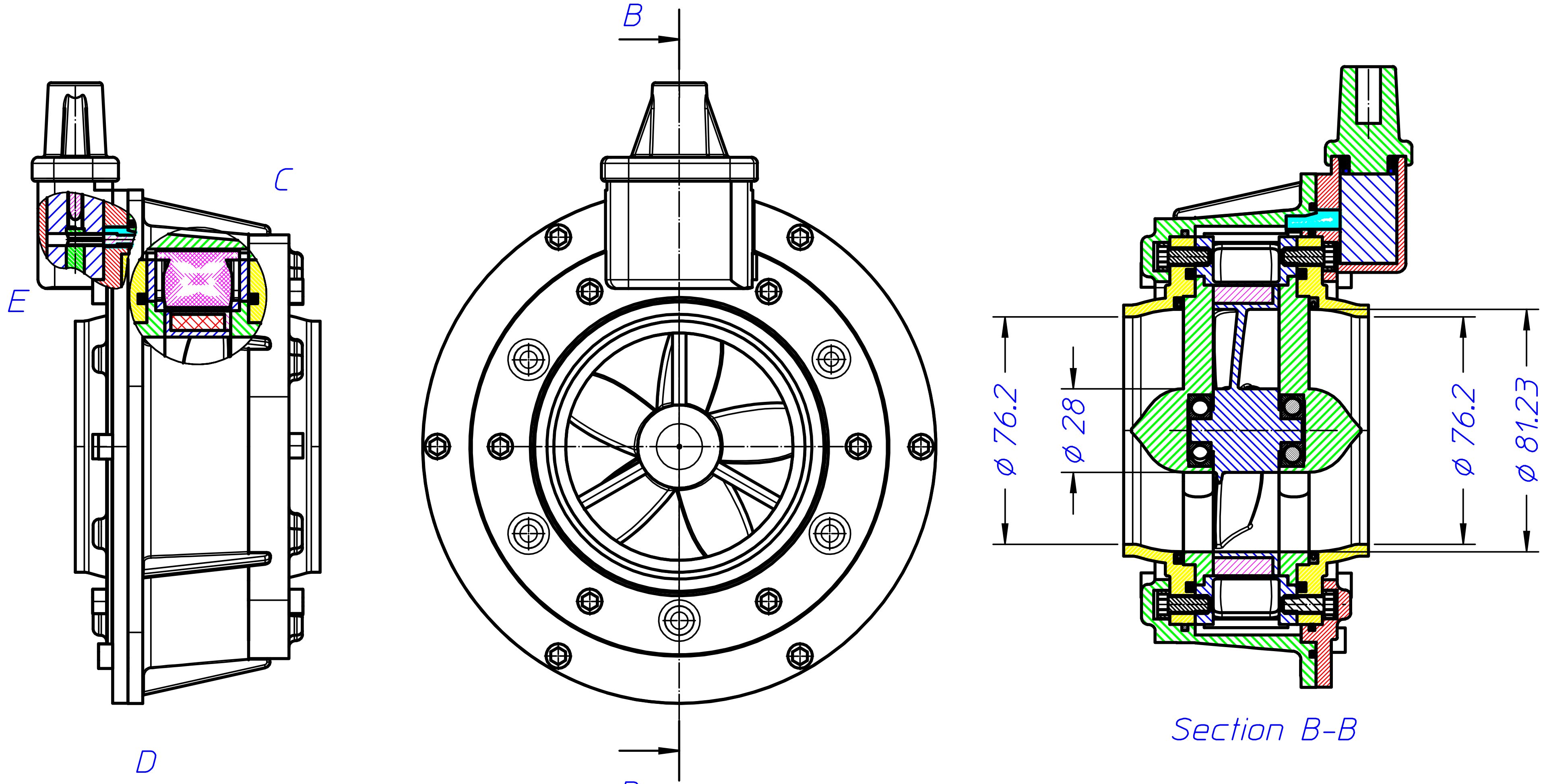

Volume of water at flow rate
of 2m/s = 9.12 litres/s
Mass of water =9.12Kg/s
Pmax $=\frac{1}{2}\eta\rho A v^3$

Output for 76.2(3") pipe = 178.3 watts

Output for 152.4(6") pipe = 714 watts

USE RANGE				TOLERANCE	SURFACE	ARCHIVE	SCALE 1:2
						MATERIAL	
					DATE	NAME	DESCRIPTION
				DRAWN	12/04/13	M.Dyke	Inline Generator Concept
				APPR.			
				RLS.			
						DRAWING-NUMBER	SHEET
B	Sheet 2 added	01/05/13	MD			turb1.1	1
A	1st. draft	12/04/13	MD				OF 2
INDEX	DESCRIPTION	DATE	NAME	ORIGINAL		I.EXCH.F.	I.EXCH.TH.

Available Power

The maximum power output from a turbine used in a run of river application is equal to the kinetic energy of the water impinging on the blades.

Taking the efficiency η of the turbine and its installation into account, the maximum output power Pmax is given by

$$Pmax = \frac{1}{2}\eta\rho Qv2$$

where v is the velocity of the water flow and Q is the volume of water flowing through the turbine per second.

Q is given by

$$Q = A\ v$$

where A is the swept area of the turbine blades.

Thus

$$Pmax = \frac{1}{2}\eta\rho Av3$$

Available Power

Potential energy per unit volume = ρgh

Where ρ is he density of the water (103 Kg/m3), h is the head of water and g is the gravitational constant (10 m/sec2)

0.5x95x103x0.004562x2(3) 178.5

0.5x95x103x0.01824x2(3) 714

The power P from a dam is given by

$$P = \eta\rho ghQ$$

Where Q is the volume of water flowing per second (the flow rate in m3/second) and η is the efficiency of the turbine.

For water flowing at one cubic metre per second from a head of one metre, the power generated is equivalent to 10 kW assuming an energy conversion efficiency of 100% or just over 9 kW with a turbine efficiency of between 90% and 95

USE RANGE	TOLERANCE	SURFACE	ARCHIVE	SCALE 1:2
			MATERIAL	

INDEX	DESCRIPTION	DATE	NAME		DATE	NAME
				DRAWN	01May13	M.Dyke
				APPR.		
				RLS.		
B	this sheet added	01/05/13	MD	ORIGINAL		
A						

DESCRIPTION: Inline Generator Concept

DRAWING-NUMBER: turb1.1

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