HYDRO STRUCTURE CP

DESCRIPTION

Concrete products classified under Hydro Structures include concrete pipes, U-Ditches, Box Culverts, Aquaponds, infiltration wells, and sabo dams. The main product in this category is the concrete pipe, which consists of pressure pipes and low-pressure pipes. Pressure pipes can be used as raw water transmission pipes as part of a water treatment plant, requiring very high resistance to water pressure. Low-pressure pipes are used for sewerage, water distribution, etc.

The pressure pipes are produced using a vibro-pressed centrifugal system to achieve high-density concrete with low permeability and low shrinkage. The low-pressure pipes are produced using reinforced concrete with two production systems: vertical and centrifugal methods. The vertical method is used for large-diameter pipes, while the centrifugal system is used for pipes with diameters ranging from 400 mm to 2000 mm.
U-Ditch and Box Culvert products are commonly used as drainage channels, with dimensions varying up to large sizes.
The Aquapond product is designed for temporary storage of excess water flow to prevent flooding during rain. The stored water is then channeled to drainage systems after the rain subsides, making it ready to accommodate the next water flow.

Infiltration wells are used to infiltrate water into the ground to reduce rainwater runoff into drainage systems, preventing flooding. This product consists of segmental ring components for easy manual installation.

The sabodam product is a type of dam that functions to store and control sediment floods, as well as direct debris flow to follow the river's course. Using modular precast concrete, the sabo structure has excellent abrasion and impact resistance, extending the dam's lifespan. This product is a result of innovation that has been patented with the Directorate General of Intellectual Property of the Ministry of Law and Human Rights since 2019, with two patent holders: the Directorate of Water Resources Engineering, Ministry of Public Works and Housing (PUPR), and WIKA Beton.

Types of Hydro Product

Concrete Pipe

- Reinforced Concrete Pipe
- Reinforced Concrete Cylinder Pipe

U-Ditch

Box Culvert

Aquapond

Infiltration Well

Sabodam Modular

DESIGN REFERENCE

Concrete Pipe

Design

JSWAS A2 - 2018	Jacked concrete reinforced pipe for sewage (ID 800-3000mm)
JSWAS A6 - 2000	Jacked concrete reinforced pipe for sewage
AWWA M9 2nd EDITION - C300	Manual of water supply practice
CPAA DESIGN MANUAL - 2013	Jacking design guidelines
BS EN 639 - 1995	Common requirements for concrete pressure pipes including joints and fittings
BS EN 641 - 1995	Reinforced concrete pressure pipes, cylinder type, including joints and fittings
BS EN 1916 - 2002	Concrete pipes and fittings, unreinforced, steel fiber, and reinforced
SNI 6880 : 2016	Structural Concrete Specification

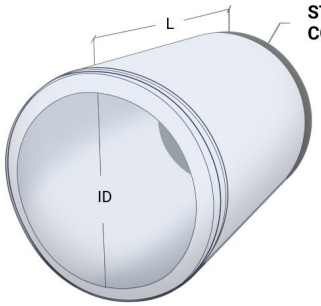
Method of Installation

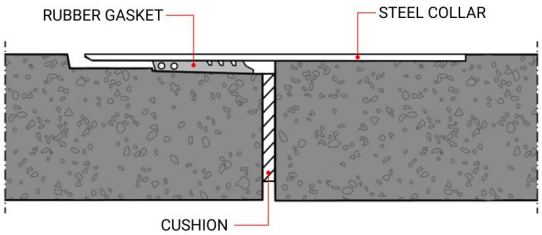
- Jacked with Micro-tunneling conduits
- Open Cut/Trench or embankment conduits

Joint System

- Reinforced Concrete Pipe : Rubber Gasket at Socket-spigot
- Reinforced Concrete Cylinder Pipe : Rubber Gasket & Welding at Socket-spigot

PRODUCT SHAPE & SPECIFICATION ▸ Reinforced Concrete Pipe

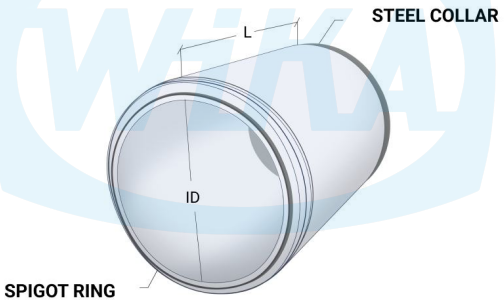


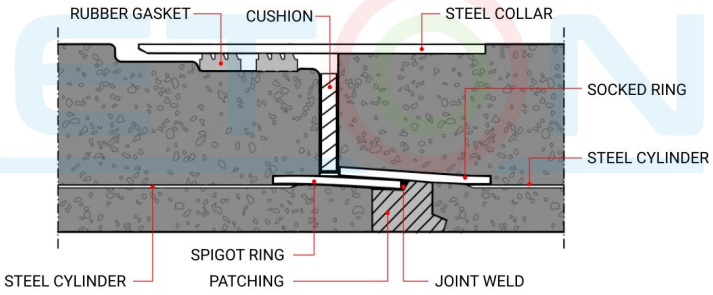


PIPE JOINT SYSTEM

Inner Diameter (ID) (mm)	Outer Diameter (OD) (mm)	Wall Thicknes (t) (mm)	Effective Length (L) (m)	Concrete Strength (fc') (MPa)	Theoretical Weight L - 1.2 m (kg)	Theoretical Weight L - 2.43 m (kg)	Cracking Load Class-1 (kN/m)	Cracking Load Class-2 (kN/m)	Breaking Load Class-1 (kN/m)	Breaking Load Class-2 (kN/m)
400	524	62	1.2 / 2.43	50 / 70	270	547	39,3	78,5	58,9	118
450	584	67	1.2 / 2.43	50 / 70	326	661	42,2	84,4	63,8	127
600	760	80	1.2 / 2.43	50 / 70	513	1.038	46,1	92,2	69,7	138
800	960	80	1.2 / 2.43	50 / 70	664	1.344	35,4	70,7	57,9	143
1.000	1.200	100	1.2 / 2.43	50 / 70	1.037	2.099	41,2	82,4	71,6	124
1.200	1.430	115	1.2 / 2.43	50 / 70	1.425	2.886	44,2	88,3	86,3	133
1.500	1.780	140	1.2 / 2.43	50 / 70	2.164	4.382	50,1	101	110	151
1.800	2.120	160	1.2 / 2.43	50 / 70	2.956	5.985	55,9	112	134	168
2.000	2.350	175	1.2 / 2.43	50 / 70	3.587	7.264	58,9	118	142	177
3.500	4.050	275	2.43	50 / 70	-	19.813	73,6	148	177	221

PRODUCT SHAPE & SPECIFICATION ▸ Reinforced Concrete Cylinder Pipe

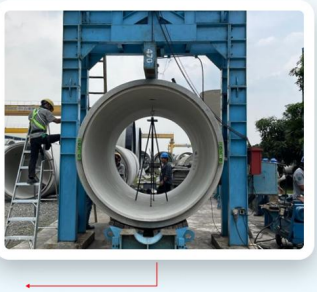




PIPE JOINT SYSTEM

Inner Diameter (mm)	Outer Diameter (mm)	Wall Thickness (mm)	Effective Length (m)	Concrete Strength (MPa)	Theoretical Weight (Kg)	Water Pressure Internal (Bar)	Water Pressure External (Bar)
1.200	1.430	115	3	40 / 60	3.563	4 / 6 / 9	2
1.500	1.780	140	3	40 / 60	5.410	4 / 6 / 9	2
1.650	1.950	150	3	40 / 60	6.362	4 / 6 / 9	2
1.800	2.120	160	3	40 / 60	7.389	4 / 6 / 9	2
2.000	2.350	175	3	40 / 60	8.968	4 / 6 / 9	2

PROJECT REFERENCE



Spam Jatiluhur

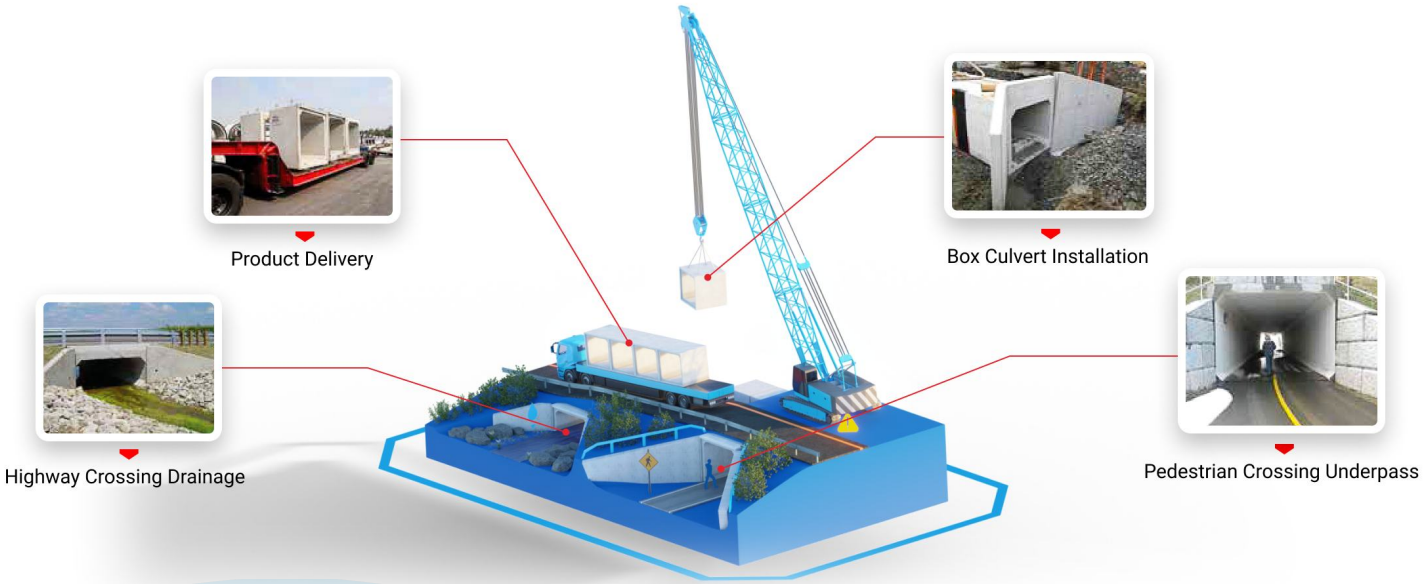
Sodetan Ciliwung - Jakarta

DESIGN REFERENCE

▸ U-Ditch & Box Culvert

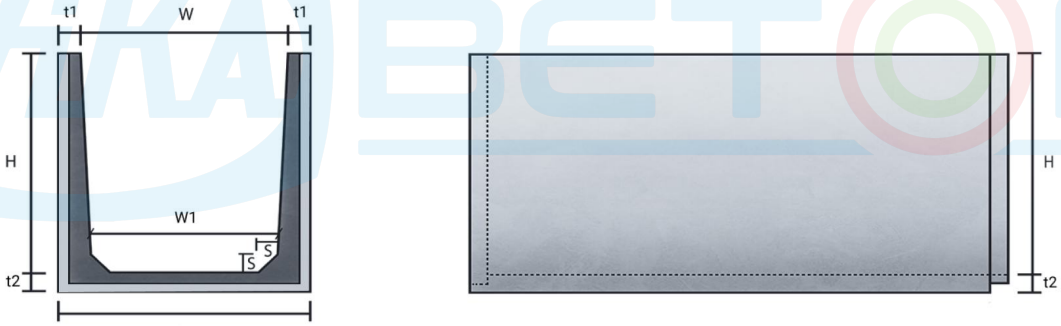
Design	**AASHTO- LRFD**	Design Code for Box Culvert
	SNI 2847 :2019	Indonesian Standard Code for Concrete

PRODUCT APPLICATION



PRODUCT SHAPE

▸ U-Ditch



SPECIFICATION

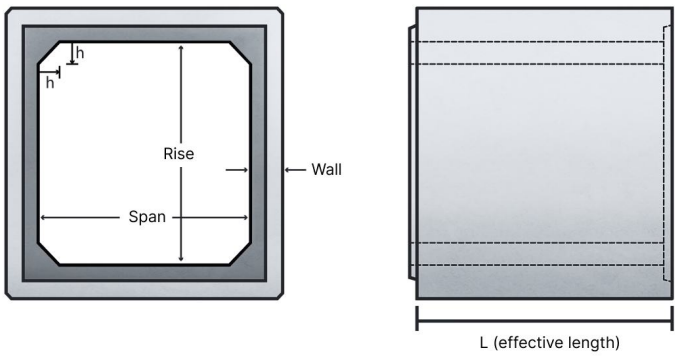
Concrete Compressive Strength fc' = 28 MPa

Type W x H x L	Dimension (mm) (W)	(H)	(W1)	(t1)	(t2)	Weight (kg/pcs) L = 1.200
300 x 200 x 1.200	300	200	294	45	60	131
300 x 300 x 1.200	300	300	294	45	60	159
300 x 400 x 1.200	300	400	294	45	60	187
300 x 500 x 1.200	300	500	294	45	60	215
400 x 300 x 1.200	397	300	390	52	70	216
400 x 400 x 1.200	400	400	390	50	70	247
400 x 500 x 1.200	400	500	390	50	70	278
400 x 600 x 1.200	400	600	390	50	70	310
500 x 300 x 1.200	494	300	488	73	70	284
500 x 400 x 1.200	497	400	488	72	70	327
500 x 500 x 1.200	500	500	488	70	70	369
500 x 600 x 1.200	500	600	488	70	70	413
500 x 700 x 1.200	500	700	488	70	70	457
600 x 400 x 1.200	594	400	584	73	70	352
600 x 500 x 1.200	597	500	584	72	70	396
600 x 600 x 1.200	600	600	584	70	70	438
600 x 700 x 1.200	600	700	584	70	70	483
600 x 800 x 1.200	600	800	584	70	70	527
800 x 600 x 1.200	795	600	780	73	70	488
800 x 700 x 1.200	797	700	780	72	70	532

Type W x H x L	Dimension (mm) (W)	(H)	(W1)	(t1)	(t2)	Weight (kg/pcs) L = 1.200
800 x 800 x 1.200	800	800	780	70	70	574
800 x 1.000 x 1.200	800	1.000	780	70	70	664
800 x 1.200 x 1.200	800	1.200	780	70	70	754
1.000 x 800 x 1.200	978	800	900	101	100	974
1.000 x 1.000 x 1.200	1.000	1.000	900	90	100	1.089
1.000 x 1.200 x 1.200	1.000	1.200	900	90	100	1.227
1.000 x 1.400 x 1.200	1.000	1.400	900	90	100	1.365
1.200 x 1.000 x 1.200	1.178	1.000	1.080	106	105	1.266
1.200 x 1.200 x 1.200	1.200	1.200	1.080	95	105	1.386
1.200 x 1.400 x 1.200	1.200	1.400	1.080	95	105	1.536
1.200 x 1.600 x 1.200	1.200	1.600	1.080	95	105	1.686
1.400 x 1.200 x 1.200	1.378	1.200	1.260	121	150	1.877
1.400 x 1.400 x 1.200	1.400	1.400	1.260	110	150	2.015
1.400 x 1.600 x 1.200	1.422	1.600	1.260	99	150	2.141
1.400 x 1.800 x 1.200	1.444	1.800	1.260	88	150	2.253
1.600 x 1.400 x 1.200	1.576	1.400	1.440	132	170	2.431
1.600 x 1.600 x 1.200	1.600	1.600	1.440	120	170	2.578
1.600 x 1.800 x 1.200	1.620	1.800	1.440	110	170	2.720
1.600 x 2.000 x 1.200	1.642	2.000	1.440	99	170	2.845

PRODUCT SHAPE

Box Culvert



LOAD CLASSIFICATION

Class	Load Type	Loading
A	Pedestrian Load Light	qLL = 500 kg/m2 or PL = 2
B	Duty Truck Heavy	Ton MST - 8 Ton
C	Duty Truck	MST - 10 Ton

Note: MST = Muatan Sumbu Terberat (Heaviest Axle Load Vehicle)

SPECIFICATION

Concrete Compressive Strength fc' = 35 MPa

Type Box Culvert	Dimension (mm)					Weight
	Span	Rise	Length	Wall	(h)	
BC.800.800.1200	800	800	1.200	115	70	1.292
BC.800.1000.1200	800	1.000	1.200	115	70	1.430
BC.800.1200.1200	800	1.200	1.200	115	70	1.568
BC.1000.1000.1200	1.000	1.000	1.200	120	100	1.673
BC.1000.1200.1200	1.000	1.200	1.200	120	100	1.817
BC.1000.1400.1200	1.000	1.400	1.200	120	100	1.961
BC.1000.1500.1200	1.000	1.500	1.200	120	100	2.033
BC.1200.1200.1200	1.200	1.200	1.200	135	100	2.223
BC.1200.1400.1200	1.200	1.400	1.200	135	100	2.385
BC.1200.1600.1200	1.200	1.600	1.200	135	100	2.547
BC.1400.1400.1200	1.400	1.400	1.200	150	150	2.925
BC.1400.1600.1200	1.400	1.600	1.200	150	150	3.105
BC.1400.1800.1200	1.400	1.800	1.200	150	150	3.285

Concrete Compressive Strength fc' = 35 MPa

Type Box Culvert	Dimension (mm)					Weight
	Span	Rise	Length	Wall	(h)	
BC.1500.1000.1200	1.500	1.000	1.200	160	150	2.842
BC.1500.1500.1200	1.500	1.500	1.200	160	150	3.322
BC.1500.2000.1200	1.500	2.000	1.200	160	150	3.802
BC.2000.1500.1200	2.000	1.500	1.200	250	200	6.240
BC.2000.2000.1500	2.000	2.000	1.200	250	200	6.990
BC.2000.2500.1200	2.000	2.500	1.200	250	200	7.740
BC.2500.2000.1200	2.500	2.000	1.200	300	200	9.420
BC.2500.2500.1200	2.500	2.500	1.200	300	200	10.320
BC.2500.3000.1200	2.500	3.000	1.200	300	200	11.220
BC.3000.2000.1200	3.000	2.000	1.200	300	250	10.455
BC.3000.2500.1200	3.000	2.500	1.200	300	250	11.355
BC.3000.3000.1200	3.000	3.000	1.200	300	250	12.255
BC.3000.3500.1200	3.000	3.500	1.200	300	250	13.155

PROJECT REFERENCE

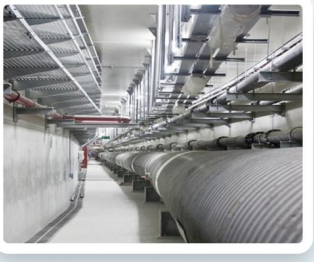
U-Ditch



Manyar Smelter Project at Gresik - East Java

Box Culvert



Single Box Culvert

Double Box Culvert

Utility Box Culvert

PRECAST CONCRETE AQUAPOND

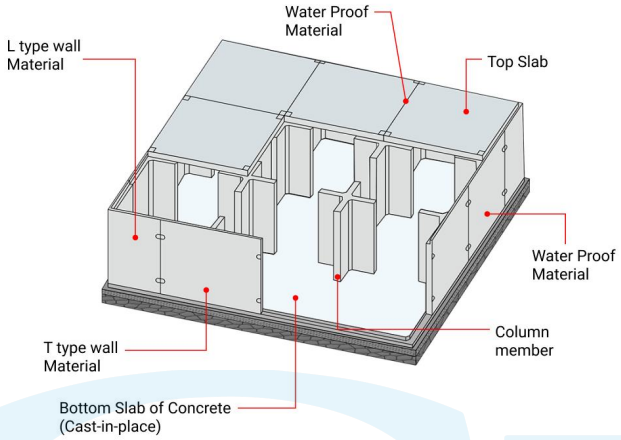
DESCRIPTION

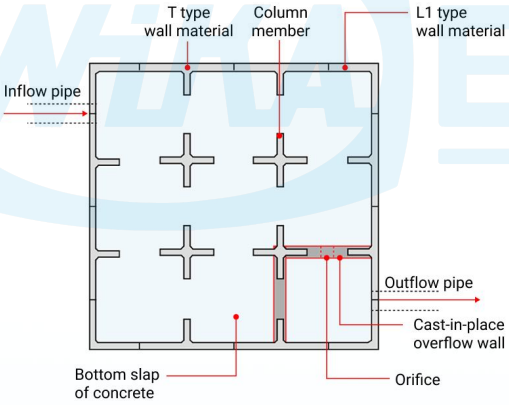
Aquapond is a reservoir building in the ground that is used as a temporary storage for rainwater with the aim of avoiding puddles/flooding on the ground or road surface.

How Aquapond Works :

1. When it rains, excess water due to insufficient drainage channel capacity is collected and enters the aquapond.
2. When the condition of the drainage channel has returned to normal, the water in the aquapond is pumped out so that the aquapond storage space is empty again and ready to accommodate the excess water again.

SPECIFICATION





Type L

Type T

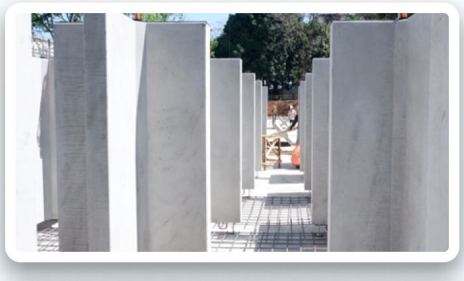
Type +

Type S

Concrete Compressive Strength fc' = 35 MPa

No	Modul Type	Dimension (mm)					Modul Weight
		h (mm)	b1 (mm)	b2 (mm)	t1 (mm)	t2 (mm)	(ton)
1	Type L	2.125	1.069	1.069	140	140	1,43
2	Type T	2.125	1.998	490	140	140	1,78
3	Type +	2.050	1.120	1.120	140	140	1,51
4	Type S	-	1.995	1.995	180	180	1,75

PROJECT REFERENCE



Aquapond In The Makassar Governor's Office Complex Area South Sulawesi, Indonesia

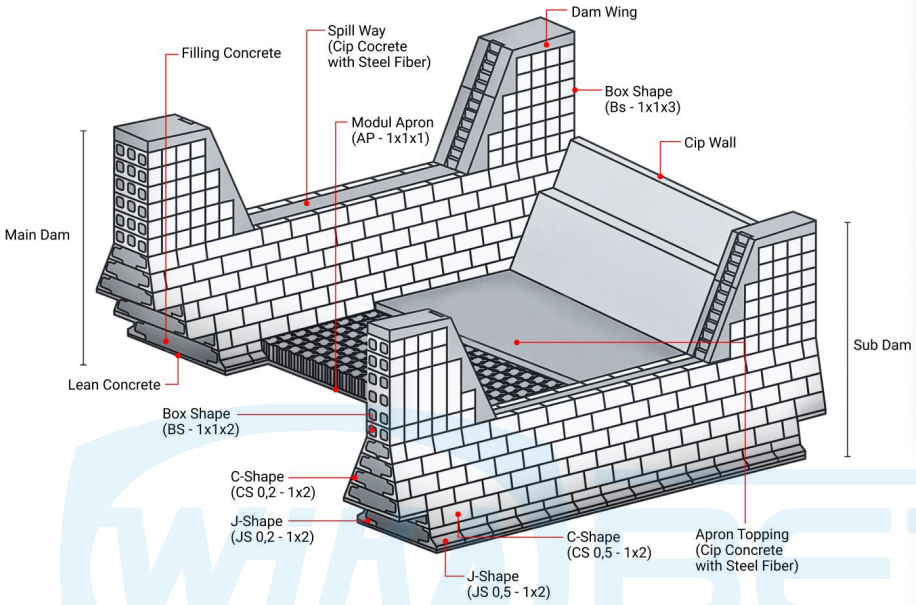
SABODAM MODULAR

DESCRIPTION

Sabo dams are typically constructed in areas highly susceptible to debris flow hazards, which exert significant impact forces. Therefore, sabo structures must be designed and planned to withstand these impact forces. One common cause of damage in conventional concrete sabo dams with low quality is their inability to withstand such impacts.

Precast concrete modular components in Sabo Dams consist of wall modules installed on the outer sides of the dam and apron modules. High-quality concrete result in resistance to impact forces and abrasion on the Sabo modules. The construction process of a sabo dam is simplified by placing precast modular components and then filling the dam body with filler concrete. The shape of the precast modules also serves as the formwork for pouring the filler concrete, significantly reducing the volume of formwork needed. To protect the upper overflow section filled with filler concrete and the apron area, the top portion is coated with fiber-reinforced concrete, making the construction resistant to impacts. The use of precast modular components results in quick, clean construction with fewer labor requirements and a highly reliable structure.

SPECIFICATION



Concrete Compressive Strength fc' = 52 MPa

Product Type		Weight (ton)
J-Shape	H 1m x L 1m (slope 1 : 0,2)	1,4
J-Shape	H 1m x L 2m (slope 1 : 0,2)	2,9
J-Shape	H 1m x L 1m (slope 1 : 0,5)	1,5
J-Shape	H 1m x L 2m (slope 1 : 0,5)	2,9
C-Shape	H 1m x L 1m (slope 1 : 0,2)	1,1
C-Shape	H 1m x L 2m (slope 1 : 0,2)	2,1
C-Shape	H 1m x L 1m (slope 1 : 05)	1,2
C-Shape	H 1m x L 2m (slope 1 : 0,5)	2,4
Box Shape	H 1m x L 1m x W 2m	1,9
Box Shape	H 1m x L 1m x W 3m	2,5
Apron	H 1m x L 1m x W 1m	2,1

Balai Teknik Sabo PUPR and WIKA Beton's Intellectual Property Right (IPR)

ID. S00201901064
Precast Modules for Modular Sabodam Construction

Precast Concrete Component

Modul J-Shape

Modul C-Shape

Modul Box Shape

Modul Apron

PROJECT REFERENCE

Pilot Project Sabodam Modular, Kediri, East Java

PRECAST CONCRETE INFILTRATION WELL

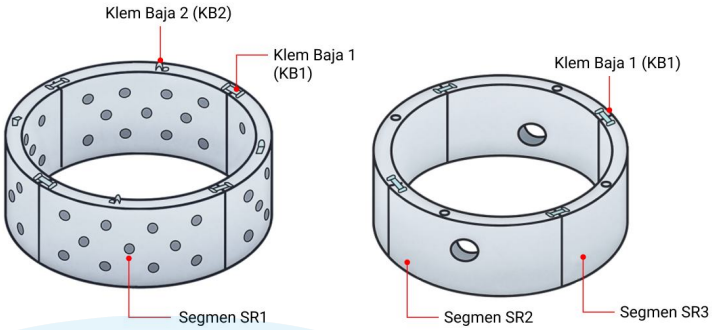
DESCRIPTION

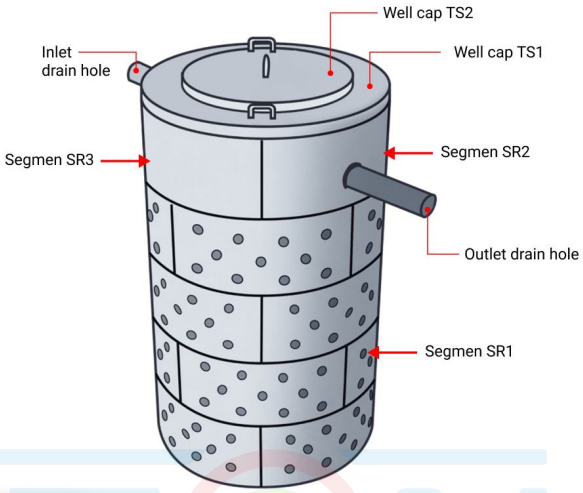
Infiltration wells are artificial infiltration systems designed to collect rainwater resulting from land coverage by buildings, whether from building floors or paved or asphalted yards. These wells function as a reservoir for rainwater, allowing it to seep back into the ground.

The location of infiltration wells should be on flat terrain, not close to waste disposal sites, with a minimum distance of 5 meters from septic tanks and at least 1 meter from building foundations. The maximum depth of infiltration wells is 2 meters below the ground surface, and the minimum water table depth should be 1.5 meters during the rainy season. Additionally, the soil should have a permeability rate of at least 2.0 cm/hour, meaning that a 2 cm water puddle should be fully absorbed within 1 hour. The greater the permeability, the better.

The components of an infiltration well consist of ring components (which can be made whole or segmental) and infiltration well cover components. Water seeps into the ground through holes in the ring walls or through pores if porous concrete is used. After the excavation process, the bottom of the well is lined with fibers, and the ring and cover components are installed step by step to protect the excavation walls. Precast components are made light enough to be lifted by workers, ensuring a quick, neat, and reliable installation process.

SPECIFICATION





Infiltration Ring

Concrete Compressive Strength fc' = 19 MPa

No	Infiltration Well Diameter	Product Name	Thickness (mm)	Height (mm)	Diameter (mm)	Weight (kg)
1	SRS OD94/ID80	Segmen SR1	70	400	-	43
		Segmen SR2	70	400	-	43
		Segmen SR3	70	400	-	45
		Well Cap TS1	80	-	940	79
		Well Cap TS2	60	-	600	39
2	SRS OD114/ID100	Segmen SR1	70	400	-	53
		Segmen SR2	70	400	-	54
		Segmen SR3	70	400	-	56
		Well Cap TS1	80	-	1.140	101
		Well Cap TS2	60	-	800	70

Optional :
Infiltration ring with porous concrete

INSTALLATION METHOD