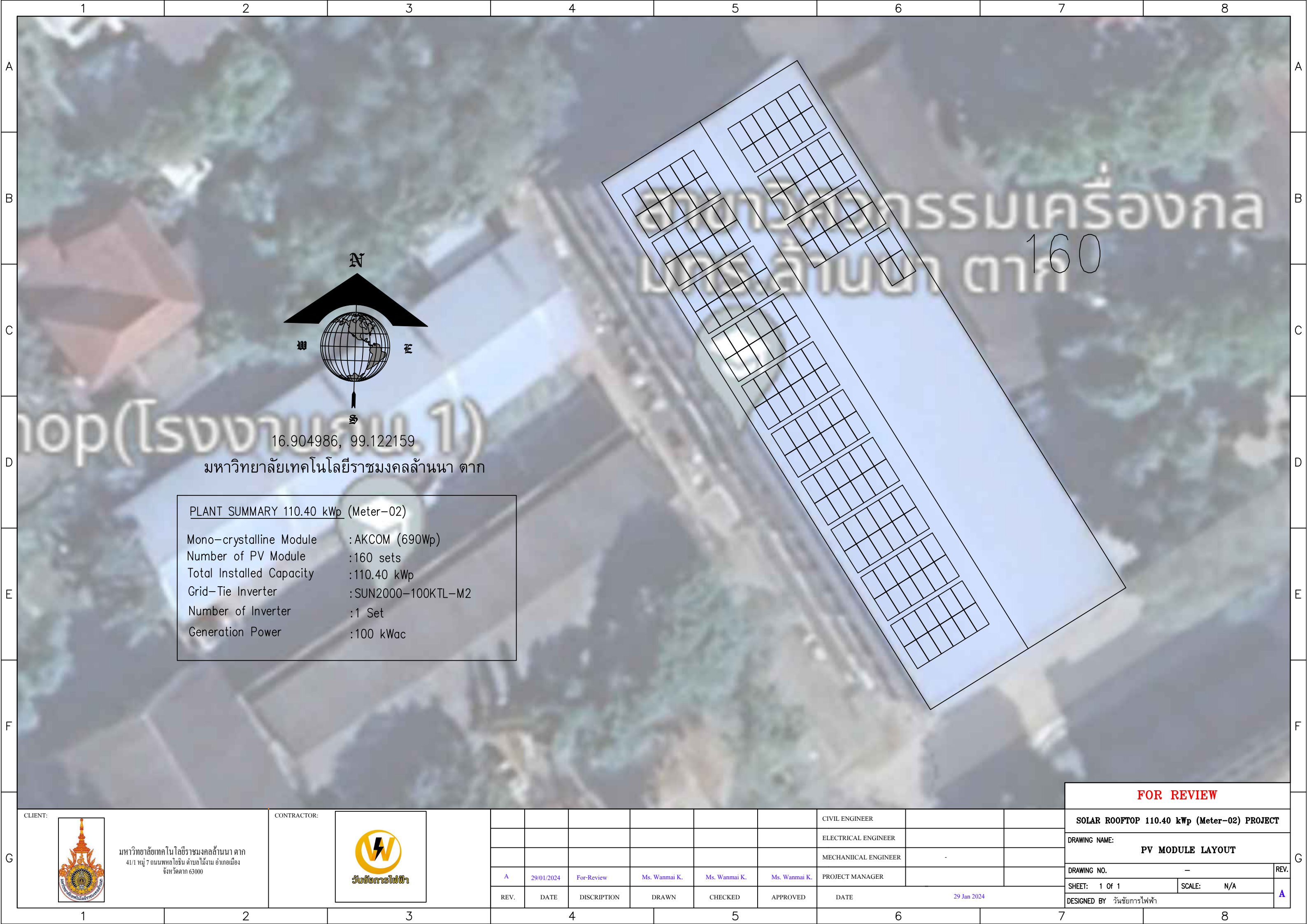




16.904986, 99.122159

มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ตาก

PLANT SUMMARY 110.40 kWp (Meter-02)

Mono-crystalline Module	:AKCOM (690Wp)
Number of PV Module	:160 sets
Total Installed Capacity	:110.40 kWp
Grid-Tie Inverter	:SUN2000-100KTL-M2
Number of Inverter	:1 Set
Generation Power	:100 kWac

CLIENT:		CONTRACTOR:								CIVIL ENGINEER			SOLAR ROOFTOP 110.40 kWp (Meter-02) PROJECT	
 มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ตาก 41/1 หมู่ 7 ถนนพหลโยธิน ตำบลไม้งาม อำเภอเมือง จังหวัดตาก 63000	 วันชัยการไฟฟ้า							ELECTRICAL ENGINEER			DRAWING NAME: PV MODULE LAYOUT			
									MECHANICAL ENGINEER	-		DRAWING NO. -		REV.
		A	29/01/2024	For-Review	Ms. Wanmai K.	Ms. Wanmai K.	Ms. Wanmai K.	PROJECT MANAGER			SHEET: 1 Of 1		SCALE: N/A	A
		REV.	DATE	DISCRIPTION	DRAWN	CHECKED	APPROVED	DATE 29 Jan 2024		DESIGNED BY วันชัยการไฟฟ้า				

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ดาก 110.40 kW Meter-02 Rev.1 (2024)

Item	Description							Remark
		Model / Brand	Quantity	Unit	Price / Unit		Total Price	
					Material	Installation		
1	Permit Coordination	Government	1	Set		100,000.00	100,000.00	
2	Engineering / Design Work	Skylink/ PV Syst	1	Set		50,000.00	50,000.00	
3	Procurement / Installation	Skylink	1	Set			-	
							-	
3.1	PV Module 690 W	AKCOM	160	Panel	993,600.00	40,000.00	1,033,600.00	
3.2	String Inverter SUN2000-100KTL-M2	Huawei	1	ea	193,490.00	6,000.00	199,490.00	
3.3	Rapid shutdown for comply with EIT standard with Emergency Botton	Projoy		ea	-	-	-	ตามมาตรฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	Controller Box for DC24V กล้องควบคุมไฟฟ้า (Rapid Shutdown Device)	Projoy		ea	-	-	-	
3.3	สายไฟเลี้ยง Rapit shutdown	Thai Yazaki		m	-	-	-	
3.3	DC Fuse(Inline Fuse)	Uriarte	0	set	-	-	-	
3.4	DC Connector	Multi Contact	30	ea	6,000.00	1,500.00	7,500.00	
3.5	DC Extension Cable (Solar Cable) FD depends on calculation	Helukabel/JJ Lap/Prysmian/Link	7,000.00	m	252,000.00	42,000.00	294,000.00	
3.6	AC Cable						-	
3.6.1	AC Cable CV Cable size ...1C x 70.. Sq.mm.(Inverter to MDB Solar)	Thai Yazaki	50	m	37,500.00	9,000.00	46,500.00	
3.6.2	AC Cable CV Cable size ...150.. Sq.mm. (MDB Solar to MAIN MDB)	Thai Yazaki	0	m	-	-	-	
3.6.4	AC Cable THW Cable size ...35.. Sq.mm. (AC Collection Ground)	Thai Yazaki	0	m	-	-	-	
3.6.5	AC Cable THW Cable size ...16.. Sq.mm. (AC Collection Ground)	Thai Yazaki	200	m	12,600.00	5,000.00	17,600.00	
3.6.5	AC Cable THW Cable size ...6.. Sq.mm. (DC Ground)	Thai Yazaki	300	m	13,500.00	7,500.00	21,000.00	
3.6.6	Acc . AC Cable (cable lag, Terminat lag, support cable grend)	Thai Yazaki	1	Set	15,000.00	7,500.00	22,500.00	
3.7	Main Distribution Board	Precise					-	
3.7.1	Main Distribution Board (MDB)	Precise	1	ea	40,000.00	5,000.00	45,000.00	
3.8	Grounding System	Kumwell	1	Set	15,000.00	6,000.00	21,000.00	
							-	
3.9	Mounting Structure (110.40 kWp)	Skylink Solar	1	Set	110,400.00	33,120.00	143,520.00	
3.10	Cable Tray	Perforated Tray					-	
3.10.1	Cable Tray 100x100x2400	Perforated Tray	100	ea	154,000.00	15,000.00	169,000.00	
3.10.3	Cable Tray 200x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.4	Cable Tray 300x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.5	Cable ladder 400x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.6	Conduit and Flexible, Support Cable Tray		1	Lot	20,000.00	10,000.00	30,000.00	
							-	
3.11	Metering System						-	
3.11.1	PQM Meter (UMG 96RM)	Janitza	1	ea		20,000.00	20,000.00	
3.11.2	Revenue Meter	EDMI ATLAS ,MK10E	0	ea	-	-	-	
3.12	Protection System						-	
3.12.1	Relay Protection System (SEL-751)	SEL-751	0	lot	-	-	-	
3.13	Other Accessories						-	
3.13.1	Transformer 360 kVA Std.Loss		0	ea		-	-	
3.13.2	22kV For Transformer	STC,Precise	0	Set	-	-	-	
3.13.3	22 kV Sac Cable		0	m	-	-	-	
3.13.4	Current Transformer MV	Precise	3	ea	96,000.00	15,000.00	111,000.00	
3.13.5	Potential Transformer MV	Precise	1	ea	51,700.00	10,000.00	61,700.00	
3.13.6	Concret Pole and Support CT,VT and Acc.	STC	0	ea	-	-	-	
3.13.7	Concret Pole For Riser Pole Incomming + Outgoing	STC	1	ea	35,000.00	25,000.00	60,000.00	
3.13.8	Drop Out Fuse	Precise	3	ea	9,000.00	3,000.00	12,000.00	
3.13.9	Lightning Arrester 21 kV 10 kA	Precise	3	ea	12,000.00	3,000.00	15,000.00	
3.13.10	Electrical Distribution Box	Schneider	1	ea	15,000.00	8,000.00	23,000.00	
3.13.11	Electrical System (Lighting Fixture, Receptacle)	Philips	1	Set	8,000.00	2,000.00	10,000.00	
3.14	Monitoring System						-	
3.14.1	Smart Logger 3000A	Huawei	1	ea	30,000.00	10,000.00	40,000.00	
3.14.2	RS485 for Zero Export	lapp	1	Set	10,000.00	5,000.00	15,000.00	
3.14.3	LAN Wiring System	TP Link	1	Set	5,000.00	3,500.00	8,500.00	
3.14.4	UPS	Leonic	1	ea	10,000.00	1,000.00	11,000.00	
4	Safety System						-	
4.1	Warning Sign,Fire Extinguisher 1 Sets ,Equipment Name Plate (Acrylic)	Skylink	1	Set	5,000.00	1,000.00	6,000.00	
4.2	Ladder For Service	Skylink	0	Set	-	-	-	
4.3	Inverter Support Structure and Fence	Skylink	1	Set	20,000.00	10,000.00	30,000.00	
5	Test and Comissioning System						-	
5.1	Commissioning Work	Skylink	1	Set		15,000.00	15,000.00	
6	Others						-	
6.1	Hand rail Lifegrad	Skylink		Set	-	-	-	
6.2	Walkway	Skylink		Set	-	-	-	
6.3	Water Cleaning system	Skylink	1	Set	80,000.00	20,000.00	100,000.00	
6.4	Mobilization	Skylink	1	Set	-	30,000.00	30,000.00	
6.5	Unload and Transportation	Skylink	1	Set	30,000.00	10,000.00	40,000.00	
6.6	Insurance	Skylink		Set	-		-	
6.7	Management and Overhead	Skylink	1	Set		30,000.00	30,000.00	
	Total				2,279,790.00	559,120.00	2,838,910.00	
		Total					2,838,910.00	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				21.84	5.06	25.71	

Solar PV Rooftop 110.40 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ดาก Meter-02

Total PV Plant Capacity (DC)	110.40 kWp
Daily Electricity Production	309.12 kWh/day
Monthly Electricity Production	9,273.60 kWh/month
Annual Electricity Production	111,283.20 kWh/year
Investment	2,838,910.0 Batt
Tariff	4.00 Bath/unit

Year	Degradation of PV Module		Annual Electricity Production (kWh/Year)	Estimated Yearly Saving (@ 4.00 Baht/kWh)	Accumulated Saving (Baht)	Payback Period (Baht)
0		100%		-2,838,910.00		-2,838,910.00
1	2.50%	97.50%	111,283	445,133	445,133	-2,393,777
2	0.60%	96.90%	108,501	434,004	879,137	-1,959,773
3	0.60%	96.30%	107,850	431,400	1,310,538	-1,528,372
4	0.60%	95.70%	107,203	428,812	1,739,350	-1,099,560
5	0.60%	95.10%	106,560	426,239	2,165,589	-673,321
6	0.60%	94.50%	105,920	423,682	2,589,271	-249,639
7	0.60%	93.90%	105,285	421,140	3,010,410	171,500
8	0.60%	93.30%	104,653	418,613	3,429,023	590,113
9	0.60%	92.70%	104,025	416,101	3,845,124	1,006,214
10	0.60%	92.10%	103,401	413,605	4,258,729	1,419,819
11	0.60%	91.50%	102,781	411,123	4,669,852	1,830,942
12	0.60%	90.90%	102,164	408,656	5,078,508	2,239,598
13	0.60%	90.30%	101,551	406,204	5,484,712	2,645,802
14	0.60%	89.70%	100,942	403,767	5,888,479	3,049,569
15	0.60%	89.10%	100,336	401,344	6,289,824	3,450,914
16	0.60%	88.50%	99,734	398,936	6,688,760	3,849,850
17	0.60%	87.90%	99,136	396,543	7,085,303	4,246,393
18	0.60%	87.30%	98,541	394,163	7,479,466	4,640,556
19	0.60%	86.70%	97,950	391,798	7,871,265	5,032,355
20	0.60%	86.10%	97,362	389,448	8,260,712	5,421,802
21	0.60%	85.50%	96,778	387,111	8,647,823	5,808,913
22	0.60%	84.90%	96,197	384,788	9,032,612	6,193,702
23	0.60%	84.30%	95,620	382,480	9,415,091	6,576,181
24	0.60%	83.70%	95,046	380,185	9,795,276	6,956,366
25	0.60%	83.10%	94,476	377,904	10,173,180	7,334,270
Total			2,543,295	10,173,180	10,173,180	

