


APPENDIX B2: CERTIFICATE OF SATISFACTORY EXECUTION –WORKS ONLY

ACTIVITY <i>(Title of Applicant Activity)</i>	Contractor Entry: Works Contractor, PSCS, Designer and PSDP		
SITE Construction contract: <i>(Title & brief description)</i>	<p>Galway Group Water Supply Scheme DBO Contract Bundle No.2</p> <p>The Galway GWS DBO Bundle No.2 involves the design, construction and operation and maintenance of 16no Water Treatment Plants ranging in size from 16m³/hr to 116m³/hr. The contract also includes for the provision of treated water reservoirs and raw water source intake upgrades.</p> 		
Site location:	Co. Galway, 24no locations including raw water source and reservoir sites.		
Proportion of Project undertaken by the Applicant	100%	Tender entity (<i>Sole trader/ Joint Venture</i>):	Private Limited Company
VALUE Construction contract value at award stage including cost of services where applicable:	DB €16,700,000 O&M €16,100,000	Construction contract value at completion (including cost of services where applicable:	DB €19,420,000
GENERAL INFO Role of Company in delivery of Service:	<p><u>Scope of Works</u></p> <ul style="list-style-type: none"> • Construction and development of the spring and borehole sources and source protection works with pumping of raw water to treatment plants • Installation and commissioning of 16 separate water treatment plants, comprising Multi-Media Pressure Filters, GAC Media Pressure Filters, Reverse Osmosis, Dissolved Air Floatation, chemical conditioning equipment, with hourly design production flow-rates from 14m³/hr to 117m³/hr of potable water to SI 244 2014 • Construction of 16 separate water treatment plant buildings and reservoirs ranging in size from 250m³ to 1,800m³, site development works and landscaping • Installation and commissioning of UV Disinfection System, Instrumentation and raw and treated water monitoring equipment • Installation and commissioning of SCADA and Telemetry System • 20 years Operation and Maintenance of all water treatment plants and associated infrastructure <p><u>Process Design</u></p> <p>The Galway GWS DBO Bundle No.2 consisted of the construction of 16 Water Treatment plants, with a variety of different raw water sources from boreholes to springs to lakes. Each water treatment plant was designed to meet the requirements of SI 244 of 2014 European Communities (Drinking Water) (No.2) Regulations 2014. A tabular summary is provided below describing the raw water source, the raw water design parameters and selected water treatment process.</p>		

1. Abbey Kylemore GWS 19.9 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 36 Hazen	- Coagulant Dosing
Turbidity : 4NTU	- 4no. 900mm Multi-Media Pressure Filters
Aluminum : 28 ug/l	- UV disinfection unit
Iron : 129 ug/l	- Disinfection (Sodium Hypochlorite) Dosing
Manganese : 35 ug/l	

2. Ballyaneen Rakerin GWS 13.9 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 30 Hazen	- Oxidant Dosing
Turbidity : 22 NTU	- Coagulant Dosing
Aluminum : 97 ug/l	- Potassium Permanganate Dosing
Iron : 875 ug/l	- Reverse Osmosis
Manganese : 725 ug/l	- 1no. 1600mm Multi-Media Pressure Filter
Nitrates : < 57mg/l	- 4no. 600mm Granular Activated Carbon Filters
Nitrite : < 0.54 mg/l	- UV disinfection unit
	- Disinfection (Sodium Hypochlorite) Dosing

3. Ballinabanaba GWS 38.1 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 20 Hazen	- Oxidant Dosing
Turbidity : 5 NTU	- Coagulant Dosing
Aluminum : 2648 ug/l	- 4no. 1200mm Multi-Media Pressure Filters
Iron : 204 ug/l	- UV disinfection unit
Manganese : 25 ug/l	- Disinfection (Sodium Hypochlorite) Dosing

4. Barnaderg/Gortbeg GWS 105.1 m³/hr (Borehole / Spring)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 45 Hazen	- Oxidant Dosing
Turbidity : 4 NTU	- Potassium Permanganate Dosing
Aluminum : 84 ug/l	- 5no. 1800mm Multi-Media Pressure Filter
Iron : 417 ug/l	- 4no. 1800mm Granular Activated Carbon Filters
Manganese : 1427ug/l	- UV disinfection unit
	- Disinfection (Sodium Hypochlorite) Dosing

5. Ballinakill GWS 20.9 m³/hr (Lake Source)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 83 Hazen	- Chemical Dosing
Turbidity : 8 NTU	- Dissolved Air Flotation (DAF) Plant
Aluminum : 67 ug/l	- UV disinfection unit
Iron : 750 ug/l	- Disinfection (Sodium Hypochlorite) Dosing
Manganese : 255 ug/l	

6. Bullaun GWS 26.7 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 20 Hazen	- Oxidant Dosing
Turbidity : 6 NTU	- Coagulant Dosing
Aluminum : 33 ug/l	- 5no. 900mm Multi-Media Pressure Filter
Iron : 320 ug/l	- UV disinfection unit
Manganese : 57 ug/l	- Disinfection (Sodium Hypochlorite) Dosing

7. CBC GWS 116.0 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 90 Hazen	- Oxidant Dosing
Turbidity : 54 NTU	- Coagulant Dosing
Aluminum : 1250 ug/l	- Potassium Permanganate Dosing
Iron : 3048 ug/l	- Clarifier
Manganese : 369 ug/l	- 4no. 2200mm Multi-Media Pressure Filter

- 3no. 2200mm Granular Activated Carbon Filters
- Disinfection (Sodium Hypochlorite) Dosing
- UV disinfection unit

8. Cappataggle GWS 100.0 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 20 Hazen	- Oxidant Dosing
Turbidity : 4 NTU	- Coagulant Dosing
Aluminum : 1544 ug/l	- Potassium Permanganate Dosing
Iron : 413 ug/l	- pH adjustment and correction
Manganese : 192 ug/l	- 4no. 2000mm Multi-Media Pressure Filter
	- UV disinfection unit
	- Disinfection (Sodium Hypochlorite) Dosing

9. Gallagh GWS 90.1 m³/hr (Spring)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 60 Hazen	- Oxidant Dosing
Turbidity : 5 NTU	- Coagulant Dosing
Aluminum : 24 ug/l	- Potassium Permanganate Dosing
Iron : 872 ug/l	- 4no. 1800mm Multi-Media Pressure Filter
Manganese : 88 ug/l	- 4no. 2000mm Granular Activated Carbon Filters
	- UV disinfection unit
	- Disinfection (Sodium Hypochlorite) Dosing

10. Kilconierin GWS 15.7 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 20 Hazen	- Oxidant Dosing
Turbidity : 7 NTU	- Coagulant Dosing
Aluminum : 38 ug/l	- Potassium Permanganate Dosing
Iron : 354 ug/l	- 1no. 1600mm Multi-Media Pressure Filter
Manganese : 133 ug/l	- Disinfection (Sodium Hypochlorite) Dosing
	- UV disinfection unit

11. Kiltiernan GWS 75.7 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 38 Hazen	- Oxidant Dosing
Turbidity : 9 NTU	- Coagulant Dosing
Aluminum : 2599 ug/l	- Potassium Permanganate Dosing
Iron : 125 ug/l	- pH adjustment and correction
Manganese : 75 ug/l	- Reverse Osmosis
Nitrates : 73mg/l	- 5no. 1400mm Multi-Media Pressure Filter
Nitrite : 0.83mg/l	- UV disinfection unit
	- Disinfection (Sodium Hypochlorite) Dosing

12. Lettermullen GWS 34.8 m³/hr (Lake Source)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 105 Hazen	- Chemical Dosing
Turbidity : 20 NTU	- Dissolved Air Flotation (DAF) Plant
Aluminum : 625 ug/l	- UV disinfection unit
Iron : 1063 ug/l	- Disinfection (Sodium Hypochlorite) Dosing
Manganese : 160 ug/l	

13. Lydacan GWS 16.2 m³/hr (Borehole)

<u>Raw Water Parameters</u>	<u>Selected Water Treatment Process</u>
Colour : 45 Hazen	- Oxidant Dosing
Turbidity : 9 NTU	- Coagulant Dosing
Aluminum : 49 ug/l	- Potassium Permanganate Dosing
Iron : 303 ug/l	- 1no. 1600mm Multi-Media Pressure Filter
Manganese : 458 ug/l	- UV disinfection unit

	- Disinfection (Sodium Hypochlorite) Dosing
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14. Menlough GWS 77.8 m³/hr (Spring / Borehole)

<u>Raw Water Parameters</u> Colour : 23 Hazen Turbidity : 12 NTU Aluminum : 30 ug/l Iron : 1255 ug/l Manganese : 798 ug/l	<u>Selected Water Treatment Process</u> - Oxidant Dosing - Coagulant Dosing - Potassium Permanganate Dosing - 3no. 2000mm Multi-Media Pressure Filter - UV disinfection unit - Disinfection (Sodium Hypochlorite) Dosing
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15. Peterswell GWS 38.1 m³/hr (Spring / Borehole)

<u>Raw Water Parameters</u> Colour : 30 Hazen Turbidity : 5 NTU Aluminum : 2877 ug/l Iron : 825 ug/l Manganese : 307 ug/l	<u>Selected Water Treatment Process</u> - Oxidant Dosing - Coagulant Dosing - Potassium Permanganate Dosing - pH adjustment and correction - Clarifier - 4no. 1200mm Multi-Media Pressure Filter - UV disinfection unit - Disinfection (Sodium Hypochlorite) Dosing
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16. Clonbur PWSS 68.4 m³/hr (Lake Source)

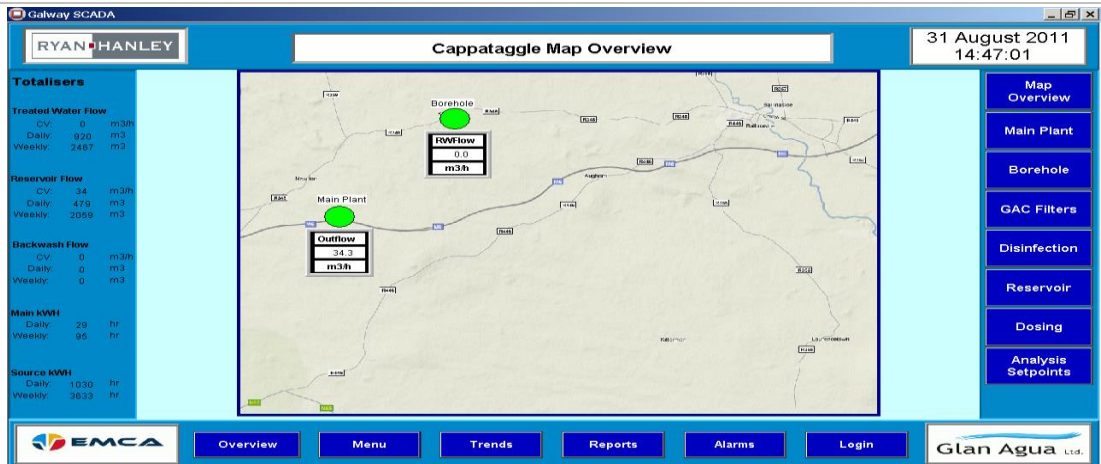
<u>Raw Water Parameters</u> Colour : 98 Hazen Turbidity : 5 NTU Aluminum : 182 ug/l Iron : 554 ug/l Manganese : 244 ug/l	<u>Selected Water Treatment Process</u> - Chemical Dosing - Dissolved Air Flotation (DAF) Plant - UV disinfection unit - Disinfection (Sodium Hypochlorite) Dosing
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Operation and Maintenance

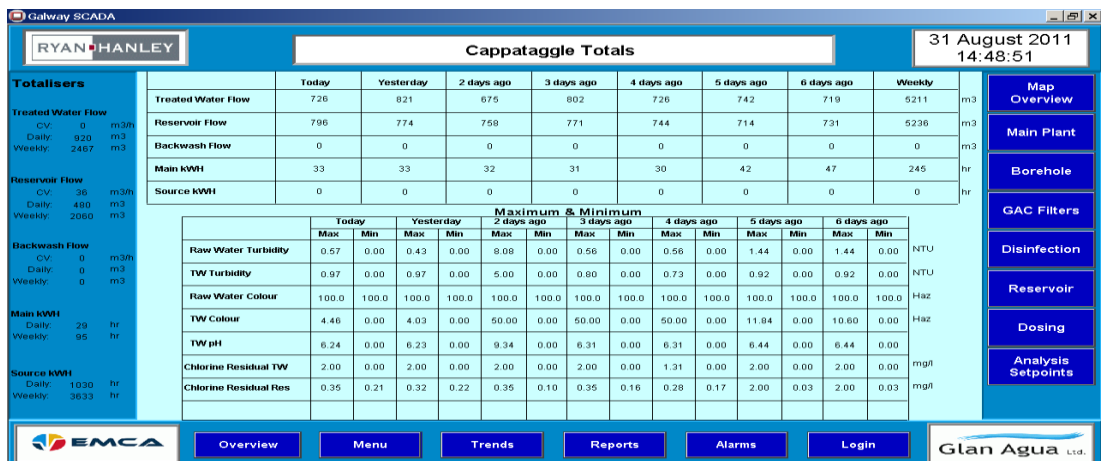
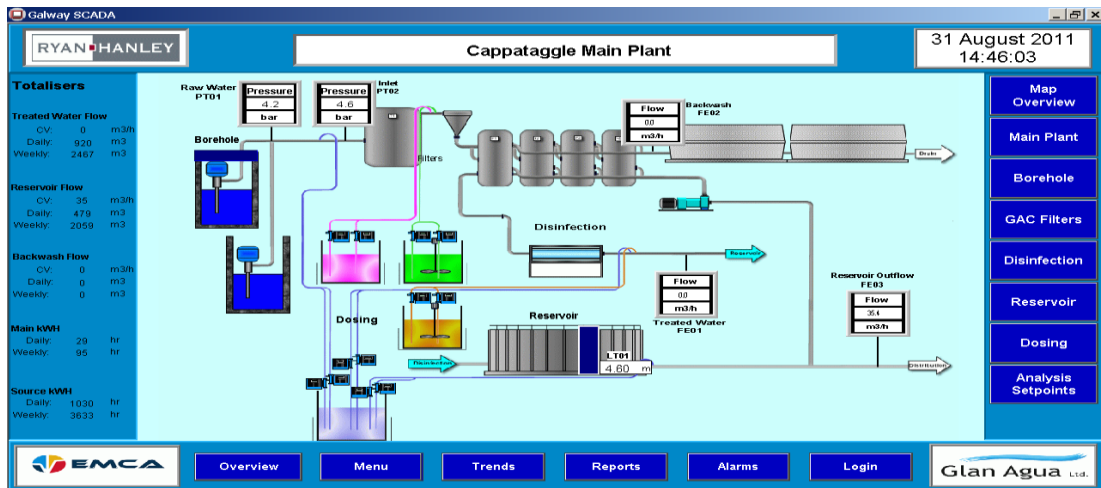
There is a Senior Operations Manager and 4no Operations Technicians employed on the Galway GWS DBO project, which provides for a fast and efficient response time and high quality delivery of service. The Operation and Maintenance Phase of the project includes the production of Monthly Status Reports, and full implementation of the PMS Reporting System.



The Operation and Maintenance of the contract is controlled via two central SCADA hub centres throughout the bundle. The SCADA system is able to remotely acquire display and store data from all 16 water treatment plants sites.



There is a SCADA server in Glan Agua Ltd head office that also acquires all the data and is stored and backed up every night at 12midnight. The SCADA Computer is a Windows XP Professional (NT compatible) operating software and the SCADA operating software is Rockwell Site Edition.



The SCADA performs scan cycles every 0-10 minutes. On analogue signals (flow, pressure, colour, turbidity) digital signals such as alarms are instantaneous. e.g if pump trips out and an alarm is generated at the WTP MCC that signal is sent immediately to the SCADA system and directly to operator. Similarly, Colour, pH, Turbidity Chlorine from Raw and treated water and are also monitored and trended on SCADA.

Health & Safety Aspects of the Contract

- Entry into Confined Space
- Excavations
- Structural Stability
- Lifting Operations / Cranes
- Road Works
- Traffic Management
- Scaffolding
- Underground Services
- Overhead Cables
- Working at Heights
- Piling
- Vibration, Noise and Dust
- Working with hazardous materials / live sewers

Environmental Aspects and Impacts of the Contract

Approximately 24 sites had to be developed through construction of a water treatment plant building, reservoir, pipework and source protection. A preliminary environmental and archaeological assessment was completed pre-tender stage, which formed part of the tender documentation. An Environmental Method Statement had to be completed for each site, and submitted for approval to NPWS prior to commencement of the construction works. There was 2no sites in particular that were significant in terms of environmental sensitivity;

Ballinakill GWS – the water treatment plant was located beside Ballinakill Lough (source). Ballinakill Lough contained 5no protected species, including Irish Hydrilla and Marsh Fritillary Butterfly. The site also contained an area of archaeological interest, which was highlighted in the preliminary report. The following mitigations were completed in conjunction with the NPWS and designated archaeologist;

- 650m of silt fencing was erected to prevent any run-off from entering Ballinakill Lough. The silt fencing was erected by hand, as per instruction of NPWS, to prevent any damage to Marsh Fritillary habitat and breeding ground.
- Environmental Supervision throughout all phases of site set-up.
- Continuous measurement of the suspended solids in Ballinakill Lough to ensure that there was no noticeable increase in suspended solids throughout the construction phase.
- On site water management to ensure that no silt entered the neighbouring stream or Ballinakill Lough
- Watching Brief by designated archaeologists throughout all initial soil stripping stages.

Kiltiernan borehole site – the borehole was located 50m from Kiltiernan Turlough, which is a special area of conservation. Environmental mitigation measures included;

- 50m of silt fencing was erected during development of the borehole as there was a significant amount of silty water produced.
- Environmental Supervision throughout all phases of site set-up.
- Installation of sedimats to prevent silt laden water from entering the Turlough
- On site water management to ensure that no silt entered the Turlough during borehole development.

Interaction and liaison with the following specialists;

- Dr Noel Kirby NPWS
- Dr Enda Mooney NPWS
- Brendan Moore – Archaeologist
- Dr Cilian Roden – Irish Hydrilla Ecology Specialist
- Dr Will Woodrow – Woodrow Sustainable Solutions – Marsh Fritillary Specialist

Name & address of Contracting Authority responsible for the project:

Galway County Council,
Aras an Chontae,
Prospect Hill
Galway

Contracting Authority contact name:

Michael Dolly

Phone no.:

091 509000

OTHER INFORMATION

Provider of Civil Design : Glan Agua Ltd

Provider of Civil and Building Construction: Glan Agua Ltd
Provider of Mechanical, Electrical & Process Design: Glan Agua Ltd
Provider of Mechanical, Electrical & Process Installation: Glan Agua Ltd
Project Supervisor Construction Stage: Glan Agua Ltd
Project Supervisor Design Stage: Glan Agua Ltd

CONTRACTORS NAME:	Glan Agua Ltd
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