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Øer Maritime Holiday Town

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ØER MARITIME HOLIDAY TOWN Ebeltoft, Denmark

Presented at Marina 89
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ØER MARITIME HOLIDAY TOWN

Ebeltoft, Denmark

GENERAL DESCRIPTION

As a result of the growing >>leisure society<< and the increasing interest in attracting tourist currency, Danish as well as foreign, a number of innovations in the holiday sector have seen the light of day. Among the best of these is the island town Øer, near Ebeltoft, designed by the Danish architects Friis and Moltke.

This project is not like anything seen in Denmark in recent years (though perhaps if one goes back far enough in history there are antecedents). The architects also admit that the French holiday town, Port Grimaud has been the structural idea, but also refer to the Scandinavian archipelago towns with their salted ambience. The town is however quite Danish. Even though wooden housing is not a major element in the Danish architectural tradition, summer homes are the exception, and that is perhaps the reason why the scheme seems to have an atmosphere of holiday and a familiar character to a Dane.

The Øer holiday scheme is formed as a low/concentrated scheme laid out on seven islands that are connected by bridges. Access from the mainland is by way of a town gate which leads to a shopping plaza that forms the entrance to Øer itself. From the sea and Ebeltoft Bay, one must pass through a lock that regulates the water level in the inner harbour area, which lies about 1.6 meters over sea level.

All the housing units are orientated toward the dock areas. The water can be seen and experienced throughout the scheme. The promenades along the edges form an outer system of paths that are connected by bridges to the various parts of the town. On the interior of the scheme, a sequence of alleys, squares and plazas as well as natural park-like areas have been laid out. The architects have created a variety of experiences, from island to island.

The three hundred units are based on a single building element: a 1-1/2 storey house with a shed roof. These elements are turned, staggered and combined in so many ways and with such a strong architectural control that throughout the scheme there is a sense of intimacy and visual richness. Here and there are buildings that deviate from the system and appear as small landmarks. Six of the islands contain housing with a sprinkling of other functions such as boat rentals, small restaurants, play areas, smoke house, etc. The seventh island contains the town center with restaurants, bars, banquet rooms, indoor swimming pool as well as a large glass covered winter garden.

The town offers a large number of activities mostly based on the surrounding water, swimming, sailing, ect. as well as fishing. The latter is possible due to the stocking of the area with trout. There are also hundreds of thousands of mussels, though their main purpose is to keep the water clean. Toward the north are the soccer and tennis area as well as an 18-hole golf course. There is also a large gymnasium for indoor sports and riding stables.

The color scheme is an important element in the total experience of the area. The painter Emil Gregersen was responsible for all the colors used, from the exterior of all the buildings to the color of the furniture inside. Another rather uncommon project by the architects, Friis and Moltke, was that of designing the boats for the town. The largest of these wooden boats functions as the harbour taxi.

THE CONSTRUCTION

Øer Maritime Holiday Town was constructed on a guaranteed maximum price by the contractors Ejner Mikkelsen A/S - Aarhus, Denmark. The construction could not be started until a system of ditches was dug and the underground water could be pumped-up and drained away from the construction site. This pumping had to be done throughout the building period, until the harbour could be filled with sea water. This ensured that the sensitive nature surrounding the site was not drained, even when keeping the bottom of the man-made harbour dry at 3.5 meters below the ground-water level.

The excavation of the man-made harbour could now be completed. The fine sand (max. 0.4 mm grains) was then used to lay the foundations for the 7 islands, built up of several compressed layers of 40-50 cm. The structures were then built on concrete foundations extending 90-100 cm. below the finish terrain. The embankments have slopes of 1:2 and 1:3. The slopes of 1:3 have been secured 1 meter below and 0.5 meters above the water level with ø 20 mm stones held in place with a geotextile mesh. The slopes of 1:2 have been secured all the way to the bottom of the harbour. The piers are built of wood and a fixed water level ensures that freezing in the winter does not harm the construction.

The approval process was extensive and included not only building codes and planning aspects but also approval from the various environmental and natural preservation authorities in the area. Such a project had never been attempted in Denmark before, where a salt water harbour was to be built from a protected wet-land area. These challenges were met, despite the constraints of a set budget and construction schedule, by a special "running approval" agreement from the local authorities. This was managed by reports from daily meetings and monthly meetings between the technicians, contractor and planners.

The project also includes a purifying plan for the waste water from the resort which is dimensioned for 3,500 PE. The filter-plant is divided in two parts based on 7 meters of sand filtration. The horse riding area is placed over this filter area. The system is automatically monitored and the water quality is constantly controlled by computer both before entering and after. The design criteria was that the waste water was not to influence the ground water and this demand has been met.

The total construction time was originally estimated to be 22 months. Ejner Mikkelsen A/S carried out the project in only 16 months which included all buildings, interiors and staff instruction.

ORGANIZATION AND FINANCING

Øer Maritime Holiday Town was to be a public resort according to the planning legislation of Denmark. This means that Øer should be a public institution while at the same time functioning as an independent institution.

The contractors Ejner Mikkelsen A/S, had to establish a public utility, form the rules, and have everything in this connection be approved by a series of boards and cabinets in Denmark. This was done partly simultaneously with the construction work and was administered during this period by the contractor in cooperation with three partners forming a contractor's board.

Of the 300 residential units built at Øer, 200 units can only be purchased by companies or organizations established in Denmark, for use by their employees. The remaining 100 units are available on a rental basis, by the week, including use of the boat dock and all the common facilities of the resort. During the holiday season employees from the companies owning the houses pay ca. 900 Dkr./week for the use of the house. While during

the low-season the cost will drop to ca. 300 Dkr./ week. The units available on a rental basis will cost ca. 4,000 Dkr./ week during the high-season and ca. 1,500 Dkr./ week during the low-season.

Following the construction period, the mananagement of the holiday town was turned over to a board whose members were appointed by : The Danish Association of Employees, Ebeltoft Municipality (appointed by the Ministry of Environment), The Land Owners and representatives chosen by the companies who have purchased houses. 340 million Dkr. was needed to finance this project which the contractor negotiated at interest rates of 4% - 6%, over a period of 30.5 years.

Ejner Mikkelsen A/S have the resources to develop similar projects world-wide with a trained staff of engineers, lawyers, economists, and a management group who can work out complete concepts and transform them into reality.

ENGINEERING AND TECHNICAL ASPECTS

The sea water harbour

The basic idea in the Øer Maritime Holiday Town was to create a costal and marina like environment in an area situated some distance from the shore line. For that reason a large artifical sea water harbour was established to make a direct contact between the town and the water. The lake and the town covers approximately one square kilometer and the water depth varies between 1 and 3.5 meters.

Physical design and structure

Due to the large area invloved, the harbour had to be surrounded by gentle slopes and protected by natural vegetation. The steeper slopes under the jetties were covered by a stone protection against erosion. Along the islands there were constructed more than two kilometers (1.3 miles) of jetties. In principle more than a thousand leisure crafts can moor here, but the common facilities such as landward toilets, showers as well as the lock are designed for around 300 boats. However, extensions are possible in the future.

The lock

The water level in the lake was fixed to be 1.6 meters above the mean sea level. For that reason a lock was designed with a length of 36 meters, a width of 8 meters and a depth of 3.5 meters. This allows all Scandinavian and North German leisure crafts to pass. The capacity of the lock in respect to the number of boats to pass per hour was based on experience from the Netherlands.

Saline water in the harbour

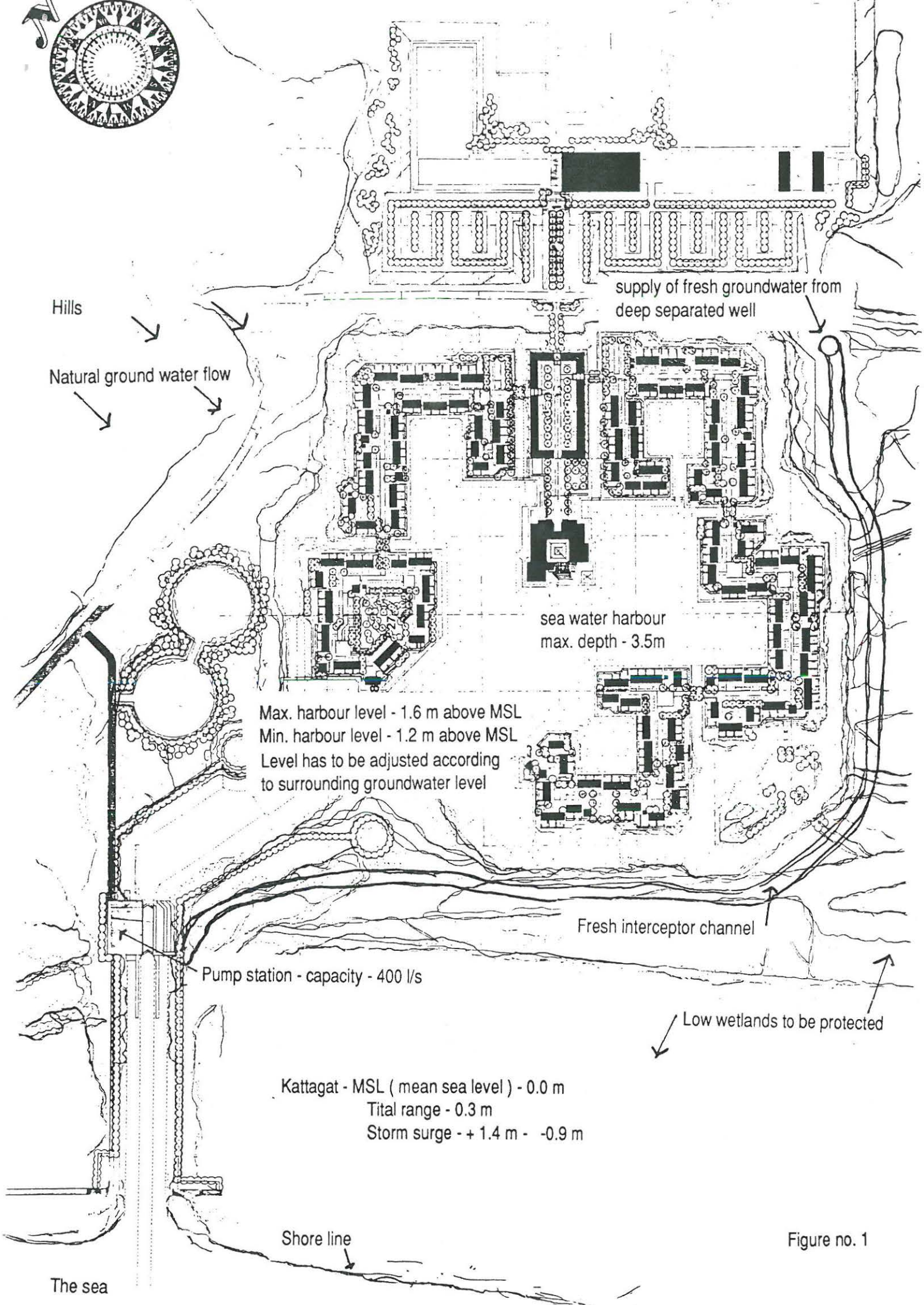
The water consumption in the lock gave only one possibility for keeping a stable water level in the harbour. This was to pump water in from the sea. Therefore, a pump station was built with a pumping capacity of 500 liters per second. Furthermore, a spillway had to be established to discharge infiltration and storm water from the harbour. The crest of the overflow in the spillway can be adjusted from 1.2 to 1.6 meters above the mean sea level.

To protect the fresh ground and surface water in the adjacent areas, the authorities set up regulations for the water level in the harbour. In principle, the saline water level must always be kept lower than the fresh water level outside the harbour. For further protection, a fresh water ditch was established around the harbour in which fresh water is pumped from an independent deep ground water well.

Ecology and water quality

The lake is kept strictly free from any discharge of sewage and direct storm water. From the surroundings, only a limited infiltration of ground water with a relatively low content of minerals takes place. The only way to control the water quality is then the water exchanged by the pumping of the sea water into the harbour. A constant and high salinity is desired. The experience with the water quality, i.e. the turbidity of the water, is satisfactory and appears to be significantly better than normal Danish marinas. In the summer many guests enjoy bathing in the harbour.

The complex geometry of the lake supplemented by the varying water depths results in a natural circulation and mixing initiated by the wind. To improve water quality and form a basis for further development of the ecology of the harbour, a large number of blue mussels have been placed in the harbour. The trout that have been planted seem to be growing well and have excellent conditions for natural feeding. These sea trout have aroused the interest of the angling guests at Øer.



Hills

Natural ground water flow

supply of fresh groundwater from deep separated well

sea water harbour max. depth - 3.5m

Max. harbour level - 1.6 m above MSL
 Min. harbour level - 1.2 m above MSL
 Level has to be adjusted according to surrounding groundwater level

Fresh interceptor channel

Pump station - capacity - 400 l/s

Low wetlands to be protected

Kattagat - MSL (mean sea level) - 0.0 m
 Tital range - 0.3 m
 Storm surge - + 1.4 m - -0.9 m

Shore line

The sea

Figure no. 1

PRINCIPLE OF PROTECTING WETLANDS AND GROUNDWATER AGAINST SALINE INTRUSION

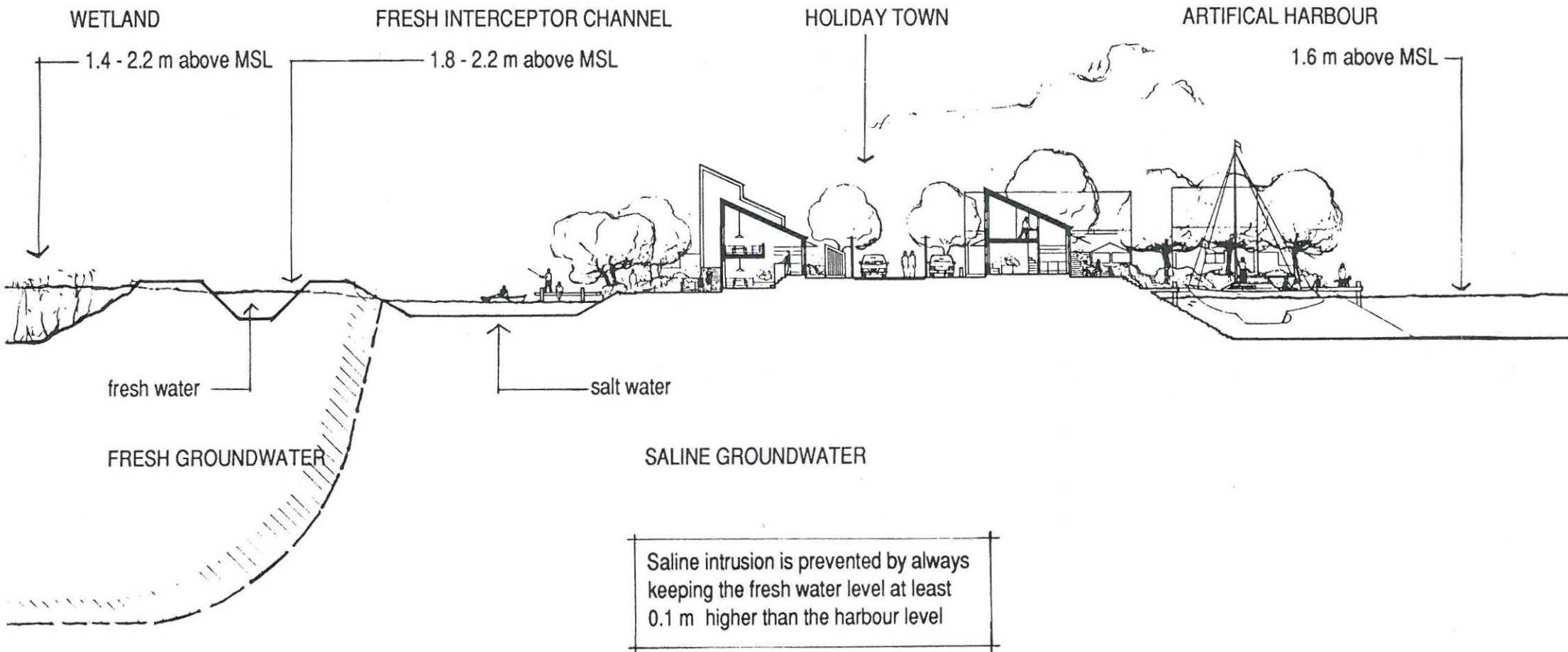


Figure no. 2