LAMPIRAN

Lampiran 1 Bill of Quantity

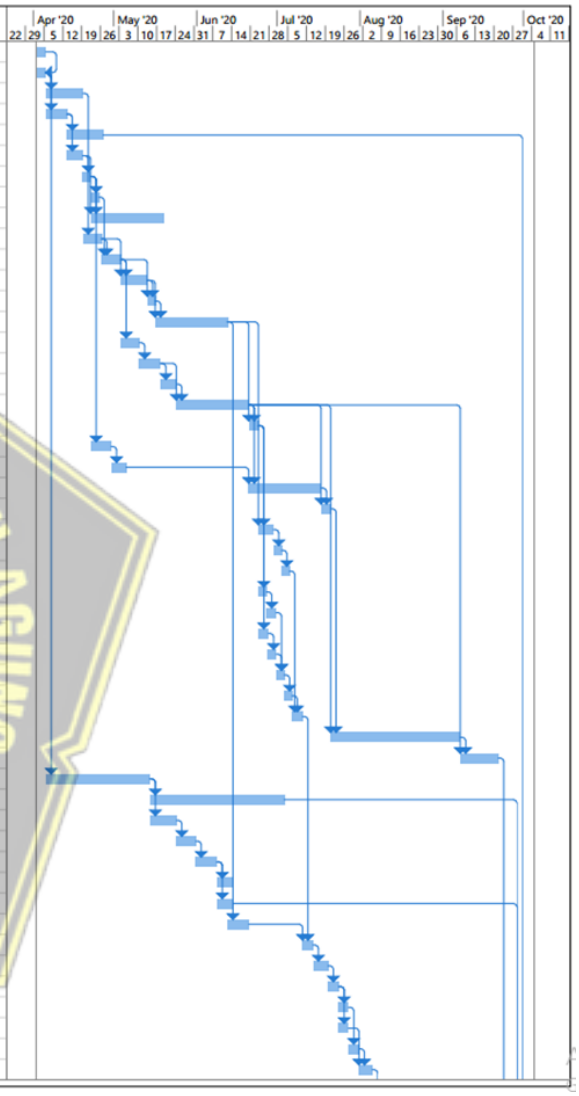
BILL OF QUANTITY
Installation of Drainage Fly Ash Unit #34

Item No.	Description	Calculation	Quantity Order	Unit
I	**Preparatory Work**			
1	Stripping and soil preparation	2 x 28.65 x 2 + 6 x 13	192.60	m²
2	Mobilization of materials and equipment	2 + 2 + 1	5.00	trip
3	Demolition of existing concrete	(9.2 - 3.53 + 0.39 x 10 + 0.3 x 0.2 x		
		3)x 1.2	11.69	m³
II	**Land Work**			
1	Soil excavation	(2.1 : 2 x 0.45 x 54		
		(8.4 x 3.3 + 11.4 x 0.3) 2 x 2.45)x		
		1.2	176.94	m³
2	Backfilling soil	176.9 - 0.50 x 0.45 x 54 - 8.1 x 3 x		
		2.45 - 1.24 x 1.12 x 12.71	87.61	m³
3	Relocate soil to outside PLTU area	176.9 - 87.61	89.34	m³
4	Compating soil	87.6	87.61	m³
III	**Civil Work**			
1	Levelling Conc. K-175 site mix, thickness = 5 cm	0.06 x(0.6 x 54 + 3.1 x 8.2 + 1.34 x		
		12.71)x 1.2	4.49	m³
2	Supply and install U-Ditch 30 cm	27 x 2	54.00	m
3	Supply and install Collecting Pit 250x550 cm			
-	Supply and install brick wall for form work	2.4 x(3 + 6 x 2 + 1.15 x 6)x		
		1.2	63.07	m²
-	Supply and install concrete K-250 readymix concrete	(3 x 6 x 2.6 - 2.5 x 3.48 x 2 -		
		2.5 x 1.78 x 2 - 2.5 x 0.25 x 0.7 +		
		1.13 x 0.25 x 6)x 1.2	26.11	m³
-	Supply and install rebar D13 as drawing attached	Lantai D13-150		
		(4 x 41 x 2 + 7 x 21 x 2)x	646.88	
		1.04		
		D13-750		
		1.7 x 18 x 1.04	31.82	
		Dinding D13-150		
		(3.3 x 2 x(41 x 2 + 21 x 2)+		
		5 x 17.67)x 1.04	943.00	
		D13-200		
		((7.2 + 6.7 + 4.2 + 3.7)x 11 + 4.2 x		
		2 x 8)x 1.04	319.28	
		Sayapan D13-150		
		3 x 5 x 2 x 6 x 1.04	187.20	
		D13-200		
		1.9 x 14 x 6 x 1.04	165.98	
			2294.17	
		1.2	**2753.00**	**kg**
-	Supply and install water stop sika	6 x 2 + 3 x 3	21.00	m
-	Install formwork	(2 x(5.5 x 2 + 2.5 x 2)+ 1.3 x		
		2.5 x 2)x 1.2	46.20	m²
4	Supply and install Pump House			
-	Supply and install brick wall for form work	1.55 x(3 + 2.1 x 2)x 1.2	13.39	m²
-	Supply and install concrete K-250 readymix concrete	Dinding		
		2.35 x 2.1 x 0.25 + 1.75 x(3 x 2.1)x		
		0.25	3.99	
		Lantai		
		0.3 x(2.5 x 1.85 - 1.3 x 0.7)	1.11	
		Pondasi Pompa		
		1.3 x 0.7 x 0.5 + 1.3 x 1.5 x 0.5	1.43	
			6.53	m³
		1.2	**7.84**	**m³**

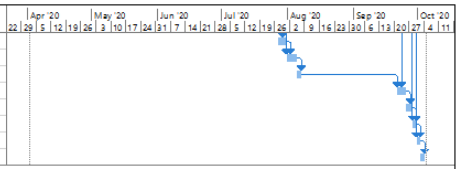
-	Supply and install rebar D13 and Ø 16 as drawing attached	Dinding D13-150		
		(2.7 x 2 x 15 + 2.5 x 2 x 35)x		
		1.04	266.24	
		D13-200		
		(3 x 2 x 9.00 x 2 + 4.2 x 2 x		
		9 + 2.7 x 2.00 x 9)x 1.04	241.49	
		Lantai D13-150		
		(3.35 x 2 x 15.00 + 2.75 x 2 x 21)x		
		1.04	224.64	
		Pondasi Pompa D13-150		
		(3.5 x 10 + 2.20 x 2 x 10 + 4.5 x		
		5 + 2 x 2.00 x 11)x 1.04	151.32	
		D13-200		
		2.4 x 2 x 3.00 x 1.04	14.98	
		Ø 16		
		1.5 x 3 x 1.57	7.07	
			905.73	
		1.2	**1086.87**	**kg**
-	Install formwork	1.45 x(1.9 x 2 + 2.5 x 2)x 1.20	15.14	m²
-	Supply and install joint filler 10 mm	0.3 x(1.3 x 2 + 0.7 x 2)x 1.20	1.44	m²
5	Supply and install Drainage 100 cm			
-	Supply and install concrete K-250 readymix concrete	(1.24 x 1.12 - 1 x 1)x 12.7 x 1.2	5.93	m³
-	Supply and install rebar D13 as drawing attached	D13-150		
		(3.4 + 1.5)x 85.667 x 1.04	436.56	
		D13-200		
		12.7 x 18.0 x 1.04	237.74	
			674.30	
		1.2	**809.16**	**kg**
-	Install formwork	(1.12 x 2 + 1 x 2)x 12.7 x 1.2	64.62	m²
6	Supply and install U-Ditch 20 cm	5	5.00	m
7	Installation Cover Collecting include support	2.5 x 5.5 x 1.2	16.50	m²
8	Installation Pump House Canopy			
-	Supply and install pipe Ø 3", tebal 4 mm	(3 x 4 + 4 x 2 + 3 x 2)x		
		6.72 x 1.2	209.66	kg
-	Supply and install pipe Ø 1", tebal 2.6 mm	((3.2 + 0.4 x 2 + 0.2 x 2)x 2 +		
		(2.5 + 0.4 x 2 + 0.25 x 2 + 1.25 +		
		0.8)x 2)x 1.98 x 1.2	48.71	kg
-	Supply and install plat 10 mm	0.15 x 0.15 x 4 x 81.007 x 1.2	8.75	kg
-	Supply and instal Cording CNP 75x45x15x2.3	6 x 7 x 3.25 x 1.2	163.80	kg
-	Supply and install Anchor M12-300	4 x 4	16.00	pcs
-	Supply and install baut & mut M12	2 x 7	14.00	pcs
-	Supply and install UPVC Aldorin	4 x 5	20.00	m²
IV	**Mechanical Work**			
1	FYBROC 1500 2X3X8-GROUP II, VR-1A, EXTERNAL FLUSHING, 81T, CARB/CER Centrifugal End Suction Pump Size : 2x3x8 Suction : 3" (inch) Discharge : 2" (inch) Brand : Fybroc – USA Capacity : 40 m3/h Head : 50 m Impeller Dia. : 8" (inch) Fluid : Water + Fly Ash Temp. : 16 deg. C Seal : Double Mech. Seal Crane 81T (Carb/Cer) External Flushing Pump Material : Fiberglass VR-1A Baseplate Material : Fiberglass VR-1 Shaft Material : SS 303 Seal Pump Elastomer : Viton Coupling Guard : Elkani standard Motor : 15kW 380V 3Ph 3000Rpm 50Hz IP55	1	1.00	unit
2	Submersible pump Tsunami 50UA 2.75-73 2"	1	1.00	unit
3	Supply and install pipe PVC 4" Rucika AW Included elbow, drain, ventilasi and U-Bold 4"	3 + 4 + 324 + 7 + 4 x 4 +		
		2 x 2	358.00	m
4	Supply and install pipe stainless 1" SUS 304 included tee and elbow	6 x 8	48.00	m
5	Supply and install Spray Nozzle 1/2" SUS 304 included tee and reducer	6	6.00	pcs
6	Supply and install Ball valve 1" SUS 304 included accessories	3	3.00	pcs
7	Supply and install solenoid valve 1" SUS 304 (klod model 2WB-25) included accessories	1	1.00	pcs
8	Supply and install UNP 100x50 support	1.3 x 56.83 x 2 x 9.37 x 1.2	1660.90	kg
9	Flexible pipe 2" included accessories	4	4.00	m
10	Supply & install removable handrail Ø 1 1/4" SCH 40 include shock 2" hot dip galvanized + painting by marine paint 300 micron yellow color as drawing attached	1.4 x(4 x 10 + 3 x 4)+ 2.4 x		
		3 x 10 + 2.75 x 3 x 4	177.80	m
11	Supply & install waterproofing / waterbars, equal with Sika joint ribbons at the joint existing concrete floor with wall conrete as drawing attached.	3 x 6 + 2 x(2.5 x 2 + 5.5 x		
		2)+ 1.3 x 2.5 x 2	56.50	m²
V	**Electrical Work**			
1	Power Cable, mfg: Supreme or equal, Type: NYY, Size: 5x16 mm², SNI colouring 3P	25 + 50 + 15	90.00	m
2	Power Cable, mfg: Supreme or equal, Type: NYY, Size: 4x10 mm², SNI colouring 3P	10	10.00	m
3	Power Cable, mfg: Supreme or equal, Type: NYY, Size: 4x6 mm², SNI colouring 3P	10	10.00	m
4	MCB, mfg: Schneider Electric or equal, 3P 60A	1	1.00	set
5	MCB, mfg: Schneider Electric or equal, 3P 40A	1	1.00	set
6	MCC IP 65,(Included Certificate) wall mounted enclosure + control sump pump include waill mounting support include terminal box, wiring cable NYA, lamp indicator, accessories, DIN rail, etc	1	1.00	set
7	Conduit cable, hot dipp galvanized steel, size: 2 inch include union coupling, bushing, U-bolt, support for main source breaker to enclosure (sump pump & receptable) for enclosure to sump pump (2 x sump pump)	25 + 50 + 15	90.00	m
8	Flexible conduit 2 in	1.5 x 4	6.00	m
9	Floating switch accessories include: push button switch (start/stop), DC power supply (if needed), relay, magnetic contactor, indicator lamp, etc.	1	1.00	set
10	Power Cable, mfg: Supreme or equal, Type: NYY, Size:3x2.5mm², P, N,G SNI colouring (selenoid)	10	10.00	m

Lampiran 2 Rencana Anggaran Biaya Proyek Instalasi Pompa Submersible

ID	Task Name	Duration	Start	Finish	Predecessors
1	Pekerjaan persiapan tanah	4 days	Thu 4/2/20	Sun 4/5/20	
2	Mobilisasi material dan alat	4 days	Thu 4/2/20	Sun 4/5/20	1FF
3	Pembongakaran konkrete lama	14 days	Sun 4/5/20	Sun 4/19/20	2
4	Pekerjaan penggalian tanah	8 days	Sun 4/5/20	Mon 4/13/20	2
5	Pekerjaan pengeluaran tanah dari PLTU	14 days	Mon 4/13/20	Sun 4/26/20	4
6	Pekerjaan kompacting tanah	6 days	Mon 4/13/20	Sun 4/19/20	4
7	Pekerjaan Levelling Conc. K-175	3 days	Sun 4/19/20	Wed 4/22/20	6
8	Pekerjaan pengisian kembali tanah	3 days	Wed 4/22/20	Sat 4/25/20	7
9	Supply and install U-Ditch 30 cm, K-250 readymix concrete	28 days	Wed 4/22/20	Tue 5/19/20	6,7
10	Supply and install brick wall for form work	7 days	Sun 4/19/20	Sun 4/26/20	3
11	Supply and install rebar D13 as drawing attached	8 days	Sun 4/26/20	Sun 5/3/20	8,10
12	Install formwork	10 days	Sun 5/3/20	Wed 5/13/20	10,11
13	Supply and install water stop sika	3 days	Wed 5/13/20	Sat 5/16/20	11,12
14	Supply and install concrete K-250 readymix concrete	28 days	Sat 5/16/20	Fri 6/12/20	12,13
15	Supply and install brick wall for form work	7 days	Sun 5/3/20	Sun 5/10/20	11
16	Supply and install rebar D13 as drawing attached	8 days	Sun 5/10/20	Mon 5/18/20	15
17	Install formwork	6 days	Mon 5/18/20	Sun 5/24/20	16
18	Supply and install concrete K-250 readymix concrete	28 days	Sun 5/24/20	Sat 6/20/20	16,17
19	Supply and install joint filler 10 mm	4 days	Sat 6/20/20	Tue 6/23/20	14,18
20	Supply and install rebar D13 as drawing attached	8 days	Wed 4/22/20	Wed 4/29/20	7
21	Install formwork	6 days	Thu 4/30/20	Tue 5/5/20	20
22	Supply and install concrete K-250 readymix concrete	28 days	Sat 6/20/20	Fri 7/17/20	18,21
23	Supply and install U-Ditch 20 cm	4 days	Fri 7/17/20	Mon 7/20/20	18,22
24	Installation Cover Collecting, support IWF 200X100 hot deep galvanized	6 days	Wed 6/24/20	Mon 6/29/20	14,19
25	Supply and install Gording CNP 75x45x15x2.3	3 days	Mon 6/29/20	Thu 7/2/20	24
26	Supply and install UPVC Alderon	3 days	Thu 7/2/20	Sun 7/5/20	25
27	Supply and install pipe Ø 3 " , tebal 4 mm	3 days	Wed 6/24/20	Fri 6/26/20	19
28	Supply and install pipe Ø 1 " , tebal 2,6 mm	4 days	Sat 6/27/20	Tue 6/30/20	27
29	Supply and install plat 10 mm	4 days	Wed 6/24/20	Sat 6/27/20	19
30	Supply and instal Gording CNP 75x45x15x2.3	3 days	Sat 6/27/20	Tue 6/30/20	29
31	Supply and install Anchor M12-300	3 days	Tue 6/30/20	Fri 7/3/20	28,30
32	Supply and install baut & nut M12	3 days	Fri 7/3/20	Mon 7/6/20	31
33	Supply and install UPVC Alderon	4 days	Mon 7/6/20	Fri 7/10/20	26,32
34	Pemasangan Pompa FYBROC 1500 VR-1A	50 days	Tue 7/21/20	Mon 9/7/20	18,23
35	Pemasangan Pompa Submersible pump Tsurumi 50UA2.75-73 2 "	15 days	Mon 9/7/20	Mon 9/21/20	18,34
36	Supply and install UNP 100x50 support	40 days	Sun 4/5/20	Thu 5/14/20	2
37	Supply and install pipe PVC 4 " Rucika AW & U-Bold 4 "	52 days	Thu 5/14/20	Fri 7/3/20	36
38	Supply and install pipe stainless 1 " SUS 304,tee & elbow	10 days	Thu 5/14/20	Sun 5/24/20	36
39	Supply and install Spray Nozzle 1/2 " SUS 304,tee&reducer	8 days	Sun 5/24/20	Sun 5/31/20	38
40	Supply and install Ball valve 1" SUS 304	8 days	Sun 5/31/20	Mon 6/8/20	39
41	Supply and install solenoid valve 1" SUS 304	6 days	Mon 6/8/20	Sun 6/14/20	40
42	Pekerjaan Flexible pipe 2"	6 days	Mon 6/8/20	Sun 6/14/20	40
43	Supply & install removable handrail Ø 1 1/4 " SCH 40 & painting	8 days	Fri 6/12/20	Sat 6/20/20	14
44	Supply & install waterprofing / waterbars, Sika joint ribbons	4 days	Fri 7/10/20	Tue 7/14/20	33,43
45	Pekerjaan Install Conduit cable, hot dipp galvanized steel, size: 2"	6 days	Tue 7/14/20	Sun 7/19/20	44
46	Pekerjaan install Power Cable, Type: NYY, Size: 5x16 mm², SNI colouring 3P	4 days	Mon 7/20/20	Thu 7/23/20	45
47	Pekerjaan Install Power Cable,Type: NYY, Size: 4x6 mm², SNI colouring 3P	4 days	Fri 7/24/20	Mon 7/27/20	46
48	Pekerjaan install MCB, 3P 60A	4 days	Fri 7/24/20	Mon 7/27/20	46
49	Pekerjaan Install MCB, 3P 6A	4 days	Mon 7/27/20	Fri 7/31/20	47
50	Pekerjaan Install MCC IP 65, terminal box, wiring cable NYA, lamp indicator	5 days	Fri 7/31/20	Wed 8/5/20	48,49



ID	Task Name	Duration	Start	Finish	Predecessors
49	Pekerjaan Install MCB, 3P 6A	4 days	Mon 7/27/20	Fri 7/31/20	47
50	Pekerjaan Install MCC IP 65, terminal box, wiring cable NYA, lamp indicator	5 days	Fri 7/31/20	Wed 8/5/20	48,49
51	Pekerjaaan Install Flexible conduit 2 in	2 days	Wed 8/5/20	Fri 8/7/20	50
52	Pekerjaan Install Floating switchrelay, magnetic contactor, indicator lamp	4 days	Mon 9/21/20	Fri 9/25/20	35,51
53	Pekerjaan Install Power Cablel, Type: NYY, Size:3x2.5mm²,	3 days	Fri 9/25/20	Mon 9/28/20	52
54	Pekerjaan Pengetesan Submersible Pump	2 days	Mon 9/28/20	Wed 9/30/20	37,42,53
55	Joint Inspection/ Final Inspection	2 days	Wed 9/30/20	Fri 10/2/20	5,54
56	Mob demob & Pembersihan Area	2 days	Fri 10/2/20	Sun 10/4/20	55



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Lampiran 3 Jadwal Perencanaan – Kurva S

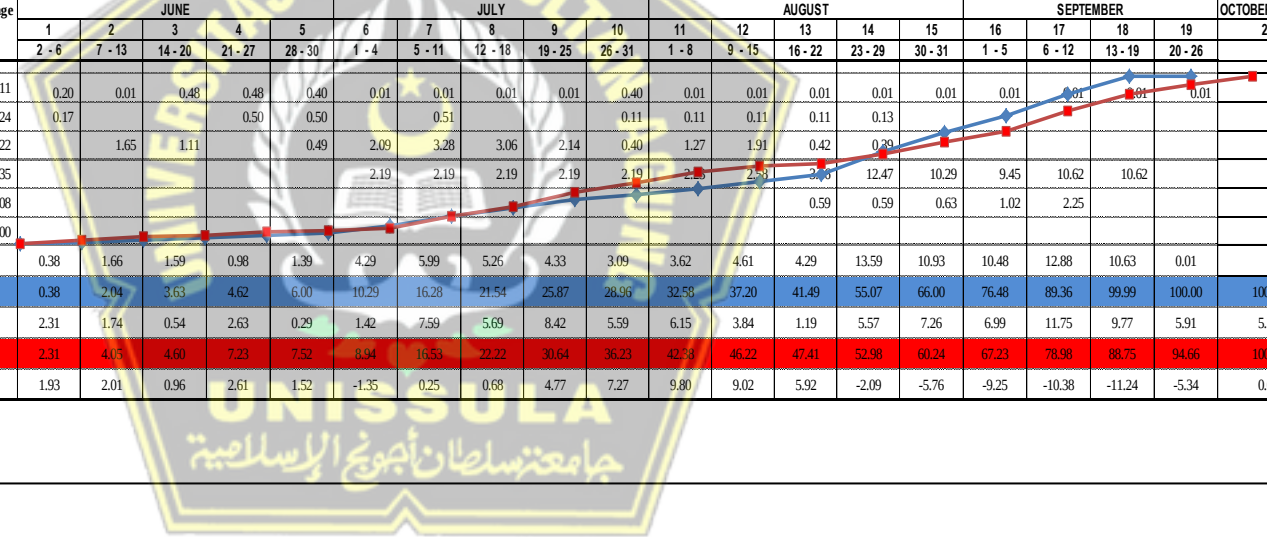
TIME SCHEDULE

Project : Fly Ash Silo Modification Related with Hazardous Waste Storage Permit

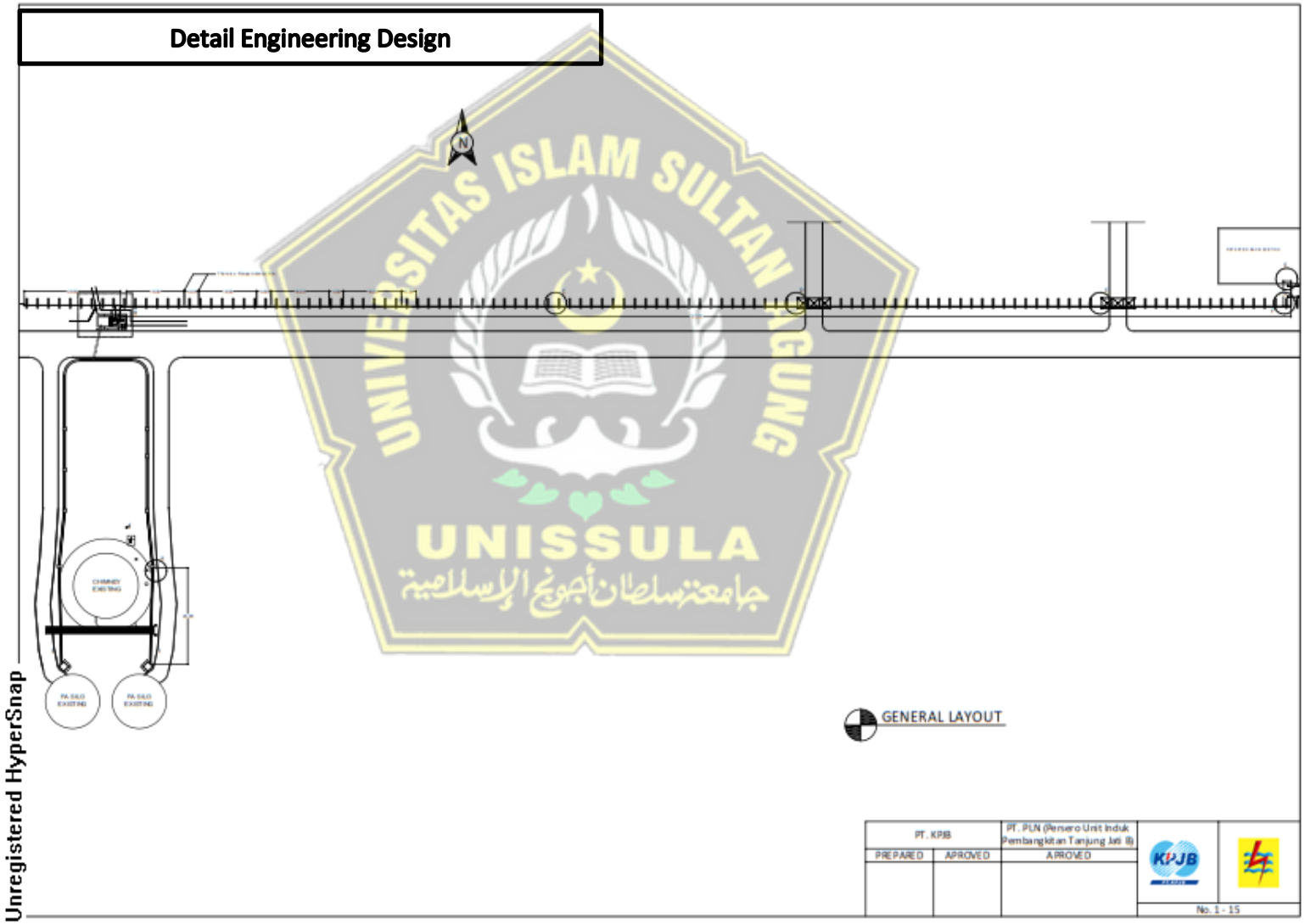
Proposed by : PT. KALINYAMAT PERKASA

Date : 31 March 2020

No.	Description	Percentage (%)	JUNE					JULY					AUGUST					SEPTEMBER				OCTOBER
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
			2 - 6	7 - 13	14 - 20	21 - 27	28 - 30	1 - 4	5 - 11	12 - 18	19 - 25	26 - 31	1 - 8	9 - 15	16 - 22	23 - 29	30 - 31	1 - 5	6 - 12	13 - 19	20 - 26	
I	Preparatory Work	2.11	0.20	0.01	0.48	0.48	0.40	0.01	0.01	0.01	0.01	0.40	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	
II	Land Works	2.24	0.17			0.50	0.50		0.51			0.11	0.11	0.11	0.11	0.13						
III	Civil Work	18.22		1.65	1.11		0.49	2.09	3.28	3.06	2.14	0.40	1.27	1.91	0.42	0.29						
IV	Mechanical Work	72.35						2.19	2.19	2.19	2.19	2.19	2.15	2.53	3.56	12.47	10.29	9.45	10.62	10.62		
IV	Electrical Work	5.08													0.59	0.59	0.63	1.02	2.25			
	TOTAL	100.00																				
Weekly progress value (Planning)			0.38	1.66	1.59	0.98	1.39	4.29	5.99	5.26	4.33	3.09	3.62	4.61	4.29	13.59	10.93	10.48	12.88	10.63	0.01	
Accumulation progress value (Planning)			0.38	2.04	3.63	4.62	6.00	10.29	16.28	21.54	25.87	28.96	32.58	37.20	41.49	55.07	66.00	76.48	89.36	99.99	100.00	100.00
Weekly progress value (Actual)			2.31	1.74	0.54	2.63	0.29	1.42	7.59	5.69	8.42	5.59	6.15	3.84	1.19	5.57	7.26	6.99	11.75	9.77	5.91	5.34
Accumulation progress value (Actual)			2.31	4.05	4.60	7.23	7.52	8.94	16.53	22.22	30.64	36.23	42.38	46.22	47.41	52.98	60.24	67.23	78.98	88.75	94.66	100.00
Deviation			1.93	2.01	0.96	2.61	1.52	-1.35	0.25	0.68	4.77	7.27	9.80	9.02	5.92	-2.09	-5.76	-9.25	-10.38	-11.24	-5.34	0.00



Lampiran 4 Detail Engineering Design



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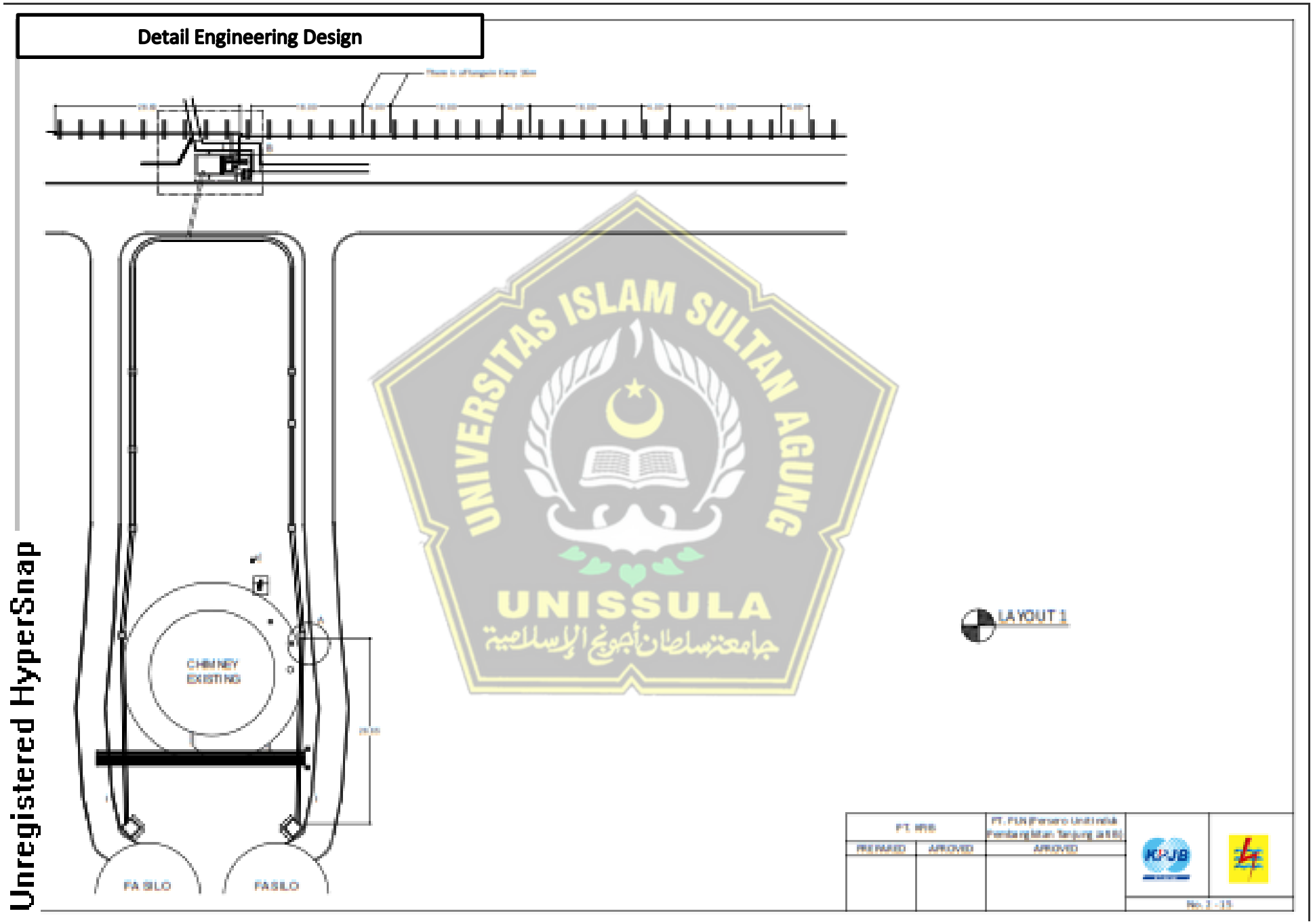

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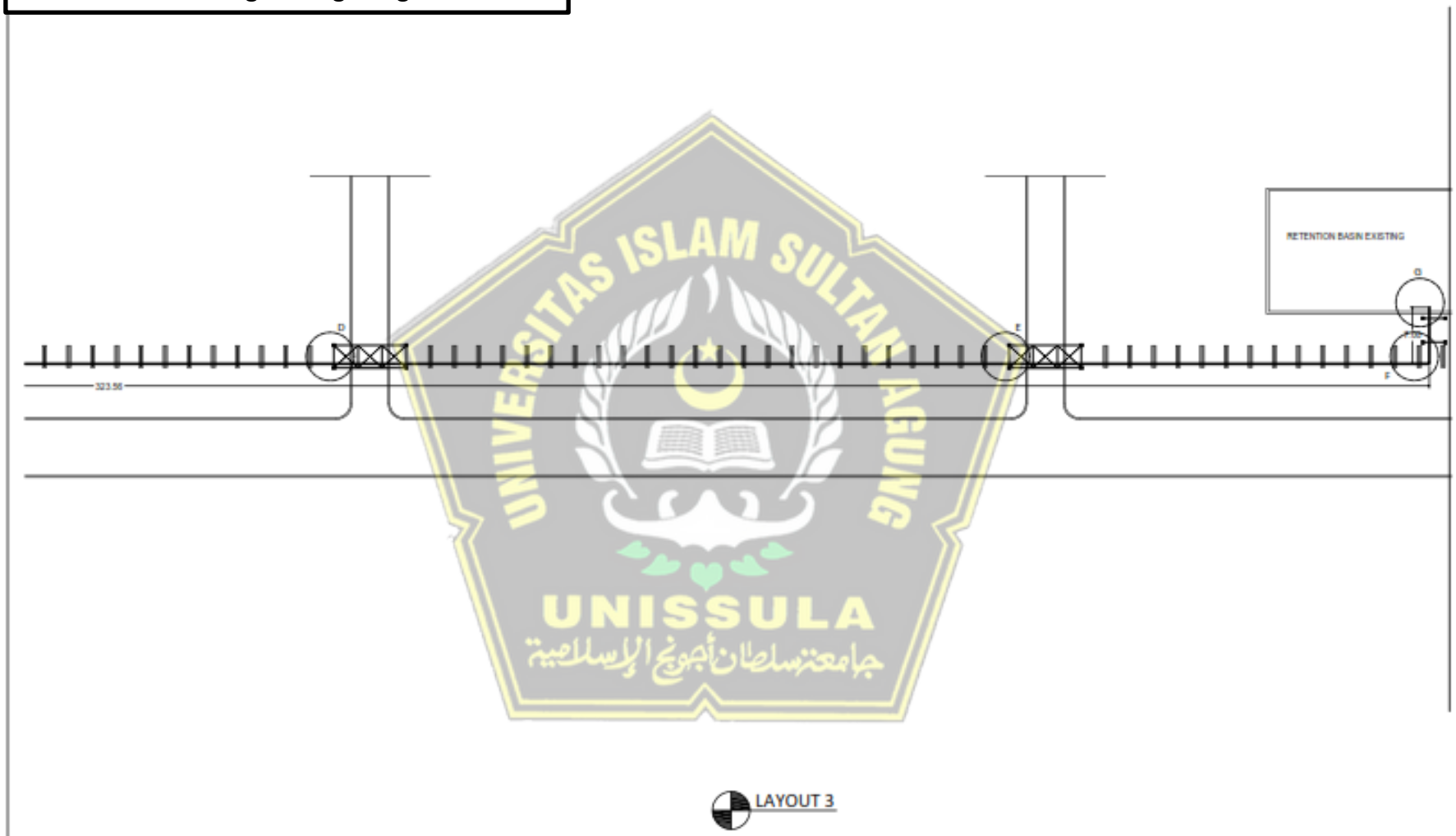
Detail Engineering Design



PT. KPJB		PT. PLN (Persero Unit Induk Pembangkitan Tanjung Jati B)
PREPARED	APPROVED	APPROVED

No. 4 - 15

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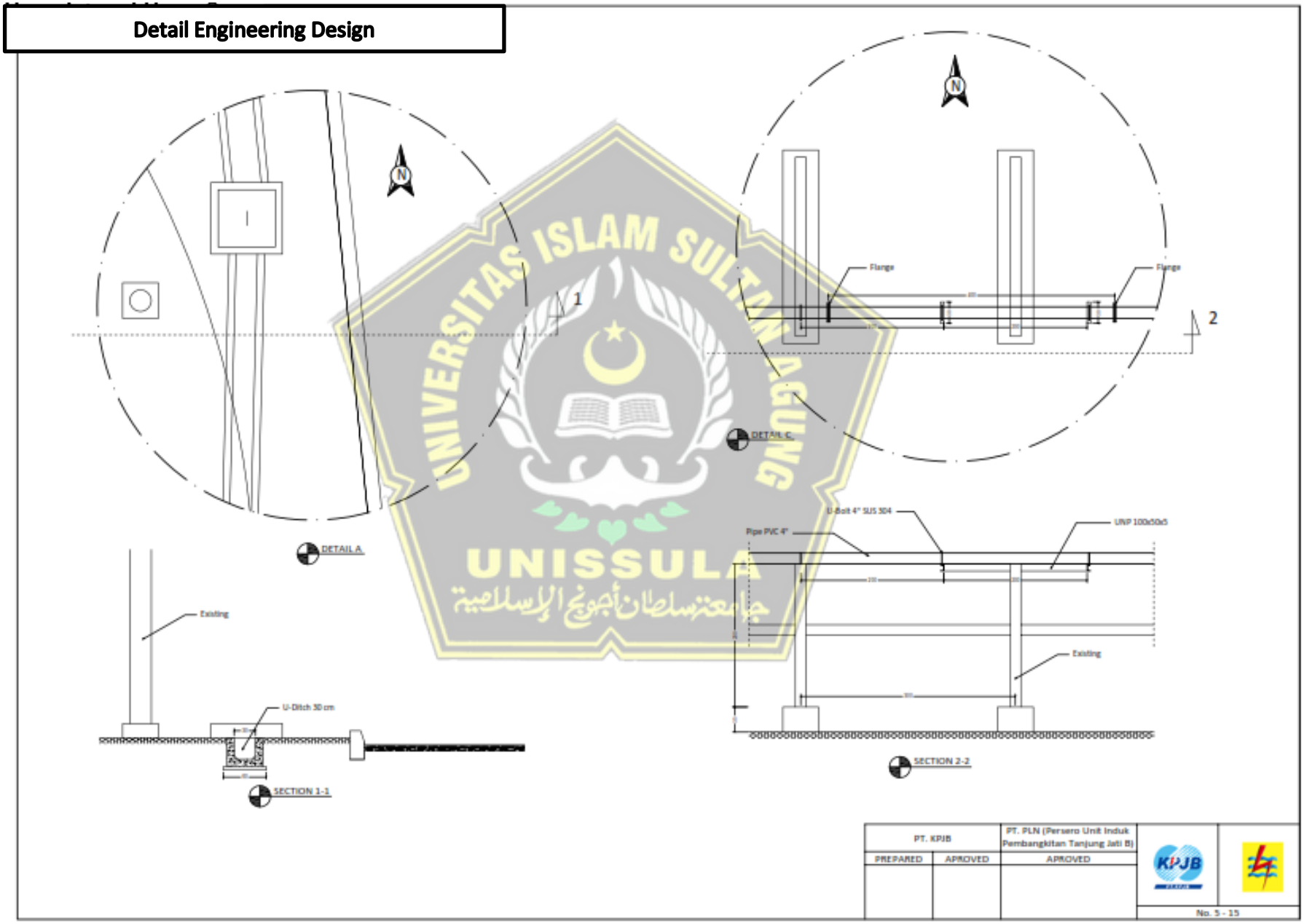
Detail Engineering Design



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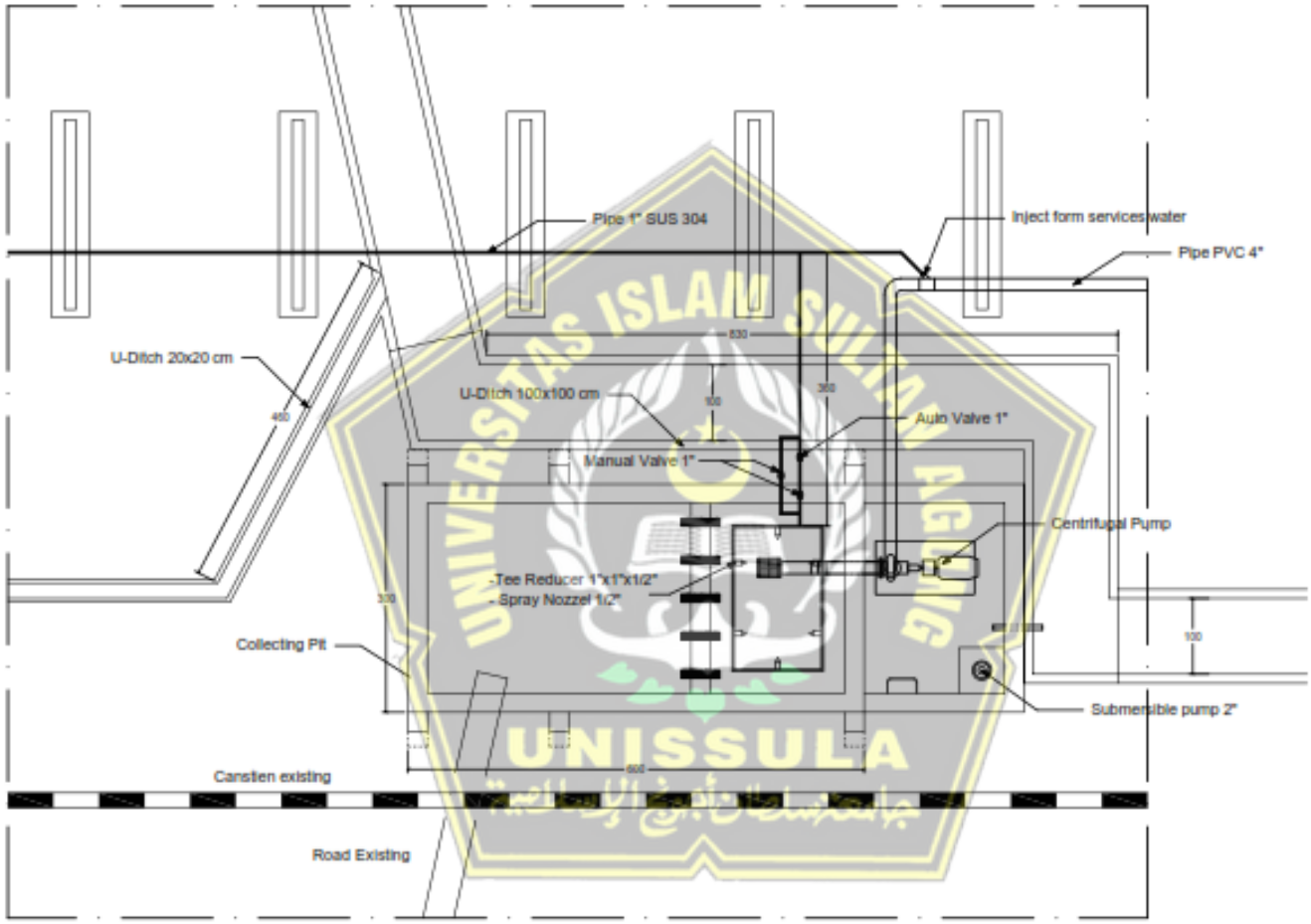
Detail Engineering Design

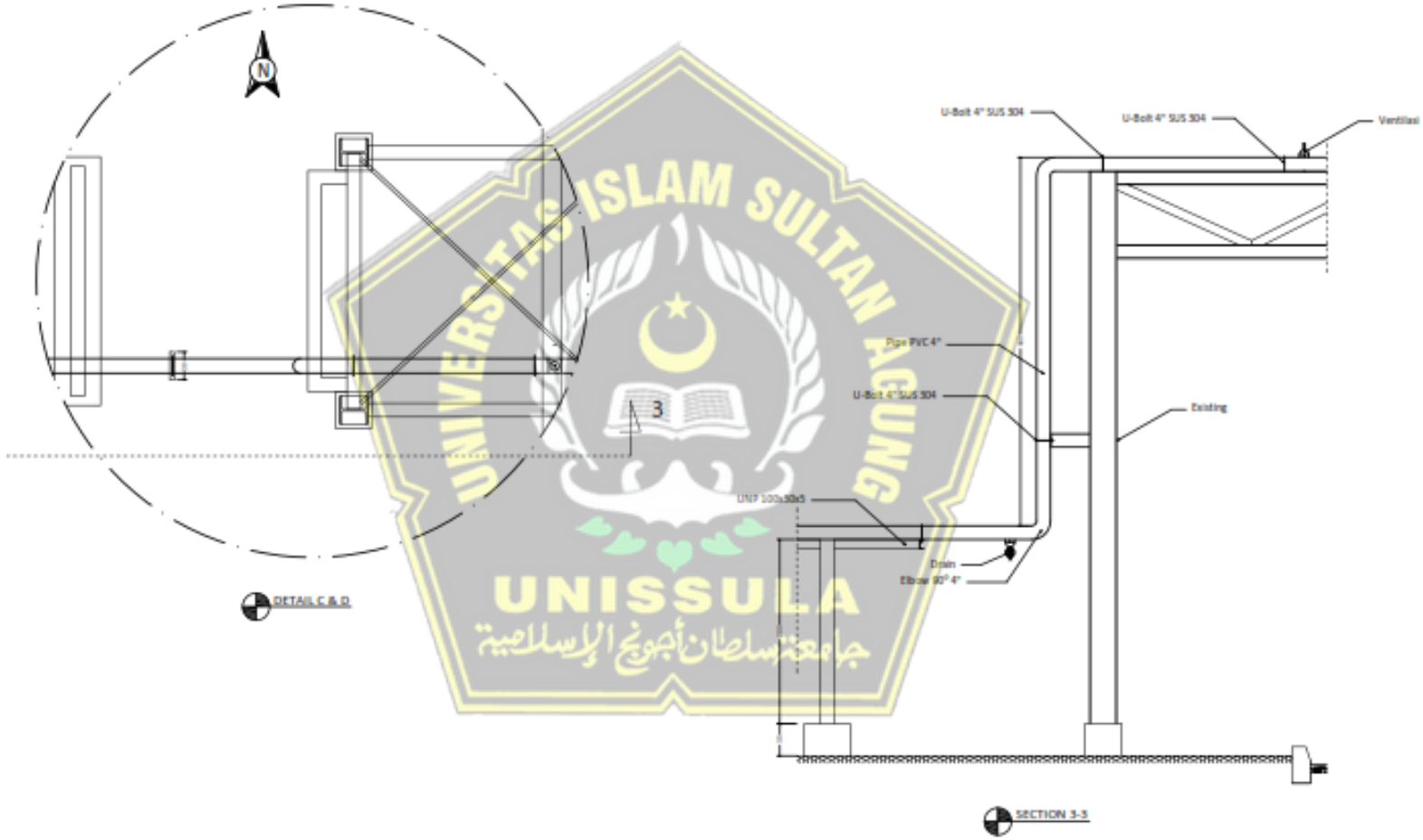


DETAIL B

PT. KPJB		PT. PLN (Persero Unit Induk Pembangkitan Tanjung Jati B)
PREPARED	APROVED	APROVED

No. 6 - 15

Detail Engineering Design



PT. KPJB		PT. PLN (Persero Unit Induk Pembangkitan Tanjung Jati B)
PREPARED	APROVED	APROVED

No. 7 - 15

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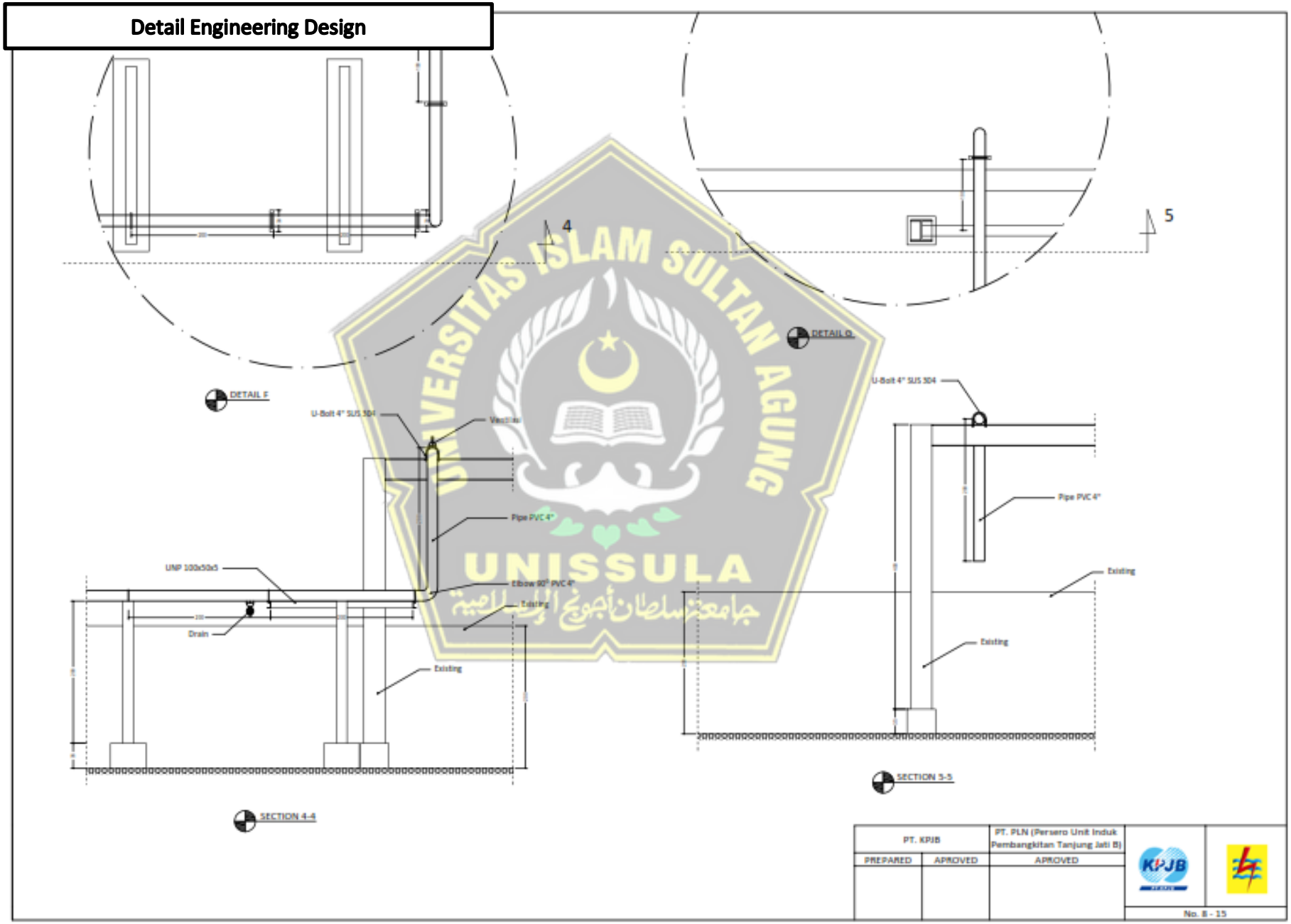
Detail Engineering Design



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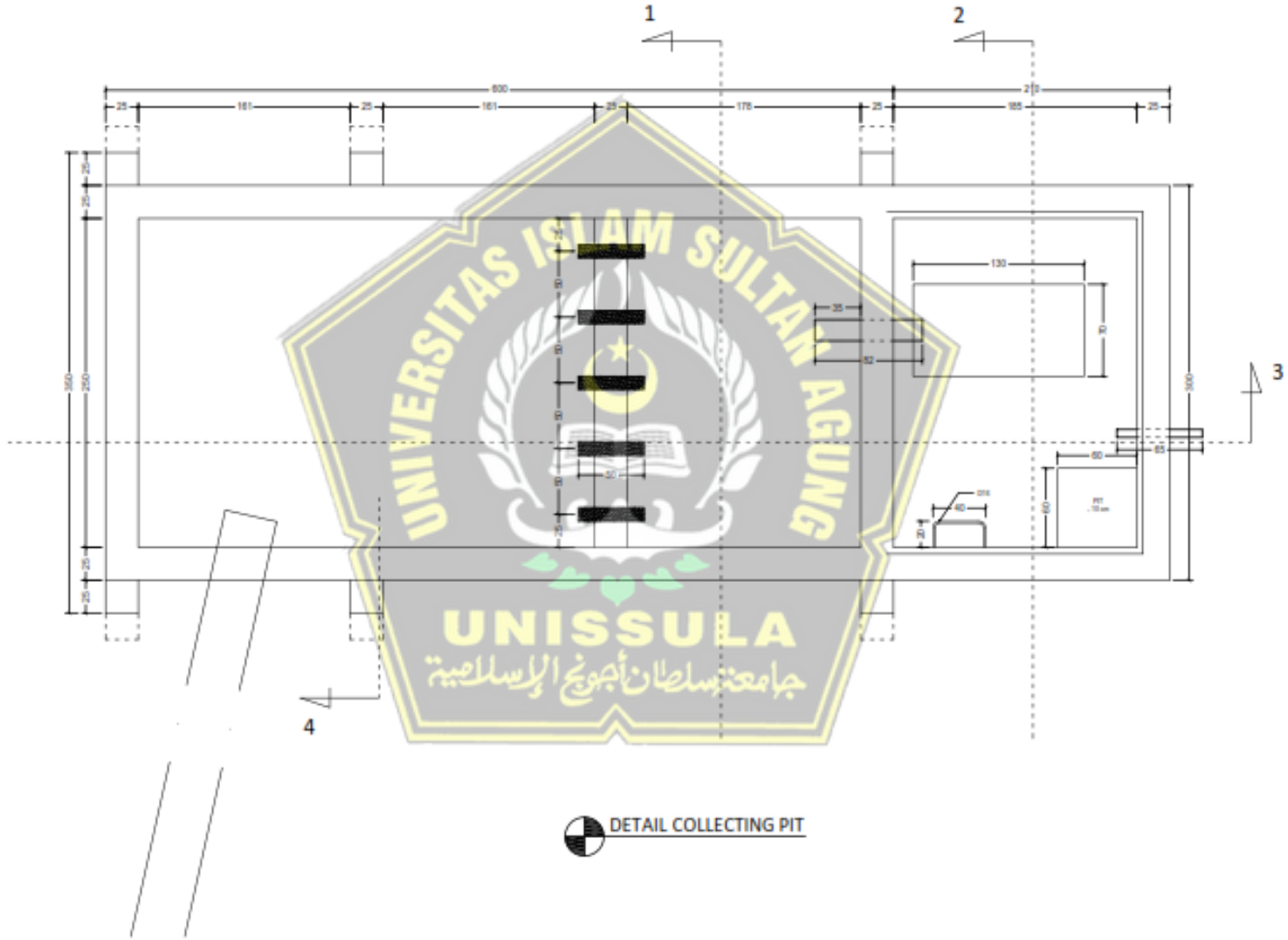
جامعة سلطان أجونج الإسلامية

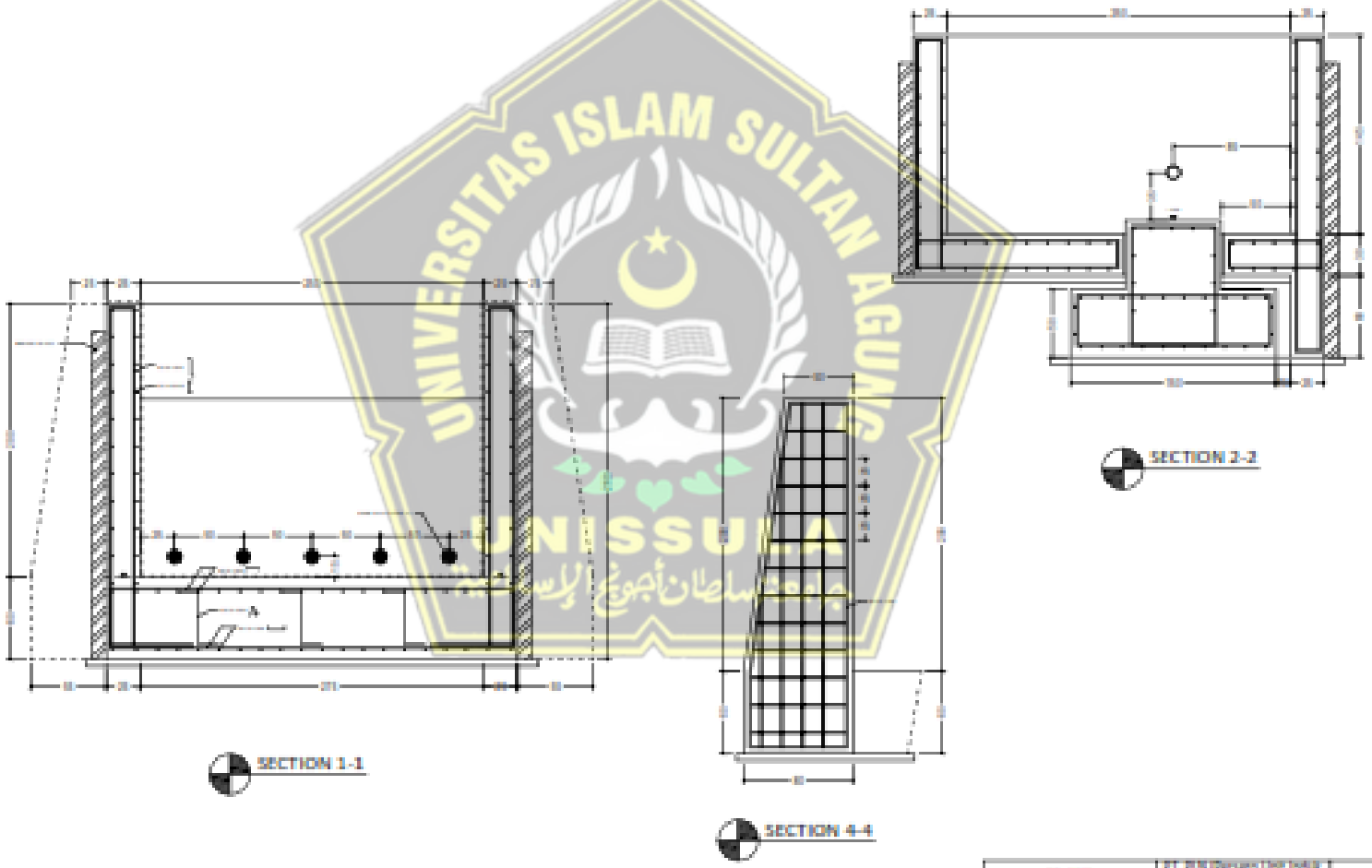
Detail Engineering Design



PT. KPJB		PT. PLN (Persero Unit Induk Pembangkitan Tanjung Jati B)
PREPARED	APROVED	APROVED

No. 9 - 15

Detail Engineering Design



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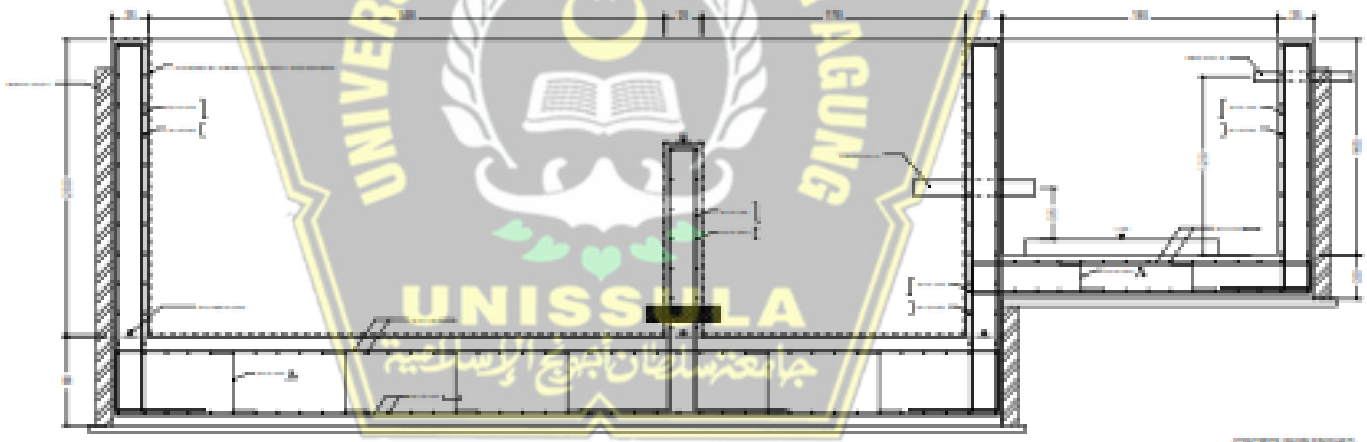
UNISSULA

Detail Engineering Design



SECTION 3-3

PT. KPJB		PT. PLN (Persero) Unit Induk Pembangkitan Tanjung Jati B	
PREPARED	APPROVED	APPROVED	

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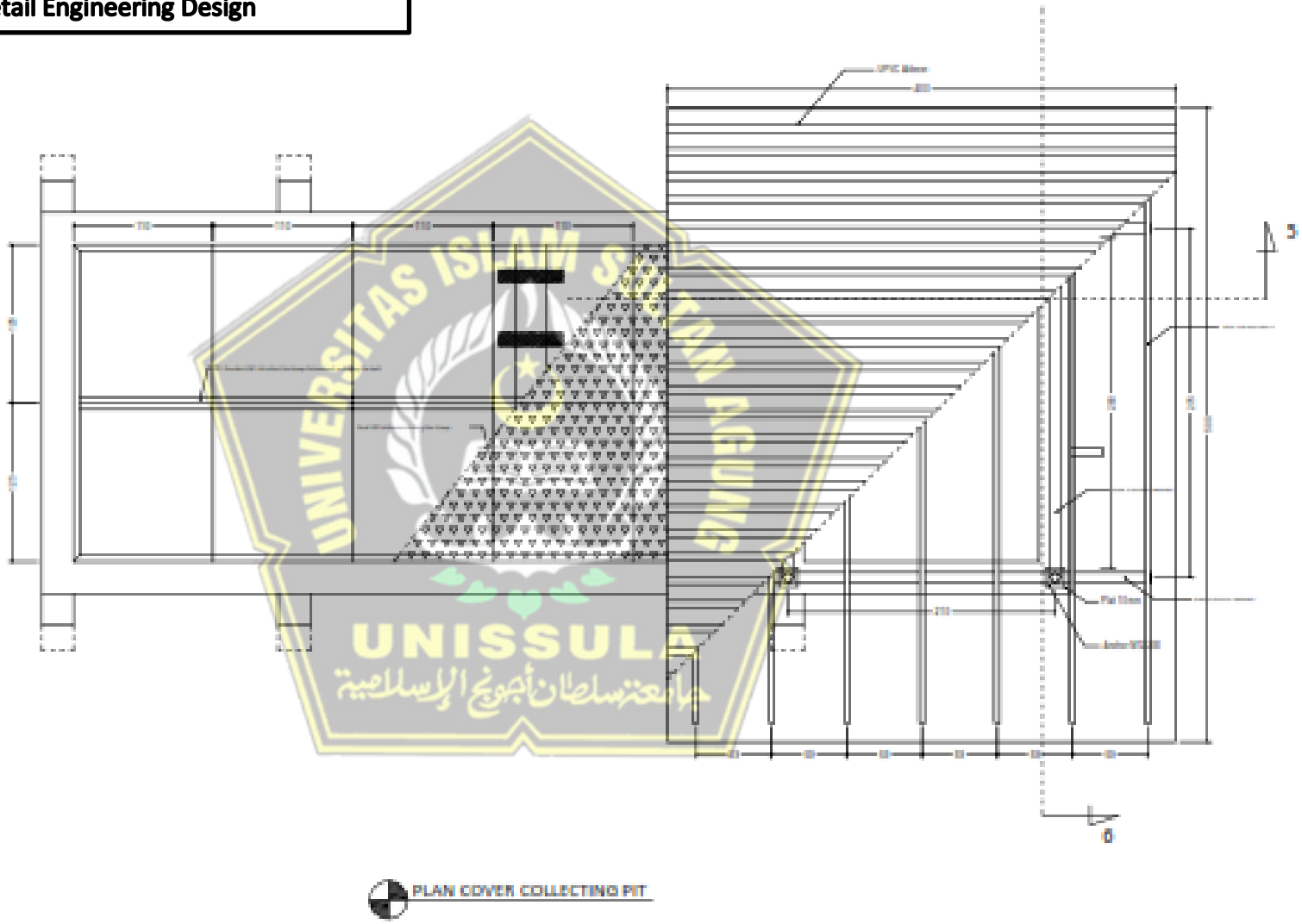
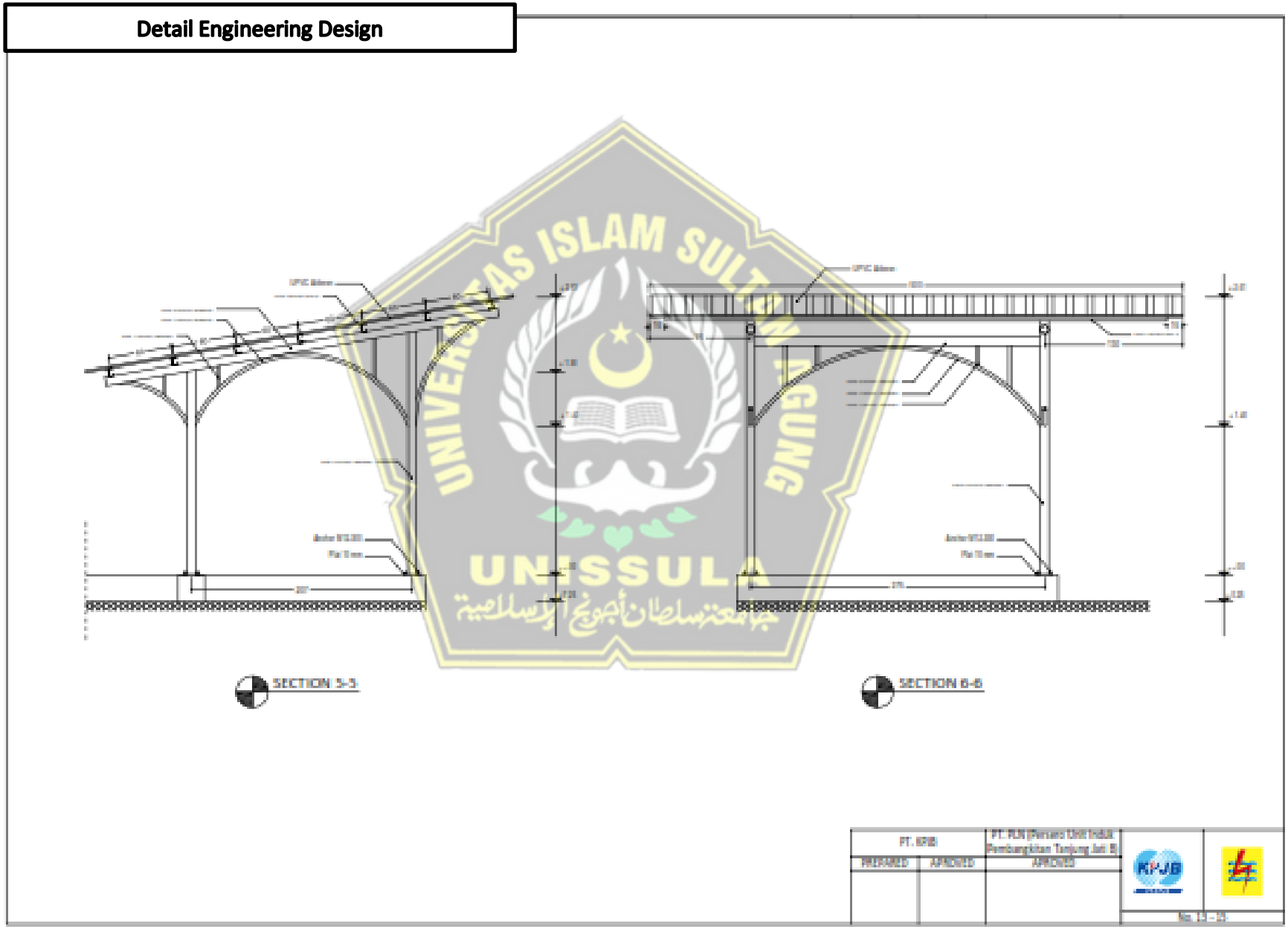
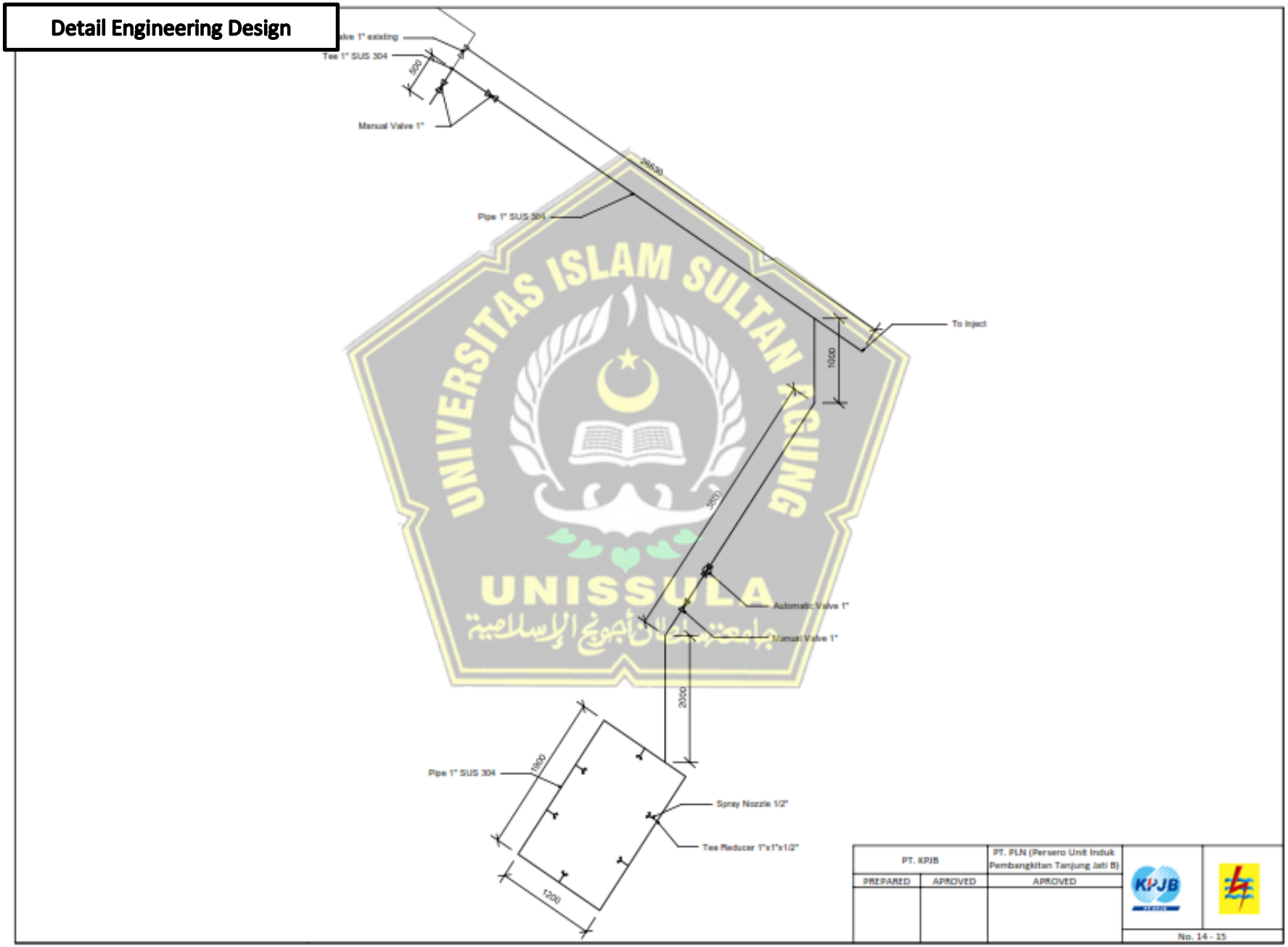
UNISSULA

Detail Engineering Design



Detail Engineering Design



Detail Engineering Design