Commercial Water Solutions
Products for Community Water Systems
Arris offers fit-for-purpose water treatment solutions for all aspects of the engineered water cycle. We work with the domestic, commercial, agricultural, trade-waste, government, industrial, mining and gas sectors. Our water projects have ranged from a single household to projects that use 10 million litres per day.

We actively work with our clients to ensure they obtain the treatment system that suits their needs for treated water quality, capital budget, installation footprint, and operational requirements.

As part of our service, our experts can design the installation, obtain the necessary regulatory approvals, install the systems, and maintain them over time. We ensure that systems that are robust and reliable with low operational costs are provided.

Our research and development has generated our own unique treatment systems; such as the Rhizopod™ technique. Arris also has exclusive import agreements on some of the world’s most advanced ozone and oxygen generation technologies. Furthermore, our company has a comprehensive supplier chain that provides access to complete treatment solutions, such as the Fuji Clean wastewater treatment units and to component suppliers that allow us to design and construct bespoke treatment chains for specialised applications.
Arris has developed a reputation for on time and on budget delivery of decentralised turnkey water services.

We have constructed potable water treatment systems, wastewater treatment facilities, groundwater treatment chains for irrigation, stormwater transfer and treatment infrastructure, recycled water networks and reuse schemes, pump stations, sewer installations, reticulated water delivery systems, biosolids dewatering, storage tanks, and irrigation works. Arris can build and containerise our water treatment plants at our Rockhampton or Adelaide yards and deliver the completed product to site. This can reduce costs for remote and regional builds and also means that the treatment solution is transportable. Moreover, we have successfully retro-fitted existing treatment chains with the aim of improving water quality and reducing operational costs. The team has exceptional skills in trouble shooting treatment issues within existing treatment chains.

We are able to build plants that can handle variable flows, in either a batching or continuous flow operation. Our team will design, build, and then transfer the completed plant to the client, or undertake the continuing operation of the plant. Arris has trained and experienced staff who can operate potable, stormwater, wastewater, and mining water treatment facilities. We can contract these staff out to developers, body corporates, business and industry, and special event managers to operate and maintain decentralised water treatment schemes. Arris can assist clients with the operation and maintenance of systems where the original proprietor is no longer available.
OZONE TREATMENT TECHNOLOGY

Features and Benefits of Ozone Treatment

Ozone is a natural product of our environment, created by electrically charging oxygen molecules. It is one of the strongest sterilants known.

New technological advances have transformed ozone water treatment into an increasingly common best practice solution.

Ozone has a high oxidation potential, making it more effective than chlorine and UV light. It can eliminate or destroy: bacteria, giardia, crypto, e coli, cysts, viruses, mould, algae, fungi, colour, odour, and protozoa.

Arris is the exclusive Australian agent for the Aclarus and Primozone water treatment Systems, for further information visit: www.aclarus.ca and www.primozone.com. Provided with water quality data or a sample, Arris can ascertain treatment effectiveness using our in-house testing capability.

Ozone treatment provides the benefits of eliminating storage or delivery of consumables to site, improved functionality, reduced trade waste disposal costs, increased abilities in recycling, simplified maintenance, and increased longevity of capital investment.

Key features of new ozone systems include the ease of installation and ongoing operation, precise delivery output, reduced footprint, and low power consumption. Arris offer systems that are easily retrofitted into existing infrastructure, providing enhanced performance and a safe operating environment.

The world’s major bottled beverage manufacturers use ozone to treat the bottled water you buy every day.

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The oxygen - ozone - oxygen cycle

1. The applied energy splits the oxygen molecule (O\textsubscript{2}) into atomic oxygen (O\textsubscript{1}).
2. The single atomic oxygen (O\textsubscript{1}) connects to an oxygen molecule (O\textsubscript{2}) and ozone (O\textsubscript{3}) is formed.
3. The single atomic oxygen (O\textsubscript{1}) disconnects from the ozone molecule (O\textsubscript{3}) and performs oxidation.
4. The ozone molecule (O\textsubscript{3}) has turned into an oxygen molecule (O\textsubscript{2}). The cycle is completed.
5. The ozone molecule (O\textsubscript{3}) has turned into an oxygen molecule (O\textsubscript{2}). The cycle is completed.

Ozone is made up by oxygen and will revert back into oxygen upon reaction.
Arris can design and supply ozone systems for any size application.

We work directly with manufacturers of the world's leading ozone technologies. This connection provides our customers with the latest global technological advantages.

**SMALL - up to 10,000 L/day.**

Potable water for your home – treating rainwater tank, bore, dam, lake or river water. Ideally suited for campgrounds, restaurants, laundries, warehouses and small factories.

**MEDIUM - up to 100,000 L/day.**

Applications such as hotel/motel, hospitals, swimming pools, dairy, industrial/food processing plants, wineries, schools, aquariums, recreation, mining camps and pump stations.

**LARGE - upwards of 100,000 L/day.**

Suitable for treating water from mining, oil and gas operations, potable WWTP, wastewater treatment plants, office buildings, bottled water/beverage/breweries, municipal infrastructure, golf courses, nurseries, ballast water, parks, apartment buildings, and farms.

Growth of US drinking water plants using ozone technology.

NSF-61 approved ozone system (National Sanitation Foundation www.nsf.org)
FUJI CLEAN TECHNOLOGY

With over 60 years of experience, Fuji Clean is one of the world’s leading manufacturers of high efficiency wastewater treatment systems with over 2 million systems (both domestic and commercial) installed around the world.

Small and compact units are specifically designed using advanced Japanese engineering technologies to achieve maximum operational efficiency without leaving a large footprint on the environment.

Due to its light weight and compact design, the Fuji Clean commercial system is extremely easy to transport and install.

TREATMENT PLANT TROUBLE-SHOOTING AND REFURBISHMENT

Older treatment plants can sometimes have ‘issues’ and struggle meeting some water treatment goals. Often people are told that only a completely new system can solve the problem. This is not always true and many older systems can benefit from some trouble-shooting and refurbishment. We have a team with a wide range of skills and many years practical experience of installing, operating, and maintaining an extensive range of technologies.

Our team includes Civil, Process, Electrical and Environmental Engineers, Biologists, Chemists, Physicists, Plumbers, Electricians, Fitters & Turners, Boilermakers, Machinery Operators, Draftspeople, Economists, and Communication specialists. Our team is highly qualified and includes people with PhD’s and some with over 40 years’ experience on the tools.

Many older systems can benefit from some trouble-shooting and refurbishment.

The combination of academic and practical knowledge allows us to economically upgrade older infrastructure to enable it to meet required water quality objectives. This process can involve repairing and replacing broken infrastructure – even if the original manufacturer is no longer in business. This can include installing some new technologies into the existing treatment chain – an option that is much cheaper than a complete replacement.

Refurbishing and/or small upgrades of existing treatment facilities is often the most cost effective option for our clients.
RHIZOPOD™ SYSTEM TECHNOLOGY

The Rhizopod™ system, formerly promoted as the Recirculating Evapotranspiration Trenches (RET) system, is designed to resemble a raised garden bed. Pre-treatment is provided through septic tanks and/or aerated tanks. The recirculating nature of the technology and the holding tank have resulted in a relatively small footprint for the Rhizopod™ system. The Rhizopod™ technology has been installed and operating since 1998. Arris Water can design, construct, maintain, and operate Rhizopod™ systems. The Rhizopod™ system has been very popular at caravan parks and for small clusters of houses.

Many soil types are unsuitable for the long term application of effluent. Some sites are so close to environmentally sensitive areas that the required set back distances make the development of the land unviable. The Rhizopod™ system imports soil suitable for the long term application of effluent, and treats and reuses it within a contained environment, minimising the applicable set back distances.

Plants grown in the channel allow all the effluent to be reused; with a holding tank providing wet weather storage. This allows the Rhizopod™ system to be successfully installed on sites with very poor soils and relatively close to environmentally sensitive areas. Rhizopod™ system installations have been approved by the Queensland Regulator as ‘no-release’ — which reduces the annual licence fee and the monitoring requirements. In 2015 has received product approval by the South Australian Department of Health. If required, the technology can be adjusted so that it produces ‘fit for purpose’ recycled water.

Arris Water can provide a contained treatment technology based upon the Rhizopod™ system. Ben Kele developed this technology during his Master’s degree through research study at the Centre for Plant and Water Science at the CQ University. The dual drivers for the development of the technology were to create a system that is independent of the local soil type and one that treated wastewater in a contained manner.

Water planners have used Rhizopod systems to delay expensive capital works programs

Rhizopods are being used for single domestic systems through to decentralised systems for small communities of 1600EP
We offer a wide range of trenching systems for the underground dispersal of treated effluent. These trenching systems are regarded as world’s best practice and approved under Australian Standard AS 1547:2012.

Below-ground dispersal helps minimise public health concerns as people cannot come into contact with the water and this method provides odour control. Trenching systems are passive, provide additional treatment, and lower the operational costs of above ground irrigation, as additional disinfection is not required.

For example, not having to replace chlorine tablets as part of a maintenance schedule reduces site visits and consumables costs. We offer evapo-transpiration trenches (ETT), pressure dosed infiltration trenches and the VAPARhizE® Trenching System. The different trenching systems allow us to cater for different soil types, loading rates, treated water quality, general site conditions and preferred system footprint.

As part of our design process we provide advice on the most suitable trenching system for your site.
VAPARhizE® system

The Venturi Aerated Pressure Alternated Rhizozone Evapotranspiration (VAPARhizE®) trenching system is an innovative method that amalgamates a number of recognised ‘best practice’ design, distribution, and dispersal techniques. The aim of the technique is to maximise the oxygen level in the water and the soil in the trench. The increased oxygen is highly beneficial for plants grown over the top of the trench.

VAPARhizE® uses the alternating pressurised distribution method in combination with venturi valve and tunnel splash-back aeration. Venturi valves place micro-bubbles of air into the water. The micro-bubbles have a very large surface area, which enables the water and soil to stay in an aerobic condition.

VAPARhizE® uses a unique pressurised ‘tunnel splashback’ style distribution technique successfully developed under local conditions in South Australia. Pressurised treated water is forced through a series of measured apertures against the underside of the tunnel. This in turn creates an aerosolising/vaporising effect that not only provides further passive aeration, but also results in a very uniform wetted dispersal over the distribution media for the entire footprint of the tunnel.

VAPARhizE® maximises the oxygen level in the water and the soil, which is highly beneficial for plants grown over the top of the trench.

The system is energy efficient as the pressure from the pump provides aeration through the venturi valve. The aeration provides additional treatment, reduces odours, has plant health benefits (particularly for roots) and helps increase soil sustainability.

The VAPARhizE® system is an innovation based on the on-site wastewater standard AS/NZS 1547:2012, the relevant South Australian Department of Health Codes, as well as components of a number of international standards and published peer reviewed scientific reports.
WISCONSIN MOUNDS

Wisconsin Mounds are an internationally successful land application system developed in the USA. The sand filled mound is essentially a secondary treatment aerobic sand filter system positioned above the dispersal site. Water is removed by evaporation from sun and wind, and transpiration from the grasses and ground covers planted over the mounds. Any effluent migrating to the base of the mound is regarded as equivalent to secondary treated wastewater and is further treated and dispersed by natural soil absorption processes. Mounds would normally only be considered on larger allotments in areas with high water tables, shallow rock or very difficult soil types.

Wisconsin Mounds are best suited for the treatment and dispersal of treated water from clusters of domestic houses, commercial or industrial applications.

The system does require a pre-treatment step, such as a septic tank followed by a pump chamber. Wisconsin Mounds are best suited for the treatment and dispersal of treated water from clusters of domestic houses, and commercial or industrial applications. The treatment system is capable of handling relatively large flows and sites that have fluctuations in wastewater generation volumes, such as sports ovals, caravan parks, restaurants, and Cellar Doors.
PRESSURE DOSED INFILTRATION TRENCHES

Arris provides an improved version of the conventional trench system – the pressure dosed infiltration trench. These trenching systems can be used in sandy to loam soils (Category 1-3 soils). The system involves a number of trenches being installed for the dispersal of the treated effluent. The top of the trench is typically planted with a lawn grass, which uses some of the treated water for evapotranspiration.

The pressurised distribution system allows for the even dispersal of water along the length of the trench (no pooling). It also means that trenches can be dosed with water in an alternating sequence through a distribution valve.

This allows trenches to dry out in between doses, encouraging healthy aerobic soil conditions. This in turn helps to maximise the evapotranspiration rate and maintain the soil permeability over time.

The pressure dosed infiltration trench is approved under AS 1547:2012 and is a marked improvement over the conventional trench design.

ETA TRENCHES

An Evapo-transpiration-absorption (ETA) trench system is suitable for sites with heavy or clay soils (such as Category 4-6 soil profiles). The trenches are comprised of a pipe distribution system, sand and aggregate, and suitable soil for the long-term application of effluent.

The trenches are designed to be covered by plants; typically, a lawn grass is used. They are approved under AS 1547:2012 and disperse the treated water via three natural water processes: sub-surface infiltration into the soil, evaporation from solar and wind influences, and transpiration by plants into the atmosphere.

The ETA trenches themselves provide additional treatment through bio-mat filtration, soil adsorption, and the ability of plants to assimilate nutrients and water into their biomass. An ETA trench has improved performance and Long Term Acceptance Rate (LTAR) in comparison to conventional trenching.
ABSORB NATURALLY AEROBIC BOTTOMLESS SAND FILTERS

The ABSORB filter is an advanced natural treatment and dispersal system designed specifically for difficult sites in Category 1-3 soils. The installation of a system requires site-specific engineering and design. A septic tank and pump chamber are necessary before the ABSORB filter.

An excellent choice for sites with variable flows such as holiday homes or Cellar Doors.

The ABSORB has the smallest dispersal footprint of any system. This is because it can achieve higher treatment quality than many treatment systems (such as Aerated Wastewater Treatment System: AWTS). Indeed, sand filters as reported in AS/NZS 1547:2000 (4.2 C5.1) are capable of treatment to 10 mg/L of BOD5 and 10 mg/L of SS against the recognised performance of most proprietary AWTS’s of 20 mg/L of BOD5 and 30 mg/L of SS. Another significant benefit is that turf can be planted over the filter, helping the system blend into the landscape.

The ABSORB aerobic, bottomless, sand filter discharge, control bed, operates on a natural aeration dynamic from mass exchange of atmospheric oxygen into the soil/filter.

The entire system is effectively passive once discharged through the pump. If there is no water produced, the system remains in stand-by mode and is ready for service at any time without adverse performance impacts.

This makes the ABSORB an excellent choice for sites with variable flows such as holiday homes or Cellar Doors. No chemicals are used in the system, as both the secondary treatment and dispersal train are completely sub-surface.

The small footprint in combination with the capacity to handle variable flows and difficult soil types makes the ABSORB a versatile, highly effective treatment and dispersal option.
CONSTRUCTED WETLANDS

Arris has experience in the design, construction, and maintenance of constructed wetlands for the water industry. We can provide surface and sub-surface wetlands. Constructed wetlands are predominately used in the stormwater and wastewater sectors. Modelling programs such as MUSIC and eWater Source are used for the design and sizing of constructed wetlands. This treatment technology reduces nutrients, heavy metals, suspended solids, potential pathogens, and chemicals such as antibiotics and personal care products.

Constructed wetlands also use water via evapotranspiration, which can reduce the volume of treated water that needs to be managed. Constructed wetlands are suited to clusters of houses, and commercial and industrial applications. This technology is typically used in the wastewater industry as a polishing treatment step after primary and secondary treatment stages. They are commonly used in conjunction with waste stabilisation ponds.

In the stormwater industry, constructed wetlands are used to detain runoff stormwater and reduce contaminants of concerns, such as suspended solids and heavy metals. They may be used to treat runoff stormwater from impervious surfaces at commercial or industrial sites. Constructed wetlands are very energy efficient and have a low level of maintenance, but they do require a larger construction footprint.

The water treated through constructed wetlands is frequently reused as irrigation water.

This treatment technology reduces nutrients, heavy metals, suspended solids, potential pathogens, and chemicals such as antibiotics and personal care products.
FILTER MEDIA

Our team has extensive experience with a wide range of filter media including sand, zeolite, granulated activated carbon, calcite, garnet, green sand, scoria, and resins. We have designed and installed media filters for potable, stormwater and wastewater applications. These have included domestic, commercial, industrial, mining, oil and gas applications.

Media filters can be used to reduce solids, microorganisms, heavy metals, sodium, nutrients, BOD/COD, colour, hydrocarbons, endocrine disruptors, personal care products, pharmaceuticals, and to adjust pH. Media filters are typically part of a larger treatment chain.

The Arris team has comprehensively researched filter media types to determine the best blends for specific water treatment applications. Through using multiple filters in sequence, we can provide a multi-barrier approach to the elimination of contaminants of concern. We have experience with different types of filter housings and working at a variety of pressures and levels of automation.

Our media filtration projects have ranged from 1000 litres per day to 6 million litres per day.
SLUDGE MANAGEMENT

Arris can provide a number of sludge management techniques, including de-watering and composting. Transporting wet sludge off-site is expensive and inefficient. Through de-water techniques like Geo-tubes or concrete lined large scale composting bins, the liquid can be drained and the volume of sludge greatly reduced.

The liquid can be shandied back into the wastewater treatment plant and the dried sludge can be more easily and cheaply managed. Our techniques minimise odour and their passive nature is energy efficient. We can also supply traditional technologies, such as belt presses.

Our sludge management techniques have enabled some of our clients to obtain a zero discharge of solids off-site, greatly reducing their operational costs.

ODOUR CONTROL

Extensive experience in the control of odours in wastewater treatment means we can supply active technologies such as ozone and oxygen generators; or passive filter media, such as granulated activated carbon. Our company can supply and install vents with filter cartridges to remove odours from tanks and storage vessels. The ozone and oxygen units can adjust their dosage levels or be made re-circulatory so that batches of wastewater with strong odours can receive additional treatment.

These techniques not only control odours, but also reduce BOD’s and colours. We have designed, built, operated, and maintained treatment plants that are located directly adjacent to people – such as at festival sites. This requires very strict odour control in the treatment of the wastewater, which we have successfully achieved. Our advanced aeration techniques, involving oxygen and ozone incorporating micro-bubbles, are quick and highly effective at controlling offensive odours.
STORMWATER TREATMENT: WATER SENSITIVE URBAN DESIGN (WSUD)

Arris has a variety of water sensitive urban design (WSUD) techniques for the management of stormwater. These include: vegetated swales, rock walls, slope revegetation, bund walls, rock swales, porous pavements, sedimentation basins, sand filters, mixed media filters, and constructed wetlands. MUSIC and eWater Source are used as design programs for our stormwater management. We can also incorporate traditional stormwater technologies such as pipes and culverts into WSUD principles. Our stormwater management projects have ranged from a single lot to sites over 100 hectares.

Our team has experience with stormwater projects across Australia, involving areas of high to low rainfall. We have worked at commercial and industrial sites where all stormwater from the impervious areas needs to be captured and treated. This experience has given us the capability to treat stormwater to the appropriate level required by regulators. We can also design and construct treated stormwater recycling schemes.
WASTE STABILISATION PONDS

The Arris team design, build, operate, and maintain waste stabilisation ponds. We have the construction equipment and experience to construct unlined or lined ponds. Varieties of aeration technologies for the waste stabilisation ponds are provided, ranging from floating aerators to bottom diffusers. We can supply blowers, compressors, and even oxygen generators. The use of oxygen generators enables a much quicker reduction in oxidisable contaminants of concern, such as solids and odours. Our company specialises in innovative aeration techniques that are energy efficient, have an increased surface area, and can target specific depths in the waste stabilisation ponds. We can automate the aeration sequences and hook the equipment up to telemetry systems for remote operation and monitoring. The balance storage in waste stabilisation ponds can also provide wet weather storage and buffering capacity for sites with fluctuations in wastewater production volumes.

Waste stabilisation ponds incorporate aeration and passive treatment processes, which provide a very cost effective effluent management technique.

RECYCLED WATER IRRIGATION AREAS

Our soil, water and agricultural team are experts in designing recycled water irrigation systems for a wide variety of soils types, water quality and plant species. We have extensive experience with recycled water irrigation schemes – involving projects from a couple of thousand litres per day to millions of litres per day. Modelling programs such as MEDLI and HYDRUS are used, in conjunction with soil tests and climate data to design sustainable recycled water irrigation schemes. We also construct, operate, and maintain irrigation systems.

Our team has extensive experience with collecting and compiling the regulatory compliance data for recycled water systems. This includes groundwater monitoring stations and plant tissue testing. Their experience includes working with all classes of recycled water and many different soil types.

We are skilled with diverse types of above ground and sub-surface irrigation. Our experts have worked with plants such as lawn grass, horticultural crops, endemic native plants, and tree plantations. Arris has successful projects Australia-wide.
OXYGATION IRRIGATION

Through the use of venturi valves, oxygen generators, and ozone units we can substantially increase the oxygen level in irrigation water. These technologies can be used singly or in combination. They are most effective when sub-surface irrigation techniques are used.

The oxygation techniques can be used in normal water or recycled water irrigation projects. The increased oxygen in the irrigation water is beneficial to soil and plant health. It keeps the rhizosphere, which is the soil immediately surrounding the plant roots, aerated. This has several benefits for the plants, such as increased sugar content in fruit, improved yields, enhanced water efficiency, greater resistance to salinity and increased resistance to diseases.

The Central Queensland University has independently researched the benefits of oxygation and published the results in peer reviewed scientific journals. The oxygation techniques are very cost effective and efficient to operate. The benefits from oxygation provide significant value adds to the capital investment in sub-surface irrigation. The oxygation technologies can be retro-fitted into existing irrigation projects.
AGRICULTURE AND ENVIRONMENT

Arris is a unique company with the skills and expertise to oversee end-to-end solutions to land and water management issues. We are a leading environmental, consulting, project management, and services company. Our company delivers and supports the development of alternative water, agricultural and food projects. We offer a wide range of services in the broad disciplines of water, environment, farm and cropping systems, and stakeholder management and lobbying. Arris Water is recognised nationally and internationally for research, consultancies, and project delivery in the water, agricultural and environmental industries.

The firm has built a name around being one of the nation’s leading consultancies in the field of recycled water. We have conducted around 20 recycled water project assessments for major clients such as Water Corporation, Power and Water, Melbourne Water, SA Water, Barwon Water, Central Highlands Water, South East Water, ACTEW and City West Water. These projects have typically included economic assessment, land capability assessments, and extensive stakeholder engagement. The Arris team has worked with a number of wastewater types – domestic, coal seam gas, hide processing and manufacturing waste streams, determining appropriate levels of water treatment and suitable soil types for the reuse of treated water for irrigation.

Recycled water offers a significant resource that can be exploited for agricultural and horticultural use. Our team has developed and instigated a number of beneficial reuse schemes across the country that are still in operation. The largest of these is the Virginia Pipeline Scheme in South Australia that currently provides more than 100GL of Class A recycled water to growers, with many growers relying solely on this water to meet their irrigation supply.

Arris Water has a range of qualified staff with expertise in the fields of soil science, environmental science, water chemistry and wine making and sensory science. We have experience in the field of contaminated land assessment and remediation programs, with ISO 14001 accredited Environmental Auditors. We take a cooperative approach with regulatory authorities to ensure that site-specific, safe, and efficient remediation targets are met. The team has extensive experience in dealing with regulatory compliance issues to effectively assess and develop plans that can accommodate whole-of-site solutions for efficient, cost effective, soil, water and environmental compliance issues.
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