JAPAN INTERNATIONAL COOPERATION AGENCY

BASIC DESIGN PACKAGE OF

RECOMMENDABLE WASTEWATER TREATMENT PLANT

FOR

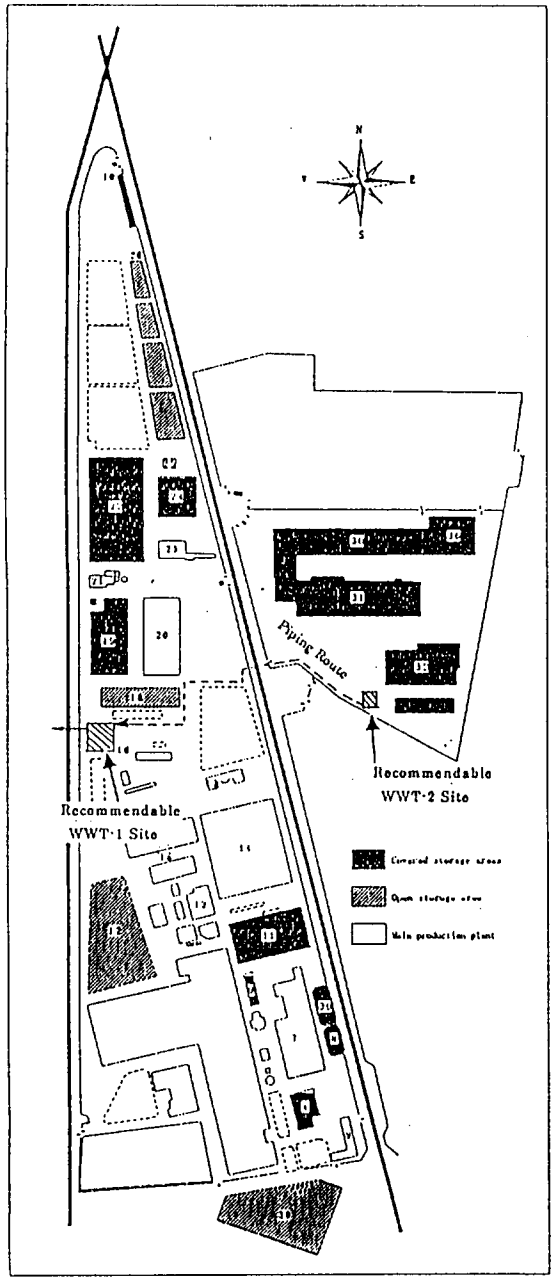
EL NASR CO. FOR STEEL PIPES AND FITTINGS

February 2000

CHIYODA DAMES AND MOORE CO.

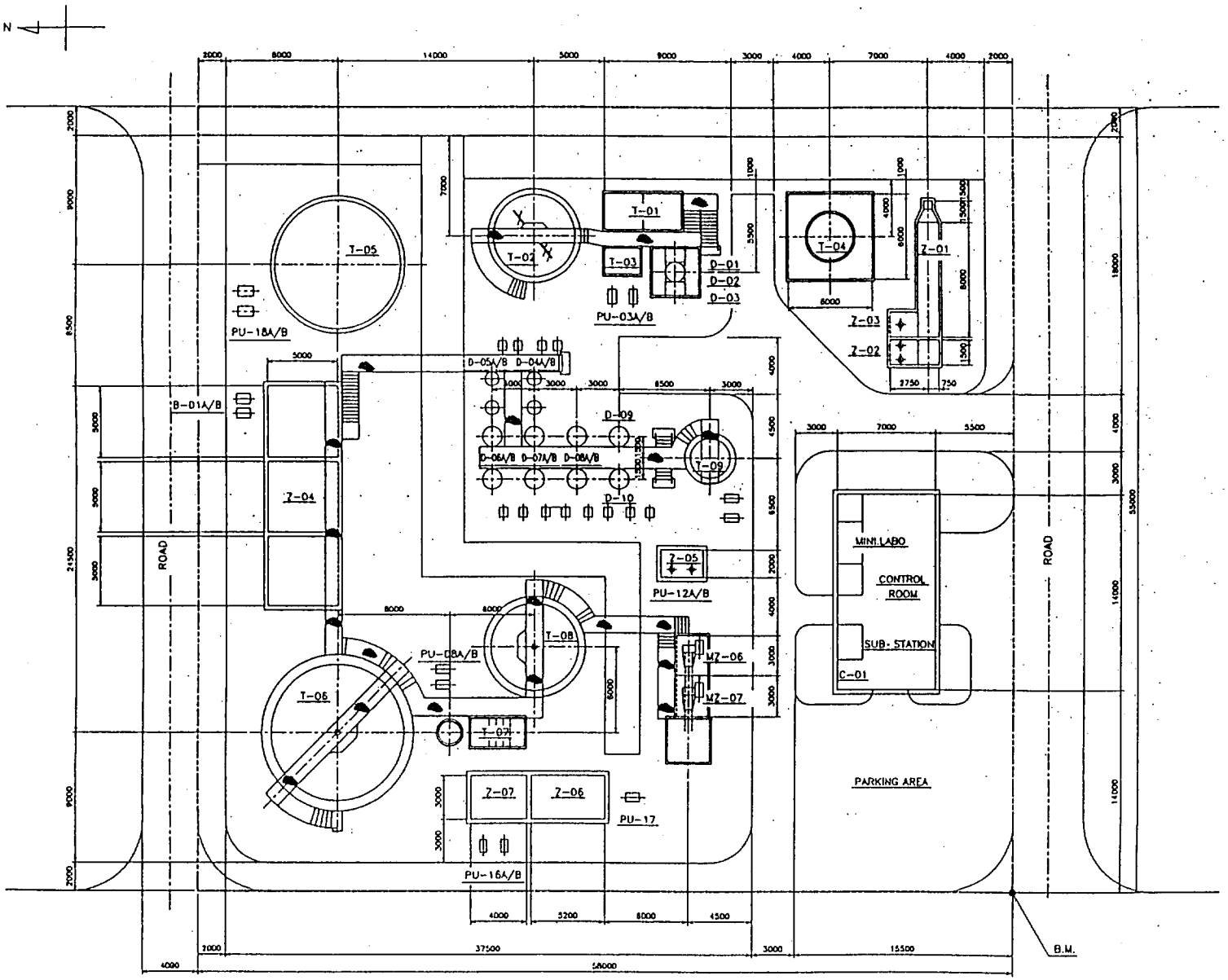
CHIYODA CORPORATION

BD-15



1. Galvanising plant (0.5-4 inch pipes)
2. Pipe workshop
3. 0.5-4 inch pipe mill
4. Main spare parts store
5. Administration
6. Electric substation
7. Small fittings foundry (includes chemical store)
8. Galvanising plant (small fittings)
9. Covered store for waste oils
10. Product store (0.5-4 inch pipe)
11. Store for foundry raw matrials
12. Product store (pipes) and scrap yard
13. Water cooling system (0.5-4 inch pipes
14. Garage (includes car workshop)
15. Workshop
16. Transport department
17. Clinic
18. Product store (pipe fitting)
19. Large fitting foundry
20. Large fittings finishing area/workshop
21. Coolong for foundries
22. Casting foundries
23. Administration
24. Central material store
25. Main electrical substation
26. Coke store, scrap and limestion
27. Raw material store (coils)
28. Raw material store (coils)
29. Product stores (2-8 inch and spiral pipes)
30. Spiral pipe mill (6-18 and6-60 inch)
31. 2-8 inch pipemill
32. Painting shop
33. Old spiral pipe mill (6-24 inch)
34. Raw material store (coils)
35. Fuel dispensing station
36. Oxygen plant
37. Central gas cylinder stire
38. Zinc dross distillation
39. Open yard for waste dry solids (core sand, slag, etc)

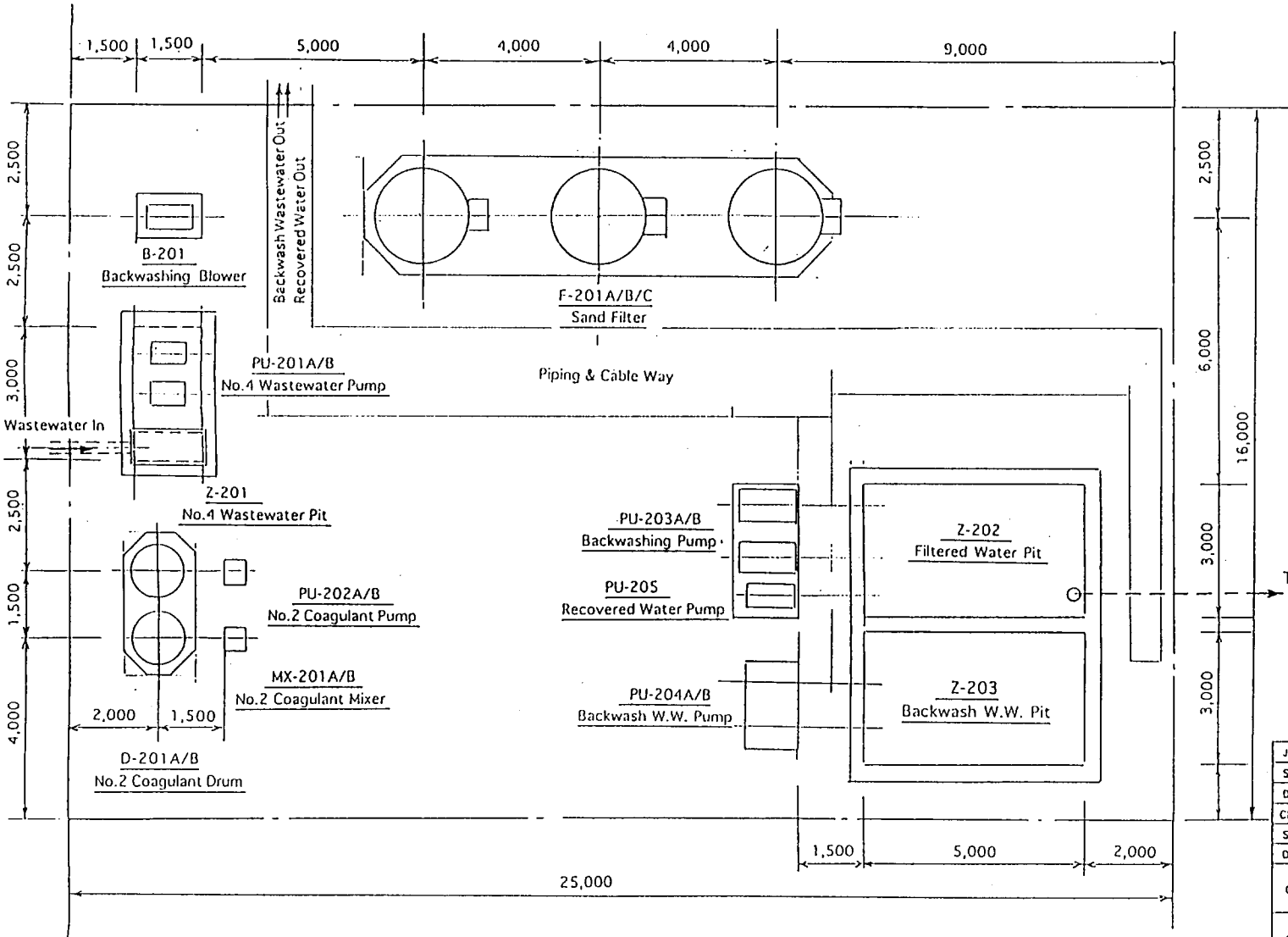
EL NASR CO. FOR STEEL PIPES & FITTINGS
LOCATION OF WASTEWATER TREATMENT PLANT
DWG. NO. SP-BD-12-00



Equipment NO.	Service	Equipment NO.	Service
T-01	Neutralization Tank	PU-08A/B	Sludge Circulation Pump
T-02	No.1 Sedimentation Tank	PU-09A/B	No.2 Lime Pump
T-03	Neutralized W.W. Tank	PU-10A/B	Coagulant Pump
T-04	Skimmed Oil Tank	PU-11A/B	Coagulant Aid Pump
T-05	Equalization Tank	PU-12A/B	Sludge Feed Pump
T-06	No.2 Sedimentation Tank	PU-13	Settling Aid Pump
T-07	Coagulation/Flocculation	PU-14A/B	Centrifuge Feed Pump
T-08	No.3 Sedimentation Tank	PU-15A/B	Filter Aid Pump
T-09	Sludge Thickener	PU-16A/B	W.W.Return Pump
		PU-17	T.W.House Pump
D-01	Lime Hopper	PU-18	Equalized Water Pump
D-02	No.1 Lime Drum		
D-03	Lime Receiver	B-01A/B	AP Blower
D-04A/B	Nutrient(N) Drum		
D-05A/B	Nutrient(P) Drum	C-01	Air Compressor
D-06A/B	No.2 Lime Drum		
D-07A/B	No.1 Coagulant Drum	MZ-01	Lime Feeder
D-08A/B	Coagulant Aid Drum	MZ-02	No.1 Sludge Rake
D-09	Settling Aid Drum	MZ-03	No.2 Sludge Rake
D-10	Filtered Aid Drum	MZ-04	No.3 Sludge Rake
		MZ-05	No.4 Sludge Rake
Z-01	Oil Separator	MZ-06	No.1 Centrifuge
Z-02	Oil Separator T.W. Pit	MZ-07	No.2 Centrifuge
Z-03	Skimmed Oil Pit	MZ-08	Belt Conveyor
Z-04	Aeration Basin		
Z-05	Sludge Pit	MX-01	No.1Lime Mixer
Z-06	Treated Water Pit	MX-02A/B	Nutrient(N) Mixer
Z-07	Wastewater Pit	MX-03A/B	Nutrient(P) Mixer
		MX-04A/B	No.2 Lime Mixer
PU-01A/B	No.1 Lime Pump	MX-05A/B	No.1 Coagulant Mixer
PU-02A/B	No.1 Sludge Pump	MX-06A/B	Coagulant Aid Mixer
PU-03A/B	Neutralized W.W. Pump	MX-07	Coagulation Mixer
PU-04A/B	Oil Separator T.W. Pump	MX-08	Flocculation Mixer
PU-05	Recovered Oil Pump	MX-09	Settling Aid Mixer
PU-06A/B	Nutrient(N) Pump	MX-10	Filter Aid Mixer
PU-07A/B	Nutrient(P) Pump		

JICA	Chck	Tech	Appr							
Sign										
Date										
CHSL	Dsgn	Chck	Appr							
Sign				Rev	Description	Dsgn	Chck	Appr	Date	
Date					REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO.FOR STEEL PIPES AND FITTINGS PLOT PLAN FOR No.1 W.W.T. RECOMMENDABLE PLANT
ISSUED DATE	SCALE 1/150
DWG NO	SP-DD-12-01 REV. 0



JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
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CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DANIES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO.FOR STEEL PIPES AND FITTING PLOT PLAN FOR No.2 W.W.T. RECOMMENDABLE PLANT
ISSUED DATE	SCALE 1/100
DWG NO	SP-00- 12-02 REV. 0

TANK

CONE ROOF TANK

OPEN TANK

DRUMS

HORIZONTAL TYPE

VERTICAL TYPE

VERTICAL TYPE(OPEN)

PUMP,BLOWER,ETC

CENTRIFUGAL PUMP

RECIPROCATING PUMP

ROOT BLOWER

EJECTOR

MIXER

BELT CONVEYOR

BELT CONVEYOR

ELECTRIC HOIST

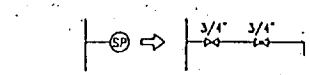
TANK CAR

DUMP TRUCK

MOTOR DRIVEN

SAMPLING CONNECTION

SAMPLING CONNECTION FOR WATER FROM PIPE LINE



SYMBOLS OF LINE

MAIN PROCESS LINE

PROCESS LINE
(& UTILITY LINE etc.)

UTILITY LINE
SUPPLEMENTARY LINE

IMAGINARY LINE, BURIED LINE

CENTER LINE

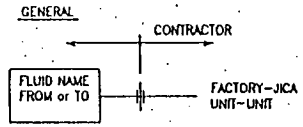
BOUNDARY LINE

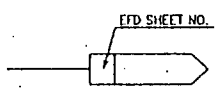
DESIGNATES PIPING CLASS
CHANGES OR APPLICABLE LOW.

INCLINED

LINE IDENTIFICATION

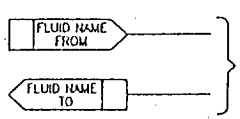
GENERAL

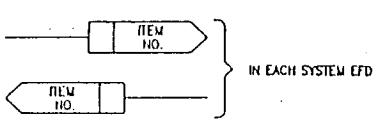




BREAK DOWN OF EFD-EFD

PROCESS LINE





SYMBOLS OF LINE

GATE VALVE

GLOBE VALVE

CHECK VALVE

BUTTERFLY VALVE

BALL VALVE

NEEDLE VALVE

DIAPHRAGM VALVE

COCK VALVE

3WAY VALVE

SAFETY VALVE

FLANGE CONNECTION

CONCENTRIC REDUCER

ECCENTRIC REDUCER

BLIND

SPECTACLE BLIND

FLEXIBLE TUBE

BELLOWS EXPANTION JOINT

SLEEVE EXPANTION JOINT

HOSE CONNECTION

RESTRICTION ORIFICE

SYMBOLS OF EQUIPMENT

Y-TIPE STRAINER

T-TYPE STRAINER

TEMPORARY STRAINER

SEWER DRAIN

FLOW DETECTOR

SIGHT GLASS

FOOT VALVE

SPOOL PIECE

SYMBOLS OF EQUIPMENT

EYE SHOWER

SHOWER

SILENCER

MAN HOLE

HAND HOLE

SIGHT GLASS

LINE MIXER

TO OILY SEWER

TO RAINY SEWER

SYMBOLS OF FLUID

SYMBOL	SERVICE
CA	CAUSTIC
AI	INSTRUMENT AIR
AS	SERVICE AIR
WCS	COOLING WATER SUPPLY
WCR	COOLING WATER RETURN
WD	DRINKING WATER
WI	INDUSTRIAL WATER
WR	RECOVERED WATER
WW	WASTE WATER
HCL	HCL
CHL	CHEMICAL

ABBREVIATION

SV	SAFETY VALVE
B/L	BATTERY LIMIT
ATM	ATMOSPHERE
MFR	MANUFACTURER
MISC	MISCELLANEOUS
T.S	TEMPORARY STRAINER
NC	NOMAL CLOSE
NO	NOMAL OPEN
FC	FAILURE CLOSE
FO	FAILURE OPEN
BW	BUTT WELD

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Da
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENC INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR ENGINEERING FLOW DIAGRAM LEAD SHEET(1/2)
ISSUED DATE	SCALE: None
DWG NO	REV.: 0

TANK

CONE ROOF TANK

OPEN TANK

DRUMS

HORIZONTAL TYPE

VERTICAL TYPE

VERTICAL TYPE(OPEN)

PUMP,BLOWER,ETC

CENTRIFUGAL PUMP

RECIPROCATING PUMP

ROOT BLOWER

EJECTOR

MIXER

BELT CONVEYOR

BELT CONVEYOR

ELECTRIC HOIST

TANK CAR

DUMP TRUCK

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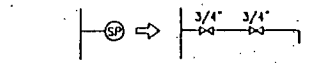
SAMPLING CONNECTION

SAMPLING CONNECTION FOR WATER FROM PIPE LINE



SYMBOLS OF LINE

MAIN PROCESS LINE

PROCESS LINE (& UTILITY LINE etc.)

UTILITY LINE SUPPLEMENTARY LINE

IMAGINARY LINE. BURIED LINE

CENTER LINE

BOUNDARY LINE

DESIGNATES PIPING CLASS CHANGES OR APPLICABLE LOW.

INCLINED

LINE IDENTIFICATION

GENERAL

CONTRACTOR

FLUID NAME FROM or TO

FACTORY-JICA UNIT-UNIT

EFD SHEET NO.

EFD-EFD

BREAK DOWN OF EFD-EFD

PROCESS LINE

FLUID NAME FROM

FLUID NAME TO

ITEM NO.

ITEM NO.

IN EACH SYSTEM EFD

SYMBOLS OF LINE

GATE VALVE

GLOBE VALVE

CHECK VALVE

BUTTERFLY VALVE

BALL VALVE

NEEDLE VALVE

DIAPHRAGM VALVE

COCK VALVE

3WAY VALVE

SAFETY VALVE

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FLOW DETECTOR

SG SIGHT GLASS

FOOT VALVE

S.P. SPOOL PIECE

SYMBOLS OF EQUIPMENT

EYE SHOWER

SHOWER

SILENCER

M MAN HOLE

H HAND HOLE

SG SIGHT GLASS

LINE MIXER

Y_D TO OILY SEWER

Y_R TO RAINY SEWER

SYMBOLS OF FLUID

SYMBOL	SERVICE
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Sign									
Date									
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Sign				Rev	Description	Dsgn	Chck	Appr	Da
Date					REVISION				

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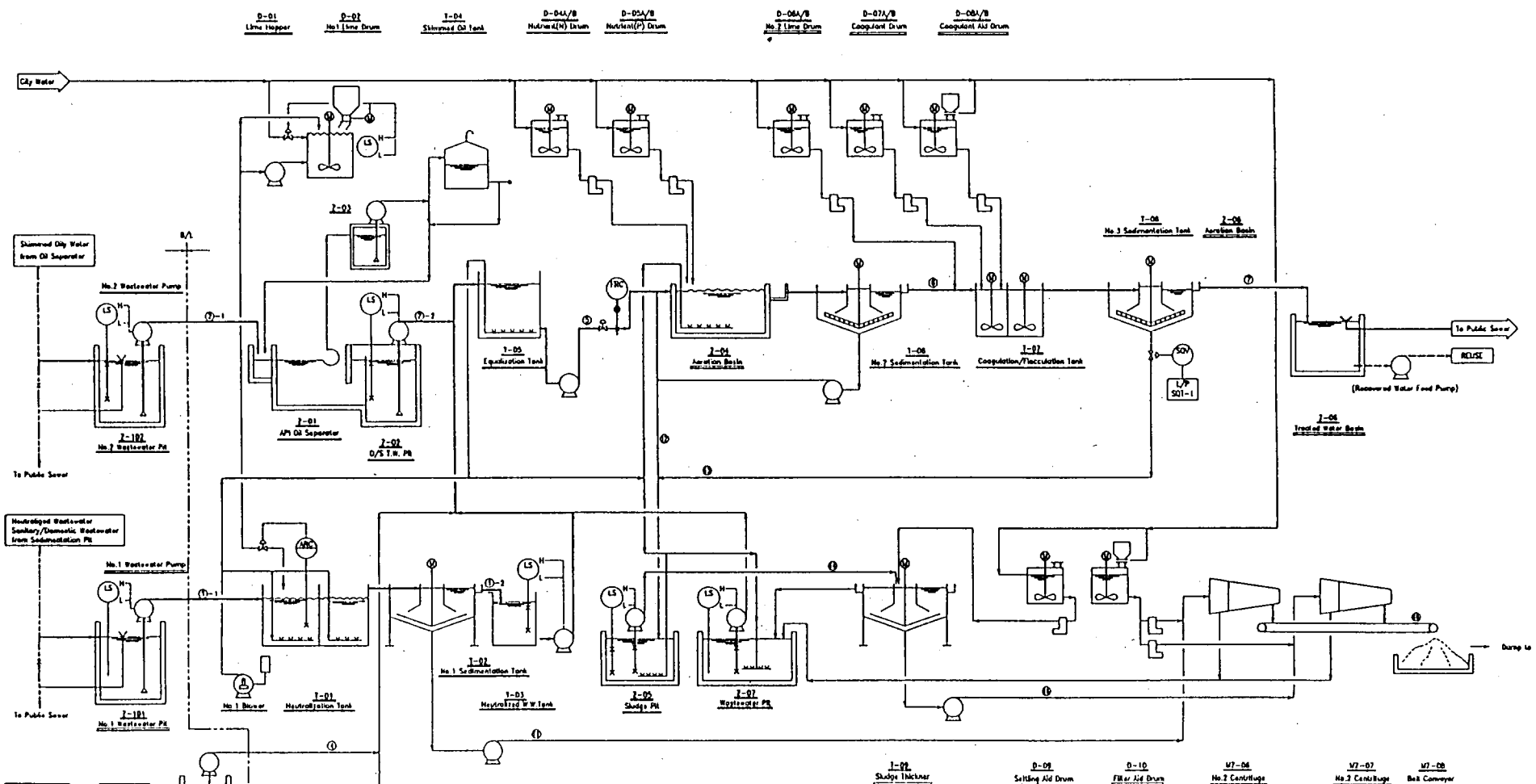
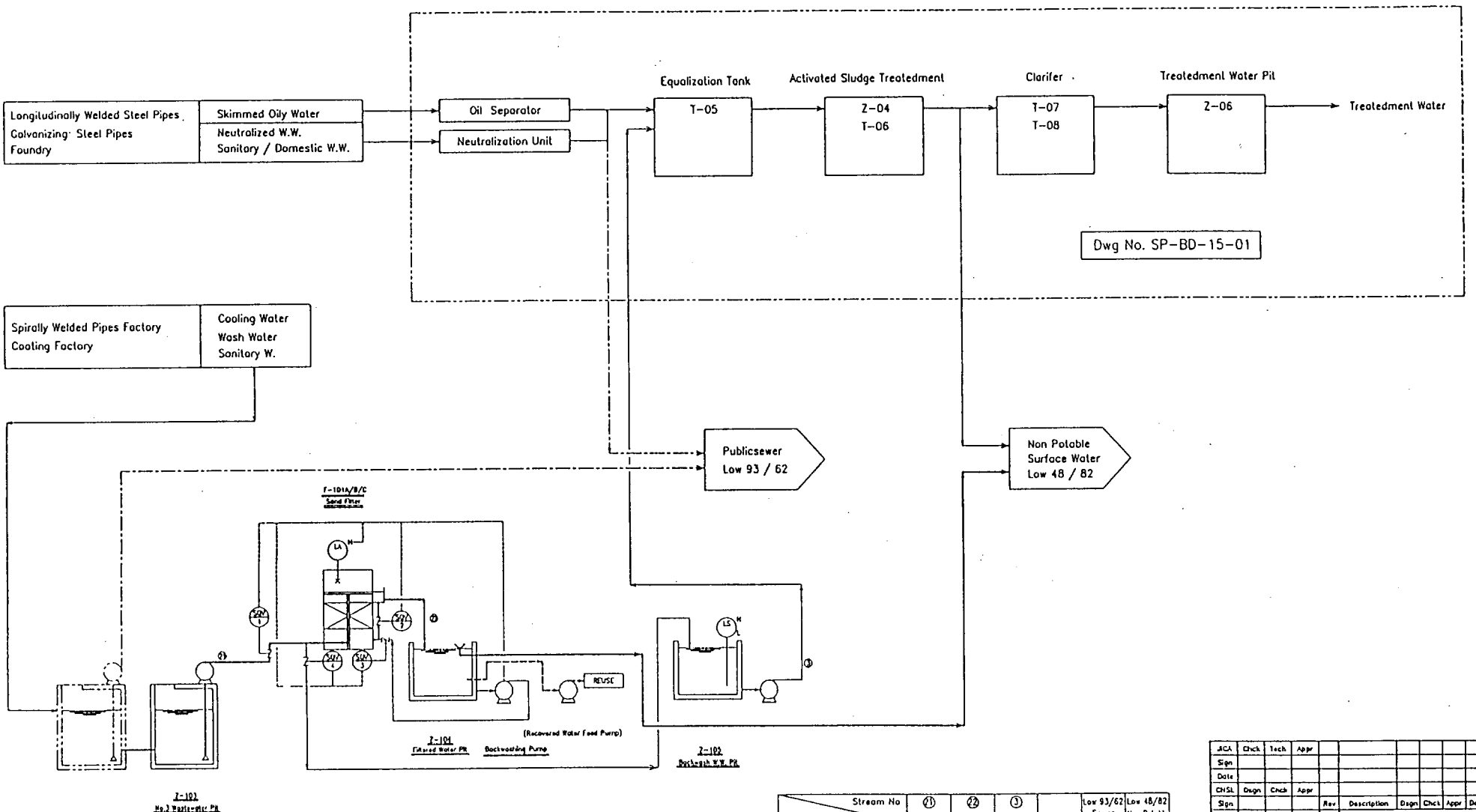
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR ENGINEERING FLOW DIAGRAM LEAD SHEET(1/2)
ISSUED DATE	SCALE None
DWG NO	REV. 0



Item \ Stream No		①-1	①-2	②-1	②-2	③	④	⑤	⑥	⑦	⑪	⑫	⑬	⑭	⑮	⑯		Law 93/62 Sewer	Law 48/32 Non Potable (Industrial)
Flow Rate Av.	(m³/D)	960	——	720	——	48	120	1848	——	——	24.0	51.1	5.5	56.6	11.4	4.5			
Flow Rate Av.	(m³/h)	40	——	30	——	2.0	5	77	——	——	3.0	2.13	0.23	2.4	1.9	0.7			
Flow Rate Max	(m³/h)	48	——	36	——	3.0	10	77	——	——									
pH	(-)	2-6	6.5-7.5	7-8	——	6.5-8	6.5-8	6.5-8	——	7-8	7-8	6.5-8	7-8	7-8	7-8	7-8		6-10	6-9
SS	(mg/L)	250	——	200	——	550	30	224	30	<30	5,000	8,000	10,000	8,200	40,000	200,000		<500	60
BOD	(mg/L)	100	——	100	——	186	30	98	30	<30								<400	60
COD	(mg/L)	200	——	200	——	496	80	200	50	<50								<700	100
Oil & Grease	(mg/L)	5	——	1000	30	83	5	17	5	3								<100	10
Pb	(mg/L)	0.1	——	0.1	——	1.0	Nil	——	——	——								——	——
Zn	(mg/L)	50	——	Nil	——	Nil	Nil	——	——	——								<10	——
Water Temperature	(°C)	20-35	——	20-35	——	20-35	20-35	——	——	——								<40	35

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA OAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO.FOR STEEL PIPES AND FITTINGS PROCESS FLOW DIAGRAM FOR W.W.T. DEMONSTRATION PLANT(1/2)
ISSUED DATE	SCALE: None
DWG NO	SP-00-15-01 REV. 0



Item \ Stream No		①	②	③		Low 93/62 Sewer	Low 48/82 Non Potable
Flow Rate Av.	(m^3/D)	1200	1200	48			
Flow Rate Av.	(m^3/h)	50	50	2.0			
Flow Rate Max	(m^3/h)	150	150	3.0			
pH	[–]	6.5–8	6.5–8	6.5–8		6–10	6–9
SS	[mg /L]	30	10	550		<500	60
BOD	[mg /L]	30	<30	186		<400	60
COD	[mg /L]	80	<80	496		<700	100
Oil & Grease	[mg /L]	5	3	83		<100	10
Pb	[mg /L]	0.1	<0.1	1.0		——	——
Zn	[mg /L]	Nil	Nil	Nil		<10	——
Water Temperature	[°C]	20–35	——	20–35		<40	35

JICA	Chck	Tech	Appr						
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Date									
CHSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

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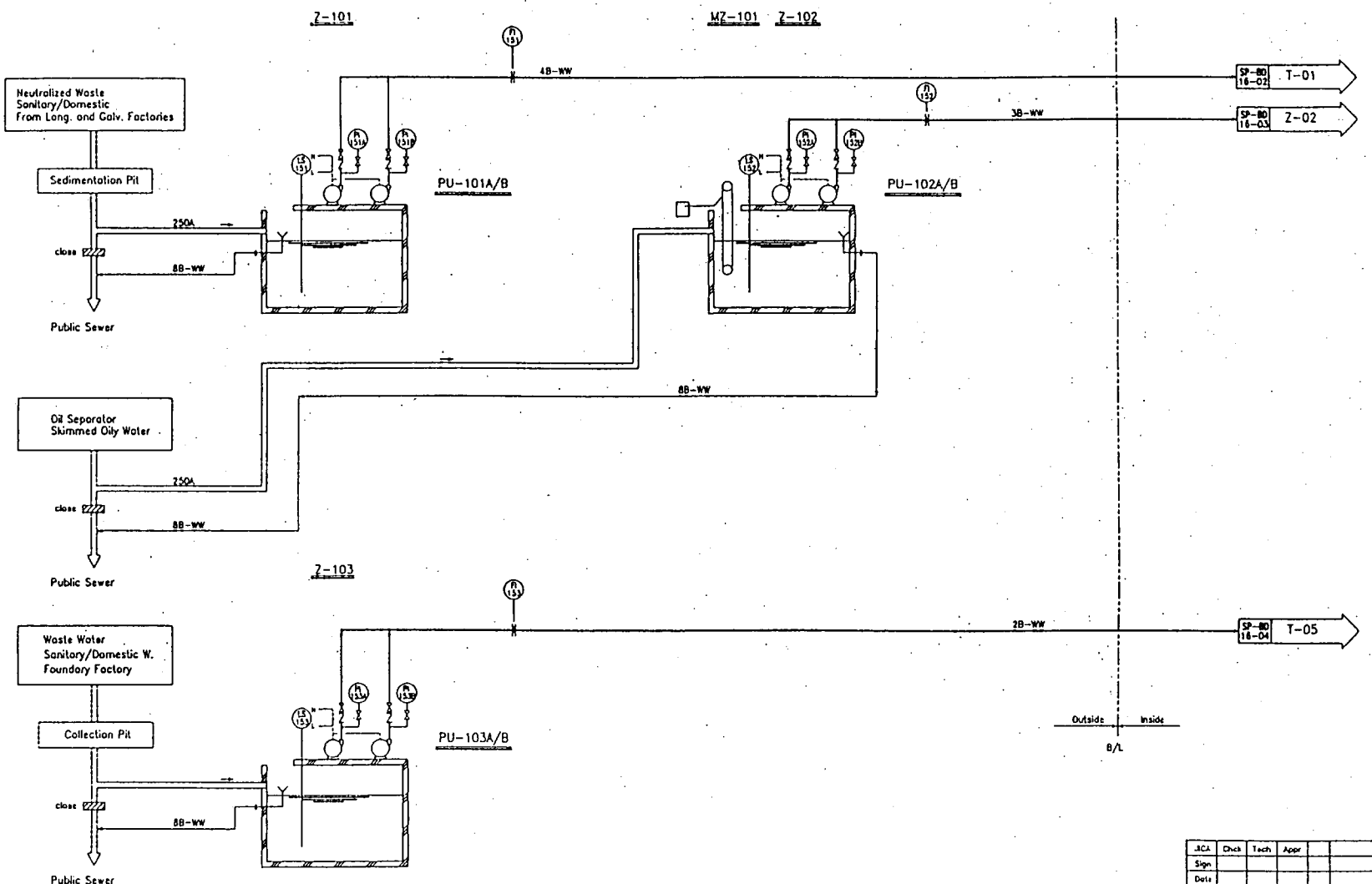
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO.FOR STEEL PIPES AND FITTINGS PROCESS FLOW DIAGRAM FOR W.W.T. DEMONSTRATION PLANT(2/2)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-15-01 REV. 0



ITEM No.	Z-101	Z-102	Z-103	PU-101A/B	PU-102A/B	PU-103A/B	MZ-101
SERVICE	No.1 Wastewater Pit	No.2 Wastewater Pit	No.3 Wastewater Pit	No.1 Wastewater Pump	No.2 Wastewater Pump	No.3 Wastewater Pump	Belt Oil Skimmer
SIZE(m)	4.0mWx5.0mLx3.5mH	3.0mWx5.0mLx3.0mH	2.0mWx3.0mLx3.5mH	48m³/hx30mHx11kW	36m³/hx25mHx7.5kW	12m³/hx25mHx2.2kW	W=300,0.4kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	1.0	1.0	1.0	None
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb	Amb.
MATERIAL/TYPE	RC/Open Basin	RC/Open Basin	RC/Open Basin	SCS/Centri.Vertical	SCS/Centri.Vertical	SCS/Centri.Vertical	Vertical

JICA	Chck	Tech	Appr							
Sign										
Date										
ENGR.	Degn	Chck	Appr							
Sign				Rev	Description	Degn	Chck	Appr	Date	
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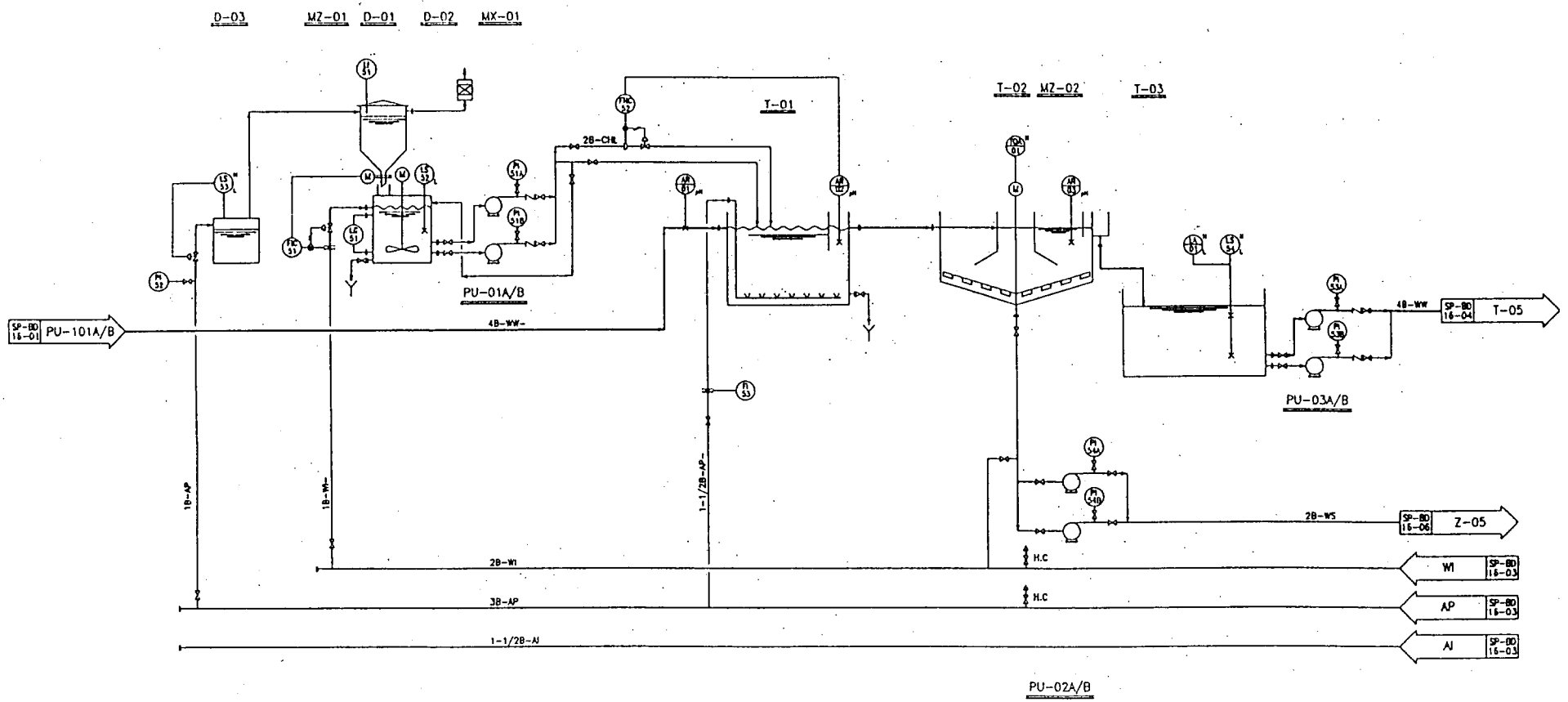
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOVERABLE PLANT(1/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-01 REV. 0



ITEM No.	PU-03A/B	MX-01
SERVICE	Neutralized W.W.Pump	No.1 Lime Mixer
SIZE(m)	48m³/hx18mHx5.5kW	1.5kW,L=1.2m
DESIGN PRESS(MPa)	0.5	Full Water
DESIGN TEMP.(°C)	Amb.	Amb.
MATERIAL/TYPE	SCS/Centri.Horiz.	CS/Verti.

ITEM No.	D-01	D-02	D-03	T-01	T-02	T-03	MZ-01	MZ-02	PU-01A/B	PU-02A/B
SERVICE	Lime Hopper	No.1 Lime Drum	Lime Receiver	Neutralization Tank	No.1 Sedimentation Tank	Neutralized W.W.Tank	Lime Feeder	No.1 Sludge Rake	No.1 Lime Pump	No.1 Sludge Pump
SIZE(m)	1.3mlDx1.5mH	1.5mlDx1.5mH	1.4mlDx1.5mH	2.6mWx5.2mLx3.0mH	5.8mlDx3.0mH	2.5mWx3.2mLx3.0mH	30kgx0.75kW	1.5kW	10L/minx0.5MPax0.75kW	4m³/hx30mHx2.2kW
DESIGN PRESS(MPa)	0.5	Full Water	0.5	Full Water	Full Water	Full Water	0.5	None	0.5	0.5
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS/Cylidrical Verti.	CS/Cylidrical Verti.	CS/	CS+Resin Lining	CS+Resin Lining/Circul.	CS+Lining	CS/Disc	CS/Center Drive	CI/Centri.Horiz.	SCS/Centri.Horiz.

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

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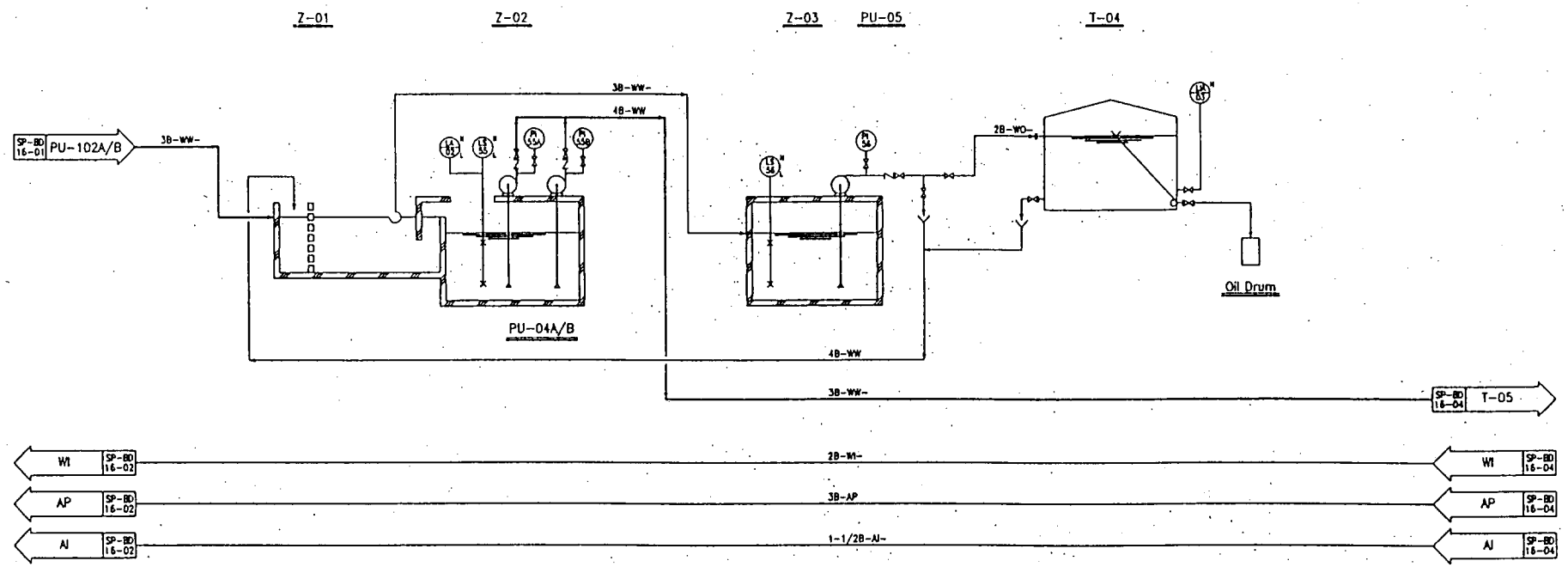
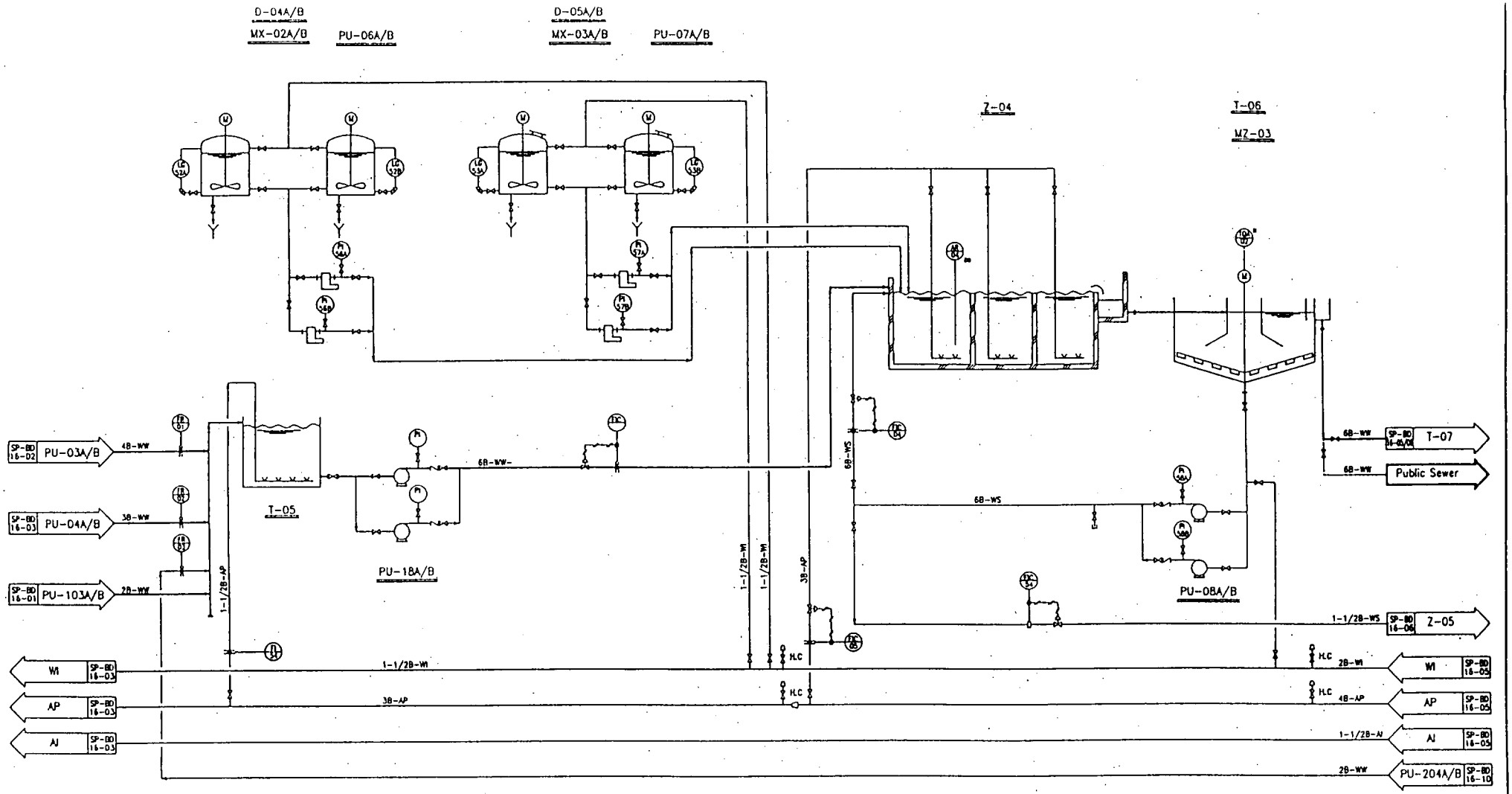
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(2/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-02 REV. 0



ITEM No.	Z-01	Z-02	Z-03	T-04	PU-04A/B	PU-05
SERVICE	Oil Separator	Oil Separator T.W.Pit	Skimmed Oil Pit	Skimmed Oil Tank	Oil Separator T.W.Pump	Recovered Oil Pump
SIZE(m)	1.5mW×8.0mL×1.0mD	2.4mW×2.5mL×3.0mD	1.5mW×2.0mL×3.0mD	3.4mID×6.1mH	36m³/hr×18mH×5.5kW	15m³/hr×15mH×2.2kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	Full Water	1.0	1.0
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	RC/API	RC/Open Basin	RC/Closed Basin	CS/Cone Roof Tank	SCS/Centri.Verti.	CI/Centri.Verti.

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(3/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-03 REV. 0

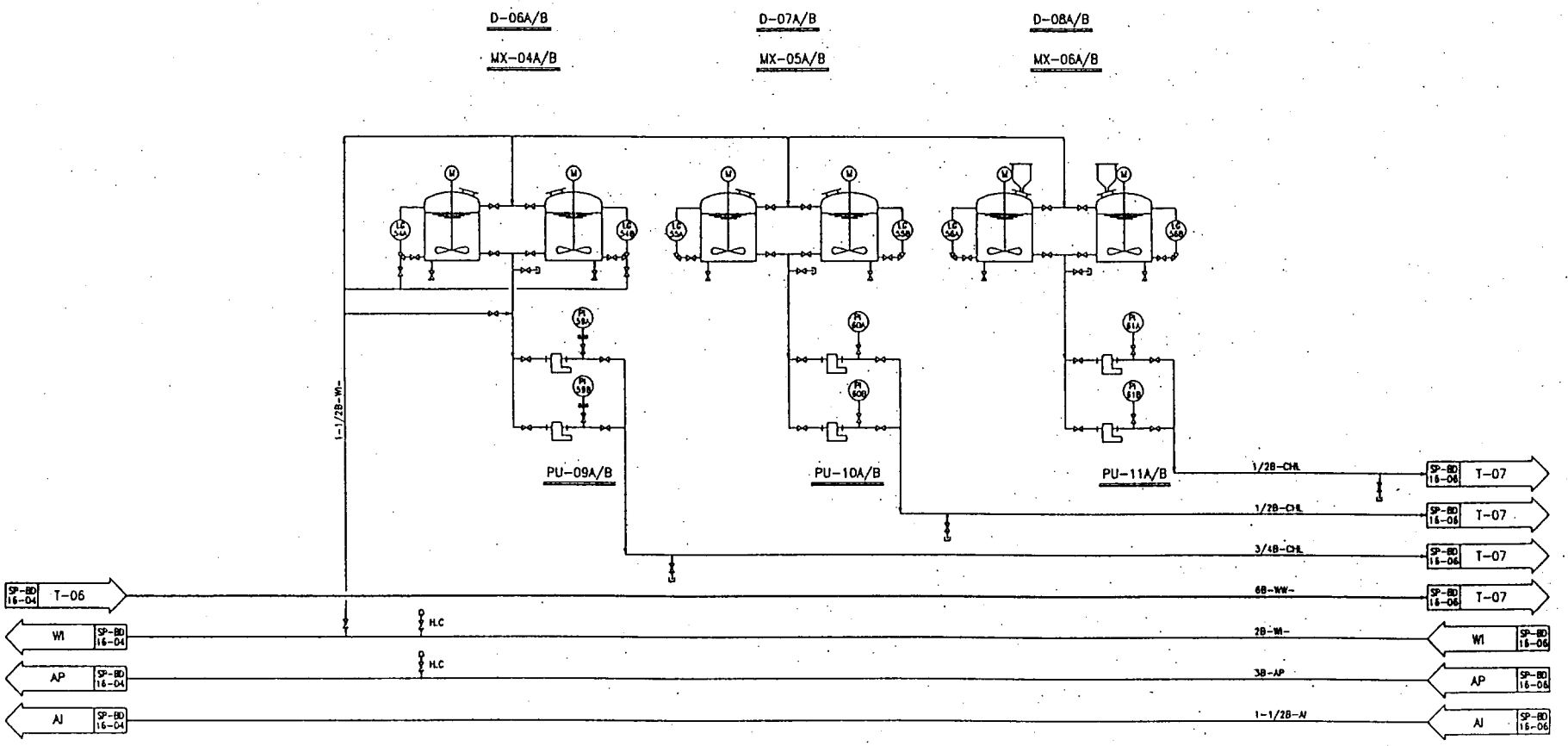


ITEM No.	PU-18A/B	T-06
SERVICE	Equalised Water Pump	No2.Sedimentation Tank
SIZE(m)	80m³/hx10mHx5.5kW	9.67mDx4.0mH
DESIGN PRESS(MPa)	1.0	Full Water
DESIGN TEMP.(°C)	Amb.	Amb.
MATERIAL/TYPE	SCS/Centri.Horizontal	CS+Epoxy/Circular

ITEM No.	T-05	D-04A/B	D-05A/B	Z-04	MX-02A/B	MX-03A/B	MZ-03	PU-06A/B	PU-07A/B	PU-08A/B
SERVICE	Equalization Tank	Nutrient(N)Drum	Nutrient(P)Drum	Aeration Basin	Nutrient(N)Mixer	Nutrient(P)Mixer	No.2 Sludge Rake	Nutrient(N) Pump	Nutrient(P) Pump	Sludge Circulation Pump
SIZE(m)	8.71mDx7.6mH	0.7mDx1.5mH	0.7mDx1.5mH	5.0mWx15mLx3.5mH	0.4kW,L=1.0m	0.4kW,L=1.0m	1.5kW	0.1L/minx0.5MPax0.4kW	0.1L/minx0.5MPax0.4kW	36m³/hx12mHx3.7kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	Full Water	None	None	None	1.0	1.0	1.0
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS/Open Top Tank	CS/Cylindrical	CS+HRL/Cylindrical	RC/Rectangular	SUS/Verti	SUS/Verti	CS+Epoxy/C. Driven	SCS/Diaphragm	SCS/Diaphragm	SCS/Centri.Horizontal

JICA	Chck	Tech	Appr						
Sign									
Date									
CHSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

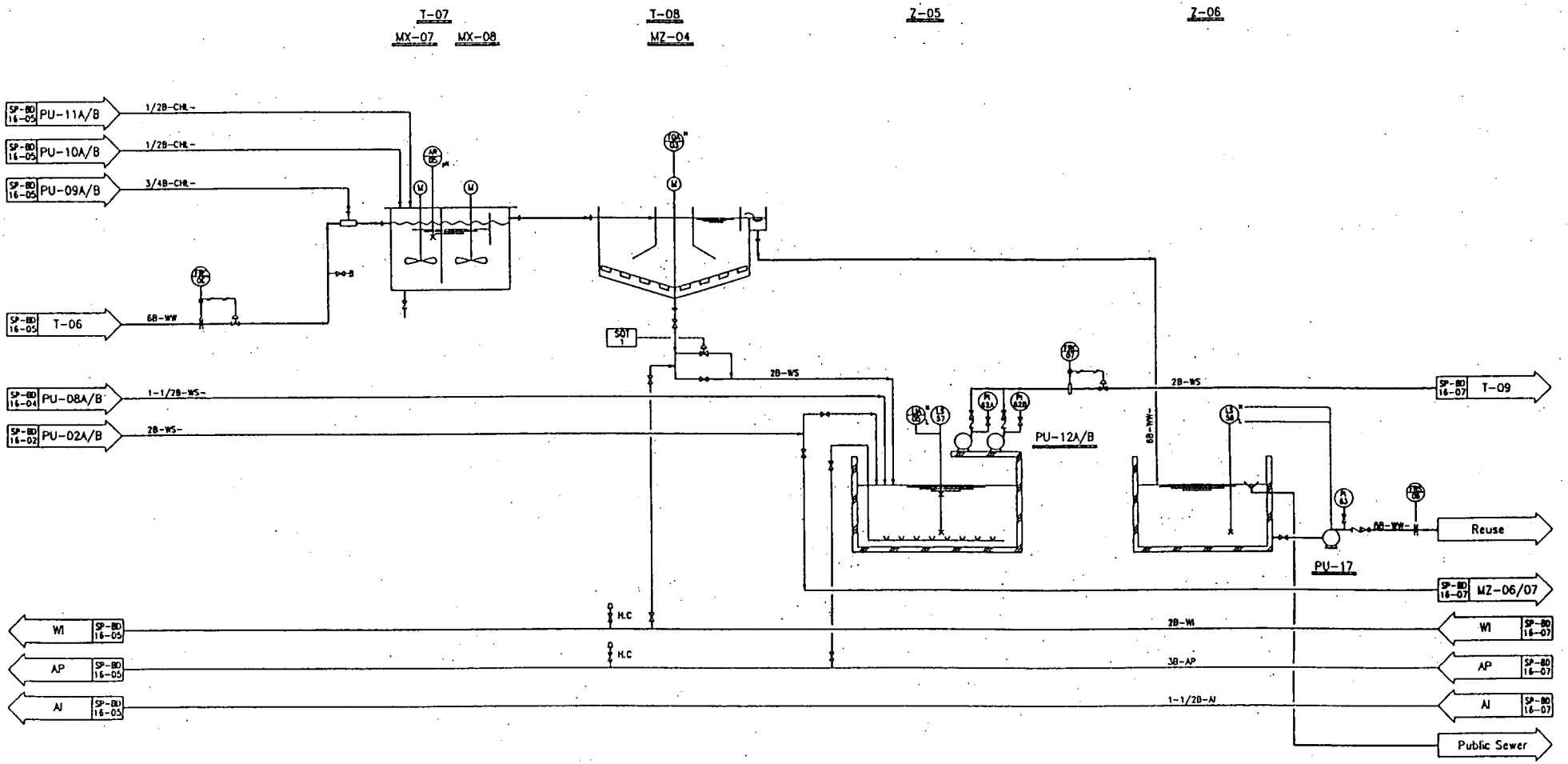
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(4/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-04 REV. 0



ITEM No.	D-06A/B	D-07A/B	D-08A/B	MX-04A/B	MX-05A/B	MX-06A/B	PU-09A/B	PU-10A/B	PU-11A/B
SERVICE	No.2 Lime Drum	No.1 Coagulant Drum	Coagulant Aid Drum	No.2 Lime Mixer	Coagulant Mixer	Coagulant Aid Mixer	No.2 Lime Pump	Coagulant Pump	Coagulant Aid Pump
SIZE(m)	1.4mDx1.8mH	1.2mDx1.8mH	1.2mDx1.5mH	1.5kW,L=1.2m	0.75kW,L=1.2m	0.75kW,L=1.0m	0.6L/minx0.5MPax0.75kW	0.3L/minx0.5MPax0.4kW	0.3L/minx0.5MPax0.4kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	None	None	None	1.0	1.0	1.0
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS/Vert.	CS+1HRL/Vert.	CS/Vert.	SUS/Vertical	SUS/Vertical	SUS/Vertical	TFL/Diaphragm	SCS/Plunner	SCS/Plunger

JICA	Chck	Tech	Appr							
Sign										
Date										
CHSL	Dsgn	Chck	Appr							
Sign				Rev	Description	Dsgn	Chck	Appr	Date	
Date					REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA OAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(S/B)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-05 REV. 0



ITEM No.	T-07	T-08	Z-05	Z-06	MX-07	MX-08	MZ-04	PU-12A/B	PU-17
SERVICE	Coagulation/Flocculation Tank	No.3 Sedimentation Tank	Sludge Pit	Treated Water Pit	Coagulation Mixer	Flocculation Mixer	No.3 Sludge Rake	Sludge Feed Pump	T.W.Reuse Pump
SIZE(m)	1.4mWx2.8mLx6.1mH	5.8mIDx4.5mH	2.0mWx3.0mLx3.0mD	3.0mWx5.2mLx2.5mD	2.2kW,L=1.5m	2.2kW,L=1.5m	1.5kWx5.1m¢	2m³/hx15mHx2.2kW	60m³/hx30mHx15kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	Full Water	None .	None	None	1.0	1
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS+Epoxy/Rectangular	CS+Epoxy/Rectangular	RC/Open	RC/Open	SUS/Vertical	SUS/Vertical	CS+Epoxy/Center Drive	SCS/Centrl.Verti.	SCS/Centrl.Horiz.

JICA	Chck	Tech	Appr						
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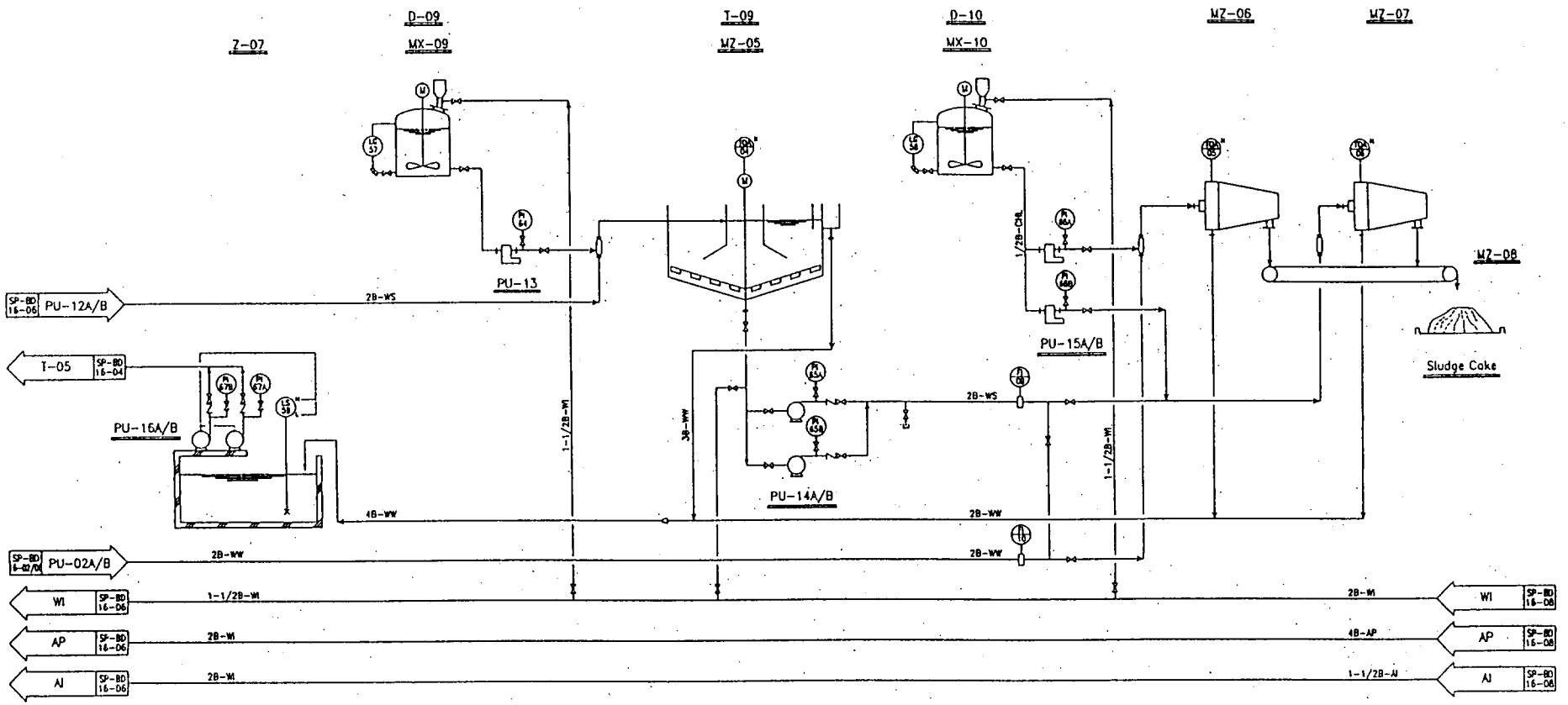
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev.	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(6/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-06 REV. 0



ITEM No.	PU-13	PU-14A/B	PU-15A/B	PU-16A/B	Z-07
SERVICE	Setting Aid Pump	Centrifuge Feed Pump	Filter Aid Pump	W.W.Return Pump	Wastewater Pit
SIZE(m)	0.1L/minx0.5MPaxO.4kW	1.5m³/hx15mHx3.7kW	3.0L/minx0.5MPaxO.75kW	5.0m³/hx15mHx0.75kW	3.0mWx6.0mLx3.0mH
DESIGN PRESS(MPa)	1.0	1.0	1.0	1.0	Full Water
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	SCS/Plunger	SCS/Horizontal	SCS/Plunger	SCS/Centri.Verti.	RC/Open Basin
ITEM No.	D-09	T-09	D-10	MZ-06	MZ-07
SERVICE	Settling Aid Drum	Sludge Thickener	Filter Aid Drum	No1.Centrifuge	No2.Centrifuge
SIZE(m)	0.7mlDx1.0mH	3.2mlDx3.0mH	1.2mlDx1.5mH	3.0m³/hx15kW	1.5m³/hx7.5kW
DESIGN PRESS(MPa)	Full Water	Full Water	Full Water	1.0	1.0
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS/Verti.	CS+Epoxy/C.Driven	CS/Verti.	SCS/Horizontal	SCS/Horizontal

MZ-08	MX-09	MZ-05	MX-10
Belt Conveyer	Setting Aid Mixer	No.4 Sludge Rake	Filter Aid Mixer
20kg/min,L=6m	0.75kW,L=0.8m	0.75kW	0.75kW,L=1.2m
None	None	None	None
Amb.	Amb.	Amb.	Amb.
CS/Horizontal	SUS/Verti.	CS+Epoxy/C.Drive	SUS/Verti.

JICA	Chck	Tech	Appr						
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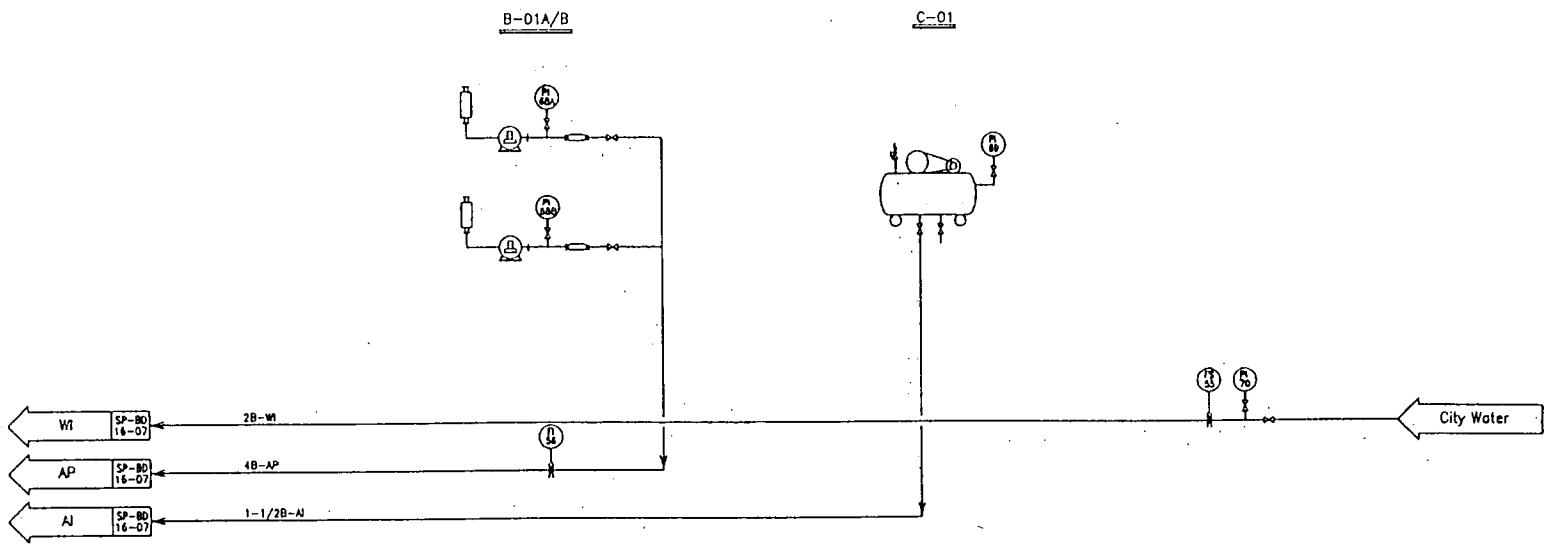
Date									
CNSL	Degn	Chck	Appr						
Sign				Rev	Description	Degn	Chck	Appr	Date
Date					REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(7/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-07 REV. 0



ITEM No.	B-01A/B	C-01
SERVICE	AP Blower	AI Compressor
SIZE(m)	5.5Nm³/minx2mHx15kW	0.3m³/minx0.7MPax1.5kW
DESIGN PRESS(MPa)	1	1
DESIGN TEMP.(C)	200	200
MATERIAL/TYPE	CI/Roots	CI/Rotary

JICA	Dhck	Tech	Appr						
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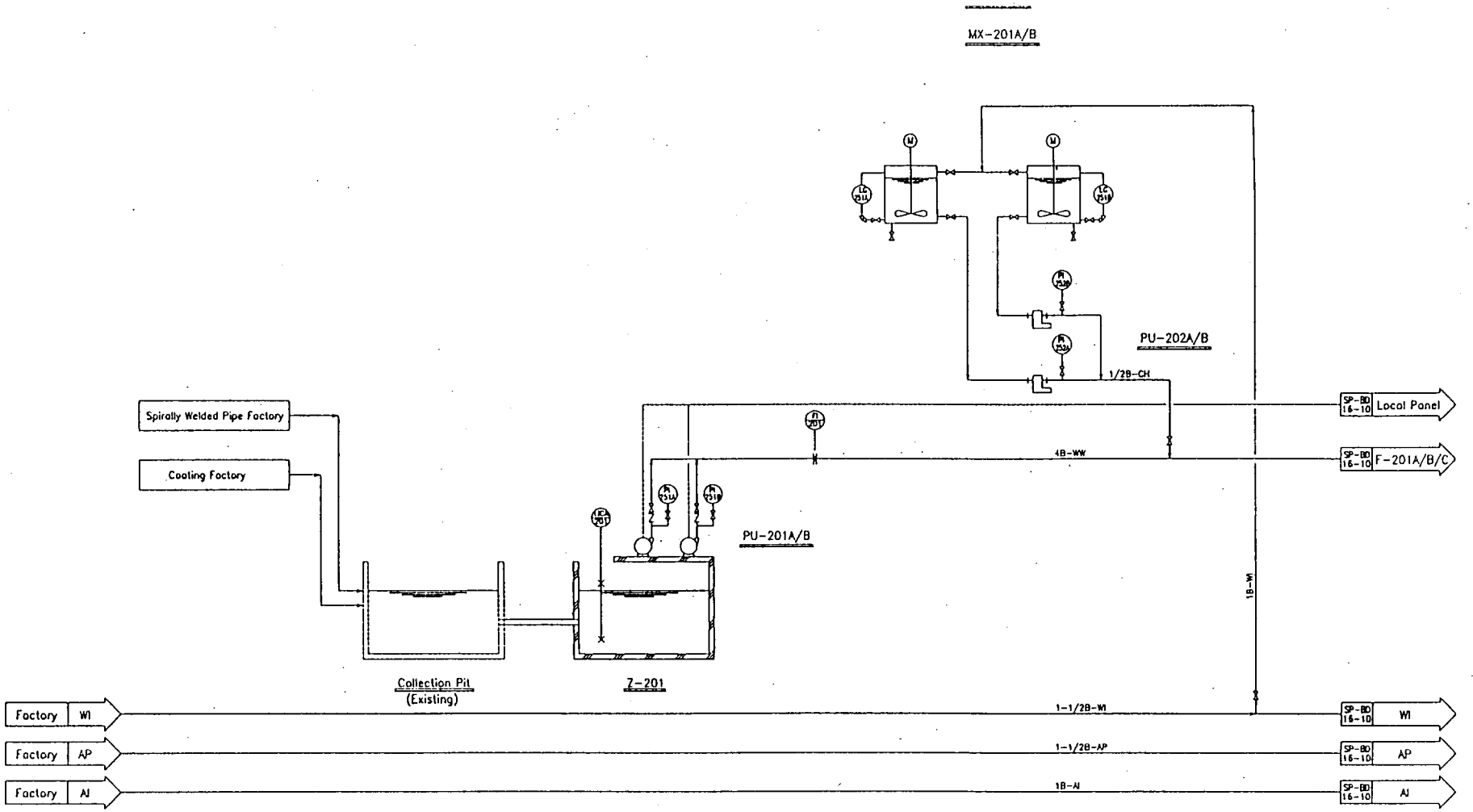
Date									
CHSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date					REVISION				

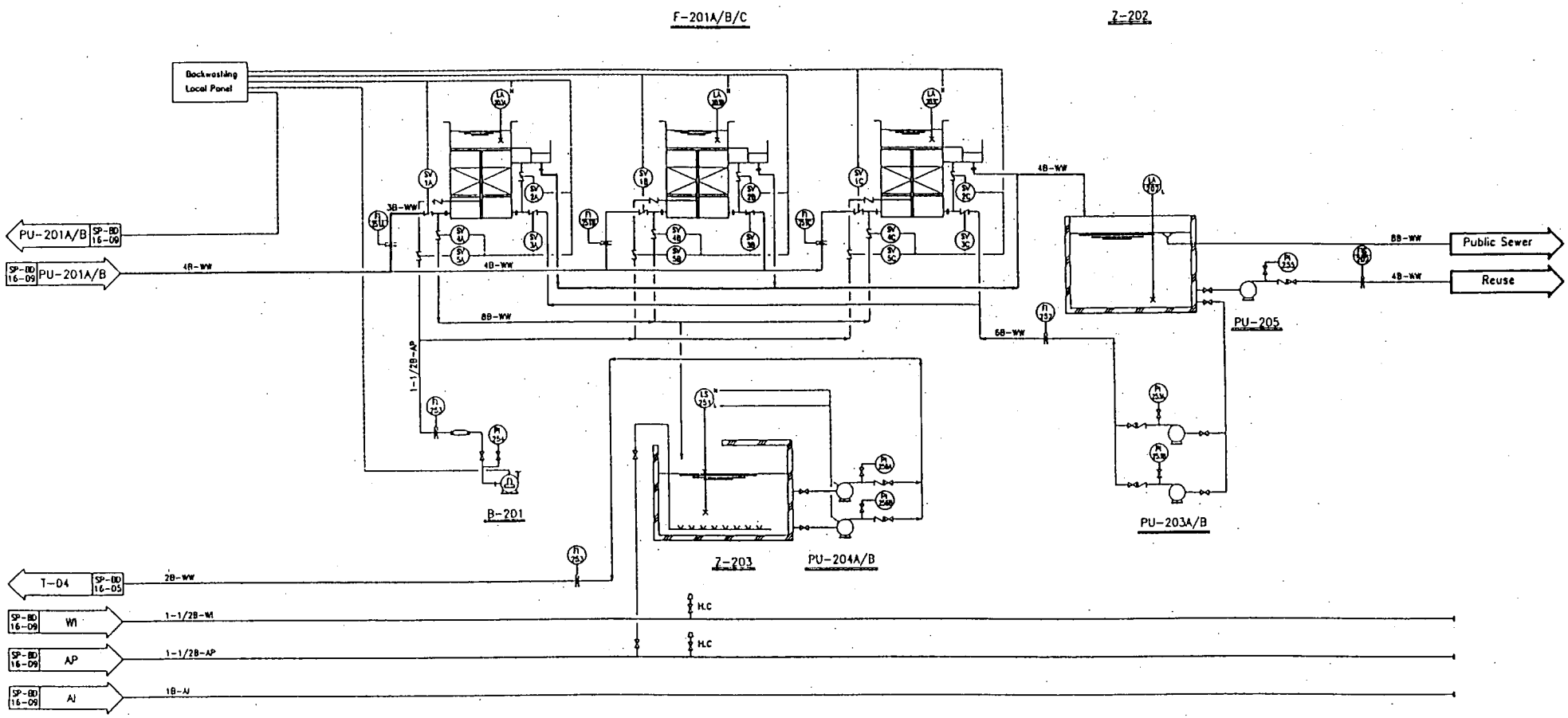
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DANES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL'NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.1 W.W.T. RECOMMENDABLE PLANT(8/8)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-08 REV. 0



ITEM No.	D-201A/B	MX-201A/B	PU-202A/B	Z-201	PU-201A/B
SERVICE	No.2 Coagulant Drum	No.2 Coagulant Mixer	No.2 Coagulant Pump	No.4 Wastewater Pit	No.4 Wastewater Pump
SIZE(m)	1.2mDx1.5mH	0.75kW,L=1.2m	0.5ℓ/minx0.5MPaxO.4kW	1.5mWx3.0mLx3.5mD	60m³/hr12mHx5.5kW
DESIGN PRESS(MPa)	Full Water	none	1	Full Water	1
DESIGN TEMP.(°C)	Amb.	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS+Hflt/Verti.	SUS/Verti.	SCS/Plunger	RC/Open Basin	SCS/Centri.Verti.

JICA	Chck	Tech	Appr						
Sign									
Date									
CNSL	Dsgn	Chck	Appr						
Sign				Rev	Description	Dsgn	Chck	Appr	Date
Date				REVISION					

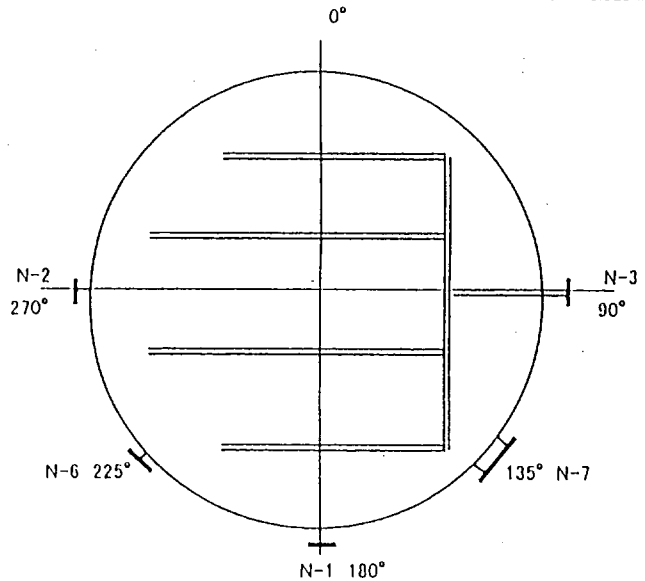
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.2 W.W.T. RECOMMENDABLE PLANT(1/2)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-09 REV. 0

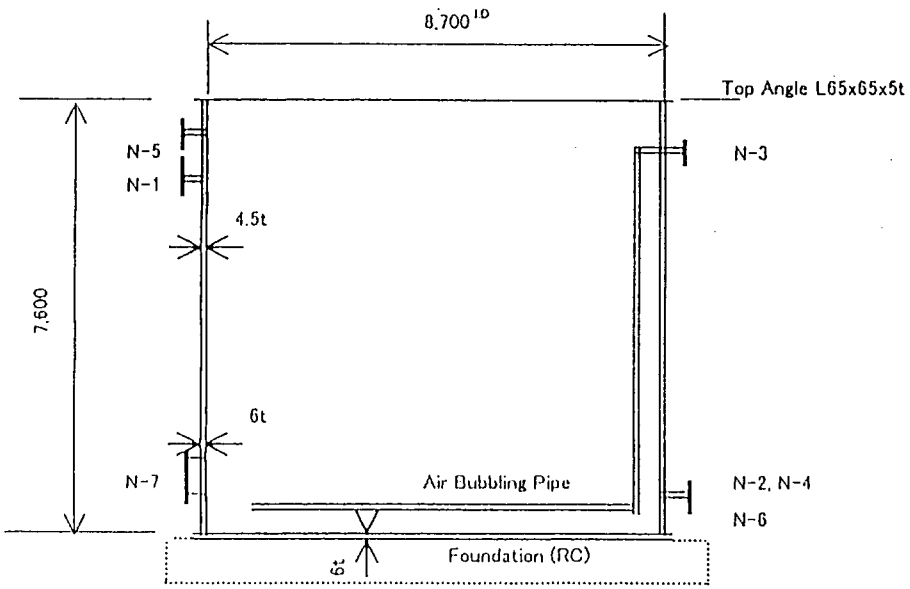


ITEM No.	F-201A/B/C	Z-202	B-201	Z-203	PU-204A/B	PU-203A/B	PU-205
SERVICE	Sand Filter	Filtered Water Pit	Backwashing Blower	Backwash W.W. Pit	Backwash W.W. Feed Pump	Backwashing Pump	Recovered Water Pump
SIZE(m)	2.1mDx4.5mH	3.0mWx5.0mLx3.0mD	3.0Nm³/minx5mHx5.5kW	3.0mWx5.0mLx3.0mH	5.0m³/hx40mHx1.5kW	155m³/hx12mHx11kW	60m³/hx30mHx11kW
DESIGN PRESS(MPa)	Full Water	Full Water	1	Full Water	1	1	1
DESIGN TEMP.(°C)	Amb.	Amb.	200	Amb.	Amb.	Amb.	Amb.
MATERIAL/TYPE	CS+Epoxy/Gravity	RC/Open	CI/Roof	RC/Open Basin	SCS/Centri.Horiz.	SCS/Centri.Horiz.	SCS/Centri.Horiz.

JICA	Check	Tech	Appr						
Sign									
Date									
CNSL	Degn	Check	Appr						
Sign				Rev	Description	Degn	Check	Appr	Date
Date				REVISION					

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY INDUSTRIAL DEVELOPMENT STUDY DIVISION
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES AND FITTINGS ENGINEERING FLOW DIAGRAM FOR No.2 W.W.T. RECOMMENDABLE PLANT(3/3)
ISSUED DATE	SCALE: None
DWG NO	SP-BD-16-10 REV. 0



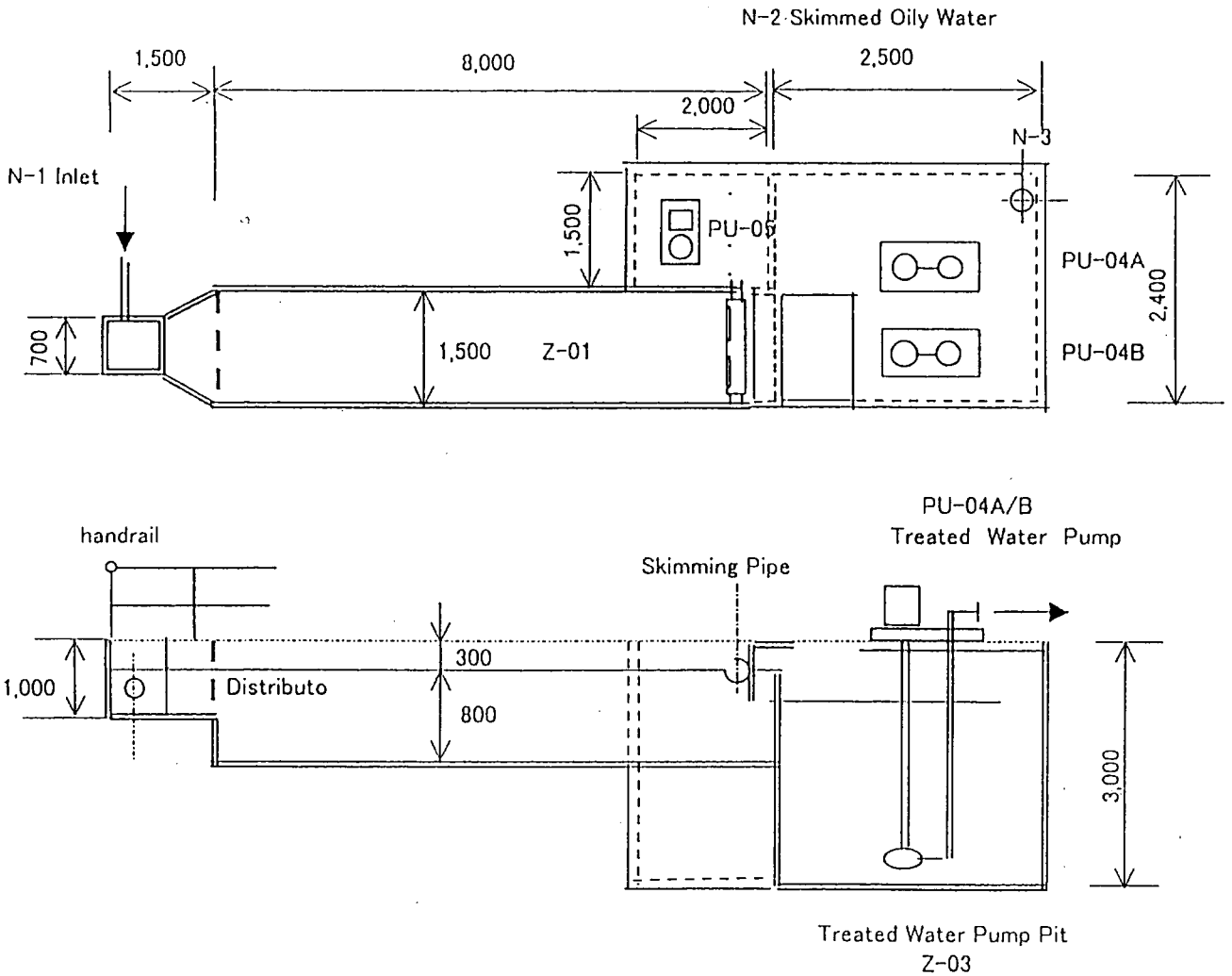


NOTE:
1)Type: Cylindrical Tank
(Open Top Tank)
2)Materials: Carbon Steel
inside Epoxy Coating
3)Accessories: Stairway
Inside Ladder
Air Bubbling
Tube

Loading Data
Weight Empty: 14.5ton
Full Water 450ton

No	Name	Size	No	Note
N-7	Manhole	500A	1	
N-6	Level Instrument	6B	1	
N-5	Over Flow	8B	1	
N-4	Drain	4B	1	
N-3	Bubbling Air Inlet	2B	1	
N-2	Raw Water Outlet	6B	2	
N-1	Raw Water inlet	6B	1	

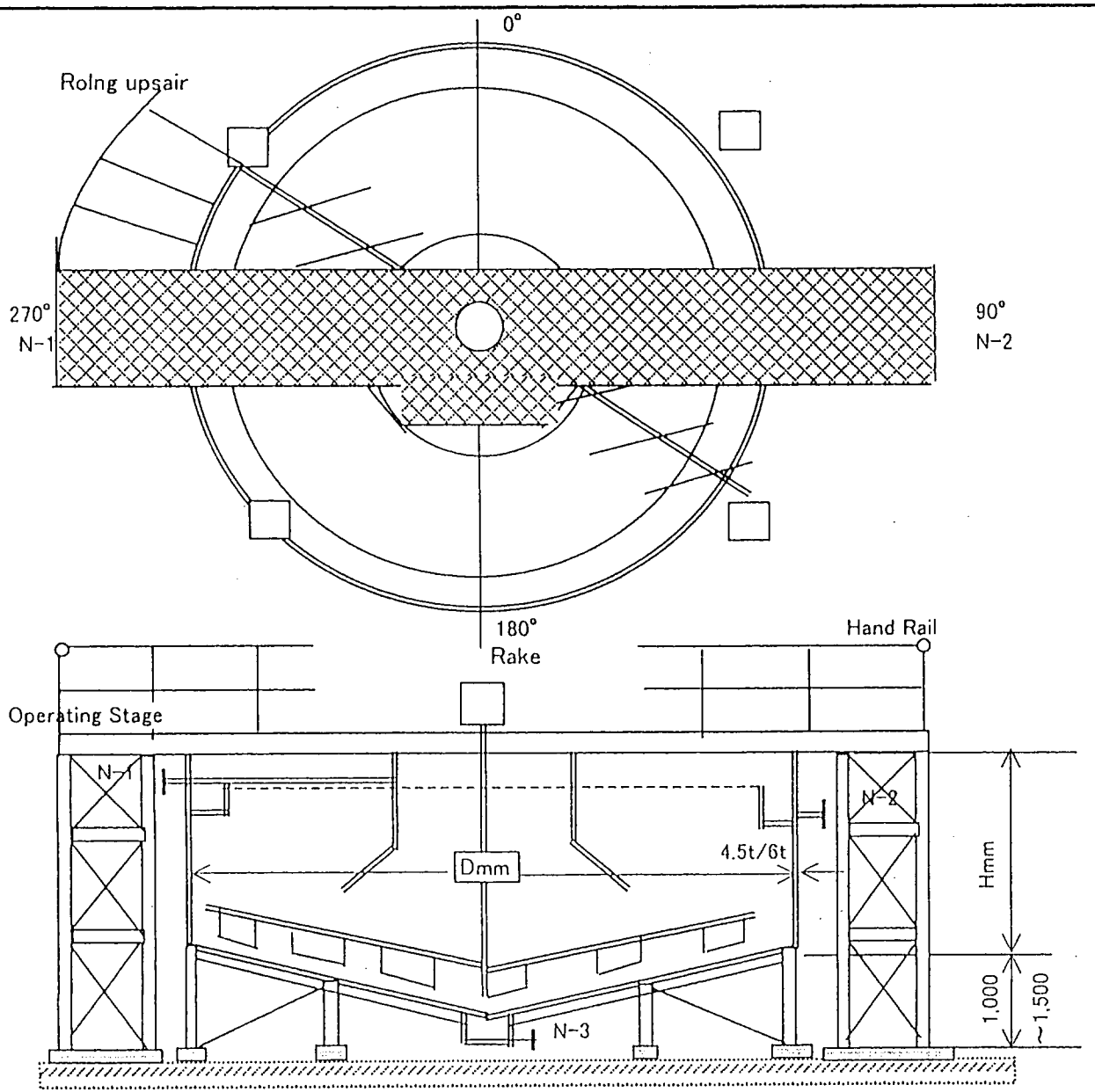
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR Co. for STEEL PIPES & FITTINGS 450 m^3 EQUALIZATION TANK (T-5) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 22 - SK01 REV.0



NOTE:
Material: Reinforced Concrete
Accessories: Skimming Pipe
Hand rail, Inside Ladder
Option: Flight Scraper (Surface, Bottom)

Nozzle No	Name	Size	No	Note
N-3	Level Instrument	6B	1	
N-2	Skimmed Oily	6B	1	
	Water Outlet			
N-1	Raw Water inlet	6B	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR STEEL PIPES & FITTINGS OIL SEPARATOR (Z-01/03/04) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 51 - SK01 REV.0

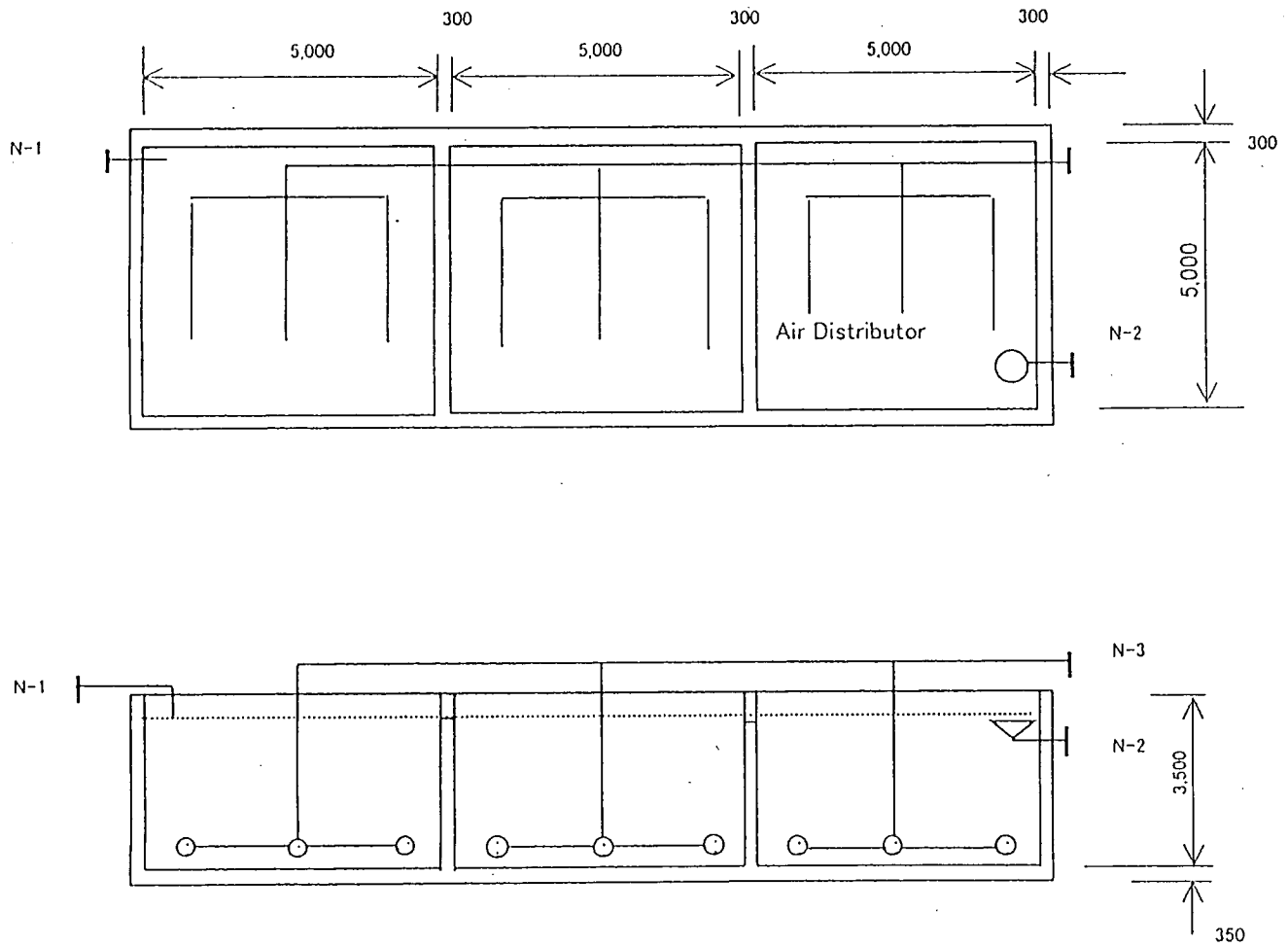


Materials: Carbon Steel/Epoxy coating
Accessories: Sludge Collection Rake
Operating Stage
Stairway

T-02: No.1 Sedimentation Tank
D=5,811 H=3,000
T-06: No.2 Sedimentation Tank
D=9,688 H=4,000
T-08: No.3 Sedimentation Tank
D=5,811 H=3,000

Nozzle No	Name	Size	No	Note
N-3	Sludge Outlet	6B	1	
N-2	Treated Water Outle	6B	1	
N-1	Raw Water inlet	6B	1	

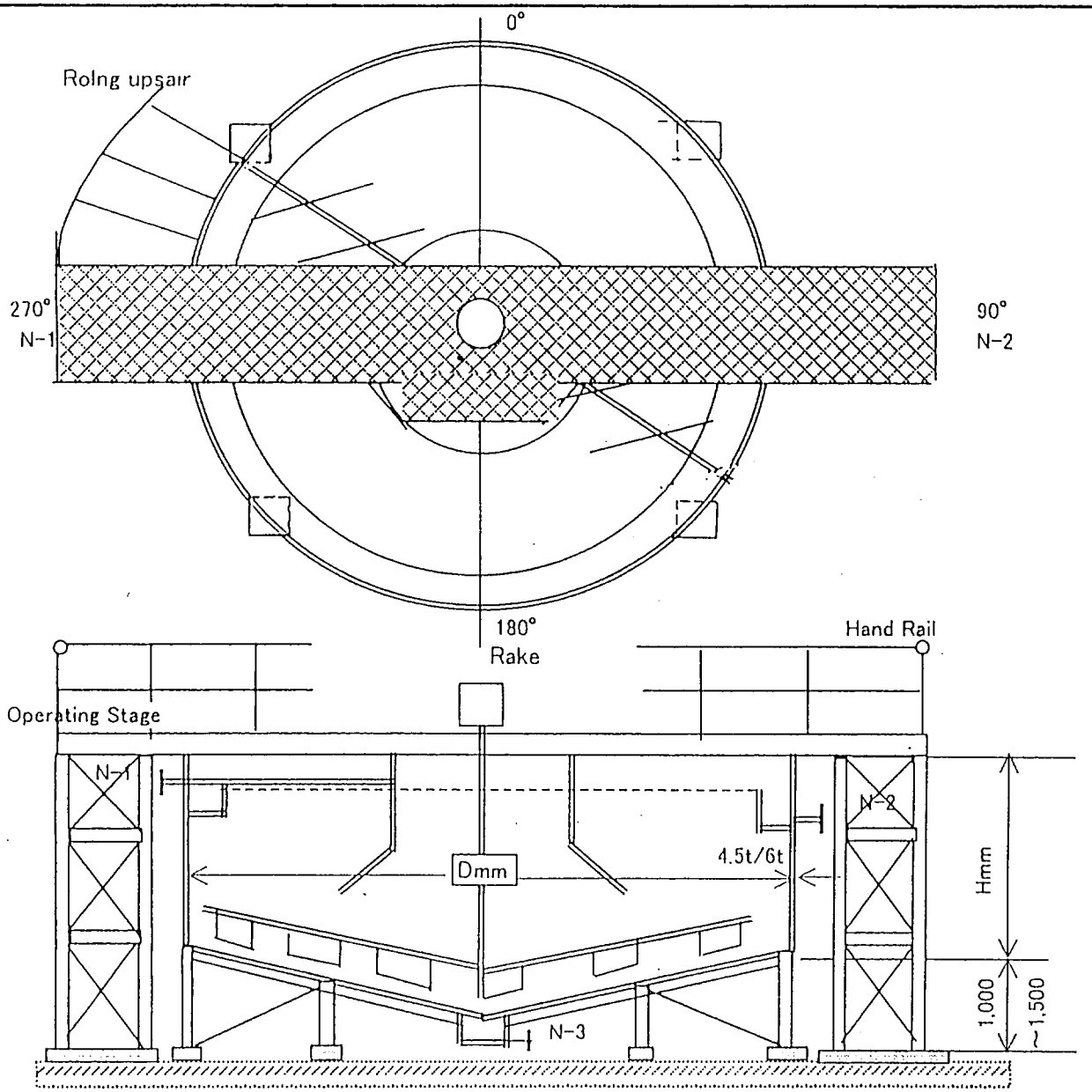
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR STEEL PIPES & FITTINGS OIL SEPARATOR (Z-01) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 22 - SK02 REV.0



Materials: Reinforced Concrete
Accessories: Operating Stage
Stairway
Air Distributig pipings

Nozzle No	Name	Size	No	Note
N-3	Air Inlet	3B	1	
N-2	T. Water Outlet	6B	1	
N-1	Inlet	6B	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR CO. FOR STEEL PIPES & FITTINGS AERATION BASIN (Z-04) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 51 - SK02 REV.0

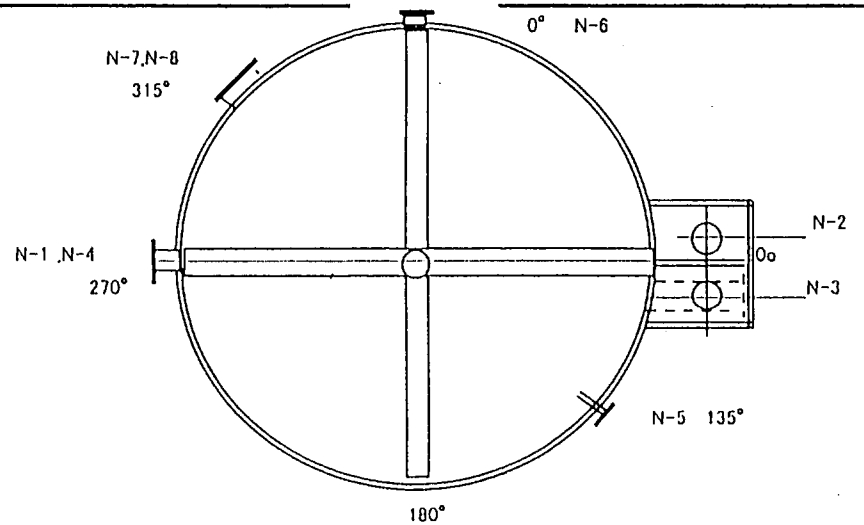


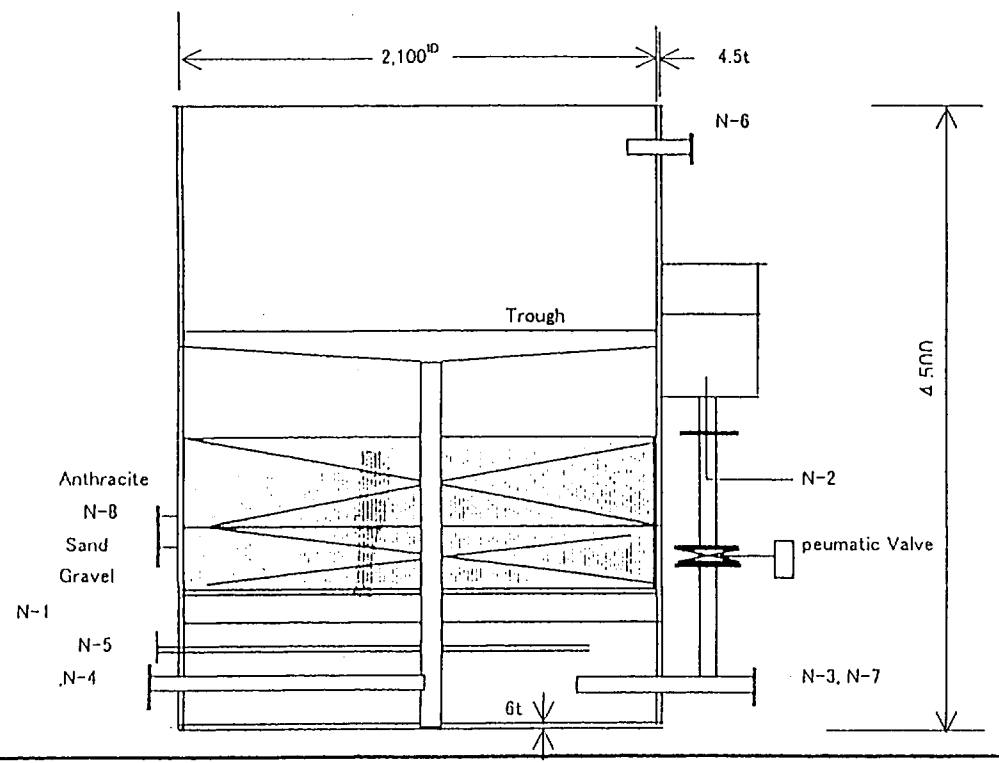
Materials: Carbon Steel/Epoxy coating
Accessories: Sludge Collection Rake
Operating Stage
Stairway

T-02: No.1 Sedimentation Tank
D=5,811 H=3,000
T-06: No.2 Sedimentation Tank
D=9,688 H=4,000
T-08: No.3 Sedimentation Tank
D=5,811 H=3,000

Nozzle No	Name	Size	No	Note
N-1	Raw Water inlet	6B	1	
N-2	Treated Water Outle	6B	1	
N-3	Sludge Outlet	6B	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR CO. FOR STEEL PIPES & FITTINGS SEDIMENTATION TANK (T-02/06/08) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 22 - SK02 REV.0





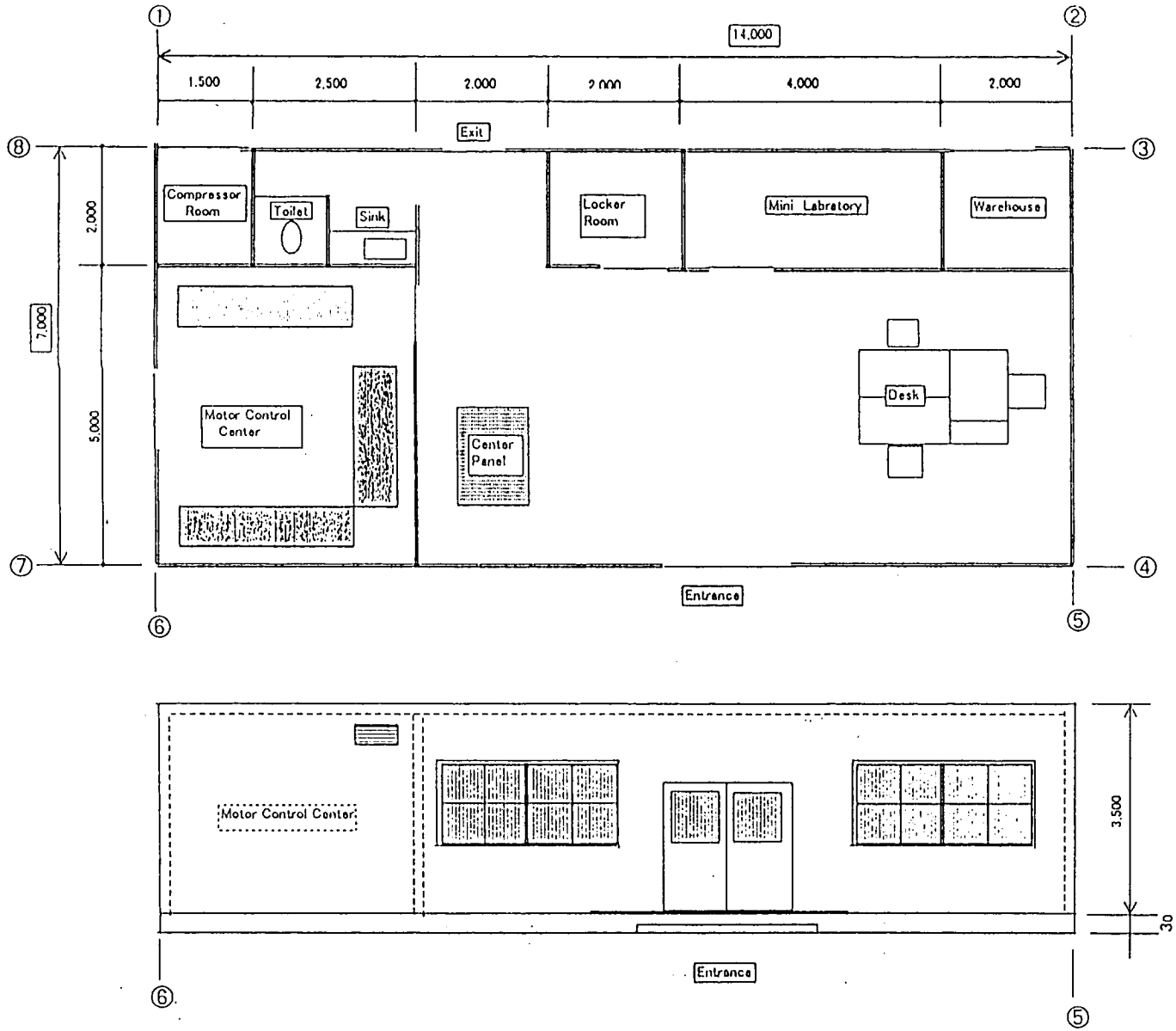
Material: Carbon steel/Epoxy Coating

Filter Media: Anthracite + Sand/Gravel

Accessories: Operating Stage
Ladder

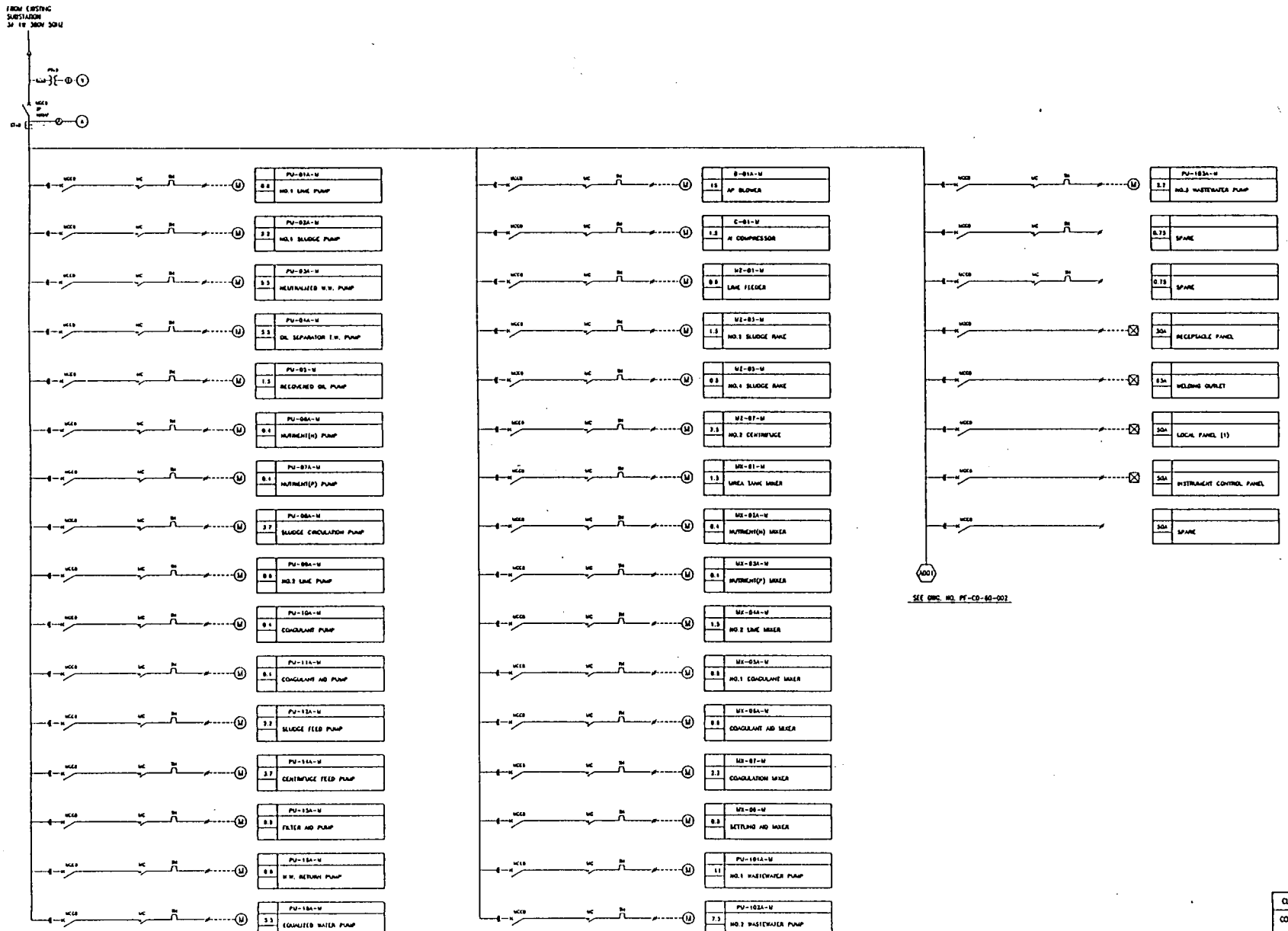
No	Name	Size	No	Note
N-8	Handhole	200A	1	
N-7	Manhole	500A	1	
N-6	Over Flow	6B	1	
N-5	Air Inlet	4B	1	
N-4	B.W.Water Outlet	8B	1	
N-3	B. Water Inlet	8B	1	
N-2	F.Water Outlet	4B	1	
N-1	C.Water Inlet	4B	1	

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
TYTLE	FOR: EL NASR CO. FOR STEEL PIPES & FITTINGS SAND FILTER (F-01A/B/C) WASTEWATER TREATMENT PLANT
DWG. NO	SP - BD - 22 - SK03 REV.0



C/S	Dsgn	Chck	Appr						
Rev				Rev	Description	Dsgn	Chck	Appr	Date
Date					description				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT	CHIYODA DAMES & MOORE CO. CHIYODA CORPORATION
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR Nominated Factory W.W.T Cotrol Room
ISSUED	SCALE: None
DWG	00-BD-56-01 REV: 0



Rev. No	Description	Dsgn.	Chck.	Appr.	Date

REVISION

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT	CHIYODA CHEMES AND MOORE CO. CHIYODA CORP.
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES & FITTINGS NO.1 WWT SINGLE LINE DIAGRAM 380V MOTOR CONTROL BOARD (1/2)
ISSUED DATE	SCALE: NONE
DWG NO.	PF-CO-60-001 REV. 0

JICA	Chck	Chck	Appr
Sign			
Date			

Consult	Dsgn	Chck	Appr.
Sign			
Date			

SEE DWG NO PF-CD-60-001
3φ 4W 380V 50Hz

(40B1)

0.8	PU-010-M	NO.1 LIME PUMP	
2.2	PU-020-M	NO.1 SLUDGE PUMP	
3.3	PU-030-M	NEUTRALIZED W.W. PUMP	
3.5	PU-040-M	OIL SEPARATOR T.P. PUMP	
0.4	PU-050-M	NUTRIENT(N) PUMP	
0.4	PU-070-M	NUTRIENT(P) PUMP	
3.7	PU-080-M	SLUDGE CIRCULATION PUMP	
0.8	PU-090-M	NO.2 LIME PUMP	
0.4	PU-100-M	COAGULANT PUMP	
0.4	PU-110-M	COAGULANT AID PUMP	
2.2	PU-120-M	SLUDGE FEED PUMP	
0.4	PU-13-M	SETTLING AID PUMP	
3.7	PU-140-M	CENTRIFUGE FEED PUMP	
0.8	PU-150-M	FILTER AID PUMP	
0.8	PU-160-M	W.W. RETURN PUMP	
15	PU-17-M	T.W. RETURN PUMP	

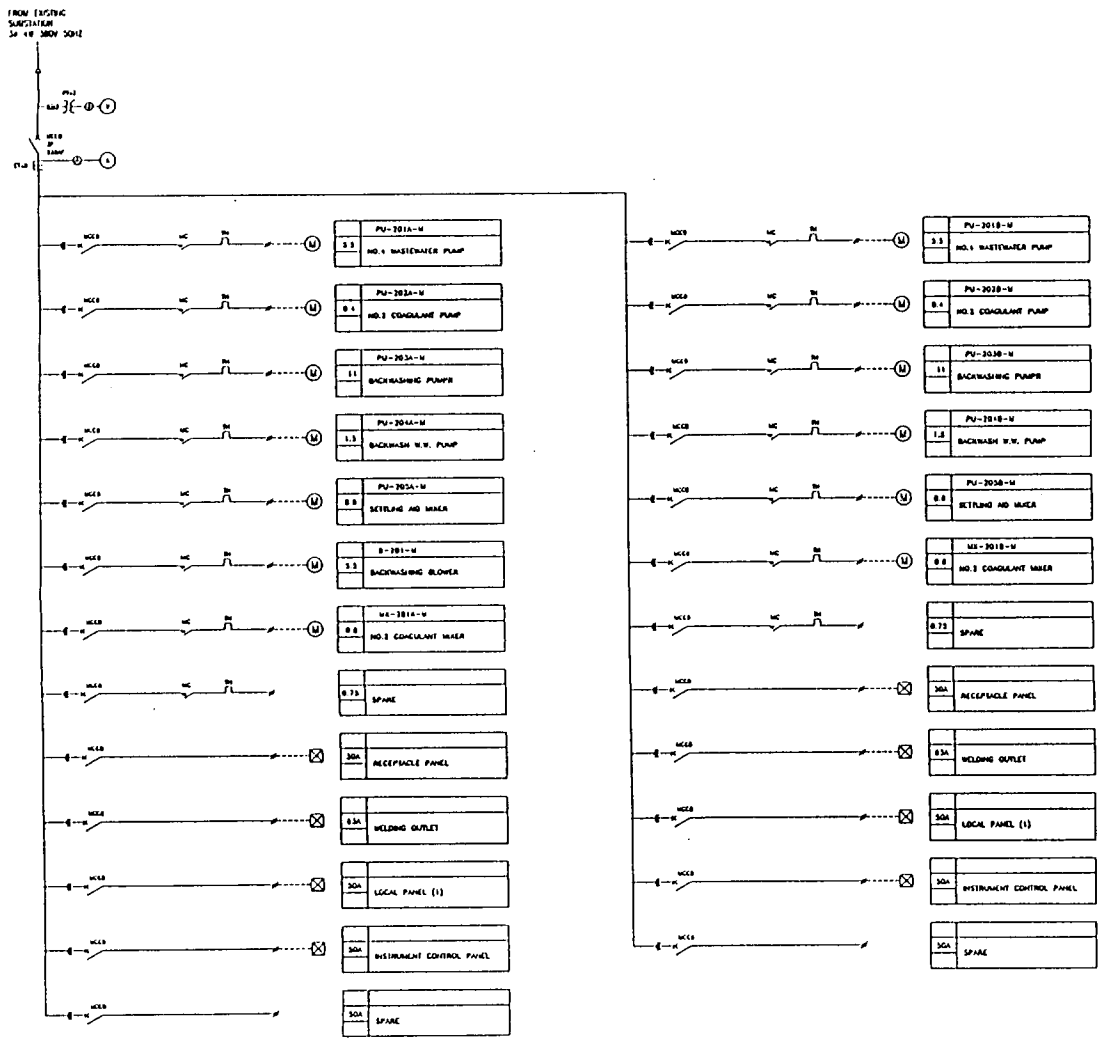
3.5	PU-180-M	EQUALIZED WATER PUMP	
15	B-010-M	AP BLOWER	
1.5	MI-02-M	NO.1 SLUDGE RAKE	
1.5	MI-04-M	NO.2 SLUDGE RAKE	
15	MI-06-M	NO.1 CENTRIFUGE	
0.8	MI-08-M	BELT CONVEYER	
0.4	MX-020-M	NUTRIENT(N) MIXER	
0.4	MX-030-M	NUTRIENT(P) MIXER	
1.5	MX-010-M	NO.2 LIME MIXER	
0.8	MX-050-M	NO.1 COAGULANT MIXER	
0.8	MX-060-M	COAGULANT AID MIXER	
2.2	MX-08-M	FLOCCULATION MIXER	
0.5	MX-10-M	FILTER AID MIXER	
11	PU-1010-M	NO.1 WASTEWATER PUMP	
7.5	PU-1020-M	NO.2 WASTEWATER PUMP	
3.7	PU-1030-M	NO.3 WASTEWATER PUMP	

0.4	MI-101-M	BELT OIL SKIMMER	
0.75		SPARE	
0.75		SPARE	
30A		LIGHTING PANEL	
63A		WELDING OUTLET	
30A		LOCAL PANEL (1)	
30A		INSTRUMENT DIST. PANEL	
30A		SPARE	

Rev.No	Description	Dsgn.	Chck.	Appr.	Date
	REVISION				

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT	CHIYODA DAMES AND MOORE CO. CHIYODA CORP.
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES & FITTINGS NO.1 WWT SINGLE LINE DIAGRAM 380V MOTOR CONTROL BOARD (2/2)
ISSUED DATE	
DWG NO.	PF-CD-60-002
SCALE	NONE
REV.	0

JICA	Chck	Chck	Appr.
Sign			
Date			
Consul.	Dsgn	Chck	Appr.
Sign			
Date			



BD-42

Rev. No.	Description	Dsgn.	Chck.	App.	Date

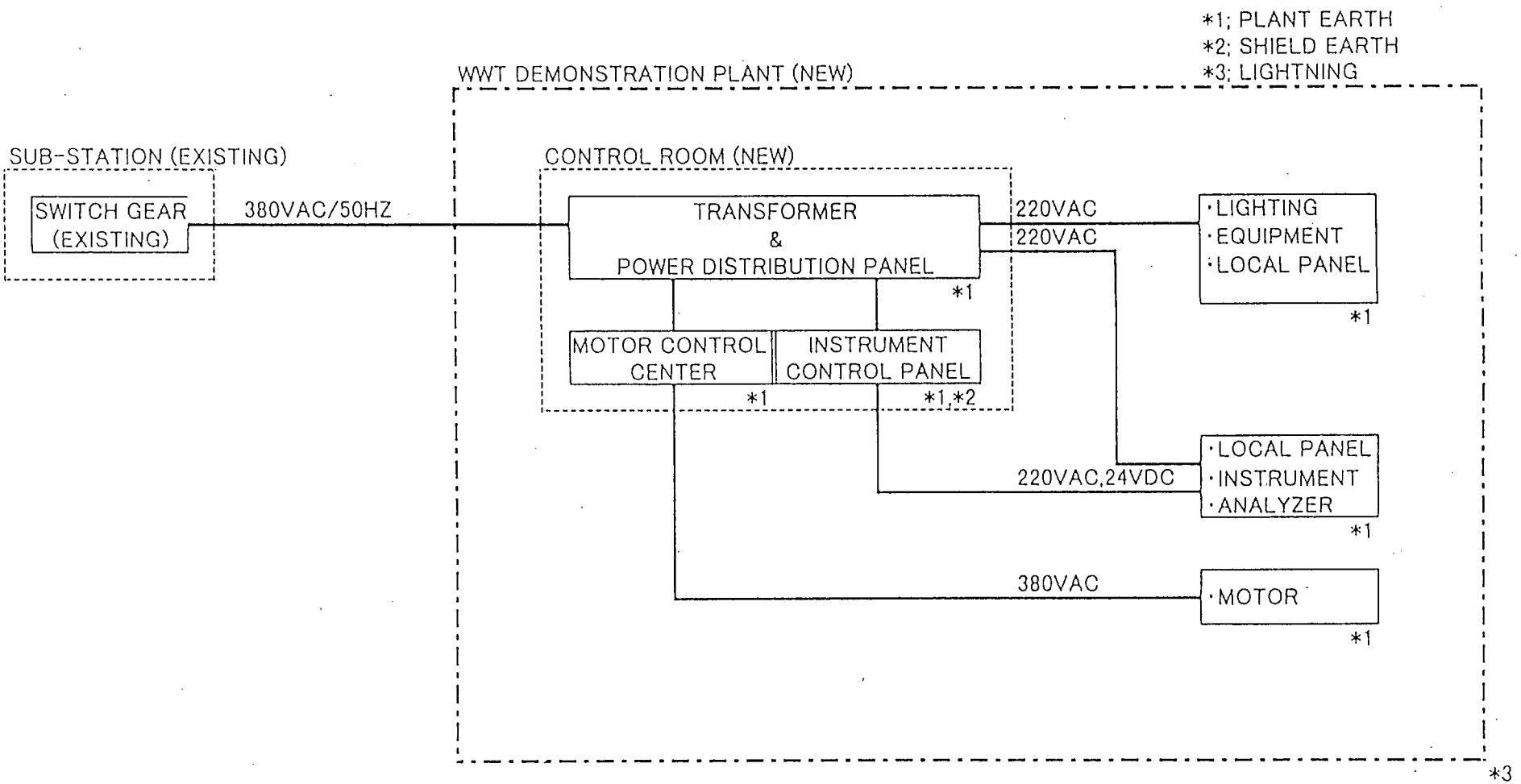
REVISION

CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT	CHIYODA DAMES AND MOORE CO. CHIYODA CORP.
PROJECT	THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT
TITLE	FOR EL NASR CO. FOR STEEL PIPES & FITTINGS NO.2 UNIT SINGLE LINE DIAGRAM 380V MOTOR CONTROL BOARD
ISSUED DATE	SCALE: NONE
DWG NO.	PF-CO-60-003 REV. 0

JGA	Chck	Chck	App
Sign			
Date			
Consul.	Dsgn	Chck	App.
Sign			
Date			

AF003

CONFIGURATION OF ELECTRICAL & INSTRUMENTATION SYSTEM FOR DEMONSTRATION PLANT



EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(1/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. :Industrial Wastewater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
T-01	Neutralization Tank	1	Rectangular	Carbon Steel/Resin
			2.6mWx5.2mLx3.0mH	Lining
T-02	No.1 Sedimentation Tank	1	Circular	Carbon Steel/Resin
			5.8mIDx3.0mH	Lining
T-03	Neutralized W.W. Tank	1	Rectangular	Carbon Steel/Resin
			2.5mWx3.2mLx3.0mH	Lining
T-04	Skimmed Oil Tank	1	Cone Roof Tank	Carbon Steel
			3.4mIDx6.1mH	
T-05	Equalization Tank	1	Open Top Tank	Carbon Steel/Epoxy
			8.71mIDx7.6mH	Coating
T-06	No.2 Sedimentation Tank	1	Circular	Carbon Steel/Epoxy
			9.67mIDx4.0mH	Coating
T-07	Coagulation/Flocculation	1	Rectangular	Carbon Steel/Epoxy
	Tank		1.4mWx2.8mLx6.1mH	Coating
T-08	No.3 Sedimentation Tank	1	Circular	Carbon Steel/Epoxy
			5.8mIDx4.5mH	Coating
T-09	Sludge Thickener	1	Circular	Carbon Steel/Epoxy
			3.2mIDx3.0mH	Coating
D-01	Lime Hopper	1	Cylindrical, Vrtical	Carbon Steel
			1.3mIDx1.5mH	
D-02	No.1 Lime Drum	1	Cylindrical, Vertical	Carbon Steel
			1.5mIDx1.5mH	
D-03	Lime Receiver	1	Cylindrical, Horizontal	Carbon Steel
			1.4mIDx1.5mH	
D-04A/B	Nutrient(N) Drum	2	Cylindrical, Vertical	Carbon Steel
			0.7mIDx1.5mH	
D-05A/B	Nutrient(P) Drum	2	Cylindrical, Vertical	C.S + H.R. Lining
			0.7mIDx1.5mH	
D-06A/B	No.2 Lime Drum	2	Cylindrical, Vertical	Carbon Steel
			1.4mIDx1.8mH	
D-07A/B	No.1 Coagulant Drum	2	Cylindrical, Vertical	C.S.+H.R.Lining
			1.2mIDx1.8mH	

NOTE:

EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(2/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. : Industrial Wastewater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
D-08A/B	Coagulant Aid Drum	2	Cylindrical, Vertical	Carbon Steel
			1.2mIDx1.5mH	
D-09	Settling Aid Drum	1	Cylindrical, Vertical	Carbon Steel
			0.7mIDx1.0mH	
D-10	Filtered Aid Drum	1	Cylindrical, Vertical	Carbon Steel
			1.2mIDx1.5mH	
D-201A/B	NO.2 Coagulant Drum	2	Cylindrical, Vertical	C.S.+H.R.Lining
			1.2mIDx1.5mH	
Z-101	No.1 Wastewater Pit	1	Open Basin/Underground	R.C. (out of Battery)
			4.0mWx5.0mLx3.5mH	
Z-102	No.2 Wastewater Pit	1	Open Basin/Underground	R.C. (out of Battery)
			3.0mWx5.0mLx3.0mH	
Z-103	No.3 Wastewater Pit	1	Open Basin/Underground	R.C. (out of Battery)
			2.0mWx3.0mLx3.5mH	
Z-01	Oil Separator	1	API Standard/underground	R.C.
			1.5mWx1.0mDx8.0mL	
Z-02	Oil Separator T.W. Pit	1	Open Basin/Underground	R.C.
			2.4mWx2.5mLx3.0mD	
Z-03	Skimmed Oil Pit	1	Closed Basin/Underground	R.C.
			1.5mWx2.0mLx3.0mD	
Z-04	Aeration Basin	1	Rectangular/Aboveground	R.C.
			5.0mWx15.0mLx3.5mH	with Air Bubbling
Z-05	Sludge Pit	1	Rectagular/Underground	R.C.
			2.0mWx3.0mLx3.0mD	
Z-06	Treated Water Pit	1	Rectangular/Aboveground	R.C.
			3.0mWx5.2mLx2.5mH	
Z-07	Wastewater Pit	1	Rectangular/Underground	R.C.
			3.0mWx6.0mLx3.0mH	
Z-201	No.4 Wastewater Pit	1	Open Basin/Underground	R.C.
			1.5mWx3.0mLx3.5mH	
Z-202	Filtered Water Pit	1	Rectangular/Aboveground	R.C.
			3.0mWx5.0mLx3.0mH	

NOTE:

EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(3/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. : Industrial Wasterwater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
Z-203	Backwash W.W. Pit	1	Rectangular/Underground	R.C.
			3.0mWx5.0mLx3.0mH	
PU-101A/B	No.1 Wastewater Pump	2	Centri. Vertical ,L=3.5m	SCS
			$48m^3$/hx30mHx11kW	Outside of Battery
PU-102A/B	NO.2 Wastewater Pump	2	Centri. Vertical ,L=3m	SCS
			$36m^3$/hx25mHx7.5kW	Outside of Battery
PU-103A/B	NO.4 Wastewater Pump	2	Centri. Vertical ,L=3m	SCS
			$12m^3$/hx25mHx2.2kW	Outside of Battery
PU-01A/B	No.1 Lime Pump	2	Centri. Horizontal	CI
			10L/minx0.5MPax0.75kW	
PU-02A/B	No.1 Sludge Pump	2	Centri. Horizontal	SCS
			$4m^3$/hx30mHx2.2kW	
PU-03A/B	Neutralized W.W. Pump	2	Centri. Horizontal	SCS
			$48m^3$/hx18mHx5.5kW	
PU-04A/B	Oil Separator T.W. Pump	2	Centri. Vertical	SCS
			$36m^3$/hx18mHx5.5kW	
PU-05	Recovered Oil Pump	1	Centri. Vertical	CI
			$15m^3$/hx15mHx2.2kW	
PU-06A/B	Nutrient(N) Pump	2	Recipro. Plunger	SCS
			0.1L/minx0.5MPax0.4kW	
PU-07A/B	Nutrient(P) Pump	2	Recipro. Plunger	SCS
			0.1L/minx0.5MPax0.4kW	
PU-08A/B	Sludge Circulation Pump	2	Centri. Horizontal	SCS
			$36m^3$/hx12mHx3.7kW	
PU-09A/B	No.2 Lime Pump	2	Recipro. Diaphragm	Teflon/SCS
			0.6L/minx0.5MPax0.75kW	
PU-10A/B	Coagulant Pump	2	Recipro. Plunger	SCS
			0.3L/minx0.5MPax0.4kW	
PU-11A/B	Coagulant Aid Pump	2	Recipro. Plunger	SCS
			0.3L/minx0.5MPax0.4kW	
PU-12A/B	Sludge Feed Pump	2	Centri. Vertical	SCS
			$2m^3$/hx15mHx2.2kW	

NOTE:

EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(4/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. :Industrial Wastewater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
PU-13	Settling Aid Pump	1	Recipro. Plunger	SCS
			0.1L/minx0.5MPax0.4kW	
PU-14A/B	Centrifuge Feed Pump	2	Centri. Horizontal	SCS
			1.5m^3/hx15mHx3.7kW	
PU-15A/B	Filter Aid Pump	2	Recipro. Plunger	SCS
			3L/minx0.5MPax0.75kW	
PU-16A/B	W.W.Return Pump	2	Centri. Vertical	SCS
			5m^3/hx15mHx0.75kW	
PU-17	T.W. Reuse Pump	1	Centri.Horizontal	SCS
			60m^3/hx30mHx15kW	
PU-18A/B	Equalized Water Pump	2	Centri.Horizontal	SCS
			80m^3/hx10mHx5.5kW	
PU-201A/B	No.4 Wastewater Pump	2	Centri. Vertical ,L=3m	CI
			60m^3/hx12mHx5.5kW	Coating Factory
PU-202A/B	No.2 Coagulant Pump	2	Recipro.	SCS
			0.5L/min. x0.5MPax0.4kW	Coating Factory
PU-203A/B	Backwashing Pump	2	Centri. Horizontal	CI
			155m^3/hx12mHx11kW	Coating Factory
PU-204A/B	Backwash W.W.Feed Pump	2	Centri. Horizontal	CI
			5m^3/hx40mHx1.5kW	Coating Factory
PU-205	Recovered Water Pump	1	Centri. Horizontal,L=3m	CI
			60m^3/hx30mHx11kW	Coating Factory
B-01A/B	AP Blower	2	Root	CI
			9.5Nm^3/minx7mHx15kW	
B-201	Backwashing Blower	2	Root	CI
			3.0Nm^3/minx5mHx5.5kW	
C-01	AI Compressor	2	Baby Compressor	CI, with Air Tank
			0.3m^3/minx0.7MPax1.5kW	
MZ-101	Belt Oil Skimmer	1	Vertical	SUS
			0.4kWx0.7MPax0.75kW	
MZ-01	Lime Feeder	1	Disc	CS
			30kg/hx0.75kW	

NOTE:

EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(5/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. : Industrial Wasterwater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
MZ-02	No. 1 Sludge Rake	1	Center Driven	CS+Epoxy Coating
			1.5kW	
MZ-03	No. 2 Sludge Rake	1	Center Driven	CS+Epoxy Coating
			1.5kW	
MZ-04	No. 3 Sludge Rake	1	Center Driven	CS+Epoxy Coating
			1.5kW	
MZ-05	No. 4 Sludge Rake	1	Center Driven	CS+Epoxy Coating
			0.75kW	
MZ-06	No. 1 Centrifuge	1	Horizontal	SCS
			$3m^3$/hx15kWx3,000rpm	
MZ-07	No. 2 Centrifuge	1	Horizontal	SCS
			$1.5m^3$/hx7.5kWx3,000rpm	
MZ-08	Belt Conveyer	1	Horizontal	CS+Rubber
			20kg/minx0.75kW	
MX-01	No. 1 Lime Mixer	1	Vertical	SUS
			1.5kW, L=1.2m	
MX-02A/B	Nutrient(N) Mixer	2	Vertical	SUS
			0.4kW, L=1.0m	
MX-03A/B	Nutrient(P) Mixer	2	Vertical	SUS
			0.4kW, L=1.0m	
MX-04A/B	No. 2 Lime Mixer	2	Vertical	SUS
			1.5kW, L=1.2m	
MX-05A/B	No. 1 Coagulant Mixer	2	Vertical	SUS
			0.75kW, L=1.2m	
MX-06A/B	Coagulant Aid Mixer	2	Vertical	SUS
			0.75kW, L=1.0m	
MX-07	Coagulation Mixer	1	Vertical	SUS
			2.2kW, L=1.5m	
MX-08	Flocculation Mixer	1	Vertical	SUS
			2.2kW, L=1.5m	
MX-09	Settling Aid Mixer	1	Vertical	SUS
			0.75kW, L=0.8m	

NOTE:

EQUIPMENT LIST for El Nasr Co. for Steel Pipes & Fittings

Doc. No. SP-BD-L-01-(6/6)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Ind. W. W. Pollution Control

PLANT :W.W.T. Recommendation Plant

WASTE W. : Industrial Wastewater/Sanitary W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Equipment NO.	Service	No. Req'd	Type of Equipment	Remarks
MX-10	Filter Aid Mixer	1	Vertical	SUS
			0.75kW, L=1.2m	
MX-201A/B	No.2 Coagulant Mixer	2	Vertical	SUS
			0.75kW, L=1.2m	
F-201ABC	Sand Filter	3	Vertical, Cylindrical, Open	CS+Epoxy coating
			$25m^3/h$, 2.1mIDx4.5mH	Anthracite + Sand

NOTE:

INSTRUMENT LIST for EL. NASR Co. for STEEL PIPES and FITTINGS

Doc. No. SP-BD-L2-(1/4)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Contro

PLANT :W.W.T. DEMONSTRATION PLANT

WASTE W. Process Water & Sanitary/Domestic Water

REV	1	2	3	MADE	
BY				CHKD	
APVE				APVE	
DATE				DATE	

Instrument NO.	Service	No. Req'd	Type of Instrument	Remarks
AR-01	pH Analyzer	1	Electrode, inline	Inlet of T-01
			pH 1-10	C.P.
AR-02	pH Analyzer	1	Electrode	Surface T-01
			pH 1-10	C.P.
AR-03	pH Analyzer	1	Electrode	Outlet T-02
			pH 1-10	C.P.
AR-04	DO Analyzer	1	Electrode	Z-04
			0-15mg/L as O_2	C.P.
AR-05	pH Analyzer	1	Electrode	Outlet T-07
			pH 4-9	C.P.
FR-01	Flow Recorder	1	Orifice, 4B	Outlet of PU-04
			0-60m^3/h, WW	C.P.
FR-02	Flow Recorder	1	Orifice, 3B	Outlet of PU-05
			0-45m^3/h, WW	C.P.
FR-03	Flow Recorder	1	Orifice, 1-1/2B	Outlet of PU-204
			0-5m^3/h, WW	C.P.
FIC-04	Flow Conroller	1	Electro-magnetic, 6B	Outlet of PU-08
			0-60m^3/h, WS	C.P.
FIC-05	Flow Conroller	1	Orifice, 3B	Inlet of Z-04
			0-10Nm^3/min, AP	C.P.
FRC-06	Flow Recorder/Controller	1	Orifice, 6B	Inlet of T-07
			0-90m^3/h, WW	C.P.
FRC-07	Flow Recorder/Controller	1	Electro-magnetic, 2B	Outlet of PU-12
			0-5m^3/h, WS	C.P.
FRS-08	Flow Integrated Indicator	1	Orifice, 6B	Outlet of PU-17
			0-90m^3/h, WW	C.P.
			0-1,000,000m^3/c	

NOTE: C.P. =Centter Panel Mount

INSTRUMENT LIST for EL. NASR Co. for STEEL PIPES and FITTINGS

Doc. No. SP-BD-L2-(2/4)
CLIENT :Japan International Cooperation Agency
PROJECT :The Study on Industrial W. W. Pollution Contro
PLANT :W.W.T. DEMONSTRATION PLANT
WASTE W. Process Water & Sanitary/Domestic Water

REV	1	2	3	MADE	
BY				CHKD	
APVE				APVE	
DATE				DATE	

Instrument NO.	Service	No. Req'd	Type of Instrument	Remarks
FI-09	Flow Indicator	1	Orifice, 4B	Inlet of MZ-061
			5m^3/h, WS	Center Panel Mount
FI-10	Flow Indicator	1	Electro-magnetic, 2B	Inlet of MZ-07
			5m^3/h, WS	C.P.
FIC-51	Flow Controller	1	Orifice, 1B	Inlet of D-02
			3m^3/h, WI	
FRC-52	Flow Controller	1	Electro-magnetic, 2B	Inlet of T-01
			1m^3/h, 10% Lime	
FI-53	Flow Indicator	1	Orifice, 1-1/2B	Inlet of T-01
			5Nm^3/min, AP	
FI-54	Flow Indicator	1	Orifice, 1-1/2B	Inlet of T-05
			10N/min, AP	
FS-55	Flow Integrator	1	Rotor Type for WD supply	Intake of WD
			2B,	
FI-56	Flow Indicator	1	Orifice, 4B	Outlet of B-01
			10N/min, AP	
FI-151	Flow Indicator	1	Orifice, 4B	Outlet of PU-101
			60m^3/h, WW	
FI-152	Flow Indicator	1	Orifice, 3B	Outlet of PU-102
			45m^3/h, WW	
FI-201	Flow Indicator	1	Orifice, 4B	Outlet of PU-201
			90m^3/h, WW	L.P.
FIS-202	Flow Integrator	1	Orifice, WW	Outlet of PU-205
			90m^3/h, WW	L.P.
FI-251A-C	Flow Inficator	3	Orifice, WW	Inlet of F-201ABC
			50m^3/h, 3B	
FI-252	Flow Indicator	1	Orifice, WW	Outlet of PU-203
			180m^3/h, 8B	
FI-253	Flow Indicator	1	Orifice, WW	Outlet of PU-204
			5m3/h, WS	

NOTE: C.P. =Center Panel Mount
L.P. =Local Panel Mount

INSTRUMENT LIST for EL. NASR Co. for STEEL PIPES and FITTINGS

Doc. No. SP-BD-L2-(3/4)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Contro

PLANT :W.W.T. DEMONSTRATION PLANT

WASTE W. Process Water & Sanitary/Domestic Water

REV	1	2	3	MADE	
BY				CHKD	
APVE				APVE	
DATE				DATE	

Instrument NO.	Service	No. Req'd	Type of Instrument	Remarks
LA-01	Level Alarm	1	Float	T-03
			H-L	C.P.
LA-02	Level Alarm	1	Float	Z-02
			H-L	C.P.
LIA-03	Level Indicator/Alarm	1	Displacer	T-04
			H-Alarm	C.P.
LIA-04	Level Indicator/Alarm	1	Displacer	T-05
			H-Alarm	C.P.
LIA-05	Level Indicator/Alarm	1	Displacer	Z-05
			H-L Alarm	C.P.
LICA-201	Level Controller/Alarm	1	Float	Z-201
			H-L Alarm	L.P.
LA-202	Level Alarm	1	Float	Z-202
			L-Alarm	L.P.
LA-203ABC	Level Alarm	3	Electrode	F-201ABC
			H-Alarm	L.P.
LI-51	Level Indicator	1	Lime Pouder	D-01
LS-52	Level Switch	1	Lime 10% Milk	D-02
LS-53	Level Switch	1	Lime Pouder	D-03
LS-54	Level Switch	1	Float, WW, H-L	T-03
LS-55	Level Switch	1	Float, WW, H-L	Z-02
LS-56	Level Switch	1	Float, WW, H-L	Z-03
LS-57	Level Switch	1	Float, WW, H-L	Z-05
LS-58	Level Switch	1	Float, WW, H-L	Z-06
LS-59	Level Switch	1	Float, WW, H-L	Z-07
LS-151	Level Switch	1	Float, WW, H-L	Z-101
LS-152	Level Switch	1	Float, WW, H-L	Z-102
LS-251	Level Switch	1	Float, WW, H-L	Z-203

NOTE: C.P. =Center Panel Mount

L.P. =Local Panel Mount

INSTRUMENT LIST for EL. NASR Co. for STEEL PIPES and FITTINGS

Doc. No. SP-BD-L2-(4/4)

CLIENT :Japan International Cooperation Agency

PROJECT :The Study on Industrial W. W. Pollution Contro

PLANT :W.W.T. DEMONSTRATION PLANT

WASTE W. Process Water & Sanitary/Domestic Water

REV	1	2	3	MADE	
BY				CHKD	
APVE				APVE	
DATE				DATE	

Instrument NO.	Service	No. Req'd	Type of Instrument	Remarks
LG-51	Level Gage	1	Tubular, L=1.5m	D-03
LG-52AB	Level Gage	2	Tubular, L=1.5m	D-04AB
LG-53AB	Level Gage	2	Tubular, L=1.5m	D-05AB
LG-54AB	Level Gage	2	Tubular, L=1.8m	D-06AB
LG-55AB	Level Gage	2	Tubular, L=1.8m	D-07AB
LG-56AB	Level Gage	2	Tubular, L=1.8m	D-08AB
LG-57	Level Gage	1	Tubular, L=1.0m	D-09
LG-58	Level Gage	1	Tubular, L=1.5m	D-10
LG-251AB	Level Gage	2	Tubular, L=1.5m	D-201AB
TQA-1	Torque Alarm	1	Limit Switch, kg-m	T-02
TQA-2	Torque Alarm	1	Limit Switch, kg-m	T-06
TQA-3	Torque Alarm	1	Limit Switch, kg-m	T-08
TQA-4	Torque Alarm	1	Limit Switch, kg-m	T-09
TQA-5	Torque Alarm	1	Limit Switch, kg-m	MZ-06
TQA-6	Torque Alarm	1	Limit Switch, kg-m	MZ-07
PI	For Lime milk and Sludge		Diaphragm Type	
	Pumps			
PI	Others		Buldon Tube Type	

NOTE: C.P.=Center Panel Mount

L.P.=Local Panel Mount

INDUCTION MOTOR LIST

DOC. NO. : SP-BD-60-L1-(1/3)

CLIENT : Japan International Cooperation Agency

PROJECT : The Study on Industrial Waste Water Plant

PLANT : El Nasr Co. for Steel Pipes & Fittings

WASTE W. : Industrial W.W./Sanitary·Domestic W.W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Motor No.	Service	No. Required	Type	Output Estimate	Output Final	Speed Chrst	Revolution	Pole / r.p.m	V-Φ-Hz	Time Rating	Starting Currrent	Starting Torque	Insulation	Enclose	Cable	Mounting	Drive	Bearing	Acc.	Location	Color Finish	Remarks
PU-01-A/B-M	No.1 Lime Pump	2	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-02A/B-M	No.1 Sludge Pump	2	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-03A/B-M	Neutralized W.W. Pump	2	SC	5.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-04A/B-M	Oil Separator T.W. Pump	2	SC	5.5		C	CW	4 / 1500	380-3-50	C				TEFC		V	D			OD		
PU-05-M	Recovered Oil Pump	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		V	D			OD		
PU-06A/B-M	Nutrient(N) Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-07A/B-M	Nutrient(P) Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-08A/B-M	Sludge Circulation Pump	2	SC	3.7		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-09A/B-M	No.2 Lime Pump	2	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-10A/B-M	Coagulant Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-11A/B-M	Coagulant Aid Pump	2	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-12A/B-M	Sludge Feed Pump	2	SC	2.2		C	CW	4 / 1500	380-3-50	C				TEFC		V	D			OD		
PU-13-M	Settling Aid Pump	1	SC	0.4		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-14A/B-M	Centrifuge Feed Pump	2	SC	3.7		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-15A/B-M	Filter Aid Pump	2	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
PU-16A/B-M	W.W. Return Pump	2	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		V	D			OD		
PU-17-M	T.W. Return Pump	1	SC	15		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
PU-18A/B-M	Equalized Water Pump	2	SC	5.5		C	CW	4 / 1500	380-3-50	C				TEFC		H	D			OD		
B-01A/B-M	AP Blower	2	SC	15		C	CW	4 / 1500	380-3-50	C				TEFC		H	B			OD		
C-01-M	AI Compressor	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		B	B			ID		
MZ-01-M	Lime Feeder	1	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		H	G			OD		
MZ-02-M	No.1 Sludge Rake	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MZ-03-M	No.2 Sludge Rake	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MZ-04-M	No.3 Sludge Rake	1	SC	1.5		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MZ-05-M	No.4 Sludge Rake	1	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		V	G			OD		
MZ-06-M	No.1 Centrifuge	1	SC	15		C	CW	2 / 3000	380-3-50	C				TEFC		H	D			OD		
MZ-07-M	No.2 Centrifuge	1	SC	7.5		C	CW	2 / 3000	380-3-50	C				TEFC		H	D			OD		
MZ-08-M	Belt Conveyor	1	SC	0.8		C	CW	4 / 1500	380-3-50	C				TEFC		H	B			OD		

Notes:

1. Type : SC = Squirrel Cage. W = Wound Rotor.
2. Speed : C = Constant. M = Multi. A = Adjustable. V = Varying.
3. Revolution Direction : Direction when viewed from coupling side.
   CW = Clockwise. CCW = Counter-Clockwise.
4. Voltage : Rated Voltage
5. Time Rating : C = Continuouse. ST = Short Time. P = Periodic.
6. Enclosure : TEFC = Totally-Enclosed Fan-Cooled.
   DR = Drip-Proof.
7. Cable(or Wire) : T = Top. B = Bottom. S = Side. H = Hub for conduit tube or flexible tube.
8. Mounting : H = Horizontal. V = Vertical
9. Drive : D = Direct. B = Belt. C = Chain. G = Gear.
10. Location : ID = Indoor. OD = Outdoor.

INDUCTION MOTOR LIST

DOC. NO. : SP-BD-60-L1-(2/3)
CLIENT : Japan International Cooperation Agency
PROJECT : The Study on Industrial Waste Water Plant
PLANT : El Nasr Co. for Steel Pipes & Fittings
WASTE W. : Industrial W.W./Sanitary·Domestic W.W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

Motor No.	Service	No. Required	Type	Output Estimate	Output Final	Speed Chrst	Revolution	Pole / r.p.m	V-Φ-Hz	Time Rating	Starting Currrent	Starting Torque	Insulation	Enclosu.	Cable	Mounting	Drive	Bearing	Acc.	Location	Color Finish	Remarks
MX-01-M	Urea Tank Mixer	1	SC	1.5		C	CW	4 1500	380-3-50	C				TEFC		V	G			OD		
MX-02A/B-M	Nutrient(N) Mixer	2	SC	0.4		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-03A/B-M	Nutrient(P) Pump	2	SC	0.4		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-04A/B-M	NO.2 Lime Mixer	2	SC	1.5		C	CW	4 1500	380-3-50	C				TEFC		V	G			OD		
MX-05A/B-M	No.1 Coagulant Mixer	2	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-06A/B-M	Coagulant Aid Mixer	2	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-07-M	Coagulation Mixer	1	SC	2.2		C	CW	4 1500	380-3-50	C				TEFC		V	G			OD		
MX-08-M	Flocculation Mixer	1	SC	2.2		C	CW	4 1500	380-3-50	C				TEFC		V	G			OD		
MX-09-M	Settling Aid Mixer	1	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-10-M	Filter Aid Mixer	1	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
PU-101A/B-M	No.1 Wastewater Pump	2	SC	11		C	CW	2 3000	380-3-50	C				TEFC		V	D			OD		
PU-102A/B-M	No.2 Wastewater Pump	2	SC	7.5		C	CW	2 3000	380-3-50	C				TEFC		V	D			OD		
PU-103A/B-M	No.3 Wastewater Pump	2	SC	2.2		C	CW	4 1500	380-3-50	C				TEFC		V	D			OD		
MZ-101-M	Belt Oil Skimmer	1	SC	0.4		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		

Notes:
1. Type : SC = Squirrel Cage. W = Wound Rotor.
2. Speed : C = Constant. M = Multi. A = Adjustable. V = Varying.
3. Revolution Direction : Direction when viewed from coupling side.
   CW = Clockwise. CCW = Counter-Clockwise.
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6. Enclosure : TEFC = Totally-Enclosed Fan-Cooled.
   DR = Drip-Proof.
7. Cable(or Wire) : T = Top. B = Bottom. S = Side. H = Hub for conduit tube or flexible tube.
8. Mounting : H = Horizontal. V = Vertical
9. Drive : D = Direct. B = Belt. C = Chain. G = Gear.
10. Location : ID = Indoor. OD = Outdoor.

INDUCTION MOTOR LIST

DOC. NO. :SP-BD-GO-L1-(3/3)
CLIENT :Japan International Cooperation Agency
PROJECT :The Study on Industrial Waste Water Plant
PLANT :El Nasr Co. for Steel Pipes & Fittings
WASTE W. :Industrial W.W./Sanitary·Domestic W.W.

REV	1	2	3	MADE	
BY				CKD	
APVE				APVE	
DATE				DATE	

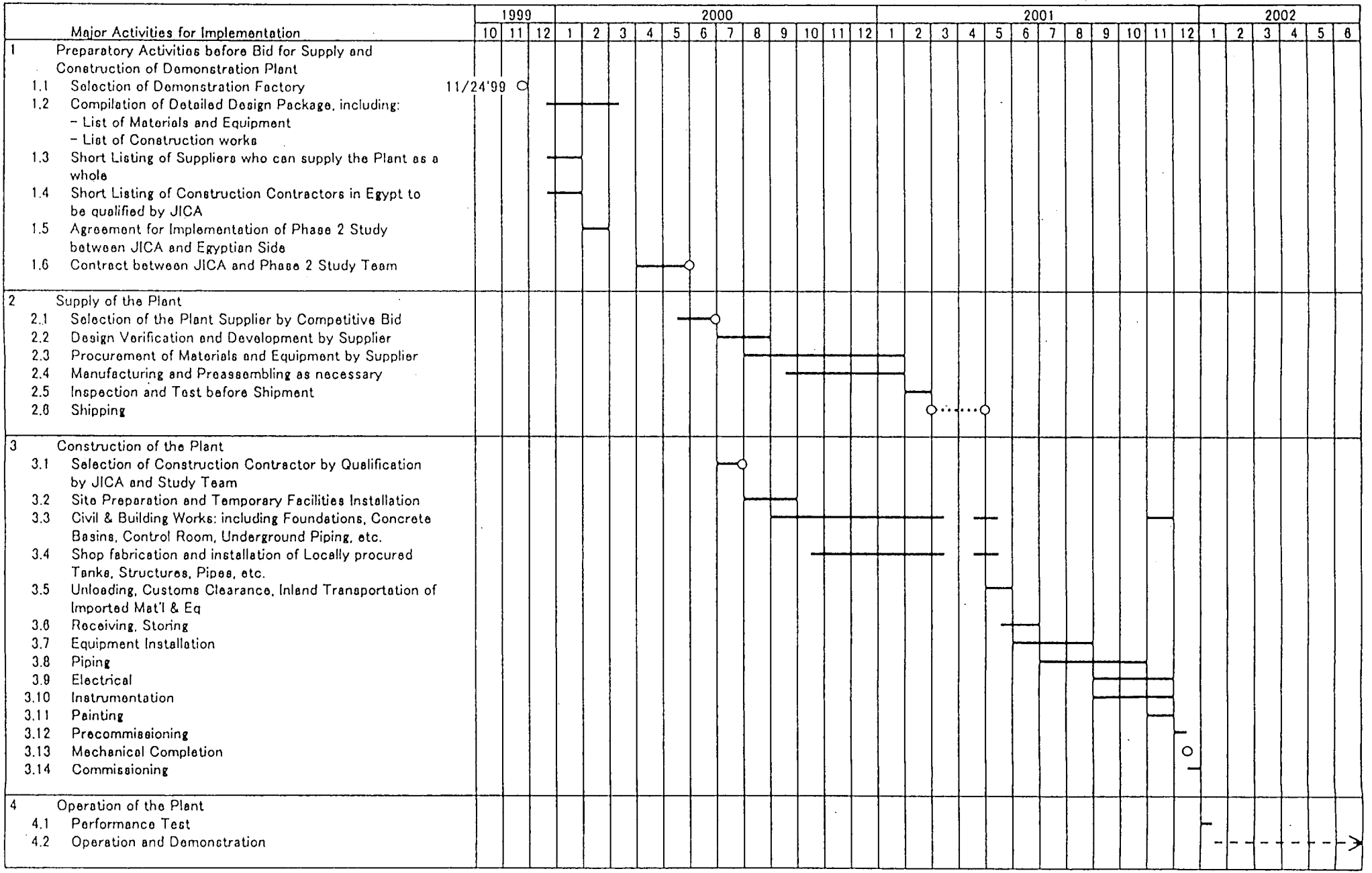
Motor No.	Service	No. Requirod	Type	Output Estimate	Output Final	Speed Chrst	Revolution	Pole / r.p.m	V-Φ-Hz	Time Rating	Starting Currrent	Starting Torque	Insulation	Enclose	Cable	Mounting	Drive	Bearing	Acc.	Location	Color Finish	Remarks
PU-201A/B-M	No.4 Wastewater Pump	2	SC	5.5		C	CW	4 1500	380-3-50	C				TEFC		V	D			OD		
PU-202A/B-M	No.2 Coagulant Pump	2	SC	0.4		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
PU-203A/B-M	Backwashing Pumpr	2	SC	11		C	CW	4 1500	380-3-50	C				TEFC		H	D			OD		
PU-204A/B-M	Backwash W.W. Pump	2	SC	1.5		C	CW	2 3000	380-3-50	C				TEFC		H	D			OD		
PU-205A/B-M	Sottling Aid Mixor	1	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	D			OD		
B-201-M	Backwashing Blower	1	SC	5.5		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		
MX-201A/B-M	No.2 Coagulant Mixor	2	SC	0.8		C	CW	4 1500	380-3-50	C				TEFC		H	G			OD		

Notes:
1. Type : SC = Squirrel Cage. W = Wound Rotor.
2. Speed : C = Constant. M = Multi. A = Adjustable. V = Varying.
3. Revolution Direction : Direction when viewed from coupling side.
   CW = Clockwise. CCW = Counter-Clockwise.
4. Voltage : Rated Voltage
5. Time Rating : C = Continuouse. ST = Short Time. P = Periodic.
6. Enclosure : TEFC = Totally-Enclosed Fan-Cooled.
   DR = Drip-Proof.
7. Cable(or Wire) : T = Top. B = Bottom. S = Side. H = Hub for conduit tube or floxible tube.
8. Mounting : H = Horizontal. V = Vertical
9. Drive : D = Direct. B = Belt. C = Chain. G = Gear.
10. Location : ID = Indoor. OD = Outdoor.

Phase 1 Study

Overall Schedule for Implementation of Demonstration Plant (Preliminary)

Dec. 11, 1999



ESTIMATION COST FOR EL NASR CO. for STEEL PIPES FITTINGS

		Yen Portion [¥1000]	LE Portion [LE]	Total
1	Direct Cost			
	1.1. Equipment & Materials			
	(1)Machinary	98,100		
	(2)Piping Materials	10,500		
	(3)Electrical Equipment & Materials	26,000		
	(4)Instrument & Materials	34,000		
	(5)Mini. Labo. Analizer & Others	4,700		
	1. 1 Sub-total	173,300	0	
	1.2. Field Work Cost			
	(1) Steel Tank & Drum		967,000	
	(2) Equipment Installation		142,000	
	(3) Piping		842,000	
	(4) Civil Work (Foundation, Pit, Pave)		1,494,000	
	(5) Building, Shelter, Steel Structure		541,000	
	(6) Lining, Coating, Painting		537,000	
	(7) Electrical, Instrumentation		498,000	
	(8) Commissioning/ Test		50,000	
	1. 2 Sub-Toatal	0	5,071,000	
2	Indirect Cost			
	(1) Export Packing, Ocean Transport	18,100		
	(2) Import Duty, Inland Transport*1		1,407,353	
	(3) Temporary Facilities*2		304,260	
	(4) Sub-contractor Expense*3		1,267,750	
	(5) Insurance, Social Tax*4		369,354	
	(6) Supervisor Expense	10,000		
	2. Sub-Total	28,100	3,348,717	
3	(1 + 2) Total	201,400	8,419,717	
	(1 + 2) Total [¥1000]	201,400	286,270	487,670
	[LE]	5,923,529	8,419,717	14,343,246

Note: Above cost includes outside battery except utilities supply.

*1: {(1.1Sub-total) + 2(1)} x 25%

*2: (1.2) x 6%

*3: (1.2) x 25%

*4:[[1.1)+(1.2)]+[2(1)+2(2)+2(3)+2(4)]] x 2.7%

Unit Cost for Estimation of W.W.T. Demonstration Plant (Reference)

Factory Name: El Nasr Co. for Steel Pipes and Fittings.
Design Case: Basic Design

1. Major Equipment

Equipment Name	Unit Cost [x10^{3}Yen]	Note
(1) Acid water pumps	1,500	Material: SCS
(2) Filter	3,000	3 sets
(3) Sludge Rake	6,000	1 set
(4) Centrifuge	10,000	1 sets
(5) Motor Control Center	16,500	
(7) Center Control Panel	3,000	1 set

2. Field Work

Work Item	unit	unit Cost[LE]	Note
(1) Site Preparation	[m^2]	8	
(2) Civil (Earth Work)	[m^3]	34	
(3) RC Work	[m^3]	1,500	Foundation, Water Basin
(3) Storage Tank	[ton]	3,430	Equalization Tank, Chemical tank Neutralization Tanks
(4) Structural Steel	[ton]	2,000	Pipe rack, Operating Stage
(5) Equipment Installation	[ton]	400	Pumps, Clarifier rakes, Dehydrator
(6) Piping	[ton]	3,970	Except valves
	[in-m]	30	Except valves
(7) Painting	[m^2]	50	
(8) Local Building	[m^2]	2,600	W.W.T Control Room
(9) Electrical	[cable-m]	3	

Running Cost-EL NASR CO. FOR STEEL PIPES & FITTINGS

* Unit cost is not fixed yet

Items	Treating Capacity (m^3/h)	Feeding Ratio (mg/L)	Consump. (kg/h)	Unit Cost (LE/kg)	Cost-1 (LE/h)	Cost-2 (LE/day)	Cost-3 LE/year)	Unit Cost (LE/m^3)	Remarks
1 Chemical Cost									
1) Alum $=Al_2(SO_4)_2 \cdot 18H_2O$(Clarifier)	77	30	2.31	0.3	0.69	17	5,489		
* 2) Lime = $Ca(OH)_2$ (Neutralization)	30	1000	30	0.1	3.00	72	23,760		
3) Polymer-A (Clarifier)	77	0.3	0.02	27	0.62	15	4,940		
4) Polymer-A (Thickener)	2.34	100	0.23	27	6.32	152	50,039		
5) Polymer-B (No.1 Centrifuge)	60	1%	0.6	27	16.20	130	42,768		
Polymer-B (No.2 Centrifuge)	75	1%	0.75	28	21.00	168	55,440		
5) $CO(NH_2)_2$	77	110	8.47	0.6	5.08	122	40,249		
* 6) H_3PO_4	77	30	2.31	0.6	1.39	33	10,977		
7) NaOCl	77	4	2.31	0.385	0.89	21	7,044		
Sub-Total	77	—	—	—	55.19	729	240,705	0.717	
2 Filter Media	Loading	Loss	Loss/h						
* 1) Anthracite (3 Sets)	10.5 m^3	20 %/year	2.1	1	2.10	50	16,632	0.027	
* 2) Sand (3 Sets)	4.2 m^3	10 %/year	0.5	0.3	0.15	4	1,188	0.005	
* 3) Activated Carbon (1 Set)	0m^3	14 days	0.0	14.7	0.00	0	0	0	
Sub-Total	—	—	—	—	2.25	54	17,820	0.029	
			kWh/d	LE/kWh					
3 Power Consumption			2,120	0.12	10.60	254.40	83,952	0.138	
			m^3/day	m^3					
4 Industrial Water or Potable Water			50	0.7	1.46	35.00	11,550	0.019	
			Person/d	LE/P/year					
5 Operator	4 Person*3 Shift+1s		16	10,000	20.20	484.85	160,000	0.262	
6 Maintenance Fee					44.56	1069.52	352,940	0.579	
(Plant Cost * 3 %/year) 400,000,000*0.03/34=352,940 LE									
Total Operation Cost	—	—	—	—	134.27	2,627.17	866,967	1.74	

Power Consumption

Tag No.	kW	Operation	Consump.
PU-01	0.75	24	18.00
PU-02	2.2	24	52.80
PU-03	5.5	24	132.00
PU-04	5.5	24	132.00
PU-05	2.2	2	4.40
PU-06	0.4	24	9.60
PU-07	0.4	24	9.60
PU-08	3.7	24	88.80
PU-09	0.75	24	18.00
PU-10	0.4	24	9.60
PU-11	0.4	24	9.60
PU-12	2.2	24	52.80
PU-13	0.4	24	9.60
PU-14	3.7	8	29.60
PU-15	0.75	8	6.00
PU-16	0.75	24	18.00
PU-17	15	24	360.00
PU-18	5.5	12	66.00
PU-101	11	24	264.00
PU-102	7.5	24	180.00
PU-103	2.2	24	52.80
PU-201	5.5	24	132.00
PU-202	0.4	24	9.60
PU-203	11	1	11.00
PU-204	1.5	24	36.00
B-01	15	24	360.00
B-201	5.5	1	5.50
C-01	0.75	12	9.00
MZ-01	0.75	24	18.00
MZ-02	1.5	24	36.00
MZ-03	1.5	24	36.00
MZ-04	1.5	24	36.00
MZ-05	0.75	24	18.00
MZ-06	15	9	135.00
MZ-07	7.5	7	52.50
MZ-08	0.75	9	6.75
MZ-101	0.75	24	18.00
MX-01	1.5	24	36.00
MX-02	0.4	2	0.80
MX-03	0.4	2	0.80
MX-04	1.5	24	36.00
MX-05	0.75	2	1.50
MX-06	0.75	2	1.50
MX-07	2.2	24	52.80
MX-08	2.2	24	52.80
MX-09	0.75	2	1.50
MX-10	0.75	8	6.00
MX-201	0.75	24	18.00
Total	—	—	2,650.25 kWh/d
Actual Consumption		0.8	2120.2 kWh/d

Client: JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

Project Name: THE STUDY ON INDUSTRIAL WASTE WATER POLLUTION CONTROL IN THE ARAB REPUBLIC OF EGYPT

Factory Name: EL NASR CO. FOR STEEL PIPES AND FITTINGS

BASIC DESIGN

Document Title:

CALCULATION SHEET

FOR

W.W.T. RECOMMENDABLE PLANT

Issued Date: September 2000

Consultant:

JICA STUDY TEAM

CHIYODA DAMES AND MOORE CO.

CHIYODA CORPORATION

1. Object

This design calculation sheet is applied to the study of W.W.T. Recommendation Plant planning for 「El Nasr Co. for Steel Pipes and Fittings」.

2. Wastewater to be treated

(1) RW-1:「Neutralization Unit Outlet」+「Sanitary/Domestic of Foundry」
(2) RW-2: Skimmed Oily Water of C.W. Oil Separator
(3) RW-3: Wastewater in the Collection Pit from Foundary Factory
(4) RW-4: Wastewater in the Collection Pit from Spiral Pipe/Coating Factories

3. Design Conditions

(1) The existing facilities of wastewater sources should be maintained, repaired, as original or revised design basis.
(2) Waste management system in the Factory should be organized, and operated adequatly under the responsible managers.
(3) Suitable routine works, periodical maintainances should be conducted in the whole company.
(4) Quality and quantity of RW-3 are assumptivel data as same as RW-4, because there was no flow during water sampling.
(5) Calcutation result figures may be changed in the layout planning stage.

4. Contents of Wastewater Treating Facility

(1) Pre-treatment : Neutralization Unit, Oil Separator, Equalization Tank
(2) Primary Treatment: Chemical Clarifier, Sand Filter
(3) Secondary Treatment: Activated Sludge Treatment

5. Design Basis

5.1 Quality and Quantity of Influent Wastewater: Shown on Table-1.

5.2 Quality and Quantity of Treated Water

The following regulations are applied to Basic Design.

(1) Existing Plant: Law93/62 Discharge to Sewer System
(2) Recommendation Plant: Law48/82 Non Potable Surface Water (Industrial)

Table－1 Design Basis of Wastewater Quality and Quantity

	Raw Water 1	Raw Water 2	Raw Water 4	Raw Water 3	Law48/82
Flow Rate Av. [m^3/h]	40	30	50	5	
Flow Rate Max [m^3/h]	50	40	150	10	
pH [-]	2 ~7	7 ~8	6.5 ~8	6.5 ~8	6 ~9
SS [mg/L]	250	200	30	30	60
BOD [mg/L]	100	100	30	30	60
COD [mg/L]	200	200	80	80	100
Oil&Grease [mg/L]	5	1,000	5	5	10
TDS [mg/L]	5,800	400	390	390	2,000
Water Temp. [℃]	25 ~35	25 ~35	25 ~30	25 ~35	35

6. Unit Design

6.1. Wastewater Collection (Out of Battery)

6.1.1 No.1 Waste Water Pit

(1) Purpose

Raw water 1 is taken from the outlet of Sedimentation Pit and is stored to pump up to the new Neutralization Unit.

(2) Design Conditions

1) Wastewater: Outlet of the Sedimentation Pit
2) Flow Rate(Q) 40 m^3/h = 0.67 m^3/min
3) Retention Time: 30 min.
4) Shape、Materials、No. : Rectangular、RC(Semi-Underground)、 1 set

(3) Sizing

(3-1) No.1 Wastwater Pit (Z-101)

1) Req'd Vol. 20 m^3
2) Effictive Height 1 m(take)
3) Cross Sectional Area Ac= Q/Ah= 20 m^2

Take: $4,000^W \times 5,000^L \times 1,500^H$*

* Actual height is based on the depth of buried pipe.

(3-2) No.1 Wastewater Pump (PU-101AB)

1) Capacity Allowance 20 % Design Flow Rate 48 m^3/h
2) Required Total Head 15 m (take)
3) efficiency of pump 0.6
4) Motor Allowance 0.3
5) Motor Power 4.24 kW→ 5.5 kW PU-101AB=48m^3/hx0.15MPax5.5kW

6.1.2 No.2 Waste Water Pit

(1) Purpose

Raw water 2 is taken from the outlet of Oil Separator and is stored to pump up to the new Oil Separator.

(2) Design Conditions

1) Wastewater: : Outlet pipe of the Oil Separator
2) Flow Rate(Q) 30 m^3/h = 0.5 m^3/min
3) Retention Time: 30 min.
4) Shape、Materials、No. : Rectangular、RC(Semi-Underground)、 1 set

(3) Sizing

(3-1) No.2 Wastewater Pit (Z-102)

1) Required Vol. Av= 15 m^3
2) Effective H of Pit Ah= 1 m(take)
3) Cross Section Area Ac= Q/Ah= 15 m^2

Take: $3,000^W \times 5,000^L \times 1,500^H$*

* Actual height is based on the depth of buried pipe.

(3-2) No.2 Wastewater Pump (PU-102AB)

1) Capacity Allowance 20 % Design Flow Rate 36 m^3/h

2) Required Total Head	15	m (take)			
3) efficiency of pump	0.6				
4) Motor Allowance	0.3				
5) Motor Power	3.18	kW→	3.7	kW	PU-102AB=36m^3/hx0.15MPax3.7kW

6.2 Pre-treatment

6.2.1 Neutralization Unit

(1)Purpose

To neutralize Wastewater which is not neutralized by the existing Neutralization Unit completely.

(2)Design Conditions

1)Wastewater: Neutralization Unit Outlet and Sanitary/Domestic Wastewater from Foundry.

2)Flow Rate:

Neutralization Unit	30	m^3/h	0.5	m^3/min
Sanitary/Domestic W.	10	m^3/h	0.17	m^3/min
Total	40	m^3/h	0.67	m^3/min

(3)Sizing

(3-1) Neutralization Tank (T-01)

1) Reaction Time	1	h			
2) Reactor Vol.	40	m^3			
3) Reactor effct. Height	3	m (take)			
4) Reactor Area	13.33	m^2			
5) Length =	2	width	W=	2.58	

Width x Length = 2.6m x5.2m T-01=2.6m x 5.2m x 3.5mH

(3-2) No.1 Sedimentation Tank (T-02)/No.1 Sludge Pump(PU-02)

1) Settling velocity	36	$m^3/m^2/d$	1.5	$m^3/m^2/h$	
2) Tank Surface Area	26.67	m^2			
3) Diameter of Tank:	5.83	m →	5.8	m (Standard)	
4) Retention Time	2	h (take)			
5) Tank Vol.	80	m^3			
6) Height(linear)	3.03	m →	3	m	
7) Sludge/Treated Water	2.5	%	(based on settling test)		
8) Sludge generation rate	1	m^3/h=	20	kg/h as SS content	20 kg/m^3
9) Sludge Storage Height	1	m (take)			
10) Sludge Storage Vol.	28.26	m^3			
11) Sludge Retention Time	28.26	h			T-02=5.8mID x 3.0mH(linear)
12) Sludge Draw-off Period	8	hours/d			
13) Pump Capacity	3	m^3/h			PU-02=4m^3/hx20mHx

(3-3) Lime Feeder(MZ-01)/No.1 Lime Pump (PU-01AB)

1) Lime Requirement	1	g-Lime/L-W.W.			
	30	kg/h			
2) Lime Milk Conc.	5	%→	0.05	kg/L	MZ-01= 30kg/h
3) Lime Milk Feed Rate	600	L/h→	10	L/min	PU-01AB=10L/minx0.5MPax0.75kW

(3-4) Lime Hopper (D-01)

1) Required Lime	1	day		
	720	kg/d		
2) Density	0.5	kg/L		
3) Allowance	30	%		
4) Hopper Vol.	1872	L→	2,000	L
5) Hopper Height	1.5	m (take)		
Hopper Cross Section Area	1.33	m^2		
Hopper Diameter	1.30	m→	1.3	m D-01=1.3$m^{I.D.}$x1.5m^{H}

(3-5) No.1 Lime Drum (D-02)

1) Lime Conc.	10	%	100	kg/m^3
2) Preparation Period	8	h		
3) Required Lime	240	kg		
4) Drum Vol.	2.4	m^3		
5) Drum Height (Take)	1.5	m		
Diameter	1.43	m→	1.45	m D-02=1.45$m^{I.D.}$x1.5m^{H}

(3-6) Neutralized W.W. Tank (T-03))

1) Retention Time	30	min
2) Required Vol.	20	m^3
3) Effective H of Pit	2.5	m(take)
4) Cross Section Area	Ac= Q/Ah= 8	m^2

Take: 2.5m^{W}×3.2m^{L}×3.0m^{H}

(3-7) Neutralized W.W. Pump (PU-03AB)

1) Capacity=	48	m^3/h,	Head=	18	mH(take)
2) Motor Power=	5.09	kW→	5.5	kW	PU-03=48m^3/hx18mHx5.5kW

6.2.2 Oil Separator

(1) Object

To remove floatable oil from the skimmed oily water of existing Oil Separator

(2) Design Conditions

1) Wastewater: Wastewater from PU-02AB

2) Flow Rater:Qm 30 m^3/h= 0.5 m^3/min

3) Design Base: API Standard

4) Wastewater

(a)Water Temp. 30 ℃

(b)Specific gravity of Water: Sw 0.995

(c)Absolute viscosity: μ 0.0076 poise

(e)Maximum allowable holizontal velocity :VH=15Vt, not exceed 3f/min.

5) Oil globles in wastewater

(a)Oil globules to be remove: 150 μ = 0.015 cm

(b)Specific gravity of Oil: So 0.9

(c)Rate of rise in wastewater: Vt 0.30 f/min= 0.09 m/min

(d)Maximum allowable VH: 4.52 f/min >3f/min

2 f/min(take) 0.61 m/min

6) Design Factors

(a)For turbulence with:VH/Vt 6.64

(b)Turbulence and Short-circuit Factor: 1.43 (Fig.5-3 of Manual)

(3) Sizing

(3-1) Oil Separator (Z-01)

1) Minimum Cross-section Area: Ac=Qm/VH 0.83 m^2

2) Width: 1.2 m (take) 1.5 m

3) Depth(effct.): 0.69 m→ 0.8 m

4) Length: 7.60 m→ 8 m

API Separator: $1.5m^W$ x $0.8m^D$x $8.0m^L$ (1channel)

(3-2) Oil Separator T.W. Pit (Z-02)

1) Retention Time 30 min

2) Required Vol. 15 m^3

3) Effective H of Pit 2.5 m(take)

4) Cross Section Area Ac= Q/Ah= 6 m^2

Take: $2.4m^W \times 2.5m^L \times 3.0m^H$

(3-3) Skimmed Oil Pit (Z-03)

1) Design Conditions Oil Contents in Wastewater 1 L/m^3

Oil Contents in Skimmed Water 10 %

2) Quantity of Skimmed Oily Wat 7.2 m^3/d

3) Retention Time 1 day

4) Required Vol. 7.2 m^3

5) Effective H of Pit 2.5 m(take)

6) Cross Section Area Ac= Q/Ah= 2.88 m^2

Take: $1.5m^W \times 2.0m^L \times 3.0m^H$

(3-4) Skimmed Oil Tank (T-04)

1) Retention Time 7 days

2) Required Vol. 50.4 m^3

3) Height 6 m(take) Reruired Area 8.4 m^2

4) Diameter of Tank: 3.27 m→ 3.4 m (Standard)

T-03=$3.4m^{ID}$x$6.0m^H$

(3-5) Oil Separator T.W. Pump (PU-4)

1) Capacity= 36 m^3/h, Head= 18 mH(take)

2) Motor Power= 3.81 kW→ 5.5 kW PU-04=$36m^3/h$x18mHx5.5kW

(3-6) Recovered Oil Pump (PU-05)

1) Design Conditions Working Hour= 1 h/day

1) Capacity= 7.2 m^3/h→ 10 m^3/h Head= 15 mH(take)

2) Motor Power= 1.06 kW→ 1.5 kW PU-05=$10m^3/h$x15mHx1.5kW

6.3 Equakization Tank

(1) Object

To equalize quality and quantity of 2 wastewaters.

(2) Design Conditions

1) Quantity and Quality of Wastewater: Shown on Table-2

2) Shape: Open Top Tank, Materials: CS /Epoxy Coating , Required No.: 1 set

3) Retention Time: 5 h

4) Others: Air bubbling device

Table-2 Quantity and Quality of Wastewater

	RW -1	RW -2	BackWash W.W.	RW -3	Equalized W.
Flow Rate [m^3/h]	40	30	2	5	77
pH [-]	6 ~7.5	7 ~8	6.5 ~8	6.5 ~8	6.5 ~8
SS [mg/L]	250	200	550	30	224
BOD [mg/L]	100	100	186	30	98
COD [mg/L]	200	200	496	80	200
Oil&Grease [mg/L]	5	30	83	5	17

(3) Sizing

A. Equalization Tank

1) Required Vol.: 385 m^3

2) Height: H= 7.6 m (take)

3) Section Area: A= 50.66 m^2 D= 8.03 m→ 8.71 m(Standard)

Take: 8.71m^{ID}×7.6m^{H}

B. Air Bubbling Device

1) Required Air (design base): 3 $Nm^3/m^2/h$

2) Required Air Quantity: 151.97 Nm^3/h= 3 Nm^3/min(take)

6.4 Biological Treating Unit (Activated Sludge Treatment)

(1) Purpose

To remove Organic Substances (BOD,COD) by aerobic micro bacterias.

(2) Design Conditions

1) Wastewater: Equalized Wastewater

2) Treating Method: Activated Sludge Treatment

3) Capacity: 77 m^3/h

4) Water Quality:

Table-4 Water Quality

	Inlet	Outlet	Law93/62 Sewer System	Law48/82 Non Potable
pH [-]	6.5~8	6.5~8	6 ~10	6~9
SS [mg/L]	224	30	< 500	60
BOD [mg/L]	98	30	< 400	60
COD [mg/L]	200	50	< 700	100
Oil & Grease [mg/L]	17	5	< 100	10
Water Temp. [℃]	20~35	20~35	< 40	35

5) Shape, Materials, Req'd No.

(a) Aeration Basin: Rectangular/Above ground, RC, 1 set

(b) Sedimentation Basin: Circular/Above ground, CS+Epoxy coating, 1 set

6) Chemicals

N and P are injected in case of lack of nutrient.

(3) Sizing

(3-1) Aeration Basin(Z-04)

1) BOD Loading 0.5 kg-BOD/m^3/day (take)

2) Vol. of Basin Vas= 250.18 m^3

3) Height of Basin Has= 3.5 m(take) Aas= 71.48 m^2

L= 3 W (take) W= 4.88 m→ 5 m

L= 15 m

Take: $5.0^{mW} \times 15.0^{L} \times 3.5^{H}$

4) BOD Removal : R_{BOD}= 125.09 kg/day

5) MLSS : Ca= 2,000 mg/L

(3-2) No.2 Sedimentation Basin(T-06)

1) Surface Loading Las= 1 $m^3/m^2/h$ (take)= 24 $m^3/m^2/day$

2) Surface Area Ass= 77 m^2

3) Height of Basin Hss= 3 m (take)

4) Vol. of Basin Vss= 231 m^3 Tss= 3 h

5) Diameter of Basin: Dss= 9.90 m → 10 m

Take: $10m^{ID} \times 4.0m^{H}$ Act.Surf.Loading= 0.98 $m^3/m^2/h$

(3-3) Surplus Sludge

1) BOD→SS Conversin Rate 0.4 (take)

2) Sludge from Act. Sludge T. Wss= 2.08 kg/h from BOD

Wss= 14.94 kg/h from SS

Total Wss= 17.02 kg/h

SS content 8 kg/m^3(take) 2.13 m^3/h= 51.07 m^3/d

(3-4) Air Requirement for Aeration

1) Oxygen Demand: W_{O2}= a*R_{BOD}+b*Sa = 95.07 kg/day

a= BOD Factor = 0.55 kg-O_2/kg-O_2

b= MLVSS Factor= 0.07

Sa= 0.75*MLSS*Vol.of Basin/1,000= 375.26

R_{BOD}= BOD Removal = 125.09 kg/day

2) Required Air : Qair= (W_{O2}*3.57m^3/kg-O_2*1.3)/(0.08*24*60)

= 3.54 Nm^3/min→ 3.6 Nm^3/min

: Misceranious Purpose 1 Nm^3/min

3) Blower(B-01) Qta= 9.12 Nm^3/min

Take: 9.5Nm^3/minx7mHx15kW

(3-5) Sludge Circulation Pump(PU-08)

1) Return Sludge Ratio Rs= Ca/(Cr-Ca) = 33.33 %

2) Pump Capacity 33.4 m^3/h PU-08=36m^3/hx12mHx3.7kW

(3-6) Nutrient as N $CO(NH_2)_2$ Injection Unit

1) Dosage : BOD : N = 100 : 5

: BOD : $CO(NH_2)_2$ = 100 : 11

2) Concentration : 12.5 wt %
3) Specific gravity: 1.069
4) Injection rate : Q_{CO}= 4.3 L/h (PU-06)
5) Storage Vol. : V_{CO}= 0.7 m^3 (7days)
6) Dimension : Take: $0.9m^{ID}X1.2m^{H}$ (D-04)

(3-7) Nutrient as P H_3PO_4 Injection Unit

1) Dosage : BOD : P = 100 : 1
: BOD : H_3PO_4 = 100 : 3
2) Conc. : 12.5 wt %
3) Specific gravity: 1.189
4) Injection rate : Q_{ph}= 1.1 L/h (PU-07)
5) Storage Vol. : V_{ph}= 0.2 m^3 (7days)
6) Dimension : Take: $0.9m^{ID}X1.2m^{H}$ (D-05)

6.4 Chemical Clarifier

(1) Purpose

To remove Suspended Solids(SS), slice of oil and color. Clarifier is not necessary, because A.S.Treated Water meets to the Regulation.

(2) Design Conditions

1) Wastewater: W.W. after equalized in T-04.
2) Capacity: 77 m^3/h
3) Water Quality of Inlet and outlet of Clarifier: Shown on Table-3.
4) Chemicals: (a)Coagulant= $Al_2(SO4)_3$
(b)pH Controller=$Ca(OH)_2$
(c)Coagulant Aid=Polymer

Table-3 Water Quality

		A.S T. Water	Out let of Clarifier	Law93/62 Sewer System	Law48/82 Non Potable
Flow Rate	[m^3/h]	77	77		
pH	[-]	6.5 ~8	7 ~8	6 ~10	6 ~9
SS	[mg/L]	30	20	< 500	60
BOD	[mg/L]	30	25	< 400	60
COD	[mg/L]	50	45	< 700	100
Oil&Grease	[mg/L]	3	2	< 100	10

(3) Sizing

(3-1) Treated Water Pit(Z-06)

1) Retention Time: 30 min
2) Req'd Vol. of Pit 38.5 m^3
3) Dimension H= 2.5 m(take) A= 15.40 m^2
W= 3 m L= 5.13 m Z-06=3.0mWx5.2mLx3mH

(3-2) Coagulation Part(T-07)

1) Rapid Mixing Time 3 min (take)
2) Reruired Vol. Vfl= 3.85 m^3

3) Shape=Cylindrical, Vertical, Materials=CS/Epoxy Coating
Required No. 1 Set

4) Demension: Hfl= 2 m (take) Req'd Area 1.93 m^2
D= 1.57 m→ 1.60 m

Take: $1.5m^{ID} \times 2.0m^{H}$

(3-3) Flocculation (+T-07)

1) Slow Mixing Time 20 min (take)

2) Required Vol. Vfl= 25.67 m^3

3) Shape=Rectangular, Vertical, Materials=CS/Epoxy Coating
Required No. 1 Set

4) Demension: Hfl= 3 m (take) Req'd Area 8.56 m^2
L= 2 W (take) W= 2.07 m, L= 4.14 m

T-07= $2.1m^{W} \times 4.2m^{L} \times 3.0m^{H}$

(3-4) No.3 Sedimentation Basin(T-08)

1) Surface Load Ls= 3 $m^3/m^2/h$ (take)

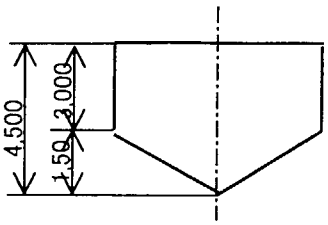
2) Req'd Area As= 25.67 m^2

3) Shape=Circular, Materials=CS/Epoxy Coating, Req'd No. 1 Set

4) Retention Time Ts= 1 h (take)= 60 min

5) Req'd Vol. Vs= 77 m^3 H= 3.00 m

6) Dimensions D = 5.72 m→ 5.8 m(Standard)



Take: $5.8m^{ID} \times 4.5m^{H}$ (linear=3.0m)

<Act. Surface Load = 2.92 $m^3/m^2/h$ >

(3-5) Sludge Draw-off

1) SS Removal 2.31 kg/h= 55.44 kg/d

2) Concentration of SS in Draw-off Sludge 0.75 %(take)= 10 kg/m^3

3) Sludge Draw-off 0.23 m^3/h 0.30 %

(3-6) Coagulant $Al_2(SO_4)_3 \cdot 18H_2O$ Injection Unit

1) Dosing Rate: 30 mg/L, Max. 50 mg/L

2) Concentration: 20 wt % = 222.4 g/L

3) Specific Gravity: 1.112

4) Injection Rate: Q_{PO}= 10.4 L/h= 0.17 L/min (PU-10)

5) Drum Vol. : V_{PO}= 1.7 m^3 (for 7days)

Height: H_{PO}= 1.5 m (take) A_{PO}= 1.16 m^2

Diameter D_{PO}= 1.2 m

Take: $1.2m^{ID} \times 1.5m^{H} \times 2$ sets (D-07)

(3-7) pH Controller: $Ca(OH)_2$ Injection Unit

1) Dosing Rate: 20 mg/L, Max. 50 mg/L

2) Concentration: 10 wt % = 100 g/L

3) Specific Gravity: 1

4) Injection Rate: Q_{PO}= 15.4 L/h= 0.26 L/min (PU-09)

5) Drum Vol. : V_{PO}= 2.6 m^3 (for 7days)

Height: H_{PO}= 1.5 m (take) A_{PO}= 1.72 m^2

Diameter D_{PO}= 1.5 m

Take: $1.4m^{ID} \times 1.5m^{H} \times 2$ sets (D-06)

(3-8) Coagulant Aid: Polymer Injection Unit

1) Dosing Rate: 0.3 mg/L, Max. 0.5 mg/L

2) Concentration: 0.5 wt % = 5 g/L

3) Specific Gravity: 1

4) Injection Rate: Q_{PO}= 7.7 L/h= 0.13 L/min (PU-11)

5) Drum Vol. : V_{PO}= 1.3 m^3 (for 7days)

Height: H_{PO}= 1.2 m (take) A_{PO}= 1.08 m^2

Diameter D_{PO}= 1.2 m

Take: $1.2m^{ID} \times 1.5m^{H} \times 2$ sets (D-08)

6.5 Sand Filter Unit

(1) Purpose

To remove overflow floc(SS) from RW-3, and reuse for Cooling Water

(2) Design Conditions

1) Wastewater: Wastewater in Collection Pit in Spiral Weldeing Factory.

2) Capacity 50 m^3/h= 25 $m^3/h \times$ 3 sets (1 stand-by)

3) Water Quality

Table-5 Water Quality

	Inlet	Outlet	Law93/62	Law48/82
pH [-]	6.5~8	6.5~8	6 ~10	6~9
SS [mg/L]	30	10	< 500	60
BOD [mg/L]	30	< 30	< 400	60
COD [mg/L]	80	< 80	< 700	100
Oil & Grease [mg/L]	5	2	< 100	10
Water Temp. [℃]	20~35	20~35	< 40	35

4) Shape: Cylindrical/Vertical/Gravity Type,

Materials: Carbon Steel + Epoxy coating, Req'd No.: 3 sets (1 stand-by)

5) Filter Media: Anthracite + Sand/Gravel

6) Backwashing: Air(Blower) + Water (Pump)

(3) Sizing

(3-1) No.3 Wastewater Pit(Z-201)

1) Retention Time: 15 min(take)

2) Existing Collection Pit: 3mx5mx3mD= 45 m^3

3) Required Vol.: 12.5 m^3 Net Retention Time= 69 min

4) Dimension: Depth= 3 m(take) Area= 4.17 m^2

L= 2 W W= 1.44 m Z-103=1.5mx3.0mx3.5mD

(3-2) Sand Filter(F-01ABC)

1) Filter Velocity Vf= 180 m/day= 7.5 m/h (take)

2) Filter Area/Diameter Af= 3.33 m^2 Df= 2.06 m

3) Height: Hf= Upper of Trough 1 m

<Linear part> Trough 0.3 m

Trough-Anthracite 0.7

Anthracite	0.7 m
Sand+Gravel	0.8 m
Support+Under	0.7 m
Allowance	0.3 m
Total Height	4.5 m

Take: 2.1 m^{ID} x 4.5 m^{H} → 3.46 m^2(net)

(3-3) Filtered Water Pit (Z-202)

1) Vol. of Pit Vfb= 45 min (take) 37.5 m^3

2) Depth of Pit Hfb= 2.5 m (take) Surface Area 15 m^2

3) L= 2 W(take) W= 2.74 m L= 5.48 m

Take: 3.0 m^{W} × 5.0 m^{L} × 3.0 m^{H}

(3-4) Backwashing Pump(PU-203)

1) Backwashing Velocity Ubw= 40 m/h (take)

2) Backwashing Flow rate Qbw= 138.47 m^3/h

3) Backwashing Time Tbw= 10 min(take)

4) Backwashing Water Vbw= 23.08 m^3/h/Cycle

5) Backwashing Pump Qp= 152.32 m^3/h Hp= 12 mH(take)

P= 9.93 kW→ 11 kW PU-203=155m^3/hx12mHx11kw

(3-5) Backwashing W.W. Pit(Z-203)

1) Vol. of Pit Vfb= 1.5 Backwashing water 34.62 m^3

2) Depth of Pit Hfb= 2.5 m (take) Surface Area 13.85 m^2

3) L= 2 W(take) W= 2.63 m L= 5.26 m

Take: 3 m^{W} × 5.0 m^{L} × 3.0 m^{H}

(3-6) Backwash Blower(B-201)

1) Backwash Air Rate 20 Nm^3/m^2/h

2) Req'd Air 1.4 m^3/min→ Blower=1.5Nm^3/minx5mHx3.7kW

(3-7) Backwash wastewater Feed

1) Max. Backwashing W.W. 34.62 m^3/C Av. Backwashing W.W. 23.08 m^3/C

2) Treating Time: 23 h/d Backwash 2 times/d

3) Av. Flow Rate: 2.01 m^3/h Max.Flow Rate 3.01 m^3/h

4) SS to be removed: 24 kg/d SS Contents: 0.52 kg/m^3

SS contents in WW RW-3 30 mg/L → 550 mg/L

5) BOD removal 10 % BOD to be removed 3.6 kg/d= 0.16 kg/m^3

BOD contents in WW RW-3 30 mg/L → 186 mg/L

6) COD removal 10 % BOD to be removed 9.6 kg/d= 0.416 kg/m^3

COD Contents in WW RW-3 80 mg/L → 496 mg/L

7) Oil to be removed 3.6 kg/d Oil Contents 0.078 kg/m^3

Oil Contents in WW 5 mg/L → 83 mg/L

6.5 Sludge Treating Unit

(1)Purpose

To reduce sludge volume by thickening and dewatering

(2)Design Conditions

1) Sludge: (a)Neutralizaton sludge (direct No.1 Centrifuge)
(b)Activated surplus sludge
(c)Clarifier Sludge (only design)

2) Thickener=conineous operation
Centrifuge=6h/day operation

(3)Sizing

(3-1) Sludge Thickener(T-09)

1) Surface Load Lss= 60 kg/m^2/d= 2.5 kg/m^2/h
Draw-off Sludge Conc. 40 kg/m^3
SS Contents of Overflow 300 mg/L= 0.3 kg/m^3

2) Sludge Rate (In)

(a)Act.Sludge Treat.	Lac=	17.02	kg/h	2.13	m^3/h
(b)Clarifier	Lcl=	2.31	kg/h=	0.23	m^3/h
Total	Lto=	19.33	kg/h	2.36	m^3/h

SS Conc.av= 8.20 kg/m^3

(feed)		(overflow)
2.36 m^3/h		1.89 m^3/h
19.33 kg/h	→→ Sludge Thickener →→	0.57 kg/h
8.20 kg/m^3		0.3 kg/m^3

↓ (conc. Sludge)

Draw-off ratio 19.84 % of feed

0.468 m^3/h
18.72 kg/h
40 kg/m^3

3) Req'd Surface Area Ath= 7.73 m^2 Df= 3.14 m

4) Thickener Height Water Retention 4 h (take) ,Hc= 1.22 m
Sludge Retention 18 h (take) ,Hs= 1.09 m

Take: 3.2m^{ID}×2.5m^{H}

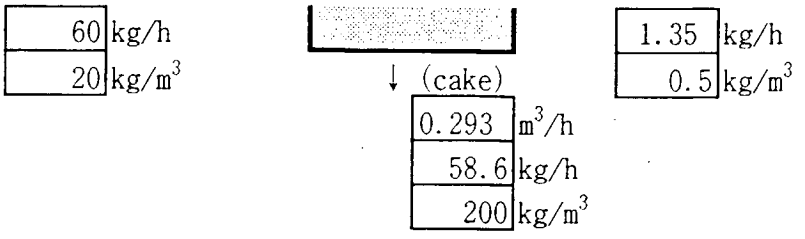
(3-2) Polymer Injection Unit for Thickener

1) Dosage 300 mg/L
2) Concentration 0.1 wt %= 1 g/L (D-09)
3) Specific gravity 1
4) Req'd Polymer 0.71 g/h= 0.71 L/h (PU-13)
5) Req'd Vol. V_{p0}= 0.04 m^3 (7days)
6) Demension : Take: 0.4mID×1.0m^{H}×2 sets

(3-3) NO.1 Centrifuge

1) Sludge Feed Rate: (Sludge generation/day)/ 8 h Operation
1.00 m^3/h= 20 kg/h Centrifuge Cap.=1.5 m^3/h
2) Solid content of Cake 20 %= 200 kg/m^3
Solid content of Water 500 mg/L 0.5 kg/m^3

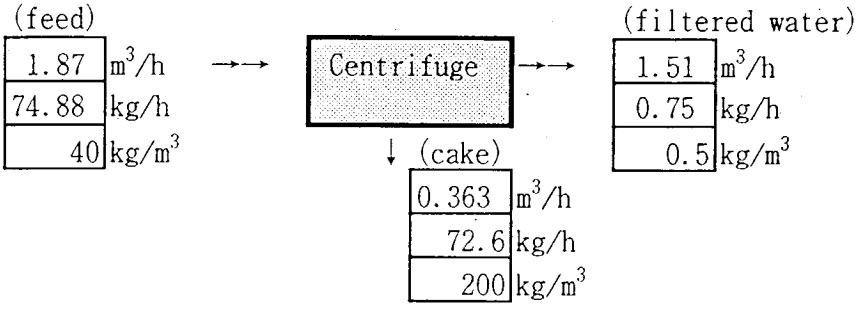
(feed)		(filtered water)
3.00 m^3/h	→→ Centrifuge →→	2.71 m^3/h



3) Sludge cake ratio 9.77 % of Feed Sludge
4) Generation of Cake 2.34 m^3/d

(3-4) NO.2 Centrifuge

1) Sludge Feed Rate: (Sludge generation/day)/ 6 h Operation
0.47 m^3/h= 18.72 kg/h Centrifuge Cap.=2.0 m^3/h
2) Solid content of Cake 20 %= 200 kg/m^3
Solid content of Water 500 mg/L 0.5 kg/m^3



3) Sludge cake ratio 19.39 % of Feed Sludge
4) Generation of Cake 2.18 m^3/d

(3-5) Polymer Injection Unit for Centrifuge

1) Dosage 1 % as Dry SS= 0.60 kg/h
2) Concentration 1 wt %= 10 g/L
3) Specific gravity 1
4) Injection rate Q_{p0}= 60 L/h= 1.00 L/min (PU-15)
5) Req'd Vol. V_{p0}= 1.08 m^3 (for 3days)
6) Drum Dimension Hpo= 1.50 m (take) Apo= 0.72 m^2
Dpo= 0.96 m
: Take: 1.2m^{ID}x1.8m^{H}, 1 set (D-10)

6.6 Sterilization

(1)Purpose

To sterilize treated water including sanitary wastewater

(2)Design Condition

1) Wastewater: Filtered water
2) Disinfictant: NaCLO Conc 12 wt% Sp.Gra 1.0155
3) Dosage 4 mg/L (Max. 6mg/L)
4) Contact Time 15 min

(3) Sizing

1) Injection Rate 1.64 L/h

2) Req'd Drum Vol. 0.28 m^3 (for 7days)

3) Drum Dimension: Take: $0.6m^{ID} x 1.0m^{H}$

4) Sterilization Basin Vol. 12.5 m^3

5) Basin Dimension H= 2.5 m (take) A= 5 m^2

Take: $2.0m^{W} X 3.5m^{L} x 2.5m^{H}$