Site-Recognizing-Technology
The InvisiHead recognizes the site and operates accordingly

The InvisiHead intake system is a smart intelligent technology that employs the natural order and integrates it into its operation and maintenance process. Site recognition is integrated into the system. Now it has the capability to recognize site conditions and commences flow management accordingly. Higher quality of water is delivered to the plant while sediments, debris, and marine life if any find their way into the system, are diverted back into the ambient. If shoals of fish for example happen to enter the structure they simply leave from the opposite end and back to the sea again without affecting flow quality. See http://www.amecosys.com/elmosa/IH-Flow-SchematicsII.jpg.

The InvisiHead makes money in terms of O&M cost savings since it requires none. The payback period is reasonably short taking into consideration the money paid for operation and maintenance of standard O&M-intensive systems. See: http://www.amecosys.com/elmosa/#The_InvisiHead_makes_money and http://www.amecosys.com/elmosa/Comparison_The_InvisiHead_and_Screens. Sep2014.pdf.

With the InvisiHead in use, seawater delivery and discharge handling is reduced to merely a flip of a switch. All the operator has to do is just flip on the seawater pump switch and forget all about it for many years to come. **As an intake,** the InvisiHead is specifically designed to avoid impingement and entrainment of sediments, debris, and marine life including sea grass, fish, and jellyfish.

Working as an outfall, the InvisiHead discharges, disperses, mixes and blends the effluent in a 3-D funneling out flow in a round surround fashion that gets to a high dilution ratio within a few meters from the discharge point where the effluents reach equilibrium and disappears into the ambient at the beginning of the near field mixing zone. See the following image extracted from the US EPA Visual Plume modeling runs made for the Ash Bridge Treatment Plant Outfall in Toronto, Canada using the InvisiHead system as the flow discharging and dispersing system. It is made for two discharge capacities: 818 and 3,923 MLD flows. The PWQO requires that the dilution ratio should be 79 as a minimum at the edge of the near field. The InvisiHead outfall dilution ratio reaches 171.9 at less than 0.01m into the near field as seen below. Please see more details in the modeling report:

http://www.amecosys.com/elmosa/ABTP-Outfall-Modeling.Report.pdf.

Step	Depth (m)	Amb-cur (m/s)	P-dia (m)	Polutnt (kg/kg)	Dilutn ()	x-posn (m)	y-posn (m)	
0	13.92	0.05	1.000E-6	0.000223	1.0	0.0	0.0;	
100	13.92	0.05	3.879E-5	0.192	7.234	-1.685E-5	9.555E-5;	
135	13.92	0.05	0.000155	0.208	14.47	-6.867E-5	0.000389;	trap level.
200	13.92	0.05	0.00204	0.219	52.41	-0.000906	0.00514;	
260	13.92	0.05	0.02019	0.222	171.9	-0.00976	0.0554.	max dilution reached
300	13.9	0.05	0.107	0.222	379.7	-0.0476	0.27;	
391	13.04	0.05	3.92	0.223	2301.6	-1.747	9.908;	acute zone.
396	12.85	0.05	4.778	0.223	2541.1	-2.129	12.08;	bottom hit.
400	12.66	0.05	5.598	0.223	2750.6	-2.495	14.15;	
432	9.472	0.05	19.85	0.223	5183.6	-8.849	50.19;	surface.

As for RO desalination concentrate dispersion, the InvisiHead was selected by Mineralogy Pty Ltd of Australia to discharge and disperse 157,000 m^3/d of brine produced by their RO Plant at Balmoral South Iron Ore Project, Cape Preston, WA. The Australian LEPA requires that areas located beyond 70 meters from the discharge point not be impacted. The "achieving the required number of dilutions to meet the requirements of 9-2 to 9-4" was met by the InvisiHead diffuser at the start of the near field mixing zone producing dilution ratios ranging from 7.4 at 0.07m from the diffuser and 114.8 at 18.16m as shown in the image below and in the report posted at:

http://www.amecosys.com/elmosa/Visual_PLUME_outfall_simulation_runs,_Australian_project.pdf.

```
        Depth  Amb-cur   P-dia   Polutnt   Dilutn   x-posn   y-posn
Step     (m)    (m/s)     (m)    (kg/kg)     ()      (m)      (m)
  0      4.0     0.04    0.0005   0.0788     1.0      0.0      0.0.
100      4.0     0.04    0.0398   0.0428     7.44    0.0773  -0.0649.
161      4.0     0.04    0.444    0.0387    24.97    0.878   -0.737. max dilution reached
200      4.011   0.04    2.06     0.0378    54.09    4.093   -3.435.
216      4.054   0.04    3.856    0.0376    74.27    7.678   -6.443. acute zone.
227      4.157   0.04    5.922    0.0375    92.35   11.82    -9.917. bottom hit.
238      4.455   0.04    9.078    0.0374   114.8    18.16   -15.24. surface.
```

As in the intake case, when the seawater intake pump is turned on at the plant onshore, its energy pulses reach the InvisiHead system via the intake or discharge pipe. The InvisiHead system recognizes site characteristics as well as operation conditions and accordingly commences flow management as planned. The system delivers good quality clean raw water low on SDI, and discharges effluents in unmatched dilution performance made at the beginning of the near field mixing zone..

The system employs natural resources in flow delivery including the utilization of gravity and marine currents. After the order is placed we dispatch a site data collector to gather specific site information that we use and get it integrated into the system when we fine-tune its identity to match that of the site so that it recognizes the site and applications operates as per the application requirements.

The InvisiHead needs no parts or any kind of operation or maintenance activities for life. Its useful operational life is over 50 years. No O&M costs are associated with its O&M process.

The InvisiHead system performance meets and exceeds the US EPA and international environmental standards and regulations. It remains in full compliance throughout its life span.

As soon as the InvisiHead senses energy generated by the seawater pumps at the pump house onshore it activates it flow management system. The flow management system triggers streamline formation. Stealth technology being part of the system design is used to pull in water particles of the lower flow streamlines at the sea bed and from between fine sediments with no disturbance of the local habitat. Flow streamlines simply slide unnoticed through the rest of the aquatic environment including fish, fish eggs, larvae, jellyfish weeds and debris toward the

InvisiHead. The InvisiHead creates according to the magnitude of energy it receives the corresponding size of a 3-D flow space and delivers the flow capacity required.
There is a case study report titled: Comparison: The InvisiHead and Screens. Sep2014

Since natural intelligence is integrated into the InvisiHead, site condition recognition becomes possible. After the order is placed we send an expert to collect specific site data. And get application and operation information for us to integrate the data into the system design. As soon as energy pulses are generated from the onshore seawater pumps and transmitted through the intake or discharge line the InvisiHead recognizes the site characteristic and operation conditions, and commences flow management both in the intake and discharge. In the intake case the InvisiHead commences to separate sediments, debris, and marine life from the flow and delivers high quality raw water. In the case of discharge it disperses, mixes, blends, and reaches high degree of dilution within the vicinity of the discharge point. The brine disappears in the ambient nearly as soon as it leaves the discharge structure. The InvisiHead systems are O&M-free for life. No spare parts or part replacement are needed. No O&M costs are associated with O&M. The InvisiHead intake head delivers a flow low on SDI.

The InvisiHead is O&M-free for life. No costs are associated with its O&M. Please see http://www.amecosys.com/elmosa/. This site is rich with relevant materials that will address your needs for information.

In order to fine-tune the InvisiHead system to the site characteristics, operation conditions, and type of application we have to send an expert after we receive the order to collect site, operation, and application data so that we can clone and match the system personality to those of the site and plant operation and application. If the InvisiHead identity is made to match those of the site and application, when it receives energy pulses from the plant seawater pumps it will recognize the site and application and commences to manage the flow accordingly. In case any sediments, debris, or marine life wonders into the system the InvisiHead guides them through and back into the environment again. It delivers high quality clean flow to the user.
When the seawater intake pump is turned at the plant onshore, its energy pulses reach the InvisiHead system via the intake pipe it will recognize site characteristics and conditions and accordingly it will commence flow management including the exclusion and diversion of any sediment, marine life, and debris if any wonders into the system, send them back to the ambient and delivers clean water. The system employs natural resources in flow delivery including the utilization of gravity and marine currents. After the order is placed we will dispatch a site data collector to gather site information and collect specific data that we use during the design phase when we fine-tune the Identity of the system to match that of the site so that it operates as per the site and application requirements.
The InvisiHead needs no parts or any kind of operation or maintenance activities for life. Its useful operational life is over 50 years. No O&M costs are associated with its O&M process.