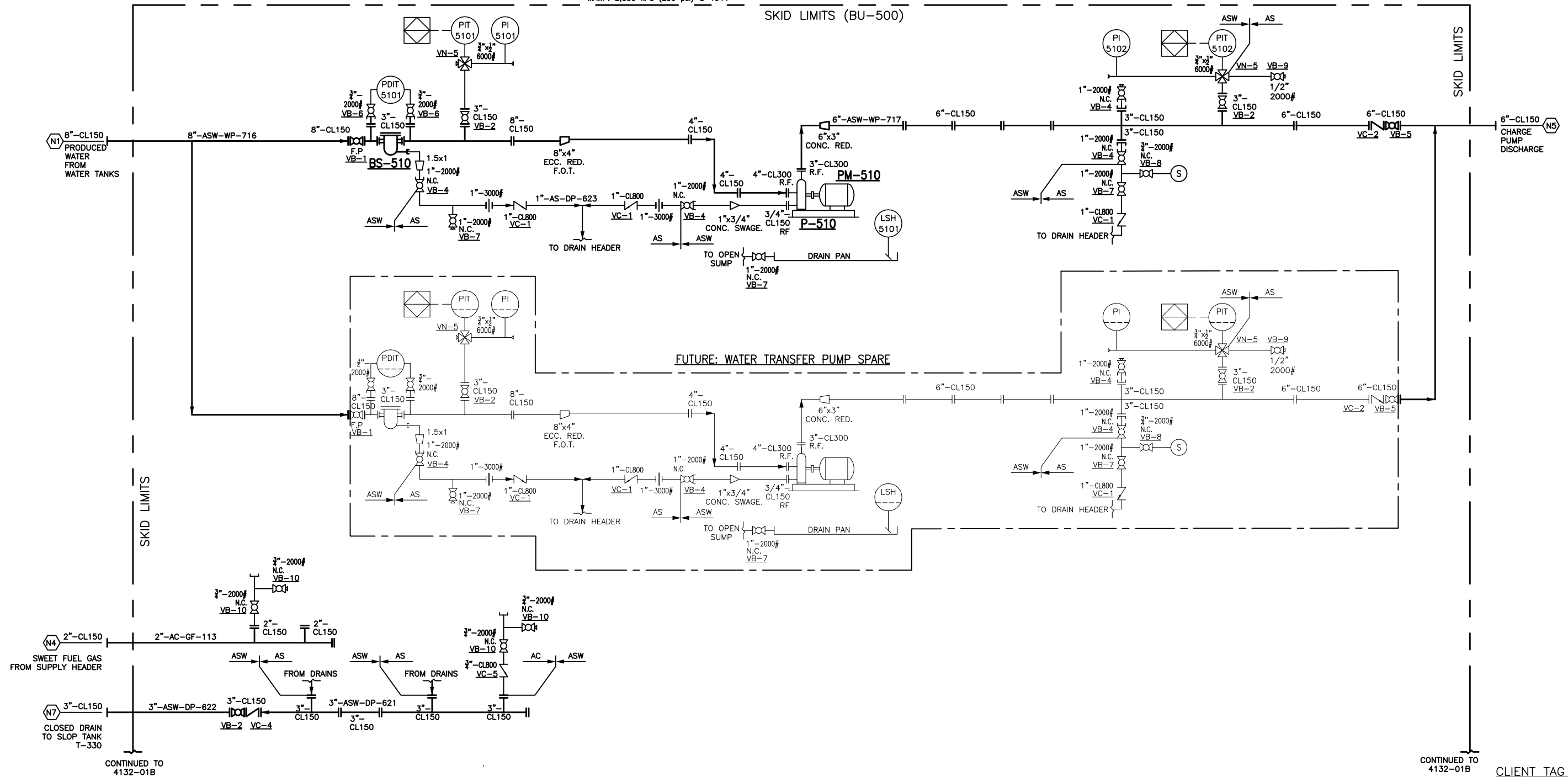


**BS-510/520**  
 BASKET STRAINER  
 MAKE: ALTA  
 MODEL: BFS 150  
 SIZE: 8" 150 ANSI  
 CS BODY, SS BASKET  
 1/8" PERFORATION  
 1.5" S.W. DRAIN  
 MAWP: 285 PSI @ 100°F  
 CRN # : TBD

**P-510/520**  
 CENTRIFUGAL PUMP  
 MAKE: FONDA API-610  
 MODEL: SPC100-80-315  
 MATERIAL: D1 DUPLEX SS  
 SUCTION: 4" CL300 RF  
 DISCHARGE: 3" CL300 RF  
 TDH: 160m  
 CAPACITY: 109.9m<sup>3</sup>/h (483.9 gpm)  
 NPSHr: 3.7m  
 IMPELLER: 11.81" (300mm)  
 MAWP: 2,000 kPa (290 psi) @ 104°F

**PM-510/520**  
 ELECTRIC MOTOR  
 MAKE: TECO WESTINGHOUSE  
 SIZE: 150HP, 3600RPM  
 460V, 60Hz, 3ph  
 FRAME: 445T  
 CLASS 1 DIV 2 TEFC  
 IEEB41  
 CSA, VFD COMPATIBLE



CONTINUED TO  
4132-01B

CONTINUED TO  
4132-01B

CLIENT TAG # : BU-500

**NOTES:**

1. ALL TUBING TO BE 316 SS SEAMLESS TUBING & FITTINGS TO BE SWAGelok UNLESS REQUESTED OTHERWISE.
2. ALL INSTRUMENTATION COMPONENTS TO BE STAINLESS STEEL UNLESS INDICATED OTHERWISE.
3. ALL CONTROL/SHUTDOWN LOGIC IS TO BE SETUP BY THE CLIENT.
4. UNLESS NOTED OTHERWISE IT IS ASSUMED THAT VESSEL OVER PRESSURE PROTECTION HAS BEEN INCORPORATED IN THE CLIENT'S OPERATING PROCEDURE.
5. ALL PIPING IS DESIGNED TO ASME B31.3

REVISION SYMBOL =

**REVISIONS:**

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.07.27	IFR	JR	RM	-
B	2014.09.25	IFA	JR	JK	-
C	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-
D	2014.10.20	IFA : CLIENT MARKUPS	JR	LF	-

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**APPROVALS:**

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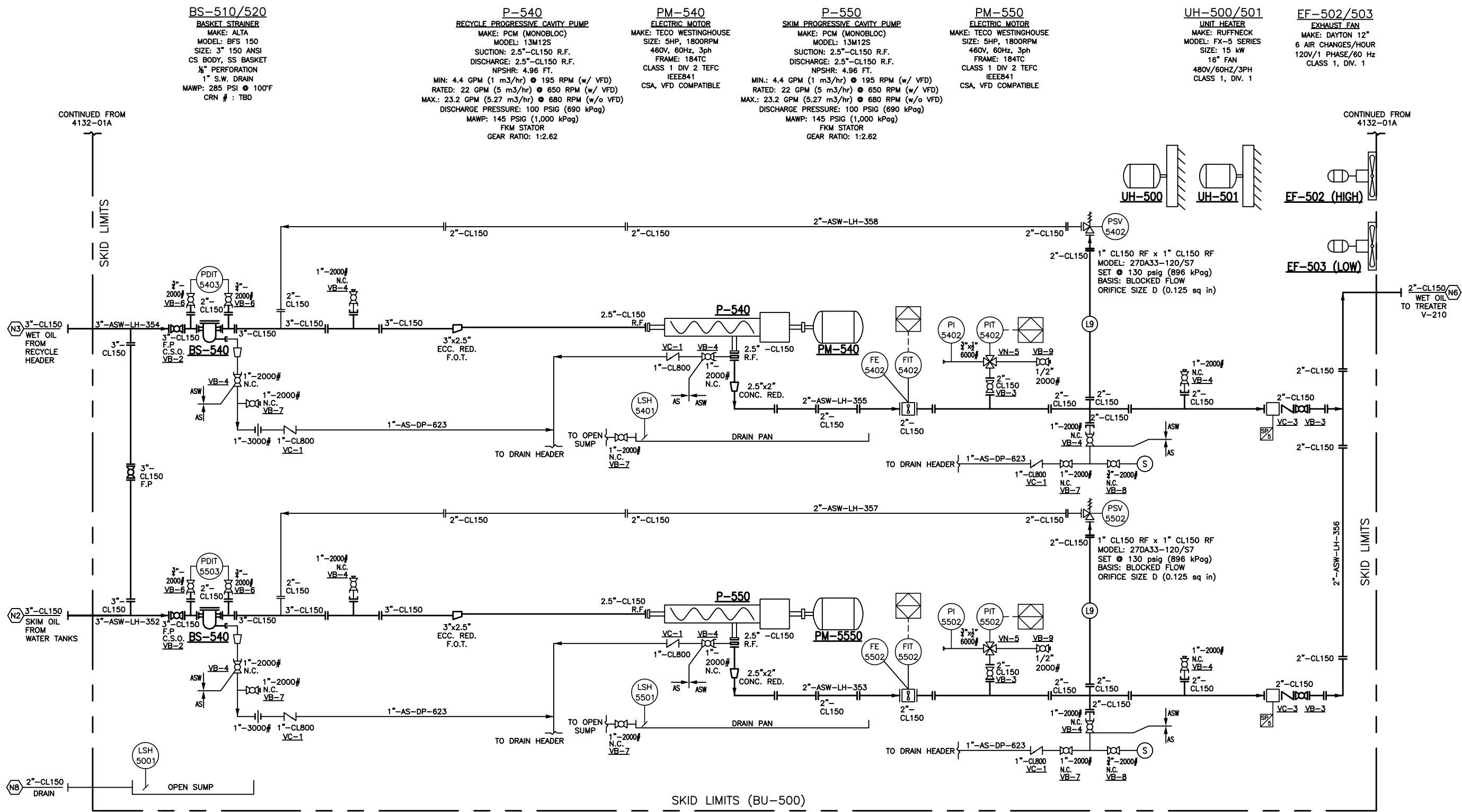
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 APPROVED AS NOTED - PROCEED WITH CONSTRUCTION  
 APPROVED AS NOTED - RESUBMIT DRAWINGS AND PROCEED WITH CONSTRUCTION  
 REVISE AS NOTED - RESUBMIT DRAWINGS

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

**CanDyne**  
 Pump Services Inc.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
 PACKAGE: PROJ.#4132-OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M PROCESS & INSTRUMENTATION DIAGRAM  
 DRAWN: JR DATE: 2014.07.27 DESIGN: RM SCALE: NTS REV: D  
 DRAWING NUMBER: 4132-01A



CLIENT TAG # : BU-500

- NOTES:**
1. ALL TUBING TO BE 316 SS SEAMLESS TUBING & FITTINGS TO BE SWAGelok UNLESS REQUESTED OTHERWISE.
  2. ALL INSTRUMENTATION COMPONENTS TO BE STAINLESS STEEL UNLESS INDICATED OTHERWISE.
  3. ALL CONTROL/SHUTDOWN LOGIC IS TO BE SETUP BY THE CLIENT.
  4. UNLESS NOTED OTHERWISE IT IS ASSUMED THAT VESSEL OVER PRESSURE PROTECTION HAS BEEN INCORPORATED IN THE CLIENT'S OPERATING PROCEDURE.
  5. ALL PIPING IS DESIGNED TO ASME B31.3
  6. SP ITEM : SIGHT FLOW INDICATOR.

REVISION SYMBOL =

REVISIONS:						
REV	DATE	DESCRIPTION	DWN	CHK	APP	
A	2014.07.27	IFR	JR	RM	-	
B	2014.09.25	IFA	JR	JK	-	
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 SIGNATURE

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**CanDyne**  
 Pump Services Inc.

CLIENT: **CNRL LTD. c/o WESTRIVER PROJECTS**

PACKAGE: **PROJ.#4132-OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M PROCESS & INSTRUMENTATION DIAGRAM**

DRAWN:	DATE:	DESIGN:	SCALE:	REV:
JR	2014.07.27	RM	NTS	D

DRAWING NUMBER: **4132-01B**

LINE LIST																							
CLIENT PROJECT NO.: STEELMAN U1A 07-08 BATTERY REPLACEMENT				CLIENT: CANADIAN NATURAL RESOURCES LTD.				CUSTOMER PO/AFE NO.: FC141110-003				ENGINEERING FIRM: WESTRIVER PROJECTS CORP.				SKID LOCATION: BROWNING SASKATCHEWAN LSD: 07-08-004-05 W2M							
LINE NO.	PIPE SPEC. (SEE NOTE 1)	PIPE SIZE (in)	DESCRIPTION		PRESSURE (KPa <sub>g</sub> )			TEMPERATURE (°C)		C.A (mm)	PIPE SCH.	X-RAY (%)	INT. COAT Y/N	MATL.	ANSI CLASS	INSULATION		SERVICE	FLUID	POST WELD TREATMENTS	TRACING	REFERENCE P&ID	COMMENTS
			FROM	TO	DESIGN	OPERATING	HYDRO TEST	DESIGN	OPERATING							TYPE	THK						
8"-ASW-WP-716	ASW (REV 1)	8, 4	SKID EDGE (N1)	P-510	1,939	TANK HEAD	2,948	-29 TO 45	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER	-	-	4132-01A	-
6"-ASW-WP-717	ASW (REV 1)	6	P-510	SKID EDGE (N5)	1,939	1,566	2,948	-29 TO 45	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER	-	-	4132-01A	-
3"-ASW-LH-352	ASW (REV 1)	3	SKID EDGE (N2) / 3"-ASW-LH-354	P-550	1,100	TANK HEAD	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-ASW-LH-353	ASW (REV 1)	2	P-550	2"-ASW-LH-356	1,100	690	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
3"-ASW-LH-354	ASW (REV 1)	3	SKID EDGE (N3) / 3"-ASW-LH-352	P-540	1,100	TANK HEAD	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-ASW-LH-355	ASW (REV 1)	2	P-540	2"-ASW-LH-356	1,100	690	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-ASW-LH-356	ASW (REV 1)	2	2"-ASW-LH-353 / 2"-ASW-LH-355	SKID EDGE (N6)	1,100	690	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-ASW-LH-357	ASW (REV 1)	2	PSV-5502	3"-ASW-LH-352	1,100	TANK HEAD	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-ASW-LH-358	ASW (REV 1)	2	PSV-5402	3"-ASW-LH-354	1,100	TANK HEAD	2,948	-29 TO 60	5-40	1.6	STD	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION	-	-	4132-01B	-
2"-AC-GF-113	AC (REV 2)	2	SKID EDGE (N4)	3"-ASW-DP-621	1,689	345	2,948	-29 TO 38	10	1.6	STD	5	N	A-333 GR.6 / A350 LF2	CL150	-	-	SWEET	SWEET FUEL GAS	-	-	4132-01A	-
3"-ASW-DP-621	AS (REV 1)	3	1"-AS-DP-623 / 2"-AC-GF-113	3"-ASW-DP-622	1,689	345	2,948	-29 TO 60	5-40	3.2	160	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION			4132-01A	-
3"-ASW-DP-622	AS (REV 1)	3	3"-ASW-DP-621	SKID EDGE (N7)	1,689	345	2,948	-29 TO 60	5-40	3.2	160	100	Y	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION			4132-01A	-
1"-AS-DP-623	AS (REV 1)	1	DRAIN CONNECTIONS	3"-ASW-DP-621	1,689	345	2,948	-29 TO 60	5-40	3.2	160	N/A	N	A-106B / A105N	CL150	-	-	SOUR	PRODUCED WATER / OIL / EMULSION			4132-01A/B	-
2"-AS-OPENSUMP	NON CODE	2	SKID EDGE / N8	OPEN SUMP	ATM	ATM	N/A	-29 TO 45	5-40	1.6	STD	N/A	N	A-106B / A105N	CL150	-	-	N/A	WATER / SKID CLEANUP	-	-	4132-01B	-

NOTES:

- REFER TO CNRL PIPING SPECIFICATIONS:  
 "ASW" CL150 RATING INTERNALLY COATED CARBON STEEL FOR CORROSIVE PROCESS FLUIDS. REV.1 NOVEMBER 2009.  
 "AS" CL150 RATING SOUR SERVICE REV. 2 DECEMBER 2011.  
 "AC" CL150 RATING SWEET SERVICE REV. 2 DECEMBER 2011.
- SYSTEM DESIGN PRESSURE DE-RATED DUE TO DESIGN TEMPERATURE, LOWER MAWP OF PCM PUMP.  
 PIPING SPOOL TO BE HYDROTESTED TO 1.5x MAWP OF PIPING BASED ON -29°C TO 38°C.

REVISION SYMBOL = 

REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.25	IFA	JR	JK	-
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C	2014.10.20	IFA : CLIENT MARKUPS	JR	LF	-

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 SIGNATURE

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 DATE

**CanDyne**  
 Pump Services Inc.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
 PACKAGE: PROJ.#4132-OIL BATTERY PUMP PKG.  
 STEELMAN 07-08-004-05 W2M  
 LINE LIST

DRAWN: JR DATE: 2014.09.25 DESIGN: RM SCALE: NTS REV: C

DRAWING NUMBER: 4132-02

INSTRUMENT LIST							
TAG #	MAKE / MODEL	PROCESS CONNECTION	PRESSURE RANGE	CLASSIFICATION	POWER SUPPLY	OUTPUTS	COMMENTS
PI-5101	WGI / WIKA	4" DIAL 1/2" NPT	0-100 PSI	-	-	LOCAL DISPLAY	-
PIT-5101/5402/5502	ROSEMOUNT/ 2088G2S33A1M5B4C6P1Q4Q8 Q15	1/2" FNPT	-14.7 TO 150 PSI	CLASS 1, DIV. 1 NACE MR0175 / ISO 15156	24 VDC	LCD DISPLAY, DIGITAL SIGNAL BASED ON DIGITAL HART PROTOCOL 4-20mA dc	-
PI-5102/5402/5502	WGI / WIKA	4" DIAL 1/2" NPT	0-300 PSI	-	-	LOCAL DISPLAY	-
PIT-5102	ROSEMOUNT/ 2088G2S33A1M5B4C6P1Q4Q8 Q15	1/2" FNPT	-14.7 TO 800 PSI	CLASS 1, DIV. 1 NACE MR0175 / ISO 15156	24 VDC	LCD DISPLAY, DIGITAL SIGNAL BASED ON DIGITAL HART PROTOCOL 4-20mA dc	-
PDIT-5403/5503/5101	ROSEMOUNT/ 3051CD3A03A1AM5C6P1Q4Q8 Q15	1/2" FNPT	-1000 inH2O TO 1000 inH2O	CLASS 1, DIV. 1 NACE MR0175 / ISO 15156	24 VDC	LCD DISPLAY, DIGITAL SIGNAL BASED ON DIGITAL HART PROTOCOL 4-20mA dc	-
FE-5402/5502	SIMARK 7/8" X 2" BETWEEN FLANGE TURBINE METER	2" WAFER STYLE	-	NACE MR0175	-	-	-
FIT-5402/5502	SIMARK SMRT-PRO-BTA-M	-	-	CLASS 1, DIV. 1 IP68 NEMA 4X ENCLOSUTE	BATTERY POWERED, 9-30 VDC (2.2W MAX, 30VFC MAX)	LOCAL DISPLAY, x2 - PULSE OUTPUT, x1 - 4-20 mA OUTPUT	-
LSH-5101/5401/5501	MAGNETROL ECHOTEL MODEL 910-P1A0-001	3/4" NPT	-	CLASS 1, DIV. 1	DPDT 10A 120 VAC	-	-
LSH-5001	SOR-1550	2" MNPT	-	CLASS 1, DIV. 1	SPDT 3A 28 VDC	-	-
FLOW SIGHT GAUGE	KENCO KSF-F	2" CL150	-	-	-	SIGHT GLASS DISPLAY	-

PSV LIST								
TAG #	MAKE / MODEL	INLET	OUTLET	ORIFICE SIZE	SET PRESSURE	BACK PRESSURE	SIZED FOR	PIPING/VESSEL PROTECTED
PSV-5402/5502	FARRIS/27DA33-120/S7	1"-CL150 RF	1"-CL150 RF	0.125 SQ. IN.	130 PSIG	ATM.	BLOCKED FLOW	PCM PUMP

SPECIFICATION DEVIATION	
SPECIFICATION	DEVIATION NOTES
-	-
-	-
-	-

EXPORT															
NO.	VALVE CODE	VALVE TYPE	SIZE (IN.)	PORT	ANSI RATING	END CONN.	OPERATION	MATERIAL	STYLE	DRWG.	LINE NO.	QTY.	MANUF.	INTERNAL COATING	NOTE
1	VB-1	BALL	8	FULL	CL150	R.F.	GEAR	A350 LF2 BODY, A350 LF2 3 MIL ENP BALL, 4140 W/ 3 MIL ENP STEM, RPTFE SEAT, HNBR SEAL, MR0175/ISO 15156, CSA Z245.15, API 6D, API 607, API 608, AND B16.34, C/W SEAT AND STEM SEALANT INJECTION FITTINGS	TRUNNION BALL VALVE, DB&B	4132-01A	8"-ASW-WP-716	1	MERIDIAN	NONE	-
2	VB-2	BALL	3	FULL	CL150	R.F.	LEVER	A216 WCB BODY, A105N W/3 MIL ENP BALL & STEM RPTFE SEAT HNBR/GRAPHITE SEALS (MEETS THE INTENT OF NACE MR 0175/ISO 15156 CSA Z245.15, API 6D, API 607, API 608 AND B16.34)	SPLIT BODY FLOATING BALL	4132-01A/B	8"-ASW-WP-716/717, 3"-ASW-LH-352/354, 3"-AS-DP-622	6	MERIDIAN	NONE	-
3	VB-3	BALL	2	FULL	CL150	R.F.	LEVER	A216 WCB BODY, A105N W/3 MIL ENP BALL & STEM RPTFE SEAT HNBR/GRAPHITE SEALS (MEETS THE INTENT OF NACE MR 0175/ISO 15156 CSA Z245.15, API 6D, API 607, API 608 AND B16.34)	SPLIT BODY FLOATING BALL	4132-01A/B	2"-ASW-LH-353/355	4	MERIDIAN	NONE	-
4	VB-4	BALL	1	FULL	CL900/2000 WOG	SWxFNPT	LEVER	A216 WCB BODY, CF8M BALL, 316 STEM RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34) W/ LOCKING HANDLE	3-PIECE	4132-01A/B	8"-ASW-WP-717, 3"-ASW-LH-352/353/354/355,	14	JAGFLO	NONE	-
5	VB-5	BALL	6	FULL	CL150	R.F.	GEAR	A216 WCB BODY, A105N W/3 MIL ENP BALL & STEM RPTFE SEAT HNBR/GRAPHITE SEALS (MEETS THE INTENT OF NACE MR 0175/ISO 15156 CSA Z245.15, API 6D, API 607, API 608 AND B16.34)	SPLIT BODY FLOATING BALL	4132-01A	6"-ASW-WP-717	1	MERIDIAN	NONE	-
6	VB-6	BALL	3/4	FULL	CL900/2000 WOG	SWxFNPT	LEVER	A216 WCB BODY, CF8M BALL, 316 STEM, RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34)	3-PIECE	4132-01A/B	8"-ASW-WP-716, 3"-ASW-LH-352, 354	6	JAGFLO	NONE	-
7	VB-7	BALL	1	FULL	CL800/2000 WOG	FNPTxFNPT	LEVER	A216 WCB BODY, CF8M BALL, 316 STEM, RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34)	3-PIECE	4132-01A/B	1"-AS-DP-623	9	MERIDIAN	NONE	-
8	VB-8	BALL	3/4	REGULAR	CL800/2000 WOG	FNPTxFNPT	LEVER	A216 WCB BODY, CF8M BALL, 316 STEM, RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34)	3-PIECE	4132-01A/B	1"-AS-DP-623, 3"-AS-DP-622	3	MERIDIAN	NONE	-
9	VB-9	BALL	1/2	REGULAR	CL800/2000 WOG	FNPTxFNPT	LEVER	A216 WCB BODY, CF8M BALL, 316 STEM, RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34)	3-PIECE	4132-01A/B	2"-ASW-LH-353/355,	3	MERIDIAN	NONE	-
10	VB-10	BALL	3/4	REGULAR	CL800/2000 WOG	FNPTxFNPT	LEVER	LOW TEMP BODY, CF8M BALL, 316 STEM, RTFE SEAT, GRAPHITE PACKING (MEETS THE INTENT OF NACE MR0175-2002, B16.34)	3-PIECE	4132-01A/B	2"-AC-GF-113	4	MERIDIAN	NONE	-
11	VC-1	CHECK	1	FULL	CL800	FNPTxFNPT	-	A105N BODY BOLTED CAP, 13CR PISTORN, STELLITE 6 SEAT, 316/GRAPHITE SPIRAL WOUND GASKET, X-750 SPRING, B7M CAP BOLTING, API TRIM 8 TO NACE MR0175	PISTON	4132-01A/B	1"-AS-DP-623	9	OMB	NONE	-
12	VC-2	CHECK	6	FULL	CL150/CL300	R.F.	-	CS BODY, 316SS TRIM, INCONEL X-750 SPRING	SPRING ASSISTED WAFER	4132-01A	6"-ASW-WP-717	1	DURABLA	NONE	-
13	VC-3	CHECK	2	FULL	CL150/CL300	R.F.	-	CS BODY, 316SS TRIM, INCONEL X-750 SPRING	SPRING ASSISTED WAFER	4132-01B	2"-ASW-LH-353/355	2	DURABLA	NONE	-
13	VC-4	CHECK	3	FULL	CL150/CL300	R.F.	-	CS BODY, 316SS TRIM, INCONEL X-750 SPRING	SPRING ASSISTED WAFER	4132-01A	3"-AS-DP-622	1	DURABLA	NONE	-
14	VC-5	CHECK	3/4	REGULAR	CL800	FNPTxFNPT	-	A105N BODY BOLTED CAP, 13CR PISTORN, STELLITE 6 SEAT, 316/GRAPHITE SPIRAL WOUND GASKET, X-750 SPRING, B7M CAP BOLTING, API TRIM 8 TO NACE MR0175	PISTON	4132-01A	3"-AS-DP-621	1	OMB	NONE	-
15	VN-5	NEEDLE	3/4x1/2	-	6000#	MNPTxFNPT	HANDLE	316SS BODY/ TRIM	MULTI-PORT	4132-01A/B	8"-ASW-WP-716/717, 2"-ASW-LH-353/355	4	WN8536-1L	NONE	-

NOTES:

1. -

REVISION SYMBOL = 

REVISIONS:

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A	2014.09.25	IFA	SL	JK	-
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APPROVALS:

SIGNATURE	DATE

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**CanDyne**  
Pump Services Inc.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS

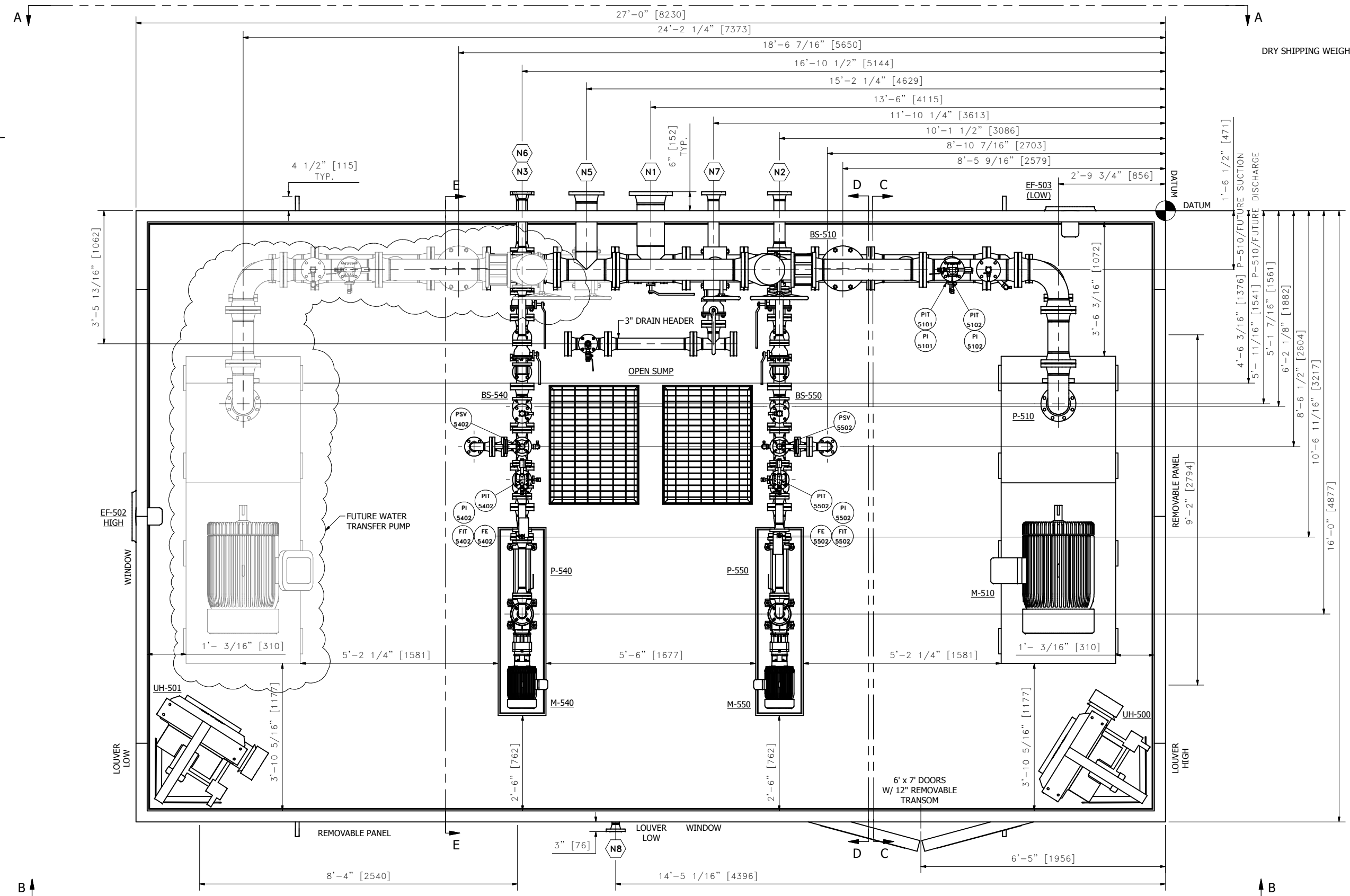
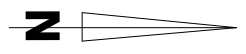
PACKAGE: PROJ.#4132-OIL BATTERY PUMP PKG.  
STEELMAN 07-08-004-05 W2M  
INSTRUMENT / PSV / VALVE LIST

DRAWN: SL DATE: 2014.09.24 DESIGN: RM SCALE: REV: C

DRAWING NUMBER: 4132-03

REVISION SYMBOL =

OVERALL SHIPPING DIMENSIONS:  
 LENGTH: 27'-0" (TBC)  
 WIDTH: 16'-0" (TBC)  
 HEIGHT: 12'-5 1/2" (TBC)  
 DRY SHIPPING WEIGHT: APPROX. 44,300 lbs (20,090 kgs)



TAG	DESCRIPTION	SIZE (O.D.)	RATING	FACING	ELEV./F.O.F.	COMMENTS
N1	SUCTION - P-510 / (FUTURE)	8"	CL150	RF	SEE DWG 4132-11	PRODUCED WATER FROM TANKS
N2	SUCTION - P-550	3"	CL150	RF	SEE DWG 4132-11	SKIM OIL FROM WATER TANKS
N3	SUCTION - P-540	3"	CL150	RF	SEE DWG 4132-11	WET OIL FROM RECYCLE HEADER
N4	SWEET FUEL GAS INLET	2"	CL150	RF	SEE DWG 4132-11	NOT SHOWN (TBD)
N5	DISCHARGE - P-510 / (FUTURE)	6"	CL150	RF	SEE DWG 4132-11	TO WATER INJECTION SITES
N6	DISCHARGE - P-540 / P-550	2"	CL150	RF	SEE DWG 4132-11	TO TREATER
N7	CLOSED DRAIN	3"	CL150	RF	SEE DWG 4132-11	TO SLOP TANK
N8	OPEN SUMP DRAIN OUTLET	2"	CL150	RF	SEE DWG 4132-21	-

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.26	IFA	JR	JK	-
B	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-
C	2014.10.20	IFA : CLIENT MARKUPS	JR	LF	-

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APPROVALS:

**ISSUED FOR APPROVAL**

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- APPROVED AS NOTED - PROCEED WITH CONSTRUCTION
- APPROVED AS NOTED - RESUBMIT DRAWINGS AND PROCEED WITH CONSTRUCTION
- REVISE AS NOTED - RESUBMIT DRAWINGS

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

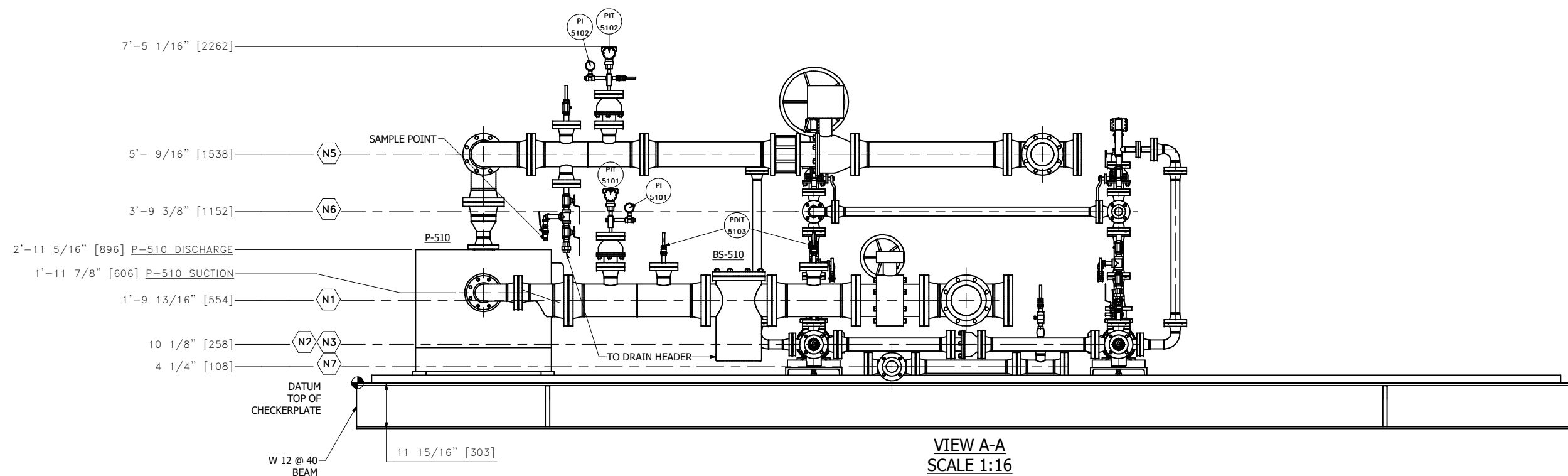
**CanDyne**  
PUMP SERVICES INC.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
 PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG.  
 STEELMAN 07-08-004-05 W2M  
 GENERAL ARRANGEMENT DRAWING

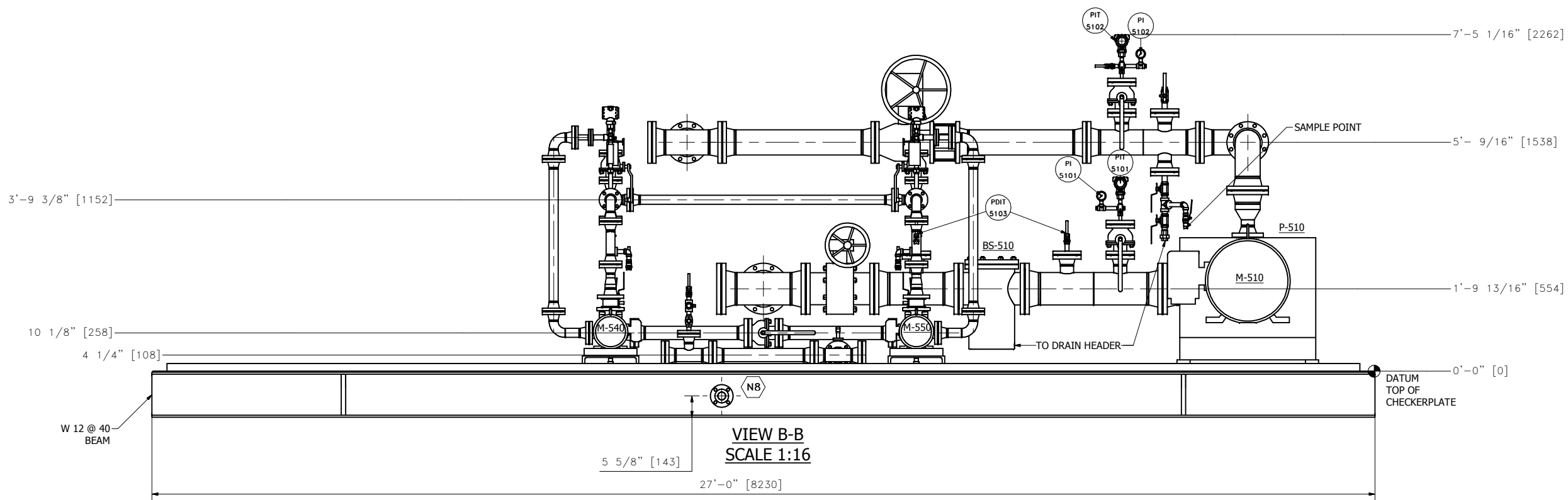
DRAWN: JR	DATE: 2014.09.26	DESIGN: RM	SCALE: 1:16	REV.: C
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DRAWING NUMBER: 4132-10

TAG #: TBD



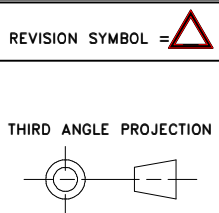
VIEW A-A  
SCALE 1:16



VIEW B-B  
SCALE 1:16

NOTES:

1. 2" CONTAINMENT LIP ON EACH SUBSKID C/W LEVEL SWITCH.



REVISIONS:					
REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.26	IFA	JR	JK	-
B	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-

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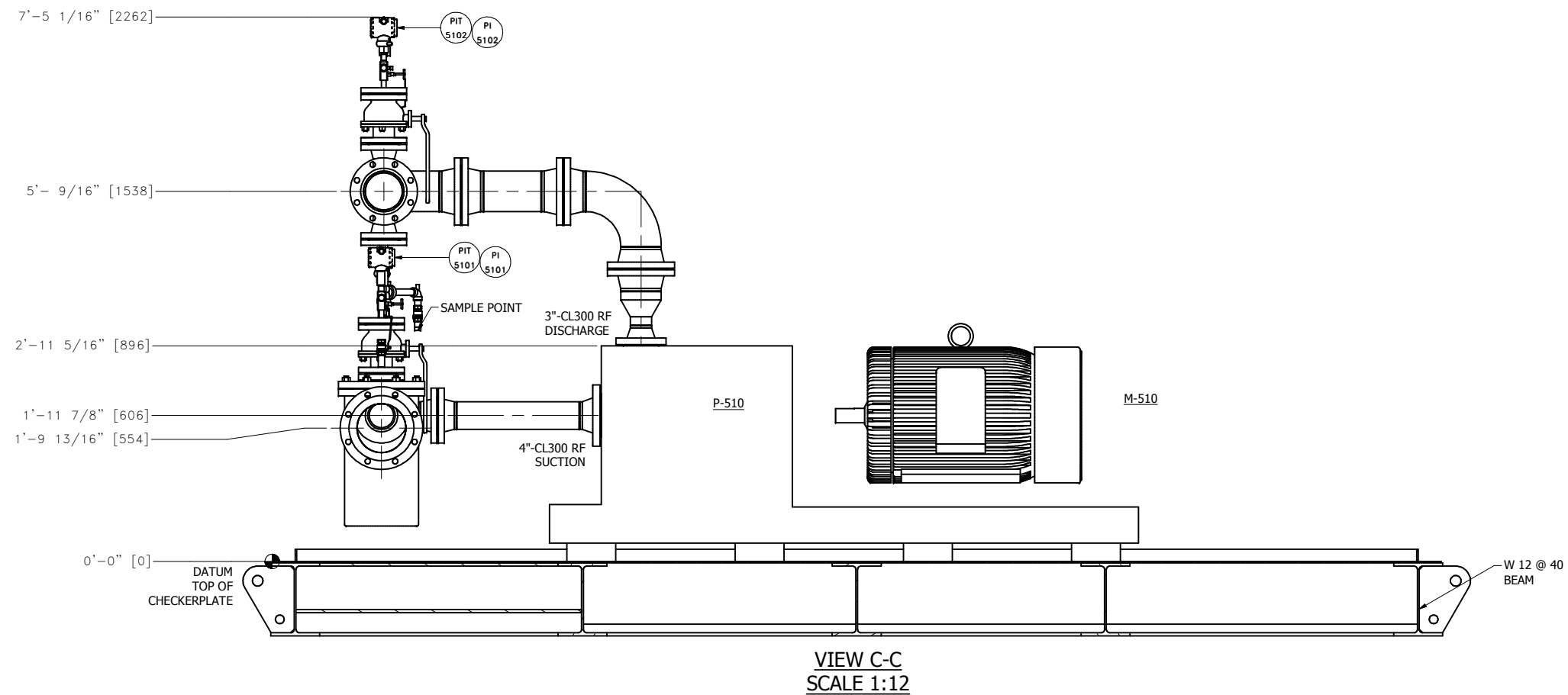
CONSTRUCTION WILL NOT PROCEED UNTIL APPROVAL AREA IS SIGNED, DATED, AND RETURNED. ANY CLIENT CHANGES MADE PAST THE REQUIRED APPROVAL DATE WILL BE SUBJECT TO ADDITIONAL COST AND DELAYS. REFER TO NOTES BELOW:

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SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

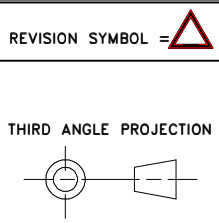


CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS				
PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M ELEVATION DRAWING A-A / B-B				
DRAWN: JR	DATE: 2014.09.26	DESIGN: RM	SCALE: 1:16	REV: B
DRAWING NUMBER: 4132-11				



**NOTES:**

1. 2" CONTAINMENT LIP ON EACH SUBSKID C/W LEVEL SWITCH.



REVISIONS:					
REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.26	IFA	RJ	JK	-
B	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-

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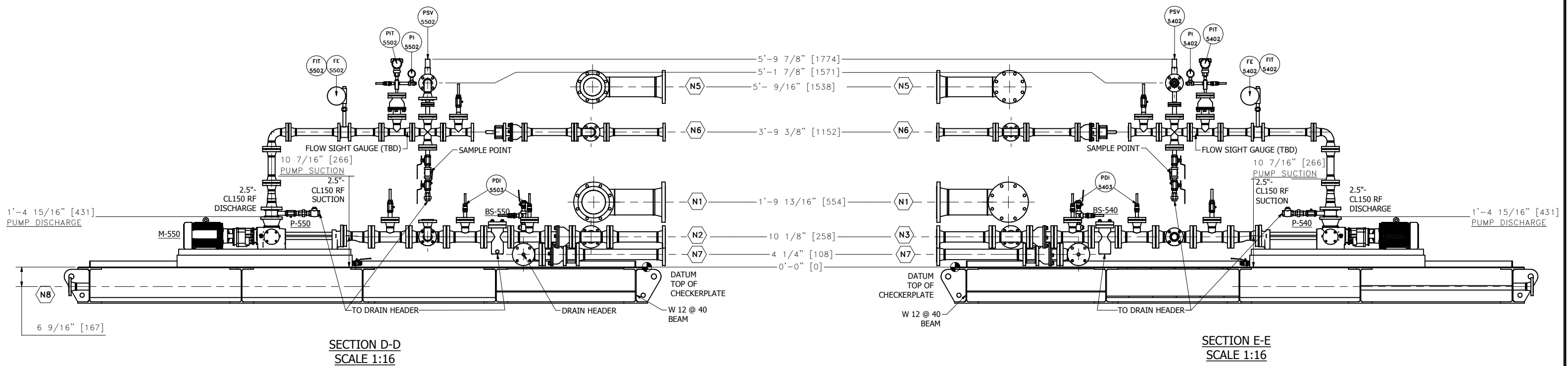
- APPROVED - PROCEED WITH CONSTRUCTION
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\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

**CanDyne**  
PUMP SERVICES INC.

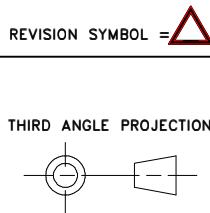
CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS				
PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG. STEEMAN 07-08-004-05 W2M ELEVATION DRAWING C-C				
DRAWN: JR	DATE: 2014.09.26	DESIGN: RM	SCALE: 1:12	REV: B
DRAWING NUMBER: 4132-12				



SECTION D-D  
SCALE 1:16

SECTION E-E  
SCALE 1:16

NOTES:



REVISIONS:					
REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.26	IFA	JR	RM	-
B	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-

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SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

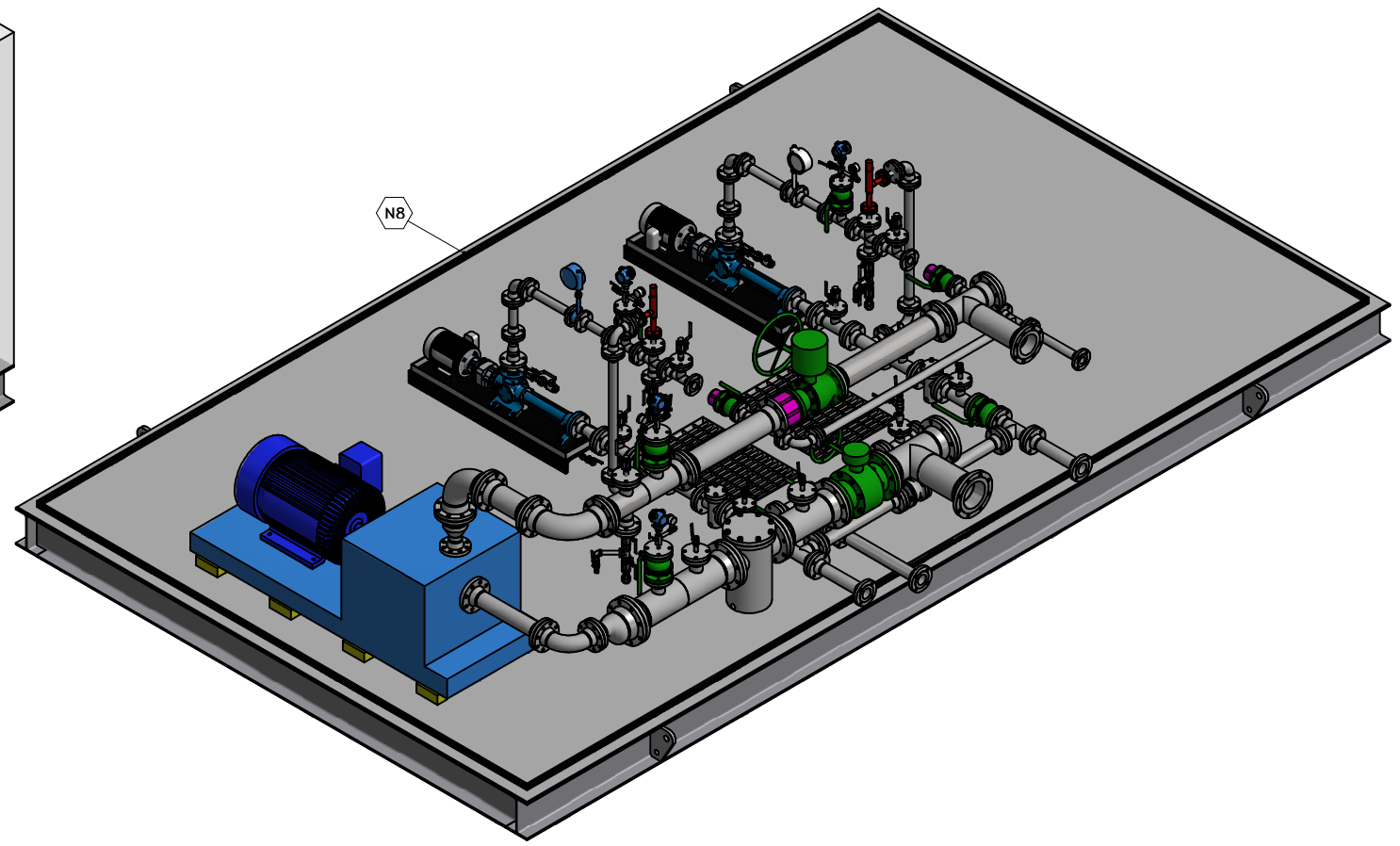
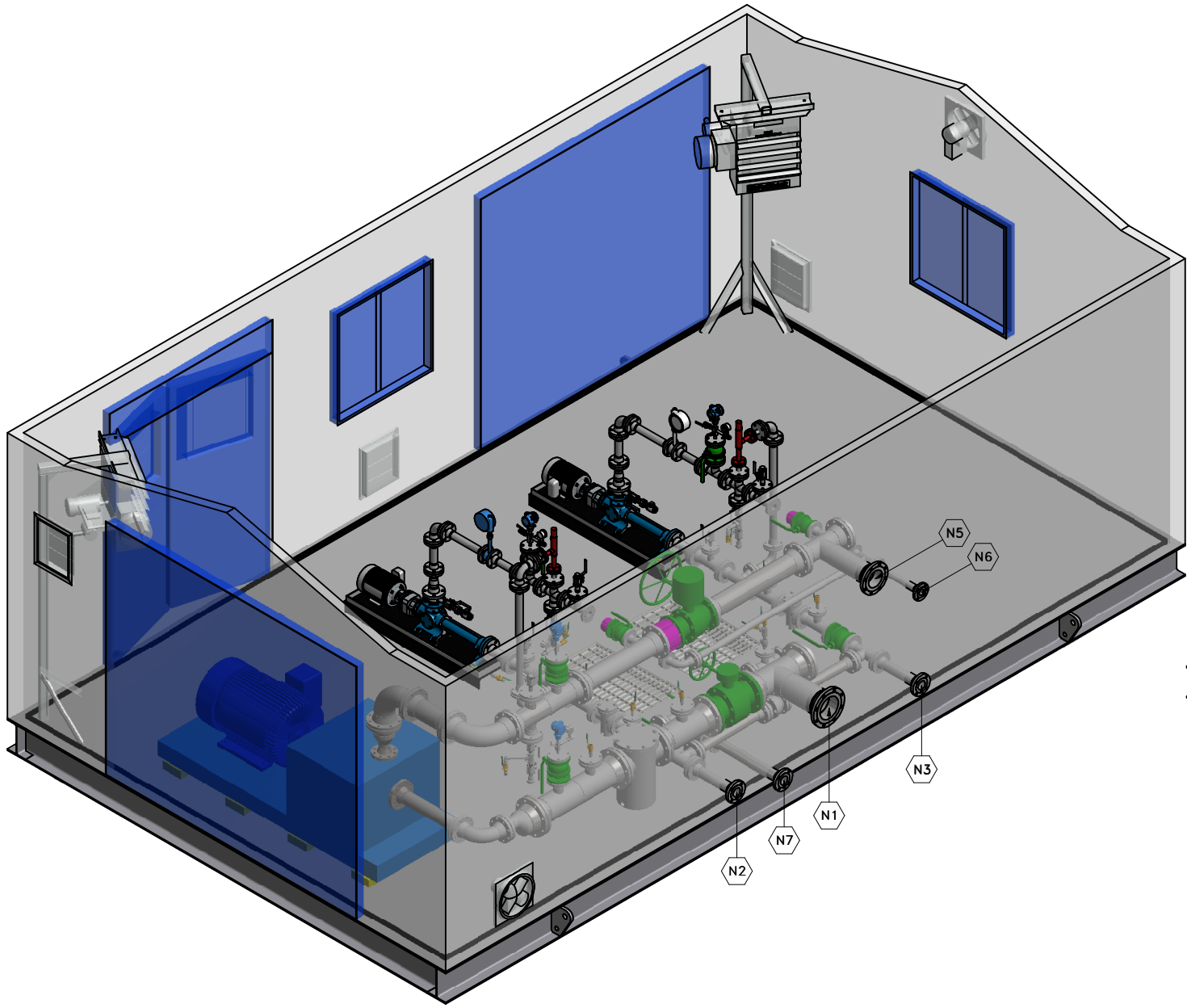
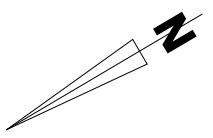


CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS

PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG.  
STEELMAN 07-08-004-05 W2M  
ELEVATION DRAWING D-D / E-E

DRAWN: JR	DATE: 2014.09.26	DESIGN: RM	SCALE: 1:16	REV: B
DRAWING NUMBER: 4132-13				





REVISIONS:					
REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-

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\_\_\_\_\_  
SIGNATURE

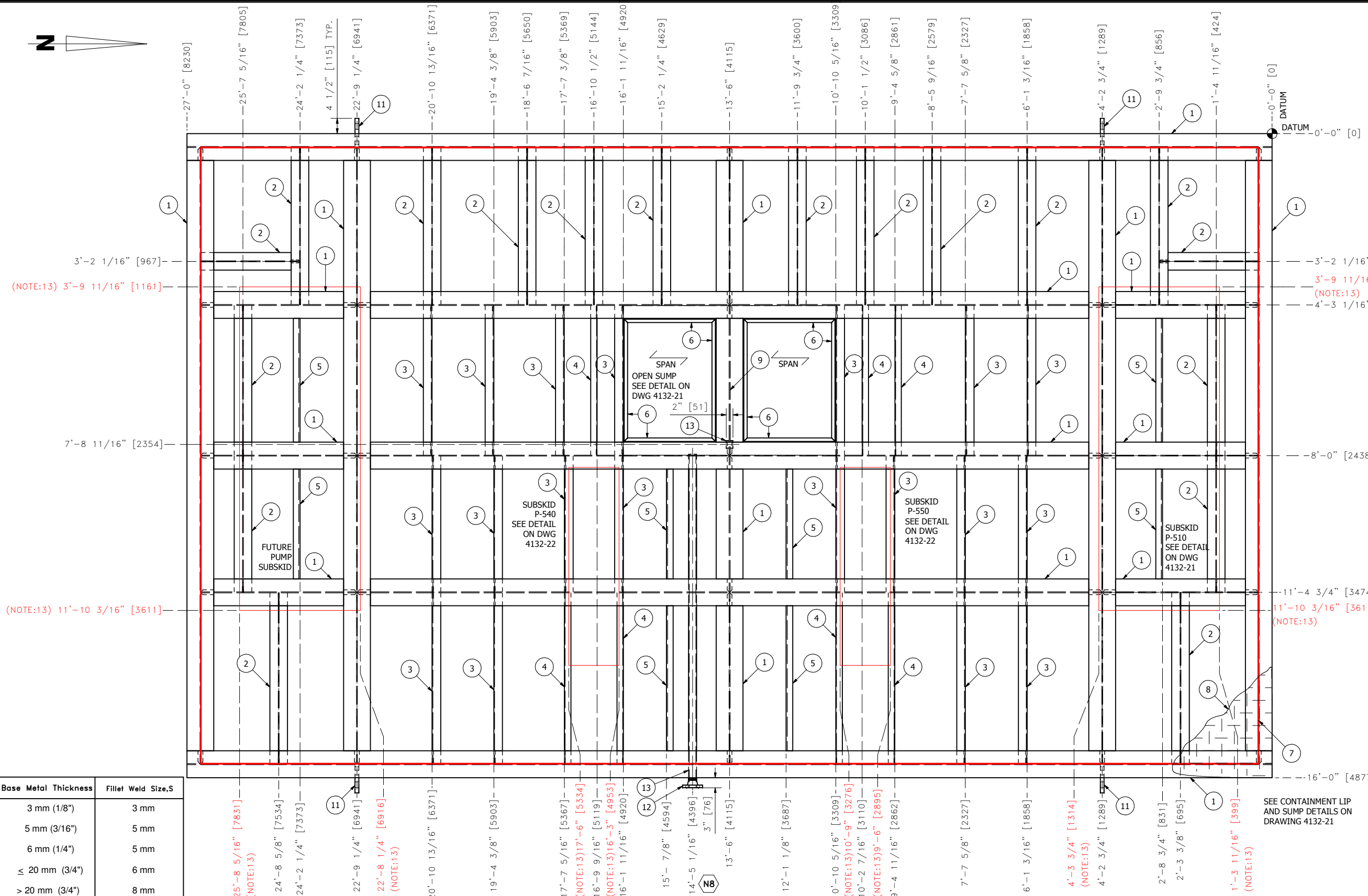
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DATE

**CanDyne**  
PUMP SERVICES INC.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG.  
STEELMAN 07-08-004-05 W2M  
GENERAL ARRANGEMENT DRAWING

DRAWN: JR	DATE: 2014.10.10	DESIGN: RM	SCALE: 1:24	REV.: A
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DRAWING NUMBER: 4132-14



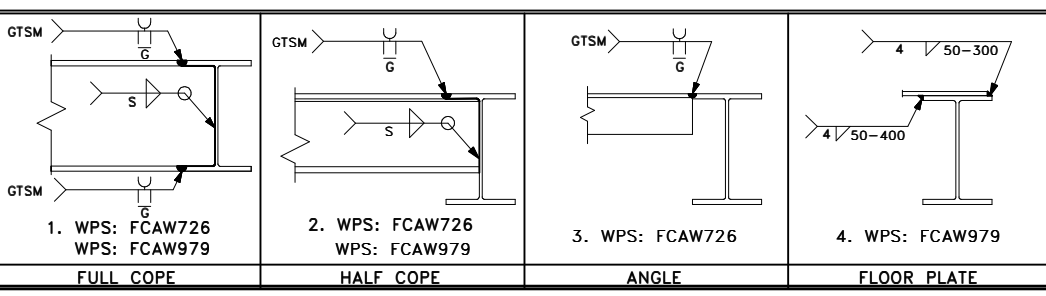
BILL OF MATERIALS	
ITEM	DESCRIPTION
1	W 12x40
2	W 8x18
3	C 10 x 15.3
4	C 6 x 8.2
5	L 2 x 2 x 3/8
6	L 1.25 x 1.25 x 1/4
7	2" x 1/4" FLAT BAR (CONTAINMENT LIP)
8	1/4" CHECKERPLATE
9	PLATE 1/4" THICK
10	1" x 3/16" SERRATED GRATING
11	LIFT_LUG_W12@40 (29mm) PLATE CSA G40.21 GRADE 300W
12	ASME B16.5 Flange RFWN - 2" CL150 A105N SCH40
13	ASME B36.10 Pipe - 2" A106B SCH40

- CONSTRUCTION NOTES:
- PERFORM OPEN SUMP LEAK TEST
  - 100% MPI ON LIFTING LUGS

- NOTES:
- STRUCTURAL STEEL MATERIAL SHALL CONFORM TO CSA G40.20 & G40.21-M (LATEST EDITION):
    - HOLLOW STRUCTURAL SECTIONS: 350 W
    - WIDE FLANGE SECTIONS: 350 W
    - PLATE & ROLLED SECTIONS: 300 W
    - ALL OTHER SECTIONS: 300 W
  - ALL STRUCTURAL STEEL FABRICATION & ASSEMBLY SHALL BE PERFORMED IN ACCORDANCE WITH CAN/CSA-S16-09 "DESIGN OF STEEL STRUCTURES", UNLESS STATED OTHERWISE.
  - ALL SHOP CONNECTIONS SHALL BE FULLY WELDED, UNLESS NOTED OR DETAILED OTHERWISE, WITH A 1/4" (6mm) CONTINUOUS FILLET WELD.
  - NDE REQUIREMENTS ARE AS PER PURCHASE ORDER.
  - ALL WELDED ASSEMBLIES ARE TO MEET THE ACCEPTANCE CRITERIA OF CSA W59.
  - ALL KERF AND DROSS TO BE REMOVED FOR ALL GROOVE WELD ASSEMBLIES.
  - ALL STRUCTURAL STEEL SURFACES TO BE CLEANED IN ACCORDANCE WITH SSPC SPECIFICATION SP-6 "COMMERCIAL BLAST CLEANING".
  - FLOOR PLATE AND OUTSIDE VERTICAL FACE OF STRUCTURAL STEEL SHALL BE PRIMED WITH GREY PRIMER TO A DFT. OF 4-6mils AND TOP COATED WITH BLACK ENAMEL TO A DFT. OF 2-3mils, UNLESS CLIENT'S SPECIFICATIONS STATE OTHERWISE.
  - ALL PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S SPECIFICATIONS.
  - THE UNDERSIDE OF THE SKID SHALL BE INSULATED WITH SPRAY-ON URETHANE, 76mm THICK, WITH FIRE RETARDANT CONFORMING TO ASTM E84.
  - LIFTING LUGS ARE FOR VERTICAL LIFTING ONLY, UNLESS STATED OTHERWISE.
  - SKID IS DESIGNED FOR TRANSPORT WITH BUILDING, PIPING, AND EQUIPMENT INSTALLED.
  - SUBSKID LIMIT DIMENSIONS.

Base Metal Thickness	Fillet Weld Size, S
3 mm (1/8")	3 mm
5 mm (3/16")	5 mm
6 mm (1/4")	5 mm
≤ 20 mm (3/4")	6 mm
> 20 mm (3/4")	8 mm

STRUCTURAL DETAILS:



REVISION SYMBOL =

TOLERANCE : 1/8" (3mm)

WEIGHT : N/A

REVISIONS:

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.09.26	IFA	JR	JK	-
B	2014.10.10	IFA : CLIENT MARKUPS	JR	LF	-

APPROVALS:

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SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

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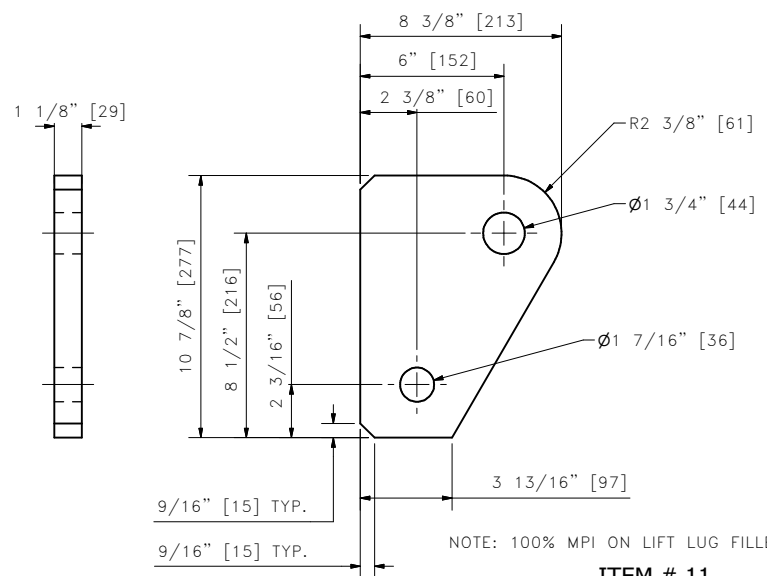
CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS

PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M STRUCTURAL DRAWING

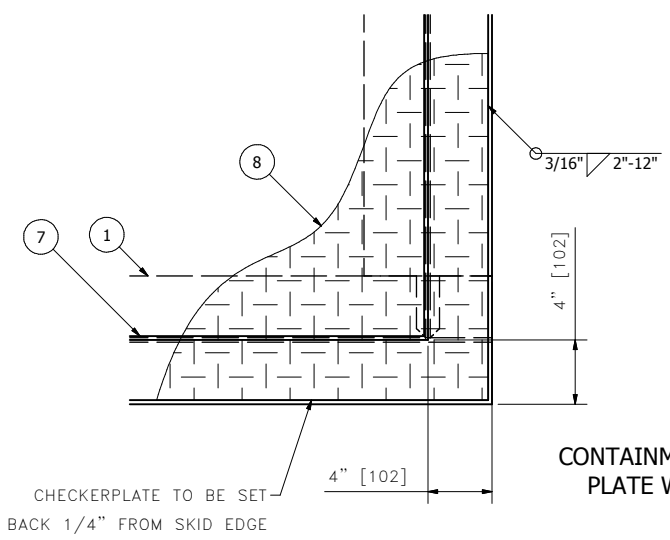
DRAWN: JR	DATE: 2014.09.26	DESIGN: JR	SCALE: 1:16	REV.: B
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DRAWING NUMBER: 4132-20

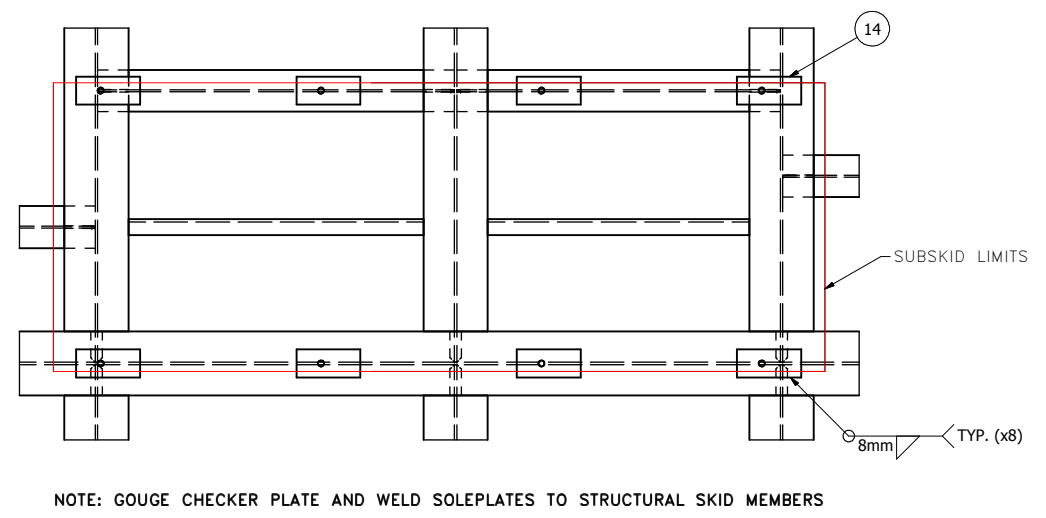
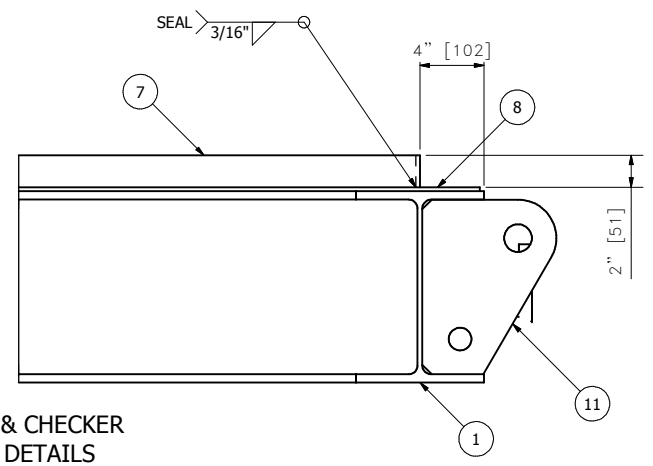
BILL OF MATERIALS	
ITEM	DESCRIPTION
1	W 12x40
2	W 8x18
3	C 10 x 15.3
4	C 6 x 8.2
5	L 2 x 2 x 3/8
6	L 1.25 x 1.25 x 1/4
7	2" x 1/4" FLAT BAR (CONTAINMENT LIP)
8	1/4" CHECKERPLATE
9	PLATE 1/4" THICK
10	1" x 3/16" SERRATED GRATING
11	LIFT LUG W12@40 (29mm) PLATE CSA G40.21 GRADE 300W
12	ASME B16.5 Flange RFWN - 2" CL150 A105N SCH40
13	ASME B36.10 Pipe - 2" A106B SCH40
14	SOLE PLATE 3" THICK



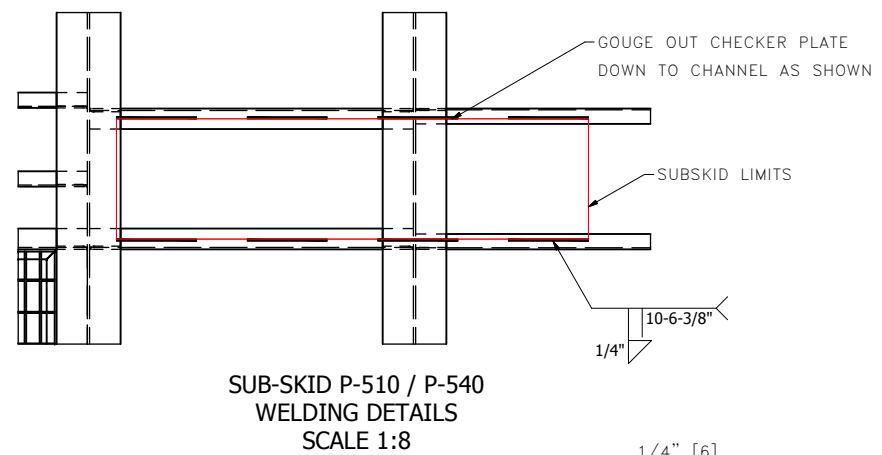
NOTE: 100% MPI ON LIFT LUG FILLET WELDS  
**ITEM # 11**  
**LIFTING LUG DETAILS**  
**SCALE 1:4**



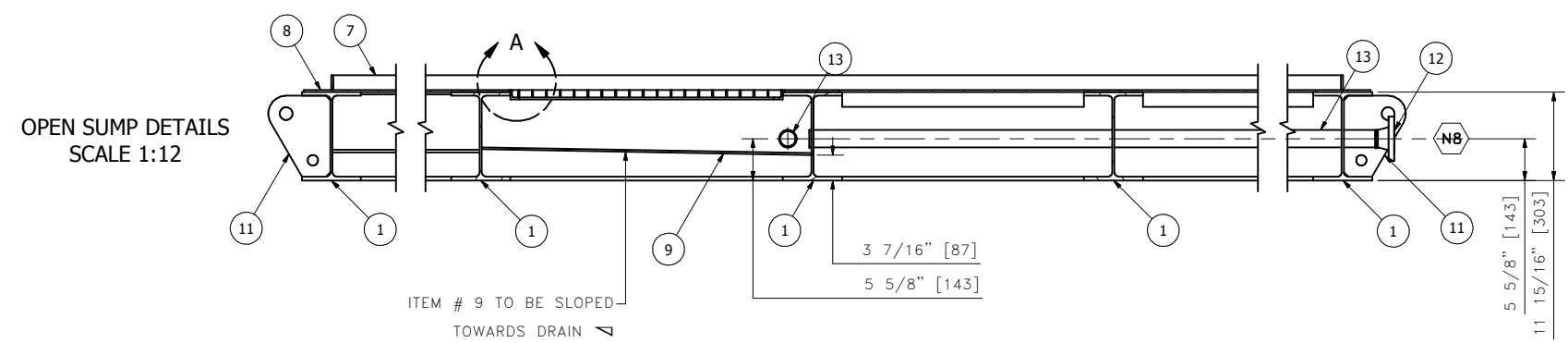
**CONTAINMENT LIP & CHECKER PLATE WELDING DETAILS**  
**SCALE 1:6**



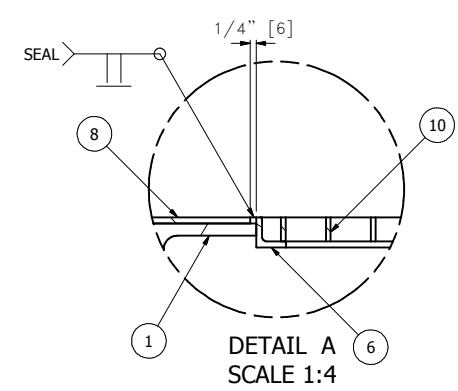
**ITEM # 14**  
**SOLEPLATE DETAILS**  
**QTY: 8**  
**SCALE 1:4**



**SUB-SKID P-510 / P-540 WELDING DETAILS**  
**SCALE 1:8**



**OPEN SUMP DETAILS**  
**SCALE 1:12**



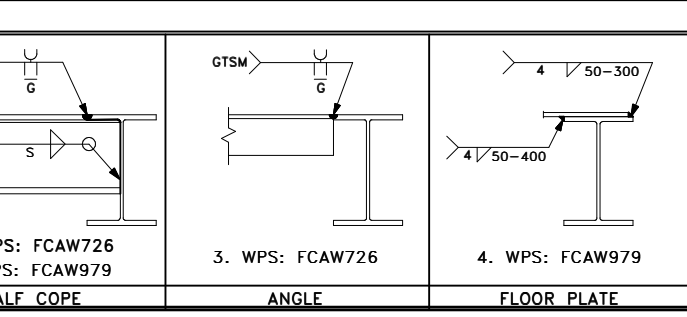
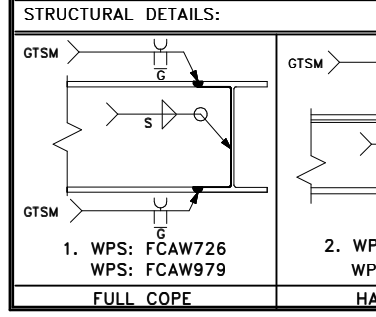
**DETAIL A**  
**SCALE 1:4**

Base Metal Thickness	Fillet Weld Size,S
3 mm (1/8")	3 mm
5 mm (3/16")	5 mm
6 mm (1/4")	5 mm
≤ 20 mm (3/4")	6 mm
> 20 mm (3/4")	8 mm

CONSTRUCTION NOTES:  
 1. PERFORM OPEN SUMP LEAK TEST

**NOTES:**

- STRUCTURAL STEEL MATERIAL SHALL CONFORM TO CSA G40.20 & G40.21-M (LATEST EDITION):
  - HOLLOW STRUCTURAL SECTIONS: 350 W
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**CanDyne**  
**PUMP SERVICES INC.**

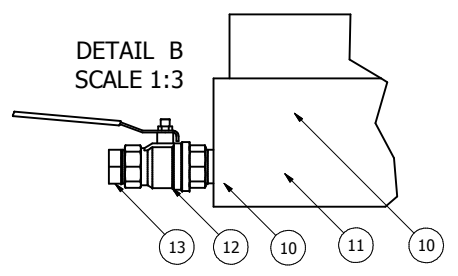
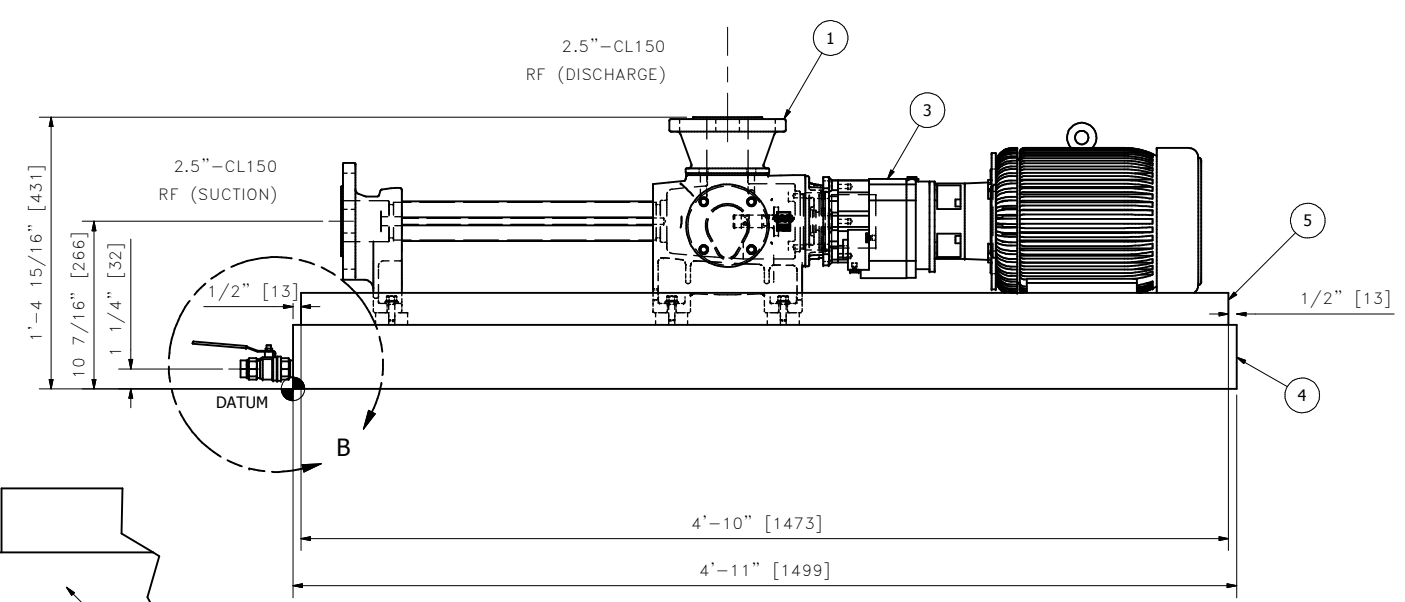
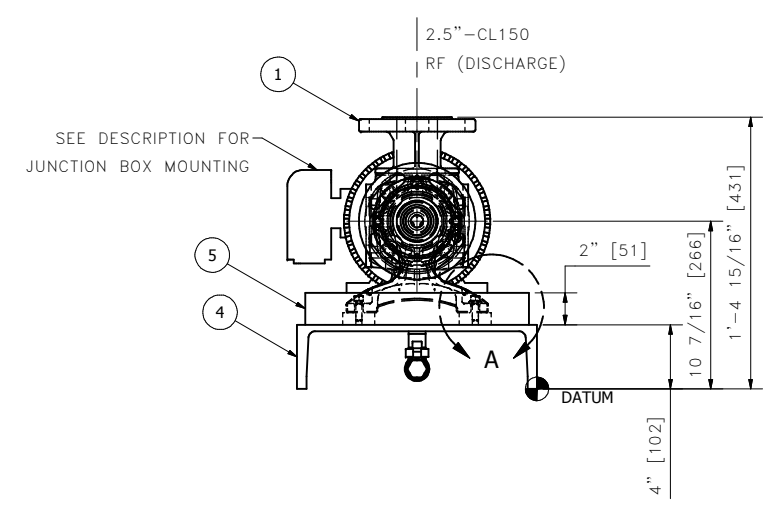
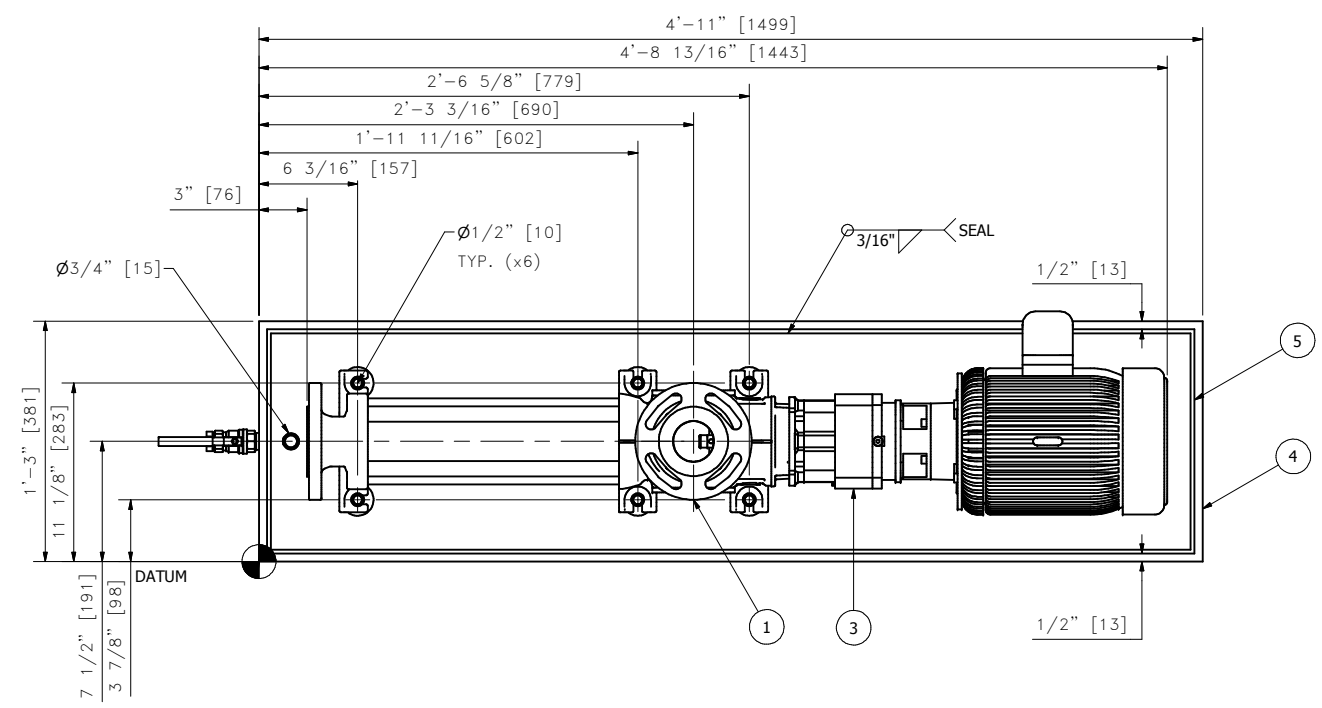
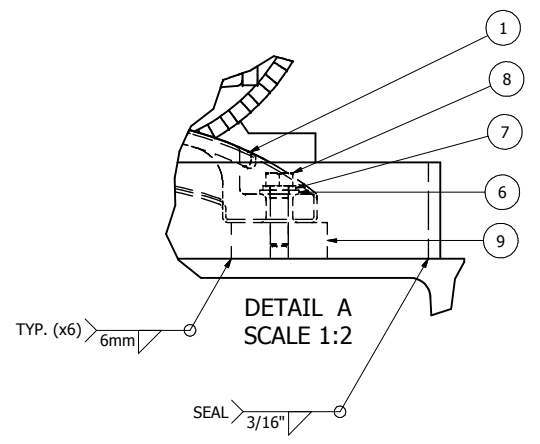
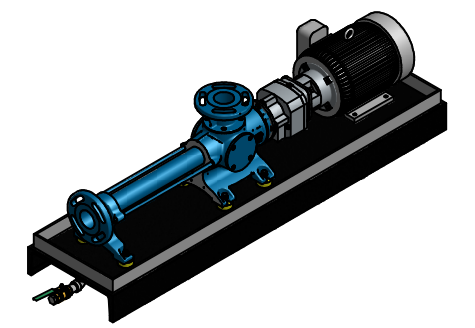
CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
 PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M  
 STRUCTURAL DRAWING

DRAWN: JR	DATE: 2014.09.26	DESIGN: JR	SCALE: NTS	REV.: B
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DRAWING NUMBER: 4132-21

REVISION SYMBOL =

BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1	1	PCM_MONOBLOC_13M125
2	1	SK372.1 GEARBOX, RATIO 1:2.62
3	1	SHP TECO ELECTRIC MOTOR IEEE-841 184TC 1800RPM 460/3/60 TEFC M-540 : F1 MOUNTING M-550 : F2 MOUNTING
4	1	BASEPLATE - FORMED CHANNEL
5	140.000 in	2" x 1/4" FLAT BAR (CONTAINMENT LIP)
6	6	3/8" REGULAR FLAT WASHER
7	6	3/8" SPLIT/LOCK WASHER
8	6	3/8" x 1-1/4" HEAVY HEX BOLT - GRADE 8
9	6	SOLE PLATE - 3/4" THICK
10	2	Nipple - 3/4" x 2" Sch 160 A106B
11	1	Elbow - 3/4" 3000# A105N
12	1	Ball Valve - 3/4" A216 WCB
13	1	Hex Head Plug - 3/4" 3000# A105N

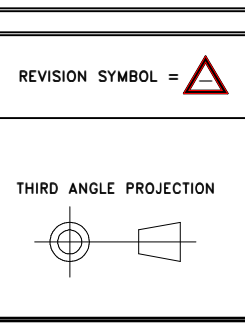
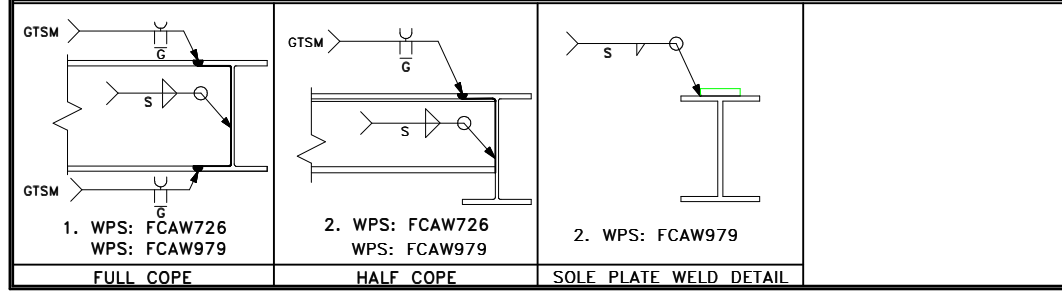


Base Metal Thickness	Fillet Weld Size,S
3 mm (1/8")	3 mm
5 mm (3/16")	5 mm
6 mm (1/4")	5 mm
≤ 20 mm (3/4")	6 mm
> 20 mm (3/4")	8 mm

**NOTES:**

- STRUCTURAL STEEL MATERIAL SHALL CONFORM TO CSA G40.20 & G40.21-M (LATEST EDITION):
  - HOLLOW STRUCTURAL SECTIONS: 350 W
  - WIDE FLANGE SECTIONS: 350 W
  - PLATE & ROLLED SECTIONS: 300 W
  - ALL OTHER SECTIONS: 300 W
- ALL STRUCTURAL STEEL FABRICATION & ASSEMBLY SHALL BE PERFORMED IN ACCORDANCE WITH CAN/CSA-S16-09 "DESIGN OF STEEL STRUCTURES", UNLESS STATED OTHERWISE.
- ALL SHOP CONNECTIONS SHALL BE FULLY WELDED, UNLESS NOTED OR DETAILED OTHERWISE, WITH A 1/4" (6mm) CONTINUOUS FILLET WELD.
- NDE REQUIREMENTS ARE AS PER PURCHASE ORDER.
- ALL WELDED ASSEMBLIES ARE TO MEET THE ACCEPTANCE CRITERIA OF CSA W59.
- ALL KERF AND DROSS TO BE REMOVED FOR ALL GROOVE WELD ASSEMBLIES.
- ALL STRUCTURAL STEEL SURFACES TO BE CLEANED IN ACCORDANCE WITH SSPC SPECIFICATION SP-6 "COMMERCIAL BLAST CLEANING". PRIMED WITH GREY PRIMER TO A DFT. OF 4-6mils AND TOP COATED WITH BLACK ENAMEL TO A DFT. OF 2-3mils, UNLESS CLIENT'S SPECIFICATIONS STATE OTHERWISE.
- ALL PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S SPECIFICATIONS.
- LIFTING LUGS ARE FOR VERTICAL LIFTING ONLY, UNLESS STATED OTHERWISE.

**STRUCTURAL DETAILS:**



REVISIONS:					
REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.10.10	IFA	JR	LF	-

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**APPROVALS:**

**ISSUED FOR APPROVAL**

CONSTRUCTION WILL NOT PROCEED UNTIL APPROVAL AREA IS SIGNED, DATED, AND RETURNED. ANY CLIENT CHANGES MADE PAST THE REQUIRED APPROVAL DATE WILL BE SUBJECT TO ADDITIONAL COST AND DELAYS. REFER TO NOTES

BELOW:

- APPROVED - PROCEED WITH CONSTRUCTION
- APPROVED AS NOTED - PROCEED WITH CONSTRUCTION
- APPROVED AS NOTED - RESUBMIT DRAWINGS AND PROCEED WITH CONSTRUCTION
- REVISE AS NOTED - RESUBMIT DRAWINGS

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

**CanDyne**  
PUMP SERVICES INC.

CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS  
PACKAGE: PROJECT #4132 - OIL BATTERY PUMP PKG.  
STEELMAN 07-08-004-05 W2M  
SUB SKID DRAWING P-510

DRAWN: JR	DATE: 2014.10.10	DESIGN: JR	SCALE: 1:6	REV.: A
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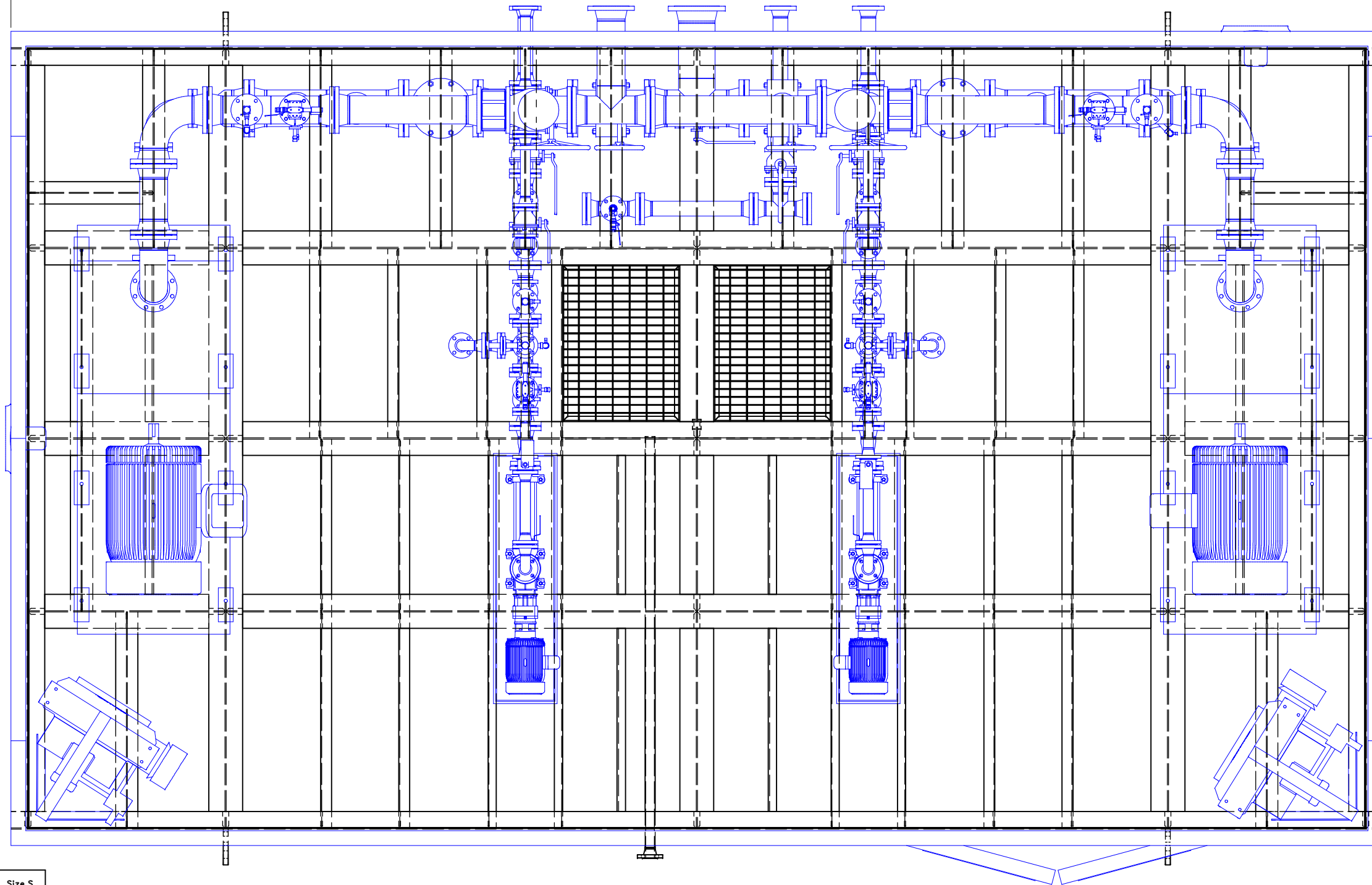
DRAWING NUMBER: 4132-22





27'-0" [8230]

16'-0" [4877]

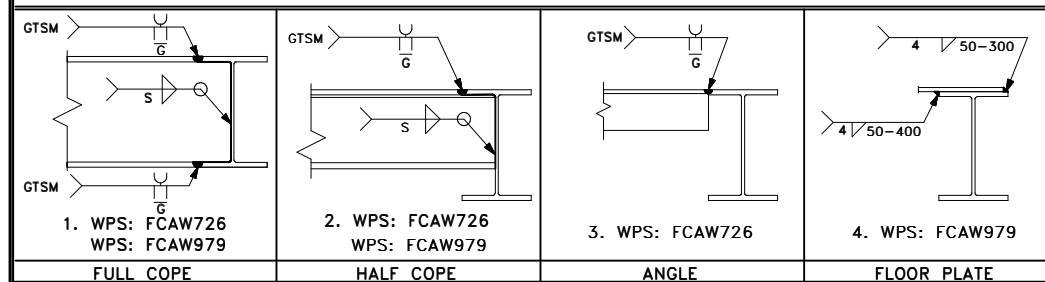


**NOTES:**

1. STRUCTURAL STEEL MATERIAL SHALL CONFORM TO CSA G40.20 & G40.21-M (LATEST EDITION):
  - HOLLOW STRUCTURAL SECTIONS: 350 W
  - WIDE FLANGE SECTIONS: 350 W
  - PLATE & ROLLED SECTIONS: 300 W
  - ALL OTHER SECTIONS: 300 W
2. ALL STRUCTURAL STEEL FABRICATION & ASSEMBLY SHALL BE PERFORMED IN ACCORDANCE WITH CAN/CSA-S16-09 "DESIGN OF STEEL STRUCTURES", UNLESS STATED OTHERWISE.
3. ALL SHOP CONNECTIONS SHALL BE FULLY WELDED, UNLESS NOTED OR DETAILED OTHERWISE, WITH A 1/4" (6mm) CONTINUOUS FILLET WELD.
4. NDE REQUIREMENTS ARE AS PER PURCHASE ORDER.
5. ALL WELDED ASSEMBLIES ARE TO MEET THE ACCEPTANCE CRITERIA OF CSA W59.
6. ALL KERF AND DROSS TO BE REMOVED FOR ALL GROOVE WELD ASSEMBLIES.
7. ALL STRUCTURAL STEEL SURFACES TO BE CLEANED IN ACCORDANCE WITH SSPC SPECIFICATION SP-6 "COMMERCIAL BLAST CLEANING".
8. FLOOR PLATE AND OUTSIDE VERTICAL FACE OF STRUCTURAL STEEL SHALL BE PRIMED WITH GREY PRIMER TO A DFT. OF 4-6mils AND TOP COATED WITH BLACK ENAMEL TO A DFT. OF 2-3mils, UNLESS CLIENT'S SPECIFICATIONS STATE OTHERWISE.
9. ALL PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINT MANUFACTURER'S SPECIFICATIONS.
10. THE UNDERSIDE OF THE SKID SHALL BE INSULATED WITH SPRAY-ON URETHANE, 76mm THICK, WITH FIRE RETARDANT CONFORMING TO ASTM E84.
11. LIFTING LUGS ARE FOR VERTICAL LIFTING ONLY, UNLESS STATED OTHERWISE.
12. SKID IS DESIGNED FOR TRANSPORT WITH BUILDING, PIPING, AND EQUIPMENT INSTALLED.
13. SUBSKID LIMIT DIMENSIONS.

Base Metal Thickness	Fillet Weld Size, S
3 mm (1/8")	3 mm
5 mm (3/16")	5 mm
6 mm (1/4")	5 mm
≤ 20 mm (3/4")	6 mm
> 20 mm (3/4")	8 mm

**STRUCTURAL DETAILS:**



REVISION SYMBOL =

TOLERANCE : 1/8" (3mm)

WEIGHT : N/A

**REVISIONS:**

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	2014.10.10	IFA	JR	LF	-

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**APPROVALS:**

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- APPROVED AS NOTED - PROCEED WITH CONSTRUCTION
- APPROVED AS NOTED - RESUBMIT DRAWINGS AND PROCEED WITH CONSTRUCTION
- REVISE AS NOTED - RESUBMIT DRAWINGS

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_



CLIENT: CNRL LTD. c/o WESTRIVER PROJECTS				
PACKAGE: PROJECT#4132 - OIL BATTERY PUMP PKG. STEELMAN 07-08-004-05 W2M OVERLAY DRAWING				
DRAWN: JR	DATE: 2014.10.10	DESIGN: RM	SCALE: 1:16	REV.: A
DRAWING NUMBER: 4132-23				