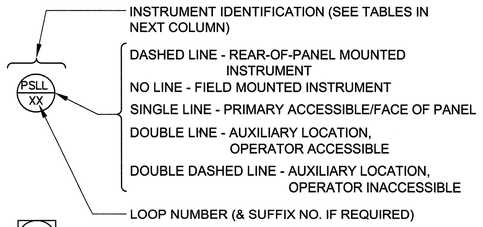
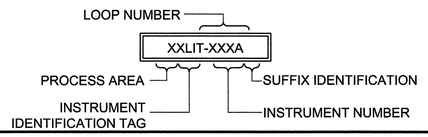
INSTRUMENT 0R FUNCTION SYMBOLS



INSTRUMENT TAGGING IS AS FOLLOWS:



INSTRUMENT TAG IDENTIFICATION LETTERS

		E	T	IT	Y	I	R	C	IC	RC	S	SLL	SL	SH	SHH	SHL	A	ALL	AL	AH	AHH	QI
		ELEMENT	TRANSMITTER	INDICATING TRANSMITTER	CONVERTER, TRANSDUCER, RELAY OR SPECIAL DEVICE	INDICATOR	RECORDER / TREND	CONTROLLER	INDICATING CONTROLLER	RECORDING CONTROLLER	SWITCH	SWITCH LO-LO	SWITCH LO	SWITCH HI	SWITCH HI-HI	SWITCH COMBINATION HI-LO	ALARM	ALARM LO-LO	ALARM LO	ALARM HI	ALARM HI-HI	TOTALIZING INDICATOR TRANSMITTER
A	ANALYSIS	AE	AT	AIT	AY	AI	AR	AC	AIC	ARC	AS	ASLL	ASL	ASH	ASHH			AALL	AAL	AAH	AAHH	
B	BURNER/COMBUSTION																					
C	CONDUCTIVITY	CE	CT	CIT	CY	CI	CR	CC	CIC	CRC	CS	CSLL	CSL	CSH	CSHH			CALL	CAL	CAH	CAHH	
D	DENSITY/MASS	DE	DT	DIT	DY	DI	DR	DC	DIC	DRC	DS	DSLL	DSL	DSH	DSHH			DALL	DAL	DAH	DAHH	
E	VOLTAGE																					
F	FLOW	FE	FT	FIT	FY	FI	FR	FC	FIC	FRC	FS	FSLL	FSL	FSH	FSHH	FSHL		FALL	FAL	FAH	FAHH	FQI
G	GAUGE																					
H	HAND										HS											
I	CURRENT	IE	IT	IIT	IY	II	IR	IC	IIC	IRC	IS	ISLL	ISL	ISH	ISHH			IALL	IAL	IAH	IAHH	
J	POWER																					
K	TIME				KY	KI	KR	KC	KIC	KRC	KS	KSLL	KSL	KSH	KSHH			KALL	KAL	KAH	KAHH	KQI
L	LEVEL	LE	LT	LIT	LY	LI	LR	LC	LIC	LRC	LS	LSLL	LSL	LSH	LSHH	LSHL		LALL	LAL	LAH	LAHH	
LD	DIFFERENTIAL LEVEL		LDT	LDIT	LDY	LDI	LDR	LDC	LDIC	LDRC	LDS	LDSLL	LDSL	LDSH	LDSHH			LDALL	LDAL	LDAH	LDAHH	
M	MOISTURE / HUMIDITY	ME	MT	MIT	MY	MI	MR	MC	MIC	MRC	MS	MSLL	MSL	MSH	MSHH			MALL	MAL	MAH	MAHH	
N	USERS CHOICE																					
O	OPERATION																					
P	PRESSURE	PE	PT	PIT	PY	PI	PR	PC	PIC	PRC	PS	PSLL	PSL	PSH	PSHH	PSHL		PALL	PAL	PAH	PAHH	
PD	DIFFERENTIAL PRESSURE		PDT	PDIT	PDY	PDI	PDR	PDC	PDIC	PDRC	PDS	PDSLL	PDSL	PDSH	PDSHH			PDALL	PDAL	PDAH	PDAHH	
Q	QUANTITY	QE	QT	QIT	QY	QI	QR		QIC		QS	QSLL	QSL	QSH	QSHH			QALL	QAL	QAH	QAHH	
R	RADIATION																					
S	SPEED/FREQUENCY	SE	ST	SIT	SY	SI	SR	SC	SIC	SRC	SS	SSLL	SSL	SSH	SSHH			SALL	SAL	SAH	SAHH	
T	TEMPERATURE	TE	TT	TIT	TY	TI	TR	TC	TIC	TRC	TS	TSLL	TSL	TSH	TSHH	TSHL		TALL	TAL	TAH	TAHH	
TD	DIFFERENTIAL TEMPERATURE		TDT	TDIT	TDY	TDI	TDR	TDC	TDIC	TDRC	TDS	TDSLL	TDSL	TDSH	TDSHH			TDALL	TDAL	TDAH	TDAHH	
U	MULTIVARIABLE	UE	UT		UY	UI	UR			URC	US			USH	USHH					UAH	UAHH	
V	VIBRATION	VE	VT	VIT	VY	VI	VR				VS	VSLL	VSL	VSH	VSHH			VALL	VAL	VAH	VAHH	
W	WEIGHT/FORCE/TORQUE	WE	WT	WIT	WY	WI	WR				WS	WSLL	WSL	WSH	WSHH			WALL	WAL	WAH	WAHH	WQI
X	UNCLASSIFIED	XE	XT	XIT	XY	XI	XR	XC	XIC	XRC	XS	XSLL	XSL	XSH	XSHH			XALL	XAL	XAH	XAHH	
Y	EVENT/STATE/PRESENCE																YA					
Z	POSITION/DIMENSION	ZE	ZT	ZIT	ZY	ZI					ZS											

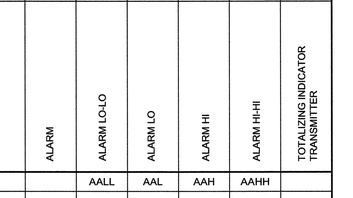
ABBREVIATIONS

AC	ANALOG COMMAND	FOS	FUEL OIL SUPPLY	MCB	MAIN CONTROL BOARD	REV	REVERSE
ACK	ACKNOWLEDGE	FR	FORWARD / REVERSE	MCC	MOTOR CONTROL CENTER	RSL	RAISE / STOP / LOWER
ADJ	ADJUSTABLE	FTC	FAIL TO CLOSE	MMI	MAN-MACHINE INTERFACE	RTM	RUN-TIME METER
ALT	ALTERNATING	FTO	FAIL TO OPEN	MTR	MOTOR	RTU	REMOTE TERMINAL UNIT
AM	AUTO / MANUAL	FTS	FAIL TO START	N	NEW	RIO	REMOTE INPUT / OUTPUT
ATM	ATMOSPHERE	FVNR	FULL VOLTAGE NON-REVERSING	NC	NORMALLY CLOSED	S/M	STROKES / MINUTE
CA	CLOSE / AUTO	FWD	FORWARD	NO	NORMALLY OPEN	S/S	START / STOP
CB	CIRCUIT BREAKER	HA	HAND / AUTOMATIC	NOR/BU	NORMAL / BACKUP	SD	SHUTDOWN
CL	CLOSE	HOA	HAND / OFF / AUTOMATIC	NTS	NOT TO SCALE	SEL	SELECT
DC	DIGITAL COMMAND	HOR	HAND / OFF / REMOTE	OA	OPEN / AUTO	SH.	SHEET
DCS	DISTRIBUTED CONTROL SYSTEM	HTR	HEATER	OAC	OPEN / AUTO / CLOSE	SIL	SILENCE
		HV	HAND VALVE	OC	OPEN / CLOSE	SLOS	START/ LOCKOUT STOP
DCU	DISTRIBUTED CONTROL UNIT	HYD	HYDRAULIC	OIS	OPERATOR INTERFACE STATION	SOF	SLOW / OFF / FAST
DEV	DEVIATION	I/P	CURRENT TO PNEUMATIC	OL	OVERLOAD	SP	SET POINT
E	EXISTING	ID	INCREASE / DECREASE	OOCR	OPEN / OFF / CLOSE / REMOTE	SPD	SPEED
ELS	ELECTRICAL SUPPLY	INTLK	INTERLOCK	OOR	ON / OFF / RESET-REMOTE	SSRV	SOLID STATE REDUCED VOLTAGE
ES	EMERGENCY STOP	IOE	INTERNAL / OFF / EXTERNAL	OOT	ON / OFF / RESET-TIMER	ST	START
ESD	EMERGENCY SHUTDOWN	IR	INTERPOSING RELAY	OP	OPEN	STP	STOP
ETM	ELAPSED TIME METER	KO	TIMER / OFF	OSC	OPEN / STOP / CLOSE	SV	SOLENOID VALVE
FOS	FAST / OFF / SLOW	LCB	LOCAL CONTROL BOARD	POH	PLC / OFF / HAND	TH	THERMAL
FACP	FIRE ALARM CONTROL PANEL	LCP	LOCAL CONTROL PANEL	PCT	PERCENT	TOR	TEST / OFF / RTU
FC	FAIL CLOSED	LEL	LOWER EXPLOSIVE LIMIT CURRENT	PLC	PROGRAMMABLE CONTROLLER	TSP	TWISTED SHIELD PAIR
FCB	FIELD CABINET			POT.	POTENTIOMETER	TYP	TYPICAL
FO	FAIL OPEN	LL	LEAD / LAG	PROP	PROPELLER	TS	TWO SPEED
FOR	FORWARD/ OFF / REVERSE	LOA	LOCAL / OFF / AUTO	R	RESET	UPS	UNINTERRUPTIBLE POWER SUPPLY
		LOR	LOCAL / OFF / REMOTE	RDY	READY		
		LOS	LOCKOUT STOP	REM	REMOTE	VFD	VARIABLE FREQUENCY DRIVE
		LR	LOCAL / REMOTE			VSD	VARIABLE SPEED DRIVE

GENERAL NOTES

1. INSTRUMENTATION SYMBOLS AND IDENTIFICATION ARE BASED ON ISA STANDARDS S5.1 AND S5.3. THE SYMBOLS SHOWN IN DWG #N-2 APPLY ONLY TO P&ID'S.
2. UNLESS OTHERWISE NOTED, THE Ⓜ SYMBOL REPRESENTS THE MOTOR AND ITS CONTROL CIRCUIT WITH STANDARD CONTROL DEVICES APPROPRIATE FOR ITS SERVICE (eg. LOCAL CONTROL STATIONS, MOTOR STARTERS, MOTOR CONTROL CENTERS CONTROL STATIONS). ADDITIONAL NON-STANDARD CONTROLS ARE SHOWN EXTERNAL TO THE Ⓜ SYMBOL.
3. ELECTRICAL SIGNALS SHOWN BY CONNECTING DASHED LINES BETWEEN DEVICES ON THE DRAWINGS DO NOT NECESSARILY REPRESENT A SINGLE PAIR OF WIRES OR INSTRUMENTATION CABLES. REFER TO WIRING DIAGRAMS, CONTROL SCHEMATICS AND THE SPECIFICATIONS FOR ACTUAL NUMBER OF PAIRS OR CABLES REQUIRED.
4. PROCESS DETAILS ARE SCHEMATIC AND MAY NOT REFLECT ALL REQUIREMENTS FOR CONSTRUCTION. ALL PHYSICAL DATA SHALL BE TAKEN FROM DETAILED DRAWINGS WHICH, IN THE EVENT OF CONFLICT, SHALL PREVAIL.
5. REFER TO ELECTRICAL DRAWINGS FOR EXACT I/O CONNECTIONS TO RESPECTIVE CONTROL CIRCUITS AND FOR EXACT QUANTITY OF DEVICES LOCATED IN MOTOR CONTROL CENTERS.
6. REFER TO PIPING DRAWING FOR DETAILED VALVE AND PIPING ARRANGEMENT. IF THERE IS ANY DISCREPANCY BETWEEN THE PIPING DRAWING AND THE INSTRUMENTATION DRAWINGS, THE PIPING DRAWING SHALL GOVERN.
7. GENERAL NOTES APPLY TO ALL INSTRUMNENTATION DRAWINGS.
8. REFER TO SPECIFICATION 01140 FOR WORK RESTRICTIONS AND CONSTRAINTS.
9. NOT ALL MECHANICAL ITEMS ARE SHOWN IN P&ID'S. THE CONTRACTOR SHALL REFER TO SPECIFICATIONS AND MECHANICAL DRAWINGS FOR ADDITIONAL MECHANICAL ITEMS.

INTERFACE IDENTIFICATION



INSTRUMENT ABBREVIATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED EC
DRAWN RAV/JVM
CHECKED JMJ
DATE OCTOBER 2010

carollo

STATE OF NEVADA — PROFESSIONAL ENGINEER — JOHN M. JACOBS — ELECTRICAL — No. 12210
10/5/10 EXP 6/30/11

REV.	DATE	DESCRIPTION	BY	APP'D

CARSON CITY PUBLIC WORKS
NORTH LIFT PUMP STATION IMPROVEMENTS
CARSON CITY CIP NO. 5.0609
INSTRUMENTATION
LEGENDS, NOTES & ABBREVIATIONS

DRAWING NO.
N-1

SHEET NO.
39 OF 55

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PUMP, COMPRESSOR AND MIXER SYMBOLS

- CENTRIFUGAL PUMP
- CENTRIFUGAL WET PIT PUMP OR TURBINE PUMP
- CHEMICAL FEED PUMP
- PERISTALTIC / HOSE PUMP
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- PISTON PUMP
- METERING PUMP
- VERTICAL TURBINE PUMP
- PROGRESSIVE CAVITY PUMP
- SUBMERSIBLE SUMP PUMP
- RECIPROCATING PUMP
- GRINDER
- HEAT EXCHANGER
- COMPRESSOR (PISTON)
- BLOWER/FAN
- MIXER
- HAND PUMP
- SCREW PUMP

GATE AND VALVE SYMBOLS

- GATE VALVE OR UNDEFINED VALVE
- CHECK- SWING
- CHECK- BALL
- CHECK- FLAPPER
- PLUG VALVE
- BALL VALVE
- BUTTERFLY
- GLOBE
- DIAPHRAGM
- NEEDLE
- PINCH VALVE
- PLUG CONCENTRIC
- CHECK VALVE (SPRING LOADED)
- AIR RELEASE OR AIR/VACUUM VALVE
- PRESSURE RELIEF OR SAFETY
- PRESSURE REGULATOR (EXTERNAL)
- PRESSURE REGULATOR (INTERNAL)
- 3-WAY
- ANGLE VALVE
- SLIDE GATE
- SLUICE GATE
- STOP GATE

MISCELLANEOUS SYMBOLS

- BLIND FLANGE
- AIR GAP
- DRAIN (D)
- IN-LINE MIXER
- PULSATION DAMPENER
- ROTATING BEACON
- HORN
- UNION
- FLEXIBLE CONNECTION
- FILTER/SEPARATOR
- STRAINER
- BACKFLOW PREVENTOR
- GEARBOX (GBX)
- PURGE/FLUSH CONNECTION (P)
- EXPANSION JOINT
- FLAME ARRESTER
- RUPTURE DISK
- DIAPHRAGM SEAL
- ANNULAR (IN-LINE) SEAL
- RADIO ANTENNA
- SHOWER/ EYEWASH
- FUEL SEPARATOR
- AIR FILTER
- WATER LEVEL
- CONCENTRIC REDUCER
- QUICK DISCONNECT
- THREADED CAP
- HOSE CONNECTION
- EDUCTOR
- DIFFUSER
- FLOW STRAIGHTENING DEVICE
- SILENCER
- OVERFLOW RINGS

VALVE ACTUATORS

- SOLENOID (S)
- ELECTRICAL/HYDRAULIC (E/H)
- DIAPHRAGM
- HYDRAULIC OR PNEUMATIC CYLINDER

VALVE LABELS

NO NORMALLY OPEN
NC NORMALLY CLOSED
FC FAILS CLOSED
FO FAILS OPEN
FIP FAILS IN LAST POSITION
LO LOCK OPEN
LC LOCK CLOSE

MOTOR DRIVES

- VFD — VARIABLE FREQUENCY CONTROLLER (ELEC AC)
- SCR — VARIABLE SPEED DRIVE (ELEC DC)
- VSD — VARIABLE SPEED DRIVE (MECH)
- M — ELECTRIC MOTOR

LOGIC SYMBOLS

- AND = AND
- OR = OR
- I = INTERLOCK
- N = NOT
- Δ = DELTA
- ∴ = THEREFORE
- MIN = MINIMUM SELECTED
- MAX = MAXIMUM SELECTED

PRIMARY ELEMENT SYMBOLS

- SONIC FLOWMETER (DOPPLER OR TRANSIT TIME)
- MAGNETIC FLOWMETER (M)
- CORIOLIS FLOWMETER
- THERMAL FLOWMETER
- THERMAL FLOWMETER WITH FLOW CONDITIONER (T)
- V-CONE FLOWMETER
- PITOT TUBE
- VORTEX FLOWMETER
- ORIFICE FLOWMETER
- PROPELLER/ TURBINE FLOWMETER
- VENTURI FLOWMETER
- PARSHALL FLUME
- WEIR
- VARIABLE AREA FLOW INDICATOR (ROTAMETER) (FI)
- FLOW NOZZLE
- RADAR LEVEL SENSOR (PTOF) (LE)
- RADAR LEVEL SENSOR (TDR) (LE)
- SONIC LEVEL SENSOR (LE)
- BUBBLER LEVEL SENSOR (LE)
- SUSPENDED SENSOR LEVEL TRANSMITTER (LE)
- INVERTED COLUMN LEVEL SWITCH (LS)
- CAPACITANCE LEVEL SWITCH (LS)
- CAPACITANCE LEVEL SENSOR (LE)
- FLOAT LEVEL SWITCH (LS)
- TEMPERATURE ELEMENT WITH THERMOWELL (TE)
- ANALYZER pH ELEMENT (AE 101)

LINE SYMBOLS

- PRIMARY-MAJOR-1
- SECONDARY-MAJOR-2
- PRIMARY- MINOR-1
- SECONDARY- MINOR-2
- INSTRUMENT
- FUTURE
- PNUEMATIC
- ELECTRICAL
- HYDRAULIC
- CAPILLARY
- UNDEFINED
- HEAT TRACE
- SONIC
- LOGIC
- BINARY
- DATALINK

ANALYZERS

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DATE OCTOBER 2010

carollo

STATE OF NEVADA — JOHN M. JACOBS — 12214 — PROFESSIONAL ENGINEER — ELECTRICAL — 10/13/10 — EXP. 6/30/11

REV.	DATE	DESCRIPTION	BY	APP'D

CARSON CITY PUBLIC WORKS
NORTH LIFT PUMP STATION IMPROVEMENTS
CARSON CITY CIP NO. 5.0609
INSTRUMENTATION
SYMBOLS

DRAWING NO. N-2
SHEET NO. 40 OF 55

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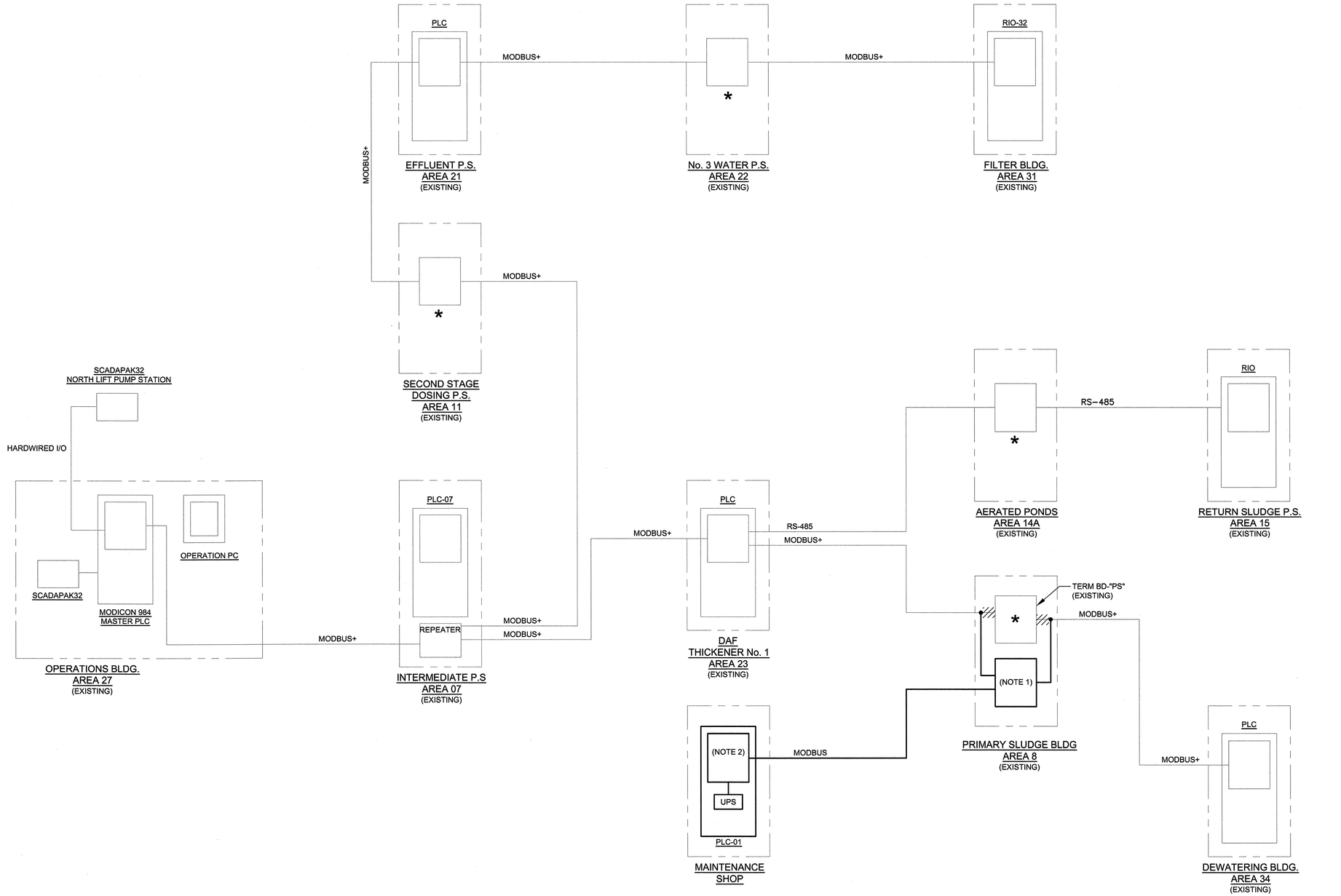

* CABLE PULLED NO EQUIPMENT

NOTES:

1. PROVIDE NEW MODBUS+ BRIDGE NW-BM85S485 OR EQUAL FOR CONNECTION BETWEEN EXISTING MODBUS+ NETWORK AND NEW SCADAPACK357 MODBUS NETWORK. LOCATE THE NEW MODBUS+BRIDGE PANEL ADJACENT TO EXISTING TERM BD-"PS" PANEL. OBTAIN 120VAC POWER TO NEW PANEL FROM ADJACENT LIGHTING PANEL.

2. NEW SCADAPACK357 PLC (P357-1A20-AB10).

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DATE OCTOBER 2010

carollo

STATE OF NEVADA
PROFESSIONAL ENGINEER
JOHN M. JACOBS
No. 12210
ELECTRICAL
exp. 6/30/11
10/31/10

BY	APP'D	DESCRIPTION	DATE	REV.

CARSON CITY PUBLIC WORKS
NORTH LIFT PUMP STATION IMPROVEMENTS
CARSON CITY CIP NO. 5.0609
INSTRUMENTATION
SCADA BLOCK DIAGRAM

DRAWING NO.
N-3

SHEET NO.
41 OF 55

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HMI

PLC

MCC

FIELD

RESET HS 200B

BEACON (24 HOUR) HS 200A

HORN WORK HOUR HS 200D

CHANNEL UPSTREAM LEVEL HIGH LAH 100

CHANNEL UPSTREAM LEVEL LI 100

ROTATING SCREEN SYSTEM FAIL YA 200

ROTATING SCREEN RUN STATUS XL 200

WET WELL(DOWNSTREAM) LEVEL LI 101

WET WELL pH INDICATION AI 101

COMBUSTIBLE GAS HIGH LEVEL AAH 201

COMBUSTIBLE GAS LEVEL AI 201

BLOWER FAIL ALARM YA 203

BLOWER RUN STATUS XL 203

FLOW INDICATION FI 101

FLOW TOTALIZER FQI 101

PLC-01

EXISTING MODBUS +

BREAK GLASS HS 200C

YA 200A RED (BEACON)

RESET HS 200B

YA-200D (HORN)

* 01-LCP-200

LIT 100 ES 120VAC

LIT 101 ES 120VAC

HS 200A

SV 200 * S 1 1/2" 3W

M

M

8" FA

12" FA

01-MS-201 * SCREENINGS WASHER/COMPACTOR

DUMPSTER

OFFSITE DISPOSAL

AE 101 pH (NOTE 3)

LSH 100 (NOTE 3)

LE 100 (NOTE 3)

FROM COLLECTION SYSTEM

36" RW

01-SL-002

* 01-MS-200 MECHANICAL SCREEN

01-SL-003

RW (OPEN CHANNEL)

LE 101 (NOTE 3)

01-SL-001 BYPASS (NORMALLY CLOSED)

MANUAL BAR SCREEN

RW (OPEN CHANNEL) WET WELL

01-SL-004 (NORMALLY CLOSED)

AAH 201 RED (BEACON)

NOTE 5

AIT 201

AE 201 COMBUSTIBLE GAS

01-LCP-204

* 01-LCP-203

LOS HS 203

pH AIT 101 ES 120VAC

EXHAUST TO ATMOSPHERE

GAC

* 01-OS-203 ODOR SCRUBBER BLOWER

* 01-OS-202 PACKAGED GAC ODOR SCRUBBER

NORTH LIFT METER VAULT

FIT 101 ES 120VAC

FE 101

M

24" RW

24" RW

FROM NORTH LIFT PUMP STATION

TO YARD DRAIN

4" SS

TO 5th STREET INFLUENT STRUCTURE

18" RW NOTE 1

TO NORTH LIFT PUMP STATION

NOTE 2

NOTES:

1. NORTH LIFT PUMP STATION PUMPS AND PIPING NOT SHOWN.
2. BID ALTERNATE "A".
3. INTRINSICALLY SAFE DEVICES.
4. ALL INSTRUMENTS AND I/O POINTS AT NORTH LIFT PUMP STATION SHALL HAVE AN AREA DESIGNATION OF "01".
5. COMBUSTIBLE GAS DETECTION SAMPLE FLOW PANEL. SEE SPECIFICATION SECTION 17504.

* VENDOR PROVIDED EQUIPMENT.

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carollo

STATE OF NEVADA JOHN M. JACOBS 9612 PROFESSIONAL ENGINEER ELECTRICAL

Exp. 6/30/11

10/13/10

REV.	DATE	DESCRIPTION	BY	APP'D

CARSON CITY PUBLIC WORKS

NORTH LIFT PUMP STATION IMPROVEMENTS

CARSON CITY CIP NO. 5.0609

INSTRUMENTATION

NORTH LIFT PUMP STATION

SCREENING, ODOR CONTROL AND METER VAULT

DRAWING NO. N-4

SHEET NO. 42 OF 55

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