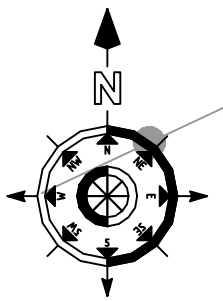


Primary Discharge
SW-01 Conna
(192677E, 093487N)

2 x BL4000 Blivet Units

River Bride

Outlet Flume

Inlet Manhole

Plant Boundary

Store

Automatic Screen

Control Panel

Forward Feed Sump

Waste Water Treatment plant
(192669E 093471N)

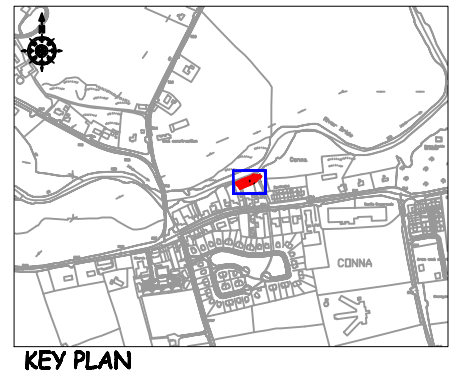
Castlev

21.3

19.0

NOTES

1. Dimensions are not to be scaled from drawing.
   For any discrepancies found consult with the design office.
2. This drawing is to be read in conjunction with the Specification.
3. This drawing is to be read in conjunction with all other contract drawings.



KEY PLAN

No.	Date	Drwn	Surv	Chkd	Revision Description

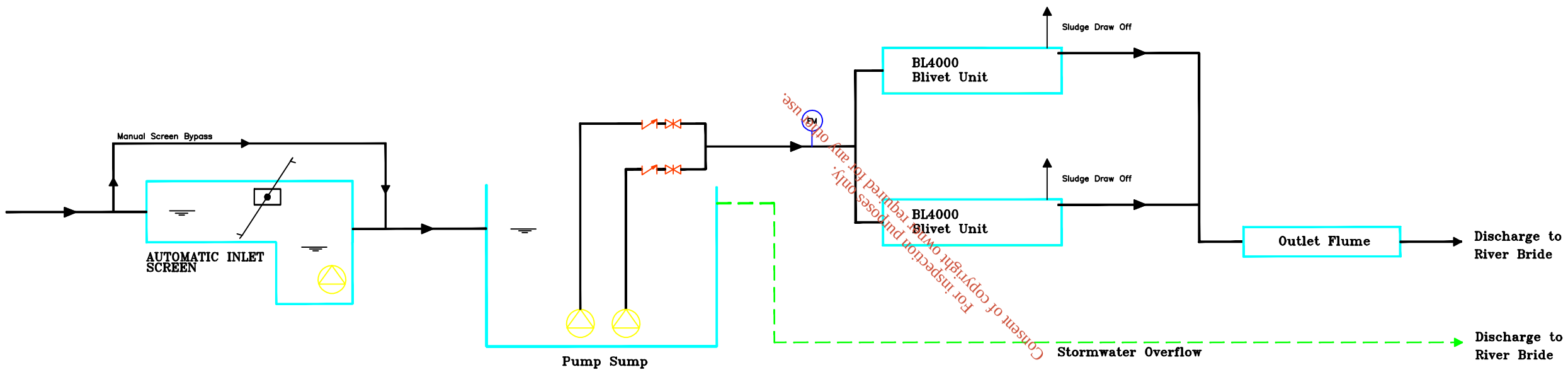
Cork County Council,
Northern Division.

N. O'KEEFFE, B.E.,
COUNTY ENGINEER,
COUNTY HALL,
CORK.

Job Title:
Conna & Environs
Waste Water Discharge
Licence Application

Drawing Title:
Waste Water Treatment Plant
Site Layout
Attachment C1 - Map 10

Scales:	Surveyed by:	Drawn by:
1:500 @ A3	D.L.	D.L.
Designed by:	**Checked by:**	**Date:**
E.M.	F.C.	June 2009
Drawing number:		**Rev:**
C1 - Map 10		-



NOTES

1. Dimensions are not to be scaled from drawing.
   For any discrepancies found consult with the design office.
2. This drawing is to be read in conjunction with the Specification.
3. This drawing is to be read in conjunction with all other contract drawings.

No.	Date	Drwn	Surv	Chkd	Revision Description

Cork County Council,
Northern Division.

N. O'KEEFFE, B.E.,
COUNTY ENGINEER,
COUNTY HALL,
CORK.

Job Title:
Conna & Environs
Waste Water Discharge
Licence Application

Drawing Title:
Schematic showing Existing Treatment Plant Process
Attachment C1 - Drawing 1

Scales:	Surveyed by:	Drawn by:
1:5000 @ A3	D.L.	D.L.
Designed by:	**Checked by:**	**Date:**
E.M.	F.C.	June 2009
Drawing number:		**Rev:**
C1 - Drawing 1		-

OUTLINE SPECIFICATION FOR SEWAGE TREATMENT PLANTS

THE BMS BL 4000 BLIVET RANGE

1.GENERAL

The BMS BLIVET system is the most compact "all in one" system available. The civil works are minimal consisting of a flat concrete support slab the plan area of the unit constructed 1.5m below the invert of the incoming pipe.

As the final appearance of the unit is critical, the system may be buried up to deck level such that the impact on the landscape is not intrusive. The units are covered preventing noise and fly nuisance. The BLIVET is a modular unit that lends itself to future expansion or relocation.

2.DESIGN PARAMETERS BL4000 BLIVET

Parameter	Influent	Effluent
Design flow	3333 L/Hr	3333 L/Hr 0.91/s
BOD	300 mg/l	20 mg/l
Average flow	80 m3/day	80 m3/day
Suspended Solids	300 mg/l	30 mg/l

Please note: Selection of unit may vary for the final effluent quality required e.g. this unit is nominally 250 PE to produce '20:30' and 310 PE to produce '25:35'.Selection of unit may vary for any other final effluent quality required.

3.TREATMENT

3.1 Primary Settlement

The Blivet is capable of receiving raw sewage and settling gross solids without recourse to mechanical means. It incorporates lamella or parallel plates to enhance efficiency and utilisation of space. The Primary Settlement zone reduces the Suspended Solids by 75% and the BOD by 25% to 30%. This zone is relatively maintenance free and contains no moving mechanical parts or electrical devices. Lockable GRP covers with easy access and sufficient ventilation are provided.

3.2 Aerobic Treatment

Settled sewage is treated by means of an efficient and compact system (the BMS Aerotor Biozone) requiring minimal power input and maintenance. It is a combined fixed film reactor and active aeration system mounted on a horizontal shaft. The rotational media is a spiral formation enclosed in outer drum to provide active aeration, intense surface area and net hydraulic lift.
The Biozone is self cleansing and no extraneous pumping or sludge returns are required.
For process efficiency it is, in effect, a plug flow system.

3.3 Final Settlement

The final settlement or Humus tank is a discrete compartment denying ingress of untreated or partially treated liquor. The design is similar to the Primary Settlement Tank on an upward flow basis. A Saran Filter or equivalent may be fitted just below the TWL. This is static design i.e. not powered, and set in frames that are easily removable for cleansing. This zone has frequent automatic removal of sludge to sludge storage by means of a timed submersible pump.

3.4 Sludge Storage

Sludge storage is provided in the base of the unit. Depending on the load applied there is approx. 12 weeks capacity provided. Normally desludging is carried out by suction tanker.

4. MATERIALS/CONSTRUCTION

4.1 Tankage
The Blivet is a unitary tank in multiple modules if necessary. The outside tank is reinforced GRP and is capable of free standing or interment up to deck level without the necessity of a concrete surround. All internal surfaces in contact with sewage are GRP. The maximum weight of the BL4000 unit is 6.8 tonne (unladen) and maximum dimensions are 2.27m width, 10.9m length and 3m overall height. Adequate permanent lifting hooks are provided.
All watertight compartments are hydraulically tested before leaving the manufacturer. Quality certificates can also be provided. Copies of certificates of conformity for all major components and materials are available for inspection.
The tank and internal components are accessed by a series of lockable GRP covers capable of being lifted by one person. These can be manufactured in a colour of the client's choice to enhance the visual impact of the location.

4.2 Mechanical
The shaft supporting the media is EN 8 steel and has a diameter of 60mm. It is driven through a reduction gear box of the helical gear variety with an output speed of 6 RPM.
Each section of the shaft is coupled by a duplex chain coupling encased in a chain guard with grease access nipple.
Either side of each coupling the shaft is supported by roller bearings in plummer blocks fitted with double lip seals and grease access nipples. The unit has just one drive train.
All mechanical components provided are of world renown manufacture with spare parts readily available in the country of operation. A grease gun with extended grease hose is provided with each unit and mounted in the motor/gearbox compartment.

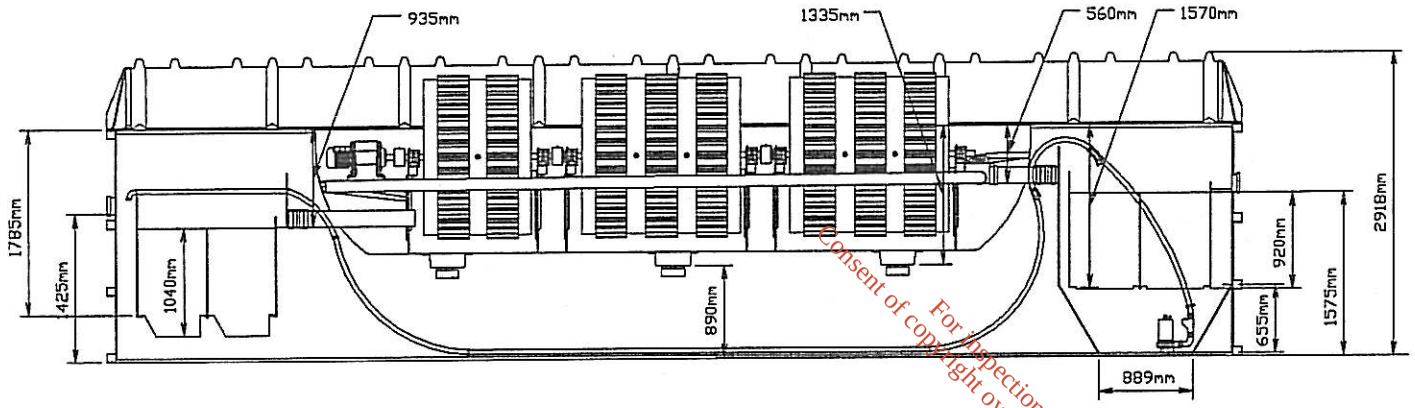
4.3 Electrical
In order to minimise power consumption, possible breakdown and extra maintenance, the unit has a maximum of two electrical devices ie. the main shaft drive and a final sludge return pump.
The main motor in the BL4000 unit is only 0.75Kw (in three phase)/1.1hp. It is directly coupled to the reduction gearbox and is easily accessible protected by a locked GRP cover.
A submersible pump of maximum 1.5hp is fitted in the final settlement compartment. This is activated by an adjustable minute timer connected in the control box.
A single control box is mounted on the motor/gearbox compartment and is accessible from the surface. It contains all the electrical controls and is to I.P 55 standard.

5 CIVIL WORKS

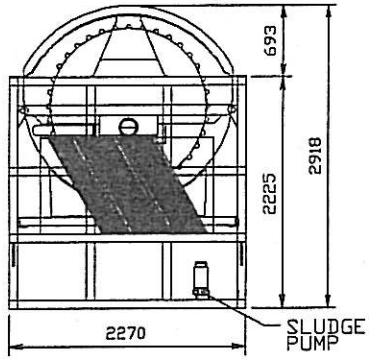
For ease of construction the civil works consist of a flat base support slab (2.3m wide by 11m long) in 20N reinforced concrete, the placing of the units thereon, the pipe and electrical connections and back filling with fine material if units are not free standing.

6. LOCATION

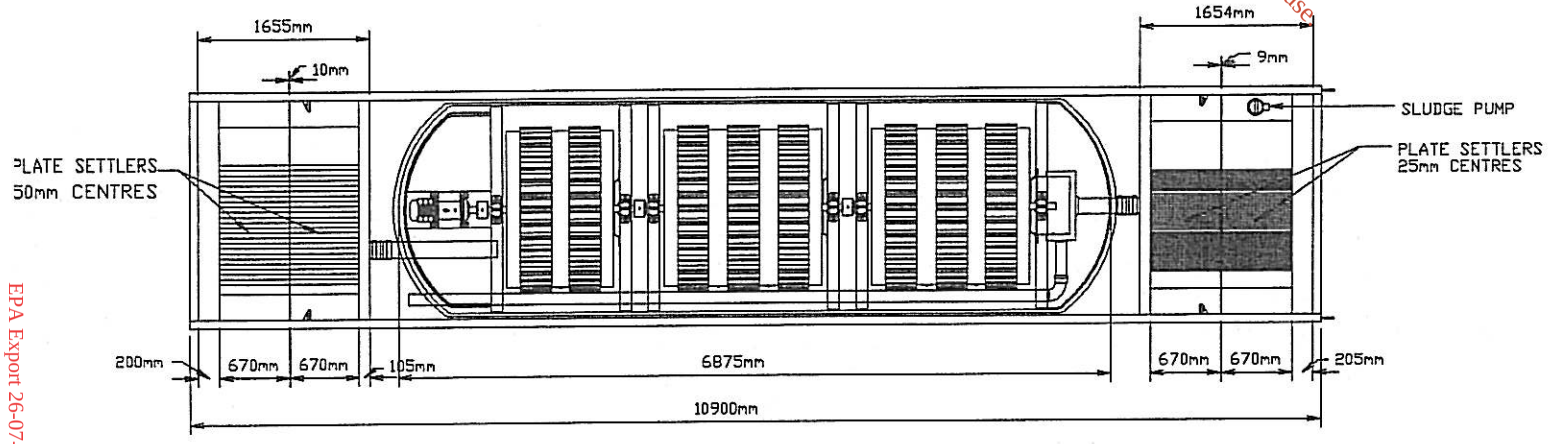
As with all similar sized sewage works it is preferable to locate a system at least 50m from the nearest habitable building. However if the units are to be inside a building e.g. a basement, then adequate procedures must be taken to ventilate the location remotely to areas not frequented by users of the development.
Particular care must be taken to avoid locations prone to flooding.



ELEVATION



END VIEW



PLAN

REVISION		
1	April 96	Changed spacings on elevation
2	Dec 00	Converted to AutoCAD LT
3	Nov 02	Changed lids

Company: BUTLER MANUFACTURING SERVICES LTD	Drawn by: DH
	Date: 22 APRIL 1997
Title: BL4000 CONTAINERISED	Scale: 1 : 50
Approved by	Drawing no.: BL40C1

Attachment E4 Conna Inlet Table E4

Sample Date	12/04/2006	05/10/2006	31/01/2007	28/01/2009	05/02/2009	05/03/2009	17/04/2009	
Sample	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Average
Sample Code				GT155	GT256	GT384	GT699	
Flow M^3/Day	*	*	*	*	*	*	*	
pH	7.5	7.4	7.4	7.3	7.4	7.6	7.7	7.471429
Temperature °C	*	*	*	*	*	*	*	
Cond 20°C	913	749	760	526	602	678	897	732.1429
SS mg/L	108	64	74	57	38	20	270	90.14286
NH_3 mg/L	17	11	*	12.6	16	21.3	23.5	16.9
BOD mg/L	185	195	125	99	40	180	325	164.1429
COD mg/L	497	411	356	227	112	392	668	380.4286
TN mg/L	*	*	*	16.6	24	33	40	28.4
Nitrite mg/L	*	*	*	0.933	*	*	*	0.933
Nitrate mg/L	*	*	*	3.04	*	*	*	3.04
TP mg/L	20	10	2	6	2.5	4.2	12.2	8.128571
O-PO4-P mg/L	8	5	3	2.91	1.7	3.2	4.3	4.015714
SO4 mg/L	*	*	*	32.9	*	*	*	32.9
Phenols µg/L	*	*	*	<0.10	*	*	*	<0.10
Atrazine µg/L	*	*	*	<0.01	*	*	*	<0.01
Dichloromethane µg/L	*	*	*	<1	*	*	*	<1
Simazine µg/L	*	*	*	<0.01	*	*	*	<0.01
Toluene µg/L	*	*	*	<1	*	*	*	<1
Tributyltin µg/L	*	*	*	not required	*	*	*	not required
Xylenes µg/L	*	*	*	<1	*	*	*	<1
Arsenic µg/L	*	*	*	<0.96	*	*	*	<0.96
Chromium ug/L	*	*	*	<20	<20	<20	<20	<20
Copper ug/L	*	*	*	10	10	10	71.3	25.325
Cyanide µg/L	*	*	*	<5	*	*	*	
Fluoride µg/L	*	*	*	32	*	*	*	32
Lead ug/L	*	*	*	<20	<20	<20	<20	<20
Nickel ug/L	*	*	*	<20	<20	<20	<20	<20
Zinc ug/L	*	*	*	10	27	10	172.9	54.975
Boron ug/L	*	*	*	<20	<20	<20	<20	<20
Cadmium ug/L	*	*	*	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	<0.2	*	*	*	
Selenium µg/L	*	*	*	1	*	*	*	1
Barium ug/L	*	*	*	10	10	10	52.6	20.65

HALF LOD FOR STATISTICAL PURPOSES

PT_CD	PT_TYPE	LA_NAME	RWB_TYPE	RWB_NAME	DESIGNATION	EASTING	NORTHING	VERIFIED
SW01 CONNA	Primary	cork county council	river	Bride	SAC 002170	192689	93500	N

Attachment E4 Conna Inlet Table E4

Sample Date	12/04/2006	05/10/2006	31/01/2007	28/01/2009	05/02/2009	05/03/2009	17/04/2009	
Sample	Influent	Influent	Influent	Influent	Influent	Influent	Influent	Average
Sample Code				GT155	GT256	GT384	GT699	
Flow M^3/Day	*	*	*	*	*	*	*	
pH	7.5	7.4	7.4	7.3	7.4	7.6	7.7	7.471429
Temperature °C	*	*	*	*	*	*	*	
Cond 20°C	913	749	760	526	602	678	897	732.1429
SS mg/L	108	64	74	57	38	20	270	90.14286
NH_3 mg/L	17	11	*	12.6	16	21.3	23.5	16.9
BOD mg/L	185	195	125	99	40	180	325	164.1429
COD mg/L	497	411	356	227	112	392	668	380.4286
TN mg/L	*	*	*	16.6	24	33	40	28.4
Nitrite mg/L	*	*	*	0.933	*	*	*	0.933
Nitrate mg/L	*	*	*	3.04	*	*	*	3.04
TP mg/L	20	10	2	6	2.5	4.2	12.2	8.128571
O-PO4-P mg/L	8	5	3	2.91	1.7	3.2	4.3	4.015714
SO4 mg/L	*	*	*	32.9	*	*	*	32.9
Phenols µg/L	*	*	*	<0.10	*	*	*	<0.10
Atrazine µg/L	*	*	*	<0.01	*	*	*	<0.01
Dichloromethane µg/L	*	*	*	<1	*	*	*	<1
Simazine µg/L	*	*	*	<0.01	*	*	*	<0.01
Toluene µg/L	*	*	*	<1	*	*	*	<1
Tributyltin µg/L	*	*	*	not required	*	*	*	not required
Xylenes µg/L	*	*	*	<1	*	*	*	<1
Arsenic µg/L	*	*	*	<0.96	*	*	*	<0.96
Chromium ug/L	*	*	*	<20	<20	<20	<20	<20
Copper ug/L	*	*	*	10	10	10	71.3	25.325
Cyanide µg/L	*	*	*	<5	*	*	*	
Fluoride µg/L	*	*	*	32	*	*	*	32
Lead ug/L	*	*	*	<20	<20	<20	<20	<20
Nickel ug/L	*	*	*	<20	<20	<20	<20	<20
Zinc ug/L	*	*	*	10	27	10	172.9	54.975
Boron ug/L	*	*		<20	<20	<20	<20	<20
Cadmium ug/L	*	*		<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	<0.2	*	*	*	
Selenium µg/L	*	*	*	1	*	*	*	1
Barium ug/L	*	*	*	10	10	10	52.6	20.65

HALF LOD FOR STATISTICAL PURPOSES

Attachment E4 Conna Discharge Outlet Table E4

Sample Date	12/04/2006	05/10/2006	31/01/2007	18/09/2008	23/10/2008	28/01/2009	05/02/2009	05/03/2009	05/03/2009	02/04/2009	17/04/2009			
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Average	Kg/Day	Kg/year
Sample Code						GT154	GT257	GT385		GT473	GT700			
Flow M^3/Day	*	*	*	*	*	*	*	*	*	*	*			
pH	7.7	7.4	7.3	*	7.7	7.5	7.4	7.4	7.6	7.5	7.7	7.52		
Temperature °C	*	*	*	*	*	*	*	*	*	*	*			
Cond 20°C	1055	853	964	*	*	624	281	556	255	*	257	605.625		
SS mg/L	7	19	11	34	50	16	5	12	9	67	4.8	21.34545		
NH_3 mg/L	13	20	*	*	*	13.5	0.1	*	0.09	*	0.06	7.791667		
BOD mg/L	20	33	11	41.85	22.4	20	<2	21	<2	124	2	32.80556		
COD mg/L	59	80	57	84	141	67	11	38	20	238	13	73.45455		
TN mg/L	*	*	*	*	*	16.9	4.7	14.9	3	36	3	13.08333		
Nitrite mg/L	*	*	*	*	*	0.451	*	*	*	*	*	0.451		
Nitrate mg/L	*	*	*	*	*	4.16	*	*	*	*	*	4.16		
TP mg/L	12	10	4	*	*	5.8	0.07	1.7	0.15	*	0.09	4.22625		
O-PO4-P mg/L	6	7	2	*	*	1.86	<0.05	*	0.07	*	0.06	2.831667		
SO4 mg/L	*	*	*	*	*	<30	*	*	*	*	*	<30		
Phenols µg/L	*	*	*	*	*	<0.10	*	*	*	*	*	<0.10		
Atrazine µg/L	*	*	*	*	*	<0.01	*	*	*	*	*	<0.01		
Dichloromethane	*	*	*	*	*	<1	*	*	*	*	*	<1		
Simazine µg/L	*	*	*	*	*	<0.01	*	*	*	*	*	<0.01		
Toluene µg/L	*	*	*	*	*	<1	*	*	*	*	*	<1		
Tributyltin µg/L	*	*	*	*	*	not required	*	*	*	*	*	*		
Xylenes µg/L	*	*	*	*	*	<1	*	*	*	*	*	<1		
Arsenic µg/L	*	*	*	*	*	<0.96	*	*	*	*	*	<0.96		
Chromium ug/L	*	*	*	*	*	<20	<20	<20	*	<20	<20	<20		
Copper ug/L	*	*	*	*	*	10	10	10	*	10	21.6	12.32		
Cyanide µg/L	*	*	*	*	*	5	*	*	*		*	5		
Fluoride µg/L	*	*	*	*	*	32	*	*	*		*	32		
Lead ug/L	*	*	*	*	*	<20	<20	<20	*	<20	<20	<20		
Nickel ug/L	*	*	*	*	*	<20	<20	<20	*	<20	<20	<20		
Zinc ug/L	*	*	*	*	*	10	10	10	*	10	38.7	15.74		
Boron ug/L	*	*	*	*	*	<20	<20	<20	*	<20	<20	<20		
Cadmium ug/L	*	*	*	*	*	<20	<20	<20	*	<20	<20	<20		
Mercury µg/L	*	*	*	*	*	<0.2	*	*	*	*	*	<0.2		
Selenium µg/L	*	*	*	*	*	1.6	*	*	*	*	*	1.6		
Barium ug/L	*	*	*	*	*	10	10	54.9	*	10	<20	21.225		

HALF LOD FOR STATISTICAL PURPOSES

Attachment E4 Conna Upstream Table E4

Sample Date	23/10/2008	28/01/2009	05/02/2009	05/03/2009	02/04/2009	17/04/2009	
Sample	River	River	River	River	River	River	Average
Sample Code		GT152	GT258	GT386	GT474	GT701	
Flow M^3/Day	*	*	*	*	*	*	
pH	*	7.6	*	7.4	7.6	7.7	7.575
Temperature °C	*	*	*	*	*	*	
Cond 20°C	*	236	*	281	255	257	257.25
SS mg/L	*	5	*	5	9	4.8	5.95
NH_3 mg/L	*	0.05	*	0.1	0.09	0.06	0.075
BOD mg/L	*	0.5	*	1	1	2	1.125
COD mg/L	*	10.5	*	11	20	13	13.625
TN mg/L	*	5	*	4.7	3	3	3.925
Nitrite mg/L	*	0.00757	*	*	*	*	0.00757
Nitrate mg/L	*	5.32	*	*	*	*	5.32
TP mg/L	*	0.1	*	0.07	0.15	0.09	0.1025
O-PO4-P mg/L	0.025	0.025	*	0.025	0.07	0.06	0.041
SO4 mg/L	*	<30	*	*	*	*	<30
Phenols µg/L	*	<0.10	*	*	*	*	<0.10
Atrazine µg/L	*	<0.01	*	*	*	*	<0.01
Dichloromethane	*	<1	*	*	*	*	<1
Simazine µg/L	*	<0.01	*	*	*	*	<0.01
Toluene µg/L	*	<1	*	*	*	*	<1
Tributyltin µg/L	*	not required	*	*	*	*	not required
Xylenes µg/L	*	<1	*	*	*	*	<1
Arsenic µg/L	*	<0.96	*	*	*	*	<0.96
Chromium ug/L	*	<20	<20	<20	<20	<20	<20
Copper ug/L	*	<20	<20	<20	<20	<20	<20
Cyanide µg/L	*	<5	*	*	*	*	<5
Fluoride µg/L	*	30	*	*	*	*	30
Lead ug/L	*	<20	<20	<20	<20	<20	<20
Nickel ug/L	*	<20	<20	<20	<20	<20	<20
Zinc ug/L	*	<20	<20	<20	<20	<20	<20
Boron ug/L	*	<20	<20	<20	<20	<20	<20
Cadmium ug/L	*	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	<0.2	*	*	*	*	<0.2
Selenium µg/L	*	1.7	*	*	*	*	1.7
Barium ug/L	*	49	<20	21.6	10	10	22.65

HALF LOD FOR STATISTICAL PURPOSES

Attachment E4 Conna Downstream Table E4

Sample Date	23/10/2008	28/01/2009	05/02/2009	05/03/2009	02/04/2009	17/04/2009	
Sample	River	River	River	River	River	River	Average
Sample Code		GT153	GT259	GT387	GT475	GT702	
Flow M^3/Day	*	*	*	*	*	*	
pH	*	7.6	*	7.3	7.5	7.7	7.525
Temperature °C	*	*	*	*	*	*	
Cond 20°C	*	242	*	278	257	258	258.75
SS mg/L	*	5	*	7	11	5.2	7.05
NH_3 mg/L	*	0.05	*	0.1	0.16	0.06	0.0925
BOD mg/L	*	2	*	1	1	1	1.25
COD mg/L	*	24	*	<5	18	14	18.66666667
TN mg/L	*	5.3	*	4.8	3	3	4.025
Nitrite mg/L	*	0.00849	*	*	*	*	0.00849
Nitrate mg/L	*	5.45	*	*	*	*	5.45
TP mg/L	*	0.1	*	0.07	0.11	0.13	
O-PO4-P mg/L	0.1	<0.05	*	0.06	0.07	0.1	0.0825
SO4 mg/L	*	<30	*	*	*	*	<30
Phenols µg/L	*	<0.10	*	*	*	*	<0.10
Atrazine µg/L	*	<0.01	*	*	*	*	<0.01
Dichloromethane	*	<1	*	*	*	*	<1
Simazine µg/L	*	<0.01	*	*	*	*	<0.01
Toluene µg/L	*	<1	*	*	*	*	<1
Tributyltin µg/L	*	not required	*	*	*	*	not required
Xylenes µg/L	*	<1	*	*	*	*	<1
Arsenic µg/L	*	<0.96	*	*	*	*	<0.96
Chromium ug/L	*	<20	<20	<20	<20	<20	<20
Copper ug/L	*	<20	<20	<20	<20	<20	<20
Cyanide µg/L	*	<5	*	*	*	*	<5
Fluoride µg/L	*	30	*	*	*	*	30
Lead ug/L	*	<20	<20	<20	<20	<20	<20
Nickel ug/L	*	<20	<20	<20	<20	<20	<20
Zinc ug/L	*	<20	<20	<20	<20	<20	<20
Boron ug/L	*	<20	<20	<20	<20	<20	<20
Cadmium ug/L	*	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	<0.2	*	*	*	*	<0.2
Selenium µg/L	*	1.3	*	*	*	*	1.3
Barium ug/L	*	47	10	57.6	10	10	26.92

HALF LOD FOR STATISTICAL PURPOSES

PT_CD	PT_TYPE	MON_TYPE	EASTING	NORTHING	VERIFIED
SWO1	Primary	Sampling	192689	93500	N
aSW01u	u/s	Sampling	192503	93447	N
aSW01u	d/s	Sampling	193054	93642	N