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Glinwood

Engineering Report

ONCE Civil & Structural Ltd

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1.0 INTRODUCTION

1.1 Instruction

ONCE Civil & Structural Ltd Consulting Engineers have been appointed to provide civil engineering design services for a Proposed new development for Glinwood, Whitechurch Road, Rathfarnham, Dublin 16, D16 TF86. The following report will address the civil engineering elements, including;

- Surface Water Strategy design, provision of SUDS.
- Foul Sewer design

The Planning Authority for this development is the South Dublin County Council.

1.2 Existing Site

The existing site covers Approximately 17656m² (1.76 Hectares) and is situated along Whitechurch Road. Approx. The site is currently a greenfield site with an existing dwelling.



Figure 1, Existing Site Plan

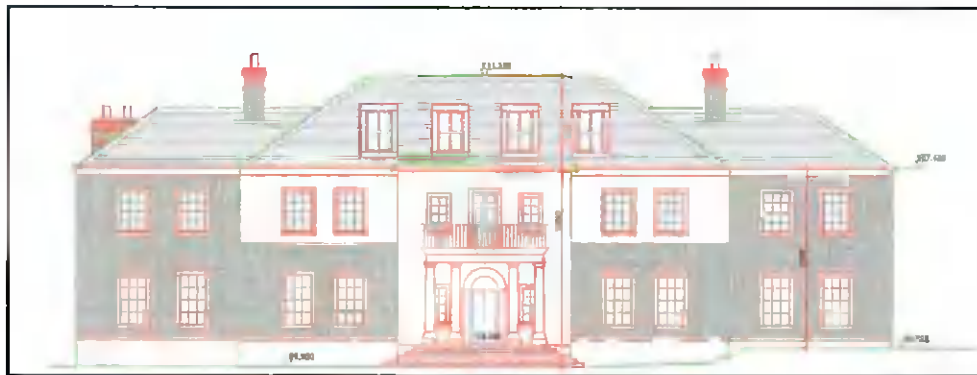


Figure 2, Existing Front Elevation

1.2.2 Existing Services



Figure 3, Public Drainage Utility Drawing

The data acquired from Irish water shows that there are no existing services Foul or surface water networks near the proposed site. Due to these circumstances, it has been proposed to use suds to Combat the additional hard landscape and to utilize the existing Foul network on site.

1.3 Proposals

The proposed works consist of the construction of a new side extension (approx. 397m²) to the east of the existing dwelling. The extension will be used to house a new swimming pool (13.5mx5m) with a WC and plant room.

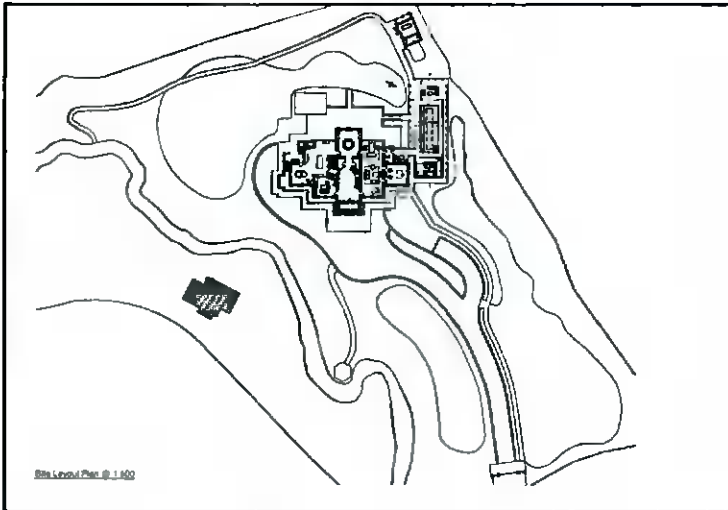


Figure 4. Proposed Site Plan

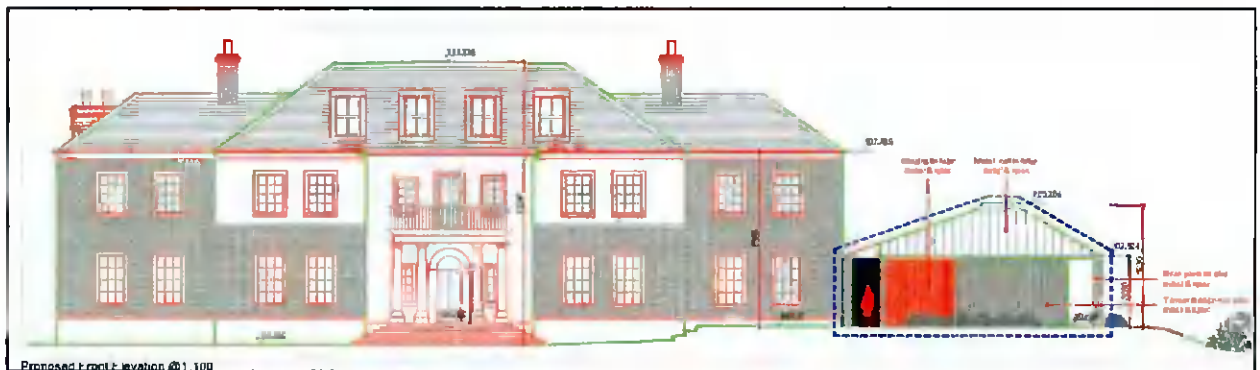


Figure 5. Proposed Front Elevation

2.0 SURFACE WATER DRAINAGE

2.1 Existing Surface Water

The existing surface water is currently discharged through infiltration.

2.2 Surface Water Police

The new development will create an additional 316m² of hard landscape. To combat the additional hard landscape it has been proposed to divert the new surface water run-off to a Soakaway Located at the rear of the property. As an infiltration test was carried out on 24/05/2006 by ByrneLooby Partners (Full report on South Dublin County Council) an infiltration rate of 0.000011 m/s was calculated.

The Soakaway will be fitted with an overflow pipe which is connected to the existing surface water network onsite. Currently, the surface water drains to River/Stream Located on-site. The Existing Drainage network is fitted with non-return vales for the protection of the site and has an outfall invert level of 200mm above the normal river/stream water levels.

2.2.1 Emptying The Pool:

Statement from Castle Swimming pools reports on Glinwood (Swimming pool provider):

When a Swimming Pool is filled it is generally never emptied. In the unlikely event of the Swimming Pool ever having to be emptied the water need not necessarily be dumped. The Pool water is clean purified and heated and it would not be desirable to dump this water in the event a small repair been necessary. Therefore the water may be pumped into an above-ground pool/s where the water may be stored while the repair work is been carried out. In the event of a liner having to be replaced the pool maybe emptied and new lining fitted and refilled from the above ground pool /s in a period of 2 days. If a pool requires emptying and no storage space is available for the above ground pools than the contractor carrying out the repair work should have the water removed by road tanker to a location where it may be stored.

(Full Report in Appendix)

With this taken into account, the swimming pool will only have to be drained full in extreme circumstances. It has been proposed to drain the swimming pool by allowing the water to flow from the plant room to a pool backwash attenuation, this will then flow to a designated percolation area (Situated next to the existing percolation area)

The drainage is designed to comply with policies and guidelines, outlined in the Greater Dublin Strategic Drainage Study (GSDSDS) the requirements of South Dublin County Council and SUDs Manuals C697 and C609.

2.3 Surface water design

Soakaway location	-	Ireland
Area draining to soakaway	A =	316 m ²
Invert to soakaway	=	0.1 m
Soakaway type	-	Trench
Length of trench	L =	5 m
Breadth of trench	B =	4 m
Effective storage depth	De =	2 m
Soil infiltration rate	f =	0.000042 m/s
Rainfall ratio	r =	0.25
Permeability of fill	Per =	30 %
Rainfall return period	=	1 in 100 year

Check calculations to BRE Digest 365 (February 2016)

Effective outflow area	as50 =	$0.5*((2*B*De)+(2*L*De))$
	=	$0.5*((2*4*2)+(2*5*2))$
	=	18 m ²
Storage volume	Vs =	$L*B*De*Per/100$
	=	$5*4*2*30/100$
	=	12 m ³
Time of emptying half storage volume	ts50 =	$Vs*0.5/(as50*f*60*60)$
	=	$12*0.5/(18*0.000042*60*60)$
	=	2.2 hrs.

D min.	Z1 -	M5-D mm	Z2 -	M100-D mm	R m	I m ³	O m ³	S m ³	Amax m ²
10	0.47	9.4	1.96	18.42	0.018	5.82	0.45	5.37	676
20	0.63	12.6	1.97	24.82	0.025	7.84	0.9	6.94	520
30	0.75	15	1.97	29.55	0.03	9.34	1.35	7.99	452
40	0.84	16.8	1.97	33.1	0.033	10.46	1.8	8.66	417
60	1	20	1.97	39.4	0.039	12.45	2.7	9.75	373
120	1.29	25.8	1.92	49.54	0.05	15.65	5.4	10.25	351
240	1.69	33.8	1.87	63.21	0.063	19.97	10.81	9.16	361
360	1.96	39.2	1.85	72.52	0.073	22.92	16.21	6.7	389
600	2.35	47	1.83	86.01	0.086	27.18	27.02	0.16	454
1440	3.27	65.4	1.8	117.72	0.12	37.2	64.85	-	-

Soakaway is satisfactory.

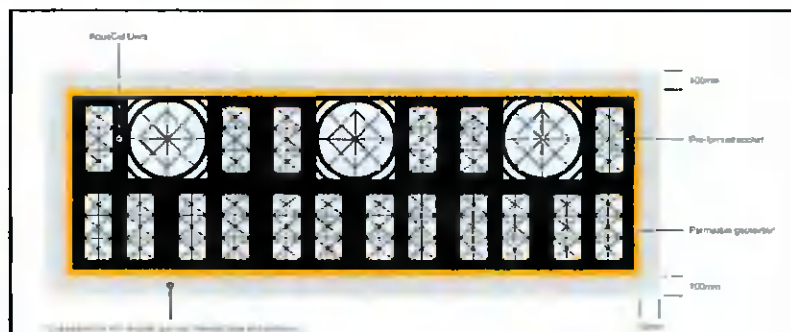
It is proposed to use a Geocellular system of water attenuation prior to infiltration to the ground.

A system such as Aquacell from Wavin or similar is proposed.

Each cell is 0.4m x 1.0m x 0.5m. An overall soak away size of 5x5x2.5Dp is proposed.

The cells will be located in the rear garden 5m from the building and 3m from the boundary line.

Aquacell are BBA Approved – certificate No. 03/4018 Modular



3.0 Design

3.1 Protection of the property

The design of the surface water runoff is such that it will cater for a storm event of a 100-year critical event without causing any significant unplanned flooding. The design allows for a 30% for climate change in the capacity of the storage.

3.2 Drainage

The proposed pipe within the site boundary will be a 110mm Diameter pipe with a gradient of 1:100 & 1:60. The Proposed Manholes will be Irish water standard - Document Number: IW-CDS-5030-01 (August 2016) Drawing number STD-WW-13. All sewers within the public roadway shall be concrete and 225mm diameter minimum.

The Existing Foul network on the site flows to a Biocycle (Biocycle 16,000 Series, suitable for 12 persons) The proposed Foul Drainage will utilize this system by flowing into an existing MH which then flows into the existing Biocycle and then to the designated percolation area.

3.3 Design Calculations

Storm & Foul Drainage have been designed in accordance with the Building Regulations Part H and specifically in accordance with the principles and methods set out in the DOE "Recommendations for Site Development Works for Housing Areas", BS8301: 1985, IS EN752 (2008), IS EN12056: Part 2 (2000) and the recommendations of the 'Greater Dublin Strategic Drainage Study', (GDSDS), and Irish Water Code of Practice.

The following criteria have been applied:

- Pipe Friction (Ks) 1.5mm
- Minimum Velocity 0.75 m/s (self-cleansing velocity)
- Maximum Velocity 3.0 m/s
- Frequency Factor 0.5 for domestic use

The standard drainage details are outlined on drawings 5487-01 and are in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

All private drainage runs will be uPVC at a fall of 1:60 or 1:80 for 100mm pipework & 1:100 or 1:150 for 150mm Pipework. All-access junctions, inspection chambers and gulley traps are uPVC.

All ground floor sink/showers will be piped separately to ground floor w.c pipes and routed through back inlet gulley traps (BIGT) prior to the external foul collection system.

3.4 Proposed Layout

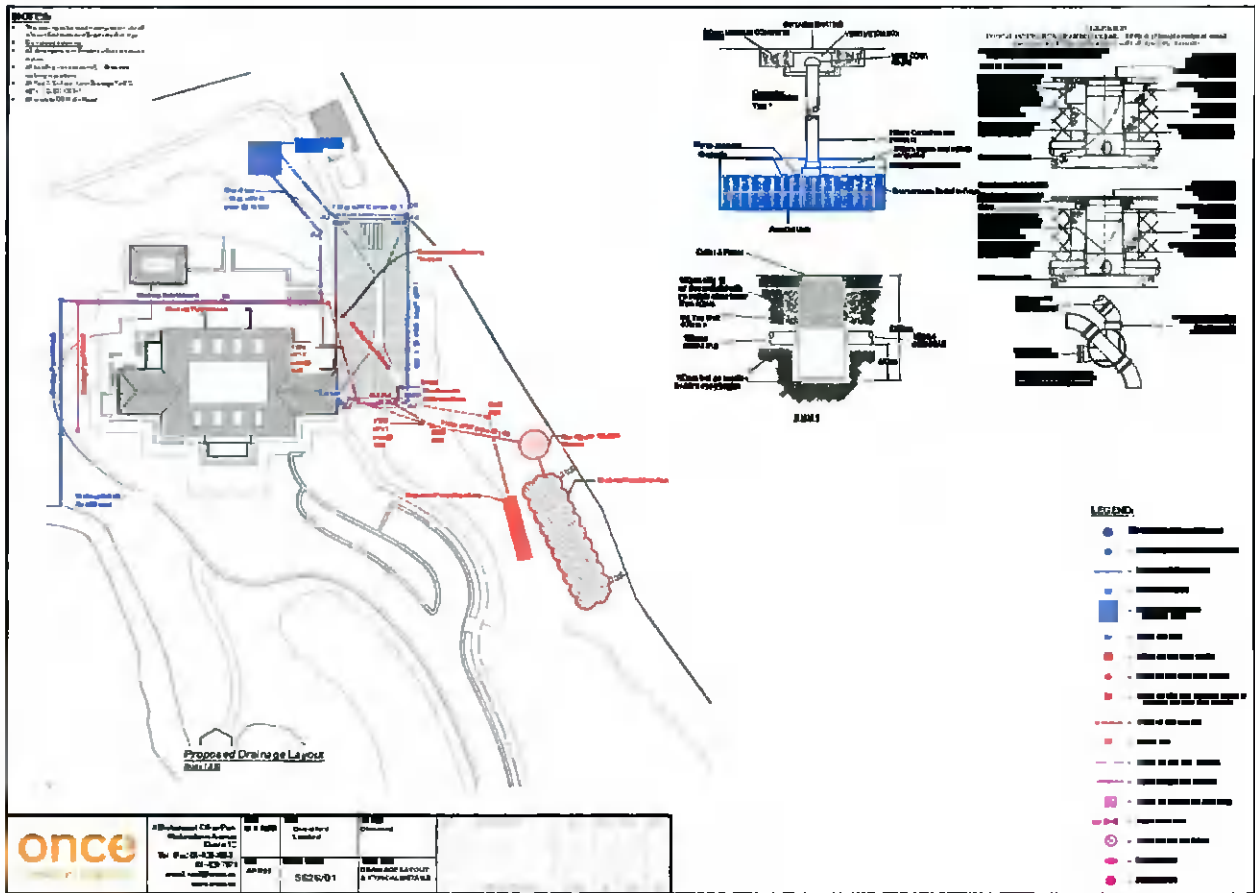


Figure 6 (5626-01)

The proposed Drainage Layout was produced in a way to attenuate as much run-off as possible to relieve pressure on the existing pipe network.

The surface water/Run-off from the proposed extension flows to a soakaway situated at the rear of the property. There is an overflow pipe which in the case of an unforeseen rainfall event the excess runoff will flow to the existing surface water network located on-site. This network flows from the back of the house to a river/stream located on-site.

The Proposed Foul Network consist of a new 110mm pipe which will pick up any new foul outlets from the proposed extension before discharging to the existing MH which then flows to the existing bio cycle on site. This treated water then discharges to a percolation area.

The swimming pool will be equipped with a foul line which will flow to a backwash attenuation and from there to a designated percolation area.

One of the foul lines appears to flow under the proposed area for the swimming pool, this pipe is to be decommissioned and the foul line divert as shown in Drawing 5626-01

M. Caffrey

Mark Caffrey for ONCE Consultant Engineers

Appendix

Castle Swimming Pools

Ballybrack, Kilcock, Co. Kildare

Ph 01 6287990. Fax 01 6287936.

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11/04/2022

Mr. Tom Moran
Glinwood
Rathfarnham
Dublin 16

Proposed Swimming Pool @ Glinwood Rathfarnham D16

Dear Mr.Moran

Further to our correspondence please find herewith our specifications and recommendations regarding Filling Backwashing & Emptying the proposed Pool at Glinwood Rathfarnham .

Pool Specifications		
Pool Type:	Residential	
Shape:	Rectangular	
Length	13.5	Meters
Width	5	Meters
Pool Surface Area:	67.5	Meters
Water Depth: <i>Shallow End</i>	1.4	Meters
Water Depth: <i>Deep End</i>	1.4	Meters
Water Depth: <i>Average</i>	1.4	Meters
Pool Volume:	94.5	Cu Mtrs
Turn Over Time:	6.00	Hours
Turnover Rate:	16	Cu Mtrs / Hour
Turnover Circulation Rate:	266.66	Ltrs Min.
Pump Flow rate:	16	Cu Mtrs / Hour
Number. of Filters:	1 x Sand filter.735mmø	
Backwash Cycle	Every 14 Days	
Backwash Discharge Time	3 Min & 30 Sec	
Backwash Discharge Volume	931	Ltrs
Sanitizer 1	Ozone	
Sanitizer 2	Chlorine	
Attenuation Tank	2000 Ltrs	

Water Balance		
CHLORINE	0.5ppm	To 1.0ppm
TOTAL CHLORINE	0.5ppm	To 1.0ppm
pH VALUE	7.4	
ALKALINITY	80 to 120	
CYANURIC ACID	30 to 100	
IRON	Less than	0.5ppm
CALCIUM HARDNESS	200ppm	To 400ppm
TOTAL DISSOLVED SOLIDS	Less than	1000ppm
SULPHATE	Less than	360ppm

(1).

REF.: Water Cycle for Residential Pools

Filling.

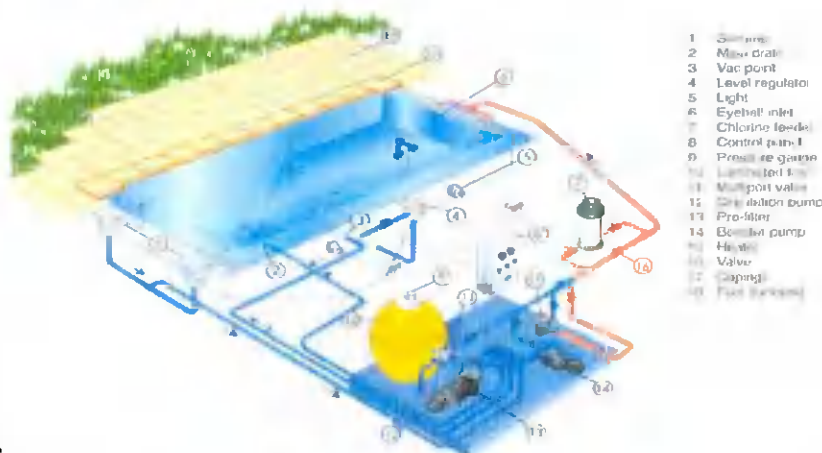
The pool shall be filled from a local water source, *i. e.* Mains water supply, Well water, or by water Tanker from a local river. When the pool is full it remains full through its lifetime unless requiring repair or maintenance. The average family pool holds approximately 75,000 Litres of water, this water is changed about every 3 years by progressive dilution through backwashing. If the pool is to be filled from mains water or well water an above ground reservoir is erected when tiling or Lining commences, the above ground reservoirs are then filled over a period of 1-2 weeks. Each reservoir holds 23,000Litres of water and filling is carried out at not more than 7,500 litres per day.



Photos show temporary above ground pools to store water when Filling or carrying out repairs

Filtration.

The pool water is continuously filtering and will be sanitised using Ozone with bromine, or chlorine as backup. The complete volume of pool water is turned over every 4-8hours. Filter consists of 735mmø. high rate sand filter which must be backwashed regularly.



Sanitization.

The proposed method of sanitization for the above proposed pool is to be a combination of Ozone & Chlorine. This method of sanitization allows chlorine levels to be kept to a minimum 0.5mg/l. For backwashing of the pool it is proposed to discharge the water into a attenuation tank. When the attenuation tank has reached its capacity, an automatic dosing pump shall administer the correct level of sodium Thiosulphate (chlorine neutraliser) to the capacity of the holding tank. In addition it is also proposed to fit an inline carbon filter on the tank discharge as a back up to the dosing pump. This will achieve a total chlorine free discharge.

(2).

Backwashed Water.

Water from the backwash is taken directly from the pool, this water is continuously monitored and a perfect chemical water balance is maintained at all times, therefore this water is not considered corrosive. The chlorine level in the pool shall be maintained at 0.5 ppm and not greater than 1.0ppm. The backwash water is pumped through an active carbon filter to an attenuation tank to allow for slow discharge to the foul sewer, this will ensure a total chlorine free discharge.

Backwash water from the pool will not be discharged into the septic tank it will be discharged through percolation via an attenuation tank subject to the engineers site survey as outlined in this documentation.

Backwashing.

Backwashing is carried out every 2 weeks by an automated process. Backwashing can also be carried out manually, this involves turning a six way multi-port valve to its backwash position & running the pump for 3 mins, this reverse's the water flow through the filter removing all dirt & solids from the filter sand. After backwashing it is necessary to rinse the filter. The filter is rinsed for 30 seconds, after rinsing the filter multi-port valve is returned to filter cycle. In backwash & rinse mode the pump discharges approximately 500Ltrs to 600Ltrs.

Water Replacement.

After backwashing the pool is topped up with an automatic top -up unit, this means that the correct amount of water is replaced. The use of a hose is not recommended as this may lead to over filling in event of the hose not been switched off.

Emptying The Pool.

When a Swimming Pool is filled it is generally never emptied. In the unlikely event of the Swimming Pool ever having to be emptied the water need not necessarily be dumped. The Pool water is clean purified and heated and it would not be desirable to dump this water in the event of a small repair been necessary. Therefore the water may be pumped into an above ground pool/s where the water may be stored while the repair work is been carried out. In the event of a liner having to be replaced the pool maybe emptied and new lining fitted and refilled from the above ground pool /s in a period of 2 days.

If a pool requires emptying and no storage space is available for the above ground pools than the contractor carrying our the repair work should have the water removed by road tanker to a location where it may be stored.



Photos show temporary above ground pools to store water when Filling or carrying out repairs

(3).

Water Balance.

Although there is automated chemical control water balance will be checked on a regular basis to ensure that the water chemistry is kept within it set parameters

Listed below is the recommended water balance which is given to the pool owner as a guideline. Not all off these tests are carried out by the owner the owner is given a 4 in 1 test kit which consist of 50 test strips each strip shows 4 off the most important tests. Castle swimming pools offer the pool owner an 11 point water analysis which is carried out on site and chemical adjustments are made if requires .

We recommend that this test should be carried out every 6-8 weeks for the comfort of bathers and for the protection of their pool equipment. The Pool owner may forward a water sample in a special container supplied by Castle Swimming Pools for analysis. Their results are returned along with the appropriate chemicals if required and a replacement container for their next water test.

C.S.P. Water Test	
CHLORINE	0.5ppm To 1.0ppm
TOTAL CHLORINE	0.5ppm To 1.0ppm
pH VALUE	7.4
ALKALINITY	80 to 120
CYANURIC ACID	30 to 100
IRON	Less than 0.5ppm
CALCIUM HARDNESS	200ppm To 400ppm
TOTAL DISSOLVED SOLIDS	Less than 1000ppm
SULPHATE	Less than 360ppm
FREE COPPER	Less than 1000ppm
TOTAL COPPER	Less than 360ppm

Pool Owner Test	
CHLORINE	0.5ppm To 1.0ppm
TOTAL CHLORINE	0.5ppm To 1.0ppm
pH VALUE	7.4
ALKALINITY	80 to 120