effluent back to the P.S.T. to not only provide dilution of incoming settled effluent but to also ensure continuous flow during periods of low or no flow, thereby keeping the biomass in prime condition.
To maximize efficiency and to minimize maintenance requirements and potential problems, there are NO mechanical or moving parts contained within the treatment plant.

Aerial view of tank

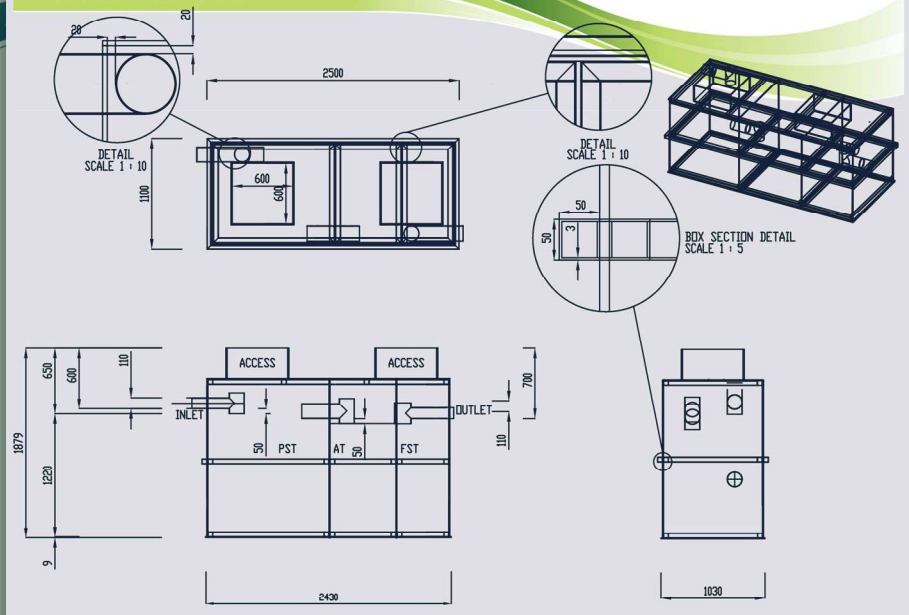


Technical details and dimensions

SHORE Model	No.of people	Length M	Width M	Height M	Nominal inlet/outlet MM	Weight Empty KG	inlet invert to base M	Outlet invert to base M	Inlet invert to ground level M	Air blower rating Watts
ALPHA	1 TO 5	2.5	1.1	1.88	110	270	1.27	1.17	0.6	ET60
BRAVO	1 TO 6	3.1	1.1	1.885	110	300	1.275	1.175	0.6	ET80
BRAVO +	2 TO 8	3.1	1.5	1.885	110	340	1.275	1.175	0.6	ET80
CHARLIE	3 TO 10	3.06	1.75	1.885	110	390	1.275	1.175	0.6	ET100
DELTA	6 TO 15	3.1	2.08	1.89	110	420	1.275	1.175	0.6	ET150
ECHO	8 TO 20	3.1	2.68	1.89	110	500	1.275	1.175	0.6	ET200
FOXTROT	8 TO 25	4.2	2.3	1.91	160	580	1.3	1.285	0.6	ET250
GOLF	10 TO 30	4.33	2.5	1.91	160	600	1.3	1.285	0.6	ET300
HOTEL	14 TO 40	4.53	2.5	2.2	160	750	1.6	1.45	0.6	ET400
INDIA	16 TO 50	4.84	2.5	2.4	160	820	1.79	1.64	0.6	ET500

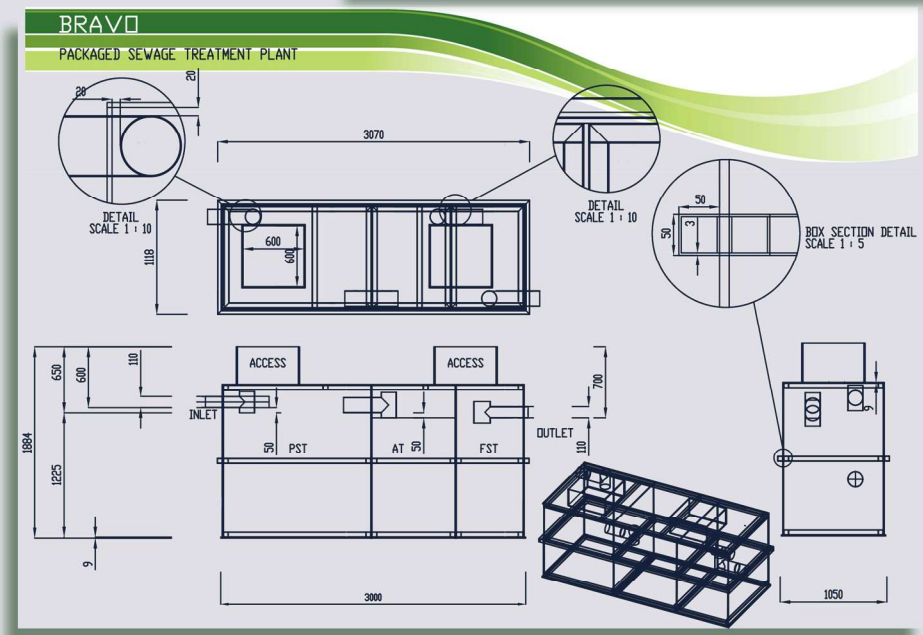
ALPHA

PACKAGED SEWAGE TREATMENT PLANT



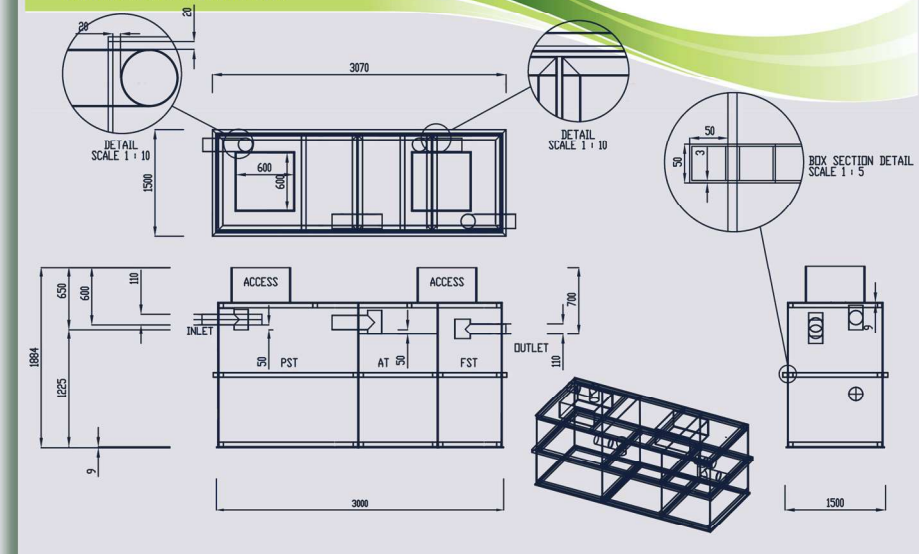
BRAVO

PACKAGED SEWAGE TREATMENT PLANT



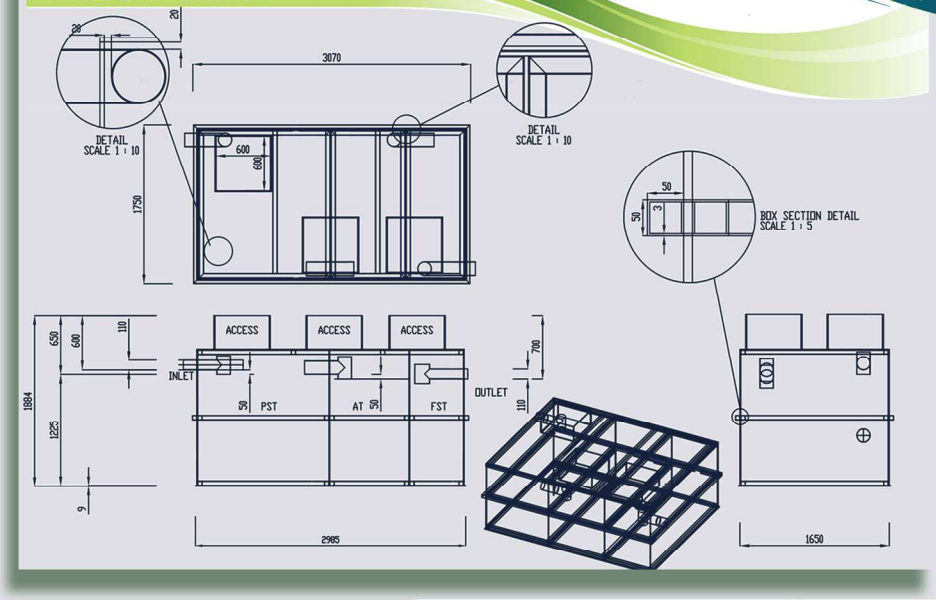
BRAVO PLUS

PACKAGED SEWAGE TREATMENT PLANT



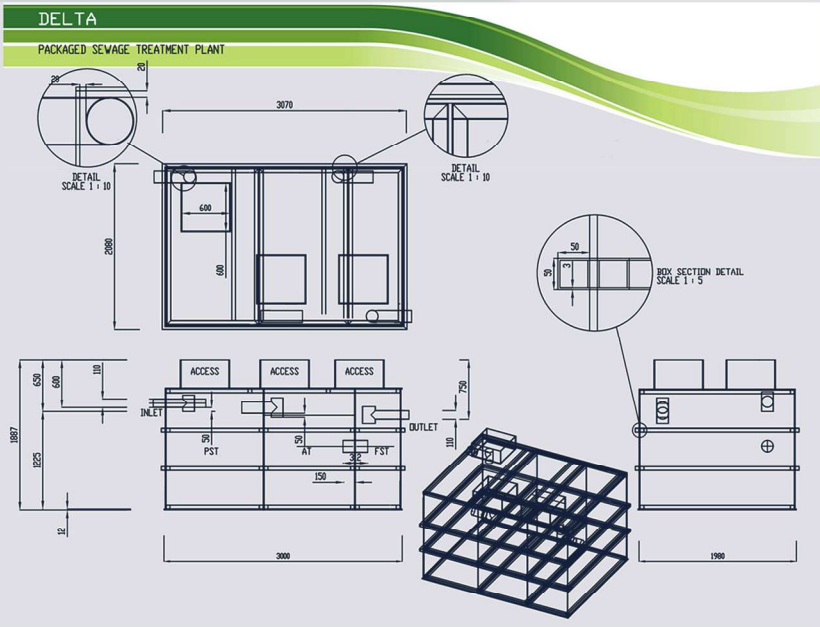
CHARLIE

PACKAGED SEWAGE TREATMENT PLANT



DELTA

PACKAGED SEWAGE TREATMENT PLANT



ECHO

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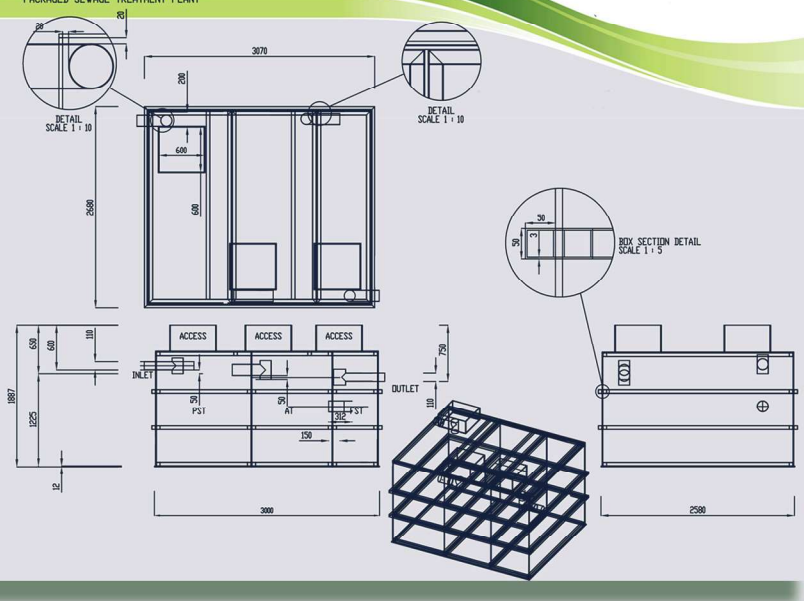
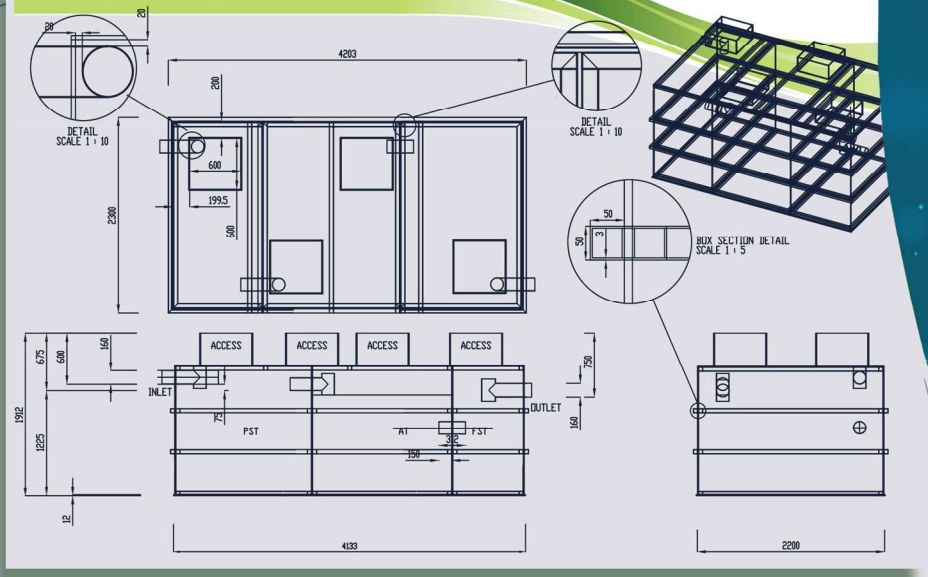


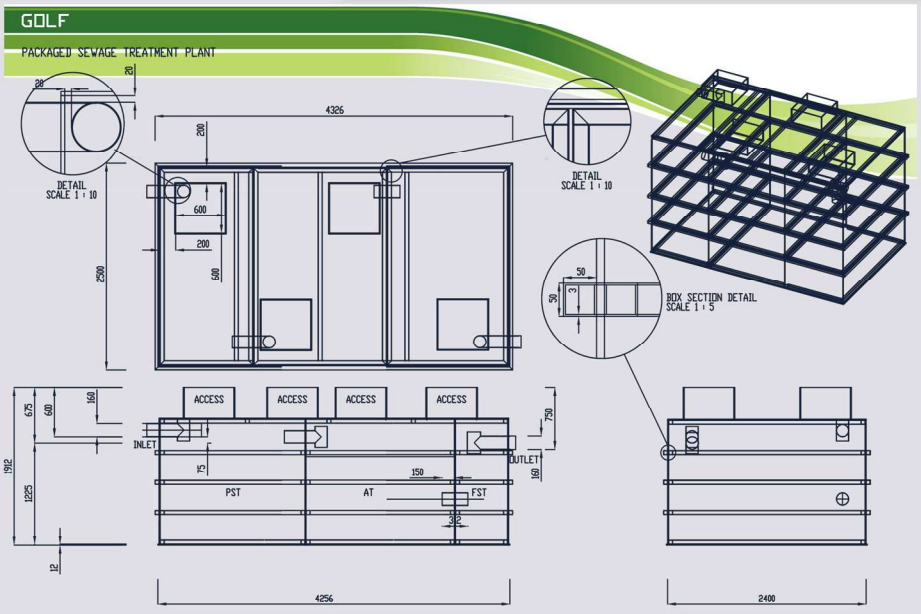
FOXTROT

PACKAGED SEWAGE TREATMENT PLANT



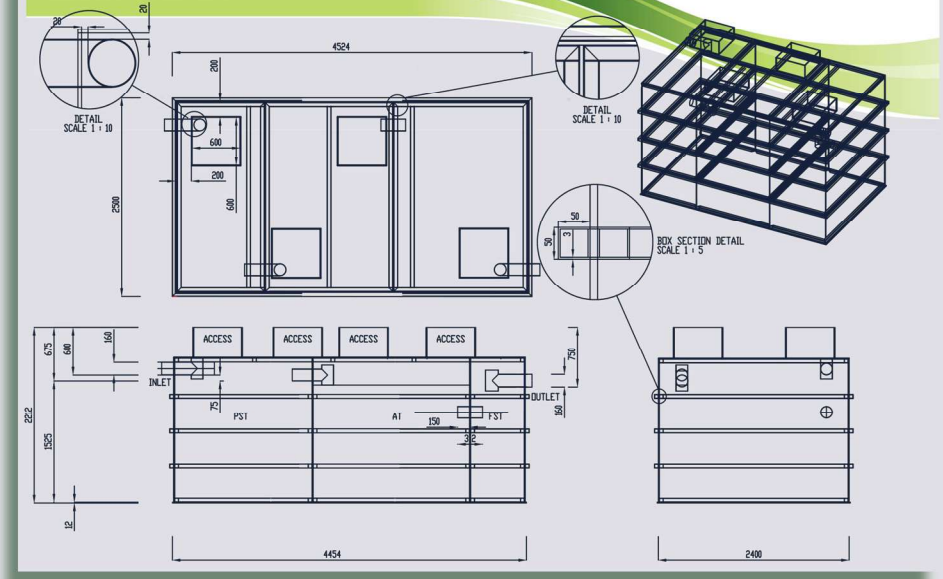
GOLF

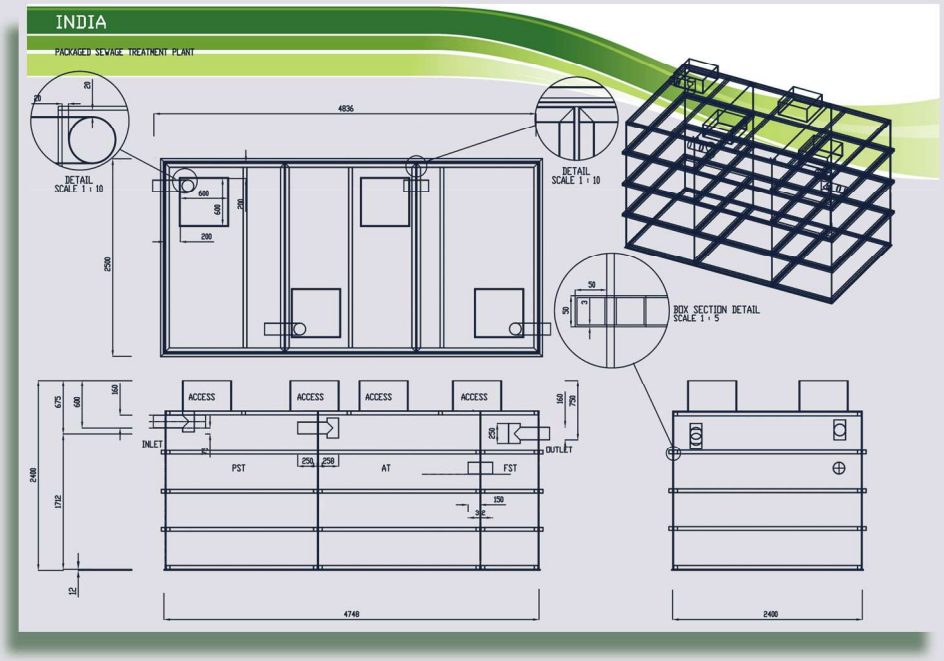
PACKAGED SEWAGE TREATMENT PLANT



HOTEL

PACKAGED SEWAGE TREATMENT PLANT




INDIA
PACKAGED SEWAGE TREATMENT PLANT
DETAIL
SCALE 1 : 10
4836
DETAIL
SCALE 1 : 10
BOX SECTION DETAIL
SCALE 1 : 5
ACCESS
ACCESS
ACCESS
ACCESS
INLET
OUTLET
PST
AT
FST
2500
2400
4740
2400

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